# Globalization, Competition and Growth in China

**Edited by**
**Jian Chen and Shujie Yao**

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# Globalization, Competition and Growth in China

This book explores the current state of globalization, competition and growth in China, presenting much new work and new thinking on a wide range of important issues.

China has produced an economic miracle since the late 1970s in its transition from a planned to a market economy. This remarkable economic performance was brought about by an open-door policy and gradual integration with the world economy, culminating in China's admission into the World Trade Organisation in 2001.

Studies included in this book focus on issues such as foreign direct investment, international trade, reforms in the financial sector, the development of rural township and village enterprises, the investment strategies of multinational corporations, and economic growth.

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# Preface

China has produced an economic miracle since the late 1970s featuring with economic reforms and the transition from a centrally planned to a market economy. The remarkable economic performance was brought about with its open-door policy and gradual integration with the world economy. The momentum of fast economic growth and the process of globalization continued to accelerate during the first five years of the 21st century, culminating at the point when China was admitted into the World Trade Organization (WTO) in December 2001.

Before China's accession to the WTO, there was intensive debate as to whether the Chinese economy would be positively or negatively affected. Experiences over the last four years have provided strong and unambiguous evidences that WTO membership has been largely beneficial to the continuing success of the Chinese economy. It is not only a cornerstone, but also an imperative stimulus for China to maintain its position as the fastest growing economy in the world. Despite the SARS scare in 2003 and the slowdown of the global economy over the last few years, China's gross domestic product (GDP) maintained an average annual rate of over 9 per cent after its WTO accession. The highest growth was achieved in 2004 at 9.5 per cent with a total GDP of 13.7 trillion yuan, or more than 10 500 yuan ($1 270) per capita. The total trade volume was $1.15 trillion, more than doubling the level achieved in 2001, making China the third largest trading nation in the world after the U.S. and Germany. China's foreign exchange reserves were $610 billion in 2004, a rise of $207 billion from the previous year. Moreover, China continues to be the world's largest recipient of foreign capital, with total inflows of $60.6 billion in 2004. Fast economic growth and globalization have led to a continuous improvement of people's incomes and living standards. Per capita incomes more than quadrupled, with urban per capita income reaching a new level of 9422 yuan and rural per capita income 2936 yuan in 2004, rising respectively by 7.7 per cent and 6.8 per cent.

There is no doubt that China's economic success has been built upon its active participation in the globalization process, its ability to gradually increase its competitiveness through the restructuring and reform of the domestic economy. China's development experiences have been studied intensively in the literature as such experiences are valuable for other similar developing countries, such as India, Pakistan and Vietnam. For many African countries, they have not been able to imitate China's growth strategy but they should be able to do so in the future.

This volume includes a selection of papers presented to the 14th and 15th Chinese Economic Association, CEA (UK), annual conferences in 2002 and 2003. They cover a wide range of issues concerning how China has participated in the globalization process to increase its competitiveness and sustain high economic growth, especially after its WTO accession. There are 17 papers to be included in this volume, which have been selected from more than 60 papers submitted to the editors for consideration for publication. We used a two-tier scrutiny process, involving an initial selection by the editors and a double-blind refereeing procedure. Thirty papers were selected in the initial selection process. Each of the 30 papers was then reviewed by two independent reviewers. After receiving referees' reports, the editors decided to include 17 papers for the volume. Most papers were requested to be improved at least once, and some two to three times until the editors were satisfied. Finally, but definitely not least, some of the chapters were kindly proofread by Dr Richard Sanders, who provided invaluable assistance to ensure the overall quality of this book.

The book is divided into three parts. The first part deals with financial sector reforms. After more than a quarter of a century of economic reform and transformation of the real economic sectors, the financial sector has become the most important obstacle to China's transition from a centrally planned to a real market economy, dogged by the mounting levels of triangular debts and bad loans. The second part covers topics in FDI and globalization, two most important aspects of China's successful experiences of economic development. Part three covers some traditional and yet important topics of economic development and policy, as the sustainability of China's future growth will greatly depend on its ability to improve its development strategies, especially its industrial policies.

CEA (UK) was established in 1988 by overseas Chinese students and scholars living in the UK. It has now become the leading academic organization in the UK for research into the Chinese economy. It has a membership of over 300 established scholars and research students throughout the world. It holds a large conference every year in the UK and recently also in China. Apart from the annual conferences, it also holds an ESRC funded seminar series which attracts a large number of participants from many different countries. This volume is part of its efforts to disseminate research results of its members both within the UK and elsewhere throughout the world. It is the third edited volume of conference papers. It does not attempt to be comprehensive in its coverage; nor does it aim to provide a coherent perspective on the transition process. Instead, it presents a selection of papers representing important theoretical and empirical contributions to our understanding of China's reform experience, the policies adopted and their impacts. The board of directors and the editors of this volume encourage research students and scholars to contribute to our academic activities and publications in books and our in-house journal, the *Journal of Chinese Economic and Business Studies* published by Taylor & Francis (Routledge).

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# Abbreviations

| | |
|---|---|
| ABC | Agricultural Bank of China |
| ADB | Asian Development Bank |
| AMC | Asset Management Company |
| APEC | Asia-Pacific Economic Cooperation |
| ASEAN | Association of SouthEast Asian Nations |
| BOC | the Bank of China |
| CAP | Common Agricultural Policy |
| CASS | Chinese Academy of Social Sciences |
| CBRC | China Banking Regulatory Commission |
| CCB | China Construction Bank |
| CCPCC | Chinese Communist Party Central Committee |
| CEO | Chief Executive Officer |
| CSRC | China Securities Regulatory Commission |
| DFID | Department for International Development |
| EPS | Earnings per share |
| EU | European Union |
| FDI | Foreign direct investments |
| FIE | Foreign invested enterprise |
| GDP | Gross domestic product |
| GM | General Motors |
| GNI | Gross national income |
| GNP | Gross national product |
| HSBC | Hong Kong and Shanghai Banking Corporation |
| ICBC | Industrial and Commercial Bank of China |
| IPO | Initial public offering |
| MOA | Ministry of Agriculture |
| MOF | Ministry of Finance |
| MNC | Multi-national corporations |
| NBS | National Bureau of Statistics |
| NIE | Newly industrialized economy |
| NPL | Non-performing loans |
| OECD | Organization for Economic Cooperation and Development |
| OLS | Ordinary least square |

| | |
|---|---|
| PBC | People's Bank of China |
| PBOC | People's Bank of China |
| PPP | Purchasing power parity |
| RMB | Renminbi |
| ROA | Return on assets |
| ROE | Return on equity |
| SARS | Severe acute respiratory syndrome |
| SME | Small and medium enterprises |
| SOCB | State-owned commercial banks |
| SOE | State-owned enterprise |
| TNC | Transnational corporation |
| TVE | Township and village enterprises |
| WTO | World Trade Organization |

# Introduction

*Jian Chen and Shujie Yao*

Since economic reforms started in 1978, China has sustained a prolonged period of high economic growth and prosperity that has been rarely observed in world development history. This is not because there are only a few countries that have managed to achieve the same pace and length of economic growth, but because China is the most populous nation in the world. The Chinese population is larger than that of all the newly industrialized nations combined, including Japan and the four Asian little dragons of South Korea, Taiwan, Singapore and Hong Kong. China is the only socialist economy among all the newly industrialized economies, and its success provides a good example of how a centrally planned economy can be transformed into a dynamic and fast-growing market one, providing useful experiences to other centrally planned economies in the former USSR and other eastern European countries.

But what are the key factors for China's success? This book suggests that globalization and international competition are important to sustainable economic growth. Pre-reform China was characterized by self-reliance, closed-door and collectivization. Post-reform China has been featured with export-push, open-door, free market and diverse ownership. Market liberalization and ownership reforms were important elements for the success in the earlier years of economic reforms up to the early 1990s. Further expansion of the Chinese economy and its sustained economic growth from the mid-1990s has increasingly depended on China's active participation in the globalization process and its ability to increase its competitiveness in the world market.

The globalization process includes three key elements, that is, inflows of foreign direct investments (FDI), export-push, and reform of the foreign exchange market. Prior to 1992, FDI inflow was negligible. After Deng Xiaoping made his south tour in 1992, FDI rose dramatically, and by 1996, China became the largest recipient of foreign capital among the developing countries, and the second largest recipient in the world after the US. By 2004, the total amount of inflows reached a record level of $60.6 billion, making China the most popular destination of direct foreign investments.

FDI and exports go hand-in-hand as China has been highly successful in using FDI and foreign investment firms to stimulate its exports. In 1978, China ranked 23rd in world trade, with a mere volume of $20 billion. By 2004, China became the world's 3rd largest trading partner after the US and Germany, with a trade volume

of $1.16 trillion, of which more than 50 per cent was accounted for by foreign invested firms. Before economic reforms, there was an acute shortage of all kinds of manufacturing goods in China. Today, China is the world's largest producer of steel, TV sets, cement, coal, cloth, computers, grain, fish, meat and many other key industrial and agricultural products. Ten years ago, China was a minor producer of vehicles. Today, China is the fourth largest producer of cars and trucks. As car ownership has increased at the two digit level in recent years, China will soon become one of the most important manufacturing and consumer markets for cars, overtaking the UK, France, Italy and even Japan in the next decade.

The emergence of China has posed challenges to many economies in the world. However, the rapid growth in China has also provided huge business and investment opportunities to all countries, industrialized or developing, small or large. Globalization has helped China to be integrated with the rest of the world through technological transfers and the spill-over of modern business practices, organization and management. China's growth has also accelerated the process of globalization. Most western economic powers are concerned about China as it may become a serious threat to the security and prosperity of the industrialized world after the Cold War. However, after 27 years of development, China has not posed a threat. Instead, it has become a huge market for the majority of the world's largest multinational corporations. Today, many western companies depend on the Chinese market for their development and growth, including some of the largest companies in the world.

Although China is the world's largest recipient of foreign capital, it has started to make significant investments abroad. In 2004, investment outflows from China were $3.62 billion, rising by 27 per cent over the previous year, with an accumulative total of $37 billion (*People's Daily*, 9 February 2004, p. 1). One recent example was the acquisition of IBM's PC business by China's largest computer company Lenovo (formerly Legend) at a value of $1.75 billion in December 2004, making Lenovo the world's third largest PC maker, behind Dell and HP. Another example is the recent proposed acquisition of MG Rover by Shanghai Automotive Industry Corporation. Although these deals are small by international standards, they signify the emerging importance of China in world business. As Chinese businesses become bigger, stronger and more aggressive in global marketing, China will be able to shake the world through the development of its own large multinational corporations.

China's participation in the globalization process culminated in December 2001 when it was admitted into the World Trade Organization (WTO). Becoming a formal member of WTO gives China great advantages to sell goods and services to the world's biggest markets, the US, EU and Japan, without being subject to an annual renewal of its most favoured nation (MFN) status. On the other hand, China was given a time scale to completely open its door to foreign investors, including some special markets, such as the financial service sector, automobiles and agriculture, which were heavily protected. For instance, by the end of 2006, foreign banks and other financial service institutions will be able to do all kinds of business that are currently confined to domestic firms. Producers of automobiles will not be able to

enjoy the monopolistic profits as they did before. The drastic price cuts for all passenger cars in the second half of 2004 were the latest push to converge domestic prices in line with international prices, benefiting consumers and posing tremendous challenges to domestic producers to improve efficiency and productivity.

Before China joined the WTO, most academic researchers and government officials were concerned with the least competitive sectors of the economy, including the above-mentioned financial, automobile and agricultural sectors. Four years after the accession, empirical evidence shows that the damaging effects have been minimal, but positive effects apparent. From 2001 to 2004, China's GDP grew over 9 per cent per year despite the SARS scare in 2003 and the challenging environment of the global economy. The total value of imports and exports rose more than 30 per cent per year.

China's ranking position in international trade moved up one place every year from 6th place to become the world's 3rd largest trading nation in 2004. On the domestic front, banking reforms have been accelerated with significant help from central government. There is still no evidence of massive down-sizing or closure of domestic banks, motor producers, or the complete collapse of any agricultural commodity. On the contrary, the government has been able to assist rural and agricultural development, as signified by the first Party Documents issued in 2004 and 2005 to promote agriculture, especially grain production, and to raise farm incomes.

Although China has made many important achievements, particularly after the WTO accession, it does not mean that China will have no major problems, constraints and dangers in its future development. The problems of unbalanced regional development, rising income inequality, the persistence of severe poverty in both the countryside and the urban sector and environmental pollution have not been resolved. Some of these problems have been exaggerated as a result of fast economic growth. Without solving or at least mitigating these problems, it is not certain that China can continue to grow as fast as it did in the past. There is no guarantee that China will become an economic superpower comparable with the US, EU and Japan in future decades. The way ahead will be long and could be very thorny indeed.

As academic researchers, what we can do is to understand the current situation, to summarize what has been achieved, to draw lessons that can be learned, and to suggest the direction that China can follow for its next step of economic development. Whatever we do, our preliminary conclusions are that China has come a long way but roughly in the right direction. It should continue in this direction but things can be done much better with a clear vision and better development strategy.

The name of this volume is 'globalization, competition and economic growth'. This title in part summarizes the past experiences that China has achieved in its fast growth through participating in the globalization process and gradually raising its competitiveness in the world market. It is hoped that China will do the same in the future to sustain its fast growth in order to become an economic superpower as Japan had done in the last century.

CEA (UK) organizes its annual conference in London each year. This volume selected 17 papers that were presented to the 14th and 15th annual conferences.

The papers have been selected from more than 60 papers submitted to the editors for consideration of publication. We used a two-tier scrutiny process, involving an initial selection by the editors and a double-blind refereeing procedure. Thirty papers were selected in the initial selection process. Each of the 30 papers was then reviewed by two independent reviewers. After receiving referees' reports, the editors decided to include 17 papers for the volume.

The papers are divided into three parts. Part I deals with financial sector reforms. After more than a quarter of a century of economic reform and transformation of the real economic sectors, the financial sector has become the most important obstacle to China's transition from a centrally planned to a real market economy, dogged by the mounting levels of triangular debts and bad loans. Part II covers topics in FDI and globalization, two most important aspects of China's successful experiences of economic development. Part III covers some traditional and yet important topics of economic development and policy, as the sustainability of China's future growth will greatly depend on its ability to improve its development strategies, especially its industrial policies.

## Part I Financial sector reform

This part consists of six chapters. In Chapter 1, Ke, Chen and Isaac discuss the reform of corporate governance in the real estate stock companies, focusing on how board structure can affect firm performance. They find a positive relationship between board size and corporate performance, which is inconsistent with the conclusions drawn by some other studies. This is due to some special characteristics of the listed companies in China. One of the main characteristics is that ownership of Chinese companies is highly concentrated, as the vast majority of shares are owned by the state or a family. About 61 per cent of shares of the listed companies are owned by the state or legal person and are not transferable in the stock market. This share ownership structure makes it difficult for any company to be taken over by another company, leading to complacency of management to perform well. Another major characteristic is that boards are dominated by insiders and board size tends to be small because there are few outside directors sitting in the board. Firms which are willing to involve more outside directors will have a bigger board size, which is an important factor for better firm performance.

In Chapter 2, Nazmi examines how financial sector reforms affect economic growth in China. Starting with a review of the financial system in its present state and how it has evolved from the centrally planned system into a mixed structure with state-owned commercial banks and other forms of financial institutions. This chapter identifies the key problems of and constraints on the financial sector to be developed into a market-styled, competitive and efficient system. The biggest problem in China's banking sector is the huge amount of non-performing loans (NPLs). China uses asset management companies (AMC) to solve the NPL problem with the injection of massive amounts of state capital, but it is argued that the AMC solution is still subject to many uncertainties and operational problems. The chapter

highlights the risks that are associated with credit deficiency and distortion in the financial sector. It is anticipated that China's accession to WTO will accelerate the process of reform and should lead to efficiency gains in the long term. Regarding policies, it is recommended that further reforms should be focused on the issues of interest rate and foreign exchange rate, and liberalization in these two areas will bring about great dividends for the national economy.

In Chapter 3, Yao, Jiang, Feng and Willenbockel study the efficiency of the Chinese banks and the implications of WTO accession on future reforms of the banking sector. They argue that despite significant reforms and changes in the past decades, Chinese banks are highly inefficient as they are burdened with huge NPLs. Accession to WTO will force these banks to compete directly with foreign banks. A stochastic production function is estimated to identify the key factors that may affect the efficiency of banks. They define both the output and profit functions and find that the average efficiency level is about 63 per cent, meaning that there is significant scope for domestic banks, particularly the state-owned commercial banks, to improve their efficiency. They conclude that non-state ownership and hard budget constraint tend to improve bank efficiency, pointing out a direction for future reforms.

In Chapter 4, Kostov, Wu and McErlean study how information affects the stock markets. This chapter extends and globalizes the concept of shared common information arrival. The key hypothesis is that information drives daily price volatility and trading volume changes in different financial markets in the world. It implies that returns in one stock market should affect the returns in another. Such an effect becomes stronger if two stock markets are closer to each other geographically. This chapter tests this hypothesis using the FGARCH approach with data collected from the stock markets in Shenzhen, Shanghai and Hong Kong.

Li and Cui study the impact of capital structure on agency costs in Chinese listed firms in Chapter 5. Most of China's listed companies have been transformed from large state-owned enterprises and hence inherited many structure problems that were typical of such enterprises. The key problem of corporate governance is the ambiguous definition of the controlling power of state shares, leading to false placement of state property, insider control, serious impingement on the interests of small shareholders, irrational managerial decisions and poor monitoring and incentives.

In Chapter 6, Xue, Zhang and Li examine the evolution of dividend pattern of the Chinese listed companies. Before 2000, most firms preferred to pay dividends in the form of issuing more shares. Since 2000, more and more firms have opted to pay cash dividends. This latter development makes the dividend policy of Chinese firms resemble that of western companies. Such a shift in dividend pattern is partially influenced by government regulatory policy. It is interesting to note that dividend payments are quite low and decreased over the sample period from 1999 to 2003. The mean dividend decreased from 0.155 yuan to 0.136 yuan. More than half of the firms paid cash dividend at or below 0.1 yuan per share in 2003.

## Part II FDI and globalization

There are five chapters in this part. In Chapter 7, Woo studies the economic impact of China's emergence as a major trading nation. The key part of this chapter is the Asia-Pacific G-Cubed Model which is established to simulate how China's accession to WTO can affect the economies in two major groups of nations: the ASEAN-4 (Indonesia, Thailand, Malaysia and the Philippines), and the Developed Economies (North America, Japan, Singapore, Hong Kong, Taiwan, South Korea, and Western Europe). The main hypothesis is that WTO membership can greatly enhance China's economic security because it prevents the US from impulsive unilateral action of switching off one of China's most important growth engines (export) by simply terminating its most-favoured nation (MFN) trading status and raising tariffs on its exports. Analytically, the removal of the MFN threat when China officially becomes a WTO member is equivalent to a reduction in the risk premium demanded by investors in China's export-oriented industries. In other words, China's accession to WTO is not only beneficial for its exports, but also for attracting FDI.

But how does China's integration with the world economy affect the economies of its trading partners? The simulation results of a general equilibrium model show that the effects on different economies are not the same. For the ASEAN-4, the full integration of China's huge labour force in the international division of labour could cause them to face the possibility of deindustrialization. However, this dismal outcome is by no means inevitable, depending on whether they are able to find lucrative niches in the lengthened production chains in manufacturing activities. It suggests that the ASEAN-4 must give the highest priority in deepening and widening their pools of human capital by speeding up the diffusion of new knowledge to their scientists and managers, and providing appropriate retraining programmes for the displaced workers. For the developed economies, the integration of China yields net positive benefits from the more refined global division of labour. The reason why empirical results do not show much impact from China's emergence on the export and GDP levels of the developed economies is because they were already in the stage of their product cycles where they were beginning to relocate their labour-intensive industries abroad. The emergence of low-wage China simply meant that more of these industries would be shifted to China instead of to the ASEAN-4. Woo argues that the common challenge to the governments of the developed economies from the rise of China as a major manufacturer is how to upgrade the workers who had lost jobs in their manufacturing sectors. This is no different from the structural adjustment that is needed to accommodate improvements in technological innovations. One should not oppose free trade to save non-competitive industries, just as one should not oppose technological progress to save obsolete industries.

In Chapter 8, Zheng, Gianluigi and Siler analyse the impact of FDI on economic growth in the Chinese regions. Over the data period 1978–99, China's GDP rose 9.58 per cent per year. From 1984 to 1999, total inflows of FDI increased by 26 per cent per year. The authors suggest that China's fast economic growth must

be associated with increasing inflows of FDI. Reviewing the existing literature, FDI is considered to affect a host country's economic growth in a number of ways: changing the factor endowment and raising the stock of real capital, bringing advanced technological and managerial know-how embodied in new capital equipment and personnel, and transforming economic structure toward export-oriented industries. However, it is also pointed out that FDI can have negative effects on the host country as rivalry between foreign and domestic firms might lead to the demise of domestic firms. FDI might create an enclave economy and contribute to rising inequality. Using a panel data set comprising regional data for the period 1985–99, the authors construct an economic model to examine how GDP growth is determined by the growth of labour, domestic investments, FDI, human capital and exports. The results suggest that FDI and labour have a strong and positive impact on GDP growth in all the geo-economic regions (east, central and west). The impact of domestic investments and exports is not as strong and significant as FDI and human capital. There exists a clear difference of economic growth between the regions. It is suggested that more FDI should be attracted to the western provinces with government support to improve the local infrastructure.

Fu studies the effects of exports and FDI on regional disparities in Chapter 9. Fu is concerned with the pronounced disparities in income and economic opportunities between the coastal and inland regions in China and tries to find an explanation to see if exports and FDI may have led to the rising disparities. In the literature, most studies suggest that exports and FDI can lead to better economic performance, but few have a clear answer as to whether they can also lead to an improvement in income distribution. The key issue is that exports and FDI may be concentrated in some parts of the country, e.g. the eastern region of China, resulting in labour migration from the poor to the rich regions. As a result, exports and FDI may lead to more income inequalities in three different ways, depending on the type and nature of exports and FDI. First, exports and FDI may function as an engine of growth for some regions but not for others. Second, exports and FDI are highly concentrated in the form of processing trade and have little linkage to the poor regions. Third, labour migration helps reduce the growth constraints on the fast-growing regions but hampers the development of the poor regions. To prove whether exports, FDI and migration have contributed to rising inequality, Fu constructs two econometric models. One model is to test whether GDP growth is affected by exports, labour and capital, and for the inland region, also by a spill-over effect variable. It is found that exports have a strong and positive effect on GDP growth in the coastal region, but such an effect cannot be found in the inland region. In addition, there is no evidence of spill-over from the growth in the coastal region to the inland region. The other model is to examine how the income gap between the coastal and inland regions is determined by emigration, the gap in FDI and the level of urbanization. The results show that emigration and the gap in FDI enhance regional income inequality, but the level of urbanization reduces the income gap. The main conclusion in this chapter is that exports and FDI have contributed to China's growing income inequalities

and suggest that government should help the inland areas to promote exports and attract FDI in order to remove the factors that have contributed to income disparities.

Zhao in Chapter 10 uses a case study approach to examine the different competitive strategies of multinational automobile enterprises in China from the US, Europe and Japan. Starting from a low level 10 years ago, China emerged to become the fourth largest producer and consumer of motor vehicles in 2003, with a total production of 4.4 million units and a total consumption of 4.5 million units. It is predicted that by 2008, China may double its present output and consumption to overtake Japan and become the world's second largest market for motor vehicles. China's automobile market is dominated by foreign players. Almost all of the world's top manufacturers have invested in China. As a result, there has been intense competition among the foreign automakers in a process to succeed in this growing and large market. Hence, the competitive strategy of foreign multinational corporations (MNCs) is an important issue of study. This chapter focuses on the strategies that have been adopted by the automobile MNCs of the US, Europe and Japan. Zhao shows that GM (the US), Volkswagen (Germany) and Toyota (Japan) are the three most successful players in China's automobile market. The key elements of competitive strategy include horizontal and vertical differentiation and response to local demand. GM is considered to be most successful in its competitive position due to its strength both in horizontal (brands), vertical differentiation (product range) and its quick response to local needs. Volkswagen was the earliest automaker to enter China and had maintained a market share of more than 50 per cent up to 2003. Its success was due to its strong vertical differentiation and pioneering (risk-taking) behaviour. Its dominant position has been critically challenged by the latecomers; especially the aggressive GM. Volkswagen's weakening position is due to its lack of horizontal differentiation and its inability to react quickly to the rapidly changing market situation in China. Toyota possesses the least competitive position in China among the three, because of its late arrival and its limit on developing a differentiation strategy in China. However, Toyota has an ambition to become the world's largest automaker by 2010 and it is making good progress to penetrate into the Chinese market.

In Chapter 11, Gao, Guo and Zhang study the impacts on Chinese accounting reforms caused by joint venture accounting. The authors argue that the introduction of new accounting standards to the joint ventures was a necessary step to attract foreign investments. Traditionally, the accounting system in Chinese firms was based on the Soviet accounting model which was under the control of uniform accounting regulations emphasizing on how state funds were used and how production quotas were fulfilled. The first major reform on Chinese accounting was the passing of the Accounting Law enacted by the National People's Congress in 1985. This law was later improved in 1993 and 2000. The New Accounting System, applicable to joint ventures and other foreign invested firms has been deliberately developed in line with international accounting practices and financial reporting standards.

## Part III Economic development and policy

This part consists of six chapters. In Chapter 12, Sun and Ma examine the impact of monetary variables on the price level during the inflation and deflation periods in China. They use the Granger causality test to examine how money supply affected prices in the 1990s and early 2000s. During the data period, the Chinese economy experienced both a historical double-digit inflation in the mid-90s and unprecedented deflation in the late 1990s and early 2000s. The central bank, the People's Bank of China (PBC), had to adopt an active monetary policy to reduce inflation in the early 1990s and then adopted an expansionary policy to contain deflation from the late 1990s. To investigate whether the monetary policies adopted by PBC were effective, Sun and Ma applied the Granger causality test based on vector auto-regressive (VAR) models to see whether money supply had caused price to change. Their main conclusion is that monetary variables were ineffective in the period of deflation, consistent with the recent development of the neo-Keynesian macroeconomic model which predicts that monetary expansion is less effective in an environment of deflation. The policy implication is that money supply should not be considered as an effective instrument to stabilize price during a deflation period and government should adopt an alternative measure such as an active fiscal policy.

Huang, Otsuka and Rozelle discuss how the Chinese rural economy can evolve into a modern industrial state in Chapter 13. The successful experiences of Japan and other East Asian industrialized economies, including South Korea and Taiwan in the 20th century were that the rural sector was heavily protected and helped by the state. In the industrialization and urbanization process, people who were left behind in the rural areas were provided an environment to gradually raise their income and eliminate poverty. China is now experiencing a rapid process of industrialization and urbanization, but rural China is facing a quite different environment. Apart from a large number of people that need to be transferred out of the rural and agricultural sector, the key challenge is whether China can also create an environment for those left behind in the villages to prosper and transform the rural areas into a modern society with high incomes and no poverty. Although there are many factors that need to be considered for the transformation of rural China, the authors focus on three key aspects for their analysis: technology and productivity, rural commodity and the land rental markets. Using historical data, the authors paint a positive picture of the state of rural China's economy during the first years of the 21st century. It is shown that a large number of China's households are well connected with non-farm production activities. The present rural production system is able to raise the productivity of agricultural resources, provide a marketing environment that will allow for specialization and rational allocation of resources and create markets for cultivated land that will allow households that still have not got a job off the farm access to more land for use in agriculture. However, they also point out that these accomplishments are not enough and also do not mean that the lives of most farm families in China are completely fulfilled. China has a long way to go in making its rural environment a nice place to live.

In Chapter 14, Poncet studies domestic price integration and economic performance in China. She analyses the relationship between domestic market integration and economic performance at the sub-national level within China. It follows a two-step procedure by first estimating a province-level indicator of market fragmentation based on a price-based approach and then using a three-dimensional data set of monthly prices on seven agricultural goods, between 1987 and 1997 across 170 cities of 28 provinces. She then embeds this measure of market fragmentation into a cross-province growth framework, estimated with the GMM method. Her analysis of provincial growth dynamics underlines the favourable impact of market integration on economic performance and agricultural value-added, confirming the benefits in fighting against regional protectionism.

Wu studies the urban unemployment situation in China in Chapter 15. Development in Eastern Europe suggests that the transition from a centrally planned to a market-oriented economy can lead to rising unemployment. China is experiencing a serious problem as millions of state-owned enterprise workers have been laid-off to join the rising pool of urban unemployed consisting of young school leavers and rural immigrants. Urban unemployment is a phenomenon parallel to economic reforms because this problem was not formally recognized in the pre-reform period. In the past, urban workers were protected by the state in various ways through a segregation policy to prevent the exodus of rural peasants into cities, job guarantees by the state-owned enterprises and a soft budget to protect these enterprises from bankruptcy once they ran into financial stress. Economic reforms, especially the enterprise reform from 1996 have changed all these protection mechanisms. Rural peasants are allowed to compete for jobs in the cities, state enterprise workers are retrenched if their enterprises do not perform well. The new environment presents challenges to policy makers on urban development and employment policy, not only on issues relating to job creation, but also on issues relating to social security and urban poverty.

Sanders asks the question of crossing which rivers and feeling which stones in Chapter 16. He discusses how China has been and will be transformed from a centrally planned into a market economy from a theoretical perspective. In his view, China has crossed 'many rivers' through feeling the stones in those rivers in a long process to transform its economy right from the late 1970s up to today. China had managed to develop a competitive manufacturing capacity from a low level and has been trying to become a global economic power at the forefront of technology. It is argued that China has, so far, been successful in both tasks, that what successes have been achieved have not been the result of crudely replacing the 'plan' with the 'market'. China's recent path to development of the 'New Economy' has been underpinned by institutional arrangements laid down in the past and subsequently nurtured by the state, despite frequent rhetorical claims to the contrary. Crossing the river to the New Economy, China has moved gradually and pragmatically, through 'feeling the stones' of 'fuzzy property rights' and 'public entrepreneurship'.

China has undergone intensive transformation in terms of industrialization and urbanization and experienced transition from 'the plan' to 'the market' and from isolation to gradual integration into the world economy. Starting as a low-income

'non-core innovator' country, China has encountered the challenges of developing an 'old' manufacturing economy, mass-production and the New Economy *simultaneously* in a uniquely short period. However, a 'catch-up' strategy relying on technological diffusion alone has its limitations and the Chinese government has taken an active approach to the challenges, fostering new and high-technology industries to provide breakthroughs in sustaining economic growth subsequent to the initial industrialization period.

In the last chapter of this volume, Cook and Qi use a case study approach to help us understand the development process of rural township and village enterprises (TVEs) in China. TVEs have been a significant element in the transformation of China from a rather closed collectivized peasant society in the Maoist period to a modern outward-looking market economy under the leadership of Deng Xiaoping. This chapter summarizes the role of TVEs in China's development trajectory. It then utilizes an original in-depth case study of a successful TVE to identify the factors affecting the growth of TVEs. The key factors determining the success of TVEs include the role of government, local initiatives, market conditions, the role of finance, and entrepreneurial skills. After China joined the WTO in December 2001, TVEs faced an uncertain future. They need to increase their capitalization, operational scale, international networking and links, managerial and technological expertise in order to cope with the increased competition that WTO entry will bring.

# Part I

# Financial Sector Reforms

# 1 Board characteristics as corporate governance mechanisms

## Evidence from China's real estate stock companies

*Jian Chen, Qiulin Ke and David Isaac*

### Introduction

The monitoring role of corporate boards in public corporations has become a central issue in both the financial and academic press. Berle and Means's (1932) seminal work suggested that managers did not have sufficient equity in the firms they managed to give them the incentive to turn their full attention to profit maximization. As a result, managers may pursue self-interested initiatives at the expense of shareholders. One monitoring mechanism that may temper that tendency is the oversight of the board of directors: this oversight, or control, function of a board is often described as the most critical of directors' roles (Fama, 1980; Mizruchi, 1983; Zahra and Pearce, 1989).

Three characteristics that affect the monitoring potential of a board are board size, board composition and board leadership structure (Jenson, 1993). The research that has examined the association between board characteristics and firm performance has produced mixed results. There has been no consensus regarding the direction of the relationship of firm performance and board size. For example, Yermack's (1996) study of Fortune 500 industrial firms, partly confirmed by Bhagat and Black (1996), verifies the predictions of Jensen (1993) and others of a negative correlation between firm value and the size of a firm's board of directors. Yermack's sample is dominated by firms with large boards and finds no consistent association between board size and firm value for board size below six board members. Eisenberg *et al.* (1998) use a randomly selected sample of approximately 900 small Finnish firms. The effect, confirming Yermack's findings, shows a negative correlation between firms' profitability, as measured by industry-adjusted return on assets, and board size.

When a single individual wears the 'hats' of both the CEO and chairman of the board (unitary leadership structure), managerial dominance is greatly enhanced since that individual is more aligned with management than with stockholders. Having separate persons holding the CEO and chairman positions (dual leadership structure) enhances the monitoring ability of the board (Jensen, 1993). Therefore, a board that is effective for monitoring has relatively more outside directors, a dual leadership structure and is small (Jensen, 1993).

So far, most studies on corporate governance in China have focused on the ownership structure, the behaviour of different types of controlling shareholders

(see Xu and Wang, 1997, which suggests that the company owned by legal person shares outperformed those controlled by state shares), ownership concentration and the behaviour of the controlling shareholder, for example the expropriation by the controlling shareholder via related party transactions, the diversion of funds from the listed companies and so on. Very little research addresses the relationship between board characteristics and firm performance. To start the research in this direction, we take one sector – the real estate sector – for tentative analysis.

This chapter focuses on a study of board characteristics and their effects on the corporate performance of listed real estate companies in China. The corporate governance environment in China is different from Yermack's study sample. The ownership of listed real estate companies of China is highly concentrated by state or family. Approximately 61 per cent of all shares in this sector comprise non-transferable state and legal person shares, making the threat of takeover ineffective as a form of governance mechanism. Holding large amounts of non-transferable stocks, managers are not worried about being taken over as a result of share price falls resulting from inappropriate operation of the business. The boards are dominated by insiders. Highly concentrated ownership structure leads to smaller board size. Thus, increasing board size implies an increase in the numbers of outside directors. Our study finds a positive relationship between board size and corporate performance, inconsistent with the studies of Yermack (1996) and Eisenberg *et al.* (1998).

In the following sections of this chapter, we first review previous studies on the advantages and disadvantages of large board size. We then discuss the board structure of China's listed companies and continue our study by defining the variables. The outcomes of regression analysis are presented in the regression analysis section and we end by drawing some conclusions.

## Why board characteristics matter

### *Why board size matters*

Researchers have not achieved a consensus on the optimal size of the board. Jensen, for example, suggested that 'when boards get beyond seven or eight people they are less likely to function effectively and are easier for the CEO to control' (1993, p. 865). This view is consistent with that of Firstenberg and Malkiel, who argued that a board with eight or fewer members 'engenders greater focus, participation, and genuine interaction and debate' (1994, p. 34). Lipton and Lorsch (1992) suggest an optimal board size between seven and nine directors, while Yermack (1996, Fig. 1.1) suggests that the greatest loss in value occurs for board sizes in the range of five to ten members, the small end of his board size.

#### *Advantages of larger board size*

The literature addressing the advantages associated with larger boards involves a range of perspectives. These include:

- Resource dependence theory which has been the primary foundation for the perspective that larger boards will be associated with higher levels of firm performance (e.g. Alexander *et al.*, 1993; Goodstein *et al.*, 1994, etc.). In this view, board size may be a measure of an organization's ability to form environmental links to secure critical resources (Goodstein *et al.*, 1994). According to Pfeffer and Salancik, 'The greater the need for effective external linkage, the larger the board should be' (1978, p. 172). Consistent with the tenets of resource dependence, Birnbaum (1984) reported that environmental uncertainty (lack of information and volatility) led to increased board size.
- The view that board interlocks may also provide a rationale for expecting larger boards to be associated with positive corporate outcomes. There is some evidence, for example, that board interlocks are associated with effective capital acquisition (e.g. Mizruchi and Stearns, 1988; Stearns and Mizruchi, 1993). It may be that larger boards provide more possibilities for such interactions.
- The expertise-counsel account of board service which suggests that directors may provide CEOs with advice of a quality unobtainable from other corporate staff (e.g. Zahra and Pearce, 1989). Lorsch and MacIver reported that many directors are themselves CEOs: 'CEOs have the most relevant experience and expertise to be effective directors. CEOs understand the complex problems of running a major enterprise and, it is argued, provide the best counsel and advice' (1989, p. 174).
- The question of board composition. The proportion of outside directors is likely to be positively correlated with board size (Yermack, 1996) and outside directors generally own negligible equity shares in firms. Outside directors thus bear a reputation cost if projects fail and the firm encounters financial difficulties while their share of the gains is limited. This asymmetry suggests that outside directors have a bias against projects with high variance which increase the probability of bankruptcy, even when the net present value of the projects is positive. Bhagat and Black (1996) find that the median outside director stock ownership is only 1 per cent for a sample of 780 public US companies, suggesting that outside directors often want to avoid risk.

*Disadvantages of larger board size*

The discussion of the disadvantages of larger board size or the advantages associated with smaller boards is focused on:

- Increased problems of communication and coordination as group size increases, and decreased ability of the board to control management, thereby leading to agency problems stemming from the separation of management and control (Jensen, 1993; Yermack, 1996). Jensen suggests that larger boards lead to less candid discussion of managerial performance and to greater control by the CEO. Thus larger board size can reduce the board's ability to resist CEO control. Yermack (1996, p. 210) suggests that 'CEO performance incentives provided

by the board through compensation and the threat of dismissal operate less strongly as board size increases'. And he concludes that whatever benefits may be associated with large board size may be overwhelmed by poor communication and decision-making processes.

- Group cohesiveness, another construct that may have application for boards of directors. Cohesiveness, which may be facilitated by having fewer group members, has been related to performance. Evens and Dion (1991), for example, relying on a meta-analysis, reported a positive association between group cohesion and performance. Arguably, smaller boards would, on average, have more group cohesiveness (Lipton and Lorsch, 1992; Jensen, 1993).
- Mintzberg (1983) suggests that board members' assessments of top management are more easily manipulated when boards are larger and diverse. It might be reasonably expected that large boards would tend to be more diverse, more contentious and more fragmented than small boards. In such cases, CEOs may gain advantage in power relations with board members through tactics like 'coalition building, selective channelling of information, and dividing and conquering' (Alexander *et al.*, 1993).

However, there are other alternative opinions on the likely power relationship between CEOs and large boards. For example, Zahra and Pearce (1989, p. 309) concluded that 'larger boards are not as susceptible to managerial domination as their smaller counterpart'. Ocasio (1994, p. 291) suggested that 'the stability and cohesiveness of the governing coalition under the CEO can best be contested when the number of directors on the board is large. A large board is more likely than a small one to generate alternative political coalitions that challenge the CEO and take control over the firm. A large board also limits the possibility of the CEO exerting social influence to maintain his power.'

A large amount of theory-driven rationale thus suggests a relationship between board size and firm performance but the literature provides no consensus about the direction of that relationship.

### *Board composition and corporate performance*

The association between board composition and firm performance has been the subject of many studies. The composition of a firm's board is typically a surrogate for the extent to which the board is independent of the firm's CEO (e.g., Daily *et al.*, 1999; Dalton *et al.*, 1998 and Seward and Walsh, 1996). Although more than 20 measurements of board composition can be found in relevant research – for example, the proportion of inside directors, outside directors, affiliated directors or interdependent directors (Daily *et al.*, 1999) – these measures are all designed to capture some aspect of board independence. The relevant research concerning firm performance and board composition includes Hermalin and Weisbach (1991), Klein (1998) and Mayers *et al.* (1997). Klein's study demonstrates a linkage between firm performance and board composition by examining the committee structure of boards and directors' roles within these committees. He finds little association

between firm performance and overall board composition. But by going into the inner workings of the board via board committee composition, he finds significant ties between firm performance and how the board is structured. A positive relation is found between the percentage of inside directors on finance and investment committees and accounting and stock market performance measures.

A board comprising members with dependent relationships with a firm (that is, inside directors, affiliated directors and/or interdependent directors) is less likely to provide a dispassionate assessment of the firm's CEO. Mayers *et al.* (1997) investigate the role of outside directors in the corporate-control process by examining variations in ownership structure within the insurance industry. In mutuals, ownership rights are not transferable. This inalienability restricts the effectiveness of control mechanisms like external takeovers, thus increasing the importance of monitoring by outside directors. Consistent with this hypothesis, they find that mutuals employ more outsider directors than public joint-stock companies and firms that switch between the two forms make corresponding changes in board composition. Laws affecting mutuals frequently stipulate participation by outside directors and mutuals with more outside directors making lower expenditure on salaries, wages and rent. Dalton *et al.* (1999) investigated the relationship between the board of directors and the firm's financial performance. Moderating variables included firm size, board composition (external vs internal members), and performance indicators (market-based vs accounting-based indicators). The results for the overall meta-analysis of the association between board size and financial performance strongly suggests a non-zero, positive relationship. Also these relationships are consistent for market-based and accounting-based firm performance measures. Likewise, board composition does not moderate the board size–financial performance relationship.

## The board structure of China's listed companies

The directors are the representatives of the shareholders. They monitor the management of the company on behalf of the shareholders. Board structures and procedures vary among countries. Some countries have two-tier boards that separate supervisory function and the management function into different bodies. Such systems typically have a 'supervisory board' composed of non-executive board members and a 'management board' composed entirely of executive members. Other countries have 'unitary' boards which bring together executive and non-executive board members. China has adopted two-tier boards. The Company Law in China requires that: 'A joint stock limited company shall have a supervisory board composed of no less than three members … . The supervisory board shall be composed of shareholders' representatives and an appropriate proportion of representatives of the staff and workers of the company … . Directors, managers and responsible persons in charge of the financial affairs of the company may not serve concurrently as supervisors' (Article 124).

The duties of the supervisory board are to 'supervise the corporate finance, the legitimacy of directors, managers and other senior management personnels'

performance of duties and shall protect the company's and the shareholders' legal rights and interests' (Article 59).

The size and responsibilities of boards of directors are defined in the Company Law: 'A joint stock limited company shall have a board of directors composed of five to nineteen members. The board of directors shall be responsible to the shareholders general meeting and exercise the following functions and powers:

1. to convene the shareholders general meeting and to report on its work to the shareholders general meeting;
2. to implement resolutions passed at the shareholders general meetings;
3. to decide on the business operation plans and the investment plans of the company;
4. to formulate the fiscal budgets and the final accounts of the company;
5. to formulate plans for the profit distribution and making up losses of the company;
6. to formulate plans for increasing or reducing the registered capital of the company and plans for the issue of company bonds;
7. to formulate plans for the merger, division and dissolution of the company;
8. to decide on the establishment of the internal management organs of the company;
9. to engage or dismiss the manager and, upon recommendation of the manager, to engage or dismiss the deputy manager(s) and responsible persons in charge of the financial affairs of the company, and to decide on matters concerning their remuneration; and
10. to formulate the basic management systems of the company.'

According to Company Law, both the board of directors and supervisory boards are nominated by the shareholders general meeting and each has no right to dismiss or appoint members on the other. The supervisory board is entitled to a limited monitoring right and has no right to remove board directors. The members of supervisory boards often include the party secretary, employee representatives or the division managers of other enterprises or external auditors. Since nominations to the supervisory board are controlled by the controlling shareholder it is difficult for it to implement the supervisory function entailed in corporate governance effectively. The supervisory function entrusted to it by Law is purely formal. The introduction of independent directors to the board is expected to strengthen and improve the monitoring function of the board of directors as well as enhancing its independence.

On the one hand, China has adopted a two-tier system with a separate board of directors and supervisory board, and on the other hand, it has introduced the 'independent director' system. The discussion of board independence has focused on the role of outside directors in limiting the potential for agency costs when decision making and decision control are separated. It is argued that by monitoring management, outside directors can limit the exercise of managerial discretion, thus

lowering contracting costs between shareholders and management (see Fama, 1980; Fama and Jensen, 1983; Williamson, 1983).

The 'Guidelines for Introducing Independent Directors to the Board of Directors in Listed Companies' issued in 2001 by CSRC requires all listed companies to have at least two independent directors by June 2002 and at least one third of the board to be independent directors by June 2003. It stipulates that 'independent directors of the listed company refer to the directors who hold no posts in the company other than the position of director, and who maintain no relations with the listed company and its major shareholder that might prevent them from making objective judgement independently'. It also stipulates that the following persons may not hold the position of independent directors:

1. anyone who holds a position in the listed company or its affiliated enterprises or those with close relatives or strong social relations with those who do;
2. anyone who holds more than 1 per cent of the outstanding shares of the listed company directly or indirectly, or any of the 10 largest natural person shareholders of the listed company or such a shareholder's direct relative;
3. anyone who holds a position in a unit which holds more than 5 per cent of the outstanding shares of the listed company directly or indirectly or in a unit which ranks as one of the five largest shareholders of the listed company, or such an employee's direct relative;
4. anyone meeting any of the three above-mentioned conditions in the immediate proceeding year;
5. anyone providing financial, legal or consulting services to the listed company or its subsidiaries.

The Code of Corporate Governance for Listed Companies in China states that 'the board of directors of a listed company may establish a corporate strategy committee, an audit committee, a nomination committee, a remuneration and appraisal committee and the special committee in accordance with the resolutions of the shareholders' meetings. All committees shall be composed solely of directors. The audit committee, the nomination committee and the remuneration and appraisal committee shall be chaired by an independent director, and independent directors shall constitute the majority of the committees. At least one independent director from the audit committee shall be an accounting professional'.

The role of independent directors in listed companies is described in the Guidelines as follows.

1. Major related party transactions (referring to transactions that the listed company intends to conclude with the related party and whose total value exceeds RMB three million or 5 per cent of the company's net assets audited recently) must be approved by independent directors before being submitted to

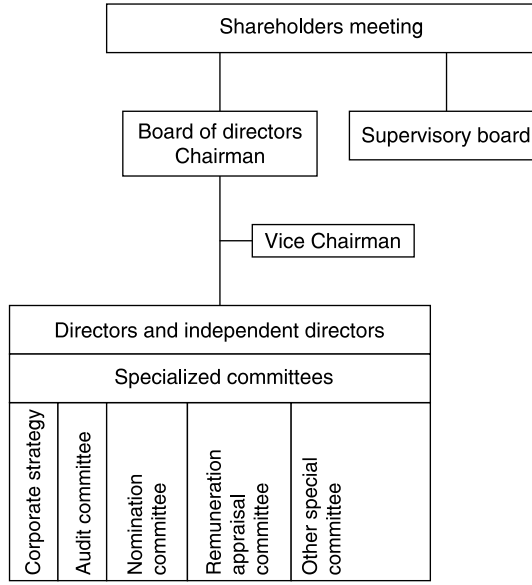


*Figure 1.1* The organizational structure of the Chinese listed companies.

the board of directors for discussion. Before the independent director makes his or her judgement, an intermediary agency can be employed to produce an independent financial advisory report, which will serve as the basis for his or her judgement.

2. The independent directors may put forward a proposal to the board of directors relating to the appointment or removal of the accounting firm.
3. The independent directors may propose to the board of directors the calling of an interim shareholders' meeting.
4. The independent directors may propose the calling of a meeting of the board of directors.
5. The independent directors may appoint an external auditing or consulting organization independently.
6. The independent directors may solicit the proxies before the convening of the shareholders' meeting. (Guideline V).

Figure 1.1 shows the organizational structure of listed companies of China.

## Data definition

The study period covers three years from 2000 to 2002, and the data for the study are selected from the Annual Reports of the listed Companies and from www.stockstar.com.

***The study variables***

The main hypotheses of this chapter are that firm performance is dependent on the quality of monitoring and decision-making by the board of directors and that the board size represents an important determinant of its performance. Below we estimate a straightforward model of the relation between firm value and board size. We regress a set of explanatory variables against the profitability ratios. We also illustrate their robustness to a variety of alternative specifications and evaluate whether alternative theories can account for the observed relation between firm value and board size.

The definitions of the study variables are made as follows.

- Board size (BSIZE): total number of directors on board.
- Inside directors (INSIDEDIR): the number of directors on the board from the controlling shareholders and executive directors.
- Independent directors (INDDIR): the number of independent directors on the board. The inside directors and independent directors are two major constituents of the board size. Thus, we expect a positive relationship of the two board constituents with board size. Although most of the listed real estate companies introduced independent directors since 2000, we expect a positive relationship of independent directors with firm performance as suggested in other empirical research (Yermack (1996) etc.).
- Management team (MAGTEAM): consists of the directors, supervisors and management members who may or may not get compensation from the listed company. Large management does not necessarily mean efficiency, especially when some members of the management team do not get their compensation from the listed companies; so we expect a negative relationship between the size of the management team and firm performance.
- Unpaid management officer (UNPAIDMAG): the percentage of management officers in the management team who do not get compensation from the listed company. They are the members of the board of directors and the supervisory board.
- Paid chairman of the board (PAID CHAIRMAN): equal to 1 if the chairman of the board gets pay from the listed company, otherwise equal to 0.
- Leadership structure (LEADER): equal to 1 if the positions of chairman of board and CEO are taken by two persons (dual leadership structure); otherwise equal to 0 for the unitary leadership structure.
- Earning per share (EPS): profitability ratio. The net income is divided by the total number of outstanding shares.
- Return on assets (ROA): profitability ratio. The net profit is divided by the size of total assets.
- Assets (log) (ASSET): the natural log of the total book value of firms' assets in billion of RMB as proxy of firm size.
- Top 10 largest shareholding (TOP10): the number of shares owned by the Top 10 largest shareholders of the listed company as the measure of ownership

concentration ratio. This information is disclosed in the Annual Report of the listed real estate companies. We expect an inverse relationship between ownership concentration ratio and board size.

- 1st largest shareholding (1ST HOLDER): number of shares owned by the first largest shareholder in the company as a measure of the ownership concentration.
- 2nd largest shareholding (2ND HOLDER): number of shares owned by the second largest shareholder in the company as a measure of the ownership concentration.
- Other (3rd to 10th) largest shareholding (OTHER 3RD–10TH HOLDERS): number of shares owned by the third to tenth largest shareholders in the company as a measure of the ownership concentration.
- SOE: equal to 1 if the ultimate owner of the listed company is the state, otherwise, equal to 0.

Other factors may also affect performance. To take some if not all of them into account, we define some other variables.

- Supervisory size (SUPSIZE): the number of supervisors on the supervisory boards.
- Inside supervisor (INSIDESUP): the number of supervisors on the supervisory board appointed by the controlling shareholders and the listed company. The information about the supervisors in the annual report of the listed real estate companies is not complete. The criteria define the inside supervisors as: (1) they take positions in the company of the controlling shareholders; (2) they get their salaries from the listed companies.
- Sales (SALE): the total operating sales in billion of RMB as an alternative proxy of firm size.
- Fraction of the state shares (ST-Sh.): equals the number of shares held by the state directly divided by the total number of shares outstanding.
- Fraction of legal person shares (LP-Sh.): equals the number of legal person shares divided by the total number of shares outstanding.
- Fraction of tradable shares (TR-Sh.) refers to all the tradable A Shares, B Shares and H Shares. They are the total number of tradable shares divided by the total number of outstanding shares.
- State share dominated company (ST-Sh. com): equal to 1 if the company is dominated by the state share; otherwise equal to 0 if the company is dominated by the legal person shares.

### *Descriptive statistics*

Table 1.1 reports the descriptive statistics of the controlling variables of the sampled firms and the correlations with board size.

The table indicates that the mean board size of China's listed real estate companies is 9.19, ranging from five to 15 members within the scope of the requirement

*Table 1.1* Descriptive statistics of governance characteristics of China's listed real estate companies and correlation with board size

| *N = 137* | *Minimum* | *Maximum* | *Mean* | *Std. Deviation* | *Corr./ BSIZE* | *Corr./BSIZE (log)* |
|---|---|---|---|---|---|---|
| BSIZE | 5.00 | 15.00 | 9.19 | 2.11 | 1.00 | 0.98** |
| BSIZE(log) | 0.48 | 1.00 | 0.78 | 0.10 | 0.98 | 1 |
| INSIDEDIR | 2.00 | 11.00 | 5.26 | 2.02 | 0.64** | 0.60** |
| INDDIR | 0.00 | 4.00 | 2.20 | 0.74 | 0.27** | 0.31** |
| SUP | 2.00 | 7.00 | 3.58 | 1.01 | 0.28** | 0.30** |
| CSUP | 1.00 | 6.00 | 2.93 | 1.17 | 0.26** | 0.31* |
| MTEAM | 10.00 | 27.00 | 16.36 | 3.16 | 0.71** | 0.72** |
| UNPAIDMAG (%) | 0.00 | 71.43 | 37.84 | 19.52 | 0.12 | 0.10 |
| Paid chairman[a] | 0.00 | 1.00 | 0.64 | 0.48 | 0.10 | 0.08 |
| Leadership structure (LEADER)[a] | | | 0.88 | 0.32 | −0.14 | −0.14 |
| EPS (Yuan) | −3.36 | 1.20 | 0.10 | 0.53 | 0.25** | 0.32** |
| ROA | −3.77 | 0.37 | −0.01 | 0.34 | 0.10 | 0.11 |
| Asset (in billion of RMB) | 0.17 | 9.69 | 2.18 | 1.82 | 0.34** | 0.31** |
| Asset (log) | −1.76 | 2.27 | 0.45 | 0.85 | 0.37** | 0.35** |
| Sales (in billion of RMB) | 0.00 | 4.57 | 0.61 | 0.77 | 0.30** | 0.31** |
| TOP10 | 1.96 | 78.88 | 56.49 | 16.10 | −0.05 | −0.04 |
| 1st holder | 0.39 | 74.69 | 41.10 | 17.82 | −0.08 | −0.08 |
| 2nd holder | 0.16 | 23.87 | 7.25 | 6.15 | −0.05 | −0.05 |
| Others (3–10) | 0.45 | 37.28 | 8.13 | 7.43 | 0.12 | 0.13 |
| LP-Sh. | 0 | 74.28 | 29.04 | 25.79 | 0.04 | 0.03 |
| ST-Sh. | 0 | 74.69 | 25.72 | 27.87 | −0.07 | −0.05 |
| Tradable-Sh. | 0 | 13.68 | 1.25 | 2.43 | −0.07 | −0.07 |
| ST-Sh.comp.[a] | 0.00 | 1.00 | 0.47 | 0.50 | 0.06 | 0.07 |
| SOE[a] | 0.00 | 1.00 | 0.75 | 0.43 | −0.03 | 0.02 |

[a]For the binary variables, the mean represents the proportion of firms with equal to 1 for the variable.
**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

of Company Law. Two companies had no independent directors by the end of 2002. Generally speaking, the board is dominated by insiders, with five (56 per cent) of the nine directors being representatives of the controlling shareholders and executive directors. The inside directors are positively associated with board size. Since 2001, most of the listed real estate companies increased or adjusted the board size by at least two independent members as required by CSRC. The average number of independent directors is 2.20 (23.6 per cent).

The management team on average comprises 16 members: they are board directors, managers and supervisors and their numbers are positively related with board size. However, 38 per cent of members of the management team do not get their pay from the listed companies. They are the members of the board of directors and supervisory board. About 36 per cent of the chairmen of boards are not paid by the listed companies. Some 88 per cent of companies have adopted a dual leadership structure with two persons taking the positions of chairman of the board and general manager (equivalent to the title of CEO). As a monitoring organ, the supervisory board is composed on average of four members, three of the four members are from the inside – controlling shareholders and employees of the listed companies.

On the one hand, China has adopted a two-tier system, with boards of directors and supervisory boards working in parallel, subject to the Shareholders General Meeting, to execute the strategy-decision rights and monitoring rights respectively. The management team is approved by the board of directors and monitored by the supervisory board. On the other hand, China has also introduced independent directors to the board of directors since 2001 to improve its monitoring function. From the description of responsibilities in the Company Law, the Code of Corporate Governance of China's Listed Companies and the Guideline of Introduction of Independent Directors, the monitoring functions of the supervisory board and independent directors are repetitive and overlapping. So far, the size of the supervisory board (the mean is 3.58) is larger than the number of independent directors (2.20). The nomination and appointment of the members of the supervisory board are controlled by the controlling shareholders. Table 1.1 shows that 2.93 of 3.58 members of the supervisory board are from the controlling shareholders and/or the employees of the listed company; therefore, they are unlikely to perform the supervisory function to the management of the company. The independent directors are expected to cover gaps in the monitoring function of the supervisory board. But the system of independent directors is at the preliminary stage, the number of independent directors is small, the relevant laws and regulations of the rights and duties of the independent directors is not available, impacting on the monitoring function of the independent directors. What is more important, the Guideline does not mention the relationship and the coordination between the supervisory board system and the independent director system: the relationship between the two systems is not clear.

The ownership is highly concentrated and the average number of shares owned by the top 10 largest shareholders is 56.49 per cent. Indeed, the single largest shareholder owns, on average, 41 per cent of the total outstanding shares, both non-transferable state shares and/or legal person shares; while the second largest shareholder owns 7.25 per cent of total shares and the other third to tenth largest shareholders own in total 8.13 per cent of shares. A controlling shareholder is defined by the Company Law as a shareholder who owns at least 10 per cent of the total shares of the company. For many listed real estate companies, there is a single controlling shareholder. Since the transfer of legal person and state shares is restricted, the non-transferable shares (29 per cent of legal person shares and 26 per cent of state shares) are in a predominant position among the shares owned by the top 10 largest shareholders. The tradeable shares are only 1.25 per cent of total shares. Of the listed real estate companies 75 per cent are SOEs and 47 per cent of them are state share dominated. The fact that the insiders control both the boards of directors and the supervisory boards casts doubt on whether there is any effective monitoring function performed in these listed companies.

The paired correlations presented in the last two columns of Table 1.1 generally suggest that, in contrast to Yermack (1996), the board size is positively correlated with firm performance measured by EPS and ROA. The firm size measured by sales and assets as proxy of firm size is also positively related with board

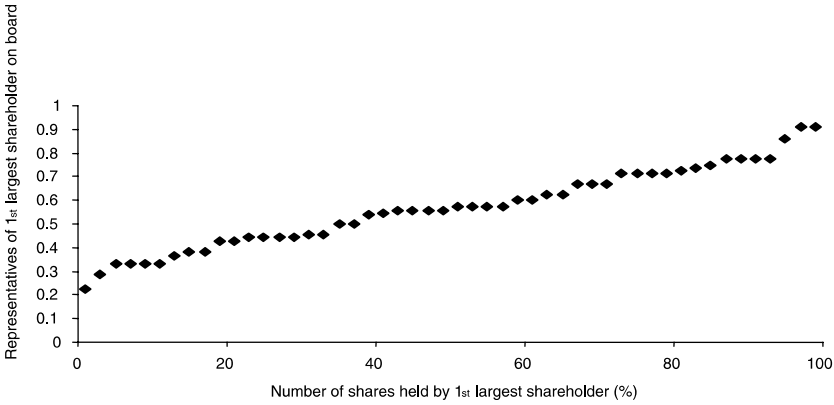


*Figure 1.2* Relation between the 1st largest shareholders and its representation on board.

size and is significant. Yermack (1996) reports that board size ought to correlate with firm size, because larger firms probably need larger boards. With regard to board composition, inside directors and independent directors are positively related to board size, since they are the major constituents. The ownership concentration measured by the top 10, 1st holder and 2nd holder are negatively related with board size, although insignificant. Another concentration ratio measured by the number of shares owned by the 3rd to 10th largest shareholders is positively related with board size. It seems that higher ownership concentration leads to smaller board size and that board size decreases with an increase in ownership concentration.

One important method of controlling a company is by controlling the dominant fraction of its shares. Control can be absolute by holding more than 50 per cent of the company's total shares and can be relative by holding less than 50 per cent, but the number of shares held is enough to allow effective control of the company.

How many of the shares are required by the controlling shareholder to control the company absolutely? Given that many companies have single controlling shareholders and there is a big gap between the number of shares owned by the 1st largest shareholder and the 2nd largest shareholder and other (3rd to 10th) largest shareholders as reported in Table 1.1, therefore, to control the company absolutely, the number of shares required by the controlling shareholder need not exceed 50 per cent of the total shares. We use the data of 2002 to run a simple linear regression of the number of shares held by the 1st shareholder and the representatives of the 1st shareholder on the board and Figure 1.2 displays the relationship between them.

The number of shares held by the 1st largest shareholder and its representatives on the board keeps a positive linear relationship. The minimum number of shares required to control the board of directors absolutely (50 per cent of the board seats

are taken by the representatives of the 1st largest shareholder) are about 35 per cent of the total outstanding shares.

Since the real estate stocks are classified into transferable shares (41 per cent) and non-transferable shares (59 per cent), the 41 per cent of tradable shares are owned by thousands of small investors. For example, in 2002, there were 77 individual investors ranked among the 500 Top10 largest shareholders of the 50 listed real estate companies, holding on average 0.2 per cent of the tradeable shares. So it is impossible for individual investors to have seats on the board of directors. Therefore, the number of shares required by the controlling shareholders (almost all the shares owned by the controlling shareholders are non-transferable shares) to control the company absolutely is less than 35 per cent. If the controlling shareholder owns 21 per cent of the total outstanding shares (59% $\times$ 35%), she/he can effectively control the board of directors and the company as well, taking the existence of large amounts of minority shareholders holding tradeable shares into account. Given the high ownership concentration in the listed real estate companies, the controlling shareholders can control the companies absolutely at relatively low cost.

According to the Company Law of China, the members of the board of directors are elected at the shareholders general meeting and shareholders attending the meeting have the right to one vote for each share held. A resolution of the shareholders general meeting must be passed by more than one half of the voting rights held by the shareholders present at the meeting.

One or two of the largest shareholders control the predominant number of the shares of the company, they put their director candidates into each position on the board and are guaranteed success in electing their representatives by the absolute majority of shares held by them, resulting in boards of directors of listed companies being dominated by the representatives of the controlling shareholders. The ownership structure decides the board structure.

Although paired correlations are informative, more conclusive evidence on the importance of board size and board composition is provided through subsequent multiple regressions, which control several potentially conflicting influences.

## Regression analysis

### *Univariate test*

To provide preliminary evidence on the association between board size and firm performance, we compare firm performance across the range of different board sizes for 2002. The results are reported in Table 1.2.

We classify sample observations according to board size into nine categories, from the firms with seven members to those with 15 members. We then estimate the mean of EPS and ROA for each board size category. Significant deviations from zero for the mean EPS and ROA are examined using *t*-tests.

The listed real estate companies with a board size of nine to 13 members have better performance than those with a smaller or larger board size. Sample observations in these categories collectively represent 62 per cent of the total observations

*Table 1.2* Board size and firm performance for China's listed real estate companies in 2002

| *Board members* | *Number of observations* | *Per cent* | *Mean (EPS)* | *Mean (ROA)* |
|---|---|---|---|---|
| 7 | 12 | 24.00 | −0.17 | −26.49*** |
| 8 | 5 | 10.00 | 0.23 | −0.81* |
| 9 | 19 | 38.00 | 0.14 | 2.12* |
| 10 | 1 | 2.00 | 0.40 | 0.05** |
| 11 | 7 | 14.00 | 0.25 | 1.88* |
| 12 | 1 | 2.00 | 0.21 | 3.70 |
| 13 | 3 | 6.00 | 0.35 | 3.24 |
| 15 | 2 | 4.00 | −0.20 | −0.04 |
| Total | 50 | 100.00 | | |

*,**,***Significant levels at 10 per cent, 5 per cent and 1 per cent.

(31 out of 50). The firms with a board size of nine to 11 members have positive mean ROA and significant *t*-tests.

The companies with a board size of nine members have the lowest performance ratios measured by EPS and ROA. The companies with a board size of nine to 13 members have positive performance ratios measured by EPS and ROA. Largeness does not mean greater efficiency. The companies with a larger board size of 15 members also have negative performance ratios, indicating the inefficiency of the large board in monitoring the management.

In sum, Table 1.2 suggests the optimal board size of China's listed real estate companies is between nine and 11 members. If larger the board is inefficient in monitoring and assessing the management, if smaller the company is likely to be controlled by its managers.

### *Regression analysis*

In this section, we estimate the relationship between board size and corporate performance. In empirical studies, for example, Morck *et al.* (1988), Hermalin and Weisbach (1991), and Yermack (1996), the OLS and 2SLS frameworks are used, since it is argued that firms that are subject to competitive equity markets have incentives to adopt appropriate governance mechanisms to control agency problems (Jensen and Meckling, 1976). Therefore, where agency problems are significant, firms will adopt governance structures that are better at controlling these problems. The OLS approach attempts to identify a cross-sectional association between board size and corporate performance while controlling for the different control mechanisms that firms employ. The OLS, however, treats the board size as exogenous and does not attempt to distinguish between the factors determining the variation in board size across the firms and produces biased estimates in the presence of endogeneity. Although we agree with this argument, the approach of 2SLS might not be appropriate to China's corporate governance, where the majority of shares is non-transferable and controlled by the state. The range of board size is fixed by

law; therefore, corporate governance factors are unlikely to be adjusted according to market criteria. As a result, we use OLS methodology in our analysis.

The equations are estimated using the means of the variables for each listed real estate company between 2000 and 2002. In the first, board size is regressed on the other governance variables by using:

$$\begin{aligned}\text{BSIZE (log)} = a_0 &+ a_1\ \text{Profitability} + a_2\ \text{Assets (log)} \\ &+ a_3\ \text{Ownership} + a_4\ \text{MTEAM} + a_5\ \text{UNPAIDMAG} \\ &+ a_6\ \text{Paid chairman} + a_7\ \text{SOE} + u \end{aligned} \tag{1.1}$$

In the second, board size and other controlling variables are regressed on the profitability ratios of EPS and ROA as shown by:

$$\begin{aligned}\text{Profitability} = a_0 &+ a_1\ \text{Assets (log)} + a_2\ \text{Ownership} + a_3\ \text{BSIZE (log)} \\ &+ a_4\ \text{BSIZE}^2\ \text{(log)} + a_5\ \text{MTEAM} \\ &+ a_6\ \text{UNPAIDMAG} + a_7\ \text{Paid chairman} \\ &+ a_8\ \text{LEADER} + a_9\ \text{SOE} + u \end{aligned} \tag{1.2}$$

where

$$\begin{aligned}\text{Profitability} &= \text{EPS and ROA} \\ \text{Ownership} &= \text{the number of shares owned by the first, second and other} \\ &\quad (\text{3rd to 10th}) \text{ largest shareholders}\end{aligned}$$

All the variables are treated as exogenous variables. The log transformation of board size is used to make the distribution of the board size dependent variable more systematic. This method is used in the Eisenberg *et al.* study.

Table 1.3 reports the OLS estimates of the relationship between board size and firm performance. In contrast with other empirical studies such as Yermack (1996) and Eisenberg *et al.* (1998), we find that there is positive association between board size and firm's performance which is significant in the regression of EPS. In the companies with more concentrated ownership, the board size tends to be smaller.

Increasing the board size implies an increase in the proportion of outside directors or the adjustment of the ownership structure. Therefore, increasing board size by adding more independent directors will improve corporate governance and the firm's performance. The literature on board size effects mainly concerns large publicly owned firms with widely dispersed ownership, such as Yermack's study of the Fortune 500 industrial firms. Obviously, their results do not address the firms operating in different legal or cultural environments such as in China.

The firm size measured by total assets (log) is positively related with board size, but insignificant. Larger firms are more likely to have a larger board size, but since the range of board size for listed companies in China is fixed by Company

*Table 1.3* OLS estimate of the relationship between board size (log) and firm performance

| | *BSIZE (log)* | *BSIZE (log)* | *EPS* | *ROA* |
|---|---|---|---|---|
| EPS (Yuan) | 0.04 | | | |
| | (3.65)*** | | | |
| ROA | | 0.02 | | |
| | | (0.96) | | |
| Assets (log) | 0.005 | 0.01 | 0.19 | 0.14 |
| | (0.65) | (1.31) | (3.82)*** | (3.94)*** |
| TOP10 | −0.001 | −0.001 | 0.01 | 0.01 |
| | (−1.78)** | (−0.80) | (4.10)*** | (4.82)*** |
| BSIZE (log) | | | 5.45 | 0.86 |
| | | | (4.79)*** | (1.07) |
| $BSIZE^2$ (log) | | | −0.01 | −0.001 |
| | | | (−3.43)** | (−0.71) |
| MTEAM | 0.02 | 0.02 | −0.02 | −0.01 |
| | (11.41)*** | (11.84)*** | (−1.23) | (−0.95) |
| UNPAIDMAG (%) | | | −0.01 | −0.002 |
| | | | (−2.74)** | (−1.14) |
| Paid chairman[a] | | | −0.10 | −0.04 |
| | | | (−1.09) | (−0.57) |
| LEADER[a] | −0.06 | −0.07 | −0.1 | −0.11 |
| | (−3.18)*** | (−3.67)*** | (−0.81) | (−1.24) |
| SOE[a] | −0.03 | −0.03 | 0.01 | −0.06 |
| | (−2.42)** | (−2.23)** | (0.12) | (−0.94) |
| Constant | 0.52 | 0.50 | −3.26 | −0.65 |
| | (12.32)*** | (12.59)*** | (−4.63)*** | (−1.31) |
| Adjusted $R^2$ | 0.63 | 0.60 | 0.40 | 0.27 |
| F | 27.42 | 27.6 | 9.56 | 5.23 |
| Sig. | 0 | 0 | 0 | 0 |

*t*-statistics are in parentheses.
*,**,***Significant levels of 10 per cent, 5 per cent and 1 per cent.
[a]For the binary variables, the mean represents the proportion of firm with value equal to 1.

Law, it is irrelevant to the firm size within a certain range: with a top line of 15 members and a bottom line of five members, the effect of firm size on board size is not significant.

The ownership concentration ratio measured by the Top 10 is negatively related with board size and significant in the equation of EPS. The inverse relationship of the ownership concentration measured by the Top 10 indicates higher ownership concentration results in the smaller board size, as expected, with the controlling shareholders controlling the company with a relatively low controlling cost. The size of the management team is positively correlated with board size. Interestingly, in SOEs, board size tends to be smaller because, as explained by Ke (2005), in SOEs, ownership is more concentrated. The companies with a dual leadership structure have larger board size.

However, as expected, firm size has a positive and significant relationship to firms' performance. Large size is associated with advantages. Pfeffer and Salancik

(1978) argue that larger firms have far more influence over their environments than do smaller firms and are concomitantly more likely to enlist the support of critical constituencies. Haveman (1993) suggests that having control over such resources makes it easier to initiate and sustain change. In addition to these arguments, we think that firm size is especially important for real estate companies. Capital and land resources are essential for real estate companies to survive and grow and the larger organizations have more ability than the smaller ones to form environmental links to secure these critical resources.

The ownership concentration measured by the number of shares owned by the Top 10 largest shareholders of the company is positively correlated with the firms' performance and significant in two equations of profitability ratios. The positive impact of the ownership concentration on the firm's performance is consistent with other empirical studies such as Xu and Wang (1997) in that ownership concentration is beneficial to firms' performance.

The size of the management team is inversely related with firm performance, although insignificant, suggesting that the larger management team does not mean it is more efficient, especially when there are more management members who are not on the company payroll. The number of unpaid management team members is inversely associated with firm performance and significant in the equation of EPS. The unpaid management team members are the chairman of the board, members of the board of directors and the supervisory board. They hold an important position in controlling companies and get paid by them. The negative impact of the number of such management officers to the firm's performance sheds doubt on the efforts and time they contribute to the listed companies. Lipton and Lorsch (1992) suggest that the most widely shared problem directors face is lack of time to carry out their duties.

Byrne (1996) and NACD (1996) even criticized the directors who spread their time too thinly by taking on too many outside directorships, confounding their ability to attend meetings regularly and therefore to monitor management well.

The leadership structure is positively related with board size and significant in both equations at the level of 1 per cent, but it has no explanatory power to the firm's performance. In our sample, only six companies have unitary leadership structure with one person taking the two positions of chairman of the board and top manager (or chief executive officer).

Although the board size is positively related with firm performance, the squared term of BSIZE is negatively associated with corporate performance and significant in the equation of EPS, which suggests that there is a non-linear relation.

The regressions of SOE to the profitability ratios yield mixed and insignificant signs and show insufficient evidence to prove that SOEs are more inefficient as shown in other empirical studies such as Xu and Wang (1997).

In sum, in contrast to other empirical studies, we find that the board size of China's listed real estate companies is positively related with firm performance. The effect of firm size is not significant to the board size, but significant to firm performance. Ownership concentration is negatively related, although insignificant, to board size, but positively and significantly related to firm performance. The larger the management team, the more inefficient, especially when there are

more unpaid management officers including the chairman of the board in the management team. SOEs have smaller board size.

### *Sensitivity check*

Given significant paired correlations among the independent variable in Table 1.3, the variance inflation factors (VIF) are estimated for each model to check multicollinearity. If the largest VIF is greater than 10, then there is cause for concern (Myer, 1990) and if the average VIF is substantially greater than 1, then the regression may be biased. VIF values in our equations fall within acceptable levels, consistent with limited, if any, multicollinearity problems.

The Durbin–Watson option is used to test for correlations between errors. The values less than 1 or greater than 3 are definitely cause for concern. All the values in the Durbin and Watson equation in each mode fall within acceptable values.

Additional tests are done to consider the potentially undue influence of outliers on the empirical results. While the full sample with available data is used in each model reported here, the results are robust to the exclusion of independent variable observations lying more than three standard deviations from their respective variable means.

The results presented in Table 1.3 are robust to several alternative variable specifications. First, firm size can be alternatively defined according to the raw data of sales. Second, the ownership concentration measured by the number of shares held by the Top 10 largest shareholders can be defined by the number of shares owned by the 1st, 2nd and other (3rd to 10th) largest shareholders. Third, the board size (log) can be substituted by raw data of board size. In all these cases, the statistical significance of the board size variable remains unchanged. Finally, when the dependent variable is defined as the return on equity (ROE), analogous results are yielded.

### *The board composition and its effect on the firm's performance*

#### *Relation of board size and ownership structure*

Board size reflects the composition of the board of directors. More independence implies that a board is able or willing to provide guidance that does not necessarily mirror the will of the CEO. The existence of a large number of non-transferable stocks restricts the effectiveness of the control mechanisms such as external takeovers. Thus, more independent boards should be adopted as suggested by Brickley and James (1987). Increasing the effectiveness of the monitoring function of the board by increasing the number of the independent directors is essential for effective corporate governance in China. The OECD suggests 'board independence usually requires that a sufficient number of board members not be employed by the company and not be closely related to the company or its management through significant economic, family or other ties. Independent board members can contribute significantly to the decision-making of the board. They can bring

an objective view to the evaluation of the performance of the board and management. In addition, they can play an important role in areas when the interests of management, the company and shareholders may diverge as in such cases as executive remuneration, succession planning, changes of corporate control, take-over defences, large acquisitions and the audit function' (OECD Commentary V, E). Since 2001, most of the listed companies have increased or adjusted board size by at least two members of independent directors as required by the CSRC. The average number of independent directors in 2002 is two, and one company has four independent directors out of nine members (44 per cent). The independent directors, as proxy of an independent board of directors, are usually defined as directors other than executive directors, affiliated directors (family-related, former executive, intercorporate directors), and grey directors (bankers who make loans or have other interests in the firm, firm lawyers, firm consultants or auditors, officers or directors of firm's suppliers and customers).

Studying board composition, Hermalin and Weisbach (1991) find no relation between firm performance and the fraction of outside directors. However, Baysinger and Butler (1985) find some evidence that companies perform better if boards include more outsiders.

There is another constituent of board composition – inside directors. These include the directors chosen by the controlling shareholders and executive directors. Normally, in listed real estate companies, the general manager (CEO), deputy general manager and financial manager are the executive directors. The inside directors are in a predominant position on the board of directors, with five out of nine members as Table 1.1 shows. The shareholders meeting, the board of directors and supervisory board are dominated by the controlling shareholders. Who will monitor and assess the senior managers and who will protect the interest of minority shareholders from being expropriated? Although inside directors have significant numbers on the board, we do not expect a positive relationship between the number of inside directors and firm performance. However, we do expect the number of independent directors on the board to be positively associated with firm performance.

The proportion of inside directors on the board is expected to be related to the ownership structure. We test, first of all, the relationship of board size and board composition and ownership structure. We use the data in 2002 and the raw data of board size for the variable. To examine the relationship of board size and ownership structure, we use the ownership concentration ratios measured by the number of shares held by 1st, 2nd, and other (3rd to 10th) largest shareholders. Table 1.4 reports the outcome of the regression.

Board size is positively related with board composition as expected and significant with the two composition constituents. Without any doubt, an increase in any of these two composition elements will increase the board size. The board size is inversely related with all three ownership concentration ratios measured by the 1st, 2nd and other 3rd to 10th largest shareholding, although insignificant. However, the positive and significant association of the squared term of the number of shares owned by the 2nd largest shareholder to board size indicates that the adjustment of ownership structure, increasing the number of shares owned

*Table 1.4* Relationship between board size, board composition and ownership structure

| | *INSIDEDIR* | *INDDIR* | *1st holder* | *2nd holder* | *2nd holder²* | *Other (3rd–10th) holders* |
|---|---|---|---|---|---|---|
| BSIZE | 0.79 | 1.37 | −0.01 | −0.11 | 0.01 | −0.02 |
| | (13.12)*** | (8.09)*** | (−1.54) | (−1.60) | (1.80)* | (−0.69) |
| Constant | 2.37 | | | | | |
| | (3.17)*** | | | | | |
| Adjusted $R^2$ | 0.59 | | | | | |
| F | 28.76 | | | | | |
| Sig. | 0.00 | | | | | |

*t*-statistics are in parentheses.
*, **, ***Significant levels of 10 per cent, 5 per cent and 1 per cent.

by the other largest shareholders can change the board size. Under the current ownership structure in China, changing the board size by changing the ownership structure is not feasible.

According to the 'Guideline for Introducing Independent Directors to the Board of Directors of Listed companies', by June 30th, 2003, at least one third of the board must be composed of independent directors. And at least one of the independent directors must be an accounting professional. By the end of 2002, the average number of independent directors in most of the listed real estate companies was two, while the average number of board directors is nine. To meet the requirement of the Guideline, most companies had added at least one independent director by June 2003. To ensure that independent directors have enough time and energy to perform the duties of the independent directors effectively, the Guideline defines that 'in principle, the independent directors can only hold concurrently the post of independent directors in five listed companies at a maximum' (Article 2).

To capture the effect of ownership structure on board size, we break down the board size and ownership structure into five categories according to the number of directors on the board and the mean ownership concentration in these categories. Table 1.5 represents the report of the breakdown.

Although the range of board size is fixed by the Company Law in China, the ownership structure still affects the board size. Table 1.5 shows that across the firms, the proportion of shares owned by the Top 10 largest shareholders deviates little, being, on average, more than 50 per cent of the total shares. Highly concentrated ownership measured by 1st largest shareholder results in smaller board size. The companies with board size of eight or below have the 1st largest shareholders holding 50.47 per cent or 40.33 per cent of the total outstanding shares. The companies with larger board size of nine or above have the 1st largest shareholders holding about 39 per cent of the total shares. The companies which have larger board size have the presence of other stockholders. For example, the companies with a board size of nine to 11 members have the 2nd and other (3rd to 10th) largest shareholders holding 8.98, 10.49, 8.53 and 13.23 per cent respectively of the companies' total outstanding shares.

*Table 1.5* Breakdown of board size and ownership concentration (2002)

| *Number of directors on board* | *No. of observations* | *Top 10* | *1st holder* | *2nd holder* | *Other (3rd to 10th) holders* |
|---|---|---|---|---|---|
| 7 | 12 | 53.88 | 40.33 | 6.45 | 7.1 |
| 8 | 5 | 56.7 | 50.47 | 3.25 | 2.99 |
| 9 | 19 | 57.3 | 39.79 | 8.98 | 8.53 |
| 11 | 8 | 58.7 | 34.53 | 10.49 | 13.23 |
| 13–15 | 6 | 54.06 | 39.23 | 5.79 | 9.31 |

When the ownership is highly concentrated in one controlling shareholder, the board size is smaller and diluting the controlling power among more than one controlling shareholder is likely to change the board size. This finding suggests that in China's corporate governance environment, optimizing the ownership structure and diluting the controlling power among more than one controlling shareholder will cause the size of the board to change. To achieve this target, the state has to reduce the number of shares controlled in the market, relieving the problem that the state is the single controlling shareholder in many listed companies and letting companies participate in market competition. This is fundamental to improve corporate governance in China. Brunello *et al.* (2003) argue that concentrated ownership, family control, limited institutional investor activism and lack of monitoring result in the Italian corporate governance structure being dominated by insiders. This can be extended to the corporate governance structure in China.

Fama and Jensen (1983) argue that outside directors can arbitrate in disagreements among internal managers and perform tasks involving serious agency problems between managers and residual claimants, such as setting executive compensation or searching for replacements to top managers. The number of other directorships held by outside directors may proxy for the value of their reputation capital. The threat of damaging this capital is likely to prevent outside directors from colluding with management. Gilson (1990) and Kaplan and Reishus (1990) present evidence consistent with the market for directorships motivating outside directors.

*Relation of board composition and firm performance*

We set up a hypothesis that board size might correlate with board composition variables and the composition explains the result. To test the effect of board composition to corporate performance, we use the 2002 data and run non-linear regressions of the profitability ratios on the board size and board composition by including a squared term of inside directors and a squared term of independent directors. Table 1.6 reports the relationship of board size and board composition to corporate performance.

The board size (log) is positively related with firm performance, although insignificant. The number of inside directors and the squared term of the insider directors have no explanatory power to the firm's performance. Although inside

*Table 1.6* Relationship of board size, board composition and firm performance in 2002

| | *BSIZE (log)* | *INSIDE DIR* | *INSIDE DIR²* | *INDDIR* | *INDDIR²* | *Constant* | *Adjusted R²* | *F* | *Sig.* |
|---|---|---|---|---|---|---|---|---|---|
| EPS | 0.59 | 0.14 | −0.01 | 0.61 | −0.10 | −1.55 | 0.15 | 5.73 | 0.00 |
| | (0.93) | (1.46) | (−1.27) | (3.78)*** | (−2.61)** | (−3.22)*** | | | |
| ROA | 0.09 | −0.01 | 0.0001 | 0.58 | −0.11 | −0.78 | 0.17 | 6.39 | 0.00 |
| | (0.20) | (−0.14) | (0.45) | (5.12)*** | (−4.04)* | (−2.32)** | | | |

*t*-statistics are in parentheses.
*, **, ***Significant levels of 10 per cent, 5 per cent and 1 per cent.

directors are considered valuable for their service in their expertise-counsel role (e.g., Baysinger and Hoskisson, 1990; Hoskisson *et al.*, 1994), they are routinely criticized for their lack of independence from CEOs. As noted previously, inside directors are chosen by the controlling shareholder and some of them are not paid by the listed company. Their professional promotion does not depend on the performance of the listed company where they take the directorship and therefore they may be less likely to spend enough time and energy on its performance. The number of independent directors is positively and significantly correlated with the firm's performance, but the significant and negative signs of the squared number of independent directors indicate a non-linear relationship. This suggests that the companies which have larger proportions of independent directors outperform the ones with smaller proportions. Shivdasani and Yermack (1999) suggest that the benefits of outside directorships may be non-linear, declining for the highest directorship levels as busy directors have less available time to monitor management properly. Although the background of the independent directors and other outside directorship they take is not disclosed in the Annual Report of the listed companies, the finding of the non-linear relationship of independent directors and firm's performance for China's listed real estate companies suggests that an appropriate increase in the number of independent directors on the board of directors will have a significant impact on firms' performance.

## Conclusion

In this chapter, we have discussed China's real estate companies' board characteristics – board size and board composition and its relationship to corporate performance. The effects of board size may be different in different cultures, legal environments and corporate governance traditions. In China, ownership is highly concentrated in one or two large shareholders who control the shareholders meeting and the board of directors. And most of the shares the controlling shareholders own are non-transferable, reducing the effectiveness of mechanisms such as external takeover in corporate governance in China. In such a situation, adding independent directors to the board of directors to improve the independence and the monitoring role of the board of directors is essential to improve corporate governance in China.

Our empirical study of one industry sector – the real estate sector – suggests that board size has effects on the firms' performance and that those effects reflect the board composition which explains the result.

In China, the Company Law fixes the range of the board size between five and 19 members. The boards of directors are dominated by insiders. The direct evidence on the association between board size and corporate performance of China's listed real estate companies suggests that board size is positively correlated with firm performance. The number of insider directors on the board has no explanatory power to the firm performance, although the board of directors is dominated by the insiders. The number of independent directors has a significant impact on the firm performance. The positive relationship between the number of independent directors on the board and firm performance indicates that an increase in the proportion of independent directors within a certain extent will improve the monitoring function of the board and the firms' performance.

For China's listed real estate companies, the effect of firm size on board size is not significant. But the firm size has significant impacts on the firms' performance, with larger firms having more ability to secure critical resources.

Ownership structure has a negative association with board size, although this is insignificant. The firms with higher ownership concentration ratios measured by the Top 10, 1st, 2nd and other (3rd to 10th) largest shareholdings have smaller board sizes. Ownership concentration is positively related with firm performance. The increase in the number of shares owned by the other largest shareholder (i.e. the change of the ownership structure and dilution of the controlling power among more than one controlling shareholder) will change the board size.

Board size is positively related with board composition as expected and significant with the two composition constituents. Without any doubt, an increase in any of the two major composition constituents will increase the board size. The board size is inversely related with all three ownership concentration ratios, although insignificant. The squared term of the number of shares owned by the 2nd largest shareholder indicates the change of ownership structure, suggesting that increases in the number of shares owned by the other largest shareholders can change the board size. Under the current ownership structure in China, changing the board size by changing the ownership structure cannot be realized in the near future. This is another important question facing corporate governance in China but it is beyond our discussion here.

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# 2 Financial sector reforms and economic growth in China

*Nader Nazmi*

## Introduction

The success of the grand Chinese transition to a market-oriented economy crucially depends on China's success in developing a sound and efficient financial system. While in recent years the government has been mindful of this fact and has taken steps to strengthen the banking system, fundamental challenges remain.

By joining the World Trade Organization (WTO) at the end of 2001, China committed to liberalizing trade and investment as well as to implementing a phased opening of its financial system to foreign capital. The inflow of foreign capital, together with the anticipated transfer of best practices and managerial know-how, will help accelerate the development of China's financial system. Nevertheless, capital markets reforms still face serious obstacles and the development of an efficient financial system is likely to require important macroeconomic policy shifts.

In this chapter I highlight possible key short-term and long-run outcomes of financial opening and reform in China. Foreign capital has helped accelerate China's growth rate in recent years. But continued rapid rates of economic growth would require the development of China's non-state sector. This, in turn, would demand a dynamic financial sector capable of allocating capital in an efficient manner. To harness the power of its financial sector as an engine of economic growth, China needs to implement further reforms that include the removal of distortions created by interest and exchange rate controls. These reforms would have significant implications for the conduct of macroeconomic policy. The recent sterling performance of China's external sector might also be compromised by capital account liberalization and a possible revaluation of the renminbi (RMB). Despite these short-term uncertainties and challenges, over a longer time horizon, the development of China's financial and banking systems should result in significant efficiency gains and faster rates of economic growth.

The plan of this chapter is as follows. The next section offers an overview of the current conditions of China's financial system. Then the restructuring of China's financial system as a result of the WTO accession is discussed. The chapter continues on the macroeconomic consequences of the integration of China's financial sector into the world economy and last section concludes.

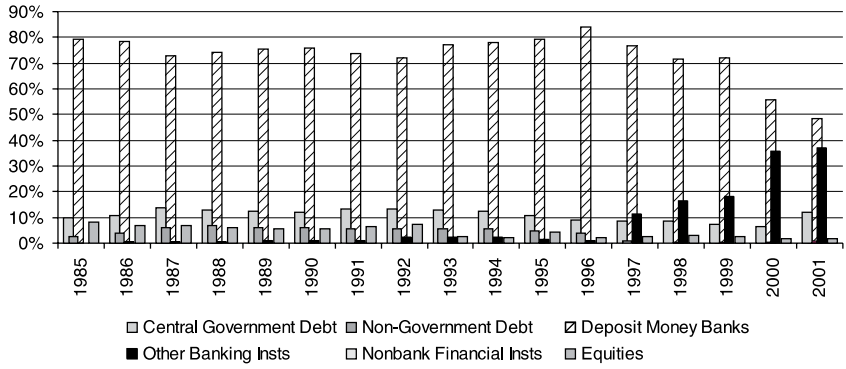


*Figure 2.1* Financial intermediation in China: 1985–2001.
*Source*: IMF International Financial Statistics.

## Current conditions

The 1994 monetary reform transferred the onus of directed lending to three newly created policy banks[1] and transformed the state's four specialized banks into state-owned commercial banks (SOCBs).[2] Relieved from their historic role as the financial arm of the state, SOCBs were given the mandate of operating according to internationally accepted commercial banking principles.

SOCBs are the principal conduit of financial intermediation in China. They manage the bulk of credit allocation and until recently accounted for about 72 per cent of outstanding loans and nearly 90 per cent of financial intermediation (Figure 2.1). In addition to these four pillars of China's banking system, over the last decade, many government-owned commercial banks were created to meet the financial needs of provinces or special economic zones.

Despite this diversification, the heavy hand of the government (federal, state and local) extends to practically all financial institutions, including national and regional quasi-commercial banks, municipal banks, and an extensive network of urban and rural credit co-operatives (see Table 2.1). In anticipation of WTO accession, in November 2000, the Chinese government announced plans to establish a number of private banks. China Minsheng Banking Corp was thus formed as the first, and so far the only, private commercial bank.

Despite tremendous changes over a relatively short time span, China's capital markets remain underdeveloped compared to other emerging market economies of East Asia and Latin America. The transition from a state-dominated economy to a dynamic market economy with the private sector as its engine of growth requires capital markets that efficiently pool liquid assets of risk-averse savers and provide capital for long-term illiquid and often risky investment projects.[3] This type of intertemporal transaction is inherently risky. It thus requires prudent assessment and management of risk based on reliable information about the borrowers and their projects. China's banks and capital markets remain ill-prepared to undertake such

*Table 2.1* Banks and non-bank financial institutions (NBFI) in China

| *Type of institution* | *Name* |
|---|---|
| Central Bank | The People's Bank of China (1978) |
| SOCBs | Bank of China (1978), China Construction Bank (1978), the Agricultural Bank of China (1978), the Industrial and Commercial Bank of China |
| Policy Banks | The State Development Bank (1994), the Export and Import Bank of China (1994), the Agricultural Development Bank of China (1994) |
| Medium-size National Banks | Bank of Communications, CITIC Industrial Bank |
| Smaller National Banks | Everbright Bank of China, Hua-Xia Bank |
| Regional Banks | Guangdong Development Bank, Shenzhen Development Bank, China Merchants Bank, Shanghai Pudong Development Bank, Fujian Industrial Bank, China Minsheng Banking Corporation, Yantai Savings Bank, Benbu Housing and Savings Bank, City United Commercial Banks |
| Non-Bank Financial Institutions (NBFI) | Urban Credit Housing and Cooperatives, Rural Credit Cooperatives, finance companies, trust and investment companies, leasing companies and Postal Savings Bureau |

*Source*: The People's Bank of China and the author.

tasks and to make prudent long-run commitment of capital for the development of the private sector.

SOCBs lend primarily to SOEs instead of financing emerging non-state businesses. In an effort to intensify financial risk controls, monetary authorities have implemented measures that hold loan officers responsible for the quality of loans extended to clients. Given the elevated degree of risk, SOCB's loan officers shun small and medium enterprises (SMEs) in favour of SOEs (whose loans come with implicit government backing) and foreign borrowers with solid financial backing.

The government's backing of SOEs' borrowing has created a moral hazard problem whereby banks finance unviable projects because of the state's implicit insurance. Absent governmental implicit loan guarantees, many SOE projects would be classified as high-risk endeavours that make little or no business sense and would not be granted credit. Empirical evidence from a panel data of Chinese companies shows that banks' lending decisions are systematically biased in favour of SOEs. Moreover, banks offer liquidity to financially strapped SOEs to prevent bankruptcies, creating system-wide moral hazard problems.[4]

According to a survey by National Bureau of Statistics (March 2002), SOCBs approved about 82 per cent and 69 per cent of loan applications from foreign enterprises and SOEs, respectively. For many SMEs, however, internal financing remains the main source of capital. Results from a different survey reported by Gregory *et al.* (2000) and summarized in Table 2.2 show that more than 90 per cent

*Table 2.2* Financing sources for China's private sector enterprises (per cent of firms surveyed)

| | *Self-financed* | *Bank loans* | *Nonfinancial institutions* | *Other* |
|---|---|---|---|---|
| *Years in operation* | | | | |
| Less than 3 | 92.4 | 2.7 | 2.2 | 2.7 |
| 3 to 5 | 92.1 | 3.5 | 0.0 | 4.4 |
| 6 to 10 | 89.0 | 6.3 | 1.5 | 3.2 |
| More than 10 | 83.1 | 5.7 | 9.9 | 1.3 |
| All | 90.5 | 4 | 2.6 | 2.9 |

*Source*: Neil Gregory, Stoyan Tenev, and Dileep M. Wagle (2000).

of private sector firms had to rely solely on internal sources for financing their projects. Only 4 per cent of private sector enterprises had access to bank loans; and banks provided credit to only 2.7 per cent of those firms that had been in business less than 3 years. To partially remedy this credit rationing problem and to encourage lending to SMEs, local governments have set up more than 200 SME guarantee funds. Yet such measures have been largely ineffectual and SMEs continue facing serious credit bottlenecks.

The credit crunch for SMEs resulting from the near exclusive channelling of funds into low-risk–low-return projects of SOEs represents a significant obstacle for the development of a healthy non-state sector. The failure of Chinese banks to serve the non-state sector and to act as the financial engine of the economy is chiefly due to the legacy of these banks as a source of soft-lending to loss-making SOEs. This historical onus of directed lending created banks that suffered from financial fragility and lacked a credit culture. As a result of these two factors, together with the existence of government-induced distortions in the financial markets, China's banking system remains unprepared to foster faster economic growth rates by promoting the development of China's private sector.

### *Financial fragility*

SOCBs' appetite for risk is severely hampered by their fragile financial conditions and the burden of hefty non-performing loans (NPLs) on their balance sheets. As described above, most of these NPLs were created through imprudent state-directed lending to SOEs. The end of China's chronic inflation in the 1990s also exacerbated the NPL problem. Inflation helped banks in three ways. First, it allowed them to collect easy revenues by paying a negative or low real interest rate on their liabilities. Second, it reduced the real value of their liabilities, shrinking the likelihood of insolvency. Third, unexpected inflation added liquidity to the banking sector by making it easier for borrowers to repay their loans. China's lax monetary

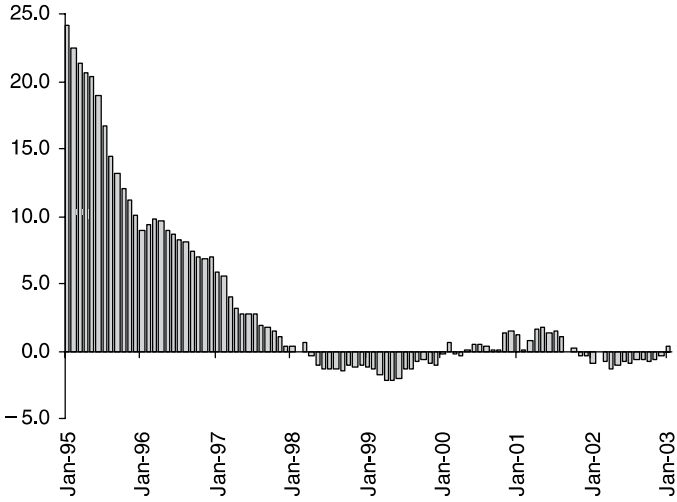


*Figure 2.2* China's CPI monthly inflation rate (y/y).
*Source*: The People's Bank of China and the author.

policy came to an end in 1993 while the funnelling of cheap credit from SOCBs to the state sector was slowing as a result of financial decentralization. These developments resulted in a substantial credit squeeze and brought about price stability (Figure 2.2).[5] The credit squeeze also pressured real estate and stock markets (Figure 2.3), accentuating SOCBs' NPL problem and weakening the banking system. This is consistent with empirical evidence from a wide variety of countries that shows significant declines in property and asset prices seriously undermine the banking system, often resulting in banking and financial crises.[6]

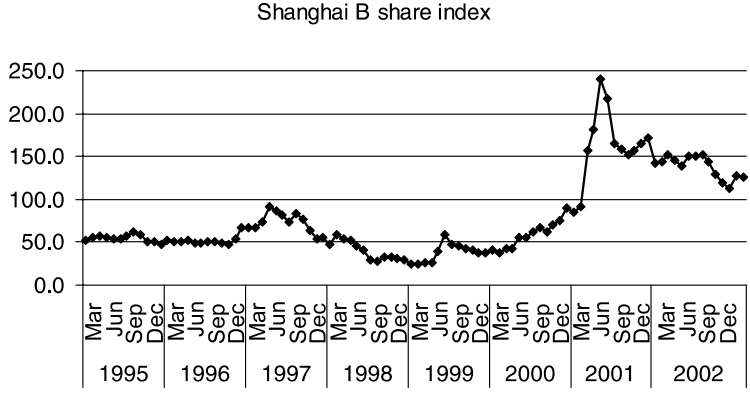


*Figure 2.3* Shanghai B share stock index: monthly observations: January 1995–December 2002.
*Source*: IMF International Financial Statistics.

*Table 2.3* SOCBs, corresponding NPLs and AMCs

| *SOCB* | *NPL (billions of US$)* | *AMC* |
|---|---|---|
| Industrial and Commercial Bank | 50.1 | Huarong |
| China Construction | 45.9 | Cinda |
| Agriculture Bank | 42.6 | Great Wall |
| Bank of China | 32.8 | China Orient |

Because they can ill-afford taking on additional risk, banks with weak balance sheets cannot fulfil their important role of financial intermediation in inherently uncertain environments. Recognizing the need to strengthen SOCBs' finances, the government of China has taken two important steps. First, it issued RMB 270 billion in sovereign debt in 1998 to recapitalize SOCBs and to raise their capital adequacy ratio from 2 to 8 per cent, in line with minimum international standards. Second, it transferred a good chunk of NPLs from SOCBs' books to four newly established asset management companies (AMCs), as described below.

### *The NPL problem and asset management companies*

Learning from other countries that suffered from a similar NPL problem,[7] China established four AMCs to help its banking industry. These companies issued approximately US$ 171 billion (RMB1.4 trillion) in bonds in 1999 and 2000 to partially dispose SOCBs' non-performing assets. AMCs used these bonds, which amount to about 17 per cent of China's 2002 GDP, to purchase SOCBs' non-performing assets at face value, shoring up banks' balance sheets. Table 2.3 shows how each SOCB was paired with a corresponding AMC. It also shows the magnitude of capital infusion from AMCs to each bank in exchange for NPLs.

According to the People's Bank of China (PBC), the scheme reduced the banks' combined NPLs from 35 per cent of the total loan portfolio to 25 per cent. Yet, PBC statistics show that by the third quarter of 2002, as much as US$ 214 billion (RMB 1.77 trillion) in NPLs had remained on SOCB's balanced sheets. Thus despite improvements, even according to official statistics, the NPL problem remains formidable, as SOCBs' non-performing assets amount to about 21 per cent of China's 2002 GDP.

In 2001, AMCs disposed of US$ 9.4 billion (about 5.5 per cent) of acquired NPLs. The cash recovery on the sales of acquired assets was US$ 3.2 billion, short of US$ 3.7 billion in estimated annual cost of servicing bonds issued by AMCs. Since AMCs have sold the more liquifiable and marketable assets in their portfolios first, it is reasonable to conclude that the cash generated from subsequent sales is likely to increasingly fall short of the amount needed for covering the cost of capitalizing banks and covering the interest payments due on AMC bonds. As a result, the central bank will have to assume the financial burden of cleaning up SOCBs' balance sheets. Furthermore, while AMCs aim at reducing the overall cost of bank restructuring through debt work-outs and asset sales, it is unclear what portion of NPLs has to be classified as unrecoverable with no market value. It is in this

context that serious questions are raised about how bank restructuring will be paid for. It is likely that the expense related to the restructuring of SOCBs will be manifested directly in China's budget deficit and public debt. According to government statistics, its deficit and debt currently amount to about 3 and 15 per cent of GDP, respectively. Should these figures be accurate, the restructuring of the banking system would prove quite manageable. But doubts about the accuracy of these statistics and the availability of the needed resources for cleaning up SOCBs' balance sheets remain.

Moreover, a review of AMCs' experiences in seven countries reveals that to succeed, asset management companies need skilled management, transparent operations, protection from political pressure, sufficient funding, and adequate bankruptcy and foreclosure laws.[8] A good many of these conditions are presently lacking in China. A successful resolution to the NPL problem in China through the AMC architecture would require adequate bankruptcy and foreclosure laws as well as measures that would ensure political considerations do not unduly influence the process.

### *Credit culture deficiency and information gap*

China's financial deregulation and globalization has been unfolding in an environment marked by deficiencies in credit culture and information. This is not a case unique to China. Banks in the Scandinavian nations of Finland, Norway and Sweden operated in a protected environment up to the late 1970s. The subsequent financial system deregulation caught the regulators and bank lending officers off guard, as they were unprepared to engage in risk assessment in the newly liberalized environment.[9] Similar deficiencies in credit culture surfaced in the newly deregulated financial systems of Latin America. It is noteworthy, and more than coincidental, that during the 1980s and 1990s, Argentina, Brazil, Chile, Ecuador, Mexico, Uruguay and Venezuela suffered major banking crises after they liberalized their financial systems.[10]

Upgrading credit risk analysis and loan approval procedures is an important element in preparing for financial liberalization. China has begun taking important steps in this direction. It recently implemented an internationally accepted loan classification system that categorizes loans according to the repayment ability of borrowers. This is a welcome move that would help banks implement a better risk management system and would enable regulators to assess financial conditions of banks more accurately. Moreover, the recent creation of an organization dedicated to bank regulation (China Banking Regulatory Commission, CBRC) is a hopeful sign, especially if CBRC trains and prepares supervisors and officials of domestic banks for the post-financial deregulation period.

### *Financial markets distortions*

Government controls on interest rates and transaction fees have to be lifted or significantly relaxed to improve the availability of credit to the non-state sector. More flexible interest rates and fee schedules would allow banks to better manage risk by discriminating against borrowers based on their financial profiles and the

*Table 2.4* Timetable for the removal of geographical and client restrictions on foreign banks in China 2002–2007

| | *2002* | *2003* | *2004* | *2005* | *2006* | *2007* |
|---|---|---|---|---|---|---|
| RMB for foreign clients | Tianjin<br>Dalian<br>Shenzhen<br>Shanghai | Guangzhou<br>Qingdao<br>Nanjing<br>Wuhan | Jinan<br>Fuzhou<br>Chengdu<br>Chongqing | Kunming<br>Zhuhai<br>Beijing<br>Xiamen | Shantou<br>Ningbo<br>Shenyang<br>Xian | All China |
| RMB for Chinese clients | | | Chinese firms only | | | All Chinese clients |

viability of their projects. Since banks are given only very limited leeway in setting the interest rate they charge borrowers, they often impose creative fees (such as illusory late fees) to bring the effective cost of the loan closer to the risk attached to the borrower. This has resulted in a non-transparent fee scheme that arbitrarily discriminates against SMEs. Liberalization of interest rates should be considered as a key factor in enhancing the efficiency of the banking system and in improving the availability of credit to the non-state sector.

## The WTO impact

Over the next four years, China will gradually loosen regional and client restrictions on foreign banks. Table 2.4 shows the timetable for the phased relaxation of geographical restrictions on foreign banks offering renminbi services to non-Chinese clients. It also shows that by next year, foreign banks will be allowed to offer renminbi services to Chinese corporations and that in four years they will be allowed to serve all Chinese clients. By 2007, foreign banks will have unfettered access to the Chinese market and will be subject to the same requirements as domestic banks. As a result, by the end of the decade, Chinese banks are likely to lose a good chunk of the market for cash management, trade financing, and credit card transactions to foreign banks.

The transition from a financial system dominated by a handful of large banks that are burdened by a serious asset quality problem, a fragmented credit culture, a noisy information set, a weak regulatory framework and widespread supervisory deficiencies to a solid financial system capable of assessing risk and allocating credit efficiently is a tall order. The entry of well-capitalized and experienced foreign financial institutions only adds to the short-term difficulties of Chinese banks.

A study of bank-level data by Claessens *et al.* (1998) shows that foreign banks collect higher profits than domestic banks in emerging markets. Moreover, the profitability of domestic banks suffers as foreign banks increase their share of the market.[11] In such an environment, credit expansion is a highly likely outcome, as a fight for market share and a redistribution of clients takes place.

The experience of Latin American countries shows that credit quality is likely to deteriorate significantly in the aftermath of financial liberalization and banking reforms.[12] This is due to a rush by weaker banks to secure market share from competitors by extending credit to high-risk borrowers.

Credit expansion in an environment characterized by substantial information deficiencies increases the likelihood of a significant deterioration in credit quality. This makes close monitoring by an aggressive regulatory body especially crucial. While it is unlikely that a seasoned and effective supervisory system will be in place by the time foreign banks begin penetrating the Chinese market, the government seems serious about bank regulation and supervision. It recently established the China Banking Regulatory Commission (CBRC) as an organization responsible for regulatory-supervisory issues. The transfer of supervisory tasks from the central bank to CBRC and the naming of a high-level official[13] as the head of CBRC bode well for the political power and potential effectiveness of this commission in monitoring banks.[14]

On the positive side, the entry of foreign banks is likely to be helpful in enhancing transparency and improving the corporate-governance system. The transfer of best practices, information technology, and managerial know-how will help domestic banks to enhance their efficiency while helping supervisors improve the quality of their monitoring of banks. The success of the regulatory system depends not only on a strong legal framework but also on the quality of monitoring. Good monitoring, in turn, requires the development of human capital, expertise and administrative competence. The entry of foreign banks could help improve the quality of monitoring as supervisors learn from best-practices of foreign banks and propagate these practices across the banking industry.

The internationalization of China's financial markets will also be instrumental in facilitating domestic financial institutions' access to foreign capital in domestic and international equity markets. Foreign capital participated enthusiastically in Minsheng Banking Corp's highly successful initial public offering (IPO) in the Shanghai Stock Exchange and Bank of China raised about US$ 2.6 billion by listing on the Hong Kong Stock Exchange. This trend is likely to gather momentum over the next few years, as Bank of China, Industrial & Commercial Bank of China, and China Construction Bank have announced plans for global offerings by 2005 or 2006. In addition to raising capital and improving the financial health of domestic banks, stock markets listing, particularly in well-established and highly regulated international exchanges, would help strengthen governance and improve the quality of the management teams at these banks.

## Macroeconomic consequences

Countries liberalize their financial sector to create a dynamic and mature system that can contribute to long-run economic prosperity. Privatization and deregulation, while not goals themselves, are often pursued on the justified grounds that they increase competition. Increased competition, it is generally agreed, is the key to improving the performance of the financial system.[15]

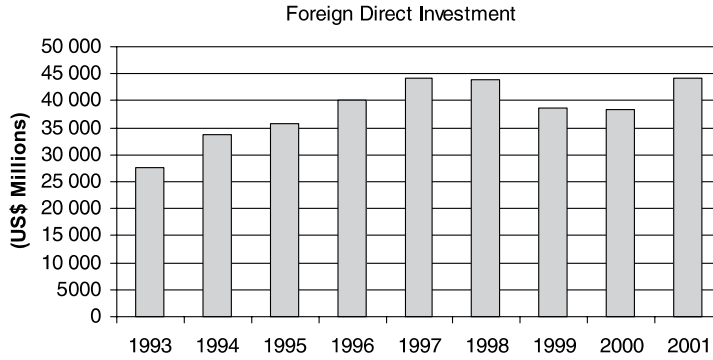


*Figure 2.4* Foreign direct investment: 1993–2001.

*Source*: International Monetary Fund, International Financial Statistics.

There is near universal consensus that government-induced distortions in the banking system retard financial development and reduce economic growth. Moreover, a vast literature offers overwhelming theoretical and empirical support in favour of the view that financial development is an important catalyst for economic growth.[16]

Notwithstanding the positive long-term impact of financial opening and deregulation, there is considerable evidence that the short-term effect of financial liberalization on the banking sector is negative.[17] This is because financial liberalization weakens the banking system in four ways. First, the lifting of interest rate controls, the hallmark of financial liberalization, is likely to lead to increased interest rate uncertainty and higher risks for banks accustomed to operating under predictable and stable interest rate conditions dictated by the government. Second, increased competition may, at least during the transition period, destabilize weaker banks. Third, financial liberalization may offer banks new venues for evading prudent regulations by allowing them to utilize offshore accounts. Finally, it is likely that the end of financial repression translates into a lending boom due to pent-up demand for credit.[18] In an environment marked by lax regulation and supervision, weaker banks are likely to participate in the lending boom by engaging in high-risk projects, creating systemic vulnerabilities in the financial sector.

China's economic growth has been impressive, but scepticism about the long run performance of the Chinese economy is justified unless China succeeds in finding a new growth driver. Since 1997, fiscal policy has been the main source of economic growth in China. In addition, over the last few years, foreign direct investment (Figure 2.4) geared towards export production has acted as a second important contributor to China's economic performance.

Since 1995, exports, accounting for roughly 28 per cent of China's GDP, have contributed to nearly 40 per cent of its growth, mostly through priming the industrial sector (Figure 2.5).

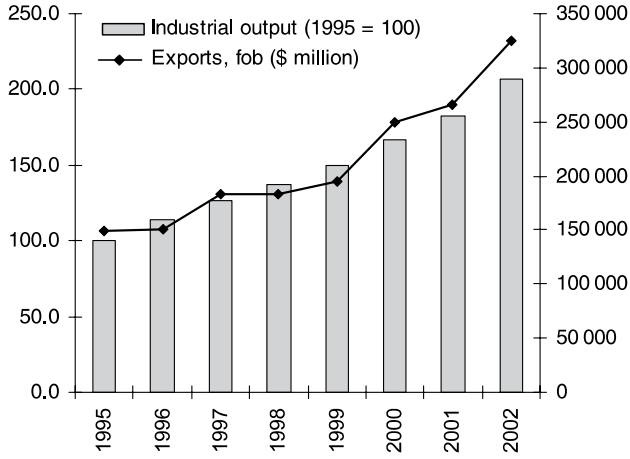


*Figure 2.5* Industrial production and export performance: 1995–2002.
*Source:* International Institute of Finance (IIF).

These two engines of the recent sterling economic performance of China will be hard pressed to continue their role as catalysts of long run growth. Long run growth prospects depend crucially on the successful implementation of measures that spur the continued development of China's dynamic non-state sector. Chief among these measures is the development of the financial sector. As argued above, despite possible adverse short-term impacts on the banks, interest rate liberalization is required for the proper functioning of the banks and the development of the financial system in the long-run.

Continued development of China's financial system requires capital account convertibility and increased exchange rate flexibility. There is a heated, but not necessarily useful, debate about whether or not the renminbi is overvalued or undervalued and about the magnitude of the presumed undervaluation or overvaluation. Those who argue that the renminbi is undervalued point to China's massive balance of payments surplus, substantial capital inflows (Figure 2.6) and the country's sizable foreign reserves[19] as evidence of a roughly 10 per cent undervaluation of renminbi.[20] Figure 2.7 shows that simple purchasing power parity type calculations would indicate that the renminbi is slightly (about 6 per cent) overvalued. In either case, the proposition that the renminbi is highly undervalued and would gain significant grounds against the US dollar in the case of a revaluation does not seem to have empirical justification. Nevertheless, government officials are reluctant to risk any changes to the exchange rate regime that might compromise the performance of the export sector.

Beijing's desire to keep renminbi competitive in order to attract foreign capital for the purpose of job creation and export promotion is understandable. Since 1998, SOEs have laid off an estimated 26 million workers, a trend that is likely to intensify in the post-WTO period as a result of increased competition and

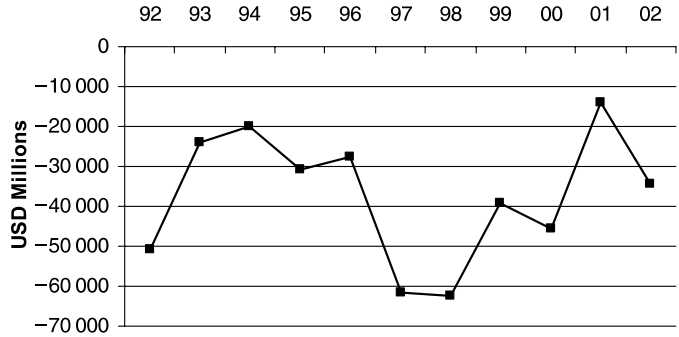


*Figure 2.6* Capital flight from China: 1992–2002.
*Source*: Datastream.

economic decentralization. This, together with considerable relocation of workers from rural to urban areas creates enormous pressure on policymakers and politicians to guard against worsening employment conditions.

Yet, it is clear that China's policymakers appreciate the need for increased exchange rate flexibility as China's financial markets become more globalized. In this context, there have been talks of introducing a narrow band for RMB-USD exchange rate fluctuations. A better approach would peg the renminbi to a basket of currencies belonging to China's main trading partners as a prelude to introducing a market-determined exchange rate. This basket of currencies approach would offer some exchange rate flexibility while providing safeguards against prolonged periods of over- or undervaluation of the renminbi against the currency of one of China's main trading partners. Figure 2.8 shows that such a scheme would have translated to a natural band of about plus–minus 15 per cent for the RMB during

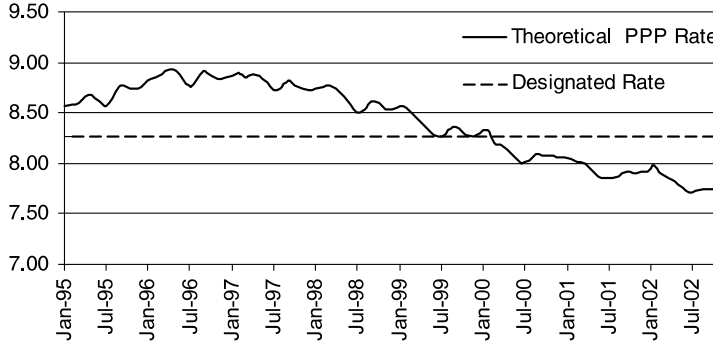


*Figure 2.7* RMB–USD official exchange rate and CPI-based PPP exchange rate.
*Sources*: Author's calculations and The People's Bank of China

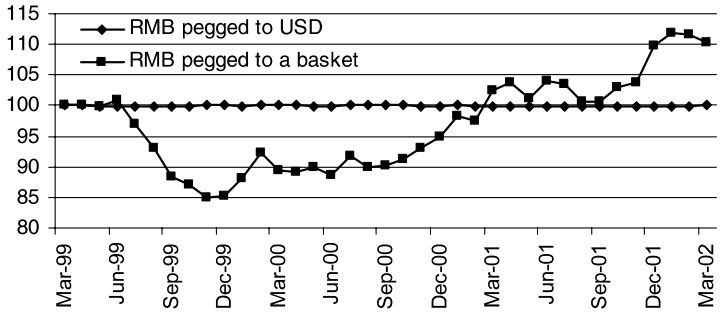


*Figure 2.8* RMB as pegged to the USD (100) and RMB pegged to a currency basket.
*Source*: Calculated by the author using Bloomberg data.

the period 1999–2002. While the devaluation of the yuan from 5 to 8.3 per US dollar in 1994 helped the Chinese export sector, evidence suggests that external sector reforms of 1988 and 1991 were the key propellers for exports. Moreover, Chinese exporters have shown increased supply responsiveness to price signals, expanding production as exports prices denominated in US dollar increase.[21] Pegging the RMB to a basket of foreign currencies would foster some exchange rate flexibility without jeopardizing the performance of the export sector.

## Conclusion

This chapter offers an assessment of the current conditions of China's financial markets and concludes that while China has introduced significant financial sector and banking reforms, considerable challenges remain. It identifies the financial weakness of banks, a legacy of decades of state-directed lending practices, as a culprit for the maturing of the private sector enterprises as an engine of growth in China. It concludes that while the AMC solution to the non-performing assets problem of SOCBs has helped strengthen banks' balance sheets, important questions regarding the eventual success of the AMC approach remain. Moreover, it highlights risks that persist because of credit culture deficiencies and distortions in financial markets.

The anticipated internationalization of China's financial markets under WTO reforms is likely to result in significant long run efficiency gains, helping create a more dynamic economy through better financial intermediation. The experience of other countries with financial liberalization, however, offers cautionary tales about possible short-term challenges associated with financial deregulation. In this context, implementing measures that would ensure prudent risk-management practices in the post-liberalized period is extremely important.

Finally, the development of globalized financial markets of China will require a rethinking of interest rate and exchange rate policies. A gradual approach to easing restriction on the interest rate and the exchange rate would pay significant longer-term dividends for the economy. Moving from an exchange rate system

pegged to the US dollar to one that fluctuates with the currencies of China's main trading partners offers a reasonable bridge to a more flexible exchange rate system.

## Notes

1. The three policy banks of The Long-Term Development and Credit Bank, the Import–Export Bank and the Agricultural Development Bank serve as the state's financial arm for its industrial, trade and agricultural policies.
2. These are Bank of China, the Agricultural Bank of China, the Industrial and Commercial Bank of China, and the China Construction Bank.
3. See Levine (1997) for a discussion.
4. Lu *et al.* (2001).
5. See Brandt and Zhu (2000) for a discussion of economic decentralization and its impact on inflation in China.
6. See Kaminsky and Reinhart (1996), Mishkin (1997) and Goldstein and Turner (1996).
7. See Klingebiel (2000) for some international comparisons.
8. Klingebiel (2000).
9. Goldstein and Turner (1996).
10. Nazmi (2000).
11. Claessens *et al.* (1998).
12. Nazmi (2000).
13. Bank of China Chairman Liu Mingkang.
14. China's two other influential regulatory entities are China Securities Regulatory Commission and China Insurance Regulatory Commission.
15. While a general consensus is still lacking, most economists agree that it is best to liberalize capital accounts only after price stability has been achieved, domestic reforms have progressed significantly, and free trade has been implemented successfully.
16. See Levine (1997) for a review.
17. Demirgüç-Kunt and Detragiache's (1998) study of 53 countries, for example, shows that financial liberalization increases the likelihood of a banking crisis while Kaminsky and Reinhart (1996) identify financial liberalization as an important early indicator of an unfolding banking crisis.
18. Goldstein and Turner (1996).
19. According to the central bank figures, China's foreign exchange reserves rose 34.9 per cent in 2002 to reach US$ 286.4 billion.
20. See, for example, Goldman Sachs (2002), 'The Five Great Myths about China and the World,' Issue No: 2002/15.
21. Cerra and Saxena (2002).

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# 3 WTO challenges and efficiency of Chinese banks

*Shujie Yao, Chunxia Jiang, Genfu Feng and Dirk Willenbockel*

## Introduction

China has experienced rapid economic growth for more than a quarter century since economic reforms started in 1978. In the meantime, the banking sector has been subject to fundamental structural change and reform. The key objective of reform was to change the sector from a centralized, state-owned, monopolistic and policy-driven to a decentralized, multi-ownership, competitive and profit-oriented system.

Despite the significant changes and reforms in the past decades, the banking system in China is still renowned for its low efficiency and mounting non-performing loans (NPLs), making further reforms more and more difficult and challenging. As China joined the World Trade Organization (WTO) in December 2001, the domestic banking market will have to have completely opened up for competition with foreign banks and other overseas financial institutions. Many foreign banks have now entered China for business activities involving foreign currency transactions. The Hong Kong and Shanghai Banking Corporation (HSBC) is now allowed to do business in Shanghai involving transactions in Renminbi, the Chinese currency. In two years time, all foreign banks will be able to do any business that can be done by domestic banks. By June 2004, there were already 100 foreign banks conducting Renminbi business in 13 large cities, and 53 of them were allowed to do such business with domestic enterprises (*People's Daily*, 2004).

The time scale for intense competition is short, but most domestic banks, especially the four large state-owned commercial banks, are still ridden with mounting NPLs and low efficiency. The task to make these banks competitive with international banks such as HSBC is undoubtedly onerous and extremely challenging for the Chinese authorities.

In response to the immediate challenges, the central government has decided to accelerate the pace of reforms. Apart from bailing out a huge sum of NPLs from the four state-owned banks, the state council has decided to support the Bank of China and China Construction Bank with $45 billion from its total foreign exchange reserves of $403 billion. This is by far the boldest and toughest decision of the government to convert the big state banks into truly commercial institutions.

The implication is that these two banks will become joint-stock companies, which will soon be placed in the stock exchanges. If this reform is successful, a similar reform measure will be applied to the other two state banks, the China Industrial and Commercial Bank and the China Agricultural Bank.

One underlying economic theory of the latest banking reform is the principal-agent problem. In the past, whatever the state banks did, the principal (the state) had to bail them out if the banks ran into difficulty as they always did. The agents (the banks), knowing that the principal was the ultimate resort of help, lent relentlessly to whatever clients they considered to be trustworthy, resulting in mounting NPLs that could never be recovered. By changing the state banks into joint stock companies, it is hoped that the state will never have to bail them out in the future. In the short run, the state has a responsibility to remove all or much of the NPLs and let them have a fresh capital structure similar to that of a truly commercial bank so that they can compete with the incoming foreign competitors on a level playing field. In the long term, the state banks will have to be entirely responsible for their own profits and losses without any political or administrative interference.

A second theory of banking reform is related to budgetary constraints. In the past, soft budget constraints meant that state banks were largely capitalized using state funds. In the future, once they are listed in the stock market, they have to rely more and more on raising capital from shareholders, rendering them to be responsible for shareholders' interests rather than state or local government's interests. The competitiveness of these banks will depend on their ability to earn profits and pay dividends to shareholders.

Whether the motivation of reform is based on the principal-agent problem, or on the impact of budgetary constraints, the ultimate goal is to increase efficiency and competitiveness of domestic banks. Whether this goal can be achieved depends on the answers to the following two questions. First, can ownership reform and hard budget constraints help improve efficiency? Second, can China change the ownership structure of its banking system and subject all the state banks to hard budgets in such a short time before foreign banks flush into the country for competition?

In this chapter, we aim to answer the first question based on available data and information. We cannot answer the second question, as it is not yet clear how quickly the state council can move to re-capitalize the four large state banks.

To answer the first question, we employ a stochastic frontier production function and use panel data of 22 state-owned and non-state banks for the period 1995–2001. Two hypotheses are tested. First, joint stock or non-state banks are more efficient than the state-owned banks. Second, banks that are subject to a harder budget are more efficient than banks that are subject to a softer budget.

The regression results support the hypotheses and show that the average efficiency level is 63 per cent in the data period, which is relatively low compared with that of the US or European banks. Two factors are found to have a significant impact on the level of efficiency: ownership characteristics and equity/asset ratio. On average, non-state banks outperform state banks by 8–18 per cent

depending on whether the output of banking is measured by the amount of loans or by profitability. The equity/asset ratio measures the extent of risk taken by banks. It also reflects the extent to which banks are subject to a hard budget. If a bank is well capitalized by the state, the equity/asset ratio is high, and hence less reluctant to take risk. It is found that banks with a high equity/asset ratio are less efficient because they are better capitalized, less risk-taking, and hence subject to a softer budget constraint.

The empirical results not only support our hypotheses, but also support the government efforts to reform the state banks through changing their ownership structure and subjecting them to a hard budget. Whether the state can successfully transform the state banks, however, remains a challenging issue for future research, but is beyond the scope of this chapter.

The rest of this chapter is organized as follows. "Bank reform and WTO challenges" section describes the background information of the Chinese banking system. Then the following section reviews literature on efficiency studies, paying special attention to the banking sector. "The stochastic frontier production model" section discusses the methodological issues, including model specifications and data. "Results and interpretation" section presents and evaluates regression results. Then the last section concludes.

## Bank reform and WTO challenges

### *Banking system reform*

The Chinese banking system was entirely dominated by the People's Bank of China (PBOC), which acted as a central bank and the only commercial bank in the country throughout the pre-reform period 1949–78. Following economic reforms since 1978, the banking system has undergone significant changes. The first change was the breaking up of PBOC into two arms, the central bank and the commercial operation. The central bank still retains the name PBOC. The commercial operation was split into four specialized state-owned banks, or the Big Four in the rest of this chapter: the Agricultural Bank of China (ABC), the China Construction Bank (CCB), the Bank of China (BOC), and the Industrial and Commercial Bank of China (ICBC). The banking system was overwhelmingly dominated by the PBOC and the Big Four until the mid-1990s when some non-state banks and joint-stock banks were allowed to run businesses throughout the country (Wong and Wong, 2001). The present banking system in China is illustrated in Figure 3.1.

The Big Four are renowned for their low efficiency, loss-making and mounting NPLs. Two main factors were responsible for their current plight. One was that each of them provided services mainly to state-owned enterprises (SOEs) within a designated sector of the economy. They were operating as some well-encapsulated monopolistic institutions, with no responsibility and incentives to penetrate and compete across regions and sectors. The ICBC provided services to commercial and industrial activities in the urban areas. The ABC was responsible for rural

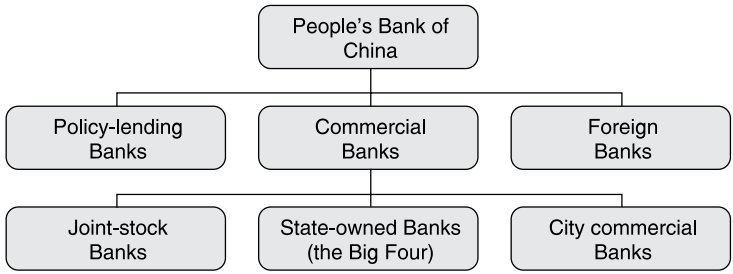


*Figure 3.1* China's banking system.

finance. The BOC mainly focused on foreign exchange dealing and foreign businesses. The CCB provided services to urban large construction projects. Each of the Big Four had provincial and local branches and each branch operated within a designated region under the administrative control and guidance of the respective local authority. As a result, all banks and their local branches had their own servicing niches, ruling out any possibility of free competition. Another factor was that the Big Four acted as governmental agencies in a planned economy. They were effectively arms of government administration to implement production plans projected by the State and Regional Planning Commissions. They extended loans to SOEs on the basis of fulfilling the national and regional production plans, regardless of profitability, resulting in huge volumes of NPLs and losses (Wong and Wong, 2001).

Since the early 1980s, the banking system has experienced some changes, and the intention of such changes is to move the state banks away from being driven by policy towards being driven by profit and competition. In the process of transition, the government has assumed concrete steps to reform in order to create a more competitive and efficient system. The first step was to remove the limits that a specialized bank had to serve a designated sector in order to create a competitive market-based financial system in 1985. However, the competition was limited because the operations of the Big Four were frequently influenced by the central and local governments. The local branches were subject to government control and much of the lending activities were still driven by the needs of policy makers.

The second step was the establishment of three policy banks in order to take over the function of extending policy loans from the Big Four in 1994. Nevertheless, the state commercial banks still play a significant role in policy lending. The serving and lending capacity of the specialized policy banks are unable to meet the need of policy lending previously provided by the Big Four due to the lack of a branch network and capital. Moreover, the state commercial banks are often subject to pressure from both the central and regional authorities to make loans to their preferred sector and enterprises.

The third step was the reorganization of the central bank in an effort to eliminate local government interference at the end of 1998. The PBOC merged provincial-level

branches into nine large regional branches. Local governments no longer have the right to appoint senior officials for the local branches of PBOC as they did before.

The fourth step was the establishment of four asset management companies (AMCs) in order to unload NPLs from the Big Four in 1999. These AMCs, namely Cinda Asset Management Company, China Great Wall Asset Management Company, Oriental Asset Management Company, and China Huarong Asset Management Corporation, are paired with CCB, ABC, BOC and ICBC, respectively. AMCs were expected to help the Big Four to clean up their balance sheets and to make them more competitive. In addition, a five-classification loan standard scheme has applied to all domestic banks in order to control the NPL ratio of new loans.

Apart from reforming the Big Four, the state allowed regional banks, or even non-state banks, to be established and to compete with the Big Four. The establishment of joint-stock commercial banks has injected vigour into the Chinese banking industry by creating a new source of competition. In addition, 90 local banks, known as city commercial banks, were formed by consolidating former local urban cooperatives. City commercial banks all adopted a shareholding ownership structure and were restricted geographically within their own localities. These joint-stock banks operate on a pure commercial basis focusing on profit maximization and market share.

Having assumed effective measures in a step by step manner, much headway has been made in enhancing the competitiveness and efficiency of the banking system. Currently, an open and competitive system has been primarily established, comprising the PBOC as the central bank, along with the Big Four as mainstay, joint-stock commercial banks as growth engines, local commercial banks and foreign banks as complementarities. However, despite a rapid expansion of non-state banks, the Big Four still overwhelmingly dominate the Chinese banking industry. The four firm concentration ratios of total assets, loans and deposits were respectively 84.93, 84.26, and 88.51 per cent in 1998, whilst the four firm concentration ratios of profits was only 55.33 per cent (Wong and Wong, 2001). These rough indicators suggest that the Big Four are large but much less profitable than other types of banks, an issue of interest to be investigated in this chapter.

### *Facing WTO challenges*

Although much progress has been made on reforming the banking system, the Big Four still face many internal and external challenges. The internal plight is the huge volume of NPLs, resulting from policy lending to loss-making SOEs. The external plight is the lack of operational experiences in a market-based financial system, brought about by the specialization of the Big Four to serve the SOE sector. The current competitive position is not good enough for Chinese banks to compete with foreign banks with immense financial muscle and international experience. For example, the second largest bank of the UK, the Royal Bank of Scotland, generated £6.19 billion of pre-tax profit in 2003. Its workforce was only 120 000, implying that each employee generated on average more than £50 000 (or $90 000) of profit. Obviously, none of the Chinese Big Four would be able to compete with the Royal Bank of Scotland if there were no protection.

*Table 3.1* Comparison of profitability level in 2002 (%)

| | *Net income/ equity* | *Net income/ assets* | *Net interest revenue/assets* | *Operating profit/assets* |
|---|---|---|---|---|
| Citibank | 15.29 | 1.27 | 4.36 | 7.16 |
| HSBC | 12.2 | 0.938 | 2.07 | 3.58 |
| Credit Agricole | 7.18 | 0.42 | 1.24 | 2.69 |
| Bank of China | 4.61 | 0.303 | 1.50 | 0.44 |

*Source*: Bankscope.

*Table 3.2* Opening schedule for the banking sector after WTO accession

| *Year* | *Business scope* | *Geographic coverage* |
|---|---|---|
| 2002 | No restriction on foreign currency | Business RMB business in 9 cities |
| 2003 | RMB business to Chinese enterprises | 13 cities |
| 2004 | | 16 cities |
| 2005 | | 20 cities |
| 2006 | RMB business to all Chinese clients | No restriction |

*Source*: WTO data cited in Huang (2004).

Table 3.1 compares the performance between the Bank of China, China's best-performing state bank, and three top world-class banking groups, Citibank, HSBC and Credit Agricole in 2002.

In all the four main indicators of performance, the Bank of China is greatly outperformed by any of the other banks. The Bank of China's profit/assets ratio is only a small fraction of that of Citibank. Its net income/equity ratio is only one fourth of that of Citibank, and its net income/asset ratio is just one third of that of HSBC.

In the past, there were high entry barriers and business restrictions for foreign banks, including geographic restrictions and entry requirements. Under the WTO rules, there is no restriction on foreign currency business upon accession in all parts of the country. For renminbi (RMB), or local currency business, however, the opening process as shown in Table 3.2 is gradual in terms of time and locality. The geographic restriction is phased out in six stages. Upon accession, RMB business by foreign banks is allowed in four large cities, Shanghai, Shenzhen, Tianjin and Dalian. It will then be expanded to Guangzhou, Zhuhai, Qingdao, Nanjing and Wuhan within one year of accession, to Jinan, Fuzhou, Chengdu and Chongqing within two years, to Kunming, Beijing and Xiamen within three years, to Shantou, Ningbo, Shenyang and Xian within four years, and to all parts of the country within five years (i.e., 2006) after accession.

Hence, how to reform domestic banks, especially the Big Four, and how to improve their efficiency has become an urgent and important issue of concern after WTO accession. Indeed, the need for reforming the Big Four is due to the pressure of competition from both outsiders and insiders. With China's entry into WTO, domestic commercial banks will face more and more competition and challenges from foreign banks. The Big Four will compete with their sophisticated

foreign rivals on an international competitive market basis. With further reform, the Chinese banking institutions will have unprecedented opportunities to enjoy their increasing weight in the international financial system. The prospect of the Chinese economy also motivates the Big Four to reform themselves.

## Literature on banking efficiency

Over the last half a century, much attention has been devoted to banking efficiency. Regarding the sources of inefficiency in banking, earlier studies tended to focus on economies of scale by examining whether costs per unit can be reduced by increasing output, and economies of scope by examining whether costs per unit can be lowered by joint production. Empirical studies of scale and scope economies show significant scale economies for medium-sized banks of $100 million to $5 billion in assets in the 1980s. However, recent studies indicate that scale economies have increased substantially, existing for large banks of $10 billion to $25 billion in assets in the 1990s. The recent merger and acquisition in the UK banking sector provides a good example of scale economies involving huge commercial banks. Such examples include the merger of the Royal Bank of Scotland with the National Westminster Bank, the Bank of Scotland with Halifax, and the earlier acquisition of Midland Bank by HSBC and the merger of Lloyds and TSB. As for scope economies, however, empirical studies reveal small cost inefficiencies (Saunders, 1999).

More recently, efficiency research has shifted to production efficiency which consists of two components: technical efficiency and allocative efficiency. Technical efficiency refers to the ability of optimal utilization of available resources either by producing maximum output for a given input bundle or by using minimum inputs to produce a given output. Allocative efficiency refers to the ability to achieve the optimal combination of inputs and outputs for a given level of prices (Lovell, 1993). In the context of production efficiency, x-efficiency first introduced by Leibenstein (1966) is attributed to overall objective determinants, such as improvement in management and application of technologies, regardless of size (scale) and product mix (scope). Within a data set, the best-practice frontier or the worst-practice frontier can be estimated. The difference between the best-practice frontier and the practice of a particular firm reflects its x-inefficiency.

In the literature, two main controversial issues addressed by researchers are how to define and measure inputs and outputs of banks and how to determine the best-practice frontier to evaluate their performance. Indeed, how to measure banking outputs and inputs is one of the most difficult issues because of the distinct features of banks. Unlike manufacturing firms producing physical goods, banks not only produce unidentifiable products – intermediary services – but also provide a wide range of products – multi-products. A number of measures on banking output have been employed in early efficiency research, such as the number of deposit and loan accounts and the dollars in each account.

By emphasizing the basic nature of a bank's production process rather than stock variables, a services flow offered to customers can be considered as bank output. There are two main approaches to measure services flow: the production approach

and the intermediation approach. The production approach treats banks as firms producing different deposit and loan accounts. The number and type of transactions and documents are considered to be the best measure of bank output. However, such specific data are generally unavailable and therefore, in practice, the number of deposit and loan accounts is usually employed as the measure of bank output. The intermediation approach treats banks as financial intermediaries channelling funds between depositors and creditors. In the production process, the value of bank loan and investment is considered to be output, while labour and deposit capital are treated as inputs. This approach is distinguished from the production approach by adding deposits to inputs, with consideration of both operating cost and interest cost (Goddard *et al.*, 2001). Neither the production approach nor the intermediation approach is perfect, they are complementary instead (Berger and Humphrey 1997). Each approach emphasizes one side of the role played by banks and can be applied to different levels of efficiency research. The production approach is appropriate for studying the cost efficiency of banks by addressing the operation costs of banking. The intermediation approach is appropriate for studying the economic differentiation of banks by controlling the overall costs of banking (Ferrier and Lovell, 1990). This approach takes interest expenses into account, which is useful not only for examining bank efficiency but also for frontier analysis.

Different estimation techniques have been applied to bank efficiency research. Berger and Humphrey (1997) provided a valuable survey on 130 financial institution efficiency studies in which five main approaches were identified. These approaches can be classified into two main categories – parametric and non-parametric techniques. Parametric technique and non-parametric technique were roughly equally adopted. Overall, their survey shows similar efficiency estimates carried out by parametric techniques and non-parametric techniques. On average, there is about 20 per cent cost inefficiency and about half of profit inefficiency in the US. Studies employing non-parametric techniques obtained lower average efficiency estimates and greater dispersion than studies using parametric techniques. Despite the similarity of average efficiency estimates, disagreement about inefficiency rankings of individual firms exists.

Parametric techniques can be subdivided into three main approaches to determine the best-practice frontier. The first approach is the stochastic frontier approach (SFA) which was developed by Aigner *et al.* (1977) and Meeusen and van den Broeck (1977). SFA specifies a functional form for the cost, profit or production function, which allows inefficiencies to be included in the error term. Two distributional assumptions on the error terms to separate the two components are (1) the inefficiencies, denoted $\mu$, follow an asymmetric half-normal distribution, based on the logic that inefficiencies only increase costs above frontier levels, and (2) random errors, denoted by $v$, follow a symmetric standard normal distribution because random fluctuations can either increase or reduce costs (Bauer *et al.*, 1993). Relevant literature on applications of SFA to banking can be found in Ferrier and Lovell (1990), Bauer *et al.* (1993), Kwan and Eisenbeis (1996) and Clark and Siems (2002). In China, this approach has been used to investigate grain production and technical efficiency by Yao and Liu (1998). However, no study has been found for the Chinese banking sector.

Other approaches to determine the best-practice frontier are the distribution free approach (DFA) and the thick frontier approach (TFA). DFA assumes that efficiency differences are stable over time. The estimated efficiency of each firm is the difference between its mean residual and industrial mean residual on the frontier. An example of DFA application is Clark and Siems (2002), in which DFA has been applied to investigating x-efficiency of off-balance-sheet activities in banking. TFA has no restriction of distributional assumption. TFA estimates provide an overall level of efficiency rather than point efficiency estimates for individual firms. This approach has been employed in Berger and Humphrey (1992) and Bauer *et al.* (1993).

Unlike the parametric technique that specifies a functional form for production efficiency, non-parametric technique has less restriction on the production frontier. Non-parametric technique can be divided into two subcategories: data envelopment analysis (DEA) and free disposal hull (FDH). DEA is a linear programming method used for estimating efficiency of decision making units (DMUs). DEA creates a production frontier directly based on a particular data set of firms rather than a specific functional form. The distance from the best-practice frontier reflects a firm's inefficiency (Charnes *et al*. 1978). Examples of DEA applications are Ferrier and Lovell (1990) and Aly *et al.* (1990). In China, one recent application of the DEA technique is found in Zheng *et al*. (2003) on state-owned enterprise performance. FDH is a special case of DEA by relaxing the hypothesis of convexity (Berger and Humphrey, 1997).

Each approach to determine the efficiency frontier possesses certain advantages and disadvantages. Non-parametric technique allows efficiency to vary over time and does not require prior assumption of the distribution of inefficiency across observations. However, its important drawback is the assumption of no random errors influencing bank performance. Ignoring the existence of potential errors, the effects of omitted errors may be composed into efficiency estimates (Berger and Humphrey, 1997). Another drawback of the non-parametric technique is the neglect of price effects on efficiency – allocative efficiency, addressing only technological efficiency (Berger and Mester, 1997). As to the parametric technique, a crucial disadvantage is the pre-specified functional form for efficiency frontier, which may result in an inaccurate efficiency measurement (Berger and Humphrey, 1997). Given that we use a panel data of 22 banks covering 6 years, there will be significant variations of efficiencies across different kinds of banks in different time periods. In other words, the effects of random errors could be large. As a result, the parametric approach, especially the stochastic frontier production function approach, is considered to be most suitable in this study.

## The stochastic frontier production model

### *A theoretical model*

This study adopts the intermediation approach to measure bank inputs and outputs since its key concern is to identify the main determinants of efficiency. Outputs of banks are defined as the book value of pre-tax profit, and/or the book

value of loans. This is because the specific frontier production model does not allow multi-outputs. The value of loans includes short-, medium- and long-term, and other loans, after deducting loan loss reserves. The value of pre-tax profit is an accounting item. Bank inputs are defined as fixed assets, deposit, equity and labour in both profit and loan models.

Previous studies have adopted a two-stage estimation procedure with shortcoming of the inconsistency in its assumptions concerning the independence of the inefficiency effects in the two estimation stages. This study adopts a single-stage estimation technique proposed by Battese and Coelli (1995), with an assumption that non-negative technical inefficiency effects are a function of firm-specific variables and time. The distributional assumption is that the inefficiency effects are independently distributed as truncations of normal distributions with constant variance, but with means that are a linear function of observable variables. The model shown below allows the estimation of both technical change in the stochastic frontier and time-varying technical inefficiencies:

$$Y_{it} = \beta_0 + \beta_t t + \beta x_{it} + (V_{it} - U_{it}), \quad i = 1, \ldots, N; \quad t = 1, \ldots, T, \tag{3.1}$$

where $i$ and $t$ denote firm and time, $x_{it}$ is a vector of explanatory variables, $V_{it}$ is a random variable assumed to be distributed with mean zero and a constant variance $N(0, \sigma^2_v)$, $\beta$ is a vector of unknown parameters to be estimated, and $U_{it}$ is a non-negative random variable, associated with technical inefficiency of production, which are assumed to be independently distributed as truncations at zero of $N(m_{it}, \sigma^2_u)$.

The specification of the technical inefficiency effects, $U_{it}$, is:

$$U_{it} = \delta_0 + \delta_t t + \delta z_{it} + W_{it}, \tag{3.2}$$

where $z_{it}$ is a vector of explanatory variables associated with technical inefficiency of production over time, $\delta$ is a vector of unknown coefficients to be estimated, and $W_{it}$ is a random variable defined by the truncation of the normal distribution with zero mean and variance $\sigma^2$.

The technical efficiency of production for the $i$th bank at time $t$ is defined as:

$$TE_{it} = \exp(-U_{it}) = \exp(-Z_{it} - W_{it}). \tag{3.3}$$

The time trend variable $t$ included in the stochastic production function (3.1) accounts for neutral technical progress at a constant rate, while the presence of $t$ in the inefficiency function (3.2) is for capturing temporal changes in inefficiency at a constant rate against the shifting frontier with respect to time. Therefore, productivity changes are decomposed into the shift in the frontier and a movement towards or off the frontier (Yao and Liu, 1998).

### *An empirical model*

Because bank output can be measured as profit or the value of loans, the same production function is estimated in two different versions. One uses pre-tax profits

as output; the other uses the value of loans. The profit model is shown in equations (3.4) and (3.5). The loan model has the same structure and explanatory variables as the profit model.

$$\ln(profit_{it}) = \beta_0 + \beta_1 t + \beta_2 \ln(Fixedasset_{it}) + \beta_3 \ln(Deposit_{it}) + \beta_4 \ln(Equity_{it}) + \beta_5 \ln(Labour) + V_{it} - U_{it} \tag{3.4}$$

$$|U_{it}| = \delta_0 + \delta_1 \ln(E/A\ ratio) + \delta_2 Ownership, \tag{3.5}$$

where subscripts $i$ and $t$ denote banks and time, respectively; ln denotes natural logarithm. In this model, output is measured by profit before tax, while inputs are measured by fixed assets, deposit, equity and labour. In the inefficiency function, two explanatory variables are bank-specific variables – equity/assets (E/A) ratio and ownership characteristic which are expected to have effects on inefficiency. In estimation, the ownership variable takes the value of 1 for non-state banks and 0 for state-owned banks.

Equity includes share or/and own capital, as well as retained profits. Assets include loans, fixed assets and other assets. It can also be defined as total liabilities plus equity, where total liabilities include deposits, borrowing from other institutions and other funds. If a bank is capitalized and supported by the state, equity also includes state capital. If a bank is a joint-stock company, part of its equity will be share capital. As total assets include loans, a bank is subject to higher risk with a lower E/A ratio, as for a given amount of equity, the bank is exposed to more liabilities. If a bank is well capitalized with support from the government, E/A can be increased if total liabilities are fixed. The recent efforts of the state council to inject $45 billion to BOC and CCB are to help them raise the E/A ratio, and hence reduce their risk. An earlier effort by the government to use AMCs to remove some NPLs from the Big Four served the same purpose.

Hence, the E/A ratio can be interpreted in different aspects. A lower E/A may mean that the bank is less capitalized and subject to a harder budget constraint, but it has to take more risk in order to increase loans to its clients. If the government is involved in changing the E/A ratio, different banks will be subject to different budget constraints. Usually, the state will support the state-owned banks, helping them to have a lower E/A ratio than the non-state banks, *ceteris paribus*. As a result, if the E/A ratio is negatively associated with efficiency, it implies that soft budget will lead to low efficiency, or *vice versa*.

### *Data*

The data are obtained from Bankscope for 22 commercial banks over the period 1995–2001. Bankscope provides data for a huge number of banks in many countries of the world. Of the 22 banks, two have data for 1996–2001, seven for 1995–2000, and the rest for 1995–2001, forming an unbalanced panel data set. The unbalanced data are allowed in a computer program – Frontier 4.1. In terms of ownership, the sample banks include the Big Four, 11 shareholding banks, and seven small

*Table 3.3* Summary statistics, mean values of 22 banks 1995–2001 (billion yuan)

| *Variables* | *1995* | *1996* | *1997* | *1998* | *1999* | *2000* | *2001* |
|---|---|---|---|---|---|---|---|
| Pre-tax profit | 6.81 | 8.26 | 9.19 | 8.49 | 8.50 | 8.77 | 7.81 |
| Loan | 745.5 | 903.3 | 1004.6 | 1142.2 | 1214.7 | 1210.7 | 1359.9 |
| Fixed assets | 13.52 | 19.22 | 20.15 | 22.46 | 29.80 | 36.41 | 32.97 |
| Deposit | 334.27 | 406.07 | 512.72 | 604.70 | 716.04 | 820.51 | 920.97 |
| Equity | 48.28 | 49.12 | 50.75 | 94.42 | 93.25 | 96.24 | 97.31 |
| E/A ratio (%) | 6.67 | 6.115 | 6.955 | 8.25 | 8.135 | 8.165 | 8.172 |

*Source*: Calculated by authors based on data for sample period obtained from Bankscope: http://bankscope.bvdep.com.

commercial banks that are ultimately owned by one of the Big Four or state council. The summary statistics of banking outputs and inputs are reported in Table 3.3.

## Results and interpretations

### *The profit model*

Maximum-likelihood (ML) estimates of parameters in the profit model are obtained using a modification of the computer program, FRONTIER4.1 (Coelli, 1996). These ML estimates and the standard errors are reported in Table 3.4.

The signs of the estimated coefficients are as expected and all coefficients are statistically significant at or below the 5 per cent critical level except that for labour. The insignificance of the estimated labour coefficient is not surprising given that most banks may be still overstaffed even after many years of reforms. The estimated coefficients for fixed-asset, deposit and equity are their elasticities with respect to profits. Deposit and equity have roughly the same value of elasticity at 0.3503 and 0.3311, respectively. The elasticity of fixed-asset is relatively small at 0.1611, but it is significant. The presence of the one-sided error component is justified by the LR test, which is highly significant. The estimates of variance ratio ($\gamma = \sigma_u^2/(\sigma_u^2+\sigma_v^2)$) of 0.9951 indicates that the inefficiency element $U_{it}$ is stochastic.

The average level of technical efficiency over the sample period is 63 per cent, leaving a gap with the maximum possible level of 37 per cent. The average estimated efficiencies of 22 banks are plotted in Figure 3.2. The most efficient bank is China Merchants Bank Co Ltd with an average technical efficiency of 91.23 per cent, whilst the most inefficient bank is ABC with an efficiency of 40.95 per cent. Wide efficiency differentiations across banks observed here indicate that there is a substantial potential for improving the overall efficiency of Chinese banks.

As the Big Four have a dominant position in the banking industry and are the focus of imminent reform, it is worth looking at their efficiency levels in detail. The average efficiencies of the Big Four during the data period are plotted in Figure 3.3. ABC is the least efficient bank in terms of profitability. Its efficiency also fluctuates drastically over time. On the other hand, its efficiency rose slightly with the same pattern as that of ICBC and BOC from 1995. The CCB enjoyed significant efficiency gain after suffering a systemic shock in 1998, when the

*Table 3.4* Regression results, dependent variable = ln (profit before tax)

| *Variables* | *ML estimates* | *T-value* |
|---|---|---|
| A. Production function | | |
| Intercept | 0.8469 | 5.5502 |
| Time | −0.0940 | −6.6178 |
| Fixed-asset | 0.1611 | 2.6673 |
| Deposit | 0.3503 | 4.6373 |
| Equity | 0.3311 | 2.6200 |
| Labour | 0.1020 | 0.8928 |
| B. Inefficiency function | | |
| Intercept | −10.9032 | −6.2360 |
| Equity/asset ratio | 4.3702 | 13.6217 |
| Ownership | −2.8344 | −4.8537 |
| C. Variance parameters | | |
| Sigma-squared | 3.8463 | 4.3056 |
| Gamma | 0.9951 | 237.3926 |
| D. Diagnosis and other information | | |
| LR test | 146.4644 | |
| Ln (likelihood) | −95.5927 | |
| Number of observations | 154 | |
| Number of years | 7 | |
| Number of cross-sections | 22 | |
| Average technical efficiency | 0.6300 | |

All the variables are in natural logarithms.

Negative sign in the inefficiency function indicates that the variable has a positive effect on production efficiency and *vice versa*.

Asian financial crisis hit China hard. However, the efficiency of CCB declined sharply in 2000 and 2001, while that of ICBC and BOC decreased slightly and that of ABC increased instead. The efficiency of ICBC and BOC exhibited a similar and stable pattern. Both ICBC and BOC achieved efficiency gains for two years from 1995 and underwent a decline from 1997, again coinciding with the Asian Financial Crisis. The ICBC picked up efficiency growth in 1998 and sustained a steady increase thereafter. The efficiency of BOC deteriorated further up to 1999 and improved in the latter two years. The average technical efficiencies of ICBC and BOC were 78.28 per cent and 80.55 per cent respectively, much above the industrial average and even above the average of joint-stock banks of 77.48 per cent. This result indicates an encouraging exception of state-owned commercial banks, which could be as efficient as joint-stock banks.

The estimated coefficients in the inefficiency model are of particular interest to this study. The technical inefficiencies are regressed on two explanatory variables: E/A ratio and ownership characteristic. The E/A ratio has a positive impact on inefficiencies. Banks are more efficient with a low E/A ratio which reflects more risk-taking. In other words, well-capitalized banks are less efficient, confirming our hypothesis on budget constraints. If banks are subject to a soft budget, such as the state-owned banks, their capital assets are mainly raised from state funds.

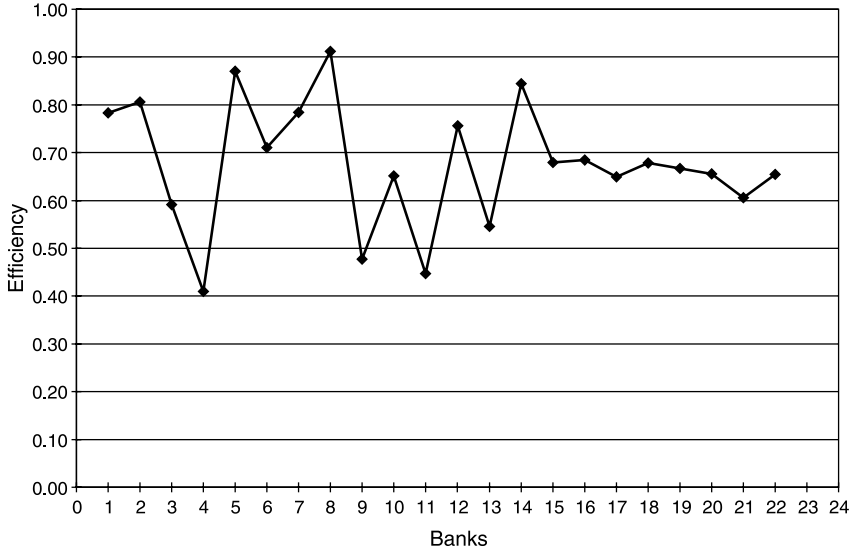


*Figure 3.2* Average efficiency of China's banks (profit) (1995–2001).

*Note*: The numbers on the x-axis represent individual banks (see Appendix A for detail).

But if banks are subject to a hard budget, they have to raise capital from shareholders. One consequence is that they will tend to be less capitalized, and hence have to take more risk to make profits (Koch and MacDonald, 2000).

Another explanatory variable is ownership characteristic measured by a dummy variable taking a value of 0 for state-owned banks and a value of 1 for joint-stock banks. As reported in the second part of Table 3.4, ownership has a significant impact on technical efficiency with an estimated coefficient of −2.53. The negative sign indicates that joint-stock banks are more efficient. The impact of ownership characteristic on bank efficiency is depicted in Figure 3.4. Joint-stock banks are found to have outperformed state-owned banks by about 18 percentage points over the data period. The estimated average technical efficiency of state-owned banks is 59.61 per cent and that of joint-stock banks is 77.48 per cent. This result suggests that ownership structure is an important variable in explaining the variations of overall inefficiency. Moreover, Figure 3.4 exhibits a similar trend of technical efficiencies between state-owned and non-state banks. The average efficiencies of state-owned and non-state banks increased from 1995 to reach a peak in 1996 and 1997, respectively. During the Asian financial crisis, the efficiency level declined and touched the lowest point in 1998. Thereafter, the average technical efficiencies of both state and non-state banks increased steadily over the last four years of the data period. These similar trends reflect both the external as well as the internal shocks. External shocks were largely triggered by the Asian financial crisis, but the internal shocks reflected the government's efforts to improve banking efficiency during the post-crisis period. Our results suggest that the tightening policy in the aftermath of the financial crisis had paid a high dividend.

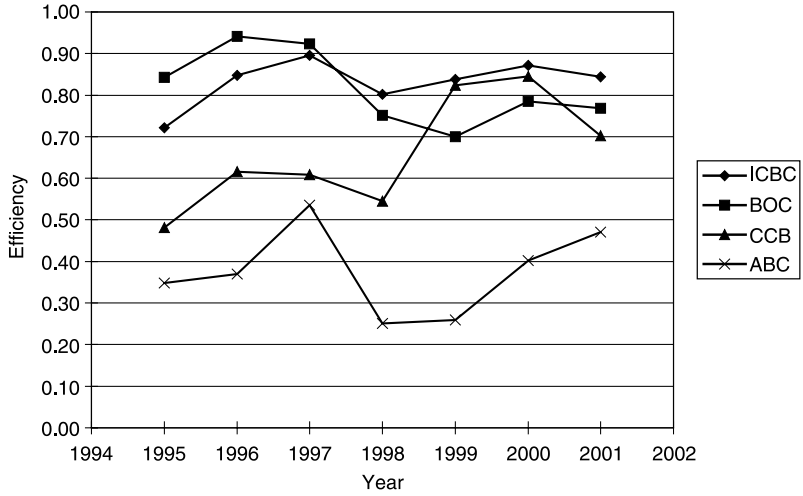


*Figure 3.3* Average efficiency of the Big Four (profit) (1995–2001).

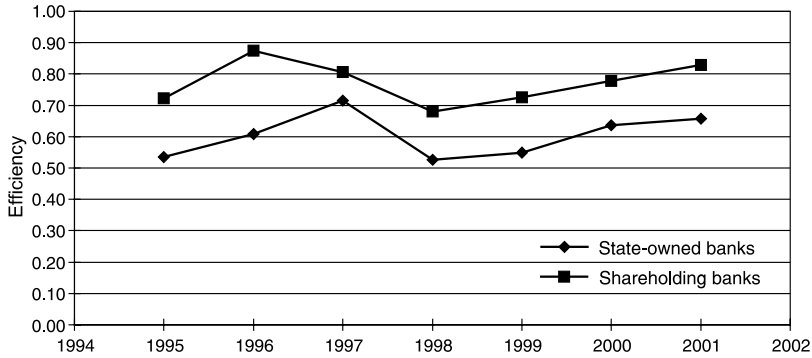


*Figure 3.4* Average efficiency of the Big Four and joint-stock banks (profit) (1995–2001).

### *The loan model*

The picture that emerges from the loan model is similar to that of the profit model, as shown in Table 3.5. The signs of the coefficients are consistent with that of the profit model and all coefficients are statistically significant except for labour. The estimated coefficients for fixed-asset, deposit and equity are 0.0841, 0.4606 and 0.6232, respectively. Deposit and equity have stronger impact than in the profit model. The negative coefficient of year indicates that the output level tends to decrease by 1.09 per cent per year over the data period. The LR test and the estimates of variance ratios also confirm the presence of a one-sided error component which represents the stochastic inefficiency component $U_{it}$.

The estimated average technical efficiency is 63.91 per cent, which is slightly higher than in the profit model. The average estimated efficiencies for 22 individual

banks are graphed in Figure 3.5. The most efficient bank is China Minsheng Banking Corporation with an average technical efficiency of 89 per cent, while the most inefficient bank is the Bank of China (BOC) with an average technical efficiency of 58.03 per cent.

Although the estimated coefficients on the time trends in the frontier production model and the inefficiency function are insignificant, they reveal a declining trend over time. The negative coefficient on the time trend in the frontier production function indicates that the production frontier moved downward by 1.09 per cent annually. The positive coefficient on the time trend in the inefficiency function reveals that the inefficiencies of production tended to increase by 2.68 per cent per year. This implies that both efficiency and the production frontier moved downward over the data period.

The efficiency of the Big Four is shown in Figure 3.6. A different picture emerges compared with that of the profit model. The average estimated efficiencies for the Big Four have a similar trend and level. Efficiencies of the Big Four are stable

*Table 3.5* Regression results, dependent variable = ln (loans)

| *Variables* | *ML estimates* | *T-value* |
|---|---|---|
| A. Production function | | |
| Intercept | 0.1909 | 1.6207 |
| Time | −0.0109 | −0.6404 |
| Fixed-asset | 0.0841 | 2.4651 |
| Deposit | 0.4606 | 11.5178 |
| Equity | 0.6232 | 9.5670 |
| Labour | 0.0860 | 1.2203 |
| B. Inefficiency function | | |
| Intercept | −0.2683 | −1.9051 |
| Time | 0.0268 | 1.4709 |
| Equity/asset ratio | 0.4525 | 7.3413 |
| Ownership | −0.2756 | −6.4406 |
| C. Variance parameters | | |
| Sigma-squared | 0.0347 | 8.6795 |
| Gamma | 0.1141 | 0.5730 |
| D. Diagnosis and other information | | |
| LR test | 92.2811 | |
| Ln (likelihood) | 40.7622 | |
| Number of observations | 154 | |
| Number of years | 7 | |
| Number of cross-sections | 22 | |
| Average technical efficiency | 0.6392 | |

All the variables are in natural logarithms.

Negative sign in the inefficiency function indicates that the variable has a positive effect on production efficiency and *vice versa*.

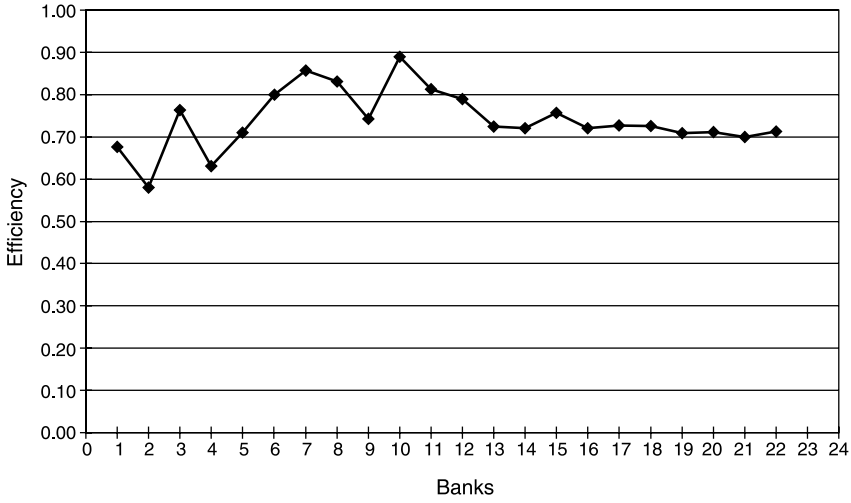


*Figure 3.5* Average efficiency (loans) (1995–2001).

over the first three years of the sample period, followed by a downward slump in 1997. Again this coincided with the Asian financial crisis. Later on, the efficiency level of the Big Four roughly remained unchanged except for BOC, which experienced a decline. This result is perhaps evidence of government intervention on lending decisions. During and after the Asian Financial Crisis, the state council ordered the Big Four to lend about 100 billion yuan per year of special loans to boost the domestic economy.

Different pictures from the profit and loan models can perhaps be attributed to the distinct degree of government intervention on banks. Direct government intervention resulted in a similar efficiency trend and level among the Big Four in the loan model. The Big Four still acted as government arms in a policy-driven financial system despite many years of reform to reduce intervention and policy lending.

As for the inefficiencies, they are also influenced by the E/A ratio and ownership characteristic. The elasticity of E/A ratio is 0.4525 and statistically significant, indicating a positive impact on inefficiencies. It is consistent with the result of the profit model. Again, ownership is found to have a different impact on inefficiency with an estimated coefficient of −0.2756, which is small but significant. The smaller impact of ownership characteristic on bank inefficiencies compared to that of the profit model can be considered as evidence that both state-owned banks and joint-stock banks are both subject to government intervention in lending. The impact of ownership characteristic on bank efficiency from 1995 to 2001 is shown in Figure 3.7. The Big Four are more efficient than the joint-stock banks in the first three years by 10 percentage points. In 1998, the efficiency of the Big Four encountered a sharp downward slump from 76.90 per cent to 52.68 per cent, while that of the joint-stock banks remained unchanged. During the last three years, joint-stock banks became more efficient than the Big Four. This result is

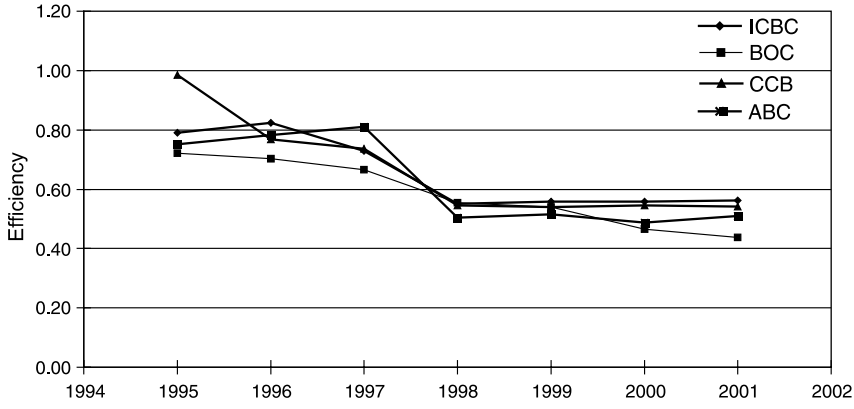


*Figure 3.6* Average efficiency of the Big Four (loan) (1995–2001).

different from that of the profit model in which joint-stock banks are 18 per cent more efficient than the state-owned banks throughout the sample period. However, joint-stock banks are still more efficient than the state-owned banks by 8 percentage points on average over the sample period. This result is attributable to the different degree of government intervention. Although government can influence the lending decisions of both state and non-state banks, the extent of intervention on the latter tends to be less than on the former.

## Conclusion

The estimated average efficiency of the sample banks is quite low at 63 per cent in both the profit and loan models, but not fundamentally different from that of previous studies for other countries. In the literature, the average efficiency score is about 80 per cent for the US banks (Berger and Humphrey, 1997). The difference of efficiency estimates is consistent with the fact that Chinese banks are more subject to government control and intervention despite many years of reform.

The Big Four have a dominant position in the banking industry. They were given a legal status in 1995, the first year of our data period, as commercial banks with a principal objective of making profits. However, after many years of reforms, the efficiency level was still low and did not improve significantly over time. On the one hand, it suggests that government intervention in lending decisions still persists, but on the other hand, it reveals that there exists a great potential for efficiency improvement.

In this chapter, we hypothesize that ownership reform and change of budgetary constraints should lead to more competition and hence greater efficiency gains. Our data set provides adequate information for constructing a stochastic frontier production function to show that joint-stock banks outperform state-banks by 18 per cent in profitability and 8 per cent in loans. The empirical results also indicate that banks which are subject to a hard budget, and hence are less capitalized,

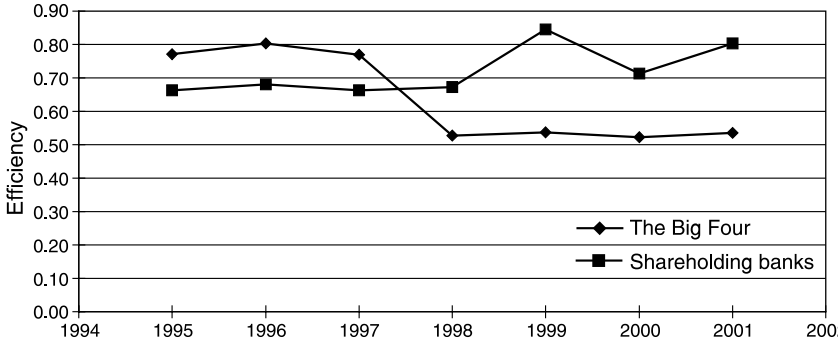


*Figure 3.7* Average efficiency of the Big Four and joint-stock banks (loan) (1995–2001).

tend to take more risk and become more efficient than those which are subject to a softer budget and hence are more capitalized. The results have important policy implications on bank reforms in China to face the WTO challenges in the immediate future.

As China has to open up its banking market for international competition, domestic banks have to become more efficient as quickly as possible. Two fundamental reforms are needed. First, the state banks, which have enjoyed a dominant position, have to become truly commercialized, to be entirely free from government control and intervention, to be re-capitalized so that their capital structure will resemble that of a western commercial bank, to have a better corporate government and incentive structure so that internal efficiency can increase as rapidly as possible. The second reform is to allow more and more medium and small banks to enter the market and compete with the state banks. The number of small and medium banks has increased enormously in recent years, but most of them are still under the control of regional or local governments. Most of them are not well managed and may lack the economies of scale and scope to compete with foreign banks.

Although the empirical results in this chapter confirm that ownership reforms and change of budgetary constraints can force banks to become more efficient, the problems faced by the Chinese banks are so many and so difficult that it may take many more years for them to compete successfully with foreign banks. The most recent decision to re-capitalize BOC and CCB is a significant step towards this direction. However, whether this reform is successful will depend on how the Big Four respond to the new reform method. We have not paid much attention to the problem of NPLs which is estimated to be as high as 30–40 per cent, although the official figure is only 15–20 per cent. If banks are still ridden with so much NPLs and if corporate governance is still heavily influenced by politics, the chance of success is very small. Hence, our conclusion is that China will have to face more pain in the near future when foreign large banks enter the domestic market and compete head on with the Big Four. This is where the real fight will begin and more radical reform measures have to be taken not only on re-capitalization but also on the appointment of senior management and the way that banks are currently managed.

## Appendix: Names of Chinese banks

| *Bank name* | *Corresponding number* |
|---|---|
| Industrial & Commercial Bank of China (The) (ICBC) | 1 |
| Bank of China | 2 |
| China Construction Bank | 3 |
| Agricultural Bank of China | 4 |
| Bank of Communications | 5 |
| CITIC Industrial Bank | 6 |
| Shanghai Pudong Development Bank | 7 |
| China Merchants Bank Co Ltd | 8 |
| China Everbright Bank | 9 |
| China Minsheng Banking Corporation | 10 |
| Guangdong Development Bank | 11 |
| Hua Xia Bank | 12 |
| Industrial Bank Co Ltd | 13 |
| Bank of Shanghai | 14 |
| Shenzhen Development Bank Co Ltd | 15 |
| Sin Hua Bank Limited | 16 |
| Kwangtung Provincial Bank (The) | 17 |
| Kincheng Banking Corporation | 18 |
| National Commercial Bank Ltd | 19 |
| China State Bank Ltd. | 20 |
| Yien Yieh Commercial Bank Ltd | 21 |
| China & South Sea Bank Ltd (The) | 22 |

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# 4 Do Chinese stock markets share common information arrival processes?

*Philip Kostov, Ziping Wu and Seamus McErlean*

## Introduction

There is a growing literature on the modelling of temporal dependencies in financial market volatility. To some extent the theoretical under-pinning for these dynamic dependencies has lagged behind. However, the so-called mixture-of-distributions hypothesis (MDH) does provide a rationale for the many empirical studies that have found evidence of a strong positive correlation between returns volatility and trading volume. According to MDH, returns volatility and trading volume are driven by the same latent news (information) arrival variable. The arrival of good news results in increased trading, as the market adjusts to a new equilibrium, and a price increase, while the arrival of bad news results in increased trading and a price fall. Consequently, returns volatility and trading volume should be positively and contemporaneously correlated. A problem in testing this implication of the MDH is the likelihood that the news arrival process has a long memory property. It follows then that both volatility and volume will have the long memory property. Bollerslev and Jubinski (1999) show that in the presence of this long memory property the contemporaneous correlation between volatility and volume is likely to be incorrectly rejected in cases where the test equation does not account for long memory (or persistence). The use of fractionally integrated GARCH (FIGARCH) offers a way to take account of long memory (and indeed to test for long memory) in testing for a contemporaneous correlation between volatility and volume (an implication of the MDH).

This chapter extends, and to some extent, globalizes the concept of shared common information arrival. Thus, we posit that a common latent news (information) arrival variable drives daily price (returns) volatility and trading volume changes in different financial markets around the world. An implication of this revised hypothesis is that returns volatility in one stock market should show contemporaneous correlation with returns volatility in another stock market. This effect is likely to be stronger if markets are geographically close or share similar hours of trading. In common with many of the papers that have tested the MDH, we don't test the hypothesis directly but rather the theoretical implications of the hypothesis. Therefore, this chapter tests whether there is a positive and contemporaneous correlation between the returns volatility of separate, but geographically

close, stock markets (Shenzhen, Shanghai and Hong Kong). The test is carried out using FIGARCH in order to account for the persistence (or long memory) effects.

The remainder of the chapter is organized as follows. The next section describes the MDH and reviews previous studies that have tested this hypothesis. In the following section the common components in the information arrival process are defined. The propositions tested in this chapter are developed and the testing procedures are explained in the "data and methodology" section. Some results are presented in the "empirical results" section and conclusions are drawn in the final section.

## Literature review

The mixture of distributions hypothesis (MDH) (Clark, 1973) suggests that a common information arrival process drives market returns volatility and trading volume changes. An implication of the MDH is that returns volatility and trading volume should be positively and contemporaneously correlated. The arrival of good or bad news results in a higher level of market activity than usual, an implication of which is increased volatility because of the adjustment to a new equilibrium state. The trading volume, which is a measure of the level of activity, should also increase. A problem in testing the MDH is that the news arrival variable is difficult to measure and as a result many researchers have resorted to using a proxy for this variable. The most widely used proxies have been trading volume, the number of transactions and volatility in an external market. The justification for the number of transactions as a proxy for the information flow is that this is another measure for the intensity of trading activity and as such is driven by the same information flow.

Studies by Epps and Epps (1976), Tauchen and Pitts (1983), Harris (1986, 1987) and Lamoureux and Lastrapes (1990) support the MDH and the conclusion that the trading volume can be a good proxy for the news arrival process. Other studies (Gallant *et al.*, 1992; Lamoureux and Lastrapes, 1994; Richardson and Smith, 1994) provide more mixed evidence on the validity of the MDH (when using trading volume as a proxy for news arrival).

The volatility of returns in external (foreign) markets can also be used as a proxy for the (global) information process. Many of the empirical studies that have modelled the relationship between volatility in one market and volatility in another market have concentrated on testing for causality effects. For example, Cheung and Ng (1996) report that the Nikkei 225 index affects the S&P 500 index, while Hu *et al.* (1997) investigate the existence of spillovers in the South China growth triangle. Indeed, the body of literature related to possible volatility spillovers among world equity markets is vast. Examples include Koch and Koch (1991), Brocato (1994), Eun and Shim (1989) using simultaneous equations modelling. The (G)ARCH type of models have been extensively used in such studies. Darbor and Deb (1997) used bivariate GARCH models for Canada, Japan, UK and USA to conclude that each bivariate pair of markets showed evidence of 'transitory correlation'. Koutmos and Booth (1995) found price spillovers (using the trivariate EGARCH model) from USA to Japan and UK, and from Japan to UK. Many of these studies report evidence of 'transitory correlation' and infer directional

'causality'. Hilliard (1979) estimated mean coherences among equity markets and concluded that 'intra-continental' prices moved together, with little 'inter-continental' co-movements. This suggests that geographical proximity may be a major determinant for the common information arrival process that determines markets' co-movements. This result however may be partially due to the time period used. A study by Fischer and Palasvirta (1990) found that "the level of interdependence, as evidenced by the co-movement of index prices in the world's stock markets, has grown", thus suggesting increasing globalization of world financial markets. Using a bivariate ARCH model with hourly data Susmel and Engle (1994) concluded that volatility spillovers last, 'only an hour or so'. This suggests that markets, which are closer in terms of trading hours, are more likely to be integrated.

The choice of information proxy in empirical studies has been subject to the observation by Epps and Epps (1976) that the mixing character of the information variable may cause the resulting returns to exhibit (G)ARCH properties. If this is the case, incorporating an appropriate information proxy in the variance equation of a GARCH process may lead to a decline in its persistence (sum of GARCH coefficients) and similarly to a decrease in excess kurtosis. Such effects have been shown for example in Lamoureux and Lastrapes (1990). However, if the information arrival proxy is poor (in that it does not adequately capture the mixing properties of the news arrival process) then these desirable effects may not materialize (e.g. Hu *et al*., 1997) and it may be necessary to find alternative proxies. It is likely that the trading volume may be a poor proxy, as it does not distinguish between a large number of small transactions and a small number of large transactions.

Bollerslev and Jubinski (1999) find that both volatility and volume have a hyperbolic decay rate in their respective autocorrelations, which is indicative of long memory in these variables and the news arrival process. They explain the potential existence of long memory in the information arrival rate as follows, "Suppose that each day a particular piece of new 'news' hits the market. Suppose also that the impact of a given day's 'news' will last for a random number of days. It follows from Parke (1999) that, under reasonable assumptions about the corresponding survival probabilities, the resulting latent aggregate information-arrival process will be fractionally integrated". They further explain that if the news arrival rate has the long memory property, it follows that both volatility and volume will have the long memory property, and "the long-run decay rates should be the same across the two series". Bollerslev and Jubinski (1999) introduce a fractionally integrated process $I(d)$, with $0 < d < 1$, to account for the long memory in volatility and volume. They show that in the presence of this long memory property the contemporaneous correlation between volatility and volume is likely to be incorrectly rejected in cases where the test equation does not account for long memory (or persistence).

## Specification of common and specific information arrival components

The information arrival process for any particular stock market can be considered to consist of two components: information *specific* to this market only and *common*

information relevant to this and other markets. If the common information arrival process drives returns volatility in a set of markets, then the returns volatility in these markets is expected to be positively and contemporaneously correlated. In other words, including the volatility of one market into the variance specification of another should increase the explanatory power of the latter.

Given an information arrival rate $I_t$ (expressing the number of pieces of 'news' arriving during the period (say a day)), the MDH implies that the conditional distribution of the returns for market $i$ will be:

$$R_{it}|I_t \sim N(\mu_i, \sigma_i^2 I_t). \tag{4.1}$$

News can be decomposed into two components: news specific to market $i$ and news that is relevant (common) to market $i$ and other markets. Denoting these component information arrival rates (specific and common) as $i_t$ and $l_t$, equation (4.1) can be rewritten as:

$$R_{it}|I_t \sim N[\mu_i, \sigma_i^2(i_t + l_t - k_t)]. \tag{4.2}$$

The variable $k_t$ denotes the number of information arrivals containing information that is common to both sets ($0 \leq k_i \leq I_t$). If strict inequalities are assumed for $k_t$, then equation (4.2) can be rewritten as:

$$R_{it}|I_t \sim N[\mu_i, \sigma_i^2(i_t - k_t) + \sigma_l^2 l_t]. \tag{4.3}$$

Equation (4.3) postulates that volatility in market $i$ consists of two distinct components. The component $(i_t - k_t)$ is the information arrival rate of news specific to market $i$ and this rate is conditional on the information set common to all markets $(l_t)$ in the sense that the former does not contain information relevant to other markets. Similarly, for another market, say market $j$, characterized by information arrival rate $J_t$, the following equation can be specified.

$$R_{jt}|J_t \sim N[\mu_j, \sigma_j^2(j_t - m_t) + \sigma_j^2 l_t]. \tag{4.4}$$

Re-specifying equation (4.3) in a volatility model, the volatility of market returns for market $i$ will be (contemporaneously) cross-correlated with volatility from another market, say market $j$, as volatility in both markets is driven to the common element of the information arrival process $(l_t)$. This correlation will be higher where the impact of $(i_t - k_t)$ is smaller, that is when the common information component $(l_t)$ dominates the information set. However, if the impact of $(j_t - m_t)$ is large (indicating that market $j$ is more independent than other markets), then the degree of correlation will decrease, because the volatility measure for market $j$ is less correlated with the common information component $(l_t)$ of the news arrival process. Epps and Epps (1976) observe that the information arrival process may cause returns volatility to exhibit GARCH properties. The volatility persistence in a GARCH model where the volatility of an external market is a dependent variable

should decrease. This decrease is negatively related to the degree of independence of market *i* and market *j*.

The 'revised' MDH model described above is used in specifying a volatility model where the volatility in market *i* is positively and contemporaneously correlated to the volatility in market *j*. The causal relationship is between the common component of the news arrival process and returns volatility in both markets. Thus, the MDH does not suggest a causal relationship between returns volatility in markets *i* and *j*.

Many researchers have searched for directional returns volatility causality between two separate markets (see literature section). There are a number of reasons why directional causality (non-spurious and spurious) may be found in studies modelling returns volatility in one market as a function of return volatility in another market. One reason may arise from using daily data for the separate markets in circumstances where the trading hours of these markets only partially overlap. In this case, three distinct information components can be identified: information arriving when only the first market is open (and the second is closed), information arriving when both are open and information arriving when only the first market is closed. It is clear that if a further distinction is made between information that is relevant to only one of these markets and information that is commonly relevant, then inference about causal effects could become contaminated by the above effects and the possibility of reaching spurious conclusions about causality increases. However, careful treatment of the issue of partial overlaps in hours of trading can help avoid the associated problems.

In addition, although the common information arrival process may affect two markets simultaneously, the characteristics of each market will determine to what extent and how the news will impact on its level of trading and returns. This may result in some small differences in the timing of the reaction to the news, which may result in the erroneous identification of a causal effect. On the other hand, a non-spurious causal relationship may be found between volatility in two markets in circumstances where returns volatility changes in one market becomes information which is specific to the other market. The news arrival process for any market can be thought of as having two components, one containing information that is relevant (*common*) to all markets and one containing market *specific* information.

## Methodology and data

### *Methodology*

This chapter tests whether the volatility of returns in two mainland Chinese stock markets, namely, Shanghai and Shenzhen, is positively and contemporaneously correlated with the returns volatility in the Hong Kong stock. Given that the news arrival process is likely to have long memory and therefore returns volatility in these markets will also have long memory it is important to use a model that takes account of these effects. Using a FIGARCH specification has three advantages. First, it provides a test for the presence of long memory in the news arrival process.

Second, if the parameter for volatility is positive and significant then evidence in support of the 'revised' MDH is found. Third, if long memory is present, then the order of fractional integration due to the common information component should be the same for both markets. A formal test on this provides another indirect test on the validity of the 'revised' MDH.

The analysis is based on the Fractionally Integrated General Auto-Regressive Conditional Heteroscedasticity Model (FIGARCH) introduced by Baillie *et al.* (1996). The FIGARCH specification proposed by these authors does not apply fractional differencing to the constant term, which causes problems when interpreting the results. Therefore, an alternative FIGARCH specification, which was suggested by Chung (1999), is used. The variance equation in this is expressed as:

$$\xi_t = z_t \sigma_t, \tag{4.5}$$

where

$$z_t \sim \text{iid D}(0, 1), \tag{4.6}$$

where D(.) is some unknown probability density function (the usual normality assumption is relaxed), $\xi_t$ is the innovations process and $\sigma_t^2$ is the conditional variance, which can be presented as:

$$\sigma_t^2 = \sigma^2 + \lambda(L)(\xi_t^2 - \sigma_t^2), \tag{4.7}$$

where $L$ is a lag operator, $\sigma$ is the unconditional variance and the infinite summation polynomial $\lambda(L)$ is given by:

$$\lambda(L) = \sum_{i=1}^{\infty} \lambda_i L^i \xi_t^2 = 1 - [1 - \beta(L)]^{-1} \phi(L)(1 - L)^d, \tag{4.8}$$

where the fractional differencing parameter $0 \leq d \leq 1$, and $\phi(L)$ is given by:

$$\phi(L) = [1 - \alpha(L) - \beta(L)](1 - L)^{-1}. \tag{4.9}$$

In equations (4.8) and (4.9), $\alpha(L)$ and $\beta(L)$ are polynomials with coefficients given by the GARCH coefficients (i.e. the coefficients of $\xi_{t-i}^2 (i = 1, ,.. \ q)$ and $\sigma_{t-j}^2 (j = 1, ,.. \ p)$ in the conditional variance equation of the standard GARCH $(p, q)$ model).

In order to estimate this process the infinite order of $\lambda(L)$ needs to be truncated. Baillie *et al.* (1996) suggest truncation at 1000 lags, which seems a rather arbitrary choice. Chung (1999) suggests truncation at the number of observations in the information set (i.e. $t-1$) which makes full use of all available information. Consequently the approach suggested by Chung (1999) is used here.

The specified model used in the analysis includes $n$ explanatory variables, $x_i$, $(i = 1, n)$, in the variance equation, the term is:

$$\sigma_t^2 = \sigma^2 + \lambda(L)(\xi_t^2 - \sigma_t^2) + \left(\sum_{i=1}^{n} w_i x_{it}\right)[1 - \beta(L)]^{-1}. \tag{4.10}$$

Note, that in the specification used (unlike the model proposed by Baillie *et al.*, 1996) there is no constant amongst the explanatory variables. A constant term is incorporated via the unconditional variance and thus the fractional differencing operator will apply to the constant, but not to the other explanatory variables.

In this study the dependent variables are logarithmic daily returns for the two mainland market indices. An important explanatory variable is the squared returns (a widely used measure of volatility) for the Hong Kong Hang Seng index, which are used in partially explaining the volatility of the dependent variables. All the returns are multiplied by 100 prior to analysis in order to make the estimation more tractable and may be interpreted in percentage terms. An important consideration is the treatment of cases where there has been trading in one market, but not in the other. In the case where there is no trading in Hong Kong, the volatility variable is set to zero. Where there is no trading in the mainland markets, but trading is taking place in Hong Kong, the corresponding volatility measure is calculated as the squared logarithmic return (i.e. the difference in the index at the beginning and the end of the period of non-trading) for the whole period of non-trading. An alternative approach would be to use an aggregate volatility measure for the period of non-trading. However, it is argued that an aggregated volatility measure might exaggerate the real news arrival process in circumstances where there is considerable global turbulence followed by calm during the period of non-trading.

The other explanatory variables are dummy variables, which are specified to account for systematic microstructure effects. These include days-of-the-week dummies and two dummies indicating where the mainland markets re-open after a longer period of inactivity (during a period when the Hong Kong market was active). The dummy variable, DUM1, takes the value 1 in the time period following a period where the mainland markets were closed for 1 or 2 days while the Hong Kong market was open and 0, otherwise. The dummy variable, DUM2, is specified in a similar way but refers to the case where the mainland markets are closed for a period of three or more trading days (while the Hong Kong market remained open). The day of the week effects are considered a stylized fact in empirical finance and their effects on volatility have been found to be significant in Chinese stock markets (Xu, 2000; Friedmann and Sanddorf-Köhle, 2002). Xu (2000) notes that these effects are likely to be model dependent.

A specific case of the FIGARCH model is the integrated GARCH (IGARCH) in which $d = 1$. In other words the GARCH coefficients sum up to one[1] as:

$$\sum_{i=1}^{q} \alpha_i + \sum_{j=1}^{p} \beta_j = 1. \tag{4.11}$$

There is a tendency for the standard GARCH model fitted to financial data to display a nearly integrated character. In other words, it approximates the FIGARCH model. Baillie *et al.* (1996) demonstrate that if the underlying process is indeed a FIGARCH representation then fitting a GARCH process to the data biases the estimated parameters towards a nearly integrated process. An additional rationale for choosing the FIGARCH specification is that financial data tend to exhibit long memory properties (see, e.g. Ding *et al.*, 1993). The standard GARCH model represents an $I(0)$ process in the variance and as such exhibits an exponential rate of decay. This characteristic means that although the GARCH model can capture the short-memory properties of volatility well, it is a disadvantage when trying to capture the long memory effects. Similarly the IGARCH specification uses an $I(1)$ process that leads to infinite persistence in volatility, which is something that lacks a convincing economic interpretation. It is therefore desirable to use a formulation that allows for both short and long memory properties in volatility to be captured.

Note, also, that estimating the model in the form of a conventional GARCH without imposing the stationarity restriction may result in the counterintuitive result of over persistence (i.e. sum exceeding 1) where no explanatory variables are included in the variance equation. Furthermore, the conventional GARCH is likely to approximate IGARCH when explanatory variables are included.

In this study the standard GARCH model is also estimated both without and with explanatory variables (the latter case exactly corresponding to the estimated FIGARCH specification). The reason for this is twofold. First, it allows examination of whether the common tendency for the standard GARCH model fitted to financial data to display a nearly integrated character holds for the data used in this study. Second, it provides an opportunity to compare the results produced by the FIGARCH specification with those of the standard GARCH.

In this chapter maximum likelihood (ML) and quasi-maximum likelihood (QML) techniques are used to estimate the FIGARCH models. Under the normality assumption, the QML estimator is consistent subject to the correct specification of the conditional mean and the conditional variance (Weiss, 1986). However, the QML estimator is inefficient (Engle and Gonzalez-Rivera, 1991). The greater the departure from the assumption of normality, then the more inefficient the QML estimator becomes. An additional consideration is that although a GARCH process with normally distributed innovations exhibits fat tails, it cannot capture all of the observed kurtosis in empirical data. Due to the importance of fat tails in empirical finance the use of alternative distributions to the normal distributions (as in equation (4.6)) is more likely to reduce the excess kurtosis of the residuals of GARCH type of models. Therefore, the assumption of normality is relaxed. Four information criteria (Akaike, Hannan-Quinn, Schwartz and Shibata) are used in selecting the appropriate distribution in (2) from the following candidates: normal, student $t$, Generalized Error Distribution (GED), and skewed $t$-distribution. The GED distribution and the skewed $t$-distribution are fat-tailed, and so is the student $t$ distribution given the appropriate choice of the tail parameter (i.e. tail parameter $= 1$ (the Cauchy distribution) or alternatively in the range (2–5)). The use of these alternative distributions is likely to result in a situation where more of the excess kurtosis is captured.

The Box–Pierce test for serial correlation based on the standardized residuals and on the standardized squared residuals (McLeod and Li, 1983) is used in this study. Using the *F*-test version of the LM ARCH test the adequacy of the estimated model is assessed by testing for residual ARCH effects (Engle, 1982). The sign bias *t*-test, the negative size bias *t*-test, the positive size bias *t*-test and the joint test for the three effects are used to identify possible misspecification of the conditional variance equation based on the news impact curve (Engle and Ng, 1993). Finally, the adjusted Pearson goodness-of-fit test can be used to compare the empirical distribution of the innovations with the theoretical distribution in order to provide a measure of goodness-of-fit.

### *Data*

Data for the Shanghai Stock Exchange Composite Index (SSEC), Shenzhen Stock Exchange Composite Index (SZSC) and Hong Kong's Hang Seng Index (HSI) for the period 2 July 1997–8 February 2002 were used to formulate and test the presence of common components in the news arrival process.

## Empirical results

The FIGARCH models are estimated using maximum likelihood (ML) and quasi-maximum likelihood (QML) techniques. Both the ML and the QML standard errors for the parameter estimates are computed (the point estimates for the parameters are the same). Two equations are estimated, one for returns volatility calculated from the Shanghai Composite Index (SSEC) and one for returns volatility calculated from the Shenzhen Composite Index (SZSC). The explanatory variables are, namely, the volatility (VOL) of the Hong Kong returns calculated from the Hang Seng Index and the dummy variables (FRI, MON, DUM1 and DUM2) discussed

*Table 4.1* Estimated FIGARCH model for SSEC (Shanghai)

| | *Maximum likelihood* | | | *Quasi maximum likelihood* | |
|---|---|---|---|---|---|
| | *Coefficient* | *Std. error* | *Prob.* | *Std. error* | *Prob.* |
| FRI (M) | 0.139920 | 0.070033 | 0.0460 | 0.078515 | 0.0750 |
| VOL (V) | 0.014953 | 0.006310 | 0.0181 | 0.005330 | 0.0051 |
| MON (V) | 0.302292 | 0.139031 | 0.0299 | 0.131124 | 0.0213 |
| DUM1 (V) | 1.697110 | 0.916812 | 0.0644 | 0.873551 | 0.0523 |
| d-Figarch | 0.420155 | 0.061416 | 0.0000 | 0.048370 | 0.0000 |
| GARCH(Beta1) | 0.454840 | 0.148224 | 0.0022 | 0.171581 | 0.0081 |
| ARCH(Alpha1) | 0.207296 | 0.148457 | 0.1629 | 0.188766 | 0.2724 |
| Asymmetry | −0.108370 | 0.037199 | 0.0036 | 0.038044 | 0.0045 |
| Tail | 5.818128 | 0.674571 | 0.0000 | 0.628426 | 0.0000 |

The letter M in brackets following the name of an explanatory variable indicates that the variable appears in the mean equation within the FIGARCH model. The letter V indicates that a variable appears in the variance equation.

*Table 4.2* Estimated FIGARCH model for SZSC (Shenzhen)

| | *Maximum likelihood* | | | *Quasi maximum likelihood* | |
|---|---|---|---|---|---|
| | *Coefficient* | *Std. error* | *Prob.* | *Std. error* | *Prob.* |
| FRI (M) | 0.125493 | 0.072873 | 0.0853 | 0.080574 | 0.1196 |
| VOL (V) | 0.022827 | 0.006782 | 0.0008 | 0.005335 | 0.0000 |
| MON (V) | 0.361157 | 0.155868 | 0.0207 | 0.147774 | 0.0147 |
| DUM1 (V) | 1.632036 | 0.915255 | 0.0748 | 0.785495 | 0.0380 |
| d-Figarch | 0.429418 | 0.060515 | 0.0000 | 0.050802 | 0.0000 |
| GARCH(Beta1) | 0.425498 | 0.132511 | 0.0014 | 0.134847 | 0.0016 |
| ARCH(Alpha1) | 0.178036 | 0.131316 | 0.1754 | 0.147182 | 0.2267 |
| Asymmetry | −0.163094 | 0.042251 | 0.0001 | 0.047154 | 0.0006 |
| Tail | 6.608929 | 0.866680 | 0.0000 | 0.818569 | 0.0000 |

The letter M in brackets following the name of an explanatory variable indicates that the variable appears in the mean equation within the FIGARCH model. The letter V indicates that a variable appears in the variance equation.

in the methodology section. These variables are included in both the mean and variance equations within the two FIGARCH models for Shenzhen and Shanghai.

During the estimation process, explanatory variables associated with insignificant parameters were excluded and the model re-estimated. The results of the final estimation are presented in Tables 4.1 and 4.2. The results indicate that FRI, a day-of-the-week dummy variables for Friday, is the only significant explanatory variable in the mean equations for both the Shenzhen and Shanghai models. This result agrees with the finding of Xu (2000) and suggests that there are higher Friday market returns on the China stock exchanges. The explanatory variables, VOL, MON and DUM1 are all significant in the variance equations for both the Shenzhen and Shanghai models. Therefore, the same explanatory variables are significant in each model.

In the variance equations, the only systematic day of the week effect is the increased volatility on Monday, again in agreement with the empirical findings reported in the literature. The other significant variable in the variance equations is DUM1 indicating a considerable increase in volatility after short (1 or 2 days) breaks in trading. Note, however, that the presence of this effect is marginal in terms of statistical significance and although the QML standard errors show it to be significant at the 95 per cent confidence level, it is only significant at the 90 per cent confidence level, according to the ML standard errors. The consistency of the ML results depends upon the correct specification of the distributional assumption (i.e. equation (4.6)), while the consistency of the QML results are more robust to alternative distributional assumptions. Consequently, the presence of this effect (described by DUM1) can be accepted.

The other inactivity dummy DUM2 (indicating a break in trading of three or more days) was found to be insignificant in both the SSEC and SZSC cases. This may indicate that the external volatility proxy cannot capture contemporaneous volatility during shorter periods of inactivity. But, that when these breaks are longer, the common information arrival component fully explains the deviation from the normal level of volatility.

The less restrictive nature of the QML significance levels can be further exploited. It can be seen that the standard error for the Friday effect in the mean equation increases in the QML case compared to the ML case and its significance becomes questionable (at least for the SZSC case). This agrees with the findings of Xu (2000). On the other hand, the significance of VOL and MON, as well as that of DUM1, increases in the QML case compared to the ML errors.

The best distributional assumption (equation (4.6)) among the pre-determined alternatives in both cases and according to all informational criteria employed was found to be the skewed student *t*-distribution. For details on its log-likelihood function and other properties, see Lambert and Laurent (2001). The skewed student *t*-distribution is an asymmetric fat-tailed distribution and thus the resulting model is intrinsically asymmetric. Tests for asymmetry of the parametric specification are negative, which indicates that there is no additional asymmetry attributable to misspecification.

Importantly, the two mainland China markets are found to follow similar dynamics. This is not only because the same parameters are significant in the respective equations, but also because the magnitudes of the estimated parameter values are similar. This is particularly evident when one compares the fractional integration parameters ($d$) (from equation (4.8)). The significance of the VOL variable in both the SSEC and SZSC equations indicates that there is correlation between the volatility in these two markets and volatility in the Hong Kong market. This finding supports the assertion that a common news arrival variable drives volatility in Shanghai and Hong Kong, as well as in Shenzhen and Hong Kong. The near equality of the fractional integration coefficients $d$ in the estimated equations[2] for SSEC and SZSC implies that the volatility of all three stock markets has a common cause. Given the near equality of the fractional integration coefficients in the two estimated equations there is validity in comparing the estimated parameters from these equations. Comparing the coefficients of VOL from the estimated equations for Shanghai (0.014 953) and Shenzhen (0.022 87), it is clear that the latter is considerably higher. This implies that Hong Kong has more influence on Shenzhen. Although Shenzhen is geographically closer to Hong Kong, than Shanghai, the most likely reason for this close relationship is the type of stocks traded in Shenzhen. Indeed, the B-shares traded in Shenzhen are traded in Hong Kong dollars, while those traded in Shanghai are traded in US dollars.

Another interesting difference is in the parameters of the skewed *t*-distribution. The tail coefficient for Shenzhen exceeds that of Shanghai (see Tables 4.1 and 4.2), although both coefficients show potential for fatter tails. The asymmetry coefficient for Shenzhen is also higher (in absolute value) demonstrating a greater degree of asymmetry in the returns.

The diagnostic test statistics for both models are satisfactory. Table 4.3 presents the result from the Box–Pierce test for serial correlation based on the standardized residuals and on the standardized squared residuals (McLeod and Li, 1983). There is no strong evidence for serial correlation, although the evidence at lag 3 in the residuals from SZSC is marginal (significant at the 90 per cent significance level). Using the $F$-test version of the LM ARCH test (Engle, 1982) no residual ARCH effects are detected (see Table 4.4).

*Table 4.3* Box-Pierce test results

| | *Box-Pierce Q-statistics on residuals* | | | |
|---|---|---|---|---|
| | *Shanghai* | | *Szenshen* | |
| | *Test statistic* | *P-value* | *Test statistic* | *P-value* |
| Q(1) | 0.68568 | 0.407637 | 1.38745 | 0.238837 |
| Q(2) | 1.21996 | 0.543363 | 2.05406 | 0.35807 |
| Q(3) | 5.17874 | 0.159167 | 6.49803 | 0.0897402 |
| Q(4) | 5.18264 | 0.269065 | 6.64331 | 0.155981 |
| Q(5) | 7.04424 | 0.217371 | 7.98416 | 0.157111 |
| Q(10) | 8.42632 | 0.587270 | 10.0275 | 0.43808 |
| Q(20) | 15.52440 | 0.745656 | 20.7249 | 0.413478 |
| | *Box-Pierce Q-statistics on squared residuals* | | | |
| | *Shanghai* | | *Szenshen* | |
| | *Test statistic* | *P-value* | *Test statistic* | *P-value* |
| Q(2) | 1.54160 | 0.214380 | 0.717925 | 0.396825 |
| Q(3) | 1.59525 | 0.450397 | 0.718781 | 0.698102 |
| Q(4) | 1.61540 | 0.655904 | 0.895537 | 0.826505 |
| Q(5) | 1.72009 | 0.787066 | 0.902503 | 0.924201 |
| Q(10) | 2.29704 | 0.985853 | 1.162860 | 0.998961 |

*Table 4.4* ARCH test results

| *Up to lag* | *Shanghai* | | *Szenshen* | |
|---|---|---|---|---|
| | *Test statistic* | *Prob.* | *Test statistic* | *Prob.* |
| 1 | 0.79888 | 0.3716 | 0.58406 | 0.4449 |
| 2 | 0.72301 | 0.4855 | 0.31085 | 0.7329 |
| 3 | 0.46955 | 0.7036 | 0.15702 | 0.9252 |
| 4 | 0.35731 | 0.8390 | 0.25058 | 0.9094 |
| 5 | 0.42843 | 0.8290 | 0.29454 | 0.9161 |
| 10 | 0.43609 | 0.9292 | 0.26610 | 0.9882 |

Table 4.5 presents the results for a range of tests designed to identify possible misspecification of the conditional variance equation based on the news impact curve (Engle and Ng, 1993).

The sign bias test examines the impact of positive and negative return shocks on volatility not predicted by the model, i.e. whether there are such effects. The negative size bias test (positive size bias test) focuses on the different effects that large and small negative (positive) return shocks have on volatility, which are not predicted by the volatility model. Finally, a joint test for these effects is also carried out. Another way to view these tests is as tests for asymmetric effects that have

*Table 4.5* Diagnostic tests based on the news impact curve

| | *Shanghai* | | *Szenshen* | |
|---|---|---|---|---|
| | *Test* | *Prob.* | *Test* | *Prob.* |
| Sign bias *t*-test | 0.16276 | 0.87071 | 0.06255 | 0.95013 |
| Negative size bias *t*-test | 0.84875 | 0.39602 | 0.92571 | 0.35460 |
| Positive size bias *t*-test | 1.40282 | 0.16067 | 1.25187 | 0.21062 |
| Joint test for the three effects | 5.67891 | 0.12832 | 4.35017 | 0.22605 |

*Table 4.6* Adjusted Pearson chi-square goodness-of-fit test

| | *Shanghai* | | *Szenshen* | |
|---|---|---|---|---|
| *Cells* | *Statistic* | *P-value(lag 1)* | *Statistic* | *P-value(lag 1)* |
| 40 | 46.9458 | 0.178960 | 40.6167 | 0.399011 |
| 50 | 50.6643 | 0.407698 | 42.3697 | 0.737094 |
| 60 | 67.8484 | 0.201084 | 60.6894 | 0.414753 |

not been captured in the GARCH specification. For this reason they are usually employed to test for EGARCH (or any other asymmetric GARCH specification against the alternative of symmetric GARCH). Note however that the model estimated in this chapter is asymmetric due to the use of the asymmetric skewed *t*-distribution in its specification (e.g. equation (4.6)). The test results presented in Table 4.5 reject possible misspecification.

Table 4.6 shows the results from the adjusted Pearson goodness-of-fit test that compares the empirical distribution of the innovations with the theoretical distribution.

Since the residuals are non-normal (by construction) it is pointless to carry out the usual tests for normality. Therefore, in this case normality tests are replaced by the Pearson goodness-of-fit test, which is used to test the appropriateness of the distributional assumption. It is useful to note that the preliminary results from this test allowed us to exclude both the Gaussian and the GED distribution as appropriate specifications.[3] In order to carry out this testing procedure, it is necessary to first classify the residuals in cells (categories) according to their magnitude. The choice of number of cells is, however, far from obvious (Palm and Vlaar, 1997). In this case three alternative choices for the number of cells are specified. These choices (40, 50 and 60) represent a reasonable range within which the optimal choice would be expected to fall. The results indicate that the empirical distribution of the innovations correspond to the assumed distribution (skewed *t*-distribution with the parameters estimated and given in Tables 4.1 and 4.2).

Due to the widespread use of standard GARCH models in empirical finance, it might be useful to ask, what are the gains in applying the more involved FIGARCH

specification? Are the efficiency gains associated with the better test statistics and improved economic interpretability of the results justified in terms of significant improvements in the quality of the results? To help answer these questions some comparable GARCH models are also estimated. It is a standard practice in estimating GARCH models to impose the following stationarity restriction:

$$\sum_{i=1}^{q} \alpha_i + \sum_{j=1}^{p} \beta_j < 1.$$

This restriction ensures the consistency of the estimation algorithm. Failure to impose this restriction may mean that counter-intuitive results are obtained. Nevertheless, unrestricted estimation may be very useful in identifying potential misspecifications. Table 4.7 reports the results from the unrestricted estimation of a number of alternative GARCH specifications for SSEC and SZSC. The GARCH (1, 1) model does not contain any explanatory variables while the reference model contains the same explanatory variables as in the FIGARCH model estimated above. Results for both the normal distribution and the skewed *t*-distribution (which are used in the reference model) are presented.

In the models without explanatory variables (GARCH(1, 1) in Table 4.7) the sum of the GARCH coefficient is found to be consistently greater than 1. This counterintuitive result (implying that the unconditional variance does not exist) suggests that there is something wrong with the model, as it is specified. Imposing the stationarity restriction will simply lead to a nearly integrated GARCH. This result is not dependent on distributional assumptions.[4] Using IGARCH in this context however seems to contradict the economic rationale. The inclusion of explanatory variables (reference model in Table 4.7) seems to reduce the volatility persistence. Nevertheless, the models remain nearly integrated. The higher levels of reduction in volatility persistence that are observed under the model where a normal distribution is assumed are likely to be spurious because of the inadequacy of this distributional assumption. The results contained in Table 4.7 suggest that a FIGARCH specification is more appropriate for the problem in hand.

*Table 4.7* Results from unconstrained estimation of standard GARCH models

| | *GARCH(1, 1)* | | *Reference model* | |
|---|---|---|---|---|
| | *SSEC* | *SZSC* | *SSEC* | *SZSC* |
| Normal distribution | | | | |
| GARCH(Beta1) | 0.860481 | 0.854330 | 0.719480 | 0.706269 |
| ARCH(Alpha1) | 0.179560 | 0.186012 | 0.215490 | 0.221892 |
| SUM | 1.040041 | 1.040342 | 0.93497 | 0.928161 |
| Skewed *t*-distribution | | | | |
| GARCH(Beta1) | 0.887819 | 0.876084 | 0.783795 | 0.760113 |
| ARCH(Alpha1) | 0.143591 | 0.154484 | 0.170112 | 0.194197 |
| SUM | 1.03141 | 1.030568 | 0.953907 | 0.95431 |

Another interesting inference from the reference model presented in Table 4.7 is that all variables in the model were significant, except for VOL. Interestingly, the same holds for the IGARCH specification (unreported results, available from the authors).[5] Actually, when the normal distribution is used the VOL variable is significant according to the ML standard errors, but not according to the QML standard errors. This result, however, is likely to be due to the incorrect specification of the conditional variance, which is evident from the test statistics (unreported results, available from the authors).

## Conclusion

The Mixture of Distributions Hypothesis (MDH) postulates that price volatility and trading volume are driven by a common news (information) arrival variable. Consequently, returns volatility and trading volume should be positively and contemporaneously correlated. This chapter extends the MDH and proposes that common information arrival process drives daily price (returns) volatility and trading volume changes in different financial markets around the world. An implication of this revised hypothesis is that returns volatility in one stock market should show a contemporaneous correlation with returns volatility in another stock market. This chapter tests this implication of the extended MDH. The analysis indicates that there is a positive and contemporaneous correlation between volatility in two mainland China stock markets, Shenzhen and Shanghai, and volatility in the Hong Kong stock market. This finding supports the view that these two mainland China stock markets share a common information arrival component with the Hong Kong market.

The analysis is carried out using a FIGARCH specification for the conditional variance, in order to account for the presence of long memory effects, which were found to be present. The estimated long memory process is nevertheless stationary ($d < 0.5$) which conforms to the theoretical expectations for a model of market returns. Using a standard GARCH(1, 1) specification[6] rejects positive and contemporaneous correlation between volatility in Shenzhen and Shanghai and volatility in the Hong Kong stock market, which rejects the existence of a common information arrival component. However, the results produced are unsatisfactory from the point of view of economic interpretation. Therefore, testing for common components crucially depends on correctly specifying the conditional variance. The diagnostic tests for the FIGARCH models were all satisfactory and an advantage of the FIGARCH specification is its ability to capture both short and long memory effects.

In carrying out the analysis the assumption of normality in the innovations was relaxed. The final results were not dependent on the relaxation of this assumption. The assumption of normality was rejected due to the existence of unexplained excess kurtosis in the residuals (from the model where normal innovations are assumed), which resulted in unsatisfactory diagnostic tests. There was evidence that these asymmetric effects (that were present when normal innovations were assumed) were properly captured when an alternative distributional assumption was used. In addition, some systematic effects were found, which were invariant to model specification. These include higher returns on Friday and increased volatility on Monday and after

short breaks in trading. The systematic appearance of these effects probably reflects the micro-structure of the markets, although the latter two are commonly observed on stock markets and the former is not new in stock market studies.

Although not formally tested, the similar magnitudes of the coefficients in the models specified for SSEC (Shanghai) and SZSC (Shenzhen) suggest that they follow common dynamics (i.e. stochastic trends). This is something that follows from the similarity of the fractional differencing parameter implying that a common component of the news arrival process drives these stochastic trends. The influence of the Hong Kong market was found to be greater in relation to the Shenzhen market compared to the Shanghai market.

## Notes

1. For instance, the first part of $\phi(L)$ contains unit root.
2. We do not explicitly test the latter, although one may use, for example, the test due to Robinson (1995).
3. The Gaussian could also be rejected by the high values of excess kurtosis and the highly significant normality test statistics.
4. It is invariant to the use of distributions other than the referred above.
5. Additionally in the IGARCH specification (estimated by restricting the GARCH coefficient beta1) the DUM1 variable is only marginally significant (significant at the 90 per cent confidence level, but not at 95 per cent).
6. Including the IGARCH specification.

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# 5 The impact of capital structure on agency costs in Chinese listed firms

*Hongxia Li*[1] *and Liming Cui*

## Introduction

The Chinese stock market was established in the early 1990s. By listing on the stock exchange, state-owned enterprises (SOEs) have improved their debt-to-assets ratio and promoted their development by directly financing from the stock market. After 10 years' development, there are now more than 1200 listed firms on the two stock exchanges. The total market capitalization at the end of March 2001 was RMB 5 trillion, 54 per cent of the previous year's GDP. This shows that listed firms play a significant role in the national economy. On the other hand, China still has much to do on reform in corporate governance.[2] For historical reasons, the majority of China's listed firms were restructured and transformed from previous state-owned enterprises or other government-controlled entities[3] and there are many problems left with the governance structure. The central problem with this governance structure is the ambiguous definition of the controlling power of the state shares. This has led to the false placement of state property. The 'insider control' problem is serious.[4] Secondly, state shareholdings are uniquely large leading to serious infringement of the interests of small shareholders. Thirdly, the board of directors is primarily composed of executive directors and controlling shareholders, yet directors lack integrity obligations, failing to perform their duties industriously.[5]

Additionally, there is little dividend pressure from shareholders, so the re-financing of listed firms usually prioritizes additional or rights shares over debt. According to the pecking-order pattern of financing observed in advanced country corporations, firms obtain capital by making greater use of internal finance followed by debt and turning to stock market finance only as a last resort. Jensen's (1986) free cash flow theory suggests that debt can mitigate the agency problems between shareholders and managers of firms and motivate management to act in the interests of the shareholders. How would their financing patterns differ from those of advanced country firms? What is the best strategy for refinancing?

There has been much research conducted concerning the agency problem in developed markets. Such research suggests there are three general ways in which to reduce the conflicts of interest between managers and the shareholders: (1) increasing management ownership because high management ownership aligns the interests of management and shareholders (Jensen, 1993; Ang *et al*., 1999);

(2) monitoring management by large shareholders (Shleifer and Vishny, 1986); and (3) using debt financing to discipline managers (Jensen, 1986; Stulz, 1990). The first option is not the focus of this study: this is because the vast majority of China's listed firms are formerly state-owned or state-controlled firms, the management holding of shares is extremely low, about 0.03 per cent of the total shareholding,[6] and is subordinate to controlling shareholders. This situation will not change in the near future. Similarly, the second option is also excluded: the state holds shares of most listed firms in great concentration, while listed firms are not really separated from controlling shareholders in terms of personnel, financial affairs and assets.

Owing to the complicated market and administrative process associated with the reform of the Chinese property system, many constraints have been present on reducing agency costs through the first two options. Thus our research concentrates on the third option mentioned: the impact of capital structure on agency costs.

The contribution of this study is two-dimensional: first, it contributes to the literature on the impact of capital structure on agency costs in Chinese listed firms. Plenty of research about Chinese corporate governance has focused on ownership structure (e.g. Shi, 2000; Xu and Wang, 2000; Zhang, 1996; Zheng, 2002). The focus of this research is the study of the interrelationship between the capital structure of listed firms and the agency costs of equity. Second, among other limited research, Yan *et al.* (2001) analyses the interrelationship between the capital structure of listed firms and agency costs. No empirical analysis has been conducted so far. This chapter will fill the gap in this area. It provides evidence on the capital structure of the firm and agency costs measured in terms of the ratio of sales to total assets and the ratio of return on equity. We wish to provide evidence through empirical study of the ways capital structure influences agency costs.

This chapter is structured as follows. The next section provides a relevant literature review. Then we move on to describe the current status of Chinese corporate governance. In the 'Data and methodology' section we present the methodology including empirical model and sample. The 'Empirical results' section reports and analyses the findings, and the last section concludes.

## Literature review

Agency problems are caused by the separation of ownership from control in large firms (Berle and Means, 1932). Jensen and Meckling (1976) apply agency theory to the modern corporation and formally model the agency costs of external equity.[7] Managers who own anything less than 100 per cent of the residual cash flow rights of the firm have potential conflicts of interest with the outside shareholders, since they choose to reinvest free cash rather than return it to investors (Jensen, 1986). The conflict arises when there is moral hazard inside the firm, referred to as the agency costs of equity. This agency problem can be solved by increasing management ownership because high management ownership aligns the interests of management and shareholders (Jensen and Meckling, 1976). Other possibilities include monitoring of management by large shareholders (Shleifer and Vishny, 1986) and the use of debt financing to discipline managers (Jensen, 1986; Stulz, 1990).

### *Managerial ownership and agency costs*

Managerial ownership has considered non-linear forms (Morck *et al.*, 1988; McConnell and Servaes, 1990; Kole, 1996). Jensen's (1993) 'convergence of interest' hypothesis suggests that managerial shareholdings help align the interests of shareholders and managers and as the proportion of managerial equity ownership increases, so does corporate performance. In contrast, Morck *et al.* (1988) argue that a high level of managerial ownership could lead to 'entrenchment', as external shareholders find the actions of such managers difficult. Kole's (1995) argument suggests that managerial ownership may impact on large and small firms differently with respect to value. ACL examined the relationship between agency costs and managerial ownership for small firms, and Singh *et al.* tested the same relationship for large firms.

### *Concentrated ownership and agency costs*

An important line of literature on agency costs relates to concentrated ownership. Stiglitz (1985) has argued that one of the most important ways of achieving value maximization by firms is through concentrated ownership of the firm's shares. Shome and Singh (1995) replicate this result and provide evidence that the large shareholder's presence improves accounting performance. Large shareholders thus address the agency problem in that they both have a general interest in profit maximization and enough control over the assets of the firm to have their interests respected. Many scholars (Shleifer and Vishny, 1986; Kang and Shivdasani, 1995; Yishay and Yosha, 1996; La Porta *et al*., 1998, 1999; Park and Song, 1995; and Denis and Sarin, 1996) argue that outside large shareholders reduce managerial entrenchment.

However, this does not exclude the possibility of rising concentration of share ownership to depreciate the market value of the firm (Huddart, 1993; Admati *et al*., 1994). The controlling shareholders often have better access to information, hold more power in selecting management and are involved in key decision-making. Especially when the manager holds fewer shares[8] and is subordinate to controlling shareholders, control shareholders impinge upon the interests of small shareholders by way of the non-distribution of dividends and diversion of profits. The exploitation of small shareholders by controlling shareholders constitutes *ex-ante* an expropriation threat that reduces managerial initiative and non-contractible investments and may come into conflict with performance-based incentive schemes (Burkart *et al.*, 1997).

### *Debt and agency costs*

Another strand of the agency literature has focused on the role of debt as a means of disciplining managers. Grosseman and Hart (1982) were the first to argue that managers could pre-commit to work hard by using debt rather than equity. Similarly, Jensen's (1986) free cash flow theory considers additional debt beneficial since the firm attempts to improve the productivity of its assets as a result of additional debt acquired. Debt not only reduces the free cash flow but also provides discipline to

management through the debt market. The debt monitoring hypothesis is formalized by Harris and Raviv (1990) and Stulz (1990) and empirically demonstrated by Maloney *et al.* (1993). Shleifer and Vishny (1997) provide an extensive survey on the role for debt in reducing the conflict of interests between managers and shareholders.[9] On the other hand, increased leverage also has costs. As leverage increases, the usual agency costs of debt rise, including bankruptcy costs (Jenson, 1986). Mayers (1997) pointed to the debt overhang problem where firms may forego good projects if they have significant debt outstanding. The reason is that for a firm facing financial distress, a large part of the returns to a good project go to bondholders. Therefore, in choosing their debt-equity level, firms need to make a trade-off between the agency costs of debt and those of equity. By appropriately allocating refinance between equity and debt, the capital structure can balance the conflicts between investors and management as well as those between management and creditors.

Finally, the two previous studies most closely related to this study are Ang *et al.* (ACL, 1999) and Singh and Wallace (2002). In the first case, ACL provide evidence on corporate ownership structure and agency costs measured in terms of asset utilization and operating expenses. ACL use data on small businesses in America to examine how agency costs vary with a firm's ownership structure. They find that agency costs: (1) are higher when an outsider rather than an insider manages the firm; (2) are inversely related to the manager's ownership share; (3) increase with the number of non-manager shareholders; and (4) to a lesser extent, are lower with greater monitoring by banks. In the second study, Singh and Wallace extend the work of ACL's analysis of the relationship between corporate ownership structure and agency costs to large publicly traded corporations. Using slightly different measures of agency costs,[10] they analyse multi-period data for the years 1992 and 1994, and study not only inside ownership structure as a determinant of agency costs but also the role of large outside equity holders in disciplining the management. They find the latter may only have a limited effect on reducing agency costs; board size is negatively related to asset turnover, but unrelated to discretionary expenditures.

In this chapter, following their example we use ratio of sales to assets as one of the measures of agency costs.[11] Additionally, we use ROE as an alternative measure of agency costs to analyse the possible impact of variables on agency costs in Chinese listed firms. Although ROE is a more flexible measure in the economic sense, the regulating authorities in China use this particular ratio as a standard to decide whether a firm is qualified for rights shares or additional shares. It is therefore one of the most strictly regulated ratios in China and is widely used for comparative purposes.

## Chinese corporate governance

### *Ownership structure and board of directors*

The main characteristic of Chinese corporate governance is the over-concentration of equity in too few hands. Most of the listed firms in China have been transformed

from state-owned enterprises. The ownership structure displays the phenomenon of the co-existence of controlling shareholders, who are normally related to the state, with many other small and comparatively weak shareholders. State shareholdings are uniquely large. Statistics show that the state holds shares of most listed firms in great concentrations. Of the listed companies, 54 per cent of the equities belong to the state or state-owned corporate persons.[12] Among the 1104 listed firms on the Shenzhen and Shanghai stock markets, the proportion of shares of the number one shareholder has reached 45 per cent and the second largest shareholder a further 8 per cent.

The management level lacks long-term incentives and restraining mechanisms. The board of directors is mainly formed by controlling shareholders and the lack of independent directors makes it difficult to perform their regulating and balancing roles. Among all the directors of the listed firms, 73.3 per cent are state shares (27.9 per cent) or shares of state-owned corporate persons (45.4 per cent). Since managers hold few shares and are subordinate to controlling shareholders, the agency problem between shareholders of a firm and its managers has turned into the second dimension of the agency problem in a firm, the conflict between the controlling shareholders and small shareholders.

### *Capital structure and corporate governance*

The central goal of corporation, including public listing, is to establish 'a modern enterprise system' in China, featuring the corporate governance structure that separates government from enterprises. Another objective is to raise capital for SOEs and reduce their high level of debt to asset ratio by increasing direct finance through selling equity to the public. The vast majority of China's listed firms are formerly state-owned or state-controlled firms, mostly large and better-performing firms. Before initial public offering, they do their best to dispose of their debt. So, the debt to asset ratio of listed firms is lower during the first couple of years after the initial public offering.

According to capital structure theory, the optimum way to refinance is determined by the cost of capital. In a developed capital market, the top managers are restrained by shareholders and creditors, facing the pressure of paying dividends and debt. The empirical results show that listed firms obtain capital first from internal sources, then from debt and last from equity. The capital cost influences the style of financing. In China, owing to the special ownership structure of listed firms, the state share is absolutely the largest among total shares and the representatives of state shares are usually absent. This reduces restrictions on managers who overpursue the control rights over cash flow. The consequence is that in the re-financing of listed firms directors have partiality for equity rather than for debt. Additionally, there is not much dividend pressure from shareholders, so the refinancing of listed firms in China usually prioritizes additional or rights shares over debt.

The optimal debt-to-equity ratio is the point at which firm value is maximized, the point where the marginal costs of debt just offsets the marginal benefits. An overly low level of debt-to-asset ratio reflects poor management of the corporate financial gearing of Chinese listed companies. Refinancing through equity is not

*Table 5.1* Industry average debt to asset ratio (%) of the listed firms

| *Industry classification* | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* | *(9)* | *(10)* | *(11)* | *(12)* | *(13)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average debt to asset ratio | 39.2 | 30.60 | 47.74 | 39.93 | 54.71 | 36.97 | 49.21 | 61.94 | 91.74 | 73.65 | 38.70 | 42.51 | 63.38 |

*(*1) Agriculture, forestry, animal husbandry and fishing; (2) Mining; (3) Manufacture; (4) Reduction and distribution of electricity, gas and water; (5) Construction; (6) Transport, storage and post; (7) Information transmission, computer services and software; (8) Wholesale and retail sale; (9) Finance and insurance; (10) Real estate; (11) Resident service and other service; (12) Disseminate and culture; (13) Synthesis.

*Source*: http://www.bigsun.com.cn/data/agora/20020730/125466.hml

the optimal strategy to reduce their capital costs. It is not a common phenomenon for a modern corporation to rely almost totally on its own capital, using little or no debt. One of the most important reasons that Chinese listed companies do not bother to use debt is the fact that they can generally obtain 'free capital' easily from the equity market. In order to limit the 'equity financing thirst', the China Security Regulatory Commission requires[13] that the debt-to-asset ratio of listed firms who want to add shares on the stock market must have a higher debt-to-asset ratio than the average level of the same industry (see Table 5.1). Listed firms have paid more attention to their capital structure since then and it has helped to improve the capital structure of listed firms.

## Data and methodology

### *Data*

The sample was a pool of several data of firms listed on the China (Shanghai and Shenzhen) Stock Exchanges from 1999 to 2001. A total of 211 listed firms[14] were randomly chosen excluding the finance and insurance industry. ST (special treatment)[15] and PT (particular transfer)[16] firms were not included in the sample either. The accounting data were obtained from listed firms' annual reports from 1999 to 2001, which were published on the web site (www.csrc.gov.cn) of China's Securities Regulatory Commission (CSRC). The inside and outside ownership information and board size information were obtained from the web sites (www.cnlist.com) and (www.cninfo.com.cn).

The sample was a pool of seven ratios of firms listed on the China (Shanghai and Shenzhen) Stock Exchanges from 1999 to 2001 (see Table 5.2) including data of firms' assets turnover, return on equity, debt-to-assets ratio, outside block ownership (the percentage of shareholding of the largest and five largest shareholders), firm total sales, board size and managerial ownership.

This table data sample contains 211 non-financial companies listed on the Stock Exchanges of China. Outside block ownership is defined as the percentage of total stock held by the largest shareholder and the five largest shareholders. The debt-to-assets ratio is debt divided by total assets at the end of accounting year. The size of the board of directors measures board size by determining the number of board members. Managerial ownership is the percentage of shares owned by managers.

*Table 5.2* Sample descriptive statistics

| | *1999* | | *2000* | | *2001* | | *Pooled* | |
|---|---|---|---|---|---|---|---|---|
| *Variable* | *Mean* | *Median* | *Mean* | *Median* | *Mean* | *Median* | *Mean* | *Median* |
| Assets turnover | 0.5335 | 0.4783 | 0.5500 | 0.4591 | 0.5634 | 0.4503 | 0.5575 | 0.4608 |
| Return on equity ratio % | 11.4210 | 10.4800 | 9.9839 | 9.6400 | 7.2498 | 7.8200 | 9.6150 | 9.5500 |
| Debt to asset ratio % | 40.4895 | 38.5374 | 39.6272 | 38.7600 | 41.4436 | 41.1300 | 40.4429 | 40.0496 |
| Outside block ownership: the largest shareholder % | 48.7506 | 49.0200 | 46.3133 | 45.5000 | 46.3500 | 45.9700 | 46.6115 | 47.2100 |
| The five largest shareholders % | 61.6255 | 61.6600 | 59.2176 | 60.1000 | 58.3813 | 58.9900 | 59.6540 | 60.5100 |
| Total sales (RMB million) | 908.94 | 463.48 | 1162.39 | 656.17 | 1364.09 | 730.46 | 1159.86 | 627.96 |
| Board size | 9.6540 | 9.0000 | 9.7678 | 9.0000 | 9.7915 | 9.0000 | 9.7300 | 9.0000 |
| Managerial ownership % | 0.0441 | 0.0191 | 0.0316 | 0.0154 | 0.0273 | 0.0116 | 0.0343 | 0.0150 |

***Methodology***

The methodology we use is a system of simultaneous equations.

The system of two equations to be estimated is:

$$\text{Agency costs} = \beta_0 + \beta_t \text{ Capital structure} + \beta_2 \text{Conc} + \beta_3 \text{Size} + \beta_4 \text{ Board} + \Sigma\, \beta_j \text{Dum}_{jt}, \tag{5.1}$$

$$\text{Capital structure} = \beta_5 + \beta_6 \text{Conc} + \beta_7 \text{ROE} + \beta_8 \text{Val}. \tag{5.2}$$

We use two alternative measures for agency costs. The first measure for agency costs is the ratio of annual sales to total assets (asset utilization), following the research of Ang *et al.* (1999). This ratio measures management's ability to employ assets efficiently. A high ratio of annual sales to total assets shows a large amount of sales and ultimately cash flows that are generated for a given level of assets. While a high asset turnover may be identified with efficient asset management practices and hence shareholder value creation, a low asset utilization reflects asset deployment for unproductive purposes. Therefore, a higher asset turnover has less agency conflict.

We use an additional measure of agency costs, the ratio of return on equity (ROE), as a measure of profitability. This indicator measures profitability from a different angle. In China, most listed firms were transformed from state-owned enterprises. In order to protect the value of state assets, fixed assets depreciation rates are centrally determined and often are artificially low, thus leading to an upward bias in fixed asset estimates. Current assets include some stockpiled goods that either cannot be sold at their book value or cannot be sold at all. ROE is clearly a more preferable indicator of profitability, matching the common usage of market economics. Profit is the return to equity-holders; therefore a higher turn on equity has less agency conflict.

Independent variables were chosen mainly in line with existing agency literature. The first variable used is capital structure, measured by debt-to-assets ratio (total debt divided by total book assets). The second variable used is ownership concentration (Conc). Ownership concentration is measured by the proportion of the shares held by the largest shareholder to the total shares and the share proportion of the top five largest shareholders. The third categories of variables are control variables. They are included in the regressions to control for other potential influences on the agency costs of firms. The variables included are the size of the board of directors, firm size and industry dummies. The number of board members measures the size of the board of directors. The measure of a firm's size is the logarithm of total sales. The industry dummy variable is Chinese listed firms' classified 13 industries, excluding financial firms. This provides 11 industry dummy variables in the multiple regression models.

To solve potential endogeneity problems, whether the ratio of return on equity and the debt-to-asset ratio are simultaneous is tested. On the one hand, the debt-to-asset ratio can affect return on equity. First, an increase in the debt-to-asset ratio, through financial charges, would reduce profit. A high debt–asset ratio, finally,

should imply a high degree of external control as creditors, concerned about the payment of interest and the repayment of the principal will have incentives to monitor the enterprise. A higher degree of supervision could lead to higher profitability. Second, by using debt, ROE would increase even though the profit does not increase, with a constant equity. On the contrary, obtaining capital through equity would reduce ROE. On the other hand, ROE affects the degree of leverage: with a high level of ROE, listed firms can get funds from newly accumulated profits or from stock market by additional or right shares. The debt-to-asset ratio may depend not only on ROE but also on the ownership structure. If there is high ownership concentration, the control shareholders might want to reduce the dividend, implying a low debt-to-asset ratio. However, if the equity value growth is high, the firm can obtain plenty of cash flow, and affect the debt-to-asset ratio. We use Val to measure the equity value growth. This valuation is used by Leech and Leahy (1991) and is calculated as the market value of the firm at the end of its accounting year, divided by the book value of equity.

Thus, with two equations, one determining agency costs, and the other determining the debt to asset ratio, another exogenous variable is needed in the determination of the debt-to-asset ratio in order for equation (5.1) to be identified. This is the outside ownership concentration. When agency costs are measured by asset turnover, equation (5.1) alone would suffice. When agency cost is measured by ROE, the debt-to-asset ratio is an endogenous variable and two equations are necessary.

## Empirical results

Empirical results are presented in Table 5.3 (panels A and B) and Table 5.4. Table 5.3 presents the OLS regression analysis results analysing agency costs, measured by asset utilization and ROE respectively. Panel A gives the result of agency costs measured by asset utilization and panel B gives the result of agency costs measured by ROE. Table 5.4 presents the result of the simultaneous equation of ROE.

### *Agency costs measured by ratio of annual sales to total assets*

In panel A of Table 5.3, the dependent variable proxy for agency costs is the ratio of annual sales to total assets. There are three groups of independent variables: capital structure variables, ownership concentration variables and control variables. Rows 1 and 2 report the regression results on the capital structure together with the largest shareholder and the five largest shareholder concentrations respectively. Rows 3 and 4 report the regression results including the control variables: board size, firm size and industry dummies.

In all of the four rows mentioned above, a positive relationship between agency costs and capital structure was identified, all significant at a better than 1 per cent level. This proves that firms with a higher debt-to-asset ratio are more efficient in their asset utilization. This result supports Jensen's (1986) theory of free cash flow, which considers additional debt beneficial as the firm attempts to improve the productivity of its assets as a result of additional debt acquired. A similarly positive

*Table 5.3* Multivariate regression analysis debt to asset ratio and ownership concentration to agency costs. Panel A: agency costs as measured by the ratio of annual sales to total assets. Panel B: agency costs as measured by ratio of return on equity

| *Regression* | *Constant* | *Debt to asset ratio* | *Ownership concentration (%)* | | *Control variables* | | | *Adj-R-squared* |
|---|---|---|---|---|---|---|---|---|
| | | | *The largest shareholder* | *The five largest shareholders* | *Board size* | *Firm size (log-sales)* | *Industries* | |
| Panel A | | | | | | | | |
| Row 1 | 0.1411 | 0.0072 | 0.0026 | | | | | 0.0912 |
| | (2.25)** | (7.83)*** | (2.90)*** | | | | | |
| Row 2 | 0.2093 | 0.0069 | | 0.0012 | | | | 0.0806 |
| | (2.61)*** | (7.49)*** | | (1.04) | | | | |
| Row 3 | −1.1820 | 0.0028 | 0.0002 | | −0.0094 | 0.1718 | | 0.3986 |
| | (−8.05)*** | (3.44)*** | (0.28) | | (−1.98)** | (14.48)*** | Yes | |
| Row 4 | −1.2294 | 0.0027 | | 0.0010 | −0.0088 | 0.1716 | Yes | 0.3995 |
| | (−7.93)*** | (3.37)*** | | (0.99) | (−1.86)** | (14.90)*** | | |
| Panel B | | | | | | | | |
| Row 5 | 5.0937 | 0.1287 | 0.0279 | | | | | |
| | (4.01)*** | (6.92)*** | (1.49) | | | | | 0.0684 |
| Row 6 | 2.7343 | 0.1251 | | 0.0626 | | | | 0.0762 |
| | (1.70)* | (6.80)*** | | (2.75)*** | | | | |
| Row 7 | 8.9014 | 0.1416 | 0.02619 | | −0.5538 | 0.1217 | Yes | 0.1663 |
| | (2.57)*** | (7.40)*** | (1.38) | | (−4.94)*** | (0.44) | | |
| Row 8 | 7.2598 | 0.1364 | | 0.0377 | −0.5447 | 0.1817 | | |
| | (1.99)** | (7.18)*** | | (1.64)* | (−4.85)*** | (0.67) | Yes | 0.1674 |

Values in parentheses are $t$ values. *10 per cent level, **5 per cent level ***1 per cent level.

Equation (5.1): Agency costs $= \beta_0 + \beta_1$ capital structure $+ \beta_2$ Conc $+ \beta_3$ Size $+ \beta_4$ Board $+ \sum \beta_j$ Dum$_{ji}$.

*Table 5.4* Impact of debt to asset ratio on the ratio of return on equity (2SLS results)

| *Regression* | *Constant* | *Debt-to-asset (%)* | *Ownership concentration* | | *Control variables* | | | *Return on equity (%)* | *Equity market-to-book value* |
|---|---|---|---|---|---|---|---|---|---|
| | | | *The largest shareholder (%)* | *The five largest shareholders (%)* | *Board* | *Firm size (log sale)* | *Industries* | | |
| Equation (1) | | | | | | | | | |
| 1999 | −29.9728 | 0.9154 | | 0.0585 | −0.0186 | 0.1813 | No | | |
| | (−74.96)*** | (254.17)*** | | (22.28)*** | (−1.61) | (6.71)*** | | | |
| 2000 | −20.9198 | 0.6317 | | 0.0345 | −0.0140 | 0.3565 | Yes | | |
| | (−36.26)*** | (187.18)*** | | (9.92)*** | (−0.87) | (9.03)*** | | | |
| 2001 | −50.1593 | 0.8332 | | 0.1354 | −0.1589 | 1.5859 | Yes | | |
| | (−9.37)*** | (18.80)*** | | (4.38)*** | (−1.03) | (4.31)*** | | | |
| Pool 1 | −25.6625 | 0.6978 | 0.1198 | | −0.0179 | 0.1859 | Yes | | |
| | (114.12)*** | (428.57)*** | (102.63)*** | | (−2.61)*** | (11.32)*** | | | |
| Pool 2 | −26.2627 | 0.6868 | | 0.0895 | −0.0385 | 0.3490 | Yes | | |
| | (−61.78)*** | (235.07)*** | | (35.65)*** | (−3.07)*** | (12.01)*** | | | |
| Equation (2) | | | | | | | | | |
| 1999 | 31.3633 | | | −0.0577 | | | | 1.0353 | 0.0795 |
| | (5.32)*** | | | (−0.66) | | | | (2.45)** | (0.27) |
| 2000 | 26.1591 | | | −0.06832 | | | | 1.5447 | 0.3620 |
| | (3.57)*** | | | (−0.64) | | | | (3.63)*** | (0.80) |
| 2001 | 41.1093 | | | −0.2024 | | | | 0.7980 | 1.4301 |
| | (6.77)*** | | | (−1.96)** | | | | (1.98)** | (4.10)*** |
| Pool 1 | 34.7605 | | −0.1694 | | | | | 1.3532 | 0.1105 |
| | (12.17)*** | | (−3.27)*** | | | | | (4.49)*** | (0.54) |
| Pool 2 | 34.7928 | | | −0.13278 | | | | 1.3031 | 0.2024 |
| | (9.10)*** | | | (−2.17)** | | | | (4.47)*** | (1.04) |

Values in parentheses are *t* values. *10 per cent level, **5 per cent level, ***1 per cent level.

Equation (5.1): $\text{ROE} = \beta_0 + \beta_1 \text{ Capital structure} + \beta_2 \text{ Conc} + \beta_3 \text{ Size} + \beta_4 \text{ Board} + \sum \beta_j \text{ Dum}_{jt}$.

Equation (5.2): $\text{Capital structure} = \beta_5 + \beta_6 \text{ Conc} + \beta_7 \text{ ROE} + \beta_8 \text{ Val}$.

relationship between capital structure and asset utilization is also identified by Filbeck Gorman (2000), Ang *et al.* (1999) and Singh and Wallace (2003).

We found mixed results for the largest shareholder concentration, a positive relationship with agency costs displayed in row 1, while an insignificant relationship was found in row 3 when regressed with other control variables. For the five largest shareholders concentration, no significant relationship was identified with agency costs. This suggests that control shareholders do not have much interest in improving their asset utilization ratio. This result was found by Singh and Wallace 2003, too, as they report that the proportion of equity held by outside block owners does not relate to agency costs as measured by asset utilization.

Among the control variables, the coefficients for the control variables for board size are negative and significant at the 5 per cent level in relation to the asset turnover ratio as displayed in both row 3 and row 4. This shows that large boards reduce asset utilization and they are detrimental to shareholders' interest. This is because the function and work procedures of boards of directors are not standardized. The amounts of shares held by directors are extremely low (see Table 5.1, managerial ownership). Many directors are appointed by the government and they are not paid by the listed companies, but paid by government institutes instead. In this way they rarely find their own interests aligned with the company. In the absence of an integrity obligation, directors fail to perform their duties industriously to improve the firms' asset utilization. The negligence of large shareholders together with the lack of any incentive for smaller shareholders to supervise effectively with those smaller shareholders choosing to 'vote with their feet', increases the 'insider control' problem among the management of listed companies. The firm size factor among the control variables shows a positive relationship to asset utilization, significant at the 1 per cent level. Hence the agency costs will be lower for a larger firm. Large firms have more efficient corporate governance. There are coefficients significant with asset turnover for five industries. They are the electricity, transportation, wholesale, real estate and service industries. Except for wholesale, their coefficients are negatively related to asset turnover.

### *Agency costs measured by ratio of return on equity*

In panel B of Table 5.3, the dependent variable proxy for agency costs is ROE instead of asset utilization as in panel A, with the independent variables identical to that of panel A. Row 5 and row 6 report the regression results on capital structure with largest shareholder ownership and five largest ownership concentrations respectively. Row 7 and row 8 results also include the control variables: board size, firm size and industry dummies.

As expected, we have found a positive relationship between capital structure and ROE, significant at the 1 per cent level, confirming the results in panel A. Firms with a higher leverage level have a higher return on equity. This conforms to the theory that creditors, concerned with the repayment of the debt, would exert positive influence on the management of the firm and thus improve the firm's profit return. The ownership concentration, however, displayed different results from those of panel A: they are positive with ROE at 1 per cent and 10 per cent respectively in row 6 and

row 8. Compared to the asset utilization results, our ROE results suggest that large shareholders are more concerned about their profitability. The highly concentrated ownership benefits the operation of the business. For the control variables, the board size result is consistent with that of panel B and showed a negative relationship with ROE, both significant at 1 per cent. Firm size displayed a positive relationship with ROE, though it was not significant. The industry dummy variable for the 11 industries does not show any significance, except one at a 10 per cent level. Together with the industry results from panel A, it suggests the industry factor does not play any significant role in deciding the level of agency costs.

Since the debt-to-asset ratio could be an endogenous variable, to solve the potential endogeneity problems we need two equations, one determining the ratio of return on equity, and the other determining the debt-to-asset ratio. Table 5.4 reports the two-stage least-squares regression results.

For equation (5.1), both the pooled data results and the results of each individual year show that the debt-to-asset ratio has a positive relationship with the ratio of return on equity at a significance better than the 1 per cent level. This result supports Jensen's (1986) debt monitoring hypothesis. This is examined by Harris and Raviv (1990) and Stulz (1990) and empirically demonstrated by Maloney *et al.* (1993) and Gul and Tsui (1998). Highly leveraged firms must be subject to better supervision than those listed firms whose assets are primarily financed through 'free' equity that comes with little monitoring.

The results for the largest and the five largest shareholders' concentrations are identical to each other. They are both positive to ROE at a significance better than the 1 per cent level in equation (1) in all the results. This finding supports the view that large shareholders play an active role in corporate governance (Shleifer and Vishny, 1986; Dennis and Serrano, 1996; Yishay and Yosha, 1996). However, all the results are negative on debt-to-asset ratios (in equation (5.2)). Although they are only significant at the pooled level, except for year 2001, this shows the large shareholders prefer to refinance through equity rather than through debt. The reason for an increased significance of the third year and for the pooled results is because CSRC requires the average return on equity level over the last three years (from 2001) to be more than 10 per cent if it is to qualify for additional shares. Thus if a firm's return on equity ratio is higher than this level, they are likely to finance from equity rather than debt. This result conforms to Shleifer and Vishny's (1997) theory that large shareholders claim they both have a general interest in profit maximization, and enough control over the assets of the firm to have their interests respected.

Our results also provide new evidence for the second dimension of the agency problem: the conflict between large shareholders and small shareholders. Since the boards of directors are mainly constituted by large shareholders in China, the boards' decisions largely reflect their will. The positive relationship between large shareholders and ROE confirmed by our data (Table 5.4) suggests that large shareholders are very concerned about the agency problem in order to maximize their own benefits. Higher return on equity would mean more profits for large shareholders. However, the non-significant positive relationship between larger shareholder and asset utilization found in Table 5.3 (panel A) illustrates that

they are not genuinely interested in improving the firms' utilization. Again their significant negative relation with the debt-to-assets ratio and their prejudice against using debt in favour of less costly capital, suggest that they are sacrificing the smaller shareholders' interests for their own good. Although large investors can be very effective in solving the agency problem, they may also inefficiently refinance the firm through equity when increasing debt could have maximized the firm's value. Driven by their own interests they may also redistribute the wealth of the firm from other small investors. Small shareholders are unlike creditors in that they are not promised any payments in return for their financial investment in the firm and have no claim to specific assets of the firms.

Board size has a negative relation to agency costs and its coefficient is not significant at each individual year, but significant at a better than 1 per cent level at the pooled level. The individual level results suggest that the large shareholders are motivated to care about company performance. This somehow counteracts the negative effects of the overall board members' 'shirking' behaviour. However, this kind of behaviour reveals itself more clearly through pooled year data by members seeking more discrete ways to enhance their own interests at the cost of the firm.

That firm size is significant at better than the 1 per cent level in all regressions further suggests large companies are more efficient in dealing with agency problems. All the results of ROE are positive to the capital structure and significant at better than either 1 per cent or 5 per cent. The equity market-to-book value is not significant.

## Conclusion

There have been many research studies conducted concerning agency costs in developed markets but less attention has been paid to emerging markets like China. The contribution of this study is two-dimensional: first, it contributes to the literature on the impact of capital structure on agency costs in the Chinese stock market. Second, among the limited studies concerning capital structure, although Yan *et al.* (2002) analyse the interrelationship between the capital structure of listed firms and agency costs in a descriptive way, no empirical analysis has been conducted so far. This chapter provides statistical evidence on firms' capital structure and agency costs measured in terms of ratio of sales to total assets and ratio of return on equity.

The results indicate that firms with a higher debt-to-assets ratio have a higher ratio of sales to assets and a higher ratio of return on equity, and that this relationship is statistically significant at better than the 1 per cent level. Capital structure theories suggest that managers make financing decisions so as to maximize the value of equity for shareholders. This finding is supportive of the theory put forward by Williams (1987) that additional debt decreases agency costs and the theory by Jensen (1986) that debt can reduce the agency costs of free cash flow by reducing the cash flow available for spending at the discretion of managers. Our results also support Shleifer and Vishny's (1997) statement that large shareholders claim that they have both a general interest in profit maximization and enough control

over the assets of the firm to have their interests respected. However, we also find that large shareholders are primarily concerned about their personal benefits, thus failing to improve the turnover on assets. The absolute control of listed firms' large shareholders makes it difficult for small shareholders to vote against the boards' decisions. This results in firms' inclination to refinance through the stock market and it harms small shareholders' interests.

## Notes

1. Financial support provided by the Heilongjiang Province Natural Science Fund G01-10.
2. In its narrowest sense, corporate governance is about the relationship of the owners or shareholders of a firm with its manager (Iskander and Chamlou, 2000), which is often characterized by economists as the 'agency problem'.
3. About 75 per cent of listed firms are formerly state-owned. Another 10 per cent are firms that mostly had significant shares held by SOEs. Only less than 10 per cent of listed firms are formerly private-owned firms or foreign-invested firms, which in most cases had SOEs as their joint venture partners. See the website of China Securities Regulatory Commission: www.csrc.gov.cn
4. The 'inside control' viewpoint was aired in 1995 by Japanese scholar Masahiko Aoki.
5. Wu Jinglian, June 8, 2001. *The Behaviour of Control Shareholders and Corporate Governance*. Shanghai Security News.
6. Statistics availble from: www.csrc.gov.cn
7. Jensen and Meckling model the agency costs of debt in this paper. However, for our purposes in this chapter, it is the agency costs of equity that are relevant.
8. Morck *et al.* (1988) showed in their empirical study that the proportion of equity held by managers and the valuation of the firm and proportion is an inverted U-shape.
9. Several articles model the benefits and costs of debt, the benefit is usually the reduction in the agency cost, such as preventing the manager from investing in negative net present value projects, or forcing him to sell assets that are worth more in alternative use. The main cost of debt is the inability of firms to undertake good projects because debt covenants keep them from raising additional funds, or else they may be forced by creditors to liquidate when it is not efficient to do so.
10. Use the SG and an expense ratio instead of operating expenses to measure agency costs.
11. Singh found the SG&A expense ratio is not significantly influenced by ownership. This is because governance variables are not as visibly related to cash flows generated by firms as are sales revenues. We conducted a similar analysis and didn't find any significant relationship either.
12. State shares are held by government bodies such as state asset management agencies, or institutions authorized to hold shares on behalf of the state such as a wholly state-owned investment firm. Legal person shares are shares held by any entity or institution with a legal person status, including an SOE or a firm controlled by an SOE.
13. In Table 5.1, the debt-to-asset ratio is the industry average level of listed firms. The industry classification conforms to the first grade industry classification of the Chinese Stock Exchange. This policy was announced on 18 March 2001.
14. There were 1160 listed firms on the stock market at the end of 2001. Sample = 1160 − (43 ST firms + 8 PT firms) × 20 per cent − 11 firms IPO after 1999 = 211 firms.
15. The Shanghai Stock Exchange and Shenzhen Stock Exchange declared emerging abnormal phenomena from some listed firms' financial statements. Such listed firms' stock was specially treated. The stock is called ST stock. There were 43 ST firms in China's two stock exchanges at the end of 2001.
16. Listed firms that have continuous 3-year losses are called PT firms. There were 8 PT firms at the end of 2001.

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# 6 Stock or cash dividends? The current dividend pattern of Chinese listed companies

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## Introduction

Corporate dividend policy has attracted considerable attention in the literature over the last few decades (for a review, see Frankfurter and Wood, 2002). Dividend policy is concerned with how the earnings of a company are distributed. The proportion of earnings paid out as dividends to ordinary shareholders can vary considerably from company to company and from country to country. This is because, as often argued in the finance literature, a company's dividend decision is frequently mixed up with other financing and investment decisions and influenced by a variety of factors including distributable profits, cash flow, the nature of business risk, investment opportunities, access to capital markets, the company's ability to borrow, restrictive covenants, investors' requirements, regulatory considerations and tax effects (e.g., Emery *et al.*, 2004; Smart *et al.*, 2004). While it is still inconclusive, researchers (e.g., Benartzi *et al.*, 1997; Crawford and Franz, 2001) have attempted to determine whether there is any particular dividend policy that a firm can adopt to maximize its shareholder wealth.

It was shown in the seminal work of Miller and Modigliani (1961) that under perfect market[1] conditions the dividend policy of a firm is not relevant to the firm's value. Consequently, dividend policy is irrelevant. However, under imperfect market conditions such as the real world, companies do adopt different dividend policies in order to maximize their market value and shareholders' wealth. Among other reasons, this is partially because tax liabilities for dividend incomes and capital gains are different from one country to another. Previous researches have shown that a dividend when used as a signal to the market has its specific function in terms of maximizing shareholders' wealth (e.g., Healy and Palepu, 1988; Akhigbe and Madura, 1996; Lippert *et al.*, 2000). While academic studies have predominately focused on the relationship between dividend policy and the market value of a firm, few have attempted to examine the actual dividend pattern of listed companies in emerging economies. As the corporate strategy and financing decisions of a firm are motivated by behavioural, political, social and economic influences (Shiller, 1990), it is expected that companies in emerging markets, where the social, economic and political environments are different from those in developed markets, will adopt different corporate strategies (including dividend policy) and financing decisions.

This chapter attempts to shed some light on the dividend policy of Chinese listed companies by examining the dividend patterns and levels of Chinese listed companies based on a sample of 400 listed companies on the Shanghai Stock Exchange (SSE) from 1999 to 2003. In the last few years, external environments for the Chinese listed companies have been changed, mainly due to the efforts of the Chinese government to join the WTO and the establishment of market regulations for new stock issuing. Therefore, it is expected that the dividend patterns of Chinese listed companies may well be different from the earlier patterns found in Chen *et al.* (2002) and Wei (1999).

Our study shows that the dividend pattern of the Chinese listed companies sampled under this study has been changed and that cash dividends have become more popular in China after 2000. The majority of companies studied paid cash dividends over the five years. Since 2000, very few companies have paid stock dividends or capital stock increases. These results indicate that the dividend pattern of Chinese listed companies is more or less similar to the pattern of companies in Western developed countries. Chinese corporate managers have changed their dividend behaviour from issuing only stock dividends in the early stage to paying mostly cash dividends at present. However, the dividend level of those listed companies studied is generally low, averaging 0.13 yuan per share and there has been very little change in the dividend level over the period. The mean dividend level dropped from 0.155 yuan per share in 1999 to 0.136 per share in 2001. In 2003 more than 51 per cent of the listed companies paid a cash dividend of 0.1 yuan or less per share.

The remainder of this chapter proceeds by briefly describing China's stock markets and its developments. A review of the literature on dividend policy and previous research findings is then presented. Subsequently we present our data, research analysis and findings. We conclude in the final section.

## Developments in China's stock markets

China has achieved great success since the launch of its economic reforms and 'open door policy' in 1978. As part of the reform, China started in 1984 to expand the experiment in Special Economic Zones with the introduction of stock enterprises.

Several thousand enterprises across the country adopted the stock company model from 1984 to 1989. The model was further developed in two ways: the conversion of existing companies to joint stock companies or the establishment of joint stock companies through mergers or division of enterprises. Enterprises were permitted to sell stocks only to employees or to related companies. Later, some selected state-owned enterprises (SOEs) were corporatized and a small proportion of their stocks allowed to sell to the general public (Brayshaw and Teng, 1995). In 1981, China issued treasury bonds which were apportioned to public enterprises but they were not allowed to be circulated or transferred between individuals. In 1986, in order to increase the liquidity and attractiveness of treasury bonds, bond transactions between individuals were made possible in Shenyang City, which marked the rebirth of the securities markets in China.

China's first stock exchange was formally established in December 1990 when the Shanghai Stock Exchange (SSE) was officially opened. After 6 months, a second

*Table 6.1* Summary of China's stock market development (1992–2003)

| | *1992* | *1993* | *1994* | *1995* | *1996* | *1997* | *1998* | *1999* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total shares issued (100m shares) | 68.87 | 387.73 | 684.54 | 848.42 | 1219.54 | 1942.67 | 2526.79 | 3088.95 | 3791.71 | 5218.01 | 5875.45 | 6428.46 |
| Tradable shares (100m shares) | 21.18 | 107.88 | 226.04 | 301.46 | 429.85 | 671.44 | 861.94 | 1079.65 | 1354.26 | 1813.17 | 2036.9 | 2269.92 |
| Total capital raised (100m yuan) | 94.09 | 375.47 | 326.78 | 150.32 | 425.08 | 1293.82 | 841.52 | 944.56 | 2103.08 | 1252.34 | 961.75 | 1357.75 |
| Total stock market cap. (100m yuan) | 1048.13 | 3531.01 | 3690.61 | 3474.28 | 9842.38 | 17529.24 | 19505.64 | 26471.17 | 48090.94 | 43522.2 | 38329.12 | 42457.72 |
| Market cap. of tradable shares (100m yuan) | | 861.62 | 968.89 | 938.22 | 2867.03 | 5204.42 | 5745.59 | 8213.97 | 16087.52 | 14463.17 | 12484.55 | 13178.51 |
| Total stock trading volume (100m shares) | 37.95 | 234.22 | 2013.34 | 705.47 | 2533.14 | 2560.79 | 2154.11 | 2932.39 | 4758.4 | 3152.29 | 3016.19 | 4163.08 |
| Total stock turnover (100m yuan) | 681.25 | 3667.02 | 8127.63 | 4036.47 | 21332.16 | 30721.84 | 23544.25 | 31319.6 | 60826.65 | 38305.18 | 27990.46 | 32115.27 |
| Number of listed companies A, B shares | 53 | 183 | 291 | 323 | 530 | 745 | 851 | 949 | 1088 | 1160 | 1224 | 1287 |

*Source*: *China Securities and Futures Statistical Yearbook* (2004).

exchange was set up in Shenzhen (the SZSE). Since then, the stock markets have grown considerably as shown in Table 6.1. The number of listed companies has increased from eight at the beginning of the stock market development when the SSE opened in 1990 to 1287 by the end of 2003 (including companies issuing A shares and B shares) and the total capitalization has reached 4245.8 billion yuan (around US$530 billion), according to the China Securities Regulatory Commission (CSRC) (2004). By the end of 2003, the SSE trading floor was handling 780 listed companies with a market capitalization of about 2980.5 billion yuan including 2940.1 billion yuan of A shares and 40.4 billion yuan of B shares (CSRC, 2004).

Presently, with a capitalization of over US$530 billion, China's stock market is Asia's second biggest, behind Tokyo. Some salient features of the Chinese stock exchanges include:

1. The state owns varying levels of shares in most of the listed companies.[2] As a result, the state retains extensive control or influence over these listed companies via its direct shareholding and via its control or influence over many legal person shareholders (Chen *et al*., 2002).
2. There are two types of shares (A shares and B shares) and a two-tier pricing system in the markets. The companies listed on these two stock exchanges were originally authorized to issue shares to domestic investors only, known as A shares. In 1992, some companies (most of them had already issued A shares) were allowed to issue shares denominated in US dollars in the SSE and Hong Kong dollars in the SZSE to overseas investors, known as B shares.[3]
3. The markets have become wildly popular with ordinary Chinese and around 50 million people have invested in them; most with little or no experience in the area of business or finance (Chen *et al*., 2002). For example, more than 65 per cent of the investors on the SSE did not have qualifications beyond secondary education (SSE, 2003).
4. There was no single foreign company listing in China's stock exchanges.
5. There were various kinds of dividends, offered by Chinese listed companies, including cash dividends (CD), stock dividends (SD), capital stock increase[4] (CSI) using capital surplus to increase capital stock, or any combination of the above three types.
6. Many companies were reluctant to pay dividends, in particular cash dividends. By 2001, over 220 companies on the two stock exchanges had never paid cash dividends since their listing and 67 had never paid any dividend (Security Herald 2001 No. 3).

In 1992, the State Securities Committee (SSC) and the CSRC were established to provide a mechanism for regulating the securities markets. The SSC is the highest governing authority of the securities markets with the responsibility for (1) organizing and drafting related laws and regulations, (2) preparing developmental strategies and plans, (3) guiding, co-ordinating, supervising and reviewing the work of related central government agencies and local government organizations and (4) supervizing the operations of the CSRC. The CSRC acts as the executive

arm of the SSC and plays a significant role in day-to-day management of the two exchanges and the country's securities markets. On February 1, 2004, China's State Council issued the Guidelines on Promoting Reform, Opening-up and Steady Development of China's Capital Market, which describes the experiences of China's capital market in the past decade and points the directions for future development.

Listed companies in China are subject to special accounting and disclosure regulations issued by the Ministry of Finance and the CSRC (Chen *et al*., 2002). According to the 1993 regulation No. 43 of the CSRC, all listed companies in China need to publish their annual and interim reports before 30 April and 30 August every year respectively. Companies also need to publish in a specific newspaper within two working days news of decisions of the boards of directors meetings, decisions of shareholders meetings and important notices such as dividend declarations. In 2000, the CSRC put forward the revised regulations (No. 153) on publicizing information, requiring all the listed companies to upload their annual and interim report to the stock exchange's website.

## Literature review

There is a substantial body of literature examining (1) whether dividend policy is relevant to the wealth of shareholders, (2) the relationship between dividend yield and security return, (3) factors that affect dividend policy and (4) tax effects on dividend policy (Frankfurter and Wood, 2002). However, current models of corporate dividend policy largely ignore behavioural and socio-economic influences on managerial and shareholder activities (Shiller, 1990). Clearly, the exclusion of these motivations from these models severely limits the applications of the existing models to corporate activities and policy determination (Frankfurter and Wood, 2002).

Studies of corporate dividend policy suggest that most companies have a conscious or, at least, some subconscious long-term target payout rate. That is, most companies tend to pay a target proportion of annual profit as dividends. This has been largely explained in the literature by the information asymmetry suggested as a major factor impacting upon a company's dividend policy (e.g., Crawford and Franz, 2001; Firth, 1996; Koski, 1998; Miller and Rock, 1985). Information asymmetry is concerned with the 'information gap' between the managers of a firm and its investors. Managers often have significant inside information about the company's prospects that cannot be divulged to investors. This information gap between management and shareholders may cause stock prices to be lower than they otherwise would be under the condition of perfect information symmetry. It is argued that changes in dividend policy may convey information to the market about the firm's future earnings power (e.g., Crawford and Franz, 2001; Miller and Rock, 1985). For example, Miller and Rock (1985) argue that changes in dividend payments represent a signal to investors concerning management evaluation of the future earnings and cash flows of the operation. For most companies with a long-term target payout rate, investors often interpret a large dividend increase as a sign of management's optimism about the company's prospects. Empirical evidence (see, e.g., Akhigbe and Madura, 1996; Amihud and Murgia, 1997) indicates that

most companies in the developed economies have a long-term target payout rate. The management cares about the long-term, stable, smooth payout dividend rate (Baker *et al.*, 1985). Kroll (2000) finds that nearly all public companies paid regular cash dividends a decade or so ago and most of them still do.

Some researchers find that, on average, the firm's share price increases (decreases) around its announcement of an increase (decrease) in dividends or of a special dividend. Akhigbe and Madura (1996) find that dividend initiations result in favourable long-term share performance while dividend omissions are followed by poor long-term share performance. Healy and Palepu (1988) also find that an abnormal return around the firm's announcement of a dividend initiation or omission is positively correlated with future earnings. Brickley (1983) finds that the firms' initiation dividend is accompanied by a strongly positive stock price reaction. Rozeff (1982) documents other links between dividend policy and revenue growth, financial leverage, outsider shareholders' holding and industry factors. A recent study by Short *et al.* (2002) shows that a positive association exists between dividend payout policy and institutional ownership, but a negative association exists between dividend payout policy and managerial ownership.

Research into the dividend policy of Chinese companies is in its infancy as China's stock market is still at its early development stage. An extensive study was done by Wei (1999), which reveals some interesting results. According to Wei (1999), there is an increasing tendency for the number of listed companies in China that pay no dividends. The dividend policies of China's listed companies change significantly over time and have no continuity,[5] and China's listed companies not only pay cash dividends but also stock dividends. Also, there are many other kinds of dividends offered by the Chinese listed companies, including some mixed dividends of cash and stock. From the annual data, it shows that companies pay high stock dividends. The average stock dividend ratio from 1992 to 1997 was 0.35. Wei found that there is a relationship between dividends and earnings: when dividends increase, current and future earnings rise and when dividends decrease, future earnings decline.

In a study on financial management practices in China, Ooghe (1998) found that most of the companies in his sample did not put forward a target dividend percentage. The actual dividend payout percentages varied from 0 to more than 100 per cent and varied from year to year. Unfortunately, Ooghe's findings were based on interviews of 16 firms in Shanghai; this approach was not designed to offer actual dividend figures.

Chen *et al.* (2002) focus on the information content of annual earnings and dividend announcements made by listed Chinese companies over the period of 1994–1997 and find that stock dividends corroborate or attenuate the earnings signal. However, unexpected cash dividends have little impact on the earnings signal and stock dividends *per se* have a small association with stock returns. In contrast, cash dividends have no discernible association with stock returns and their results are overall consistent with dividend irrelevance arguments. Gul's (1999) study shows government ownership is positively associated with debt financing and dividend policy in China.

In sum, although there is a large body of research literature on dividend policy in general, the existing research on the dividend policy of the Chinese listed companies is very limited and data used are mostly prior to 1997. More research is needed to better understand the current dividend policy of Chinese listed companies. The aim of this chapter is to provide an up-to-date analysis of Chinese listed companies on their dividend pattern over the last five years.

## Research data, analysis and findings

This study is based on a sample of 400 companies listed on the SSE over the period of 1999 to 2003. In 1999 there were 484 companies listed on the SSE and our sample represents over 80 per cent of the total listed companies. By the end of 2003, there were 780 companies listed on the SSE. Of these 780 listed companies 770 companies issued A shares and 54 companies issued B shares. The total number of stock for public offering reached 417 billion shares, 11.86 per cent higher than 2002. Among them, 115.7 billion shares are tradeable in the market, 16.57 per cent higher than 2002. By the end of 2003, total market capitalization and value of tradeable stock reached 2980.5 yuan billion and 820.1 billion yuan respectively (SSE, 2003).

The dividend information of all the sample firms is obtained from published annual reports. We intend to include all the listed companies in 1999 in this study. However, owing to the lack of availability of some annual reports, this study finally considers 400 companies in 1999. We use 400 as the sample size for the remaining years of the period in order to compare and observe the changes over the period. Over the period from 1999 to 2003, some of the companies listed in 1999 had changed their names, were taken over, merged or de-listed. As a result, we were not able to use matching listed companies for the whole period, instead a random selection of 400 companies was chosen for the years 2000 to 2003. The representative rates of our sample over the population are given in Table 6.2. As shown in Table 6.2, our sample size represents at least 51 per cent of the population of the listed companies on the SSE in any one year.

Table 6.3 provides a summary of dividend payments of 400 listed companies from 1999 to 2003. Five types of dividend payments were considered, including a stock dividend, a capital stock increase, a cash dividend, a mixture dividend and an omission. Table 6.4 provides a detailed breakdown of the number of companies paying mixture dividends as reported in Table 6.3.

Table 6.3 shows a big increase in the number of companies paying cash dividends: from 143 (35.75 per cent of the sampled companies) companies in 1999

*Table 6.2* Sample size and representative rate

| | *1999* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|
| Total listed companies on SSE | 484 | 572 | 646 | 715 | 780 |
| Sample companies | 400 | 400 | 400 | 400 | 400 |
| Representative rate | 83.65% | 69.93% | 61.92% | 55.95% | 51.28% |

*Table 6.3* The dividend pattern of the listed companies on the SSE (1999 to 2003)

| | *1999* | | *2000* | | *2001* | | *2002* | | *2003* | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *No.* | *%* | *No.* | *%* | *No.* | *%* | *No.* | *%* | *No.* | *%* |
| SD | 11 | 2.75 | 13 | 3.25 | 8 | 2.0 | 11 | 2.75 | 0 | 0 |
| CSI | 33 | 8.25 | 2 | 0.5 | 11 | 2.75 | 43 | 10.75 | 4 | 1 |
| CD | 143 | 35.75 | 264 | 66.0 | 308 | 77 | 312 | 78 | 374 | 93.5 |
| MD | 22 | 5.5 | 66 | 16.5 | 55 | 13.75 | 24 | 6 | 12 | 3 |
| OM | 191 | 53.25 | 55 | 13.75 | 18 | 4.5 | 10 | 2.5 | 10 | 2.5 |
| Total | 400 | 100 | 400 | 100 | 400 | 100 | 400 | 100 | 400 | 100 |

SD, Stock Dividend; CSI, Capital Stock Increase; CD, Cash Dividend; MD, Mixture Dividend of SD, CSI and CD; OM, Omission.

*Table 6.4* Mixture dividend paying companies on the SSE (1999 to 2003)

| | *1999* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|
| SD and CD | 11 | 11 | 22 | 10 | 8 |
| CD and CSI | 0 | 55 | 33 | 14 | 4 |
| SD and CSI | 11 | 0 | 0 | 0 | 0 |
| Total | 22 | 66 | 55 | 24 | 12 |

SD, Stock Dividend; CSI, Capital Stock Increase; CD, Cash Dividend; MD, Mixture Dividend of SD, CSI and CD.

to 374 (93.5 per cent) companies in 2003. As mixed dividend payments also included a cash dividend (as shown in Table 6.4), the number of companies paying cash dividends was actually 154 in 1999 and 386 in 2003. Clearly, the number of listed companies paying cash dividends had increased dramatically over the period; in particular there was an over 50 per cent increase from 1999 to 2000 in the number of companies paying cash dividends.

This result is somewhat different from the findings of Wei (1999) and Chen *et al.* (2002). There are several possible reasons for the difference. First, both Wei (1999) and Chen *et al.* (2002) use pre-1999 data while this research is based on data from 1999 to 2003. Due to the rapid development of the Chinese markets over the last few years and China's entry of the WTO in 2001, Chinese listed companies have adopted dividend policies different from the ones of several years ago. Second, the difference may be heavily influenced by one very important regulation. In March 2000, there was a new internal assessment regulation introduced by the CSRC for the approval of rights issues. According to this regulation, a company needs to have a regular cash dividend payment record for previous years in order to apply for additional rights issuing. Third, from 1998, China has been under a massive investment period and the government's 'five-year plan' focused on the reforming of the state-owned enterprises, on the improvement of the finance sector's performance

and the cutback in bad loans of commercial banks (particularly the four state-owned commercial banks which account for 71.8 per cent of outstanding loans). As a result, companies had more difficulty in borrowing from banks and direct finance from the capital market therefore became very important to them. This forced listed companies to obey the CSRC's regulation strictly in order to get direct financing. Thus, an increasing number of companies have selected a cash dividend rather than stock dividends in order to meet the regulatory requirements.

Table 6.3 also shows a decreasing trend of non-dividend payments. The number of companies not paying a dividend decreased from 191 (53.25 per cent) in 1999 to 10 (2.5 per cent) in 2003. This is contrary to the findings of Wei (1999) who concluded the number of non-dividend paying companies was increasing. Further, Table 6.3 and Table 6.4 reveal the number of the listed firms issuing SD and CSI from 1999 to 2003. In 2003, there was no company paying wholly stock dividends and there were only four companies paying CSI, a mere 1 per cent of the total listed companies on the SSE.

The above indicates that the dividend pattern of listed Chinese companies is more or less similar to the pattern of Western developed countries where cash dividends are popular among listed companies. This further suggests that Chinese listed companies have largely changed their dividend policy from issuing only stock dividends in the early stage to paying mostly cash dividends at present.

This study also analyses dividend levels. Table 6.5 presents descriptive statistics of the dividend levels paid by listed companies on the SSE during the five-year period. Note that the data used are the yearly cash dividend levels, excluding non-dividend payments.

Table 6.5 shows a low level of cash dividends. For the years from 1999 to 2003, the average cash dividend level was about 0.13 yuan per share, the highest being 0.155 yuan in 1999 and the lowest 0.103 yuan in 2001. The largest dividend was 0.65 yuan per share in 1999 and the smallest was just 0.003 yuan per share in 2002 and 2003. In 2003 more than 51 per cent of the listed companies paid cash dividends of 0.10 yuan or less per share.

A low level of cash dividend payments can be explained in terms of China's social and economic systems. Prior research has suggested that dividend policy and behaviour are related to the social and economic systems of an individual country (Shiller, 1990). Different social and economic systems require companies to adopt a particular dividend policy that suits its needs within its particular environment. One of the key characteristics of the Chinese economy over the past has

*Table 6.5* Dividend levels of listed Chinese companies on the SSE

| | *1999* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|
| Max | 0.650 | 0.450 | 0.288 | 0.52 | 0.6 |
| Min | 0.031 | 0.032 | 0.010 | 0.003 | 0.003 |
| Mean | 0.155 | 0.125 | 0.103 | 0.133 | 0.136 |
| Median | 0.123 | 0.094 | 0.080 | 0.10 | 0.10 |
| Standard deviation | 0.1235 | 0.0834 | 0.0692 | 0.9639 | 0.0982 |

been the shortage of capital in the markets. As a result, companies had some difficulty in raising external finance. Under these circumstances, Chinese listed companies do not like cash to flow out of the company once it has been raised.

A major problem for Chinese listed companies in the domestic market is liquidity in that there is a shortage of capital in the market and there are no other proper channels that a company can use to increase its capitalization. Many of these listed companies were formerly SOEs before being listed (Xiang, 1998; Chen *et al*., 2002), and most at low efficiency (Green, 2003). Some made a great deal of losses every year. As a result, it was difficult for them to get loans from banks, as banks started to pay more attention to avoiding the financial loss associated with bad debts. Therefore the most effective way of raising capital was to get into the premier stock markets. Once a company had obtained the 'lifeblood' of cash, it became very important to the company not to return it back to investors through large cash dividends and they were very reluctant to do so.

Moreover, under China's current economic system there is a significant gap, from an investor's point of view, between the benefits from the two kinds of gain, in that cash dividends will reduce shareholders' wealth as a result of individual income tax. In China, different tax rates exist between cash dividend incomes and capital gains. Since the establishment of China's securities market, a tax of 20 per cent has been levied on cash dividend gains, while capital gains have been tax-free up to now. Given this difference in the tax treatment, there is little shareholder pressure on the company for high cash dividends.

## Conclusion

This study is acknowledged as exploratory. Though the findings are tentative, this study provides several results that are different from the findings of Wei (1999) and Chen *et al.* (2002).

First, the majority of the listed companies pay dividends of various kinds to their shareholders and since 2000 cash dividends have become the primary form of dividend payments. There is an increased tendency towards pure cash dividend payments, the proportion of cash dividend payments being 35.75 per cent in 1999 and 93.5 per cent in 2003. Other types of dividend payment have decreased over the period and no companies were paying pure stock dividends by 2003. While companies still made mixed dividend payments including either SD or CSI, all involved an element of cash since 2000.

Second, the dividend level of the listed companies was very low over the period, at an average of 0.13 yuan per share. The mean dividend level dropped from 0.155 yuan per share in 1999 to 0.136 yuan per share in 2003. More than 50 per cent of the listed companies paid cash dividend of RMB 0.10 or less in 2003.

Even if Chinese listed companies pay low levels of cash dividends, the results reveal that the dividend pattern of Chinese listed companies is getting closer to developed countries and the companies have changed their dividend policies. It is argued that this new pattern of dividends is largely due to changes in the government's regulations and this might indicate that the government has a strong

influence on the dividend policies of listed companies. In conclusion, therefore, dividend policies of Chinese listed companies are primarily determined by the influences of macro-factors (such as the Chinese economic system and the development of the capital market) and the regulations of the government.

## Notes

1. The perfect market is considered a frictionless market in which there are no taxes, no transaction costs, and all relevant information is available to all participants at no cost and all participants are price takers.
2. On average, about one-third of the shares of listed companies in China are held by the state, one third by legal entities and one third by individual or private shareholders (Chen *et al*., 2002).
3. In June 2001, the Chinese government took a major step toward eliminating the country's two-tier pricing system for stocks – whereby foreigners and local investors own different kinds of shares at different prices. From then on regulators began allowing Chinese residents to buy foreign currency shares without restrictions using whatever dollars they may have in legal foreign currency accounts.
4. CSI is to use capital surplus to increase stock. In essence, it doesn't constitute a dividend, but in China it is announced in the dividend policy. As it has the same effect on earnings as a stock dividend in that they both increase the stated capital and dilute earnings per share, we treated it as the stock dividend in this chapter.
5. Wei found that there were 15 companies, or 28.3 per cent of the companies under study not paying a dividend in 1992. In 1997, however, 374 companies did not pay a dividend, accounting for 50.2 per cent of the total. Of a sample of 1367 observations in his study, only 117 or 8.56 per cent remain unchanged. From the annual data, the number of no-change companies is five for 1993, accounting for 7.14 per cent. From 1994 to 1997, the numbers are 17 (8.54 per cent), 33 (11.57 per cent), 33 (10.21 per cent), and 29 (5.92 per cent) respectively. There are 312 (22.82 per cent) companies that have increased their dividends and 454 (33.21 per cent) that have reduced their dividends. In other words, the number of companies that have changed the level of dividend payment reached 766 (33.21 per cent) from 1992 to 1997.

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# Part II

# FDI and Globalization

# 7 The economic impact of China's emergence as a major trading nation[1]

*Wing Thye Woo*

## Introduction

The key to understanding the international impact of China's emergence as a major economic power, as marked by its accession to the World Trade Organization (WTO), is that the global division of labour at the end of the last millennium was a highly unnatural one. It was unnatural because the self-imposed isolation of China in the 1949–1979 period and its slow integration into the international economy in the 1980–1991 period kept over one fifth of the human race from meaningful participation in the world trade and investment systems. This is why China's accelerated integration into the world economy beginning in the mid-1990s has led to significant relocation of labour-intensive industries to China. In mid-2003, the electronic and electrical firms in Penang, Malaysia, employed 17 per cent fewer workers than in 2000. On the other side of the Pacific, 500 of Mexico's 3700 *maquiladoras* (foreign-owned export-oriented firms) have closed since 2001, and the surviving *maquiladoras* have reduced their employment by almost a third.

Foreign direct investment (FDI) into China increased from US$44.2 billion in 1997 to US$52.7 billion in 2002. This caused China's share of total FDI into the developing world during this period to rise from 22.9 per cent to 32.5 per cent, and its share of total FDI into Asia to soar from 40.6 per cent to 55.5 per cent.

## The gorilla awakes

Developments like the above are the reason why the Prime Minister of Singapore, Mr Goh Chok Tong, informed his fellow citizens during his National Day address in 2001 that:

> … China poses a big economic challenge. Some economists describe China as an *800-pound trading gorilla.* A Hong Kong newspaper added that this gorilla was *very hungry* …
>
> Even India is being flooded with cheap but good quality Chinese goods. Some Indian manufacturers are finding it hard to compete. So they have done the next best thing. They stick 'Made in China' labels on their products to boost sales …

> Our biggest challenge is therefore to secure a niche for ourselves as China swamps the world with her high quality but cheaper products. China's economy is potentially ten times the size of Japan's. Just ask yourself: how does Singapore compete against ten post-war Japans, all industrializing and exporting to the world at the same time?
>
> I do not mean that China will overpower every other economy, and grow at the expense of everybody else. As China develops and exports more, its imports will grow too. There will be many opportunities to invest in China. We must grasp those opportunities.

Mr Goh is certainly correct in pointing out that China cannot just be an exporter without also being an importer too. But the crucial issue is whether the composition of goods that China would import would require a complete overhaul of the production structures of East and Southeast Asia. Would China's WTO accession cause Indonesia, Malaysia, Philippines and Thailand (the ASEAN-4) to de-industrialize and return to their roles in the 1950s and 1960s as primary commodity exporters? Or would there be sufficient lucrative niches within the manufacturing production chains that the ASEAN-4 could specialize in?

The second scenario is certainly a possibility, particularly for Singapore, Taiwan, and South Korea. In the opinion of Stanley Fischer, the former deputy managing director of the IMF:

> … there is little cause for fear … a big dynamic economy in the neighborhood is a benefit, not a curse, for those around it – look at Canada or Mexico … Or, one might add, look at Asia after Japan emerged as an economic power from the 1970s onward. ("Don't fear China threat," *The Straits Times*, 4 September 2001.)

Boom or doom? And for whom? These are the two questions that I would like to address in this statement. In order to answer the above two questions about the international impact of China's rise as a major economic power, we have to first understand why China has been so arduous in its pursuit of WTO membership. Since WTO membership for China mainly requires it to implement drastic reductions in its trade barriers across-the-board in a relatively short period of time, it can therefore appear puzzling why WTO membership is necessary when China can achieve the same results by undertaking unilateral cuts in effective tariff rates by the amount that it chooses and within a time period that it determines. Why did China pursue protracted negotiations to get an arrangement where the lowering of trade barriers is externally supervised, and leaves China open to international sanctions if the trade liberalization does not meet the externally imposed criteria, when unilateral trade deregulation is an option?

The answer to this riddle is that the fundamental reason for China's enthusiasm for WTO membership is that WTO membership will greatly enhance China's economic security. The United States had enacted the Permanent Normal Trade Relations (PNTR) Act on 10 October 2000, and the PNTR ended the annual

approval from the US Congress for most-favoured-nation (MFN) status in order for its exports to compete in the US markets on equal terms against the exports from WTO countries. However, the important point to note is not the passage of PNTR, but the realistic situation that whatever laws are passed by Congress can also be repealed by Congress later without violating any international law. So, until China is a WTO member, which gives China unconditional, *permanent*, multilateral rights to trade with other WTO members, the threat of PNTR being repealed renders China's exports vulnerable to passing passions in the US political arena. Examples of recent passing passions would include accidents like military airplane collisions in the South China Sea, and the Chinese burning of the US consulate in Chengdu following the unintended US bombing of the Chinese embassy in Belgrade. The importance to China of maintaining high export growth and of maintaining the competitiveness of its exports to the US market is hard to overstate.

The United States is China's biggest export market. The United States, until the recent restrictions on steel imports, had been perceived as ideologically committed to free trade and consequently less prone to protectionism than Europe and Japan. Clearly, in order for exports to be a sustainable growth engine, China must secure assured access to its biggest market. And, only WTO membership can prevent the United States from the impulsive unilateral action of switching off one of China's most important growth engines by simply suspending the PNTR Act, and raising tariffs on China's exports. (The reader interested in the legal protocol under which China joined WTO should consult Qin (2003).)

## China's economic linkages to the world

China's enhanced economy security has important implications for its neighbours because the international movement of goods is only one of China's two economic links to the world. The international movement of capital is the other. The important but oft-neglected point in analysing China's WTO membership is that the removal of the uncertainty about China's market access to the US market increases China's reliability as a supplier. This means that producers of labour-intensive goods destined for sale in the high-income economies can now reduce management cost by reducing the geographical diversification of its production facilities. More of the production can now be carried out in China because its labour costs are lower than in the ASEAN-4.

Analytically, the removal of the MFN threat when China officially became a WTO member at the end of 2001 is equivalent to a reduction in the risk premium demanded by investors in China's export-oriented industries. The complete picture of China's WTO membership is more than a reduction in China's effective tariffs; it also includes a reduction in the risk premium for investment in export-oriented production inside China. The effect of the tariff reduction is to reallocate the composition of China's output from importables to exportables and non-tradeables; and the effect of the risk premium is to reconfigure the global distribution of FDI in China's favour.

*Table 7.1* The 10 most promising destinations for manufacturing FDI by Japanese TNCs over the next three years (frequency, expressed in per cent, that the country is identified by Japanese firms responding to annual surveys conducted by Japan Bank for International Cooperation, JBIC)

| *Rank* | *1996 survey* | *Ratio* | *2000 survey* | *Ratio* | *2001 survey* | *Ratio* |
|---|---|---|---|---|---|---|
| 1 | China | 68 | China | 65 | China | 82 |
| 2 | Thailand | 36 | United States | 41 | United States | 32 |
| 3 | Indonesia | 34 | Thailand | 24 | Thailand | 25 |
| 4 | United States | 32 | Indonesia | 15 | Indonesia | 14 |
| 5 | Vietnam | 27 | Malaysia | 12 | India | 13 |
| 6 | Malaysia | 20 | Taiwan province of China | 11 | Vietnam | 12 |
| 7 | India | 18 | India | 10 | Taiwan province of China | 11 |
| 8 | Philippines | 13 | Vietnam | 9 | Rep. of Korea | 8 |
| 9 | Singapore | 10 | Rep. of Korea | 9 | Malaysia | 8 |
| 10 | United Kingdom and Taiwan province of China | 7 | Philippines | 8 | Singapore | 6 |

[a]The share of firms that consider the country as promising in total respondent firms (multiple responses).
[b]Fiscal year.

*Source*: United Nations Conference on Trade and Development (2002).

There is indeed evidence of the FDI diversion effect created by China's WTO membership. The Japan Bank for International Cooperation (JBIC) conducts an annual survey of Japanese trans-national corporations (TNCs) to find out which are the top 10 locations for manufacturing FDI over the next three years. Table 7.1 contains the results from the surveys undertaken in 1996, 2000 and 2001. A total of 68 per cent of Japanese TNCs listed China as one of the top 10 locations in 1996, and 65 per cent did so in 2000. These responses made China the most frequently identified promising location for FDI in both years, i.e. China was ranked first in the list of 10 locations.

The evidence in favour of our FDI diversion hypothesis is captured in the 2001 survey. It became clear to the international community at the end of 2000 that China's accession to WTO was imminent. The upshot was that the proportion of Japanese TNCs in 2001 that identified China as one of the 10 most promising locations for manufacturing FDI jumped to 82 per cent from 65 per cent in 2000. Most telling of all, the "identification gap" between China and the United States, which were ranked first and second respectively in 2000 and 2001, widened from 24 percentage points in 2000 to 50 percentage points in 2001.

The frequency that the ASEAN-4 economies were identified as top 10 locations for FDI dropped between 1996 and 2000, and the most important reason for this change in TNC's perception could be the Asian financial crisis. The frequency that Thailand was identified fell from 36 per cent to 24 per cent, Indonesia from 34 per cent to 15 per cent, Malaysia from 20 per cent to 12 per cent, and Philippines

from 13 per cent to 8 per cent. In terms of ranking within the 10 most cited locations, Thailand slipped from 2 to 3, Indonesia from 3 to 4 and Philippines from 8 to 10, while Malaysia improved from 6 to 5.

As the Asian financial crisis was over by early 2000, the changes in the frequency of identification and ranking of the ASEAN-4 economies on the list of profitable FDI locations between 2000 and 2001 could therefore justifiably be attributed to the WTO-created improvement in China's reliability as an international supplier. The frequencies that Thailand and Indonesia were identified as desirable FDI locations are practically identical in 2000 and 2001, but the identification gaps between them and China increased significantly. The China–Thailand gap went up from 41 percentage points to 57 percentage points, and the China–Indonesia gap from 50 percentage points to 68 percentage points. The frequency that Malaysia was cited declined from 12 per cent to 8 per cent, and the Philippines dropped out of the top 10 list. Malaysia's rank moved from 5 to 9, and the China–Malaysian identification gap soared from 53 percentage points to 74 percentage points. These differences in the survey results of 2000 and 2001 are certainly consistent with our hypothesis of WTO-induced diversion of FDI to China.

A recent news report makes clear that the drop in inward FDI in Malaysia has been substantial in 2002, and that the Malaysia government has no doubt that much of the drop is due to FDI diversion to China:

> Malaysia attracted approved manufacturing FDI of only RM 2.16 billion … for the first six months of this year [2002]. This is a sharp drop from the RM 18.82 billion it pulled in for the whole of last year.
>
> … "Everybody is feeling the pinch because the amount of FDIs has shrunk and then, a lot of that is going to China," Dr. Mahatir [Prime Malaysia] told a news conference later. ("Malaysia turns inward for growth," *The Straits Times*, 21 September, 2002.)

To fully appreciate the importance of this diversion of FDI, we should be cognizant of the possibility that FDI diversion could be more than just a simple relocation of the capital stock. FDI might also generate positive externalities. The East Asian experience suggests that FDI could facilitate technological transfers (i.e., generate technological spillovers) not only to domestic firms in the same industry but also to domestic firms in other industries; see Okabe (2002). Furthermore, FDI could also help solve the difficulties of access to the international markets in these goods. In short, a country gaining FDI could experience not only a bigger capital stock but also possibly a (maybe temporary) increase in its total factor productivity (TFP) growth rate; while a country losing FDI could experience a (maybe temporary) slowdown in TFP growth as well as a (maybe temporary) lower capital stock.

Table 7.2 presents the evidence in support of the link between FDI and technological diffusion by presenting the index values of the Overall Technological Capacity, column (3), for a number of the 59 countries ranked in the *World Competitiveness Report* issued by the World Economic Forum (2000). Also shown

*Table 7.2* Indices of indigenous ability to innovate, technology transfer from abroad, and overall technological capacity

| *Index of indigenous ability to innovate* | | *Index of ability to get technology transfer from abroad* | | *Index of overall technological capacity* | |
|---|---|---|---|---|---|
| USA | 1 | Singapore | 1 | USA | 1 |
| Finland | 2 | Ireland | 2 | Finland | 2 |
| Germany | 3 | Luxembourg | 3 | Singapore | 3 |
| Switzerland | 4 | Malaysia | 7 | Ireland | 4 |
| Japan | 5 | Taiwan | 12 | Germany | 5 |
| Singapore | 14 | South Korea | 13 | Switzerland | 6 |
| Taiwan | 16 | Hong Kong | 17 | Japan | 7 |
| South Korea | 22 | Philippines | 19 | Malaysia | 18 |
| Hong Kong | 27 | India | 26 | Taiwan | 24 |
| Malaysia | 30 | Thailand | 36 | Korea | 25 |
| China | 34 | Japan | 39 | Hong Kong | 30 |
| India | 38 | China | 43 | Philippines | 32 |
| Philippines | 47 | Indonesia | 45 | India | 37 |
| Thailand | 50 | *ASEAN-4 (average)* | *27* | Thailand | 43 |
| Indonesia | 55 | | | China | 48 |
| *ASEAN-4 (average)* | *46* | | | Indonesia | 50 |
| | | | | Ecuador | 58 |
| | | | | Bolivia | 59 |
| | | | | *ASEAN-4 (average)* | *36* |

The Indigenous Innovation Index and Technology Transfer Index are the two components of the Overall Technology Index.

The Overall Technology Index is combined with the Startup Index (relative ease in establishing a new firm) to produce the Economic Creativity Index.

The Growth Competitiveness Index is constructed from the Economic Creativity Index, the Finance Index (relative efficiency of the financial system), and the International Index (degree of integration into the international economy).

These are the index values in 2000.

*Source*: World Economic Forum (2000).

in Table 7.2 are the two determinants of the Overall Technological Capacity: the Indigenous Ability to Innovate, column (1), and the Ability to Obtain Technology Transfer from Abroad, column (2). The overall technological capacity index is determined by averaging the other two indices, the 'indigenous innovation index' and the 'technology transfer index'.

The rankings of the Overall Technology Index for Malaysia (18), Philippines (32), and Thailand (43) are above China (48), and Indonesia (50) is only slightly below China in ranking. However, it is important to realize that the higher average rank of the ASEAN-4 in overall technology (36) comes from the higher technology transfer from abroad – the rank of Malaysia is 7, Philippines is 19, Thailand is 36, China is 43, and Indonesia is 45. China's indigenous ability to innovate is ranked 34 which is substantially above the rank of the ASEAN-4 to innovate indigenously (46). The point is that the average ASEAN-4 economy depends critically

on technological diffusion through FDI to raise its overall technological level to be above that of China. FDI diversion from China's WTO membership is therefore likely to cause the future rank of Indonesia, Malaysia, Philippines, and Thailand in the Overall Technology Index to fall, and of China to rise.

Since Hong Kong, Japan, Singapore, South Korea, and Taiwan rank above China in both the ability to innovate indigenously and to obtain foreign technology, the diversion of FDI into China is unlikely to affect their levels of technological capacity. The fact is that these five East Asian economies are some of the sources of FDI into China and into the ASEAN-4 means that they are amongst the sources of the technological diffusion that is being discussed.

In summary, there are three levels of answers in thinking about the consequences of China's WTO membership on the ASEAN-4. The first level is the standard analysis of a unilateral cut in China's effective tariff rates. The result is a redirection of labour and capital away from China's importable goods sector toward its exportable goods sector, causing China to import and export more. A more detailed examination might reveal that the additional Chinese imports will be capital-intensive goods from the developed economies, and the additional Chinese exports will be labour-intensive goods to developed and developing countries. We call the first-level answer the *naive analysis*.

The second-level answer recognizes that not only would there be tariff cuts as required by WTO membership but also that the removal of the market access threat to China would likely lower the risk premium required for investing in China. The expectation generated by the latter development is that there would be diversion of FDI to China, especially from its East and Southeast Asian neighbours. We call this second-level answer the *FDI diversion analysis*.

The third-level answer enriches the second-level answer by pointing out that FDI would not only increase the domestic capital stock, but some argue that it could also increase technological transfers to the whole economy and improve the access of more Chinese goods to foreign markets. We call this the *analysis of the diversion of FDI with technological spillovers*.

## Quantifying the impact – the G-Cubed (Asia-Pacific) model

The G-Cubed Asia-Pacific (AP-GCUBED) model is ideal for such analysis having both a detailed country coverage of the region and rich links between countries through goods and asset markets. The AP-GCUBED model encompasses the United States, Japan, Australia, New Zealand, South Korea, the Rest of OECD (ROECD), China, Indonesia, Malaysia, Philippines, Taiwan, Thailand, Hong Kong, Singapore, India, OPEC, EEFSU (Eastern Europe and the former Soviet Union), and the Rest of the World (ROW). Each of the 18 countries in the AP-GCUBED model has six sectors: energy, mining, agriculture, durable manufacturing, non-durable manufacturing, and services.

Each core economy or region in the model consists of several economic agents: households, the government, the financial sector and the six production sectors. Intertemporal budget constraints on households, governments and nations (the latter

through accumulations of foreign debt) are imposed. To accommodate these constraints, forward looking behaviour is incorporated in consumption and investment decisions. The investment process is assumed to be subject to rising marginal costs of installation. Aggregate consumption is chosen to maximize an intertemporal utility function subject to the constraint that the present value of consumption be equal to human wealth plus initial financial assets. International trade imbalances are financed by flows of financial assets between countries (except where capital controls are in place).

As a result of this structure, the AP-GCUBED model contains rich dynamic behaviour, driven on the one hand by asset accumulation and, on the other by wage adjustment to a neoclassical steady state. It embodies a wide range of assumptions about individual behaviour and empirical regularities in a dynamic general equilibrium framework. The interdependencies are solved using a computer algorithm that solves for the rational expectations equilibrium of the global economy. It is important to stress that the term 'general equilibrium' is used to signify that as many interactions as possible are captured, not that all economies are in a full market clearing equilibrium at each point in time. Although it is assumed that market forces eventually drive the world economy to a neoclassical steady state growth equilibrium, unemployment does emerge for long periods due to wage stickiness, to an extent that differs between countries due to differences in labour market institutions. The model has approximately 7400 equations in its current form with 140 jumping or forward looking variables, and 263 state variables. More technical details of the model are given in the appendix at the end of this chapter.

We will undertake four sets of simulations:

1. baseline simulation;
2. naive simulation;
3. reduction in risk premium simulation; and
4. diversion of FDI with technological spillovers simulations.

*The baseline simulation*: This simulation generates the future values of all the endogenous variables based on the assumption that the existing policy regimes in the world will persist indefinitely into the future. The tariff rates we use are based on the GTAP 4 database which contains estimates of the levels of tariff and non-tariff barriers. The baseline simulation, in short, assumes that the trade regimes in 2000 are continued forever (which includes China's exclusion from WTO).

*Counterfactual simulation No. 1 – the naive simulation*: The only changes are the reduction in China's trade barriers (both tariff and non-tariff barriers). We assume that trade barriers are reduced gradually over time by an equal amount (measured in percentage points) over the ten-year period of 2003 to 2012.

*Counterfactual simulation No. 2 – a reduction in the risk premium demanded by FDI – the FDI diversion simulation*: This simulation supplements the naive simulation with a 1 percentage point reduction in the risk premium demanded by foreign investors in China.

*Counterfactual simulation No. 3 – FDI creates technological spillovers in the host economy – the FDI with technological spillovers simulation*: We supplement the simulation of the FDI diversion case with five conditions.

1. A temporary decrease in the total factor productivity (TFP) growth *rate* of the manufactured durable goods industries located in Indonesia, Malaysia, Philippines, and Thailand. We assume an annual decline of 1 percentage point beginning in 2003 until the TFP level is 10 percentage points below the baseline TFP *level* in 2012.
2. A temporary decrease in the TFP growth rate of the manufactured non-durable goods industries located in Indonesia, Malaysia, Philippines, and Thailand. We assume an annual decline of 1 percentage point beginning in 2003 until the TFP level is 10 percentage points below the baseline TFP level in 2012.
3. A temporary increase in the TFP growth rate of the manufactured durable goods industries in China. We assume an annual increase of 1 percentage point beginning in 2003 until the TFP level is 10 percentage points above the baseline TFP level in 2012.
4. A temporary increase in the TFP growth rate of the manufactured non-durable goods industries in China. We assume an annual increase of 1 percentage point beginning in 2003 until TFP level is 10 percentage points above baseline TFP level in 2012.
5. A temporary increase in the TFP growth rate of the service industries in China. We assume an annual increase of 1 percentage point beginning in 2003 until the TFP level is 10 percentage points above the baseline TFP level in 2012.

The above five conditions are assumptions about the stances of public policy and the steepness of the learning curves in the ASEAN-4 and China. We assume that it will take a decade for the ASEAN-4 to improve their scientific bases sufficiently to offset the slowdown in technological diffusion due to the lower FDI inflows. We also assume that it will also take a decade for the Chinese sectors to fully master the new technology contained in the diverted FDI. Again these are assumptions rather than predictions, but they give indicative estimates of the impacts of a range of plausible assumptions.

## The results of the simulations

### *Naive simulation*

Figure 7.1 reports the deviations from baseline GDP of 11 economies: United States, Europe, Australia, New Zealand, Japan, South Korea, Taiwan, Indonesia, Malaysia, Philippines, and Thailand. None of their GDP deviations are more than 0.2 per cent from the baseline, which are indistinguishable from measurement errors. Figure 7.2 shows the deviations of exports of 10 out of the 11 economies from the baseline to be less than 0.3 per cent. The largest export deviation is that

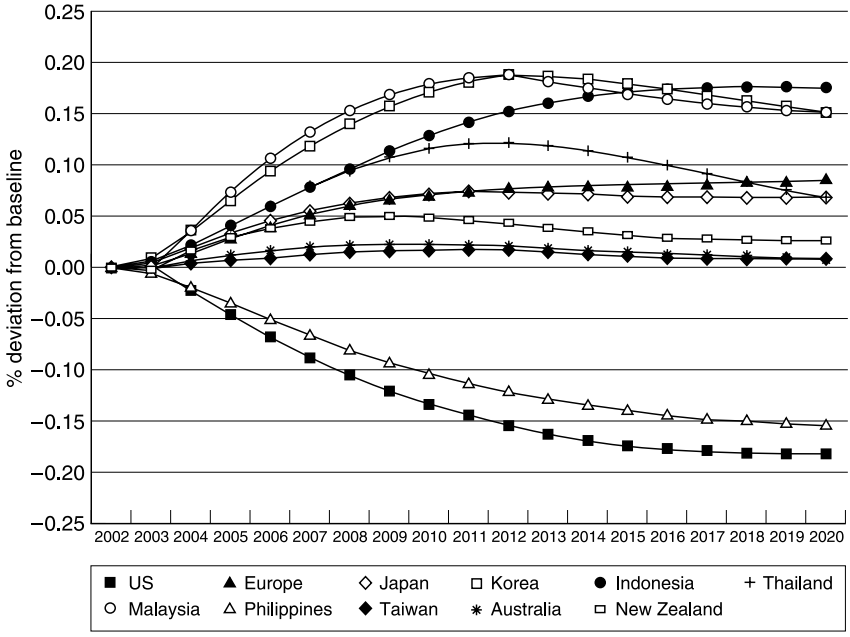


*Figure 7.1* Change in real GDP in other countries – naive case.

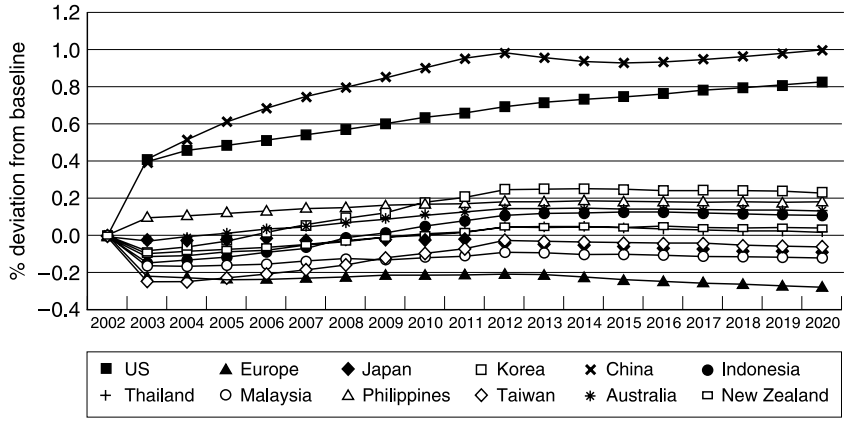


*Figure 7.2* Change in exports – naive case.

of the US which is 0.8 per cent above the baseline in 2020 – possibly, the reduction in Chinese protection of its import-competing industries led China to import more capital goods from the United States. In practical terms, however, China's WTO membership has no impact on these 11 economies.

***Simulation of the FDI diversion case***

Figure 7.3 reveals that while the deviations in GDP are negative for these 11 economies, their magnitudes are trivial. In 2020, the deviations of 10 economies are below 0.3 per cent, and Korea's deviation is almost 0.5 per cent. The export deviations exhibited in Figure 7.4 are almost the same as in Figure 7.2 – US exports in 2002 are now 0.9 per cent above the baseline. On the whole, it is hard to say that any of the 11 economies are hurt in a non-trivial way.

***Simulation of the case of FDI with technological spillovers***

We consider this simulation to be the most realistic one. Figure 7.5 shows substantial long-run GDP losses by four Southeast Asian economies: 7 per cent for Thailand, 5 per cent for Malaysia and Philippines, and 3 per cent for Indonesia. The GDP of the other seven countries show minor long-run deviations from the baseline. Figure 7.6 reports that only the ASEAN-4 face significant export displacements. The US, being primarily an exporter of capital goods and high value-added services, has the biggest positive deviation, which is about 0.9 per cent in 2020.

The interested reader can find more details of the above simulations in McKibbin and Woo (2003a), and full details in McKibbin and Woo (2003b).

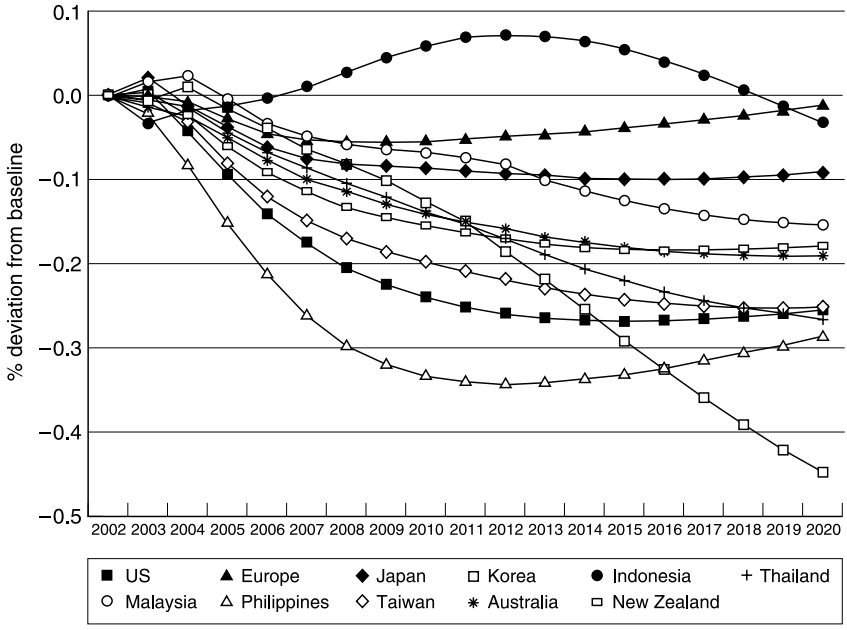


*Figure 7.3* Change in real GDP in other countries – FDI diversion case.

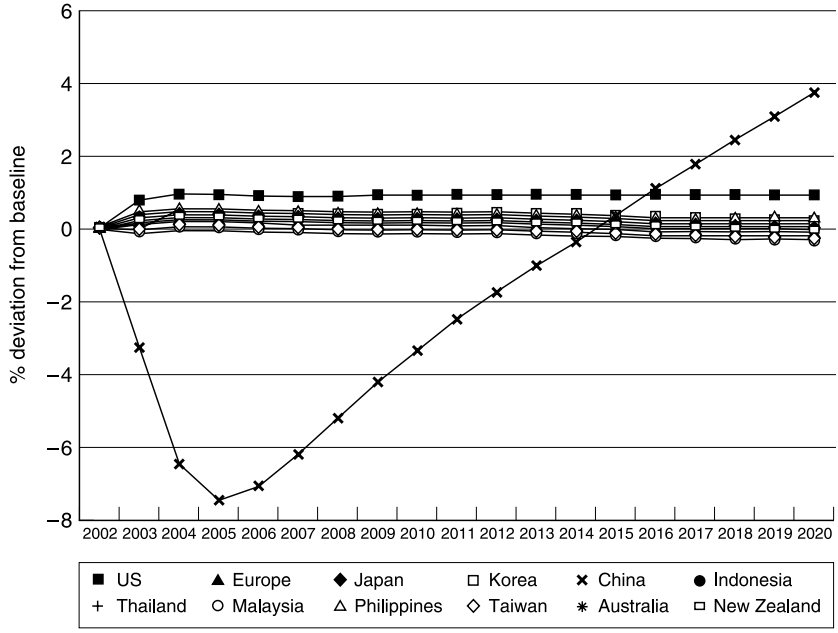


*Figure 7.4* Change in exports – FDI diversion case.

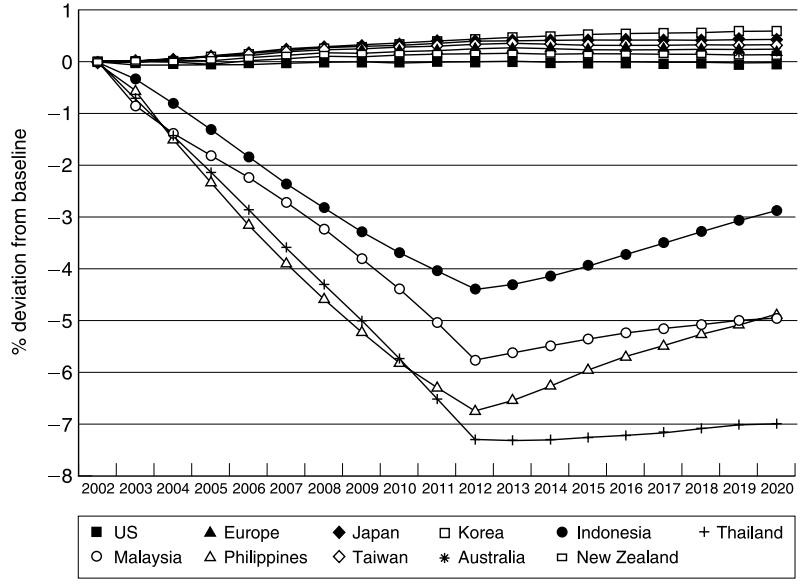


*Figure 7.5* Change in real GDP in other economies – case of FDI with technological spillovers.

## Economic impact on the ASEAN-4

Table 7.3 examines the export composition for the *FDI diversion scenario* and the *Diversion of FDI with technological spillovers scenario* for China and the ASEAN-4. There are no substantial changes from the baseline for any ASEAN-4 country under FDI diversion. In the export compositions from the technological spillover simulation, we observe significant deviations from baseline in the ASEAN-4 countries. Table 7.3 reports that:

1. China's manufactured exports accounted for 27 percentage points of the 33 per cent increase in total exports above the baseline;
2. the manufacturing sectors in the ASEAN-4 show substantial long-run declines *vis-à-vis* their baselines. In Indonesia and Philippines, the drop in manufactured exports exceed the drop in total exports; and in Malaysia and Thailand the decline in manufactured exports accounted for, respectively, 97 per cent and 91 per cent of the fall in total exports.

This transfer of manufacturing jobs to China will not stop in the medium-run because a vast amount of surplus agricultural labour remains to be tapped. Rightly, ASEAN is concerned about whether it would return to its previous role as a supplier of minerals and primary commodities. The likelihood of this development is greatly strengthened when one realizes that the other shoe is about to drop on

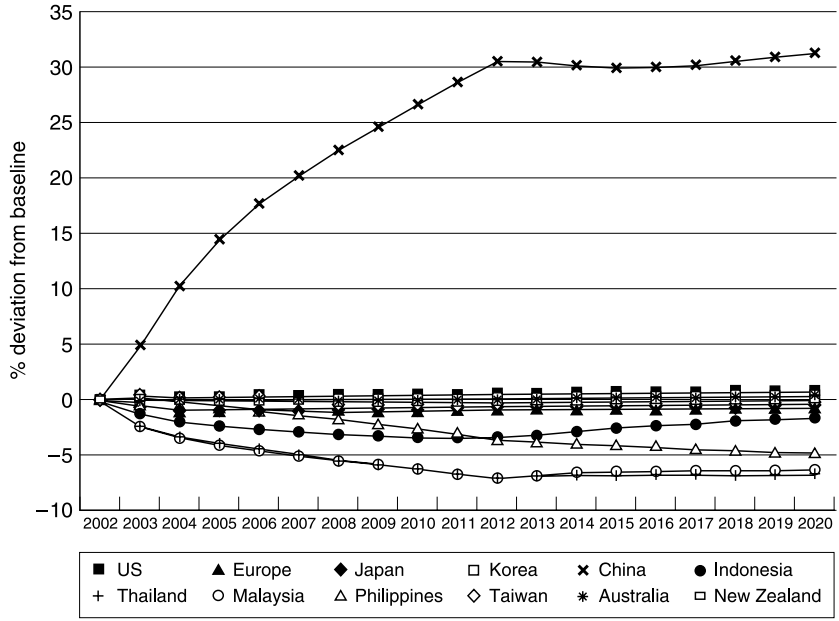


*Figure 7.6* Change in exports – case of FDI with technological spillovers.

*Table 7.3* Deviation of exports from baseline in 2020

| | *China* | *Indonesia* | *Malaysia* | *Philippines* | *Thailand* |
|---|---|---|---|---|---|
| ***Simulation of FDI diversion*** | | | | | |
| *Deviation of total exports from baseline, in percent* | *3.70* | *0.34* | *−0.04* | *0.12* | *−0.04* |
| *Contribution to deviation from baseline, in percentage points* | | | | | |
| Energy | 0.11 | 0.64 | 0.01 | 0.04 | 0.00 |
| Mining | 0.01 | −0.02 | 0.00 | 0.01 | 0.00 |
| Agriculture | −0.10 | −0.02 | 0.08 | 0.04 | 0.12 |
| Durable manufacturing | 1.44 | −0.01 | −0.08 | 0.02 | −0.01 |
| Nondurable manufacturing | 0.87 | −0.14 | 0.01 | 0.02 | −0.02 |
| Services | 1.36 | −0.10 | −0.06 | −0.01 | −0.13 |
| ***Simulation of diverted FDI with technological spillovers*** | | | | | |
| *Deviation of total exports from baseline, in percent* | *32.64* | *−3.20* | *−6.95* | *−5.22* | *−8.09* |
| *Contribution to deviation from baseline, in percentage points* | | | | | |
| Energy | 0.77 | 0.19 | −0.02 | 0.02 | 0.00 |
| Mining | 0.16 | 0.00 | 0.00 | −0.01 | 0.00 |
| Agriculture | 0.57 | −0.20 | −0.30 | −0.11 | −0.47 |
| Durable manufacturing | 14.34 | −0.07 | −4.59 | −3.05 | −3.94 |
| Nondurable manufacturing | 13.11 | −3.28 | −2.14 | 0.97 −2.36 | −3.41 |
| Services | 3.69 | 0.15 | 0.10 | 0.28 | −0.26 |

ASEAN. India, which is still shallowly integrated into the world economy because of its strong economic nationalism and the home to another fifth of the world labour force, is now implementing significant economic deregulation in response to the sustained high growth in China, e.g. the cap on FDI has been raised from 51 per cent to 76 per cent. One sobering scenario for ASEAN is that whatever manufacturing jobs that did not move to China would now migrate to India!

This gloom-and-doom projection for ASEAN is not inevitable, however. The final outcome actually rests largely in the hands of ASEAN leaders. When the ASEAN-4 are able to implement policies to completely offset the reduction in technological diffusion from the reduction in FDI, then we are back in the FDI diversion case. In the FDI diversion case, China's insertion of one-third more workers into the international division of labour leads to further division of labour (i.e. to even finer specialization in production activities) within the manufacturing sector worldwide rather than the displacement of the ASEAN-4 from manufacturing. The prerequisite for the lengthening of the production chains in manufacturing to create niches in manufacturing activities for the ASEAN-4 is that they are technologically versatile. For the ASEAN-4 to have such versatility, their governments must invest in strengthening the scientific and technological capability of their citizens; see Yusof (2003) for a discussion of the Malaysian situation.

The ratcheting up of indigenous innovation in the ASEAN-4 requires, among many things, the institutionalization of synergistic relationships among the government, the business sector, and the universities. This national mobilization to promote indigenous innovation will have to overturn many taboos. An illustration of such national taboos is the Malaysian redistribution policy to reduce income inequality across races, which results in the regulation that Malay Malaysians must own at least 30 per cent of a publicly listed firm; see Perkins and Woo (2000) for details. This means that a firm seeking listing must sell 30 per cent of its shares at a heavy discount. The upshot from this tax on firm growth is that, unlike Taiwanese firms, few Malaysian firms have expanded beyond import-competing enterprises to achieve economies of scale and become big exporters of manufactured goods. In the case of Malaysia, whether a zero-sum or a win-win outcome will emerge from its economic interaction with China will depend on whether the enlightened self-interest concept that 'a rising tide raises all ships' will prevail.

China has recently proposed the formation of a free trade area (FTA) with Southeast Asia. This action should be recognized as a natural consequence of a fast-growing China that is anxious to undertake investments in the production of primary commodities and minerals so that its vertically integrated conglomerates could better absorb large price shocks of raw materials should they appear. (This is also why China also recently attempted, unsuccessfully, to buy oil fields in Russia.) China's enthusiasm for an FTA with ASEAN flows directly from the convergence of its economic interests to those of the major developed countries, i.e. the minimization of disruption from huge increases in the prices of raw commodities, the breakdown of the international communication system, and the collapse of the open multilateral trading system. This last concern is particularly important because China cannot get rich by exporting only to its neighbours, it needs access to all the markets of the world to get rich. This means that any Chinese regional economic strategy is likely to be subordinate to the concern of helping to maintain an open multilateral trading system, and that if, and when, China becomes the leader of an Asian economic bloc, China is unlikely to shape it into a protectionist trade bloc, unless the European Union and the Free Trade Area of the Americas (FTAA) are already closed trade blocs.

Southeast Asia has welcomed the formation of an ASEAN–China FTA because this will increase (1) its access to the increasingly important Chinese market, (2) the possibility of lengthening the production chain to permit ASEAN to occupy some niches in the manufacturing process, and (3) the inflow of FDI from China to offset the loss to China of FDI from other countries. (The reader interested in the quantitative effects of the various combinations of free trade areas within East and Southeast Asia should consult Cheong (2003).)

## Economic impact on the developed economies in East Asia, Western Europe and North America

For the developed economies, the integration of China yields net positive benefits from the more refined global division of labour. This is most clearly seen in how

the industries in Hong Kong, Japan, Singapore, South Korea, and Taiwan have preserved their competitiveness by shifting the labour-intensive manufacturing components of their production chains to China, and by expanding at home the higher value-added components of research and development, and of marketing and distribution; for example, see Abe (2003). The reason why my empirical work does not find much impact from China's emergence on the export and GDP levels of these five developed East Asian economies is because they were already in the stage of their product cycles where they were beginning to relocate their labour-intensive industries abroad. The emergence of low-wage China simply meant that more of these industries would be shifted to China instead of to the ASEAN-4.

Tain-Jy Chen (2003) has pointed out the possibility that the China challenge might be more difficult for Taiwan than for the other developed economies. Because Taiwanese, unlike Japanese and Koreans, incur minimal adjustment costs in fitting into the social and cultural life in mainland China, this means that the entire production chain, not just the manufacturing component, might move from Taiwan to China in the medium run.

The fact that the total value of the international trade of Western Europe and North America is not affected significantly by the rise of China is not surprising. These developed economies are now exporting a larger proportion of their capital-intensive goods and high value-added services to China and a lower proportion to the other Asian economies, and importing a bigger share of labour-intensive goods from China and a smaller share from the other Asian economies. This shift in the destination of Western European (North American) exports and in the sources of Western European (North American) imports is why there are noticeable changes in the composition of bilateral trade between Western Europe (North America) and individual Asian countries, but no noticeable change in the composition of overall trade between Western Europe (North America) and Asia.

## Conclusion

Our analysis suggests that the full integration of China's huge labour force into the international division of labour could cause the ASEAN-4 to face the possibility of de-industrialization. However, this dismal outcome is by no means inevitable. This will happen only if the ASEAN-4 economies allow the drop in FDI inflow to lower the rate of technological diffusion to their economies. If the ASEAN-4 can prevent themselves from falling behind technologically, then they can also find lucrative niches in the lengthened production chains in manufacturing activities. This finding suggests that the ASEAN-4 must give the highest priority in deepening and widening their pools of human capital by speeding up the diffusion of new knowledge to their scientists and managers, and providing appropriate retraining programmes for the displaced workers.

The common challenge to the governments of the developed economies from the rise of China as a major manufacturer is how to upgrade the workers who had lost jobs in their manufacturing sectors. This challenge is no different from the

structural adjustment that is needed to accommodate improvements in technological innovations. Just as one should not oppose technological progress in order to save obsolete industries, one should also not oppose free trade in order to save non-competitive industries. It is a failure of political will and of economic policy when governments in the developed economies impose protection instead of funding trade adjustment programmes to assist the workers in the trade-impacted sectors.

The entry of China to take its place in the international economic system will permit further specialization of tasks in the workplace, and this is a wealth-creating outcome. The country that can provide its workforce with the depth and range of scientific training required in the new workplace will be in line to receive some of the newly created wealth. The country that is slow in building up its scientific and technological capability is one that does not understand the right remedy for the constant structural adjustment forced by globalization.

What has not been mentioned so far is that the fulfilment of the projected scenarios of China's impact on the global economy will necessitate China to undertake even bigger economic structural adjustments than any of its trade partners. My estimate is that the wide-ranging economic deregulation package that China agreed to implement for its WTO accession will cause at least a fifth of its labour force to change jobs over the coming decade, and this could be a politically destabilizing process if not handled adeptly, and if external shocks were to slow down economic growth.

The trade-off between stability and restructuring that is so starkly brought to the forefront by China's admission into WTO is really not a new trade-off. What China's WTO membership has done is to accentuate an existing dilemma and not introduce a new one. The government has always realized that the soft budget constraint of the inefficient state-owned enterprise (SOE) sector is a constant threat to price stability, and the diversion of resources to keep this sector afloat is a drag on economic growth. But serious restructuring of SOEs means much more than facing higher urban unemployment, it also means confronting the politically powerful industrial–military complex and the industrial–bureaucratic complex. Economic rents now pose a bigger obstacle to restructuring than ideological sentimentality, and, unlike the latter, they constitute a problem that the mere passing of time (i.e. the death of the remaining Stalinist sentimentalists) will not resolve. Because the greatest challenge to the deepening of economic reform and opening in China comes from the entrenched interests within the ruling structure, Woo (2001) has suggested that China's "WTO accession could be seen as an attempt by reformers to lock economic policies on to a course for further marketization and internationalization that is costly to reverse."

While the WTO benefits to China are likely to be immense, for example, McKibbin and Woo (2003a) show that China's GDP in 2020 could be higher by as much as 20 per cent, the WTO shocks could well stretch Chinese economic management to the limit. The granting of national treatment to foreign banks within the next three years will require China to re-capitalize the insolvent state-owned banks (SOBs) a second time since 1996, and to apply a financial tourniquet on the losses of the state-owned enterprises (SOEs) to attenuate the creation of non-performing loans.

Because the reforms of the SOBs and SOEs are very expensive (in addition to being very difficult), they are likely to push China's fiscal position to the edge of unsustainability; see Sachs and Woo (2003). The outbreak of an AIDS pandemic, for example, could mean a large-scale public health programme that would bankrupt the government.

Developments external to China could also prevent the fulfilment of the scenarios projected by our analysis. External conflicts over North Korea, Taiwan, islands in the South China Sea, and Tibet could see a dramatic decline in FDI, and hence in the diffusion of technology, into China. Even a vastly less dramatic external event like the acceleration of economic deregulation in English-speaking India and its greater opening to inward FDI could reduce the FDI flow into China, and China's exports of labour-intensive industrial products. In short, the realization of the potential for greater common prosperity created by China's integration into the world economy will require more than good economic management by China and its trade partners, good sense by all as well as good luck for all are also required.

## Appendix: technical outline of Asia-Pacific G-cubed model

Full details of the model including a list of equations and parameters can be found online at: http://www.msgpl.com.au/msgpl/apgcubed46n/index.htm. The AP-GCUBED is based on the GCUBED model (described in McKibbin and Wilcoxen, 1998), which is in turn an expansion of the MSG2 model founded by McKibbin and Sachs (1991). There have been many studies of trade reform in China but most studies ignore the role of capital flows and dynamic adjustment, e.g. Wang (2002). There are three significant qualitative differences between the AP-GCUBED model and the standard general computable equilibrium (CGE) model.

1. The AP-GCUBED is based on explicit *intertemporal* optimization by the agents (consumers and firms) in each economy. In contrast to static CGE models, time and dynamics are of fundamental importance in the AP-GCUBED model.
2. There is an explicit treatment of the holding of a range of financial and real assets in the AP-GCUBED model (money, bonds, equity, household capital, physical capital, etc). Money is introduced into the model through a restriction that households require money to purchase goods. The model distinguishes between the stickiness of physical capital within sectors and within countries and the flexibility of financial capital, which immediately flows to where expected returns are highest. This important distinction leads to a critical difference between the *quantity of physical capital* that is available at any time to produce goods and services, and the stock market *valuation of that capital* as a result of decisions about the allocation of financial capital. So the AP-GCUBED model has linkages between the financial markets and the real sectors, unlike the usual CGE models, which have real sectors only.

3. In AP-GCUBED, the behaviour of agents is modified to allow for short run deviations from optimal behaviour either due to myopia or to restrictions on the ability of households and firms to borrow at the risk free bond rate on government debt. The model also allows for short run nominal wage rigidity (by different degrees in different countries) and therefore allows for significant periods of unemployment depending on the labour market institutions in each country. The deviations from intertemporal optimizing behaviour take the form of rules of thumb, which are chosen to generate the same steady state behaviour as optimizing agents so that in the long run there is only a single intertemporal optimizing equilibrium of the model. The AP-GCUBED model's assumptions hence differ from the market clearing assumption in most CGE models.

## Note

1. Statement made at the Hearing of the *U.S.–China Economic and Security Review Commission* on *China's Growth as a Regional Economic Power: Impacts and Implications*, December 4, 2003, Room 124, Dirksen Senate Office Building. The empirical work presented in this statement is from joint research conducted with Professor Warwick McKibbin of Australian National University as part of the ongoing project on Economic Growth in China conducted by the East Asian Program of the Centre for Globalization and Sustainable Development at Columbia University.

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# 8 The impact of FDI on economic growth in China's regions

*Ping Zheng, Gianluigi Giorgioni and Pamela Siler*

## Introduction

The market-oriented economic reforms and 'opening up' policies pursued by the Chinese government since 1978 have resulted in high rates of economic growth and a remarkable transformation of the economic structure of the country. During the 1978–1999 period, the Chinese economy grew at an annual average rate of 9.58 per cent,[1] ranking China among the fastest growing economies in the world. At the same time there were dramatic increases in foreign direct investment (FDI) into the country. From 1984 to 1999 the annual average rate of growth of FDI inflows was 26 per cent. By the end of 1999, the last year of our study, the total number of FDI projects in China reached 341 062 with a cumulative total of US$305.92 billion invested. According to the OECD (2000), this was equal to 10 per cent of direct investment worldwide and about 30 per cent of the total amount invested for all the developing countries. Given the large inflows of FDI in response to Government policies, a central issue is whether FDI has indeed had a significant impact on China's economic growth and development.

FDI can affect a host country's economic growth in several ways. At the macroeconomic level FDI inflows can change the factor endowments of a country, increasing the stock of real physical capital. To the extent that advanced technology is embodied in new capital equipment, FDI may be a major channel for technological diffusion from developed countries to developing countries (Balasubramanyam *et al*., 1996; Borensztein *et al.*, 1998). As Kojima (1975) emphasizes, FDI can transmit a 'package of capital, technology and managerial know-how'. It can also augment human capital within the host country as workers acquire the skills and knowledge to work with advanced technology and production processes and as managers are exposed to alternative management practices and organizational arrangements (de Mello, 1999). The benefits associated with the package not only accrue to multinational subsidiaries in the host country but may also spill over to indigenous firms who copy the superior management and production practices of foreign firms and hire workers who have been trained by foreign firms. These direct and indirect benefits increase the marginal physical productivity of the capital stock in the host country and increase real output, further promoting economic growth (Wang and Blomstrom, 1992).

FDI may also be an agent for the transformation of the structure of the host country's economy by playing a central role in directing production capacities towards export-oriented activities (Lloyd, 1996). The commodity composition of a country's exports may also change as a result of the presence of multinational firms. A further macroeconomic benefit of FDI might be the direct creation of new employment or indirect job creation if foreign firms use the inputs produced by local firms.

It is important to emphasize that the effects of inflows of FDI on a developing country may not necessarily be positive. While rivalry between foreign and domestic firms might enhance competition in the short-run, in the long run it can lead to the demise of domestic firms and increased industrial concentration (Karikari, 1992). This concentration further reduces the host country's welfare if multinational firms use their market power to introduce transfer pricing policies. FDI might also lower domestic investment and lead to the contraction of indigenous industries. For a developing country a primary concern is that FDI might create an enclave economy, widening the income gap, and biasing the host economy towards an inappropriate product mix and inappropriate technologies (Zhang, 2001).

The objective of this chapter is to add to the empirical evidence concerning the relationship between FDI inflows and China's economic growth. The study contributes to the empirical literature by using an expanded and more recent panel data set and different methodologies from those used in previous studies. The chapter also compares the various influences on economic growth across China's macro-regions. This is important given the uneven pattern of FDI inflows across the three major regions.

The rest of the chapter is organized as follows. The next section provides an overview of the patterns of growth of FDI and GDP in China. Then the 'review of previous work' section reviews selected literature on the relationship between FDI and economic growth. In the 'model, data and methodology' section the empirical methodology using an extended production function is discussed. The 'empirical results' section presents the main empirical results while the last section offers conclusions and policy implications.

## The growth of FDI and GDP in China

Prior to the introduction of economic reforms, the Chinese economy was virtually closed to foreign investment. This isolation from foreign influence was the result of the Maoist ideology of 'self-sufficiency'. However, since the reforms and opening-up policies initiated in 1978, FDI in China has gradually blossomed (Tso, 1998). According to Dees (1998), Wu (1999) and the OECD (2000), the growth of FDI in China can be distinguished by three different phases. In the earliest phase, 1979–1983, FDI grew at a sluggish pace, with much of it concentrated in the construction of hotels and apartments to house foreigners. In the second phase, 1984–1991, with more geographic areas opened up to foreign investment, FDI inflows began to show a distinct upward trend. In the third phase, after 1992,

*Table 8.1* FDI inflows and GDP for China, 1985–1999

| | *FDI (US$) 100 million (1)* | *FDI (RMB) 100 million (2)* | *GDP (RMB) 100 million (3)* | *FDI/GDP (%) (4)=(2)/(3)* |
|---|---|---|---|---|
| 1985 | 16.61 | 48.8 | 8964.4 | 0.54 |
| 1986 | 18.74 | 64.7 | 10202.2 | 0.63 |
| 1987 | 23.14 | 86.1 | 11962.5 | 0.72 |
| 1988 | 31.94 | 118.9 | 14 928.3 | 0.8 |
| 1989 | 33.92 | 127.7 | 16 909.2 | 0.76 |
| 1990 | 34.87 | 166.8 | 18 547.9 | 0.9 |
| 1991 | 43.66 | 232.4 | 21 617.8 | 1.07 |
| 1992 | 110.07 | 607 | 26 638.1 | 2.28 |
| 1993 | 275.15 | 1585.4 | 34 634.4 | 4.58 |
| 1994 | 337.67 | 2910.3 | 46 759.4 | 6.22 |
| 1995 | 375.21 | 3133.3 | 58 478.1 | 5.36 |
| 1996 | 417.25 | 3469.1 | 67 884.6 | 5.11 |
| 1997 | 452.57 | 3751.7 | 74 462.6 | 5.04 |
| 1998 | 454.63 | 3763.9 | 78 345.2 | 4.8 |
| 1999 | 403.19 | 3338.3 | 81 910.9 | 4.08 |

*Source*: Columns (1) and (3) are from the *China Statistical Yearbook 2000.* Columns (2) and (4) are computed by the authors. Figures in column (1) are converted to those in column (2) by using period average exchange rates.

the large-scale expansion of FDI made China (after 1993) the largest recipient of FDI among developing countries and the second largest in the world after the US Meanwhile, China's average annual growth rate of GDP was 9.58 per cent over the period of 1978–1999, 8.1 per cent in 1985–1991 and 12.7 per cent in 1992–1999. The patterns of growth of FDI and GDP strongly suggest a correlation between the two variables.

Table 8.1 shows data for FDI, GDP and the ratio of FDI to GDP for China over the period of our study, 1985–1999. The table shows the dramatic expansion of both FDI and GDP during the 1985–1999 period. The ratio of FDI to GDP also grew from 0.54 per cent in 1985 to 4.08 per cent in 1999.

Figure 8.1 is composed of two indices, one for FDI inflows into China and one for Chinese GDP. Both indices are derived from Table 8.1 and use 1985 as the base year. The figure clearly shows the growth trends of FDI and GDP in China during the 1985–1999 period. Before 1991 the growth indices of FDI and GDP were almost identical, with the two curves overlapping. After 1992, FDI inflows into China increased dramatically, reaching a peak in 1997–1998 when the volume of FDI was 27 times higher than in 1985. While the growth of GDP is impressive, in 1999 GDP was only eight times higher than in 1985.

China is divided into three macro-regions: the Coastal (eastern) region, the Central region, and the Western region. The three regions differ enormously in their characteristics in terms of natural and social resources, physical endowments and historical and economic development (see Zheng *et al.*, 2004). The three-region

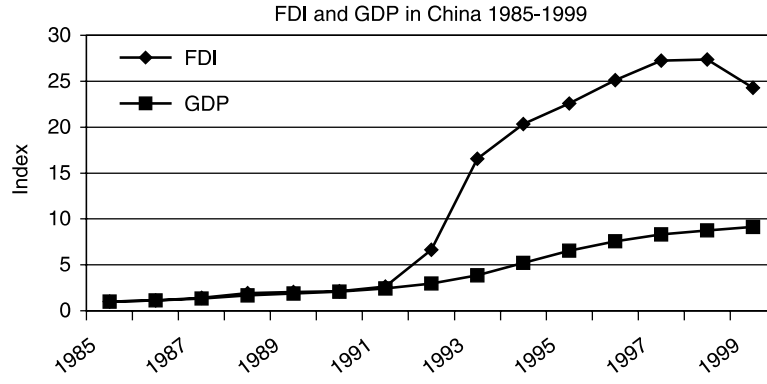


*Figure 8.1* FDI and GDP in China 1985–1999.
*Source*: Table 8.1 data.

framework is widely used in the analysis of the Chinese economy and has been adopted in the Five-Yearly Plans of the Chinese government.

Table 8.2 shows that for the period 1985–1999, the share of total GDP in the Coastal, Central and Western regions was 58 per cent, 28 per cent and 14 per cent, respectively. Also the geographical distribution of cumulative FDI in China was significantly characterized by its high concentration in the Coastal region. During the same period of 1985–1999, 88 per cent of FDI flowed into the coastal region, while only 9 per cent flowed into the Central region and 3 per cent into the western region.

There are a number of explanations for the uneven spatial distribution of FDI in China. Most importantly the Chinese government has encouraged FDI in the coastal region through its preferential policies. Also, the Coastal region is larger in terms of market size than the other regions and it also has better infrastructure and a higher level of human capital. 'Special factors' have also played a role in the targeting of FDI in the Coastal region. Its close geographical proximity to and cultural affinity with Hong Kong, Macao, and Taiwan, along with associated pre-existing kinships and social networks, have made it a natural location for direct investment

*Table 8.2* Actually used FDI, DI and GDP by three regions in China 1985–1999

| | *FDI (US$10,000)* | | *DI (RMB million yuan)* | | *GDP (RMB million yuan)* | |
|---|---|---|---|---|---|---|
| Coastal | 26 005 322 | 88 | 11 538 088 | 63 | 33 146 050 | 58 |
| Central | 2 661 927 | 9 | 4 282 660 | 23 | 16 145 140 | 28 |
| Western | 945 021 | 3 | 2 598 247 | 14 | 8 342 265 | 14 |
| Total | 29 612 270 | 100 | 18 418 995 | 100 | 57 633 460 | 100 |

*Source*: China State Statistical Bureau.

from these countries. The distribution of domestic investment (DI) in the three macro-regions is also skewed, as Table 8.2 shows, with 63 per cent in the Coastal region, 23 per cent in the Central region, and 14 per cent in the Western region.

The uneven spatial patterns shown in Table 8.2 raise questions concerning the impact of FDI and domestic investment on China's GDP growth in different regions. In this chapter, empirical results will be reported at both the national and regional levels in an attempt to address such questions.

## Review of previous work

A number of empirical studies on the relationship between FDI and economic growth have been conducted for developing countries (Karikari, 1992; Balasubramanyam *et al.*, 1996; Khan and Leng, 1997; Borensztein *et al.,* 1998; de Soysa and Oneal, 1999; Zhang, 1999; Nair-Reichert and Weinhold, 2001). In addition, a few studies use data from both developed and developing countries in their analysis (e.g., Olofsdotter, 1998; de Mello, 1999). Table 8.3 provides a summary of previous studies on the relationship between FDI and economic growth, detailing the countries investigated, the econometric techniques used and the major results.

There is conflicting empirical evidence in the literature regarding the impact of FDI on economic growth. Karikari (1992) examined causality between FDI and economic growth in Ghana during the 1961–1988 period. His results show that FDI has no affect on economic output, while increases in economic output caused a slight decrease in the inflows of FDI.

Using annual cross-sectional data over the 1970–1985 period, Balasubramanyam *et al.* (1996) investigated the role that FDI plays in the growth process of 46 developing countries characterized by different trade policy regimes. They found FDI to be more growth enhancing in export promoting (EP) countries than in import substituting (IS) countries.

Similarly, Ozawa (1992) emphasizes that economic growth and transformation are accompanied by changing patterns of dynamic comparative advantage. His argument is based on Kojima's theory (1975) that FDI, by changing the factor endowments of a country, can change the structure and direction of its trade. The international transfer of comparative advantage depends on whether FDI inflows substitute for or complement trade flows. In Ozawa's view FDI has a significant effect on economic development through an increase in trade. Therefore the acceleration of economic growth depends on the adoption of an export-led strategy of development along with an outward orientation of the economy creating a favourable environment for FDI inflows. Ozawa adds that this outward orientation attracts pro-trade FDI, and that inward orientation and import substitution attracts anti-trade FDI. The former is more effective than the latter in achieving faster economic growth and structural upgrading in developing countries.

Borensztein *et al.* (1998) tested the effect of FDI on economic growth in 69 developing countries over the last two decades using a cross-country regression framework. Their findings show that FDI is an important vehicle for the transfer of technology, contributing relatively more to growth than domestic

*Table 8.3* Summary of previous studies on FDI and economic growth

| *Studies* | *Countries/ region* | *Data/econometric technique* | *Results* |
|---|---|---|---|
| Karikari (1992) | Ghana | Annual data (1961–88) Granger causality test | FDI does not affect economic output while increases in economic output cause a small reduction in the inflow of FDI |
| Balasubramanyam, Salisu and Sapsford (1996) | Forty-six developing countries | Cross-section, annual average (1970–85) OLS | FDI enhanced economic growth is stronger in export promoting countries than in import substituting countries |
| Khan and Leng (1997) | Korea, Singapore, and Taiwan | Annual data (1965–95) DF and ADF tests Cointegration test Granger causality test | A general lack of causation in the relationship between FDI-exports-GDP |
| Borensztein, deGregorio and Lee (1998) | Sixty-nine developing countries | Panel data (1970–89) SUR | FDI contributes to economic growth only when a sufficient absorptive capability is available in the host country. |
| de Soysa and Oneal (1999) | 114 countries including 97 LDCs | Annual average data (1980–91) | No evidence that FDI harms the economic prospects of developing countries |
| Zhang (1999) | Ten East Asian countries | Annual data Unit-root test Cointegration test Causality test | Mixed evidence |
| Nair-Reichert and Weinhold (2001) | 24 developing countries | Panel data (1971–95) Holtz-Eakin causality test MFR causality test | Mixed evidence |
| Olofsdotter (1998) | 50 countries (developed and developing countries) | Annual data (1980–90) OLS | FDI leads to higher growth rates by bringing new technology to the host country |
| de Mello (1999) | OECD and non-OECD countries | Time-series and panel data (1970–90) ADF test Co-integration test FES | Whether FDI is growth-enhancing depends on the degree of complementarities and substitution between FDI and domestic investment |

*(Continued)*

*Table 8.3 (Continued)*

| *Studies* | *Countries/ region* | *Data/econometric technique* | *Results* |
|---|---|---|---|
| Sun and Chai (1998) | China | Panel data (1986–1992) GLS | The effect of FDI on economic growth is stronger in the eastern region and very weak in the western region, reinforcing regional inequalities |
| Sun (1998) | China | Panel data (1979–1996) Kmenta model | Domestic investment is the main determinant of China's economic growth. FDI and the labour force also play important roles |
| Berthelemy and Demurger (2000) | China | Panel data (1985–1996) Endogenous growth model | The transfer of foreign technology through FDI is a key determinant of economic growth; exports and domestic investment have an insignificant role in China's economic growth process |
| Zhang (2001) | China | Cross-section and panel data (1986–1997) FES | FDI has a positive impact on China's economic performance, with the effect larger in 1992–1997 than in 1986–1991 and numerically much larger in the coastal region as opposed to the western region. The effect of FDI is much larger than that of domestic investment |
| Buckley *et al.* (2002) | China | Panel data (1989–1999) OLS | Host country conditions impact strongly on the growth relationship at both the national and provincial levels. FDI favours growth in the economically stronger provinces |

investment. However, they argue that the higher productivity of FDI holds only when the host country has a minimum threshold stock of human capital. Thus FDI contributes to economic growth only when the host country has sufficient capability to absorb the advanced technologies.

A number of recent studies have focused on the role of FDI in the Chinese economy including those of Sun and Chai (1998), Sun (1998), Berthelemy and Demurger (2000), Zhang (2001), and Buckley *et al.* (2002). Sun and Chai (1998)

investigated the effects of FDI on economic growth in the eastern and western regions of China using panel data across 16 provinces over the 1986–1992 period. Their paper emphasizes the skewed spatial pattern of economic growth in the eastern and western regions of China. It also highlights the differences in industrial structure and resource conditions between the two regions, along with the favourable treatment of the eastern region in terms of open-door policies. As a result of these differences both FDI and domestic investment grew much faster in the eastern region, furthering economic disparities. In addition their findings indicate that the impact of FDI on economic growth was much stronger in the eastern region, reinforcing the regional inequalities.

In another study, Sun (1998) examined the macroeconomic impact of FDI on China from 1979 to 1996. He found that, although domestic investment was the main determinant of economic growth during the period, FDI and labour force expansion also played important roles.

Berthelemy and Demurger (2000) investigated the relationship between FDI and economic growth in China across 24 provinces over the period 1985–1996, using an endogenous growth model. They argued that the transfer of foreign technology through FDI is a key determinant of economic growth. Their results confirmed the fundamental role played by foreign investment in provincial economic growth in China. They also found exports and domestic production factors to be insignificant determinants of provincial growth.

Using cross-sectional and panel data for 28 provinces over the 1986–1997 period, Zhang (2001) found that FDI generally had a positive impact on economic growth. However the effect of FDI was much larger during the 1992–1997 period than the 1986–1991 period and numerically much larger in the coastal as opposed to the inland region. Zhang's results indicate that, with respect to China's economic growth, the impact of foreign investment has been much greater than that of domestic investment.

Buckley *et al.* (2002) investigated the proposition that local economic and technological conditions can modify the relationship between FDI and growth. Using panel data across 29 Chinese provinces over the years from 1989 to 1999, they found that the conditions of the host location have a strong influence on the growth relationship at both the national and provincial levels. They argue that FDI favours growth in the economically stronger provinces and therefore that market-oriented reform can be a successful general policy to encourage growth.

This chapter aims to provide further estimates of the role of FDI on economic growth in China using a rich panel data set for 29 provinces over the 1985–1999 period. This analysis enables us to compare our findings with those of similar studies. The provinces are also aggregated into three macro-regions (coastal, central and western), allowing us to make inter-regional comparisons concerning the impact of FDI.

## Model, data and methodology

Growth theories can be categorized into three broad groups: the early post-Keynesian growth models, which emphasize the role of savings and investment in

promoting growth; the neo-classical models, which focus on the role of exogenous technical progress; and the more recent new endogenous growth models, which stress the role of R&D, human capital accumulation and externalities.

Early development economists such as Rosenstein-Rodan (1943, 1961), Nurkse (1953) and Lewis (1954) emphasized the role of capital accumulation in growth. Given a constant capital-output ratio, the Harrod–Domar model (Harrod, 1939; Domar, 1946) predicted that higher savings rates would lead to higher rates of growth. However, since capital accumulation was regarded as central to growth, diminishing returns could soon be expected to reduce and finally eliminate all per capita income growth.

Neo-classical growth theory (Abramovitz, 1956; Solow, 1956, 1957) regards long run growth as largely the outcome of technical progress, which effectively offsets the diminishing returns to which inputs are subjected. Therefore, in neo-classical growth models, the effect of FDI on output is limited by diminishing returns to physical capital in the long-run. Long-run growth can only result from technological progress and/or population (labour force) growth, which are both considered to be exogenous. The impact of FDI in these models is very much a short-run phenomenon.

The new endogenous growth models (Romer, 1986, 1987; Lucas, 1988; Krugman, 1990; Murphy *et al.*, 1989a, 1989b; Shaw, 1992; Aghion and Howitt, 1998) also consider long-run growth to be a function of technological progress, however in the case of these models, technological change is endogenous. Endogenous growth theories provide a framework in which FDI can permanently increase the rate of growth in the host economy through technology transfer, learning and spillover effects. FDI is also expected to be a very important source of human capital augmentation and technological change in developing economies since it promotes the use of more advanced technologies by domestic firms and thus necessitates productivity enhancement through labour training and skill acquisition. New growth theory provides powerful support for FDI as a potent factor in promoting economic growth in host countries, especially developing countries (Balasubramanyam *et al.*, 1996; de Mello, 1997; Wu, 2000; Nair-Reichert and Weinhold, 2001).

Following new growth theory, we use an extended Cobb–Douglas production-function model where cumulative FDI is treated as an additional production input along with labour and (domestic) capital. Capital is then divided into a fixed physical capital stock and a human capital stock. As shown in equation (8.1), GDP which is used as a proxy for economic output, can be expressed as a function of labour, domestic investment, FDI and human capital.

$$\text{GDP} = f(\text{labour, domestic investment, FDI, human capital}). \tag{8.1}$$

We expect all explanatory variables to positively influence GDP. We measure the labour force using data on the number of staff and workers. The data representing FDI are the actually used FDI. As FDI is reported in US dollars and GDP and domestic investment in RMB yuan, period average exchange rates are used

*Table 8.4* Data sources

| *Variable* | *Source of data* |
|---|---|
| GDP | *China Statistical Yearbook* |
| Labour | *China Statistical Yearbook* |
| Domestic investment | *China Statistical Yearbook* |
| Human capital | *China Statistical Yearbook* |
| FDI | *China Statistical Yearbook* |
| | *China Foreign Economic Statistical Yearbook* |
| | *Almanac of China's Foreign Economic Relations and Trade* |

to convert FDI into RMB yuan. Total investment in fixed assets is employed to represent the domestic investment variable. We proxy human capital by using the number of students enrolled in specialized secondary schools.[2]

The empirical analysis is based on panel data that cover 29 provinces (autonomous regions and central municipalities) over a period of 15 years from 1985 to 1999. We use panel data, pooling time-series and cross-section data, which possess several major advantages over conventional cross-sectional or time-series data sets (Hsiao, 1985, 1986; Baltagi, 1995). As Table 8.4 shows, the data are taken from various issues of the *China Statistical Yearbook*, *China Foreign Economic Statistical Yearbook* and *Almanac of China's Foreign Economic Relations and Trade*. Tibet is excluded because it did not attract any significant FDI throughout the period. Chongqing became a central municipality out of Sicuan province in 1996. To maintain consistency, the data for Chongqing is included in Sicuan province from 1997 onwards.

While equation (8.1) above presents the relevant variables, a number of factors need to be considered in arriving at an estimating equation. Due to the fact that two explanatory variables in equation (8.1), FDI and domestic investment, are flows while the others are stocks, we follow Nair-Reichart and Weinhold (2001) and convert the investment variables to ratios of GDP. We also use the growth rate of all variables in our analysis. This is because we are primarily interested in whether increases in FDI will lead to increases in economic growth. Also, as Nair-Reichart and Weinhold (2001) note, the use of growth rates leads to explanatory variables which are much more likely to be stationary, avoiding spurious regression results.

The possibility of a bidirectional relationship between economic growth and FDI inflows must also be recognized. In order to take into account the dynamic effect of FDI on economic output, one year lagged values of FDI are employed in our estimating equation. In addition, a log-linear functional form of equation (8.1) is adopted to measure directly the impact of the explanatory variables on the dependent variable in terms of elasticities. Thus equation (8.1) can be rewritten in the following form:

$$\begin{aligned} \mathrm{LGGDP}_{it} &= \beta_1 \mathrm{LGLA}_{it} + \beta_2 \mathrm{LRDI}_{it} + \beta_3 \mathrm{LRFDI}_{it-1} \\ &\quad + \beta_4 \mathrm{LGHC}_{it} + v_{it}, \end{aligned} \tag{8.2}$$

where L indicates logged values, $v$ is a composite term including both intercept and the stochastic error term, and $i$ and $t$ denote individual provinces and time respectively. The converted variables are: GGDP which is the growth rate of GDP; GLA which is the growth rate of labour; RDI which is the ratio of domestic investment to GDP; RFDI which is the ratio of FDI to GDP; and GHC which is the growth rate of human capital.

A panel data set can be estimated by three different methods: pooled ordinary least squares (POLS), fixed effects (FES), and random effects (RES), depending on whether the individual cross-section effects are considered to be constant, fixed or random. To determine the appropriate model we apply the three tests: the likelihood ratio (LR) test, the Lagrange Multiplier (LM) test, and the Hausman Specification (HS) test. The LR tests the validity of the FES model against the POLS model. A large value of the LR statistic indicates that the FES should be preferred to the POLS model. The LM test discriminates between the POLS and RES models. A large value of the test statistic favours the RES model against the POLS model. Finally, to choose between the FES and RES models, the HS test is used. A large value of the HS test statistic favours the FES model over the RES model.

## Empirical results

The empirical results obtained from estimating equation (8.2) by the POLS, FES, and RES methods are presented in the four tables below. Results at the national level are shown in Table 8.5, while Tables 8.6, 8.7 and 8.8 show results for the coastal, central and western regions, respectively. We first focus on the results for all three models at the national level in Table 8.5. The LR, LM and HS tests indicate that the FES model is the best one in this case and therefore, we will only comment on the results from this particular model.

*Table 8.5* Results of panel data estimations of equation (8.2) at the national level, 1985–1999

| | *POLS* | *FES* | *RES* | *Tests* |
|---|---|---|---|---|
| C | −0.4657 | | 0.2071 | |
| | (0.2044)** | | (0.2684) | LR: |
| LRDI | 0.0808 | 0.2180 | 0.1758 | $\chi^2(28) = 51.32^{***}$ |
| | (0.1367) | (0.1921) | (0.1810) | |
| LRFDI(−1) | 0.0878 | 0.1845 | 0.1575 | |
| | (0.0203)*** | (0.0235)*** | (0.0225)*** | LM: |
| LGHC | 0.1317 | 0.1552 | 0.1507 | $\chi^2(1) = 0.36$ |
| | (0.0468)*** | (0.0693)*** | (0.0479)*** | |
| LGLA | 0.0881 | 0.1240 | 0.1137 | |
| | (0.0167)*** | (0.0156)*** | (0.0198)*** | HS: |
| Adjusted $R^2$ | 0.1918 | 0.2960 | 0.3459 | $\chi^2(4) = 25.81^{***}$ |

Standard errors are in parentheses.

***, **, * Coefficient is significant at the 1 per cent, 5 per cent and 10 per cent levels respectively.

Number of observations is 229.

*Table 8.6* Results of panel data estimations for the Coastal Region, 1985–1999

| | *POLS* | *FES* | *RES* | *Tests* |
|---|---|---|---|---|
| C | 0.1317 | | 0.5823 | |
| | (0.3558) | | (0.3819) | LR: |
| LRDI | −0.1159 | 0.2624 | 0.1077 | $\chi^2(11) = 21.22^{**}$ |
| | (0.2299) | (0.2885) | (0.2850) | |
| LRFDI(−1) | 0.1271 | 0.1867 | 0.1592 | |
| | (0.0296)*** | (0.0391)*** | (0.0422)*** | LM: |
| LGHC | 0.4345 | 0.4383 | 0.4444 | $\chi^2(1) = 0.06$ |
| | (0.1284)*** | (0.1214)*** | (0.0818)*** | |
| LGLA | 0.0957 | 0.1059 | 0.0997 | |
| | (0.0296)*** | (0.0272)*** | (0.0357)*** | HS: |
| Adjusted $R^2$ | 0.3417 | 0.4152 | 0.4465 | $\chi^2(4) = 8.37^{*}$ |

Standard errors are in parentheses.

***, **, * Coefficient is significant at the 1 per cent, 5 per cent and 10 per cent levels, respectively.

Number of observations is 88.

*Table 8.7* Results of panel data estimations of equation (8.2) for the Central Region, 1985–1999

| | *POLS* | *FES* | *RES* | *Tests* |
|---|---|---|---|---|
| C | 0.9295 | | 1.1012 | |
| | (0.4572)** | | (0.4961)** | LR: |
| LRDI | 0.3972 | 0.5423 | 0.4623 | $\chi^2(8) = 6.64$ |
| | (0.2393) | (0.3330) | (0.2783) | |
| LRFDI(−1) | 0.2563 | 0.2700 | 0.2628 | |
| | (0.0404)*** | (0.0375)*** | (0.0373)*** | LM: |
| LGHC | −0.0611 | −0.0404 | −0.0523 | $\chi^2(1) = 0.84$ |
| | (0.0741) | (0.0895) | (0.0812) | |
| LGLA | 0.1724 | 0.1816 | 0.1768 | |
| | (0.0377)*** | (0.0309)*** | (0.0337)*** | HS: |
| Adjusted $R^2$ | 0.4076 | 0.4060 | 0.4399 | $\chi^2(4) = 1.69$ |

Standard errors are in parentheses.

***, **, * Coefficient is significant at the 1 per cent, 5 per cent and 10 per cent levels, respectively.

Number of observations is 75.

The results from the FES model show that each explanatory variable has a positive and significant influence on the country's economic growth except LRDI, which is statistically insignificant. The insignificant coefficient for LRDI is consistent with results from a number of previous studies. Berthelemy and Demurger (2000), for example, suggest that a lack of significance for domestic investment may be associated with its inefficient allocation in China's state-owned enterprises. In summary, the results appear to indicate that China's economic growth has been mainly driven by the expansion of FDI, the labour force and human capital.

Table 8.6 shows the results of the estimation of equation (8.2) for the coastal region. The results indicate that the FES model is again statistically superior to the POLS and RES models. Therefore, again, we will only comment on the results from the FES model. The results are very similar to those from the national panel, with FDI playing a positive and significant role in growth. The most notable difference is the much larger coefficient for human capital. The superior economic conditions in the coastal region may act as a magnet in attracting and maintaining a skilled workforce in this region. The high concentration of human capital certainly seems to have acted as an engine of economic growth in the region.

Table 8.7 shows the results for the central region using the three models. In this specific case, the results from the three tests indicate that the POLS model is statistically superior to the FES and RES models. Thus we only report the results from the POLS model. LRFDI $_{(-1)}$ and LGLA are still positive and significant at the 1 per cent level while LRDI is positive but insignificant. However, unlike in the previous tables, LGHC is no longer significant and in fact has the wrong sign. The results indicate that FDI and labour force expansion are important factors driving economic growth in the central region, rather than domestic investment or human capital.

Finally, Table 8.8 shows the results using the three models for the western region of China. The results from the three tests suggest that the FES model is statistically superior to the POLS and RES models. Thus we only report the results from the FES model. LRFDI $_{(-1)}$ and LGLA are positive and significant at the 1 per cent level in this region. However, LRDI is negative and insignificant while LGHC is positive but also insignificant. Similar to the central region, regional growth is driven by FDI and labour force expansion, rather than domestic investment or human capital.

*Table 8.8* Results of panel data estimations of equation (8.2) for the Western Region, 1985–1999

| | *POLS* | *FES* | *RES* | *Tests* |
|---|---|---|---|---|
| C | −0.7979 | | −0.7404 | |
| | (0.3514)** | | (0.4041)* | LR: |
| LRDI | 0.1467 | −0.1822 | 0.0452 | $\chi^2(7) = 13.60^*$ |
| | (0.2103) | (0.3361) | (0.2563) | |
| LRFDI(−1) | 0.0664 | 0.1126 | 0.0925 | |
| | (0.0236)*** | (0.0342)*** | (0.0313)*** | LM: |
| LGHC | 0.0062 | 0.0222 | 0.0018 | $\chi^2(1) = 3.27^*$ |
| | (0.0833) | (0.0821) | (0.0657) | |
| LGLA | 0.0792 | 0.0847 | 0.0849 | |
| | (0.0264)*** | (0.0216)*** | (0.0283)*** | HS[3]: |
| Adjusted $R^2$ | 0.0796 | 0.1986 | 0.2203 | $\chi^2(4) = ?$ |

Standard errors are in parentheses.

***, **, * Coefficient is significant at the 1 per cent, 5 per cent and 10 per cent levels respectively.

Number of observations is 66.

Before the economic reforms of 1978, China's trade policy was an extreme version of import substitution. However, since 1979 the Chinese government has adopted an export-oriented policy leading to a remarkable improvement in export performance. In 1978, China was ranked thirty-second in the world in terms of the volume of exports. Just two decades later, in 1999, China became the world's ninth largest exporter. Following Salvatore and Hatcher (1991), and Balasubramanyam *et al.* (1996), we add exports as an additional explanatory variable to estimation equation (8.2). According to Salvatore and Hatcher (1991), there are several reasons for introducing exports into the production function. First, export orientation may lead, *ceteris paribus*, to higher factor productivity. Secondly, exports may relieve serious foreign exchange constraints providing greater access to international markets. Thirdly, exports like FDI may result in higher rates of technological innovation and dynamic learning from abroad. These effects are likely to be proportional to the share of exports in total output. Equation (8.2) can then be rewritten in the following form:

$$\begin{aligned} \mathrm{LGGDP}_{it} = \beta_1 \mathrm{LGLA}_{it} + \beta_2 \mathrm{LRDI}_{it} + \beta_3 \mathrm{LRFDI}_{it-1} + \beta_4 \mathrm{LGHC}_{it} \\ + \beta_5 \mathrm{LREX}_{it} + v_{it} \end{aligned} \tag{8.3}$$

where REX is the ratio of exports to GDP. This variable is expected to positively influence GDP. We conduct the estimation by using the FES model, with the empirical results presented in Table 8.9.

The results from Table 8.9 appear consistent with results obtained previously. LREX like LRDI seems to have a positive but insignificant effect on economic growth at the national and regional levels. The exception is in the western region where the export variable is significant at the 10 per cent level. The results suggest that for China generally, exports do not fulfil the role expected in the export-led growth hypothesis.

*Table 8.9* Results of panel data estimation of equation (8.3) using the FES method only

| | *China as a whole* | *Coastal* | *Central* | *Western* |
|---|---|---|---|---|
| LRDI | 0.2054 | 0.2541 | 0.6209 | −0.1803 |
| | (0.1877) | (0.3146) | (0.3445)* | (0.3299) |
| LRFDI(−1) | 0.1757 | 0.1854 | 0.2626 | 0.1008 |
| | (0.0240)*** | (0.0380)*** | (0.0410)*** | (0.0342)*** |
| LGHC | 0.1578 | 0.4382 | −0.0500 | 0.0438 |
| | (0.0693)** | (0.1229)*** | (0.0893) | (0.0799) |
| LGLA | 0.1269 | 0.1066 | 0.1840 | 0.0852 |
| | (0.0160)*** | (0.0296)*** | (0.0323)*** | (0.0224)*** |
| LREX | 0.1484 | 0.0158 | 0.1686 | 0.2619 |
| | (0.1069) | (0.1786) | (0.2304) | (0.1500)* |
| Adj. $R^2$ | 0.3001 | 0.4071 | 0.4051 | 0.2189 |
| | $n = 229$ | $n = 88$ | $n = 75$ | $n = 66$ |

Standard errors are in parentheses.

***, **, * Coefficient is significant at the 1 per cent, 5 per cent and 10 per cent levels.

## Conclusion

The purpose of this chapter is to assess the impact of FDI on China's economic growth at both national and regional levels. The results of the panel data analysis suggest that FDI, labour force expansion and human capital are the main drivers of China's economic growth. The contribution of domestic investment is negligible and export intensity is only a determinant of growth in the western region.

Our findings are consistent with those of other studies, which emphasize the importance of FDI in China's remarkable economic growth. Our results seem to confirm the theories of Ozawa (1992) and Balasubramanyam *et al*. (1996) that argue that FDI has a positive impact on economic growth in host economies that are outward oriented and export promoting. Interestingly the labour force is another important engine for rapid national and regional growth. This suggests that China's economy is still at the stage where GDP growth relies on labour-intensive industries. At the same time, human capital is also an important factor affecting economic growth at the national level. However, the role of human capital differs across the three macro-regions, being very important in the coastal region, but less important in the central and western regions.

Our finding, concerning the negligible role for domestic investment in China's economic growth, is consistent with those of most other studies (see Borensztein *et al.*, 1998; Sun and Chai, 1998; de Soysa and Oneal, 1999; Berthelemy and Demurger, 2000; Zhang, 2001), with Sun's (1998) results being the exception. As Borensztein *et al.* (1998) point out, FDI is more productive than domestic investment, especially in developing countries, because of the transfer of advanced management skills and more modern technology. Our findings suggest that the investment allocated to state-owned enterprises in China is not contributing significantly to economic growth. Policies that introduce a more market-oriented institutional framework in the state-owned sectors might be needed to enhance productivity.

The empirical evidence also supports the view of other previous studies (Wei, 1993; Berthelemy and Demurger, 2000; Buckley *et al.*, 2002) that export intensity on its own has not contributed to China's economic growth. However, as discussed previously, FDI is often targeted toward export-oriented industries, suggesting that the relationship between FDI, exports and growth may be more complex than that portrayed in our estimating equations.

As emphasized earlier, the Tenth Five-year Plan (2001–2005) of China states that one of the country's dominant tasks is to develop the western region, which covers 56 per cent of the country's land and 23 per cent of the nation's population. However, this vast area contributes only 15 per cent of the country's GDP and per capita GDP is only 60 per cent of the national average. To stimulate economic growth in this region, greater inflows of FDI need to be attracted. The Chinese government should consider preferential policies to foreign investors in the western region. It should also improve the local infrastructure making investment opportunities more attractive and encourage an outward orientation, which has been so successful in the coastal region.

## Notes

1. Despite the insistence of the Chinese government that its reported figures for GDP growth are reliable (see for instance *The Economist,* March 16th 2002 and *The Financial Times,* February 28th 2002), the credibility of China's statistics on economic growth has been an issue of concern for years. A number of studies have concluded that Chinese growth statistics have significant errors and need to be revised (see Rawski, 2001; Wang and Meng, 2001; or Maddison, 1998).
2. Previous studies have used data on primary school, secondary school and higher education enrolment. Specialized secondary schools are the middle level in the Chinese education system and therefore may be a better proxy for human capital.
3. The results of the HS test from STATA suggest that RES estimator has degenerated to POLS and the Wald test from HS may not be appropriate.

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# 9 Exports, FDI, linkages and regional disparities in China[1]

*Xiaolan Fu*

## Introduction

Pronounced disparities in income and economic opportunities between the coastal and inland regions of China are well documented in the literature. Factors responsible for these regional inequalities include preferential government policies, favourable geographical location, and superior infrastructure facilities in the coastal regions. Another factor contributing to the observed increase in regional disparities in China is insufficient linkages from important growth engines. This chapter explores the proposition that regional disparities in China are related intimately to the structure of exports and foreign direct investment (FDI), which results in limited linkages from these growth engines to inland regions. After embarking upon economic reforms in 1978, the Chinese government has been opening up the economy gradually to foreign trade and investment. In 1988, the government introduced a coastal regions' development strategy and the two-ends outside policy,[2] both of which encourage processing trade in order to exploit China's comparative advantage in abundant cheap labour. Export-oriented FDI was encouraged by fiscal and financial incentives, for example, tax holidays and tax rebates for exports. As a result, exports of foreign-invested enterprises (FIEs) and exports due to processing trade have increased rapidly in the coastal regions.

Accompanying the rapid growth of exports and FDI concurrent with domestic reforms, the Chinese economy has experienced impressive growth. Real GDP per capita increased from RMB792 to RMB3631 in 1990 constant prices during the period 1978 to 1999. However, this growth has not been balanced across regions; disparities developed during the 1990s as Table 9.1 indicates. On average, the coastal regions registered relatively higher growth than the inland provinces following the reforms and into the 1990s.[3] Although the inland regions experienced growth similar to that of the coastal regions during the 1980s, these regions fell considerably behind their coastal counterparts during the 1990s when real GDP per capita increased by only 95 per cent in the inland regions but by 144 per cent in the coastal regions. In fact, GDP per capita in purchasing power terms in the coastal regions began to catch up with that of the Southeast Asian emerging economies, for example, Malaysia, Philippines, Indonesia and Thailand, in the early 1990s and even surpassed that of these countries in 1996.[4] Regional income

*Table 9.1* Real GDP per capita of coastal and inland regions

| *Regions* | *Real GDPPC (yuan at 1990 constant prices)* | | | | *% Change* | | | |
|---|---|---|---|---|---|---|---|---|
| | *1952* | *1978* | *1990* | *1999* | *1952–78* | *1978–99* | *1978–90* | *1990–99* |
| Coastal | | | | | | | | |
| Beijing | 462 | 2807 | 4881 | 9960 | 507 | 255 | 74 | 104 |
| Tianjin | 813 | 2524 | 3621 | 8017 | 210 | 218 | 43 | 121 |
| Shanghai | 1186 | 5436 | 5910 | 15459 | 358 | 184 | 9 | 162 |
| Liaoning | 593 | 1480 | 2698 | 5062 | 150 | 242 | 82 | 88 |
| Hebei | 340 | 792 | 1465 | 3479 | 133 | 339 | 85 | 137 |
| Jiangsu | 356 | 936 | 2016 | 5352 | 163 | 472 | 115 | 165 |
| Zhejiang | 305 | 720 | 2122 | 6041 | 136 | 739 | 195 | 185 |
| Fujian | 277 | 594 | 1767 | 5418 | 114 | 812 | 197 | 207 |
| Shandong | 248 | 688 | 1815 | 4353 | 178 | 533 | 164 | 140 |
| Guangdong | 275 | 799 | 2395 | 5886 | 191 | 637 | 200 | 146 |
| Guangxi | 182 | 490 | 1066 | 2082 | 169 | 325 | 118 | 95 |
| **Average** | **347** | **1018** | **2132** | **5204** | **193** | **411** | **109** | **144** |
| Inland | | | | | | | | |
| Shanxi | 316 | 794 | 1493 | 2372 | 152 | 199 | 88 | 59 |
| Inner Mongolia | 471 | 690 | 1478 | 2685 | 47 | 289 | 114 | 82 |
| Jilin | 416 | 829 | 1746 | 3182 | 99 | 284 | 111 | 82 |
| Heilongjiang | 636 | 1227 | 2028 | 3844 | 93 | 213 | 65 | 90 |
| Anhui | 212 | 531 | 1182 | 2362 | 150 | 345 | 123 | 100 |
| Jiangxi | 310 | 601 | 1110 | 2339 | 94 | 289 | 85 | 111 |
| Henan | 226 | 505 | 1091 | 2456 | 124 | 387 | 116 | 125 |
| Hubei | 245 | 722 | 1556 | 3269 | 195 | 353 | 115 | 110 |
| Hunan | 234 | 622 | 1228 | 2562 | 166 | 312 | 97 | 109 |
| Sichuan | 182 | 551 | 1105 | 2234 | 202 | 306 | 101 | 102 |
| Guizhou | 158 | 381 | 810 | 1242 | 141 | 226 | 113 | 53 |
| Yunnan | 190 | 492 | 1224 | 2234 | 158 | 354 | 149 | 83 |
| Shaanxi | 231 | 640 | 1241 | 2058 | 177 | 222 | 94 | 66 |
| Gansu | 340 | 757 | 1099 | 1851 | 123 | 144 | 45 | 68 |
| Qinghai | 275 | 931 | 1558 | 2340 | 239 | 151 | 67 | 50 |
| Ningxia | 343 | 805 | 1393 | 2245 | 135 | 179 | 73 | 61 |
| Xinjiang | 452 | 681 | 1799 | 3247 | 51 | 377 | 164 | 80 |
| **Average** | **255** | **637** | **1280** | **2497** | **149** | **292** | **101** | **95** |
| **National average** | **294** | **792** | **1630** | **3631** | **169** | **358** | **106** | **123** |

*Source*: State Statistical Bureau of China, 1999a and 2000a.
Growth that is higher than the national average appears as a shaded entry.

inequality in China, measured in terms of real GDP per capita, grew at a rate of 3 per cent per year in the 1990s (Figure 9.1). In 1999, the average GDP per capita in the coastal regions, measured using 1990 constant prices, was RMB5204, while the same figure in the inland regions was only RMB2497. GINI indices for the 29 provinces, municipalities and autonomous regions indicate similar results.[5]

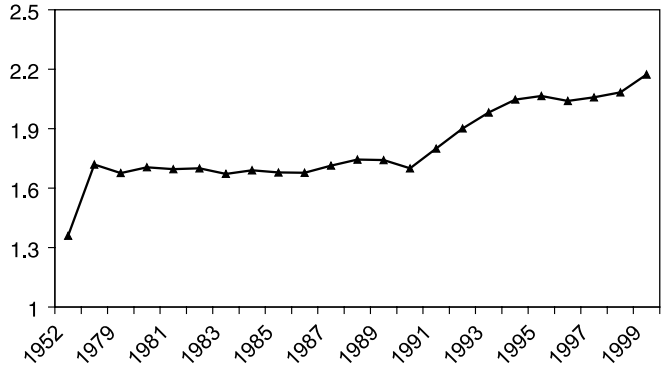


*Figure 9.1* Real GDP per capita, coastal/inland regions.
*Source*: SSB (1999c) and author's estimation.

The literature on regional disparities in China takes exports and FDI into consideration (e.g., Yao and Liu (1998), Yao and Zhang (2001a and 2001b), Sachs and Woo (2000), Zhang (2001), Sun and Parikh (2001), Demurger (2001) and Demurger *et al.* (2002)). These studies find that both exports and FDI have a significant and positive impact on growth in coastal regions but not in inland regions. However, none of these papers accounts for the structure and the nature of exports and FDI or their impact on regional development. Yao and Zhang (2001b) attribute the income divergence between the Chinese regions to the slow process of economic spillovers from the growth centre to the remote provinces. In this chapter, we investigate the factors that are responsible for this slow spillover process and place particular emphasis on exports and FDI, which are often regarded to be the engines of growth for the Chinese economy over the post-reform period. In addition, we examine the spillover and migration effects of these two engines.

The chapter is organized as follows. The following section presents the theoretical framework for understanding the relationships between exports, linkages and regional income inequalities. Then the linkage and migration effects of China's exports and FDI are discussed. The 'Empirical evidence' section provides econometric evidence of spillover effects and migration effects. The last section concludes with policy implications.

## Linkage and migration effects: a theoretical framework

The trade literature identifies several possible channels through which exports promote growth. These include vent-for-surplus effects, resource reallocation, increased specialization, market augmentation, capital accumulation, technology transfer and knowledge spillovers, X-efficiency effects, and financing of imports (see Myint (1955), Corden (1985), Grossman and Helpman (1991) and Baldwin and Caves (1997)). Exports are regarded as the engine of growth for the recently

settled regions in the 19th century by Nurkse (1961) and for the newly industrialized countries (NICs) by Krueger (1995). However, backward linkages are essential for successful export-led growth to ensure that the export sector does not remain a separate enclave. Meier (1995) argues that an integrated process should be established to diffuse stimuli from the export sector to the rest of the economy. The strength of the spillover effects depends both on the extent of the linkages between the economy and the export sector and on the availability of the basic ingredients of development in the domestic economy, for example, infrastructure facilities, ambitious entrepreneurs, and a threshold level of human capital (Greenaway and Sapsford, 1994). Furthermore, a high proportion of manufactures in total exports and an advanced production technology in the export sector are essential for generating strong spillover effects to the rest of the economy from technology transfer (Fosu, 1990). If these prerequisites are not met, exports may lead to economic growth in several regions only with weak spillover effects for the rest of the economy.

If export sector growth attracts a substantial number of immigrants from other regions, the impact of exports on regional income inequalities depends on the costs and benefits of migration for both the home and the host regions. For the home regions, emigrants may benefit their economy through two major channels. First, emigrants' remittances can help home regions to overcome capital constraints and support economic development. Second and more importantly, returning migrants should bring skills and capital back to the home region and thereby contribute to both human and physical capital accumulation and promote growth in the home economies. Entrepreneurial activities of returnees should also contribute to wealth generation and job creation. Furthermore, emigrants may invest in their home regions, provide market intelligence, and train home labour. On the other hand, emigration may actually impose welfare costs on home regions. As Bhagwati (1997) argues, a home region may suffer either if the wage rate of the emigrant prior to emigration is less than his private marginal productivity (PMP) or if the social marginal productivity (SMP) of the emigrant is higher than his wage rate due to externalities. In both cases, the home region loses the surplus generated by the emigrant.

The net welfare effect of immigration on the host region equals the immigration surplus net of the fiscal burden imposed by immigrants on native taxpayers (Borjas, 1995). The fiscal costs of immigration are likely to be low in developing countries having low welfare entitlements, while the positive impact of immigration on these host regions tends to be large due to the immigrants' contribution to sustainable growth. In a two-region model with a fixed supply of labour, wages will increase and returns to capital will decrease in the faster-growing region. However, immigration from the slower-growing region will relax the labour supply constraint in the faster-growing region and attenuate the decrease in the marginal productivity of capital so that faster growth is sustainable (Faini, 1996). Moreover, labour mobility across regions may interact with increasing returns to scale to create a tendency for firms and workers to cluster together, which intensifies agglomeration effects (Krugman, 1991; Puga, 1999). Therefore, richer regions

will experience faster growth due to increasing returns to scale and agglomeration effects. However, relatively poor regions are less likely to experience such dynamic growth effects. The growth effects in such regions may be due more to a one-time resource reallocation because of emigration than to technical progress. In addition, the poorer regions may lose the more able and educated persons due to migration. Therefore, richer and poorer regions will grow at different rates and income disparities will actually increase.

In summary, exports impact regional income inequalities in three ways depending on the type and the nature of the exports. First, exports may function as an engine of growth for some regions but not for others. Second, if exports in the richer regions are mainly in the form of processing trade, backward linkages toward the poorer regions are limited. Third, when relatively efficient labour migrates from the poorer regions to the richer regions because of the increased demand for labour in the faster-growing export activities, regional income inequalities are likely to increase.

## The linkage and migration effects of exports in China

In China, exports exhibit several distinctive features over the post-reform period. First, the extent to which exports are related to FDI is considerable. In 1999, exports of foreign-invested enterprises (FIEs) accounted for 45 per cent of China's total exports of $195 billion. Second, the proportion of processing-type exports is high. Since 1996, exports generated from processing trade have accounted for more than 50 per cent of China's total exports (Figure 9.2). Third, export activities are concentrated geographically in the coastal regions. Fourth, the exports to GDP ratio is relatively high in the coastal regions. As Table 9.2 indicates, exports from the coastal regions accounted for 91 per cent of China's total exports in 1999. The average exports to GDP ratio in the coastal regions was 25 per cent, compared to 5 per cent in the inland regions for the same year. Fifth, the export composition in the coastal regions is relatively sophisticated. The major export commodities of the

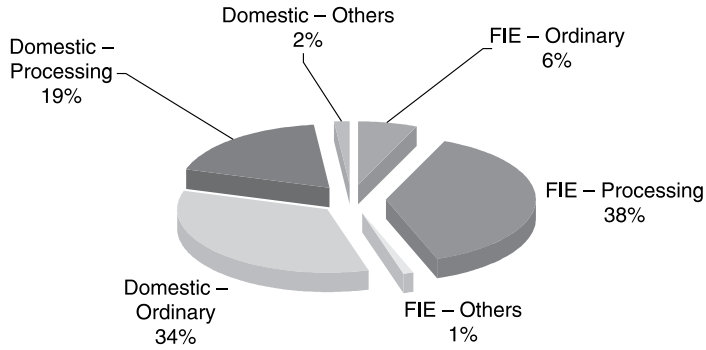


*Figure 9.2* Exports by ownership and trade mode, 1999.
*Source*: MOFTEC, 2000.

*Table 9.2* Exports and FDI by Regions, 1999

| *Regions* | *GDP* | *FDI, by 1999* | *Exports, 1999* | | | | |
|---|---|---|---|---|---|---|---|
| | *% of total* | *% of total* | *% of total* | *EX/GDP (%)* | *Primary %* | *Processing as % of total* | *Exports of FIEs as % of total* |
| **Coastal** | | | | | | | |
| Beijing | 2.7 | 4.13 | 3.2 | 23.9 | 7.6 | | 45 |
| Tianjin | 1.8 | 3.94 | 3.3 | 36.4 | 9.3 | 67 | 72 |
| Shanghai | 4.9 | 8.19 | 9.4 | 37.5 | 4.0 | 46 | 54 |
| Hebei | 5.1 | 4.16 | 4.2 | 16.1 | 26.16 | 19 | |
| Liaoning | 5.6 | 1.99 | 1.4 | 4.8 | 26.3 | | |
| Jiangsu | 9.4 | 12.13 | 9.5 | 20.0 | 3.3 | 54 | 51 |
| Zhejiang | 6.5 | 3.11 | 7.0 | 21.1 | 11.4 | 24 | 25 |
| Fujian | 4.3 | 9.78 | 5.4 | 24.8 | 12.1 | 53 | 57 |
| Shandong | 9.4 | 5.9 | 6.3 | 13.2 | 22.8 | 53 | |
| Guangdong | 10.3 | 28.25 | 40.4 | 77.0 | 3.9 | 78 | 49 |
| Guangxi | 2.4 | 2.09 | 0.6 | 5.2 | 17.6 | 15 | 18 |
| **Coastal sum** | **62.4** | **83.7** | **90.7** | | | | |
| **Coastal average** | | | | **25.5** | **13.1** | | |
| **Inland** | | | | | | | |
| Shanxi | 1.8 | 0.42 | 0.8 | 8.2 | 49.8 | | |
| Inner Mongolia | 1.5 | 0.17 | 0.4 | 4.5 | 33.3 | | |
| Jilin | 2.0 | 0.84 | 0.6 | 6.0 | 43 | | |
| Heilongjian | 3.5 | 1.09 | 0.8 | 4.4 | 30.4 | | |
| Anhui | 3.6 | 0.88 | 0.8 | 4.7 | 15.5 | | |
| Jiangxi | 2.4 | 0.81 | 0.5 | 3.9 | 18 | | |
| Henan | 5.6 | 1.22 | 0.6 | 2.2 | 17.5 | | |
| Hubei | 4.7 | 1.78 | 0.8 | 3.3 | 10.8 | | |
| Hunan | 4.1 | 1.48 | 0.7 | 3.5 | 14.2 | 12 | |
| Sichuan | 4.5 | 1.54 | 0.6 | 2.6 | 18.5 | | |
| Guizhou | 1.1 | 0.13 | 0.2 | 3.6 | 32.2 | | |
| Yunnan | 2.3 | 0.27 | 0.5 | 4.1 | 27.1 | | |
| Shaanxi | 1.8 | 0.9 | 0.5 | 5.7 | 11.9 | 22 | |
| Gansu | 1.1 | 0.13 | 0.2 | 3.4 | 18 | | |
| Qinghai | 0.3 | 0.01 | 0.1 | 4.2 | 20.3 | | |
| Ningxia | 0.3 | 0.04 | 0.1 | 9.8 | 22 | | |
| Xinjiang | 1.4 | 0.11 | 0.5 | 7.1 | 22.4 | | |
| **Inland sum** | **40.0** | **11.8** | **8.7** | | | | |
| **Inland average** | | | | **4.8** | **23.8** | | |

Exports are by origin of products.

*Source*: State Statistical Bureau (2000a and 2000b) and MOFTEC (2000).

coastal regions include not only traditional labour-intensive products, for example, clothing and footwear, but also electrical equipment, machinery and electronic products.

The impact of a particular economic activity on the rest of the economy occurs through interindustry linkages. Backward linkages refer to purchases of inputs; forward linkages refer to sales of output. Since 1996, more than 50 per cent of exports from coastal regions have been in processing trade, which corresponds mainly to sub-contracts from Hong Kong companies and foreign invested enterprises (FIEs). The fastest growing export industries in China, for example, electronics, have been involved primarily in processing trade. In 1998, about 80 per cent of the exports of machinery and electronic products were of this type (MMI, 1999). In 2001, 99 per cent of the exports of computer products in Guangdong province were of processing trade (Anon, 2001).

Processing export activities in these industries include processing or assembly with imported materials and processing or assembly with supplied materials. The latter type of processing is also called contract manufacturing. In this case, Chinese firms process duty-free materials and components supplied by foreign firms and export finished products. Chinese firms do not assume ownership of the imported components and are paid a fee for the assembly or processing activity. The foreign firms control both the supply of the materials and the entire international marketing of the processed goods. In the case of processing or assembly with imported materials, Chinese firms import, free of customs duty, parts and components that are used to produce finished goods. Then, the Chinese firms export these goods to international markets. Hence, backward linkages from these processing trade activities to local firms may be limited because the utilization of local materials and intermediate inputs is small. In addition, forward linkages of such processing trade are also limited because the Chinese firms are often paid a low processing fee and because tariffs and taxes are usually exempted for export processing activities. As Sung (2000) finds, the rate of value-added for exports from Hong Kong is 100 per cent higher than from mainland China. Although some adaptation of the production process to the use of local raw materials, components and equipment has occurred, the resulting linkages generated by exports are limited leading Lardy (1995) to categorize the export industries as enclaves.

Furthermore, FDI-related exports in the coastal regions combine cheap labour with foreign capital. Thus, exports from inland regions must compete not only with the products from other nations but sometimes also with exports from the coastal regions manufactured using cheap labour and funded by foreign capital. This provides a partial explanation for the crowding out of these exports from international markets and the decrease in export growth in inland regions. In China, foreign trade companies not only purchase local products for export, but they also purchase for export goods produced in other provinces if the non-locally produced goods are more competitive. In 1999, the value of exports by origin in six coastal provinces exceeded the corresponding value of exports by location of trade companies, as Table 9.3 indicates. Hence, some of the products exported by trade companies located in other regions are not produced by local firms but by

*Table 9.3* Differences between exports by origin and by location of trade companies

| *Coastal provinces* | *Exports[a]–Exports[b]* | | |
|---|---|---|---|
| | *1997* | *1998* | *1999* |
| Beijing | −377591 | −402186 | −361813 |
| Tianjin | −6717 | −3349 | 4548 |
| Hebei | −59988 | −50370 | −45911 |
| Liaoning | −104924 | −42994 | −7197 |
| Shanghai | −30272 | −31499 | −50871 |
| Jiangshu | 33722 | 30343 | 27400 |
| Zhejiang | 65895 | 30343 | 27400 |
| Fujian | 74946 | 75904 | 26792 |
| Shangdong | 85081 | 85024 | 64240 |
| Guangdong | 85081 | 85024 | 64240 |
| Guangxi | −61284 | −20026 | −2698 |

The entries under tint indicate the regions and the years in which the values of exports by origin exceed the corresponding values of exports by location of trade companies.

[a] Exports by origin.
[b] Exports by location of trade companies.

*Source*: MOFTEC, 2000.

firms in these six coastal provinces, which have been the growth engines of China since the reforms began.

Technology and knowledge spillovers are another channel through which exports and FDI may contribute to growth. The extent and quality of technology embodied in export-oriented FDI influence the strength of technology spillovers. On average, the level of technology embodied in FDI has been only two years ahead of the technology in place in China, according to survey results reported in Huang (2001). Although the technology level of FDI has increased since the mid-1990s when large multinational enterprises began investing in China, case studies in Beijing and Shenzhen by Wang (2000) report that technology advancement levels of foreign-invested firms are significantly correlated to the equity structures of these firms. High technology levels are usually found in wholly foreign-owned enterprises or joint ventures in which foreign partners hold majority equity shares. Advanced core technologies are often controlled by foreign investors in these firms. Therefore, technology spillovers from foreign investment to indigenous firms are limited. In a case study of China's largest car assembly joint venture, the Shanghai-Volkswagen Automotive Company Ltd., Nolan (2002) argues that, after more than a decade as a joint venture partner to Volkswagen, Shanghai Auto has no capability at all to compete as an independent carmaker. In the Chinese electronics industry, Hu and Jefferson (2002) find significant productivity depression rather than positive spillover effects of FDI on domestic firms.

The rapid growth of exports and FDI in the coastal regions has attracted substantial volumes of labour to migrate from inland regions to the coastal regions. Recent population census data indicate that there were about 22 million net migrants working in the 12 coastal provinces in 2000[6] (SSB, 2001b). Emigrants usually remit 20 to 50 per cent of their income back home (World Bank, 1997), which raises rural household incomes. According to Li (2001), remittances accounted for about 4 per cent of the total income of all households in the home regions in 1995. Out-migration has also increased the labour productivity of members remaining in their households because of resource reallocation. Therefore, there are some benefits to home regions from emigration.

Most migrants are young and educated; the majority are aged between 15 and 35. The education level of migrants is higher than the average in the home regions, but nevertheless lower than that in the host regions. In 2000, about 60 per cent of all migrants had nine years of schooling or more, while the figure for the average rural population was only 43 per cent (Hu, 2001). Therefore, the inland regions have lost relatively young and educated labour to emigration. Although China has abundant supplies of unskilled labour, this young and educated labour is not in surplus in the poor regions. In the poorer inland regions, the average education level of rural residents has actually decreased due at least partly to emigration. Hence, a shortage of educated working-aged labour force has developed in some inland regions.

In addition, the wage earnings of emigrants prior to emigration are less than their private marginal product. In 1999, the average income of rural migrant households was 17 per cent higher than that of rural non-migrant households (Hu, 2001). Hence, this surplus of output over average earnings, which accrued to home regions, is lost with emigration. Moreover, emigration increases income inequalities in backward regions, for example, Sichuan, mainly due to the lack of mobility of workers in very low-income households (Li, 2001). The growth in inequalities in these poor regions may well, in turn, hamper economic growth. Therefore, emigration from the inland regions is not necessarily favourable to their development in the long term. In fact, the costs may outweigh the benefits of emigration for the home regions.

In the host regions, immigrants do jobs that non-migrants will not or cannot do so that they are complements to non-migrant workers. As Knight and Song (1999) argue, the immigrants constitute an increasingly important group that meets the growth in demand for low-skilled labour in the coastal regions and, hence, enabled the coastal regions to sustain their rapid growth. In addition, the marginal product of migrants is more than three times their wage rate (Knight and Song, 1999). Hence, the immigrants generate a significant surplus over their earnings; this surplus contributes to the welfare of the coastal host regions.

When and if the migrants return to their home regions depends on the attitudes of the migrants, the enterprises and the government (Knight *et al.*, 1999). From the migrants' perspective, their social and cultural environment does not change fundamentally in the case of inter-regional migration. This makes it easier for them to integrate into the society of the host region than into a foreign land. If

access to health and education services for migrants and their children is similar to those for local residents in the host regions, and if wage and opportunity differentials between the two regions persist, migrants are unlikely to return. Hence, widening income and opportunity inequalities between the two regional groups in China, together with the lack of infrastructure for returnees' career or business development in the inland regions, may lead to very little return migration. In addition, the unmarried status of most migrants in the coastal regions reduces the probability of return migration.

From the firms' perspective, employers of immigrants will try to stabilize migrant labour in order to recover their investment in training. Temporary migration will become economically inefficient as the migrant workers move up the job ladder. Therefore, more and more migrants will be induced to stay in the host regions and become urbanized. Finally, whether and when the migrants return also depends on the government's policy on migration. If government policy is designed only to encourage labour to migrate from the poorer inland regions to the richer coastal regions rather than to encourage a two-way movement of capital and labour, fewer migrants will return.

In summary, two significant propositions may be drawn from this analysis. First, exports in China have led to economic growth in the coastal regions, but not in the inland regions. FDI-funded processing-type exports generate only limited linkages and weak spillovers to the inland regions. As a corollary, these exports have aggravated regional income inequalities in China in the 1990s. Second, export-oriented FDI in labour-intensive industries in the coastal regions has induced labour in the inland regions to capital-rich coastal regions, which has enabled the coastal regions to sustain their growth. The effects of this migration on the growth in inland regions have been unfavourable on balance, although the contribution of remittances to the home regions cannot be ignored. As a corollary, this migration may have contributed to the increase in the income gap between the coastal and inland regions in the 1990s.

## Empirical evidence

### *Econometric evidence of spillover effects*

The first proposition and its corollary on exports, spillover effects and regional income inequalities can be tested statistically. Following Salvatore and Hatcher (1991) and Greenaway and Sapsford (1994), we specify a log-linear dynamic panel model as:

$$y_{it} = \alpha + \varphi x_{it} + \beta l_{it} + \gamma k_{it} + \lambda y_{it-1} + v_{it}, \tag{9.1}$$

where $i$ and $t$ denote regions and time, respectively. The disturbance term, $v_{it}$, varies across regions and time and has the usual properties. The dependent variable, $y_{it}$, is the real growth rate of GDP; the explanatory variables are the real growth rate of exports, $x_{it}$, the growth rate of labour, $l_{it}$, the growth rate of the capital stock, $k_{it}$, and $y_{it-1}$, which is the one year lag of $y_{it}$. We introduce exports

into the production function explicitly for three reasons. First, the incentives associated with export orientation are likely to lead to higher total factor productivity because of economies of scale and competition effects. Second, exports are likely to alleviate serious foreign exchange constraints and thereby enable the country to import more advanced machinery and materials. Third, exports are likely to result in a higher rate of technological innovation and dynamic learning from abroad (Balasubramanyam *et al.,* 1996). We include a lagged dependent variable, i.e., $y_{it-1}$ as an explanatory variable not only to take account of the dynamic process of growth, but also because the lagged dependent variable provides a proxy for many omitted variables (Nair-Reichert and Weinhold, 2001).

The spillover effects of coastal-region export growth on the growth of the inland regions is assessed by including a spillover effect variable, *s*, in the growth equation for inland regions. Demurger (2000) specifies the indicator of diffusion as the weighted average of neighbouring provinces' values for the variable under consideration. Hence, we measure the spillover effects variable, $s_{it}$, for an inland province *i* as the weighted average of the export growth rates of coastal provinces adjusted by the geographical distances between these coastal provinces and that inland province. The following equation provides the calculation:

$$s_{it} = \sum w_{jt} \times \frac{x_{jt}}{d_{ij}}, \tag{9.2}$$

where $w_{jt}$ is the share of exports of coastal province *j* in total exports of all the coastal provinces, $x_{jt}$ is the export growth rate of coastal province *j*, and $d_{ij}$ is the geographical distance between inland province *i* and coastal province *j* measured by the distance between their capital cities. Therefore, the modified growth equation for inland regions takes the form:

$$y_{it} = \alpha + \varphi x_{it} + \beta l_{it} + \gamma k_{it} + \delta s_{it} + \lambda y_{it-1} + \upsilon_{it}. \tag{9.3}$$

We use a panel data set for the coastal and inland regions in China; the data are collected from the *China Statistical Yearbook* (SSB, 2000a and 2001a) and the *Comprehensive Statistical Data and Materials on 50 Years of New China* (SSB, 1999c). The growth rate in the number of employees is used to measure labour growth. Because of the difficulties associated with measuring the capital stock in developing countries, we follow the practice common in empirical studies of approximating the rate of growth of capital stock by the share of investment in GDP (e.g., Balasubramanyam *et al.*, 1996). Because the problem of increasing income inequalities between the coastal and inland regions started in the early 1990s, we concentrate on the time period from 1990 to 1999.

This model allows us to examine dynamic effects, but it raises the problem of convergence of the estimators because the lagged dependent variable is correlated with the disturbance term. Several instrumental-variable (IV) approaches are suggested, for example the IV estimator proposed by Anderson and Chen (1981), the GMM estimator proposed by Arellano and Bond (1991), and the Corrected LSDV

approach discussed by Kiviet (1995). For estimation of dynamic macroeconomic panel data model in a small sample, the Corrected LSDV approach provides the best result but it cannot be easily implemented. The GMM estimator is a second-best solution, especially if $T \leq 10$ (Judson and Owen, 1999). Therefore, we adopt the GMM method that uses all the feasible lags of the dependent variable and other explanatory variables as instruments for $\Delta y_{i,t-1}$.

Because of possible endogeneity between exports and growth, we apply the Wu–Hausman specification procedure to test for endogeneity between these two variables. Following Nair-Reichert and Weinhold (2001), one-year lagged values of $y_{it}$, $x_{it}$ and other exogenous variables are used as instrumental variables because of our short time period. If endogeneity between exports and growth is present, we apply the IV method in our estimation; otherwise, we use normal fixed-effects or random-effects models, depending on the estimated Hausman statistics. To check for the robustness, we also present results based on different panel data techniques.

Table 9.4 reports both the static and dynamic panel estimation results. In the case of coastal regions, exports exhibit a significant positive effect on output growth in all specifications. Investment also has a positive effect on output growth, but it is only statistically significant in the static specification. For the inland regions, investment exhibits a significant positive effect on output growth, while the estimated coefficients are statistically insignificant for labour input variable in all specifications and for exports variable in the dynamic specification. Although the estimated coefficient of exports variable is statistically significant in the two-stage static specification, its magnitude is negligible. Our results confirm the conventional wisdom that exports have been the major force of economic growth for the coastal regions, but not for the inland regions. More importantly, the estimated coefficient of spillover effects for inland regions is positive but statistically insignificant. These results are robust in both the static and dynamic specifications; importantly, they indicate that spillovers from coastal region export growth to the inland regions are weak. In summary, we find statistical evidence that FDI-related processing-type exports provided the growth engine for coastal regions but had only limited linkages with, and weak spillover effects on, the inland regions.

### *Econometric evidence of migration effects*

We test the second proposition and its corollary concerning the effects of exports, FDI-induced migration, and regional income inequalities in two steps. First, we estimate rank correlation coefficients between the number of immigrants in each of the coastal provinces and the value of exports and inward FDI in these provinces. The estimated rank correlation coefficients are as high as 0.93 for the number of immigrants and the value of exports and 0.77 for the number of immigrants and the value of realized FDI. This result suggests that exports and FDI in labour-intensive industries have attracted labour to the capital-rich coastal regions. In Guangdong, the region that has attracted about 30 per cent of total inward FDI in China, net migrants numbered around 12 million in 2000 (SSB, 2001b).

*Table 9.4* Exports and growth: panel data estimation results

| *Independent variables* | *Inland regions* | | | | | | *Coastal regions* | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Static* | *Static* | *Dynamic* | *Static* | *Static* | *Dynamic* | *Static* | *Static* | *Dynamic* |
| $x_{it}$ | 0.021 | 0.000*** | −0.002 | 0.003 | 0.028 | 0.007 | 0.106*** | 0.129*** | 0.032** |
| | (1.188) | (5.838) | (−0.117) | (0.141) | (0.934) | (0.380) | (2.895) | (2.771) | (2.165) |
| $l_{it}$ | 0.035 | 0.040 | 0.005 | −0.011 | 0.010 | 0.038 | 0.130 | 0.089 | −0.001 |
| | (0.231) | (0.298) | (0.033) | (−0.074) | (0.095) | (0.272) | (0.764) | (0.533) | (−0.021) |
| $k_{it}$ | 0.082*** | 0.070*** | 0.037 | 0.082*** | 0.083*** | 0.052** | 0.064*** | 0.067*** | 0.028 |
| | (5.524) | (5.282) | (1.694) | (5.578) | (5.611) | (2.174) | (3.842) | (4.164) | (0.844) |
| $s_{it}$ | | | | 0.076 | 0.032 | 0.023 | | | |
| | | | | (1.066) | (0.702) | (0.651) | | | |
| $y_{it-1}$ | | | −0.089 | | | −0.176 | | | 0.000 |
| | | | (−1.759) | | | (−1.509) | | | (0.554) |
| Number of observations | 144 | 144 | 128 | 144 | 144 | 128 | 99 | 99 | 88 |
| Estimation method | FE | IV-FE | GMM | FE | IV-FE | GMM | FE | IV-FE | GMM |
| Adj R Square | 0.210 | 0.380 | 0.250 | 0.230 | 0.57 | 0.264 | 0.284 | 0.584 | 0.190 |
| Hausman Statistic ($H_0$=Random effects) | 25.7*** | | | 23.34*** | | | 8.98** | | |
| Wu Hausman (*p*-value) ($H_0$: Exogeneity of *x*) | 0.010 | | 0.330 | 0.009 | | 0.310 | 0.000 | | 0.120 |

The dependent variable is $y_{it}$.

The *t*-statistics are in parentheses.

Significance at the one or five per cent level is designated by *** or **, respectively.

Second, we test the proposition that migration and regional income inequalities are related in a log-linear panel data specification of the form:

$$gap_{it} = \alpha + \beta mig_{it} + \chi str_{it} + \phi fdi_{it} + \mu_{it} \tag{9.4}$$

where $i$ and $t$ denote regions and time respectively. The disturbance term, $\mu_{it}$, varies across regions and time and has the usual properties. The dependent variable is the ratio of average GDP per capita of coastal provinces to that of inland province $i$, denoted $gap_{it}$. The explanatory variables are the ratio of the number of rural emigrants to total population in province $i$, denoted $mig_{it}$, a structural variable measured by the ratio of the number of urban employees to total employees in province $i$, denoted $str_{it}$, and the ratio of the average FDI in coastal provinces to that in inland province $i$, denoted $fdi_{it}$.

Because people decide to leave their homeland and move to another region, emigration depends on several economic and political factors. The income difference between the home region and the destination region is a major factor; hence, reverse causality from the income gap to the emigration ratio may be present. Therefore, we use a Wu–Hausman test to test for such endogeneity. One-year lagged values of $gap_{it}$, $mig_{it}$ and other exogenous variables are used as instrumental variables. If endogeneity between income gap and emigration ratio is present, we use a two-stage fixed-effects model for estimation; otherwise, we use normal fixed-effects or random-effects models depending on the estimated Hausman statistics. The analysis is based on a panel of data for 16 of 19 inland regions of China during the period 1995 to 1998. Tibet and Qinghai are omitted due to lack of reliable data and data for Congqing are combined with those for Sichuan. The data are taken from various issues of the *China Labour Statistical Yearbook* (SSB, 1996b to 1999b) and the *Statistical Yearbook of China* (SSB, 1996a to 1999a).

Because the Wu–Hausman test indicates significant endogeneity between the income gap and the emigration ratio, the two-stage fixed-effects specification in Table 9.5 is preferred to the others. In addition, this specification controls for regional-specific effects. This is important because urbanization may reflect the level of economic development in the inland areas, while the inland provinces are themselves heterogeneous in terms of development level. However, we include the other estimation results to check for robustness. As Table 9.5 indicates, emigration exhibits a significant positive impact on the income gap between the coastal and the inland regions. A 1 per cent increase in the share of emigrants in the total population will increase the per capita income gap by about 0.07 per cent. This result suggests that migration of young and educated labour from the inland regions to the coastal regions contributes to the increasing income gap. However, the significant endogeneity between the income gap and the emigration ratio indicated by the Wu–Hausman statistics suggests a two-way causal relationship. Although migration has contributed to income inequality, income inequality has also induced more migration.

*Table 9.5* The impact of emigration on the income gap between coastal and inland regions

| *Dependent variable: gap* | | | | | | |
|---|---|---|---|---|---|---|
| *Independent variables* | *Fixed-effects* | | *Random-effects* | | *2S-fixed-effects* | |
| | *Coefficient* | t-*ratio* | *Coefficient* | t-*ratio* | *Coefficient* | t-*ratio* |
| mig | 0.018*** | 4.176 | 0.022*** | 3.039 | 0.071** | 2.204 |
| str | −0.181*** | −4.971 | −0.274*** | −5.177 | −0.189*** | −7.563 |
| fdi | 0.025*** | 7.219 | 0.027*** | 3.297 | 0.017** | 2.696 |
| R-square | 0.996 | | 0.991 | | 0.999 | |
| Adj. R-square | 0.994 | | 0.990 | | 0.999 | |
| Lagrange Multiplier | | 75.68*** | | | | |
| Hausman statistics (H0: Random Effects) | | 14.6*** | | | | |
| Wu-Hausman (*p*-value) (H0: Exogeneity) | | 0.000 | | | | |

Significance at the one or five per cent level is designated by *** or **, respectively.

The relative FDI ratio also exhibits a significant positive impact on the income gap; it indicates that a 1 per cent increase in the average FDI in coastal provinces relative to that in inland regions increases the income gap by about 0.02 per cent. This result suggests that an increase in FDI in the coastal regions relative to the inland regions leads to a larger income gap between the regions. The estimated coefficient of the structural variable is negative and statistically significant; it indicates that a 1 per cent increase in the ratio of the number of urban employees to the number of total employees reduces the income gap by 0.19 per cent. This result suggests that urbanization in the inland regions reduces the income gap between coastal and inland regions. Finally, the movement of domestic capital may increase regional income inequalities because capital has been flowing from the poor inland regions to the fast-growing coastal regions since the reforms began. However, because we lack reliable data on the scale of inter-regional capital flows, we could not include this effect in our empirical model.

## Conclusion

This chapter investigates the spillover and migration effects of exports and FDI and estimates their impact on regional income inequalities in China. Exports are found to exert a significant positive impact on growth in the coastal regions, while

the inland regions have not experienced similar growth-inducing effects from exports and FDI. The FDI-based labour-intensive processing-type exports in the coastal regions have attracted the relatively mobile and efficient resources from the inland regions, but have offered only limited growth linkages to these regions. Contrary to previous studies, for example, Kanbur and Zhang (1999), we find evidence that emigration from the inland regions enlarges the income gap between the coastal and the inland regions. However, although the difference in FDI between the coastal and the inland regions widens the income gap, urbanization of the inland regions serves to reduce regional income inequalities. On balance, exports and FDI have played an important role in the increasing regional disparities in China.

Since FDI-based labour-intensive processing trade has grown rapidly in recent decades due to the globalization of production and the increasing liberalization of trade and FDI, our results suggest that any linkages between inland and coastal economic activity that might have been derived from such trade have been limited at best. The FDI-based processing trade sectors still remain as enclaves in China, as in other developing countries. Therefore, as argued by the World Bank (2002), complementary policies are needed to achieve poverty-reducing growth. Moreover, simply encouraging labour in the poorer regions to migrate to capital-rich regions is likely to aggravate the existing regional disparities. Hence, government policies that encourage capital to move to labour surplus areas and also encourage foreign and domestic investment in inland regions are useful tools to reduce regional disparity in China. The inland regions would benefit from the growth-inducing effects of exports and FDI and skilled labour would remain in, or even be attracted to, inland regions because returns would be raised by capital inflows. Finally, our results suggest that urbanization in the inland regions helps to reduce the regional income inequalities and leads to more balanced regional growth. The policies espoused above also promote urbanization in the inland regions and thus reinforce their objectives.

## Notes

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2. Two-ends outside refers to both the sources of production material and the markets of final products are outside the domestic market.
3. The coastal regions refer to the three municipalities, Beijing, Tianjin and Shanghai, and the provinces located by the coast, namely Hebei, Liaoning, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Guangxi provinces. Hainan province is excluded because of incomplete data. The remaining non-coastal provinces are referred to as inland

regions. The names of all included provinces in the coastal and inland regions appear in Table 9.1.

4. The coastal regions of China and the four Southeast Asian economies, i.e., Indonesia, Malaysia, Philippines and Thailand, converged over the 1990s at an annual rate of 0.002 per cent. The rate of convergence is estimated from the equation:

$$(1/T)\ \log(y_{i,t+T}/y_{i,t}) = \alpha - \beta\ \log(y_{i,t}) + \varepsilon_{i,t},$$

where $y_{i,t}$ is the per capita income in region $i$ at the beginning of the interval, $T$ is the length of the interval, $Y_{i,\,t+T}$ is the per capita income in country $i$ at the end of the period and $\beta$ is the annual rate of convergence. If $\beta > 0$, the data exhibit absolute $\beta$ convergence.

5. The GINI index by regions is estimated as:

$$G = \frac{1}{2n^2\mu} \sum_{j=1}^{m} \sum_{k=1}^{m} n_j n_k |y_j - y_k|,$$

where $n$ is the total number of people, $\mu$ is the average income equal to total income divided by total population, $m$ is the number of regions, $n_j$ is the number of individuals in regions $j$, and $y_j$ is the income per capita in region $j$. The estimated GINI indices are 0.218, 0.252, 0.225 and 0.276 for 1952, 1978, 1990 and 1999 respectively.

6. Migrants are defined as residents who left their *hukou* (household registration) places for more than half a year. This figure includes immigrants who come from within the province and from other provinces.

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# 10 Competitive strategy – differentiation of multinational enterprises in China

## Case studies of American, European and Japanese automobile enterprises

*Min Zhao*

### Introduction

In the past ten years, the production of motor vehicles in China has seen an average annual growth rate of 15 per cent, compared to a world average of 1.5 per cent in the same period. China produced 4.4 million vehicles in 2003 (OICA, 2004) with a growth of 35 per cent from 2002, becoming the fourth largest vehicle manufacturer in the world, after America, Japan and Germany. Rising consumer wealth levels have been a major contributory factor to the sudden explosion in the car market. According to the world market research centre, Chinese consumers' purchasing power has risen to $5500, which has historically been the level of car consumption in other markets. With 4.5 million vehicles sold in 2003, China now is the fourth largest automobile market in the world (WMRC, 2004). Several institutes argue that China's vehicle market is set to almost double to 2008, challenging Japan for its position as the world's second-largest auto market.

China's large market draws many foreign automobile actors. Almost all of the world's top automobile assemblers and suppliers have invested in China, with Volkswagen, PSA, General Motors, Delphi, Visteon, Valeo and Man as early entrants, and Honda, Toyota, Nissan, Hyundai and Denso as later arrivals. The competition is becoming increasingly fierce. With all of the world's leading global automakers ramping up production in a bid to dominate the local market, the tensions have begun to mount among foreign automobile enterprises.

In this context, it is important to establish an appropriate strategy for the success of automobile Multinational Enterprises (MNEs) in China. The key questions that we respond to in this chapter are: what are the competitive positions for MNEs to be successful in China and what is the relation between the competitive strategy and position of MNEs?

We develop and test our concept employing a multiple case design (Yin, 1988). Through these case studies, we build a competitive strategy for MNEs in China's automobile industry.

We start by presenting our theoretical framework and our contentions on competitive strategy in the automotive industry in China, as well as our research design. We then introduce auto firm case studies to test our strategy before presenting our findings. Finally, we conclude by comparing the competitive strategies of American, European and Japanese automobile multinationals in China.

## Theoretical bases for competitive strategy and its development

Competition is an indispensable determinant for the success of firms in the market. Competitive strategy involves researching and establishing a profitable and sustainable position in an industry where the company can best defend itself against competitive forces (Porter, 1980, 1982). Furthermore, the firm's successful position depends on its competitive advantages *vis-à-vis* its rivals. According to Porter (1980), competitive advantage is manifested either in lower costs or the ability to differentiate from rivals. Sustainable advantages come from occupying a unique competitive position. A firm must make a choice between cost leadership and differentiation or it will become stuck in the middle, since achieving cost leadership and differentiation are usually inconsistent with differentiation.

Hall (1980), in a study of 64 companies in eight major industries, supported Porter's position, finding that many of the most profitable firms had achieved either the lowest cost or the most differentiated position within their industry. However, Hall also observed that a minority of the most successful firms simultaneously pursued both a differentiating and a low-cost strategy. The immediate effect of differentiation will increase unit costs. However, unit costs fall, usually with increasing volume. According to Hill (1988), a firm that differentiates its product can increase demand by creating brand loyalty or broadening product appeal, therefore establishing a low cost position as output increases. The author proposed six circumstances under which differentiation is most consistent with achieving a low cost position: (1) when the firm's ability to differentiate the product is high; (2) when consumers' commitment to the products of rival firms is low; (3) when market growth is high; (4) when the production process is new and complex; (5) when economies of scale (ES) (particularly at the firm level) are present; and (6) when minimum efficient scale (MES) exists. It is not necessary for all of these circumstances to coexist for the strategy to succeed, although some of them are critical for this strategy.

According to Hill's six circumstances, automobile multinationals with the differentiation advantage in China would simultaneously achieve a cost advantage for the following reasons.

1. The Chinese automobile market is one of the largest in Asia. Its rapid development is shown by the expansion of the internal market for cars and light commercial vehicles. In 1978, there were no more than 1.4 million vehicles but by 2000 there were more than 14 million on Chinese roads. In 1978, only three people in 2000 owned a car, but by 2000 it was about 13 in 1000 (Murtaugh, 2002). China's automobile market has shown the greatest growth rate since its entry into the WTO in 2001. Most automobile multinationals estimate that China will be the second largest auto market in 2008, after the US.
2. Automobile multinationals in general are specialized with high differentiation, compared to other firms in the same industries, which is justified by their advertising budgets for popular brands or top-range products (Table 10.1).
3. The process of producing a vehicle is unimaginably complex. An automobile is not only composed of more than 10 000 parts, but also finished by various processes, such as press, body, paint and general assembly. Furthermore, it

needs advanced technologies to design the different models and to support rapid design changes.

4. ES and MES exist in the automobile industry. Theories of 'large-scale equals strength' play an important role in the automobile industry. In addition, automobile specialists (Fujimoto and Takeishi, 2001) pay attention to the more appropriate concepts like 'economies of scale' (increasing return on scale), the 'Silverstone Curve' (the relationship between the expansion of production scale and the decrease in costs) and the 'Experience Curve' (the relationship between the increase in the cumulative production quantity and the decrease in costs). Generally, the smallest optimum mass production scale for automobile production is said to be about 200 000 to 300 000 cars per platform, and if it is assumed that a company needs five platforms to stabilize its entire business, production of 1 to 1.5 million cars per company is necessary. Attaining an economy of scale to reduce costs is an important strategy for automakers to achieve profit and it is often necessary for a company to take an alliance strategy in order to secure the minimum efficient scale. Furthermore, the historical studies give six profit sources for the competitive position of automobile enterprises: (a) economic scale to reduce unit costs; (b) diversity of product to respond to the variations in demand; (c) higher quality of product compared to competitors; (d) commercial innovation to obtain a monopoly return; (e) flexibility of production to adjust to the variation of demands and (f) permanent cost reductions to preserve a sufficient margin. Among these strategies utilized, only innovation, quality, economic scale and cost reduction criteria are pursued today by automakers, emphasizing the importance of a differentiation strategy and low cost position.

*Table 10.1* Top-10 automotive advertising spenders in 2003 ($1000)

| | *2003* | *2004 H1* |
|---|---|---|
| 1. GM | 2 083 960.5 | 1 129 421.6 |
| 2. DCX | 1 569 230.5 | 826 467.3 |
| 3. Ford | 1 312 148.8 | 636 762.1 |
| 4. Nissan | 961 662.8 | 536 592.4 |
| 5. Toyota | 965 354.2 | 503 160.3 |
| 6. Honda | 672 496.1 | 322 070.4 |
| 7. Hyundai | 486 197.6 | 301 148.0 |
| 8. Volkswagen | 446 293.9 | 192 376.9 |
| 9. Mitsubishi | 272 061.4 | 163 711.6 |
| 10. Mazda | 229 870.4 | 155 644.9 |
| Top-10 total | 8 999 276.2 | 4 767 355.5 |
| Industry total | 9 403 726.6 | 4 982 218.6 |

Excludes online advertising.

*Sources*: TNS Media Intelligence/CMR, Magazine Publishers of America Inc; based on 16 media (Network TV, Cable TV, Spot TV, Syndication TV, Hispanic Network TV, Network Radio, National Spot Radio, Magazines, Sunday Magazines, Local Magazines, B-to-B Magazines, Hispanic Magazines, Newspapers, National Newspapers, Hispanic Newspapers and Outdoor). Cited in WMRC. 2004. US Automakers' Advertising Spending Rises as Branding Battle Heats Up.

The traditional models of determinants of MNE foreign activities relate to cost-seeking, resource-seeking, market-seeking, efficiency-seeking and strategy-seeking (Dunning, 1993). Indeed, the major motivations of multinationals entering China's automobile industry are market-seeking and cost-seeking. By the growth of product volume in broadening the product appeal, differentiation provides MNEs with both cost-seeking and market-seeking outcomes and monopoly returns in creating brand loyalty in China.

Differentiation is of two types. Traced back to Hotelling (1929) concerning the characteristics of customers, differentiation is conceived as horizontal if the population of consumers is homogeneous in terms of willingness to pay (e.g., through having the same levels of income), but heterogeneous when it comes to having different tastes. In the case of vertical (or quality) differentiation, consumers may be heterogeneous in terms of income but homogeneous in terms of preferences or tastes. With regard to product characteristics, horizontal differentiation involves selling products with more characteristics that appeal to the tastes of a particular segment of buyers. In vertical differentiation, products with the same characteristics differ in quality.

In this chapter, vertical differentiation refers to the ability of an MNE operating in the Chinese market to produce different ranks of vehicle (with different prices) for one or more unique brand. Horizontal differentiation reflects the diversity of models (or brands) for the same rank of vehicle (with the same price). However, MNEs' products have to adapt to local demand, which enables MNEs to achieve differentiation and cost advantage in China by increasing local loyalty and market share. Furthermore, the development of a differentiation strategy in adapting to changes in local demand is a necessary condition of success for MNEs in China. Therefore, our contentions for an MNE competitive strategy through differentiation are as follows:

*Contention 1.* With the advantage of more vertical differentiation, automobile MNEs achieve a more competitive position in China.

*Contention 2.* With the advantage of more horizontal differentiation, automobile MNEs achieve a more competitive position in China.

*Contention 3.* The faster the development of differentiation to cater for local demand, the more competitive the position achieved by automobile MNEs in China.

## Research design

We tested our contentions employing a multiple case design, which is most likely to be appropriate for 'how' and 'why' questions (Yin, 1988). These case studies permit us to understand more fully why differentiation is a necessary strategy for automobile multinationals to be successful in China and how MNEs achieve and sustain a competitive position in the Chinese automobile market.

We collected data for this study from interviews, questionnaires and archives. We conducted in-depth interviews in automobile MNEs' joint ventures, with the chairman, vice chairman and marketing, production, strategy managers in joint ventures or in MNEs' representative offices. Each interview and questionnaire,

lasting between two hours and three hours, was conducted in China in two periods: December 2003 and June, July and August 2004.

The description of cases is organized into two sections. The first section provides an overview of strategic context for MNEs in the Chinese automobile industry. The second section presents an MNE's competitive strategy and position analysis, emphasized by the horizontal and vertical differentiation strategy in Sino–foreign joint ventures. Our examples are three American, European and Japanese automobile manufacturers: General Motors, Volkswagen and Toyota, respectively (Table 10.2).

## Case study of automobile MNE's differentiation strategy in China

The success of a competitive strategy depends on the attractiveness of the industry in which the firm competes and on the firm's relative position in that industry (Porter, 1980). Therefore, before analysing an automobile MNE's competitive strategy in the Chinese market, we will outline the automobile industry, emphasizing its context for firm strategy and rivalry.

The context for strategy and rivalry relates firstly to the policy of the automotive industry. The Chinese government declared the automotive industry a 'pillar' industry in 1985, targeted for financial and developmental assistance. The automobile industry is the first among Chinese industries to be backed by a formal state industrial policy. This policy was first formulated in 1987 and modified in 1994 with emphasis on three points: to shift the product mix of the industry from commercial vehicles to passenger cars; to boost economies of scale by restructuring the industry from a situation of fragmentation and miniaturization towards concentration and to seek technology transfer by inviting the participation of foreign companies (Xinhua News Agency, 2004). However, operational practices involve a series of measures designed to limit foreign investment. The most important obstacles are high tariff and non-tariff barriers, foreign investment limits and local content requirements.

China's WTO membership (at the end of 2001) favours the liberalization of trade and the establishment of foreign corporations in terms of customs rights, property rights, distribution, finance and so on. Tariffs for automobiles will be reduced to 25 per cent by 2006 from about 50 per cent in 2001 (Feenstra *et al.*, 2001). With China's WTO accession, foreign-invested companies may currently distribute all the products they have manufactured in China in the domestic market. Within one year, they will be able to distribute both domestic and foreign products. However, the form of investment for automakers remains the major limitation. Automobile assembly firms have to enter China in cooperation with local partners and foreigners are limited to a maximum 50 per cent shareholding, although there will be the possibility for foreigners to constitute a majority in joint ventures for engine construction.

FDI inflows in the Chinese automotive industry started to accelerate sharply with the expansion of the joint venture from 1992. There were about 20 joint

*Table 10.2* General characteristic of JVs of automobile MNEs in China

| *Characteristic* | *General Motors* | | | | *Volkswagen* | | *Toyota* | | |
|---|---|---|---|---|---|---|---|---|---|
| *Principal JVs* | *Shanghai GM* | *Jinbei GM* | *Dongyue GM* | *Wuling GM* | *Shanghai VW* | *FAW VW* | *Sichuan Toyota* | *FAW Toyota* | *Dongfeng Toyota* |
| Formation F1 | 1997 | 2001 | 2002 | 2002 | 1984 | 1991 | 1998 | 2002 | 2004 |
| Product segment | CAR | LCV S1 | CAR | LCV | CAR | CAR | LCV HCV S2 | CAR LCV | CAR |
| Equity share | 50:50 | 50:50 | 50:50 | 34:66 E1 | 50:50 | 50:50 | 45:55 E2 | 50:50 | 50:50 |
| Local partner | SAIC P1 | Jinbei Auto | SAIC | SAIC Wuling Auto | SAIC | FAW P2 | Sichuan Auto (FAW) | FAW | Dongfeng Auto |
| Location | Shanghai | Shenyang L1 | Yantai L2 | Luizhou L3 | Shanghai | Changchun L4 | Chongdu L5 | Tianjin Shenyang | Guangzhou L6 |
| Market share 2000 | 8% | | | | 50% | | 7% | | |
| MS 2003 | 9.8% | | | | 38% | | 8% | | |

F1: date of formation or of launching the production.
S1. LCV: Light Commercial Vehicle, S2. HCV: Heavy Commercial Vehicle.
P1. SAIC: Shanghai Automobile Industrial Corporation, P2: FAW: First Automobile Work.
E1: 34% for GM, 66% for Chinese partners (50.1% for SAIC, 15.9% for Wuling Auto). E2: 45% for Toyota, 55% for Sichuan Auto.
L1: Shenyang in Liaoning province (northeastern China), L2:Yantai in Shangdong province (northeastern China), L3: Luizhou in Guangxi province (southwestern China), L4: Changchun in Jilin province (northeastern China), L5 Chongdu in Sichuan province (southwestern China).

*Source*s: interviews, company reports and China auto news.

*Table 10.3* World motor vehicle productions by manufacturers in 2003

| *Manufacturers* | *Total vehicles* | *Passenger cars* | *Commercial vehicles* | *Heavy trucks* | *Coaches and buses* |
|---|---|---|---|---|---|
| 1 General Motors (Opel-Vauxhall) | 8 185 997 | 4 682 656 | 3 479 713 | 23 628 | — |
| 2 Ford (Jaguar–Volvo Cars) | 6 566 089 | 3 320 706 | 3 189 662 | 55 721 | — |
| 3 Toyota | 6 240 526 | 5 369 176 | 638 748 | 232 602 | — |
| 4 Volkswagen group | 5 024 032 | 4 843 085 | 158 856 | 15 819 | 6272 |
| 5 Daimler-Chrysler (with Evobus) | 4 231 603 | 1 819 973 | 2 149 526 | 228 461 | 33 643 |
| 6 PSA Peutgeot Citroën | 3 310 368 | 2 934 641 | 375 727 | — | — |
| 7 Nissan | 2 942 306 | 2 363 155 | 448 849 | 130 302 | — |
| 8 Honda | 2 922 526 | 2 868 705 | 53 821 | — | — |
| 9 Hyundai-Kai | 2 697 435 | 2 275 535 | 92 504 | 144 809 | 184 587 |
| 10 Renault-Dacia-Samsung | 2 386 098 | 2 110 557 | 275 541 | — | — |

*Source*: OICA Statistics Committee 2004.

ventures up to the end of 1989, but they accumulated to 120 in 1993 and skyrocketed to 604 in 1998 with an accumulated investment of 21 billion dollars, accounting for 9 per cent of China's total FDI stock during this period (according to Ministry of Foreign Trade and Economic Cooperation data). Since the first ten world original equipment manufacturers were set up in China (Table 10.3), the automotive market is considered increasingly competitive worldwide.

As a pioneering foreign carmaker in China, Volkswagen was the colossus of China's car scene for years. Since the start of production in its Shanghai joint venture in 1985, Volkswagen has been the lead carmaker in China's automobile market. Together with its second joint venture with FAW, the company represented more than 50 per cent of the market share in China for almost 15 years (Figure 10.1). Another pioneer in China's automobile market is the PSA Group, with its joint venture, Dongfent Citroën, which handled about 5 per cent of market share in 1997, 7.5 per cent in 2000 and 6.7 per cent in 2002 (WMRC data 2002).

However, the leadership position of Volkswagen in China is seriously threatened by new entrants and developments of other foreign and national carmakers owing to the explosion of vehicle demand in China since 2001. The passenger car market in China continued to expand in 2002, with a 42.8 per cent increase to 0.5 million units sold (WMRC data 2002). The rapid expansion of China's automobile market has attracted global automobile manufacturers, such as GM, Toyota, Honda and Suzuki (Table 10.4), challenging the dominance of Volkswagen in the car market. Moreover, independent Chinese carmakers, such as SAIC-Cherry and Geely, have meanwhile emerged as significant players by adopting aggressive pricing strategies in the fast-growing economy-car segment.

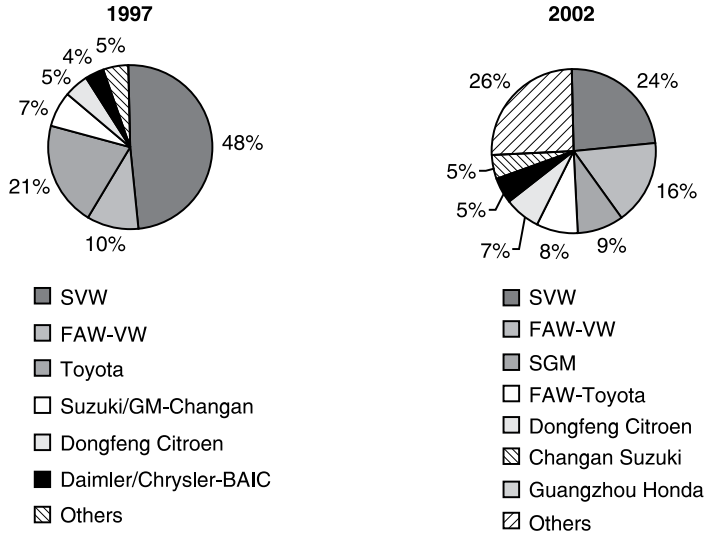


*Figure 10.1* Market share of passenger cars* in China in 1997* and in 2002 (*including imported cars).

*Source*: Company reports and Chinese auto news 1997–2003.

*Table 10.4* Ten top passenger car manufacturers in China in 2002

| *Manufacturer* | *Sales (unit) (Growth rate to 2001)* | *Market share (Ratio of 2002/2001)* |
|---|---|---|
| Shanghai Volkswagen | 301 095 (24.9) | 23.8 (–6.6) |
| FAW-Volkswagen | 207 858 (66.4) | 16.4 (0.6) |
| Shanghai GM | 110 763 (89.9) | 8.8 (1.4) |
| FAW-Toyota | 95 433 (35.7) | 7.5 (–1.3) |
| Dongfeng Citroen | 85 088 (60.0) | 6.7 (0) |
| Changan Suzuki | 65 018 (50.9) | 5.1 (–0.3) |
| Guangzhou Honda | 59 151 (15.9) | 4.7 (–1.7) |
| Cherry | 50 155 (73.8) | 4.0 (0.3) |
| Geely | 45 972 (97.0) | 3.6 (0.7) |
| Fengshen Auto | 41 060 (133.0) | 3.2 (1.0) |
| Passenger cars in total | 1 265 050 (59.6) | |

*Sources*: China auto news, Japan Economic Journal. 2003. cited in Lee and Fujimoto, 2003, The Chinese automobile industry and the strategic alliances of China, Japan and US Firms, IMVP working paper.

### *Case study 1: Competitive strategy of General Motors in China*

General Motors (GM), as the world's number one car and truck manufacturer, produced 8.3 million vehicle units and achieved $186.8 billion revenue in 2002, with a global market share of 15 per cent. Founded in 1908 and incorporated in 1916,

*Table 10.5* Annual sales of GM and its joint venture brands in China

| *Marks* | | *1999* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|
| **Buick** | CAR | 19 826 | 30 543 | 58 328 | 110 763 | 201 188 |
| **Chevrolet** | CAR | 0 | 0 | 0 | 0 | 213 |
| | LCV | 0 | 0 | 2900 | 3190 | 3285 |
| **Opel** | CAR | 517 | 1175 | 1890 | 2462 | 2508 |
| **Wuling** | LCV | 84 212 | 111 968 | 120 143 | 146 658 | 179 975 |
| **Daewoo** | CAR | 38 | 43 | 2551 | 2814 | 2647 |
| **Isuzu** | LCV | 1313 | 331 | 248 | 225 | 566 |
| | HCV | 259 | 129 | 708 | 937 | 1003 |

Sales include imported vehicle sales.
LCV: Light Commercial Vehicle, HCV: Heavy Commercial Vehicle.

*Source*: WMRC database 1999–2004.

GM manufactures cars in Detroit, Michigan. It has been the global automotive sales leader since 1931.

The company boasts a strong brand portfolio, which covers all ends of the market. GM cars and trucks are sold under the following brands: Chevrolet, Pontiac, Buick, Oldsmobile, Cadillac, GMC, Saturn, Hummer, Saab, Opel, Vauxhall and Holden. In addition, GM also operates one of the largest and most successful financial services companies, GMAC, which offers automotive, mortgage and business financing and insurance services to customers worldwide.

The company has manufacturing facilities in over 30 countries, with more than 260 subsidiaries and 325 000 employees in more than 200 countries. As a global company it is able to enjoy all of the benefits that come with size, such as economies of scale, with risk of failure being spread over several product and geographical markets. GM possesses strong links to the Asian market. It has a 42 per cent stake in Daewoo Motors, 20 per cent in Suzuki Motors, and 12 per cent in Isuzu Motors (GM, 2003). These partnerships give General Motors a valuable link to the growth market of Asia.

The General Motors–China relationship dates back more than eight decades. Today, GM operates six joint ventures and two wholly owned foreign enterprises, with about 10 000 employees in China. GM has participated in an investment of over $2 billion in China, boasting a combined manufacturing capacity of 530 000 vehicles, which are sold under the Buick, Chevrolet, Opel, Daewoo and Wuling nameplates (Table 10.5). GM and its joint ventures offer the widest portfolio of products among foreign manufacturers in China.

### *General Motors principal joint ventures in China*

#### SHANGHAI GENERAL MOTORS

Formed in 1997, Shanghai General Motors (SGM) is a 50–50 joint venture with Shanghai Automotive Industry Corporation (SAIC) in Shanghai. SAIC, one of the

world's top 500 firms, is China's third largest auto group and largest saloon manufacturer. With GM's $1.5 billion investment, SGM is the largest Sino–US partnership in China.

Manufacturing at SGM is powered by world-class technology and world-class facilities. Five shops (general assembly, powertrain, press, body and paint) are situated in a 240 000 square metre state-of-the-art plant, which is the most advanced of its kind in China. SGM has adopted advanced industry processes such as flexible tooling and lean manufacturing. This allows it to build several distinct models on a single production line. The company manufactures vehicles, including the popular Buick saloon, engines and transmissions. SGM sold 201 188 vehicles in 2003. This was an 81.6 per cent increase over the previous year. Its share of China's passenger car market grew to nearly 9.8 per cent, placing SGM among the top three passenger car manufacturers in China, after Shanghai Volkswagen and FAW-Volkswagen (WMRC data 2003).

### GOLDEN CUP GM

Golden Cup GM Automotive Company Limited (Jinbei GM) is a $230 million 50–50 truck-making joint venture between GM and its Shenyang Brilliance Chinese partner, located in Shenyang (Liaoning province) in northeastern China. The joint venture began regular production in 2001 for two of GM's most popular trucks: the Chevrolet Blazer and the Chevrolet S-10 crew cab pickup. It was to add a Sport-Utility Vehicle (SUV) version of the Blazer in 2003. It sold 3285 vehicles in 2003 for about seven configurations of the Chevrolet Blazer SUV for the domestic market.

Jinbei GM is being restructured to ensure its sustained growth with a new shareholder structure in 2004. SGM now holds a 50 per cent stake and oversees management (GM China and SAIC each hold a 25 per cent stake in the facility). The new joint venture will have an annual manufacturing capacity of 30 000 vehicles during the first phase of production and a capacity of 50 000 units during the second phase of production.

### SGM DONGYUE

Shanghai GM Dong Yue Automotive Powertrain Company Limited is a $108 million joint venture, founded in December 2002, located in Yantai (Shandong province) in northeastern China. SGM holds a 50 per cent stake and oversees management (GM China and SAIC each hold a 25 per cent stake in the facility). The joint venture was the former Shandong Daewoo Automotive Engine Company Limited, which began production in 1996. The facility will have an annual manufacturing capacity of 300 000 engines. It will provide engines for vehicles manufactured in China by GM and SAIC's joint ventures. It began production of the Buick Sail in 2003, concentrating on developing models to diversify into the mini-car or low-end, mid-range sedan segments. The plant has a two-shift annual designed production capacity of 100 000 units. Furthermore, SGM began to produce Daewoo Lanlong's small car in the Yantai plant in 2004.

SAIC-GM-WULING

SAIC-GM-Wuling Automobile Company Limited (SAIC-GM-Wuling) is a $99.6 million joint venture that was launched in June 2002. GM China holds a 34 per cent stake, while SAIC holds 50.1 per cent and Wuling Automotive holds 15.9 per cent. The joint venture is situated in Liuzhou (Guangxi Zhuang Autonomous Region) in western China. It manufactures a range of mini-trucks and minivans. SAIC-GM-Wuling began production of its first new vehicle, the Wuling Sunshine mini-van, at the end of 2002. SAIC-GM-Wuling is capable of producing up to 180 000 vehicles per year. The van shares the same platform as GM's Opel S4200.

As one of the four largest mini-vehicle producers in China, SAIC-GM-Wuling sold more than 146 700 vehicles in 2002. All of its products, competitively priced between RMB 23 000 ($2800) and RMB 80 000 ($9600), meet Euro I emission standards. Most also meet Euro II standards. SAIC-GM-Wuling operates an extensive network of over 400 retailers in 29 provinces and municipalities and over 400 aftersales service centres nationwide.

GM-SAIC-DAEWOO-SUZUKI

In China, GM has also taken a 42 per cent capital share of Korean Daewoo, alongside Daewoo (33 per cent), Suzuki (15 per cent) and SAIC (10 per cent). The new company named GM Daewoo Automobile Technology is developed by GM/Suzuki and produced by GM Daewoo and SAIC. SAIC will invest $6 million and become a large shareholder of GM Daewoo (Lee *et al.*, 2003). It is the first case of a Chinese automobile firm investing in foreign firms.

GM ISUZU

A GM Isuzu joint venture Qingling (Chongqing Isuzu Auto) located in Chongqing (Sichuan province) in western China, has produce heavy-duty diesel trucks since 2003. The capacity of this joint venture will achieve 10 000 units per year.

SAIC signed a partnership agreement in November 2002 with Isuzu and GM to co-operate within China's heavy-truck market and a joint venture was formed in 2003, SAIC and GM holding a combined 40 per cent stake and Isuzu a further 20 per cent stake. Annual production was aimed at 10 000 trucks from 2004 and was targeted to rise to 20 000–30 000 units in 2005. The operation was to utilize existing facilities in Shanghai, with the key components imported from Japan and the local content gradually being raised for cost competitiveness.

### *Differentiation strategy*

GM carries out a full line strategy in China, from the passenger car to the commercial car and truck, from the small, low-priced popular car (Wuling, Chevrolet) to the middle- and high-priced car (Buick, Opel) and to the luxury car (Cadillac, Saab) by establishing joint ventures, merging existing companies and increasing the number of supply sites (Table 10.6).

*Table 10.6* Prices of GM's brands in China at the end of 2004

| | | *Price (1000 RMB)* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Brand* | *Model* | *1–50* | *50–100* | *100–200* | *200–300* | *300–400* | *400–500* | *Above 500* |
| Cadillac | CTS | | | | | | | • |
| | SRX | | | | | | | • |
| | XLR | | | | | | | • |
| Saab | 9-5 Arc | | | | | | | • |
| | 9-5 Aero | | | | | | | • |
| Opel | CD1.6 | | | | • | | | |
| | CD 1.8 | | | | | | | |
| | Elegance2.2 | | | | | • | | |
| | C Elegance | | | | | | • | |
| | NJOY | | | • | | | | |
| | Step III | | | • | | | | |
| Buick | Royaum | | | | | • | | |
| | Regal | | | | • | | | |
| | GL8 | | | | • | • | | |
| | Execlle | | | • | | | | |
| | HRV | | | • | | | | |
| | Sail | | • | • | | | | |
| | Sail SRV | | • | • | | | | |
| Chevrolet | Blazer | | | • | • | | | |
| | Spark | | • | | | | | |
| Wuling | | • | • | | | | | |

$1 = RMB 8.27.

*Source*: China Auto Market 2004 and GM 2004.

## *Vertical differentiation*

### BUICK BRAND

GM has achieved a vertical differentiation strategy in China thanks to its Buick brand. The Buick possesses different models from lower medium to high-class vehicles (Table 10.6), which is very much in demand in China with around 100 per cent growth every year from its launch in 1999 to 2003.

GM has introduced new products in its Shanghai joint venture every year. SGM began regular production of three models of midsize luxury sedans in 1999: the Buick New Century, Buick GLX and Buick GL. In 2000, SGM launched the driver-oriented Buick GS sedan and the first executive wagon made in China, the Buick GL8. A sedan with a smaller engine, the Buick G, was added to the portfolio and the Buick Sail, Shanghai GM's first small car, came off the production line in the same year, the low-cost Sail catering specifically to the needs of Chinese customers. In 2001, SGM began exporting the GL8-based Chevrolet Venture to the Philippines, and introduced the Buick S-RV recreational vehicle. GM has

revamped its mid-size sedan for the booming China market, launching the Buick Regal car at the end of 2002. Priced at RMB 338 000 to 369 000 ($40 830–44 580), the top-of-the-line Regal comes with a 2.98-litre engine and electronically controlled four-speed automatic transmission. It is the first vehicle built in China by an original equipment manufacturer to include a DVD entertainment system. In 2003, Shanghai GM unveiled its first lower-medium sedan: the Buick Excelle at Auto Show Shanghai 2003. SGM produced a new model 'J200', a model that competes with Volkswagen's Santana and Citroen ZX, which will succeed the mid-sized 'Nubira', jointly produced with Korea Daewoo. The new car was procured through the existing Chinese production sites such as Delphi and will sell through Shanghai Auto's sales network. GM intended to release a new small car priced below $12 000 in 2003 in order to capitalize on increasing demand in the economy car segment. It released the 2.5-litre Buick Regal in China in January 2003. SGM invested over $242 million in July 2003 in order to boost its annual production capacity to 400 000 units by 2007.

### CHEVROLET BRAND

Chevrolet is a lower-medium brand of GM, which has been offered from Jinbei GM to suit the needs of a variety of users in urban and rural areas of China, through three models of the Blazer and one model of the S-10 crew cab pickup. Today, seven configurations of the Chevrolet Blazer SUV for the domestic market are produced. Jinbei GM's products are aimed at those who are looking for a dependable and versatile vehicle that can carry cargo and people.

Furthermore, SGM-Wuling is going to invest RMB2 billion over the coming ten years, developing and producing commercial cars, mainly small-sized wagons targeting rural areas. In 2004, GM introduced its first Chevrolet car in its Wuling joint venture, which is priced slightly under local rival Volkswagen's Gol at around $7466.

### HYBRID CAR

GM is seeking the Chinese government's support in promoting the use of fuel-cell cars by petitioning the government on the setting up of hydrogen filling stations in order to promote the use of fuel-cell cars, according to WMRC. By developing fuel-cell car use China will be able to reduce its dependence on oil, the imports of which have begun to rise as gasoline car demand has taken off over the past two years. With China now developing the fuelling infrastructure needed for a mature car market, GM sees an ideal opportunity to pioneer the use of hydrogen fuel-cell cars. GM is scheduled to release its first commercially viable fuel-cell cars by 2010.

GM is considering launching a hybrid SUV in China, according to the *Detroit News.* The hybrid SUV would be assembled in its Shanghai joint venture, using technology developed by GM's Japanese affiliates, Suzuki and Fuji Heavy Industries. There is strong potential for low-emission hybrid vehicles in China as the boom in car demand has caused a major increase in air pollution. GM's rival

Toyota is reportedly awaiting government regulations to enable the launch of its Prius hybrid car in China.

*Horizontal differentiation*

GM has done an outstanding job of reading and responding to the market. GM has fixed its production in middle-class vehicles between RMB100 000 and RMB300 000, through its famous Buick, Opel and Chevrolet brands: eight major models for Buick, four major models for Opel and two major models for Chevrolet (Table 10.6). In fact, the demand for medium-priced cars ($15 000–$32 000) comprised 43.2 per cent of market share in China in 2003, increasing 95 per cent from 2002 (WMRC, 2004).

In addition, GM is targeting the expanding luxury car market with the launch of the Cadillac, a top-of-the-line brand, as part of its bid to take market leadership from Volkswagen in China. GM is to begin selling its first locally built Cadillac in China in early 2005, according to Reuters. The automaker is to begin selling its imported CTS Cadillac in September 2004 and an SRX SUV is expected to be launched by the end of 2004. Both models will be made at SGM. Initial assembly will be dependent on semi-knocked-down kits imported from the US. The US automaker expects China to account for a fifth of its global luxury brand sales in 2005.

The differentiation strategy of GM is promoted by its R&D in America and in China. Pan Asia Technical Automotive Centre Company Limited (PATAC), located in Pudong district Shanghai, was jointly established by GM and SAIC (50–50) with a registered capital of $50 million in 1997. It is the first independent domestic automotive technical and design centre. It provides automotive engineering services including design, development, testing and validation of components and vehicles. Among its achievements is the re-engineering of the Buick Regal, Buick Excelle and other products for SGM. In addition, PATAC's emission test laboratory is one of the 10 emission-test centres authorized by the State Environmental Protection Administration and is the only new vehicle emission test centre in southern China. China's first Concept Car 'Qilin' was revealed to the world in PATAC in 1999, signifying a major achievement of China's auto design industry. In the same year, PATAC was entrusted to undertake the localization of and launch support project for the SGM 'Sail'. The original proven world car was successfully upgraded to cater to Chinese customers' styling, performance, durability and comfort requirements.

***Case study 2: Competitive strategy of Volkswagen in China***

In the 1930s, Dr Ferdinand Porsche began a car company known as Volkswagen in Germany. Following a series of acquisitions and rapid expansion in South America and China in the 1980s and 1990s, the company is now among the top four global vehicle groups, alongside General Motors, Toyota and Ford.

Volkswagen produces passenger and commercial vehicles with four major volume brands: Volkswagen, Audi, SEAT, Skoda, and a number of low-volume

*Table 10.7* Annual sales of the Volkswagen Group brands in China

| *Makes* | | *1999* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|
| **Audi** | CAR | 11 863 | 16 534 | 31 771 | 37 549 | 62 501 |
| **SEAT** | CAR | 9 | 9 | 9 | 9 | 14 |
| **Skoda** | CAR | 299 | 345 | 364 | 364 | 421 |
| **Volkswagen** | CAR | 307 704 | 317 505 | 330 112 | 473 833 | 632 737 |

Sales include imported vehicle sales.

*Source*: WMRC database. 1999–2004.

luxury marques: Bentley, Bugatti and Lamborghini. The Golf is a marque which has been the company's best-selling vehicle for more than 20 years. Since 2002, the group has been organized into two brand groups: the Classic (Volkswagen) brand including the Volkswagen passenger cars, Skoda, Bentley and Bugatti, and the Sports (Audi) brand including Audi, SEAT and Lamborghini (Volkswagen, 2003).

The group's strong dependence on Europe is clear from its sales and production, however its next steps have to be to increase sales volumes outside Europe. China and South America are clearly the main markets in terms of volume potential.

Volkswagen is the lead carmaker in China's automobile market, with over 16 000 employees. It sold over 2.7 million vehicles from 1985 to 2002 through its two famous joint ventures. Volkswagen earned $630 million in China in 2003 with 632 737 cars sold (Table 10.7), and is expected to generate more than $700 million in 2004.

### *Volkswagen's principal joint ventures and its products*

#### SHANGHAI VOLKSWAGEN

Shanghai Volkswagen Automotive Company, a 50–50 venture between Volkswagen and the number one domestic carmaker Shanghai Automotive Industry Corporation (SAIC), handles the famous Volkswagen passenger car models Santana, Passat and Polo. Shanghai Volkswagen took 20 per cent (26 per cent for 2002) of the market share in China as its sales rose by over 30 per cent to 396 023 units in 2003. It is expected to make 700 000 cars annually by 2007.

#### FAW–VOLKSWAGEN

FAW–Volkswagen, a 50–50 venture between Volkswagen and China's leading First Auto Works (FAW), was founded in Changchun (Jilin province) in north-eastern China in 1991. It makes the Audi, Bora and Jetta models, and the annual production was 300 000 at the end of 2003. It sold 200 000 cars in the country by the end of 2002, growing 70 per cent annually. With that sales volume, the FAW–Volkswagen has captured 18 per cent of China's car market share.

With its two Chinese auto-making ventures in Shanghai and in Changchun, the German car giant's sales volume leapt half a million units in 2003, resulting in the Chinese market becoming its second biggest market in the world after Germany. It is attempting to defend its top market share in China with an annual sales volume growth from 600 000 to achieve one million in 2007.

### *Differentiation strategy*

As the biggest carmaker in China, Volkswagen has built the full-line system in its two joint ventures, producing vehicles from low-priced compact and middle-sized passenger cars to luxury cars. The differentiation strategy of Volkswagen in China is realized by its popular, conservative and luxury, progressive brands: Volkswagen and Audi.

### *Vertical differentiation*

#### TWO BRANDS: VOLKSWAGEN AND AUDI

Volkswagen's success in China is due to the local development of its family (Volkswagen) and luxury (Audi) brands.

In its local family segment, the Santana was a product revolution for China in 1985, as was the Jetta some years later and today the Passat, the Bora and the Polo represent the latest technology. The successful establishment of Volkswagen brand loyalty, to include the Jetta, promises a smooth ride for the company to support sales activities on a large scale. The constant and overwhelming loyalty towards Volkswagen's older models and the excitement about the latest products prove the company right and confirm its strategy. Concerning the luxury brand, a longer version of the Audi A6 has been produced since September 1999. Volkswagen's luxury car unit Audi is planning to invest $651 million in China over the next three years to expand production capacity, launch new models and build up sales networks. Audi leads the luxury car market in China through its best-selling A6 model. The carmaker launched the A4 in China in April 2003. Audi is aiming to maintain its leadership in the Chinese luxury car market and fend off the challenge from BMW, which was expected to begin local production in 2004.

### *Evolution of Volkswagen and Audi*

For the first 10 years of Shanghai Volkswagen in China, it produced only one model, the Santana, because of the weak competition. In 1995, the more modern Santana 2000 was launched. With two other models, the Jetta and Audi models of FAW-Volkswagen, Volkswagen held more than half the market share in China. As foreign entrants began to plunge in at the end of the millennium, Volkswagen launched production of Passat at the Shanghai plant. The product offensive started back in 1999 and 2000 when the Audi A6 and the Passat were introduced,

respectively, in the premium and upper medium market segments. Today, with competitive pressure on all sides, Volkswagen plans one or two new models every year, all of them to appear on the market within months of their European and American launches. Volkswagen now produces the Polo, Santana, Santana 3000, Passat, Gol and Tuaran (MPV) in Shanghai, and the Jetta, Bora, Audi A4, A6 and Golf in Changchun. The Gol costs considerably less than RMB100 000 ($12 500). This car is aimed at first-time private buyers, the most rapidly expanding market segment in China. The Polo hatchback will further strengthen the position of the suc-cessful range of products introduced to China in April 2002. Furthermore, the Polo was the first model the production of which started in China almost at the same time as its worldwide market launch. In addition, Volkswagen will make specifically for China a three-box version of the new Polo at its Shanghai plant, and a two-door version of the Brazilian Gol is also being produced there for the local market. The Bora will also be made in Changchun as the group seeks to build on its local strength. The group is determined to offer the complete Volkswagen, Audi and Skoda range in China in the coming years, and these vehicle models have boosted Volkswagen's positive development in China.

However, Volkswagen's market lead over General Motors has crumbled over H1 of 2004, seeing its market share fall below its watershed 30 per cent level in the first five months of 2004 to 24.8 per cent, following the disappointing reception of the Polo. In order to maintain its market share, Volkswagen intends to expand its light commercial vehicle, motor and component production in China by the production of its Multivan and Caravelle light trucks, along with four-cylinder engines. The automaker has also invested 149.5 million euros ($184.7 m) in a new company, named Volkswagen FAW Platform, to produce chassis components for its Caddy, Bora and Touran models by the end of 2005.

### *Horizontal differentiation*

Volkswagen's horizontal differentiation in China is focused in lower medium and high-class vehicles through its Volkswagen and Audi brands (Table 10.8).

There are 11 major models of the Volkswagen brand for popular lower medium priced cars and four major models of Audi for luxury cars. In particular, there are many colour choices for every model. For example, there are eight colours for Santana and Santana 3000, 11 colours for Polo 2-box, 10 colours for Touran. Furthermore, every major model possesses several variations: there are 12 models of the Audi A6 and 13 of the Polo.

In order to develop its production differentiation in China, Volkswagen founded an R&D centre in 1997, with its own test area in Shanghai. It has brought considerable improvements to car techniques: new engines, automatic transmission, and ABS have been adapted to the model range.

Volkswagen's assessment highlighted the company's strategy of reducing fuel consumption and its innovative working time models. Moreover, both Volkswagen's environmental and risk management were rated as global leaders. Volkswagen is the

*Table 10.8* Prices of Volkswagen brands in China at end of 2004

| | | *Price (1000 RMB)* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Brand* | *Model* | *1–50* | *50–100* | *100–200* | *200–300* | *300–400* | *400–500* | *Above 500* |
| Audi | A6 | | | | | • | • | • |
| | A4 | | | | | • | • | • |
| VW | Passat | | | | • | | | |
| | Polo 2 box | | | • | | | | |
| | Polo 3 box | | | • | | | | |
| | Santana 1.8L | | • | | | | | |
| | Santana 3000 1.8L | | | • | | | | |
| | Touran | | | • | | | | |
| | Bora | | | • | | | | |
| | Jetta | | • | • | | | | |
| | Golf | | | • | | | | |
| | Gol 2 door | | • | | | | | |
| | Gol 4 door | | • | | | | | |

*Source*: China Auto Market 2004 and Volkswagen 2004.

world's only carmaker to put a 3-litre vehicle into series production (3 litres of diesel fuel per 100 km) and is the first to publicly present a '1-litre car'.

### *Case study 3: Competitive strategy of Toyota in China*

Toyota is the second ranked global carmaker and the third automobile manufacturer, with over 6.7 million units sold in 2003 and an estimated 10 per cent share of the world light vehicle market. Founded in 1937 by Kiichiro Toyoda, Toyota became the first licensed Japanese motor vehicle manufacturing company during the Second World War. In the 1960s, Toyota turned out cheap, dependable cars using *just in time* and *total quality control* systems. Toyota has two main brands: Toyota and Lexus.

Its main platforms such as Vitz, Corolla, Avensis and Camry differentiate about 20 models across the world. Its core products are compact passenger cars, small vans and wagons, commercial vans and compact trucks.

Toyota operates 56 plants in 25 countries and employs 20 000 people worldwide. Toyota holds a 51 per cent controlling stake in Daihatsu, 36.6 per cent in Hino (truck maker), and 5 per cent in Yamaha (engine manufacturer). It also has stakes in suppliers such as Aichi Steel (25 per cent), Denso (25 per cent), and Kanto Auto (49 per cent) (Toyota, 2003).

Toyota's involvement with China began in 1964 with the export of the Crown sedan. Since then, Toyota has been steadily building its base in line with its business philosophy of increasing local production as well as sales and service to develop

*Table 10.9* Annual sales of the Toyota brands in China

| *Marks* | | *1999* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|
| **Toyota** | CAR | 945 | 2825 | 3227 | 20 552 | 76 382 |
| | LCV | 3332 | 6533 | 8102 | 27 236 | 26 758 |
| | HCV | 468 | 829 | 2083 | 3105 | 2862 |
| **Lexus** | CAR | 843 | 815 | 1126 | 1680 | 3746 |
| **Daihatsu** | CAR | 9 | 7 | 0 | 0 | 10 865 |
| | LCV | | | | | 713 |

Sales include imported vehicle sales.

*Source*: WMRC database, 1999–2004.

alongside local industry. Toyota established mechanic training centres to develop China's automobile and auto parts industries in Shanghai, Beijing, Guangzhou, Shenyang and Tianjin in the 1980s. In October 2002, the first Toyota branded passenger car rolled off the line at Toyota's joint venture factory in Tianjin. Currently, the Toyota group operates in three principal auto-making joint ventures with its Toyota, Lexus and Daihatsu brands in China (Table 10.9), as well as in several component supplier joint ventures in China.

### *Toyota's principal joint ventures in China*

#### FAW–TOYOTA

Toyota entered into an alliance in 2002 with China's First Automotive Works (FAW), which had manufactured jointly with German automaker Volkswagen in Changchun. The Japanese automaker has a 50 per cent stake in Tianjin Xiali with an investment of approximately $100 million in 2000. Tianjin Xiali joined the FAW group in June 2002. Toyota FAW Tianjin Xiali began production of the Vios and assembled versions of the Yaris in late 2002. The minivehicles (under the Daihatsu brand) were to be produced with an initial annual output of 100 000 vehicles at Tianjin Automotive Group factory from 2003. Toyota will also build a second plant in Tianjin to begin production of the luxury Crown sedan in mid-2005, with initial annual output of 50 000 cars. The medium- and large-class luxury SUV were made in mid-2003 at the existing FAW site in Changchun, with an initial annual output of 10 000 to 20 000 units. FAW–Toyota joint venture plans to make 300 000 to 400 000 compacts, luxury sedans and SUV annually in China by 2010.

#### SICHUAN–TOYOTA

The Sichuan Toyota joint venture was founded at the end of 1998 between Toyota and Sichuan Luxing Automobile Company in western China, manufacturing the Toyota Coaster Bus. Sichuan Luxing was merged into FAW in August 2002. FAW

has an 80 per cent stake in the joint venture, Chengdu FAW, which is to produce medium, light-duty buses, multi-purpose vehicles and replacement components. New Sichuan Toyota joint venture is 45 per cent owned by Toyota and 50 per cent owned by Chengdu FAW. Toyota builds a variant of the Land Cruiser SUV with local partner Chengdu FAW Auto, aiming for an annual output of 1000 to 2000 units.

#### GUANGZHOU–TOYOTA

In 2004 Toyota launched its third vehicle production alliance, a 50:50 RMB1.3 billion ($157 m) joint venture, in Guangzhou with local partner Guangzhou Automobile which has a joint venture with Toyota rival Honda Motor. Annual production capacity is targeted at 100 000 units in 2006 with the investment slated at RMB3.8 billion and with 1400 employees. The joint venture is to carry out production of the 2.0- and 2.4-litre Camry mid-sized sedans, fitted with AZ engines made by the Guangzhou–Toyota joint venture, Guangqi Toyota Engine, in the same city.

### *Vertical differentiation*

#### TOYOTA BRAND

Toyota possesses a strong brand loyalty through its products exported to China, such as the luxury sedan, Crown. It will progress in its local brand establishment, centring its efforts on three types of vehicles with four models: medium/large-class luxury sedans (Crown), small passenger cars (Corolla, being positioned in response to the rapidly expanding Chinese market) and medium/large-class luxury SUVs (Land Cruiser and Land Cruiser Prado) (Table 10.10).

#### THE PRIUS CAR

Toyota has a competitive edge in anticipating and responding quickly to demand through research and development on issues of concern to its customers (safety, the environment and energy conservation). Prius cars, the world's first hybrid petrol–electrical vehicles, can be mass-produced for the ecologically concerned market segment. The Prius uses an electric motor, gets 66 miles to the gallon, and produces only half the normal amount of carbon dioxide.

Toyota is eager to launch the low-emission Prius in China because the potential for demand is strong amidst the country's expanding middle class and increasing traffic congestion. Indeed, the Chinese government is placing an ever greater priority on cleaning up vehicle emissions and improving fuel consumption, increasing the potential market for fuel-efficient, low-emission hybrid cars. Toyota has announced plans to begin assembly in China of its Prius hybrid sedan with local partner FAW in 2005. Toyota has also agreed to cooperate with its Chinese partner on the possible future joint production of FAW-brand hybrid vehicles.

*Table 10.10* Prices of Toyota's brands in China at the end of 2004

| | | *Price (1000 RMB)* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Brand* | *Model* | *1–50* | *50–100* | *100–200* | *200–300* | *300–400* | *400–500* | *Above 500* |
| Toyota | Crown | | | | | • | • | |
| | Camry SE | | | • | | | | |
| | Camry SE Sport | | | | • | | | |
| | Camry SLE | | | | • | | | |
| | Corola CE | | | • | | | | |
| | Corola LE | | | • | | | | |
| | Corola S | | | • | | | | |
| | Corola XRS | | | • | | | | |
| | Sienna CE | | | | • | | | |
| | Sienna LE | | | | • | | | |
| | Sienna XLE | | | | | • | | |
| | Vios | | | • | | | | |
| | Land Cruiser | | | | | | • | |
| | Land Cruiser Prado | | | | | | • | |

*Source*: China Auto Market 2004 and Toyota 2004.

Toyota know-how will also be applied to an upgrade of FAW's Red Flag luxury sedan, a favourite of the Chinese elite.

*Horizontal differentiation*

Toyota's vehicle type takes account of Chinese consumer demand and the environmental protection situation. It has concentrated its production in medium-class vehicles through different models of the Toyota brand. For example, in 2002, Toyota launched a compact car designed especially for the Chinese market in its Tianjin plant. The car, code-named T-1, is called the 'Vios', with high performance in quality terms and environmental protection. Supply fell short of demand as soon as it went on the market. Its monthly production is 5000 units, at the price of RMB130 000–140 000 each.

Toyota will begin joint production of its Camry sedan, as well as its luxury Crown sedan with FAW in 2005, with initial output targeted at 50 000 units. Assembly of the Toyota Corolla subcompact model was to begin at Tianjin in 2004. Toyota and FAW plan to produce and sell 300 000–400 000 vehicles by 2010. Output of mini-cars was to begin in mid-2003 at the Tianjin plant, targeting an initial production of 100 000 units. Toyota also produces sport-utility vehicles, and began producing the Land Cruiser SUV at the end of 2003 in Toyota-FAW's Jilin plant for an annual production of 10 000 units. At the same time, 5000 luxury SUV Land Cruiser Prados were produced in Sichuan Toyota. Medium- and heavy-duty truck production at FAW Qingdao (Shangdong province) in

*Table 10.11* Competitive position of GM, Toyota and Volkswagen in China

| *MNE* | *Number of models* | *Best brands sale* | | *Market share* |
|---|---|---|---|---|
| 2000 | | | | |
| GM | 7 | Buick | 30 543 | 8% |
| Volkswagen | 8 | Volkswagen | 317 505 | 50% |
| Toyota | 3 | Toyota | 10 187 | 7% |
| 2003 | | | | |
| GM | 20 | Buick | 201 188 | 9.8% |
| Volkswagen | 12 | Volkswagen | 632 737 | 38% |
| Toyota | 6 | Toyota | 106 002 | 8% |
| 2003/2000 | | | | |
| GM | 2.9 | Buick | 6.6 | 1.2 |
| Volkswagen | 1.5 | Volkswagen | 2.0 | 0.8 |
| Toyota | 2 | Toyota | 10.4 | 1.1 |

Brands include original automaker and its joint venture brands.
Toyota brand includes its car, LCV and HCV segments, while only car and LCV segments for GM and Volkswagen.

*Source*: Calculated from previous table and WMRC databases, 2000–2004.

northeastern China, began in June 2003 with an annual production capacity of 30 000 units.

## Findings

In this section, we determine the relation between the competitive strategy of an automobile MNE and its competitive position in China through the case studies above.

The competitive strategy is defined in this chapter by a differentiation strategy in terms of horizontal and vertical dimensions and its response to local demand. It is illustrated by model diversification (model numbers for rank focused by company) and value of vertical differentiation product (best brand sale by company). The competitive position of an MNE in China is tested by its market share and market share growth. The competitive strategy and position of GM, Volkswagen and Toyota are illustrated in two periods: 2000 and 2003 (Table 10.11).

The model numbers (7, 8, 3) and their best brand sale (30 542, 317 505, 10 187) of GM, Volkswagen and Toyota were positively related to their market share (8, 50, 7) in 2000. For 2003, GM, Volkswagen and Toyota's best brand sale (201 188, 632 737, 106 002) were positive to their market share in China (9.8, 38, 8). Although the three firms' model numbers (20, 12, 6) could not directly support their market share due to the Ford model evolution of GM, it was positive related to GM's quick growth in market share, while the weak model evolution of Volkswagen is positive related to its diminished market share. It demonstrates therefore that the horizontal and vertical differentiation strategy of MNEs is positively related to their competitive positions in the industry.

Furthermore, the relative development rate of segment GM, Volkswagen and Toyota between 2000 and 2003 are 2.9, 1.5, 2, and their corresponding relative competitive position is 1.2, 0.8, 1.1. The relative best brand sales for the three groups are 6.6, 2.0, 10.4. Those of GM and Volkswagen correspond to their competitive position while the best brand sales of Toyota are high because the percentage of imported car sales among Toyota's brand sales in China is very much higher than that of GM or Volkswagen. Therefore, the evolution rate of differentiation due to local demand of MNEs is positively related to the development of their competitive position.

In summary, with greater differentiation advantage or more rapid differentiation to meet local needs than its rivals, an automobile MNE will achieve a more competitive position in China.

## Conclusion

GM, Volkswagen and Toyota are the successful players on the Chinese automobile market. However, their different competitive strategies have made their competitive positions different in China.

American automobile maker GM currently has the most competitive position in China, especially as a result of GM's strength both in horizontal, vertical differentiation and its market flexibility.

GM has realized the product diversity of its medium-class vehicle through a highly dynamic alliance strategy. In order to increase its share of the world's fastest-growing market, GM has set up six principal joint ventures in China in order to introduce quickly the greatest possible number of appropriate car models. For example, it acquired the Yantai plants from Daewoo and it will buy another Daewoo plant in Qingdao City, Shandong province, because Daewoo's car model is well-suited to the local market. Furthermore, GM's local partners have quickly completed the locally adapted segments. For example, Wuling is a famous LCV brand in China with a large production capacity, while Isuzu is a good brand both for LCV and HCV. Daewoo, Isuzu and Wuling's car, LCV and HCV segment brands help GM to diversify its product in achieving its competitive position in the Chinese automobile market, paralleling with its own Buick, Chevrolet and Opel brands. Furthermore, GM locally launched its luxury Cadillac in China as part of its bid to take the market leadership from Volkswagen in China.

GM has done a very good job in developing its products in responding rapidly to local customer needs by bringing in the right products for the right segments at the right time. Up to the end of 2003, GM had developed more than 20 automobile models in China since 1998 when it established its first joint venture, while Volkswagen has only 12 models, although it entered China in the 1980s.

GM is strong in competitive strategy in China both with differentiation advantage and its development over time, compared with Volkswagen or Toyota. Its sales in the first quarter of 2004 with 68 304 vehicles, achieving a year-on-year increase of about 140 per cent, demonstrating the success of SGM and building its competitive position for the future.

European carmaker Volkswagen is now the largest carmaker in China. Its success is due to its strong vertical differentiation and pioneering behaviour. However its competitive position in China has been threatened since 2003 by a lack of horizontal differentiation and development strategy.

Volkswagen has been the colossus of China's car scene since the 1980s when it entered China's market and it possessed more than half of the car market share before China's entry into the WTO. As the pioneering foreign carmaker in China, it was the only one to thrive in a very restricted market that was dominated by fleet sales to government and state companies. Volkswagen's two joint ventures still lead the local family and luxury car segments, producing the best-selling Santana model in Shanghai and making the market-leading Audi A6 in Changchun. Volkswagen's successful brand strategy makes China its second-largest and most profitable global market.

However the exclusive possession of a vertical differentiation strategy is risky for a company in a market that is changing quickly and competing fiercely. The customer has changed from the state to private individuals since China's entry into the WTO. Furthermore, every major player in the world's car market is investing in China. Heavy hitters such as GM and Honda, both of which began manufacturing in China in 1999, have their sights firmly set on taking market share from Volkswagen. The German company's market share in China, already hurting, will fall even further as sales volume rises steeply. After enjoying a market share of 50 per cent as recently as 2002, Volkswagen suffered a sharp fall to 16 per cent of the Chinese market share in June 2004, according to the *Financial Times*, well below its watershed target of 30 per cent. Volkswagen has lost its lead in China as a result of fierce competition. Moreover, its new Polo model has not been well received by the Chinese, which is an important reason why Volkswagen lost its competitive position in China. Lacking horizontal differentiation, there are no new local-adapted models to replace the Polo immediately and thus Volkswagen's market share is suffering. Furthermore, Volkswagen has developed few vehicles priced between RMB200 000–300 000, which is currently becoming an important market segment in China. In this context, the competitive position of Volkswagen is weak in comparison with GM owing to its failure to meet local needs.

Faced by its negative position in China's auto market, Volkswagen has pledged greater investment for its China joint ventures, FAW and SAIC, with 6 billion euro ($7billion) investment in the joint ventures over the next five years. Shanghai Volkswagen is hoping to increase its sales to 462 000 units in 2004 by the release of new models. For example, it launched the latest version of its popular Santana family car, the Santana 3000, in mid-2004, followed with the launch of the Touran Multi-Purpose Vehicle at the same time. Furthermore, Volkswagen has announced investment in a new LCV joint venture in a bid to halt its sliding market share in China.

In addition, Volkswagen is enforcing its vertical differentiation by augmenting brand loyalty. It is preparing its first full branding campaign in China to develop a 'Love' campaign, which will feature Volkswagen's traditional 'Love Bug' elements.

Japanese automaker Toyota possesses a less competitive position in China than either GM or Volkswagen because of its late market position and its limited development of a differentiation strategy in China.

As the world's second largest carmaker, Toyota made a relatively late entry into the Chinese market with the formation of its principal alliance with the FAW Group in 2002. In fact, Toyota possesses strong brand loyalty in China and is one of the first companies to export automobiles to China, nearly quadrupling its exports from 12 000 cars in 2001 to 47 000 in 2002. Although it has already achieved popular name recognition, Toyota was a follower rather than a leader in China by virtue of its conservative organizational and corporate structure. Until 2004, it assembled vehicles only with FAW in China. Toyota was so wary of taking risks and slow to make investments in China that it missed the right time to enter the Chinese car market, while its international competitors had already signed joint venture agreements with the top Chinese firms.

However, it has made quick progress in its local production through its four famous models, Crown for the medium/large-class luxury sedan segment, Corolla for the small passenger car segment, and the Land Cruiser or Land Cruiser Prado for the medium/large-class luxury SUVs segment. Furthermore, Toyota has a strong nationwide production presence in China, based in the northeast, west and south. Having a production base in Guangdong province will be the key to Toyota's China expansion strategy through brand development. Toyota will launch local production of one of its core global models, Camry.

Meanwhile, Toyota is stepping up its local production capacity in order to be the main challenger to Volkswagen and GM in the Chinese car market. Toyota is going to deepen its cooperative relationship extensively through R&D, sales to services with emphasis on beginning a full-scale business in China, attempting to produce 400 000 cars by 2010 and targeting 10 per cent of market share in China, leveraging its cooperative relation with FAW. However, the target of 400 000 annual units by 2010 is behind those of Volkswagen, General Motors and domestic rival Honda. Toyota's global ambition of obtaining 15 per cent of global new vehicle sales, becoming the world's largest automaker by 2010, will not be achieved unless it capitalizes on strong performance in China, the fastest-growing market.

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# 11 China's joint venture accounting and its impacts on Chinese accounting reforms

*Simon S. Gao, Gordon Shanyou Guo and Jane J. Zhang*

## Introduction

Foreign investments have contributed significantly to China's economic growth since 1979 when China began its open door policy and economic transformation. Foreign investments in China have been encouraged through the provision of tax break, preferential tariff and favoured financial support. For example, the State Administration of Taxation announced that from January 1 of 2000 foreign-funded businesses in western and central provinces would enjoy a preferential 15 per cent rate of income tax for three years (most domestic companies pay a 33 per cent income tax). Foreign companies making high-density fertilizer, stainless steel and micro-electronics products across the country would also enjoy the 15 per cent tax rate. "By encouraging foreign investment, the government aimed to reduce the deficiency of foreign funds, introduce foreign advanced technology and modern managerial expertise, upgrade the industrial structure, develop and extend international trade, and optimize the export mix" (Hao, 1999, p. 291). Over the last two decades, there has been a steady improvement in the country's investment environment and foreign investments have been on an increasing trend as shown in Table 11.1. Foreign investment attracted to China is generally in the form of direct investment.[1] The most adopted forms of foreign direct investment (FDI) in China are Sino–foreign joint ventures (also referred to as Sino–foreign equity joint ventures), Sino–foreign cooperative ventures, wholly foreign-owned ventures and cooperative exploitation.

'Joint ventures' are business agreements whereby two or more owners create a separate entity. A joint venture can be a partnership or a closely held corporation, or can issue corporate securities in its own right. International Accounting Standards (IAS) No. 31 defines a 'joint venture' as a contractual agreement whereby two or more parties (the ventures) undertaken an economic activity which is subject to joint control. An investor should account for its investment either as an associate or as an investment, depending on whether or not it has significant influence. Joint control is defined as the contractually agreed sharing of control of economic activity. A venturer should account for its investment based on the type of joint venture: jointly controlled operations, jointly controlled assets or jointly controlled entities. In China, the most common type of joint venture is a jointly controlled entity.

*Table 11.1* Foreign investment in China excluding funds borrowed (US$100 million)

| *Year* | *Total of investment* | *Direct foreign investment* | *Other investment by foreign companies* |
|---|---|---|---|
| 1979–1983 | 26.83 | 18.02 | 8.81 |
| 1984 | 14.19 | 12.58 | 1.61 |
| 1986 | 22.44 | 18.74 | 3.70 |
| 1988 | 37.39 | 31.94 | 5.45 |
| 1990 | 37.55 | 34.87 | 2.68 |
| 1991 | 46.66 | 43.66 | 3.00 |
| 1992 | 112.91 | 110.66 | 2.84 |
| 1993 | 277.71 | 275.15 | 2.56 |
| 1994 | 339.46 | 337.67 | 1.79 |
| 1995 | 378.06 | 375.21 | 2.85 |
| 1996 | 421.35 | 417.26 | 4.09 |
| 1997 | 459.70 | 452.57 | 7.13 |
| 1998 | 479.16 | 455.82 | 23.34 |
| 1999 | 421.69 | 403.98 | 17.71 |
| 2000 | 420.90 | 407.72 | 13.18 |
| 2001 | 488.24 | 468.78 | 19.47 |
| 2002 | 550.11 | 527.43 | 22.68 |

*Source*: *China's Statistics Yearbook* (2002).

A major factor in China's economic development has been the large number of international joint ventures established within China in recent years (Si and Bruton, 1999). Accordingly, joint ventures in China have attracted a considerable amount of attention in management literature (e.g., Beamish and Wang, 1989; Shenkar, 1990; Beamish, 1993; Pan *et al.*, 1995; Pan, 1996; Pan and Li, 1998; Wang *et al.*, 1998; Si and Bruton, 1999; Blake *et al.,* 1997, 2000; Chadee *et al*., 2003; Meschi and Hubler, 2003). Management literature focuses mainly on the operational and management aspect of joint ventures and different cultural influences on the management of a venture. Blake *et al.* (2000) identify eight key issues in the management of a joint venture in China, including selecting a partner, the process of negotiation, the problem of corruption, a capricious legal framework, asset valuation, currency remittances, length of the contract, and taking the long view.

In the accounting literature, much has been written about accounting in China, predominately addressing China's accounting reform and new accounting standards setting (e.g., Zhou, 1988; Fang and Tang, 1991; Ge and Lin, 1993; Ge *et al.*, 1997; Xiao and Pan, 1997; Xiang, 1998; Hilmy, 1999; Lin and Chen, 1999). Little has been documented about China's joint venture accounting and how it differs from other accounting (e.g., industrial-based accounting) in terms of standards development and practice. Earlier research on joint venture accounting (e.g., Hoyt and Maples, 1980) needs updating to take into consideration recent joint venture legislation, the changes in China's economic development and the introduction of new accounting standards.

The purpose of this chapter is to review the development of joint venture accounting in the People's Republic of China (PRC), taking into account the current changes in legislation and the introduction of new accounting standards and the new 'Accounting System for Business Enterprises (refer to the New Accounting System)', and to examine the role of joint venture accounting in directing China's accounting reform since the first joint venture accounting law was issued in 1985.

The rest of the chapter is organized as follows: the next section will examine the Chinese accounting reform. The third section will briefly discuss China's legal system and joint venture legislation. The following section will focus on the development and change of joint venture accounting in China, arguing that the gap between joint venture accounting and other accounting practices is diminishing. The final section provides a conclusion and highlights some of the major problems encountered in the development of joint venture accounting and joint venture investments in China.

## China's accounting reforms

After the founding of the PRC in 1949, the Soviet accounting model had a profound influence on Chinese accounting practices until 1992. For a long time, China's accounting practices had been under the control of uniform accounting regulation with an emphasis being placed on how state funds were used and if production quotas were being met. This 'uniform accounting system' allocated assets and liabilities of a business entity into three separate funds: the 'fixed fund' covering fixed assets; the 'current fund' covering items circulated in the process of production and operation; and the 'special funds' relating to resources allocated to the enterprise for specific objectives outside the operating cycle. Each fund was effectively ring-fenced (Blake *et al.*, 2000). This kind of accounting system was a macro-oriented system with the primary objective of providing statistical data to different levels of governmental ministries and tax authorities in China for economic planning (Adhikari and Wang, 1995). Under this system, accounting had been used as a means to serve central planning and macro-control, and there was a strong influence from the government and taxation regulations, resulting in rigidity and uniformity. The literature (e.g., Lou and Enthoven, 1987; Zhou, 1988; Chen and Tran, 1995; Chen *et al.*, 1997; Hilmy, 1999) has critically reviewed this 'fund accounting' system.

Since 1985, accounting in China has undergone reforms following the Accounting Law which was enacted by the National People's Congress (NPC) in 1985 and amended in 1993 and 2000. The Accounting Law sets forth the highest level of legislative requirements on accounting practice in China. It legalizes the basic accounting objectives, the statutory responsibility of the accounting profession, the legal authority of accounting standards and regulations, and the fundamental accounting principles and procedures to be followed in organizing accountancy. Apart from the NPC, other central ministerial authorities were also able to stipulate certain industry-specific accounting regulations, but they must obtain the consent of the Ministry of

Finance (MoF) in advance. In addition to the Accounting Law, the Corporate Law of the PRC (1993) contains specific provisions on accounts-keeping for all corporations. The Regulation on Securities Exchanges (1992) and its Supplementary Guidelines for Information Disclosure (both issued by the State Council of China in 1992) also specify the type and manner of accounting information to be released by the listed corporations in the country. The Taxation Law of the PRC (the Taxation Law) contains certain provisions on accounting measurement and reporting. In China, the state's taxation policies have a dominant influence on business financing and accounting, because the Taxation Law mandates that enterprises must comply with the financing and accounting regulations promulgated by the finance and taxation authorities, including the requirements for the scope and criteria of business expenditure and financing, product costing, depreciation and profit allocation, etc.

Adhikari and Wang (1995) document that the reform of the Chinese accounting system has been part and parcel of China's overall free market economic reforms. Xiang (1998) argues that China's accounting reform has been largely responsive to the country's enterprise reform. On the one hand, China revised and amended the accounting regulations for state-owned enterprises to keep pace with new measures to reform that sector. On the other hand, China developed and implemented the 'Accounting Regulations for Joint Ventures Using Chinese and Foreign Investment' in 1985 that in many aspects adopted the principles of IAS (now IFRS, International Financial Reporting Standards) for the purpose of attracting foreign investment. The regulations later evolved into the 'Accounting Regulations for Enterprises with Foreign Investment', and the 'Accounting Regulations for Experimental Stock Companies' in early 1992. In 1993, China issued 'the Enterprise Accounting Standards (EAS)' which apply to all business enterprises. In 1993, with funding from the World Bank, the MoF began a project to develop some 30 accounting standards appropriate to China's developing socialist market economy and aimed at bring China's accounting and financial reporting practices more into line with those used internationally. Since then exposure drafts on over 30 standards have been published and a number of final standards have been issued. Table 11.2 lists accounting standards issued as of January 2004.

In January 2001 as part of the programme for improving financial reporting by business enterprises, the MoF adopted a new comprehensive 'Accounting System for Business Enterprises' (called the New Accounting System), which is based, in part, on the experience of the MoF in implementing the Accounting System for Joint Stock Limited Enterprises and, in part, on the existing individual Chinese accounting standards issued over the period of 1993 to 2000, and the disclosure rules promulgated by China's Securities and Regulatory Commission (CSRC).

The New Accounting System, applicable to joint stock limited enterprises effective on 1 January 2001 and to foreign investment enterprise (other than financial services companies) effective on 1 January 2002, has been deliberately developed in line with international accounting practices and financial reporting standards. The main features of the New Accounting System, among many other things, include the following.

*Table 11.2* A summary of PRC accounting standards as of January 2004

| *Accounting standard* | | *Effective date* | *Applicability* |
|---|---|---|---|
| 1 | Disclosure of related party relationships and transactions | 1 January 1997 | Listed enterprises |
| 2 | Cash flow statements (revised 2001) | 1 January 2001 | All enterprises |
| 3 | Events occurring after the balance sheet date | 1 January 1998 | Listed enterprises |
| 4 | Debt restructuring (revised 2001) | 1 January 2001 | All enterprises |
| 5 | Revenue | 1 January 1999 | Listed enterprises |
| 6 | Investments (revised 2001) | 1 January 2001 | Joint stock limited enterprises (prior to 1 January 2001 it was listed enterprises only) |
| 7 | Construction contracts | 1 January 1999 | Listed enterprises |
| 8 | Changes in accounting policies and estimates and corrections of accounting errors (revised 2001) | 1 January 1999 | All enterprises (prior to 1 January 2001 it was listed enterprises only) |
| 9 | Non-monetary transactions (revised 2001) | 1 January 2001 | All enterprises |
| 10 | Contingencies | 1 July 2000 | All enterprises |
| 11 | Intangible assets | 1 January 2001 | Joint stock limited enterprises |
| 12 | Borrowing costs | 1 January 2001 | All enterprises |
| 13 | Leases | 1 January 2001 | All enterprises |
| 14 | Interim reporting | 1 January 2002 | Listed enterprises |
| 15 | Inventories | 1 January 2002 | Joint stock limited enterprises |
| 16 | Fixed assets | 1 January 2002 | Joint stock limited enterprises |

1. It defines certain fundamental principles that must be applied in preparing financial statements, including going concern, accounting period, substance over form,[2] consistency, timeliness, understandability, accrual basis, matching, impairment recognition, prudence, materiality, and measurement currency vs. presentation currency.
2. It defines the basic elements of financial statements including assets, liabilities, owners' equity, revenues, expenses, and profits, and also specifies classifications within the asset, liability and equity elements. Most of them are in line with the framework of the International Accounting Standards Board (IASB).
3. It specifies recognition and measurement principles for receivables, prepaid expenses, inventories, current and long-term investments, fixed assets, construction in progress, intangible assets and other assets.
4. It specifies recognition and measurement principles for current liabilities, long-term liabilities, lease obligations, and government grants and loans.
5. It specifies principles of revenue recognition for goods, services, royalties and interests.
6. It specifies expense recognition principles for bad debts, cost of goods sold, depreciation, major overhauls and impairment of assets.

7. It requires that expenses should be classified into operating, administrative and financing, and profit be classified between operating profit, investment income, subsidy income and several other non-operating income categories.
8. It specifies accounting principles for non-monetary transactions, assets contributed by investors, income taxes, foreign currency transactions, changes in accounting policies, changes in estimates, corrections of errors, post-balance sheet events, contingencies, and related party relationships and transactions.
9. It defines the content of a financial and accounting report, minimum notes to the financial statements, and how soon after period-end the reports should be published.
10. It specifies principles for consolidated financial statements and accounting for investments in associates and joint ventures.

While there are a number of accounting matters that remain to be addressed, such as business combinations, consolidation procedures, discontinued operations, revaluation, earnings per share, reorganization, liquidation and employee benefits, the New Accounting System constitutes an important building block in the continuing development of the PRC socialist market economy to meet international expectations (Pacter and Yuen, 2001).

Chinese accounting standard-setting has involved multiple stages (Xiao and Pan, 1997). The features of the Chinese accounting standards setting process include:

1. The government (particularly, the MoF) plays a dominant role in setting and implementing accounting standards. In accordance with the Accounting Law, the MoF is responsible for all accounting and reporting matters including the setting of accounting standards. The participation of government in the process has an important implication to China's accounting reform. Comparing with reforms in other countries where accounting standards are predominately drafted by professional accountancy bodies, Chinese reformers have considerable power of the state behind them to enforce the new standards.
2. An evolutionary approach to the accounting reform was adopted, beginning with a parallel of joint venture accounting and fund-based accounting for a certain period of time, then expanding joint venture accounting into other sectors of the economy (e.g., stock listed companies), and finally developing new accounting standards based on joint venture accounting for all types of enterprises.
3. Chinese standards setters have supported international financial reporting standards, rather than standards of an individual country.

The MoF has been actively engaged in a programme to formulate and promulgate Chinese accounting standards. In 1992, the MoF promulgated the Enterprise Accounting Standards (EAS) and the General Financial Principles for Enterprises (GFPE). The former standardizes financial accounting and reporting by all enterprises; the latter standardizes corporate finance practices. As Chen and Tran (1995)

conclude, the two are the foundation of a new accounting and financial regulatory framework operative from July 1, 1993. The EAS is the fundamental standards that set the basic assumptions and general principles of accounting and provide the definition, classification, recognition and measurement rules for six elements of accounting. The EAS also prescribes the basic format of financial statements. Although in many aspects the EAS adopted the Anglo-American accounting principles and conceptual framework, the EAS maintains Chinese characteristics (*Guo Qing* in Chinese) which have been influenced by its political and economic considerations (Kazenski and Wong, 1994; Winkle *et al.*, 1994; Yang and Kao, 1994; Adhikari and Wang, 1995; Leung, 1995; Graham and Li, 1997). The infusion of foreign investment and international interactions in economic activities have been considered as an impetus for moving Chinese accounting towards conformity with international accounting practice (e.g., Chow *et al*., 1995; Hao, 1999; Islam and Gowing, 2003).

The promulgation of the EAS and the GFPE signifies a major accomplishment in unifying accounting practices in the PRC and harmonizing them with international practices. The EAS calls for unification and harmonization of accounting practices across different sectors. Unification refers to the objective that all enterprises, regardless of the industries in which they operate or of the forms of their ownership, eventually follow the same body of accounting standards set by the MoF. This has had a significant impact on both the development of joint venture accounting itself and the process of unifying joint venture accounting with other accounting systems (e.g., industrial-based accounting systems) in China. Even after the recent reforms that have moved Chinese accounting practices closer to IFRS, a number of accounting practices remain that reflect the state-controlled nature of the Chinese economy (Adhikari and Wang, 1995). The principle of *Guo Qing* in the economic and accounting reforms implies that the future change will be implemented only in conjunction with Chinese needs. Indeed, Chinese historical, cultural and economic circumstances all affect some areas of China's accounting practice and reforms (Graham and Li, 1997; Gao and Handley-Schachler, 2003). In addition to these variables, China's legal system and legislation also affect the development of China's accounting and joint venture accounting.

## China's legal system and joint venture legislation

The Chinese legal system is a mixture of common law and continental legal system. The supreme legislative authority in China is the National People's Congress (NPC) and its Standing Committee which works primarily through the Legislative Affairs Committee. Under the 1982 Constitution, the State Council and the NPC at the provincial and municipal level have the authority to formulate administrative regulations and local legislation that may not be inconsistent with the national law. In co-operation with the NPC, the Supreme Court interprets new laws and passes guidance down to lower courts. Although the system is a mixture of common law and continental legal system, it places relatively less emphasis on legal precedents. In Si and Bruton's (1999) view, China's legal system is not a consistently applied

system of recognized rights and wrongs, but rather a series of broad guidelines that give an individual judge leeway to determine rights and wrongs. The establishment of economic courts at the Supreme Court and three levels of provincial courts was authorized by the 1979 Organic Law of the People's Courts of the PRC. The economic courts have jurisdiction over contract and commercial disputes between Chinese entities; trade, maritime, insurance, and intellectual property rights; other business disputes involving foreign parties; and various economic crimes, including theft, bribery and tax evasion. In 1994, the lowest level of provincial court started to try economic cases involving foreign parties.

In China, the concept of 'one country two systems' which was adopted for reunifying Hong Kong and Macao with the mainland of China has been accepted in reforming Chinese accounting and developing accounting standards. The Regulation on Accounting System for Sino–Foreign Joint Ventures was issued by the MoF in 1985. The regulation, differing significantly from the accounting rules under the central planning system, adopted internationally accepted accounting principles to the maximum extent possible under China's socialist economy. Chow *et al.* (1995) observe that the 1985 Regulation marked a significant breakthrough in Chinese accounting history by introducing western accounting practices and requirements to the foreign investment sector of the economy. Since 1985, there were two different accounting systems operating in China: a transaction-based accounting system for joint ventures and an industrial-based accounting system for state-owned and collective-owned enterprises. Moreover, not only are there different laws for an international joint venture than for the domestic partner alone, but also there are different laws depending on whether the Chinese partner is a state business or a village to township enterprise. Requirements governing the joint venture also vary depending on who has control and what assets are provided by whom (Si and Bruton, 1999). Legal regulations concerning equity joint venture companies in China require a quorum of over two thirds of the directors for meetings of the Board of Directors.[3] Foreign firms that need working capital (foreign exchange or local currency) may obtain short-term loans from the state-owned commercial banks, but these institutions often give priority in their lending to investments that bring in advanced technology or produce goods for export. Foreign-invested firms generally borrow funds from abroad, registering all foreign loans with the State Administration for Foreign Exchange. Under regulations promulgated in March 1987, the government restricts the debt-to-equity of foreign-funded firms and sets minimum equity requirements.[4] There were a few provisions in the legislation for joint ventures that were somewhat different from that for the state-owned enterprises which consequently resulted in the differences in accounting treatment and reporting practices.

The Law of the PRC for Enterprises with Foreign Investments (1992), which replaced the Law of the PRC for Joint Venture with Chinese and Foreign Investments originally enacted in 1980, and the Income Tax Act for Enterprises with Foreign Investment (1992), which replaced the 1980 Income Tax Law of the PRC Concerning Enterprises with Foreign Investment and Foreign Enterprises, give specific accounting provisions and reporting requirements for

all kinds of business entities with foreign investments, such as joint ventures with Chinese and foreign investments, business corporations or associations with Chinese and foreign partners, and branches or subsidiaries of foreign corporations operating in China. The 1992 Income Tax Law for enterprises with foreign investment consolidated the various tax provisions, and eliminated the distinction between equity joint ventures and other foreign enterprises. All foreign-funded investment ventures, including Sino–foreign equity joint ventures, co-operative joint ventures and wholly foreign-owned ventures are taxed on a uniform basis. The purpose of the unified tax law is to simplify the tax structure, with the aim of minimizing confusion and inefficiency in tax collection procedures.

Recently, the Ministry of Foreign Trade and Economic Co-operation issued 'Provisional Measures on the Establishment of Sino–Foreign Joint Venture Trading Companies on a Pilot Basis' which specifies detailed guidance for the establishing of a joint venture trading company. The provisional measures state that "the shares of the Chinese company in the registered capital of a joint venture trading company shall be no less than 51 per cent and that of the foreign company shall be at least 25 per cent. The legal representative shall be appointed by the Chinese company" (Article 3). "The establishment of a joint venture trading company shall satisfy the following conditions upon its establishment: The foreign company shall (1) enjoy a turnover of over US5 billion in the year prior to the application; (2) enjoy an average annual trading volume of over US30 million with China in the three years prior to the application; (3) have established representative office within the territory of China for more than three years or have made an investment of over US$30 million within the territory of China prior to the application" (Article 4).

## Joint venture accounting – development and differences

Under the direct influence of the Law of PRC for Joint Ventures with Chinese and Foreign Investment (1980) and the Income Tax Law of PRC Concerning Enterprises with Foreign Investment and Foreign Enterprises (1980), as well as the pressure of foreign investors and joint venture companies, the Regulation on Accounting System for Sino–Foreign Joint Venture (Joint Venture Accounting Regulation) was issued by the MoF in 1985. The 1985 Regulation provided accounting guidelines for joint ventures operating in China with the intention of attracting foreign investment. The regulation for the first time introduced Western accounting practices to the firms operating in China, representing a radical departure from the traditional fund accounting (Xiang, 1998). Under the 1985 Regulation, all joint ventures using Chinese and foreign investment established within the territory of China (excluding Hong Kong) were required to comply with the Chinese Accounting Regulations. In principle, joint ventures should use RMB for bookkeeping purposes. A foreign currency may be used for these purposes if all the participants of a joint venture agree. However, in this case, the joint venture was required to prepare both foreign currency financial statements

and statements translated to RMB from the foreign currency. The Joint Venture Accounting Regulations stipulated the use of two exchange rates depending on whether a given event or transaction results in an increase or a decrease in the relevant balance sheet or income statement accounts. The 'recording exchange rate' (i.e., the spot rate) was to be used for an increase, while the 'book exchange rate' (i.e., the historical rate at time of the initial transactions) for a decrease in the relevant balance. The difference of currency translation was to be entered in the equity section of the balance sheet and acted as a fluctuating balance of unrealized results (Hilmy, 1999). The financial statements include balance sheet, income statement, statement of changes in financial position and relevant supporting schedules. A joint venture may include the needs of consolidation by the foreign participant's parent company.

It is generally recognized that the joint venture accounting system implemented in 1985 was very successful and it assisted in promoting foreign investment in China (e.g., Hao, 1999). The 1985 Regulations were replaced by the Accounting Regulation for Enterprises with Foreign Investments in 1992, in an effort to expand its applicability to all kinds of business entities with foreign investments in China. These two regulations have made a direct contribution to the improvement of Chinese accounting in the following years (Ge *et al.*, 1997). Many of the principles, concepts and methods in these two regulations were adopted and transformed to the 1992 EAS (Xiao and Pan, 1997) and applied to develop the new Accounting System of 2001. The two regulations have provided a foundation for China's accounting standards and were largely used as one of the major references in drafting the EAS and the New Accounting System.

To meet both domestic and international demands for accounting information as a result of economic reforms, international accounting principles were adopted in the development of joint venture accounting and the New Accounting System in China. However, differences between IFRS and Chinese accounting standards still exist in many areas, as shown in Deloitte Touche Tohmatsu (2002). For example, the equity method is required to report the venturer's interests according to China's accounting standards, whereas IFRS No. 31 accepts either the proportional (i.e., line by line) method[5] or the equity method.

Another area of differences between IFRS and Chinese accounting standards is related to land use right. All land in China is owned by the state and rural collectives since the enactment of the 1982 Constitution, which abolished remaining private land ownership. According to China's 1982 Constitution, all land in urban areas is owned by the state and is called state-owned land. All agricultural land and homesteads in the suburban and rural areas are owned by rural collectives and called collective land. Chinese law prohibits transferring ownership of state-owned land, but permits the Chinese government to grant, lease, or allocate land-use rights for state-owned land. For example, the Tentative Regulation of the PRC on the Sale and Transfer of Land-use Rights in Cities and Towns, a regulation issued by the State Council in May 1990, allow individuals and enterprises to acquire the right to use land. The land-use rights granted by local land bureaus at

county and municipal levels may be transferred, leased, or mortgaged in accordance with the law and the terms of the land-grant contract. Land-use rights in China are of special significance because they are often used by the Chinese government/ partner as investment in joint ventures, and foreign investors are increasingly interested in acquiring such rights. The right of land-use is accounted for as an intangible asset, and is amortized over a period determined in the purchase agreement. The cost consists of the price paid in negotiation or auction and is amortized on a straight-line basis. The Land Administration Law of the PRC (the New Land Law) came into effect on January 1, 1999. The New Land Law has some major legal implications for joint ventures. For instance, in the short term, land acquisition for investment projects in China is likely to become more time consuming, and the risk of penalties and legal invalidity due to non-compliance is likely to be higher. Also, the Implementing Regulations for the New Land Law authorize the government to lease (rather than grant) land-use rights. One basic difference between a land grant and a land lease is that a land grant would require a substantial downpayment and a 'peppercorn' land-use fee annually, whereas a land lease instead calls for a higher annual rent but no huge downpayment. On the other hand, leased land-use rights may not be transferred, subleased, or mortgaged, thus leased land-use rights lack marketability. Another important implication is that the New Land Law reaffirms the legality of contribution of land-use rights as capital.[6] However, the legal and valuation procedures for it are still unclear.

In general, the financial reporting requirements in China are mainly based on the Accounting Law and on standards and regulations issued by the MoF. The International Form on Accounting Development (IFAD) provides the GAAP Convergence 2002 Survey (see Table 11.3), which highlights the major differences between Chinese accounting standards and IFRS.

Overall, China's joint venture accounting was developed in accordance with specific legislation. In China, legislation plays a key role in initiating the change of accounting practice. This is because new legislation regulating economic activities has an impact on accounting, and accordingly accounting standards must be amended to suit the changing socio-economic environment. As shown in Figure 11.1, following the issuance of various regulations, China's accounting has been transformed from the Soviet system through a two-tiered system to the current single system embracing the principles of the IASB with Chinese characteristics or needs (*Guo Qing*). During the transitional process, legislation on certain areas was always issued before the related accounting regulations and standards. Hilmy (1999) divides the development of accounting in China into four phases. He splits the pre-economic reform era (1949–1980) into two phases: 1949 to the mid-1960s and the mid-1960s to the early 1980s. He indicates that, in the third phase (i.e., from opening up the Chinese economy to outsiders in the early 1980s to around 1992), Chinese accounting is a set of unique accounting conventions with an interesting blend of accrual accounting, which reflects traditional Chinese cultural values, and includes a conservative concept of the accounting realization/ recognition principle (Hilmy, 1999, p. 493). As Figure 11.1

*Table 11.3* IFAD GAAP Convergence Survey 2002 – China vs. IFRS

| | |
|---|---|
| **Chinese accounting may differ from that required by IAS because of the absence of specific Chinese rules on recognition and measurement in the following areas:** | |
| uniting of interests | IAS 22.8 |
| provisions in the context of acquisitions | IAS 22.31 |
| employee benefit obligations | IAS 19 |
| discounting of liabilities | IAS 37.45 |
| the treatment of an issuer's financial instruments | IAS 32.18/23 |
| the derecognition of financial assets | IAS 39.69 |
| hedge accounting for derivatives | IAS 39.142 |
| the treatment of the cumulative amount of deferred exchange difference on disposal of a foreign entity | IAS 21.37 |
| **There are no specific rules requiring disclosures of:** | |
| a primary statement of changes in equity, except for joint stock limited enterprises | IAS 1.7 |
| the fair values of financial instruments (except for listed investments) | IAS 32.77 |
| the fair values of investment properties | IAS 40.69 |
| discontinuing operations | IAS 35 |
| diluted earnings per share | IAS 33.47 |
| the current or FIFO cost of inventory, when LIFO is used | IAS 2.36 |
| **There are inconsistencies between Chinese and IAS rules that could lead to differences for many enterprises in certain areas. Under Chinese rules:** | |
| certain subsidiaries with dissimilar activities can be excluded from consolidation | IAS 27.14 |
| subsidiaries are excluded from consolidation if intended for sale, even if previously consolidated | IAS 27.13 |
| for most business combinations accounted for using purchase accounting, the identifiable assets and liabilities of subsidiaries acquired are consolidated based on their book values | IAS 22.40 |
| either provisions for major overhaul costs or deferral of incurred major overhaul costs are allowed | SIC 23 |
| trading and derivative financial assets and liabilities are generally not held at fair value | IAS 39.69/93 |
| proposed dividends are accrued | IAS 10.11 |
| deferred tax accounting is uncommon and, when done, is calculated on the basis of timing differences, with the deferral method or the liability method allowed | IAS 12 |
| the definition of extraordinary items is wider | IAS 8.6/12 |
| certain disclosures relating to primary segments (e.g., acquisitions and depreciation of assets) are not required | IAS 14.57/58 |
| there are no rules addressing the consolidation of special purpose entities | SIC 12 |
| **In certain enterprises, these other issues could lead to differences from IAS:** | |
| under some circumstances, finance leases can be recognized at the undiscounted amount of minimum lease payments | IAS 17.12 |
| there is no specific requirement for segment reporting to be prepared on the basis of the policies used for financial reporting | IAS 14.44 |

IAS, International Accounting Standard, now International Financial Reporting Standard; SIC, Standing Interpretations Committee.

*Source*: Adopt from http://www.ifad.net/content/ie/GAAP2001/ie_f_gaap_china_2001.htm

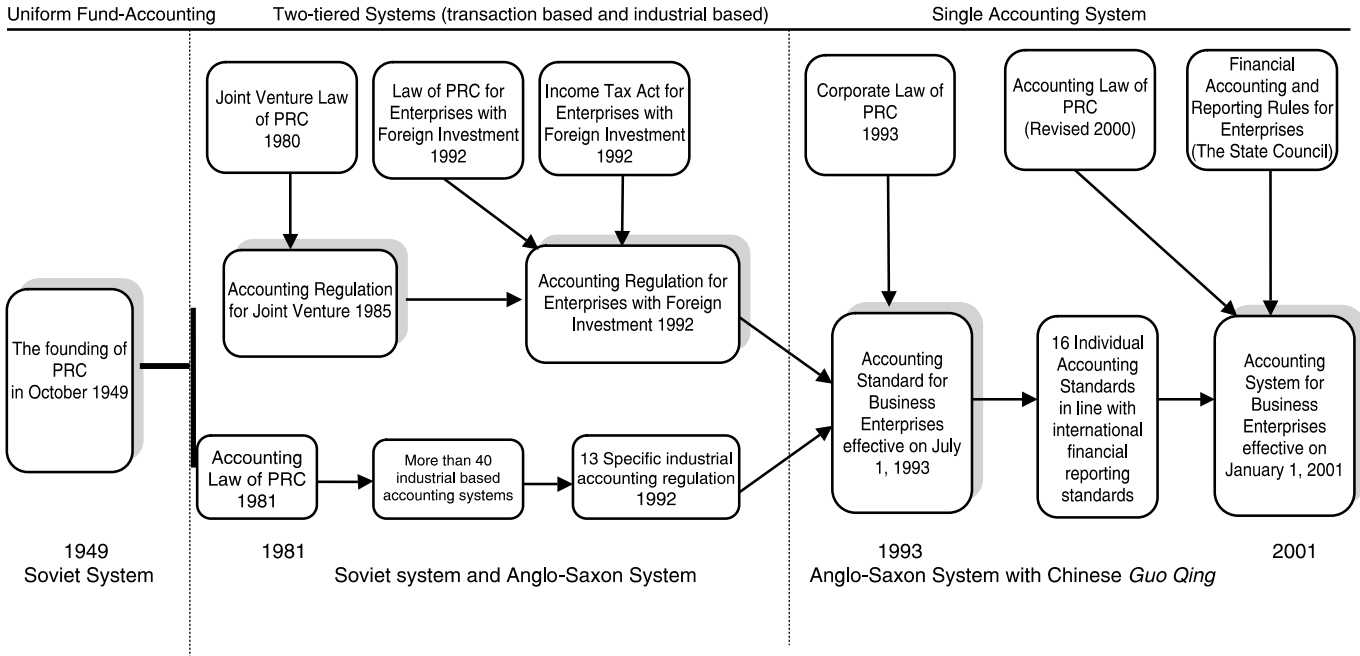


*Figure 11.1* Three stages of accounting development in the People's Republic of China.

*Source*: Adapted from Blake *et al.* (2000).

illustrates, in this period industrial-based accounting practice which survived from the Soviet model paralleled with joint venture accounting that drew mainly on international accounting practices.

In addition to legislation, international accounting (or financial reporting) standards have been adopted in developing China's joint venture accounting. Acceptance of international accounting standards was to a certain extent a result of the external pressure as a precondition for foreign investments in China. It was also driven by the internal demand for a different accounting system that can be widely recognized and accepted internationally for both boosting foreign investments and guiding the development and reform of China's accounting system during the transition from the centrally planned economy to a market-based economy. The increasing listing of Chinese companies in overseas stock exchanges (particularly, in Hong Kong, Tokyo and Singapore) also calls for IFRS to be adopted in China.

There is very little research in both China and overseas as to whether China's cultural, economic and political environments are suitable for the implementation of international accounting standards. It seems that Chinese take the approach of 'adopting-then-remedying'. The introduction of the EAS and the following 16 individual standards is the evidence of employing such an approach. Despite this, China has always emphasized the flexibility and Chinese *Guo Qing* in setting accounting standards. However, the question arises of what elements of the standards setting process are purely and unchangeably 'Chinese', although some elements of accounting standards setting in China could be bound either to traditional Chinese culture (Gao and Handley-Schachler, 2003) or to contemporary Chinese interpretations of Marxist theory (Xiao and Pan, 1997; Xiang, 1998). As argued by van Hoepen (1995), cultural influences on China's accounting are diminishing and economic influences gaining importance. Similarly, we argue that the development of joint venture accounting in China was predominately motivated and influenced by economic reasons, *inter alia*, attracting foreign investment; very little evidence of cultural influences can be found following the examination of China's joint venture accounting regulations and the standards-setting process.

Figure 11.2 shows that joint venture accounting has played a leading role in China's accounting reform and the current accounting standards were mainly derived from the joint venture accounting regulation. The experiences gained by Chinese accountants from joint venture accounting practices have provided a solid base for China to broaden the use of internationally accepted accounting principles to other sectors of the economy on a step-by-step basis, leading to the emergence of the New Accounting System.

Since the introduction of the New Accounting System, the accounting system in China has been changed in various ways, especially in relation to internationalization and convergence with the Anglo-Saxon system and international standards. The gap in accounting between joint ventures and other enterprises in China is diminising. It is expected that there will be no major division in the future of accounting practices among different forms of enterprises in China as a result of the application of the New Accounting System to all enterprises in China.

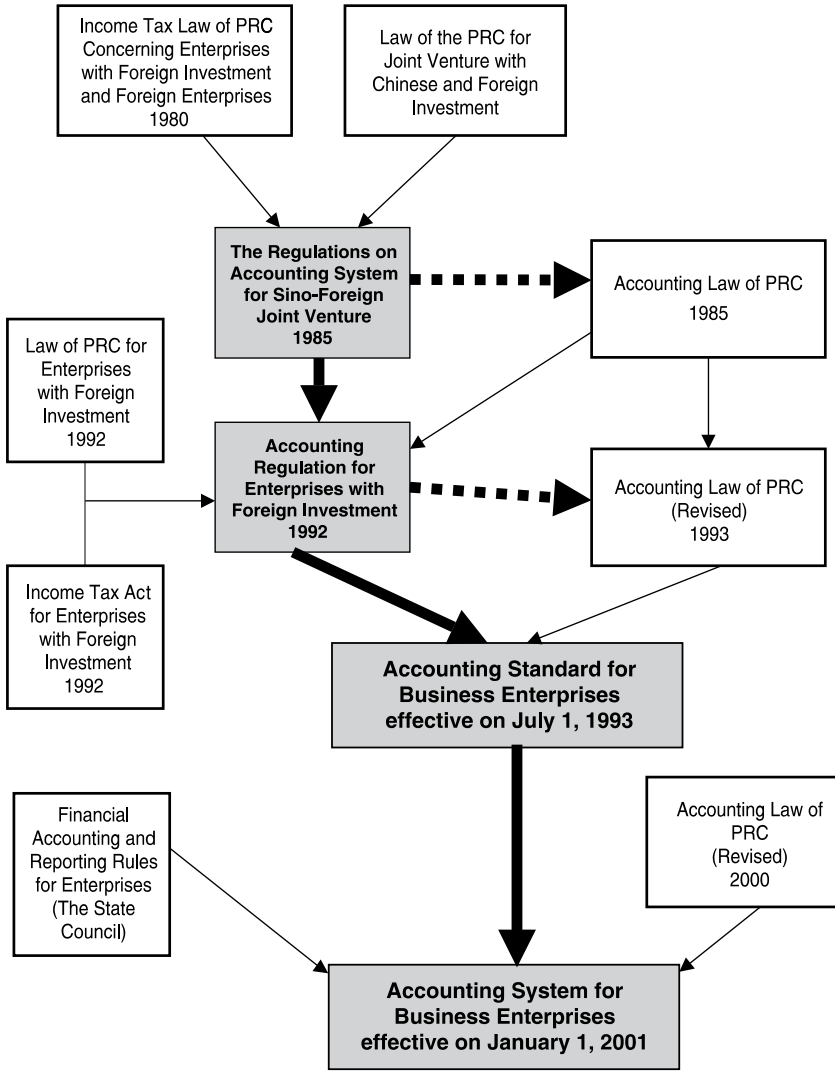


*Figure 11.2* Joint venture regulations and accounting development in China.

## Conclusion

Accounting issues for joint ventures and foreign enterprises in China have usually been excluded from the mainstream of the Chinese accounting literature. It is known that joint ventures in China have their peculiar characteristics, such as tax incentives, special regulations and accounting systems. Accounting reforms in China began with the introduction of internationally accepted accounting principles and

practice for joint ventures with the purpose of attracting foreign investments. This led to a two-tiered accounting system operating in China for the period of 1985 to 1993: transaction-based system for joint ventures and industrial-based system for the state-owned and collective-owned enterprises. Since the effectiveness of EAS and GFPE in July 1993, the division between the two systems has been diminishing towards a single system based on the Anglo-Saxon accounting principles and practice; the New Accounting System, effective on January 1, 2001 for joint stock limited enterprises and on January 1, 2002 for foreign investment enterprises, is applicable to all enterprises apart from banks and financial services companies. During the transitional process, international accounting standards were predominantly considered, and Chinese characteristics (or *Guo Qing*) became less important despite there being a strong voice from some Chinese politicians that Chinese *Guo Qing* should be the core of any adoption of foreign models or systems. This may partly be the vanishing influence of Chinese culture in reforming Chinese accounting and setting accounting standards. Also, external pressures have played an important role in bringing international accounting standards to China. As Hao (1999) observes, "political events in China, as interpreted and influenced by the state, along with foreign influence, have changed, directed and shaped the development of Chinese accounting" (p. 288).

In the past few years, foreign investment in China has taken a number of mergers and acquisitions (M&A) forms, including the acquisition, by a foreign-invested enterprise, of all of the assets of a going concern (usually a state-owned, township, or collective enterprise); the purchase of shares in a listed or unlisted Chinese company; and the purchase from other foreign investors of existing interests in Chinese entities. M&A transactions in China will continue to increase as China attempts to reform its state-owned enterprises and foreign institutional investors are permitted to enter the market. This requires the development of M&A accounting standards to meet the increasing M&A transactions which will have an important impact on joint ventures and related accounting practices.

Economic incentives to joint ventures and foreign-invested enterprises depend in large part on state policies for industrial development and the direction of foreign investment. Chinese regulations classify all foreign investment projects into four categories: encouraged, permitted, restricted and prohibited. The Guiding Catalogue for Foreign Investment in Industry which was first issued in 1995 and later amended and effective from January 1, 1998, lists the various industries in which foreign investment is encouraged, restricted or prohibited. In line with these regulations, different economic incentives (either offered by the central government or local authorities) and tax treatments have applied to different categories of investment and joint ventures. The frequent alterations in government policies and incentives for joint ventures have to some extent damaged the confidence of foreign investors, and made accounting measurement more difficult. Some evidence shows that foreign investors with previously established joint ventures in China are increasingly pursuing exit strategies. Although joint venture accounting has nothing to do directly with the uncertainty of government polices, joint venturers (especially foreign partners) are keen to assess such a risk through

examining various sources of information including financial reports. It will be interesting to see how financial reports can disclose information which enables investors to analyse the policy risk and value the economic incentives attached to joint ventures.

The current major problems facing joint ventures and joint venture accounting are related to the problems and difficulties of joint ventures. 'Different dreams in the same bed' – an old Chinese saying – has caused some failure of joint ventures and led to the dissolution of some joint ventures. Accounting for joint venture dissolution will be of great interest to many joint venture partners.

China is keen to improve the investment environment for companies as a way of boosting flagging foreign direct investment. The development of internationally accepted accounting standards and practice in China is a signal for the improvement of the environment. However, an internationally accepted accounting system cannot directly bring foreign investment into China unless there are parallel economic and policy incentives available as well as less uncertainty for foreign investors. The recent weaknesses of domestic demand, oversupply in most industrial sectors and a squeeze on corporate margins have depressed international enthusiasm for investing in China. In addition, concerns that China may in fact appreciate the RMB, in spite of repeated promises to hold the Chinese currency steady, have acted as a further disincentive to foreign companies. China is a huge market and this naturally generates enormous opportunity and interest for foreign investment. The New Accounting System, a significant advancement of Chinese accounting, expects to enable Chinese businesses to provide better and comparable financial information for foreign investors.

## Notes

1. Recently, there has been a trend of increasing foreign portfolio investment in China since China issued B shares and overseas shares. Two types of shares are traded on two domestic stock exchanges in China – the Shanghai Stock Exchange and the Shenzen Stock Exchange: the 'A' shares denominated in RMB were originally available only to Chinese residents, but now foreign institutional investors subject to the approval of the Chinese authorities may be able to purchase A shares; and the 'B' shares denominated in foreign currency are reserved for foreigners. Shares issued by Chinese companies on overseas stock exchanges are called H shares (in Hong Kong Stock Exchange), N shares (in New York Stock Exchange) and so on.
2. This concept has not been spelled out before in Chinese accounting standards or regulations; this could show that China has adopted international accounting principles in the new system.
3. However, to date, statutory regulations did not offer solutions if the quorum was not reached where one party obstructed board meetings by not sending its directors.
4. The requirements are as follows: for investments under $3 million, debt cannot exceed 30 per cent of the total investment; for investments of $3 million to $10 million, $10 million to $30 million, and over $30 million, the debt/capital rations cannot exceed, respectively, 50 per cent, 60 per cent, and 70 per cent. For investments over $60 million, debt is limited to two thirds of the total value of the investment.
5. The proportional method is a method whereby a venturer's share of each of the assets, liabilities, income and expenses of a jointly controlled entity is combined on a line-by-line

base with similar items in the venturer's financial statements, or reported as separate line items.

6. In the early 1980s, the standard method of land acquisition in joint venture projects was through the contribution of land-use rights by Chinese parties, pursuant to the joint-venture law issued in 1979. The land contribution was a transaction between the investors only, albeit with the consent of the government. There would not be a land-grant or land-lease contract with the government if a joint-venture site were acquired in this way.

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# Part III

# Economic Development and Policy

# 12 The impact of monetary variables on the price level during inflation and deflation periods in China[1]

*Huayu Sun and Yue Ma*

## Introduction

This chapter tests the Granger causality from money ($m$) to price ($p$) in China since the 1990s. This period is chosen for a number of reasons. The Chinese economy experienced both a historical double-digit inflation in the mid-1990s and unprecedented deflation in the late 1990s and early 2000s (cf. Figure 12.1). The People's Bank of China, which was given the status of the Central Bank of China in 1983, has been trying to adopt an active monetary policy to reduce inflation and contain deflation. However, there remains an open issue whether its policy is effective (Sun and Ma, 2003, 2004b).

In this chapter, we formally investigate the effectiveness of monetary variables in the two regimes of inflation and deflation, respectively. We apply the Granger causality test based on vector auto-regressive (VAR) models to achieve this objective. If the Granger causality is found from money to price, then we

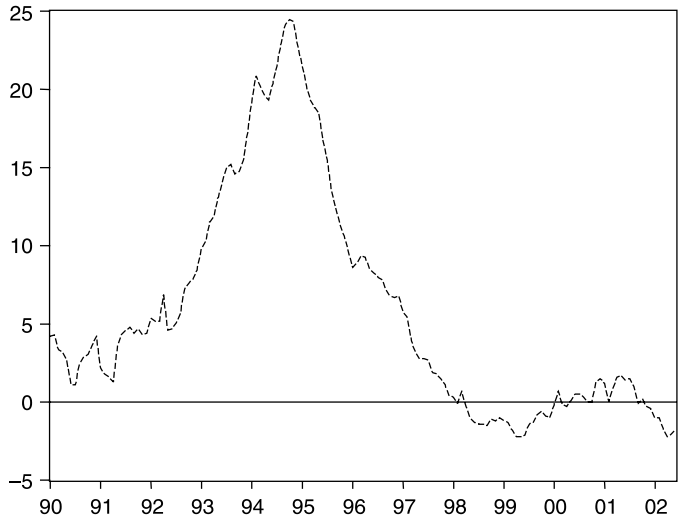


*Figure 12.1* Annual inflation rate (%).

conclude that monetary variable has significant impact on the price level. However, if there is no Granger causality from money to price, then money is ineffective and money supply may not be chosen as a monetary policy instrument for the central bank.

One of the biggest challenges to our research is the frequent structural changes in the Chinese monetary system. This implies that both the lags and the parameters of the VAR model are not constant over time. Therefore we apply a rolling estimation approach on the VAR models to conduct our Granger causality tests from money to price.

The main findings of the chapter are that the monetary variables have become impotent to the price level in the deflation era started from 1998. This conclusion is consistent with the recent development of the neo-Keynesian macroeconomic model which predicts that the monetary expansion is less effective in an environment of deflation (e.g., Svensson, 2003).

Since the seminal paper by Lucas (1972) and its further development by Sargent and Wallace (1976), the neoclassical doctrine holds the view that the anticipated monetary changes are impotent. Only the monetary shocks may generate significant impact on the economic variables such as GDP and prices. This view was initially supported with empirical evidence by Barro (1977). However, it was subsequently challenged by neo-Keynesian economists both theoretically and empirically.

For example, Mishkin (1982) was the first to challenge the monetary neutrality hypothesis based on his empirical evidence. Mankiw and Romer (1991) collected some representative theoretical work that provides microeconomic foundations for wage and price rigidity that violate the conditions under which the money neutrality holds. Latest development in this area can be found in, for example, Clarida *et al.* (2002).

The money neutrality hypothesis is also under much debate in China. The debate is especially important after witnessing the recent Asian financial crisis (Tsang and Ma, 2002) and China's accession to the WTO (Ma, 2001). Li and Ma (1996) and Zhao *et al.* (2002) showed that the gradual economic reform and price stickiness provide the microfoundation of money non-neutrality in China. Liu (2001) found a significant effect of monetary supply over the period of 1987–2000. Tsang and Ma (1997, 2000) found that there was significant monetary impact on the economy of mainland China based on a simulation model. However, Sun (2000) explained theoretically why money supply is decreasingly effective during a deflationary period. It is due to the inefficiency of the monetary transmission mechanism in China. This conclusion was supported by empirical evidence by Lu and Shu (2002). Nevertheless, all of the empirical works reviewed above are based on a conventional constant-parameter–constant-structure econometric approach that is subject to model mis-specification due to the frequent structural changes in China (Ma *et al.*, 2002, 2003). Another drawback of these researches is that they are all based on Johansen's (1991) maximum likelihood estimation (MLE) and therefore are subject to the pre-test bias. To overcome both problems of structural changes and pre-test bias, this chapter adopts the surplus lag VAR

(Lutkepohl and Burda, 1997) rolling estimation method (Swanson, 1998) to examine the effectiveness of the monetary policy in China.

The remainder of the chapter is organized as follows. The next section discusses in detail our procedure to test Granger causality in a system with frequent structural changes. In the 'empirical evidence' section this procedure is implemented to investigate the effectiveness of the monetary variables in China. Finally, the last section concludes.

## Procedure to test Granger causality in a system with frequent structural changes

Granger (1996) pointed out that the structural instability may be the most important problem facing researchers today. This section lays out the econometric testing procedure we adopt carefully in this chapter to overcome the problem of structural changes and to minimize the pre-test bias for the Granger causality test. The structure of this section is given as follows.

First, we discuss how to determine the structure of the VAR model we will utilize to investigate the effectiveness of the monetary variables in China. This is achieved by choosing the appropriate lag length of the macroeconomic variables in the model. Second, we explain how to present the evidence on the instability of the Chinese monetary system. We apply the recursive Johansen (1991) maximum likelihood estimation (MLE) to the VAR model to investigate its changing statistical properties in terms of non-stationarity of the time series and possible number of cointegration relations. Third, we lay out the testing procedure for Granger causality from money to price by surplus lag estimation developed by Lutkepohl and Burda (1997) to minimize the pre-test bias. Finally, we show how to implement the rolling window estimations on the VAR to compare the effectiveness of monetary variables over the inflation and deflation periods.

Following the recent development of the monetary economics research by Estrella and Mishkin (1997) and Friedman and Kuttner (1992), we choose our economic model as trivariate vector autoregressive (VAR) of money ($m$), price ($p$), and real GDP ($y$), all in logarithms. Let $X_t = (m_t, p_t, y_t)$ be the vector of the three variables.

Our sample is monthly data ranging from January 1990 to June 2002, a total of 150 observations. Three definitions of money supply will be utilized: M0, M1 and M2. The price variable is defined as consumer price index with 1990 as the base year. Real GDP is in constant 1990 prices. Since only quarterly real GDP time series is available, we applied the best linear unbiased method developed by Chow and Lin (1971) to interpolate the monthly real GDP series from the monthly real industrial value-added series (IVA), together with the quarterly series of real GDP and real IVA. We utilize seasonally adjusted series of real GDP, money and price. All variables are expressed in logarithms. The data are collected from various issues of *International Financial Statistics* published by the International Monetary Fund. The inflation and deflation are defined as the year-to-year change of consumer price index (CPI) to be positive and negative, respectively (cf. Figure 12.1).

***Choice of lag length in a VAR model***

There are some commonly used procedures to choose the lag length of a VAR system in the existing literature. One of them is starting from a maximum lag length and then testing down the significance of the longest lags. This is called the 'general-to-specific' approach. Another one is starting from a minimum lag length and then expanding the VAR by accepting the significant extra lagged variables added in. This is called the 'specific-to-general' approach. However, in our opinion, both approaches of lag selection are not appropriate in testing the Granger causality. This is because both approaches involve testing the causal variables implicitly that may create a pre-test bias. For example, when we test the significance of the lagged money variable $m_t$ in the price equation to choose the optimal lag for $m_t$, we are actually testing the causality from $m_t$ to price implicitly. This may create potential pre-test bias. As a result, we adopt an alternative lag selection approach which is the Schwarz information criterion (SIC). The SIC is a consistent estimator for the lag length (Lutkepohl, 1993). That is, when the sample size approaches infinity, the estimated order will converge in probability to the true order of the VAR process.

***The non-stationarity of the time series and possible number of cointegration relations***

Given the lag length $q$ for a VAR model of $X_t$ selected by the SIC, we have:

$$X_t = B_0 + \sum_{j=1}^{q} B_j \Delta X_{t-j} + U_t \tag{12.1}$$

we can re-parameterize it as:

$$\Delta X_t = A_0 + \sum_{i=1}^{q-1} A_i \Delta X_{t-i} + \prod X_{t-i} + U_t \tag{12.2}$$

where

$$\Delta X_t = X_t - X_{t-1},\ A_0 = B_0,\ A_i = -\sum_{j=i+1}^{q} B_j\ (i = 1, 2, \ldots, q-1),$$

$$\prod = -I + \sum_{j=1}^{q} B_j$$

Applying the Johansen MLE approach to estimate the $r = \text{rank}(\Pi)$ gives the following two possible alternative outcomes:

1. matrix $\Pi$ has full rank, $r = 3$, i.e. all $X_t$ are stationary, or
2. matrix $\Pi$ does not have full rank, $0 \leq r < 3$, i.e. some of $X_t$ are non-stationary and the number of cointegration vectors is $r$.

However, there are frequent structural changes in the Chinese monetary system. This implies that the parameters of $(A_i, \Pi)$ $(i = 0, 1, 2, \ldots, q-1)$ are not constant over time. Therefore we apply the recursive Johansen MLE to the VAR model in (12.1). That allows us to investigate the possible changes of $(A_i, \Pi)$ as well as the rank of $\Pi$ over time. It can be regarded as a stability test for the monetary system in China.

***Test the Granger causality by surplus lag estimation***

To avoid the pre-test bias that may arise from the integration and cointegration tests, we apply the surplus lag estimation to test the Granger causality from money to price. Suppose the lag length is chosen as $q$ by the SIC. We estimate a VAR with $q+1$ order and then only apply the Wald test on the coefficients of the variables with lags up to $q$ to conduct the Granger causality test (Lutkepohl and Burda, 1997). Assume the $(q+1)$-order VAR is given as:

$$X_t = B_0 + \sum_{j=1}^{q+1} B_j X_{t-j} + U_t, \tag{12.3}$$

of which we are particularly interested in the price equation rewritten as:

$$\begin{aligned} p_t = \beta_0^p &+ \beta_1^{mp} m_{t-1} + \cdots + \beta_q^{mp} m_{t-q} + \beta_{q+1}^{mp} m_{t-q-1} \\ &+ \sum_{j=1}^{q+1} \beta_j^p p_{t-j} + \sum_{j=1}^{q+1} \beta_j^{yp} y_{t-j} + u_t^p. \end{aligned}$$

Then the hypothesis of Granger non-causality from money to price ($m_t \to p_t$) is to test only the following $q$ parameters to be zero:

$$H_0 : \beta_1^{mp} = \beta_2^{mp} = \cdots = \beta_q^{mp} = 0. \tag{12.4}$$

Suppose we apply the OLS estimator to equation (12.3), then the Wald statistic is:

$$\text{Wald} = \hat{\beta}' V^{-1}(\hat{\beta}) \hat{\beta} \sim \chi^2(q).$$

where $\beta = (\beta_1^{mp}, \beta_2^{mp}, \ldots, \beta_q^{mp})'$, $\hat{\beta}$ is the estimated coefficient vector of $\beta$, and $V^{-1}(\hat{\beta})$ is the estimated variance-covariance matrix of $\hat{\beta}$.

If the Wald test accepted the $H_0$, then the conclusion is that $m_t$ does not Granger cause $p_t$. That is, money is neutral. However, if $H_0$ is rejected, then we conclude that $m_t$ Granger causes $p_t$, i.e., money has significant impact on the price level.

***Fixed window rolling regression***

To accommodate the frequent structural breaks in the Chinese monetary system, we apply the fixed window rolling regression to the level VAR model defined in

equation (12.3). Rolling regression means we run a series of regressions with fixed sample size in each regression, i.e. fixed window size. Here we use only 5-year monthly observations to run a regression each time, i.e. each window size is fixed to 60 observations. The choice of 60 observations in each window has taken account of the two conflicting demands: (1) the degree of freedom of estimation demands for a larger sample size to estimate the parameters accurately, whilst (2) the potential structural change of the model requires a smaller sample size to reduce the risk of containing a structural break within the sample period. We follow the recommendation by Zapata and Rambaldi (1997) that a minimum of 50 observations is necessary to balance the conflict of the two demands.

The details of the window definitions are given as follows. The 1st regression window uses the observations from January 1990 to December 1994 (the window size is 60). Then we roll the regression window forward by simultaneously adding one new observation of January 1995 and dropping one last observation of January 1990 from the 1st window. Hence the new window's size remains being fixed at 60 observations. Repeat this until we reach the 91st regression window for the period of July 1997 to June 2002.

The lag length is chosen by the SIC in each regression. This indicates that the number of lags of the VAR model is also allowed to be time-varying to fully capture the structural changes due to the major monetary reforms in China.

## Estimation results

We have three VAR systems corresponding to M0, M1 and M2 respectively. Each VAR has three variables: $L_p$, $L_y$, and $L_{mj}$ ($j = 0, 1, 2$), which represent log of price, real GDP and $M_j$, respectively, as discussed in the previous section.

## Empirical evidence on the instability of the Chinese monetary system

Figure 12.2 presents the time-varying lag lengths of the three VAR models of ($L_{mj}$, $L_p$, $L_y$) ($j = 0, 1, 2$) under the rolling regressions discussed in the 'Fixed window rolling regression' section. These lags are estimated by the 91 windows illustrated in the section. The vertical axis of Figure 12.2 shows the lag length estimated in a corresponding window given by the date on the horizontal axis. The horizontal axis defines the 5-year windows of fixed size that finishes at the date given at the horizontal axis, and starts 5 years earlier.[2] For example, in Figure 12.2(a), the first date of December 1994 with an estimated lag three indicates that the optimal lag length of the VAR model ($L_{m0}$, $L_p$, $L_y$) in the first window is lag three according to the SIC. It also tells us that this window starts from January 1990 and finishes in December 1994, given the fact that the window size is fixed to 5 years. Similarly, the date of June 2002 corresponds to the last window, i.e., the 91st window. This window starts from July 1997 and finishes at June 2002. The optimal lag for the VAR model ($L_{m0}$, $L_p$, $L_y$) is one in this window.

The lag lengths are chosen to minimize the SIC in each window. Figure 12.2 shows that frequent structural changes occurred during the period of December

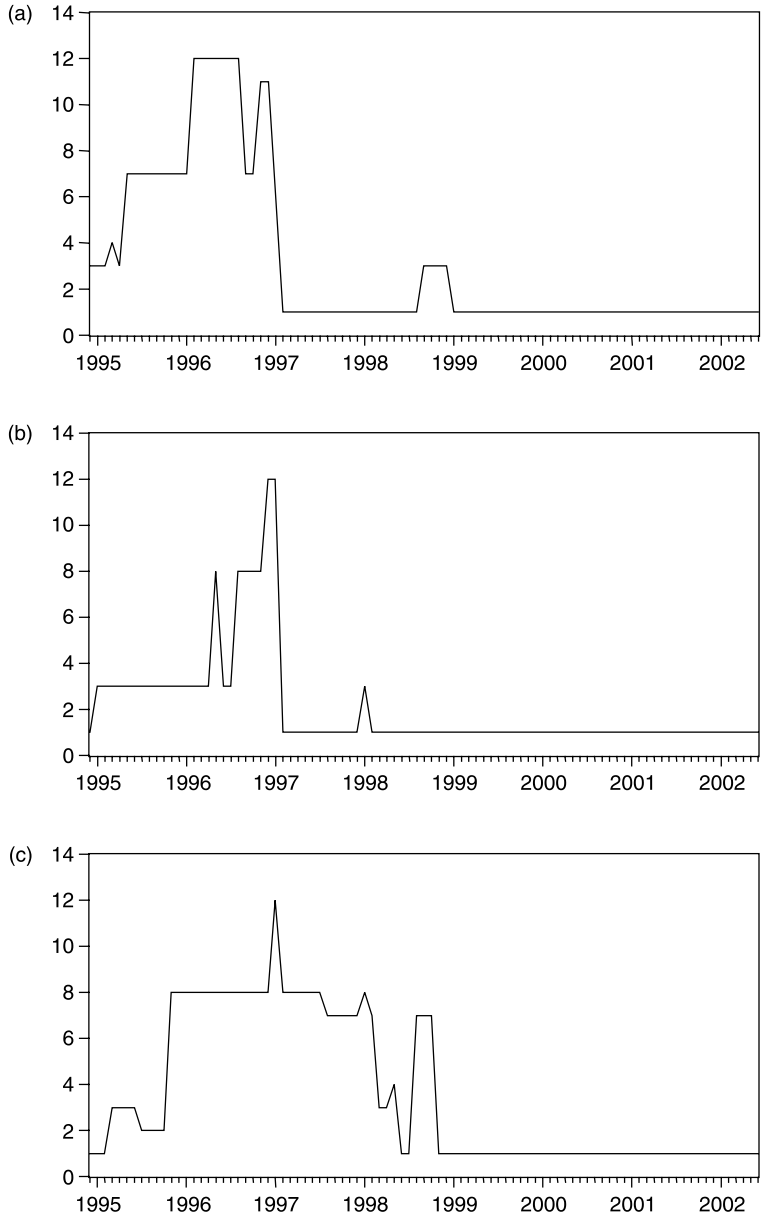


*Figure 12.2* (a) Lags of VAR: ($L_{m0}$, $L_p$, $L_y$); (b) Lags of VAR: ($L_{m1}$, $L_p$, $L_y$); (c) Lags of VAR: ($L_{m2}$, $L_p$, $L_y$).

1994 to December 1998 in all three VAR models. However, all estimated lag lengths eventually stabilized at lag one since January 1999.

Figure 12.3 displays the *p*-values of the augmented Dicky–Fuller (ADF) and Phillips–Perron (PP) unit root tests for the five time series of $L_{mj}$ ($j = 0, 1, 2$), $L_p$ and $L_y$. The tests are based on the fixed window rolling regressions again. The null hypothesis of both ADF and PP tests is that a time series is non-stationary. A straight solid line of 5 per cent significance level is drawn in each of the figures. If a *p*-value of the test statistic is below the 5 per cent significance line, it indicates that the time series is stationary in the corresponding estimation window. However, if a *p*-value is above the 5 per cent line, then it implies that the time series is non-stationary for that corresponding period.

It is shown from Figure 12.3 that all five time series exhibited structural breaks. Non-stationarity could be found in the early estimation periods whilst stationarity could be accepted in the later estimation windows. Furthermore, the ADF and PP tests also generate conflicting results regarding the stationarity of some of the time series from time to time. For example, in the figure for the log of price ($L_p$), the ADF test indicated that $L_p$ became stationary in the later estimation periods, whilst the PP test indicated that $L_p$ remained non-stationary throughout all the regression windows. This creates uncertainty on the statistical inference for the subsequent Granger causality tests that may generate pre-test bias for the final conclusion about the effectiveness of the monetary variables.

Figure 12.4 shows that the number of cointegration vectors, i.e., the number of long-run relationships, among the three VAR models for ($L_{mj}$, $L_p$, $L_y$) ($j = 0, 1, 2$), respectively. It is estimated by the Johansen maximum likelihood estimation (MLE) (Johansen, 1991) by the rolling windows again. All three VAR models have experienced frequent long-run structural breaks. These breaks are indicated by the changes of the number of cointegration vectors ($r$) in different estimation windows, ranging from no cointegration ($r = 0$), to one ($r = 1$) or two ($r = 2$) cointegration vectors. These structural breaks may also generate pre-test bias for the subsequent Granger causality, as explained in 'The nonstationarity of the time series and possible number of cointegration relations' section.

To conclude, all of the findings from Figures 12.2, 12.3 and 12.4 show that the Chinese monetary system has experienced significant structural breaks and uncertain statistical properties over the period of January 1990 to June 2002. As a result, this chapter adopts a different estimation strategy to bypass the potential pre-test bias and, as explained in the 'Test the Granger causality by surplus lag estimation' and 'Fixed window rolling regression' sections, uncertainty in statistical inference from unit root tests and Johansen MLE. We utilize the surplus lag estimation approach developed by Lutkepohl and Burda (1997) recursively to examine the effectiveness of the monetary variables in China.

### *Empirical results of effectiveness of monetary variables*

Figure 12.5 presents the *p*-values of the Granger causality tests from $L_{mj}$ to $L_p$ ($j = 0, 1, 2$) based on rolling window regressions defined in the 'Fixed window

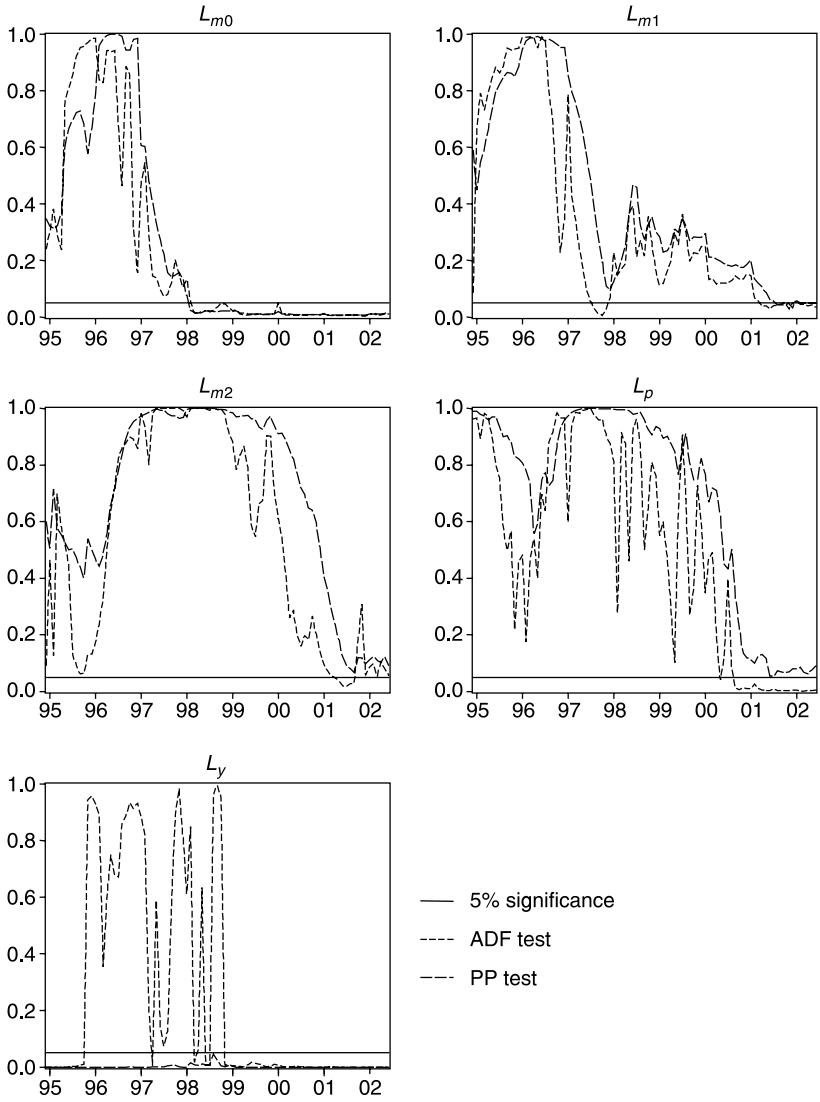


*Figure 12.3* *P*-values of ADF and Phillips-Perron (PP) tests.

rolling regression' section. The test is conducted by the surplus lag estimation approach developed by Lutkepohl and Burda (1997). A straight line of 5 per cent significance level is also drawn in these figures. If a *p*-value of the test statistic is below the 5 per cent significance line, it indicates that there is evidence of Granger causality from money to price in the corresponding estimation window. However, if a *p*-value is above the 5 per cent line, then it implies that there is no

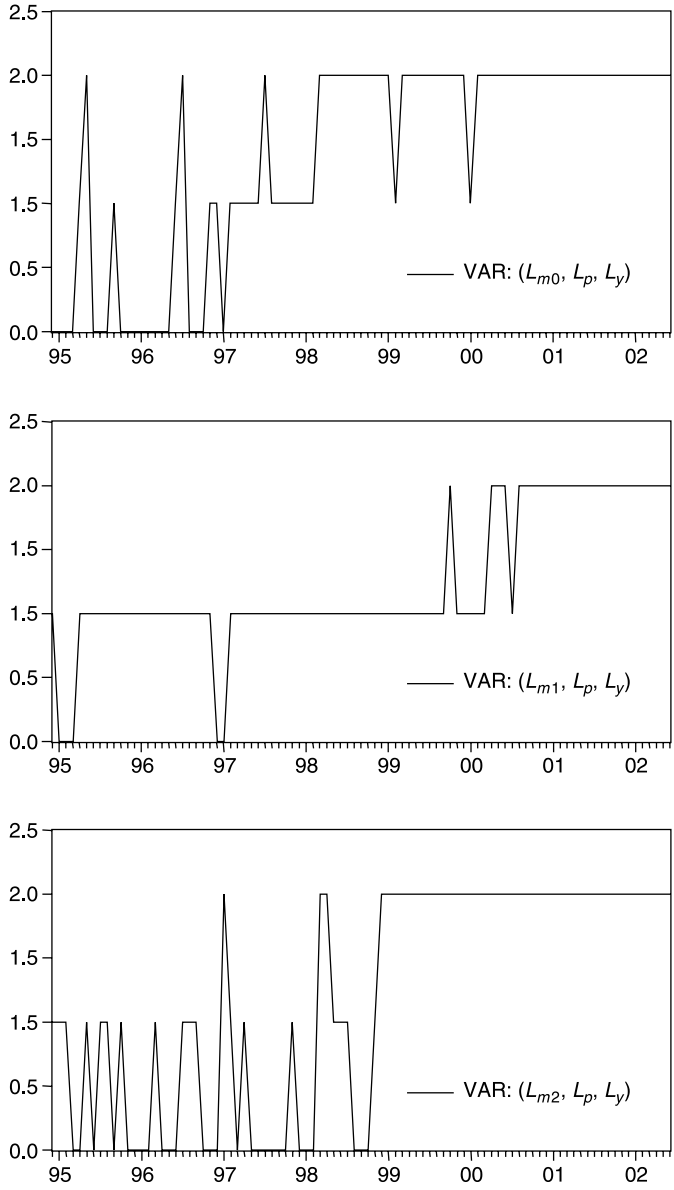


*Figure 12.4* Number of cointegration vectors by Johansen MLE of VAR ($L_{mj}$, $L_p$, $L_y$), $j = 0, 1, 2$.

evidence of Granger causality from money to price in that window, which means money is ineffective for that corresponding period.

Figure 12.5(a) displays the $p$-values of the Granger causality tests from $L_{m0}$ to $L_p$. It shows that $L_{m0}$ has been significantly Granger causing $L_p$ for the entire inflation

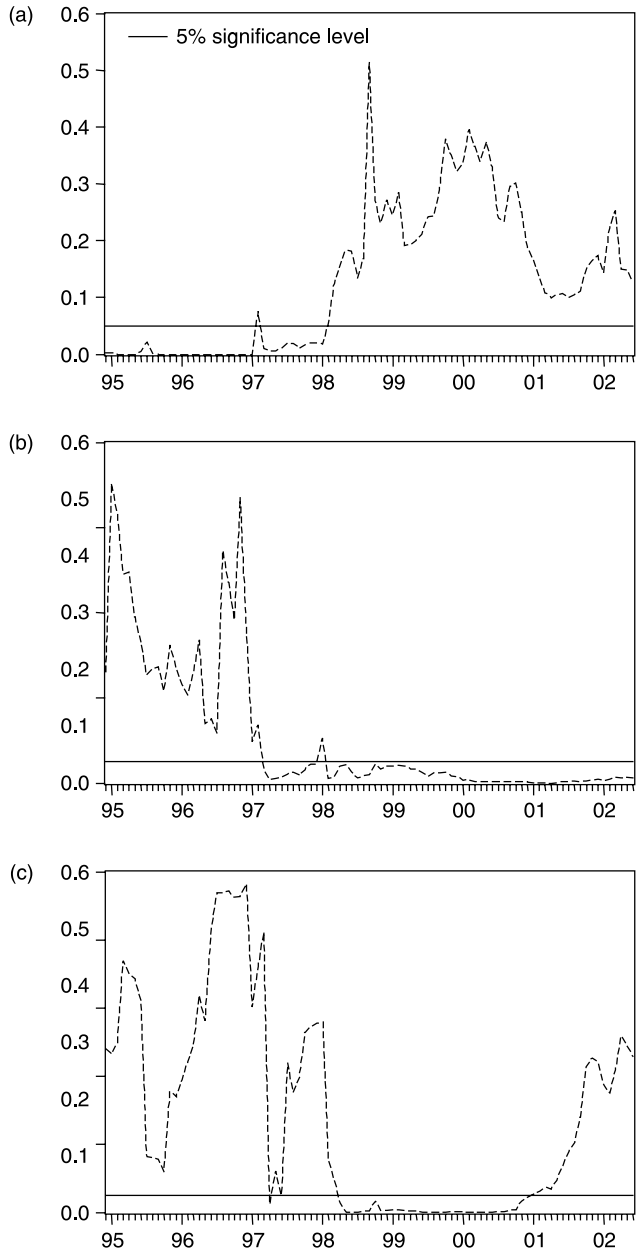


*Figure 12.5* *P*-values of Granger causality test of $L_{mj} \Rightarrow L_p$ ($j = 0, 1, 2$). (a) $L_{m0} \Rightarrow L_p$; (b) $L_{m1} \Rightarrow L_p$; (c) $L_{m2} \Rightarrow L_p$.

period until January 1998. However, it started to Granger cause $L_p$ insignificantly since February 1998. Since the deflation era started from February 1998 (see Figure 12.1), this indicates that the M0 became impotent during the deflation period in China.

Figure 12.5(b) exhibits that $L_{m1}$ does not Granger cause $L_p$ until February 1997. Since then, it starts to Granger cause $L_p$ significantly in most of the regressions. This indicates that the monetary variable is effective in these estimation periods. However, we found that the effectiveness of M1 has been declining. This conclusion is supported by regressing the log of coefficients of lagged $L_{m1}$, $\beta_{1t}^{mp}$ [cf. equation (12.4)], on a constant and a linear time trend. This regression result is given as:

$$\underset{}{\text{Ln}(\beta_{1t}^{mp})} = \underset{(18.97)}{-1.56} \quad \underset{(6.26)}{-0.0072 * (\text{time trend})} + u_{1t}.$$

Estimation period, January 1999 to June 2002; adjust $R^2 = 0.48$, $\sigma_{u1} = 0.09$, where $t$-values are given in the parentheses.[3]

This shows that the effectiveness of M1 measured by the coefficient of $\beta_{1t}^{mp}$ is declining at the speed of 0.72 per cent each month.

Figure 12.5(c) reveals that $L_{m2}$ does not Granger cause $L_p$ for most of regression windows until March 1998. Since then, $L_{m2}$ Granger causes $L_p$ up to December 2000. After that, there is no Granger causality again from $L_{m2}$ to $L_p$. We also found that the effectiveness of M2 has been decreasing. This evidence is discovered by regressing the log of coefficients of lagged $L_{m2}$, $\beta_{2t}^{mp}$ [cf. equation. (12.4)], on a constant and a linear time trend. This regression result is given as:

$$\underset{}{\text{Ln}(\beta_{2t}^{mp})} = \underset{(10.25)}{2.24} \quad \underset{(16.29)}{-0.050 * (\text{time trend})} + u_{2t}.$$

Estimation period, January 1999 to June 2002; adjust $R^2 = 0.87$, $\sigma_{u2} = 0.24$, where $t$-values are given in the parentheses.[4]

This regression implies that the effect of M2 measured by the coefficient of $\beta_{2t}^{mp}$ is falling at the rate of 5 per cent per month. Since the deflation in China began from February 1998 (see Figure 12.1), the results of M1 and M2 both indicate that the money is getting weaker and weaker impact on the price level in the deflation period.

The policy implication of our findings is that an alternative policy such as the fiscal policy may be more useful in the deflation period due to the declining effectiveness of the monetary variables. This is consistent with the recent practice of the Chinese government emphasizing an active fiscal policy to maintain the economy on a high growth track.

## Conclusion

This chapter formally investigates the effectiveness of monetary variables in the two regimes of inflation and deflation, respectively. We applied the Granger

causality test on the vector auto-regressive (VAR) models to achieve this objective. One of the biggest challenges in our research is frequent structural changes in the Chinese monetary system. This implies that both the lags and the parameters of the VAR model are not constant over time. Therefore we apply the surplus lag estimation recursively to conduct our Granger causality tests from money to price. The main findings of the chapter are that money has become less effective to the price level in the deflation era started from 1998.[5] This conclusion is consistent with the recent development of the neo-Keynesian macroeconomic model which predicts that the monetary expansion is less effective in an environment of deflation. The policy implication is that money supply should not be considered as an effective monetary policy instrument to stabilize price level during the deflation periods in China. It provides some empirical evidence to support the Chinese government to adopt an alternative policy such as an active fiscal policy in the era of deflation.

## Notes

1. We are grateful for useful suggestions and comments from Jian Chen, the editor, Chor-Yiu Sin and the participants of the 14th Chinese Economic Association (UK) Annual Conference, Middlesex University, London, UK, 14–15 April 2003. This research was supported in part by a Competitive Earmarked Research Grant (No. LU3110/03H) from the RGC of Hong Kong SAR Government and a research grant from Lingnan University, Hong Kong (No. DR03B3). We are also grateful for the financial support from 'Macroeconomic policy research in China during transition' project led by Prof Ruifang Wang, Macroeconomic Research Centre of Xiamen University, and a research grant from China's National Philosophy and Social Science Research Foundation (No. 05BJL056). However, we are responsible for any remaining errors.
2. Similar interpretation applies to the horizontal axis in all of the subsequent figures.
3. We chose the starting date of estimation as January 1999 because the orders of all three VAR models ($L_{mj}$, $L_p$, $L_y$) ($j = 0, 1, 2$) have been stabilized to one lag. This simplifies the measure of M1 to only the coefficient on the lag one of $L_{m1}$, i.e., $\beta_{1t}^{mp}$ [cf. equation (12.4)].
4. See note 3.
5. For the reverse Granger causality from inflation to money supply, see Sun and Ma (2004b).

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# 13 China's rural economy and the path to a modern industrial state

*Jikun Huang, Keijiro Otsuka and Scott Rozelle*

## Introduction

The *East Asian Miracle* is generally regarded as one of the most successful development paradigms in the 20th century. In the making of the miracle, Japan, Korea and Taiwan – among other nations – experienced rapid transformations from rural to urban societies based on industry rather than agriculture as their main sources of income. During the *takeoff periods* large fractions of the rural population moved off the farm into urban manufacturing jobs, fueling sharp rises in productivity and incomes. Almost as important, during their industrialization and urbanization phases leaders were able to reduce poverty among those left in rural areas and maintain a healthy agricultural sector, thereby attenuating trends towards increased inequality (Johnston, 1970). The ability to increase or at least maintain the income and asset levels of those left behind in rural areas during and after the initial waves of migration played a key role in giving the rural population the means to sustain the drive to modernization. The process of rapid urbanization and industrialization depended in no small way on the human capital and other investments made by rural households.

In many ways China's development during the past two decades has been generating a new East Asian Miracle. Starting with a largely rural population that was largely engaged in farming, many rural residents have reoriented their livelihood strategies since the early 1980s. Off-farm work has emerged as a main source of income growth for many rural households (Lohmar, 1999; Kung, 2002). Migration has become the most common way for rural labourers to get a job off the farm (de Brauw *et al.*, 2002). Up to 100 million migrants now reside outside of their home villages. More than 75 per cent of 16 to 20 year olds work off the farm; most of them work in cities far away from their homes. Most of the young workers, unlike those in the past, are now specializing in off farm work; few have worked a day on the farm in many years, if ever. When not working for a wage, many households are investing increasing amounts of capital and using more sophisticated technologies in their family-owned businesses and privately run factories (Mohapatra, 2004). To an extent only experienced in other East Asian nations, a veritable flood of young and relatively well-educated workers has been flowing towards China's cities and into industrial jobs in recent years.

Despite the historical similarities, however, China is confronting a number of challenges which in many ways exceed in complexity those that were faced and overcome by Japan, Korea and Taiwan. When Japan was in its period of rapid transformation in the pre- and post-Second World War periods, it aggressively used trade barriers and other pricing measures to raise the returns to farming and increase the value of the assets of rural residents; Korea and Taiwan implemented similar policies in the 1960s and 1970s. Even though there is little doubt that leaders in these East Asian nations pursued the policies at a high cost to society, such trade and pricing practices – along with other investments – helped to keep rural incomes and asset values high and contributed to the reduction in poverty and rise in rural incomes during the periods of rapid industrialization. When rural households were endowed with greater incomes and wealth, undoubtedly they were better able to make the investments that allowed them and their children to continue an active and productivity-enhancing role in the process of industrialization and urbanization through the 1950s, 1960s and 1970s in the case of Japan and through the 1980s and 1990s in the cases of Korea and Taiwan.

It is important to note for our study that the trade and other agricultural protectionist policies in Japan, Korea and Taiwan were implemented singularly without the aid of free commodity markets and without changing the fundamental structure of the farms – either in terms of operational or ownership size or in terms of production patterns. China, by contrast, is going through the early stages of development in an environment in which reliance on input provision by parastatals and output price subsidies through subsidies paid through government programmes as a means to ensure a minimum standard of living for rural households are no longer an option. Instead, China's WTO accession agreement and its own internal reforms have committed the nation to making its transition in an environment in which producers and consumers, including those that work and live in poor rural areas, will need to gain access to factors of production and make their incomes mainly through markets at prices that are at or near competitive international levels.

In facing such challenges the question that is naturally raised is whether or not the rural economy is organized in such a way that it can support the healthy and sustained transformation that will have to occur for China to become a modern country. Without at all minimizing the difficulties that China must overcome to create the jobs for the rural workforce, in our chapter we are concerned primarily with another dimension of the development process: the income earning and investment capacity of those left in the rural sector. The key question is whether or not a majority of rural households will be able to use the resources at their disposal – mainly land and labour – to generate rising levels of income and savings from farming and other rural-based enterprises that can be used to finance China's industrial transformation.

In the process of modernization, rural households need access to financial assets for several reasons. First, households require capital to finance their move or that of their children to the cities when job opportunities present themselves. For those without the wherewithal to make the move in the immediate future, liquidity is

needed to invest in the education of the household's children in order to increase their opportunities for employment in the future. Finally, rural households need rising incomes and increasing access to productive resources during periods of rapid transition so they do not believe themselves to be disenfranchised or helplessly mired in poverty. If farm households have expectations that their lives or the lives of their children will be better off, it is highly unlikely that they will be willing to participate in activities that would undermine the stability of rural areas. However, if rural households do not believe their lives will get better, the probability will increase that some individuals will turn to less productive, illegal and/or violent activities that can be destabilizing to both the local and overall economy. Surprisingly, despite the importance of such questions at this stage of China's development, there is almost no work examining the overall nature of the rural economy. We believe an effort is needed to understand if rural China is currently (or is tending to be) organized in a way that will support a healthy development process.

To overcome this shortcoming in the literature, the overall goal of this chapter is to make an assessment of China's rural economy. In doing so, we will attempt to understand if rural producers are operating in an environment in which we should expect them to enjoy rising incomes and assets. In general, we will try to understand if rural producers have the means at their disposal to either increase the efficiency of their resource base or expand that base or both. In order to meet this goal, we have three specific objectives. First, we examine whether or not the farming operations that semi-rural households engage in have increased their productivity during the past two decades and if they have we want to know what has been the source of the rise in productivity, and the possibility that the factors behind the productivity rise will continue to be present in the future. Rises in productivity will increase rural incomes by raising the efficiency of the production process. Second, we examine the development of commodity markets in rural China. If markets are functioning, households should be able to begin to specialize and make more efficient allocations of their resources; specialization and increased allocatative efficiency both increase farm household incomes. Finally, given the importance of rural China's most scarce resource, land, we will examine the nature of land rental markets. In particular, we want to understand how well rental markets are operating. It is important to that if farm households that have not yet migrated need land, whether or not they can get access to it.

In the pursuit of such a broad set of objectives, we necessarily need to narrow the scope of our analysis. To do so, we ignore a number of important issues. Above all, in this chapter we are only examining part of the rural environment: the availability of technology and the nature of commodity and land rental markets. If China's agriculture is becoming increasingly productive and if commodity and labour markets function adequately, it means that if opportunities for profitable opportunities for rural households arise (e.g., from access to international trade opportunities or the support of new technologies through the nation's investments in research and development), farmers should be able to benefit and enjoy the fruits of such investments in the form of rising incomes. It should be noted, however,

that although efficiency-enhancing technologies and well-functioning markets are necessary for a developing country in the 21st century, they are not sufficient. In addition, rapidly developing rural economies also need rural financial markets, a well-designed fiscal regime and a system of rural governance that will give those in the rural economy a way to make their leaders make the complementary investments in public goods and institutional innovations that will raise the returns to well-functioning land and labor markets. Despite their importance, we do not examine these aspects of the rural economy. Instead, to be perfectly clear, if in the course of our analysis we find that China's research and development systems are creating efficiency-enhancing technologies and that markets for commodities and cultivated land function effectively, we believe that these are good signs that the rural economy is developing, but we also know that these are only the necessary ingredients for promoting the rises in rural incomes that are needed for the transformation of an economy from rural to urban and from agricultural to industrial. There are other investments and institutional changes that we do not discuss in this chapter.

## Agricultural productivity, technology and the future efficiency of farming

Scientists and policy makers in the international community, in both developing and developed countries, recognize the importance that agricultural technology and its extension has played in promoting the expansion of supply and increased productivity in the world over the past 30 years. Alston *et al.* (1995) have documented the importance of rising total factor productivity in the agricultural sector in the US. Hayami and Ruttan (1985) document the role that agricultural technology played in Japan's development. In the developing world, Rosegrant and Evenson (1992) have documented the importance of new varieties and extension effort on Indian total factor productivity. Pingali *et al.* (1997) review the contributions made by the Green Revolution in South and Southeast Asia. Much of the world's early economic growth has been shown to be tied closely with the productivity of the agricultural sector.

While important in the rest of the world, less is known about the overall productivity of China's agricultural economy; instead, more attention has been given to the rise in partial productivity measures, such as yields and output. During China's reform period, the rapid and monotonic expansion of the real output of major food crops has ranked as one of the nation's great achievements, although a significant portion of that gain arises from the mobilization of inputs (Stone, 1993). The output of rice, wheat and maize rose sharply between 1982 and 1995 (Figure 13.1, upper line on each graph). Rice production increased by 20 per cent, wheat by 80 per cent and maize by 95 per cent during the 1980s and early 1990s. At this point in China's development, however, technological improvements do not account for all of the growth. Indices of aggregated inputs (that is, measures of land, labour and material inputs) for rice, wheat and maize actually fell for all the crops during the early 1980s (Figure 13.1, lower line on each graph). The drop

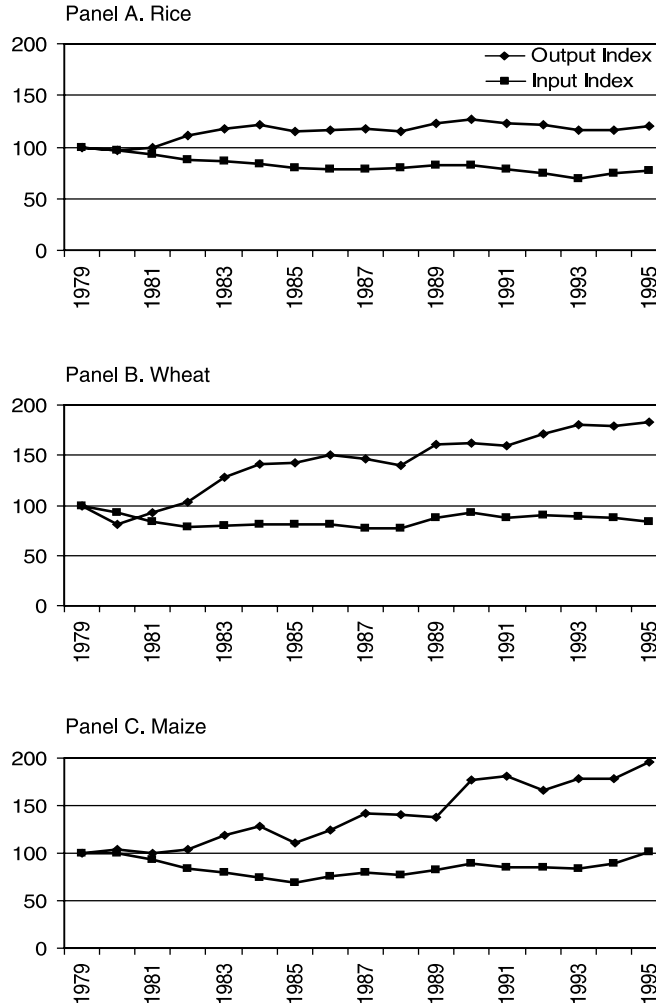



*Figure 13.1* Output and input indices for major rice, wheat and maize growing provinces in China, 1979–1995.

*Source*: Authors' calculation based on Divisia–Tornquist formula, Jin *et al*. (2002).

in inputs, while output has been rising, will by itself lead to higher TFP measures. While land and labour fell during the early 1980s before stabilizing during the late 1980s and 1990s, material inputs, including fertilizer, pesticide and other material factors rose sharply throughout the period, increasing at an annul rate of 32 per cent for rice, 26 per cent for wheat and 30 per cent for maize (China National Statistical Bureau, 2003). Lin (1992) and Huang and Rozelle (1996) show that rising purchased inputs account for a significant part of the increase in output during the 1980s and 1990s.

While changes in inputs account for a substantial part of the increase in output during the last 20 years, China's future food supply increases will not be able to rely on inputs as much as in the past. The rise in fertilizer and pesticide use sharply slowed in the 1990s. High levels of fertilizer and pesticide use in many regions of the country mean that the decelerating trends may continue. Other correlates of development, such as rising wage rates, environmental awareness and resource limitations mean that there will be pressures on farmers to reduce inputs more. As the importance of technological change grows, our need to understand the record of past TFP performance and its determinants also rises.

### *The record on TFP*

Historically estimates of China's cropping TFP have been controversial, arriving at significantly different conclusions. Poor data and *ad hoc* weights may account for the debates and uncertainty over pre- and post-reform productivity studies. In the past, researchers gleaned data from a variety of sources; they warn readers of the poor quality of many of the input and output series (Stone and Rozelle, 1995).

To overcome this problem, we use data that have been collected for the past 20 years by the State Price Bureau. Using a sampling framework with more than 20 000 households, enumerators collect data on the costs of production of all of China's major crops. The data set contains information on quantities and total expenditures of all major inputs, as well as expenditure on a large number of miscellaneous costs. Each farmer also reports output and the total revenues earned from the crop. Provincial surveys by the same agency supply unit costs for crops and have detailed information on input use. During the last several years, these data have been published by the State Development and Planning Commission ("The Compiled Materials of Costs and Profits of Agricultural Products of China", SPB, 1988–1998). The data have previously been used in analyses on China's agricultural supply and input demand (Huang and Rozelle, 1996; Rozelle *et al.*, 1996; World Bank, 1997). We use standard, modern methods to calculate TFP trends for China's agriculture.[1]

Although there are differences over time and across space, in general, China's TFP has risen at a healthy rate of about 2 per cent per year during the reform era (Figure 13.2). The national levels of TFP of all crops rise rapidly in the early 1980s, the earliest period of China's reforms. Such an unparalleled rise in TFPs, however, could not be sustained. In fact, for a period of five years in the late 1980s, there was a stagnation in TFP growth; the average TFPs of our sample provinces were at about the same level in 1990 as they were in 1985 for all crops. The rise in TFP, however, restarted in the 1990s. Although TFP growth patterns for all of the crops aggregated to the national level are similar, trends of the various sample provinces – even within a crop – vary sharply. For example, wheat TFP rises 3 to 4 per cent annually in Hebei and Shandong Provinces, but less than 1.5 per cent annually in Sichuan and Shanxi Provinces. Overall, however, a growth rate of 2 per cent is above the rate of population growth and is considered strong by international comparisons, about the same as the US during the 20th century and as Japan in the post-war period.

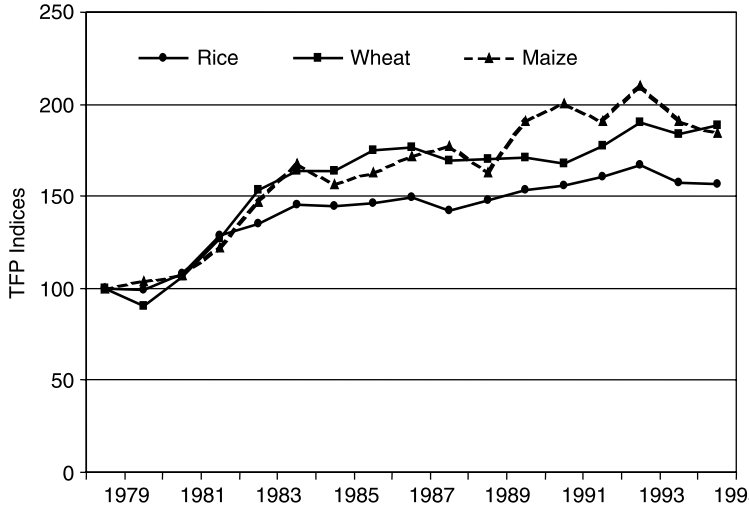



*Figure 13.2* Total factor productivity indices (sown area weighted average) for rice, wheat and maize in China, 1979–1995.

To examine the relative size of the impact of different factors, we use the work of Jin *et al.* (2002) that produces estimates of the determinants of TFP change on China's provinces over time and then performs a decomposition exercise on rice, wheat and maize. According to Jin *et al.* (2002), between 1981 and 1995, the TFP of China's rice (Table 13.1), wheat and maize (Appendices 1 and 2) grew on a per annum basis by approximately 2.0 per cent. However, since the TFP growth was not constant over time, we conduct the decomposition analysis over two sub-periods, 1981–1984, and 1984–1995. Although institutional change is certainly important, the rice decomposition results in Table 13.1 show that technology is one of the key factors that drive the sharp increase in TFP in the early reform period. Improvement in technology contributed by far the largest share, augmenting the annual growth rate of TFP by 6.01 per cent (63.61 per cent of the total growth rate). Interestingly, expenditure on extension and investment in irrigation did not help the growth of TFP. The breakdown of China's extension system and the deterioration of the irrigation systems that began in the early reform period appear to already have limited the effectiveness of impact on investments in extension and irrigation on TFP.

In the late reform period, 1984 to 1995, technology remains the most important source of TFP growth (Table 13.1). In fact, during this period, it is the only factor that underlies the positive growth of TFP during that period. If it had not been for other negative factors, technology would have caused TFP to grow by 4.17 per cent (instead of actual 1.11 per cent). In contrast, factors associated with the continuing break-down of the irrigation system, above all, significantly reduced the growth of TFP. The decomposition analysis for wheat (Appendix Table 1) and maize (Appendix Table 2) find that the results are similar to those for rice.

*Table 13.1* Decomposition of the sources of rice TFP growth in China

| | | *1981–1984* | | | *1984–1995* | | |
|---|---|---|---|---|---|---|---|
| | *TFP elasticities*[a] | *Factor annual growth rate*[b] | *Sources of growth* | | *Factor annual growth rate* | *Sources of growth* | |
| | | | *Rate*[c] | *Per cent*[d] | | *Rate* | *Per cent* |
| Varietal turnover (VT2) | 0.28 | 21.47 | 6.01 | 63.61 | 7.81 | 2.19 | 197.01 |
| Extension | –0.02 | 2.03 | –0.04 | –0.43 | 3.96 | –0.08 | –7.14 |
| Flood index | –0.01 | 29.02 | –0.18 | –1.93 | 9.26 | –0.06 | –5.19 |
| Drought index | –0.02 | –13.17 | 0.21 | –2.26 | 1.24 | –0.02 | –1.80 |
| Irrigation index | –0.34 | 0.70 | –0.24 | –2.58 | 1.29 | –0.44 | –39.50 |
| Residual | | | 1.21 | 56.62 | | –0.30 | –143.94 |
| Actual growth rates | | | 9.45 | 100 | | 1.11 | 100 |

[a] TFP elasticity with respect to each factor is calculated on the basis of coefficients from the Maize Model in Table 13.5.

[b] TFP and factor growth rates are computed by a least square estimate.

[c] Growth rate contributed by each factor is calculated by multiplying factor growth rate (column 2) by elasticity (column 1).

[d] The percentage of total TFP growth explained by each factor is the corresponding figure in column 3, divided by the total growth rate of TFP (which for the period of 1981–90 was 9.45 per cent).

### *Prospects for future technology-induced TFP growth*

The record of growth of TFP in the past demonstrates the strength of China's institutional innovations and technology development in creating the rise of productivity. Future TFP growth, however, will only occur if China's agricultural research and development system is able to generate a series of new varieties that will increase the productivity potential that can be adopted by farmers. In this section, we first examine the quantity of varieties that is being produced by China's agricultural research system. We then look at the quality. Finally, we estimate the propensity of farmers to adopt the new varieties.

Building on one of the strongest research systems in the world, during the 1980s and 1990s, China's agricultural scientists and the extension system developed and disseminated technology throughout the People's Republic period. Reform era breeders have turned out a constant stream of rice, wheat and maize varieties (Table 13.2).[2] For example, each year in each province breeders have had more than 20 rice varieties in use. Although the number of wheat and maize varieties was somewhat less, the number is rising slowly over time.

China's breeding efforts also have enhanced the quality of its seed stock. Using *experiment station yields* of each major variety during the year that the variety was certified, a measure of quality was developed, a variable we call the 'yield frontier' variable. The yield frontier, which is created by using the *highest* yield of any *one* major variety in the field in each province during a given year, is a

*Table 13.2* Total and provincial averaged of the number of major varieties planted by farmers in China's rice, wheat and maize growing provinces, 1982–95

| | *Rice* | | *Wheat* | | *Maize* | |
|---|---|---|---|---|---|---|
| | *Total* | *Average per province* | *Total* | *Average per province* | *Total* | *Average per province* |
| 1982 | 379 | 24 | 211 | 15 | 130 | 10 |
| 1983 | 333 | 21 | 274 | 20 | 130 | 10 |
| 1984 | 380 | 24 | 277 | 20 | 130 | 10 |
| 1985 | 424 | 27 | 313 | 22 | 156 | 12 |
| 1986 | 419 | 26 | 303 | 22 | 156 | 12 |
| 1987 | 373 | 23 | 313 | 22 | 156 | 12 |
| 1988 | 381 | 24 | 301 | 22 | 130 | 10 |
| 1989 | 365 | 23 | 337 | 24 | 143 | 11 |
| 1990 | 412 | 26 | 333 | 24 | 156 | 12 |
| 1991 | 395 | 25 | 350 | 25 | 156 | 12 |
| 1992 | 403 | 25 | 338 | 24 | 156 | 12 |
| 1993 | 392 | 25 | 341 | 24 | 182 | 14 |
| 1994 | 416 | 26 | 330 | 24 | 182 | 14 |
| 1995 | 391 | 24 | 311 | 22 | 208 | 16 |

These are totals for the 16 rice growing provinces, 14 wheat-growing provinces and 15 maize growing provinces in our sample. The 16 rice growing provinces are Heilongjiang, Jilin, Liaoning, Hebei, Jiangsu, Anhui, Hubei, Hunan, Jiangxi, Zhejiang, Fujian, Guangdong, Guangxi, Yunnan, Guizhou, and Sichuan. Together the 16 rice-growing provinces make up more than 90 per cent of China's rice sown area and output in 1995. The 14 wheat-growing provinces are Hebei, Shanxi, Jiangsu, Anhui, Shandong, Henan, Sichuan, Gansu, Guizhou, Heilongjiang, Hubei, Shaanxi, Yunnan and Xingjiang. The 14 wheat growing provinces account for 92 per cent of China's wheat sown area and 95 per cent of its output in 1995. The 13 maize growing provinces include Guangxi, Hebei, Heilongjiang, Henan, Jiangsu, Jilin, Liaoning, Shanxi, Shandong, Shaanxi, Sichuan, Xingjiang and Yunnan. The maize growing provinces account for more than 89 per cent of China's soybean sown area and 92 per cent of its output in 1995.

*Source*: Authors' data gathered from the Ministry of Agriculture.

measure of the ultimate yield potential of the current technology used by farmers in each province's research system. According to our measure, China's research system has created a steady stream of quality technology (Figure 13.3). On average, the yield frontier is moving up at about 2 per cent annually, a rate that, if continued into the future, would provide added productivity potential in the future. Hence, from Table 13.2 and Figure 13.3 we see that China's research system has developed and appears to be developing a large quantity of quality varieties.

Perhaps surprisingly, given the breakdown of the extension system during the reform era, China's researchers have not only produced new varieties, farmers have adopted them. In fact, China's farmers use new technologies in ways that are usually only seen in the most advanced agricultural economies. To examine this issue we use a varietal turnover variable, which is a variable that measures the proportion of the average farmer's sown area that is planted to a new variety in each year. Using this variable, we find that during the 1980s and 1990s China's producers were replacing from about 20 to 25 per cent of their sown areas during

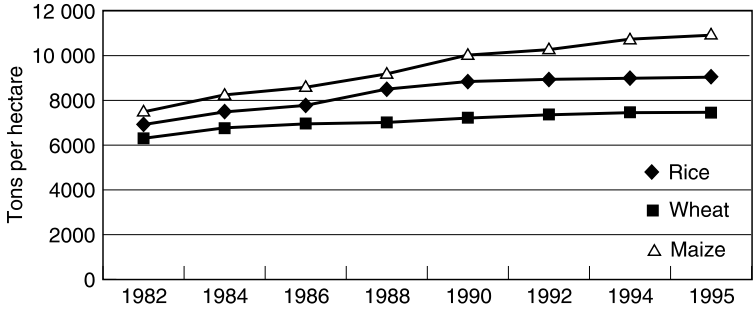



*Figure 13.3* Rise of "yield frontier" in China's experiment stations for rice, wheat and maize in China, 1982 to 1985. (Sown area weighted sample province.)

*Data source*: Jin *et al*. (2002).

each cropping season. In other words, about every four to five years, China's farmers are completely turning over their technology portfolios. Although such information is not widely reported in other countries, interviews with extension agents in the US found that farmers in some of the most progressive states typically turnover their technology baskets about every 3 to 4 years, much like China's farms. In contrast, according to interviews with national research administrators in India, we found that the typical Indian farmer changed their entire varietal basket about every 8 to 10 years.

### *Plant biotechnology research resources*

In addition to conventional agricultural technology that China's scientists and breeders are producing for the farm sector in the coming decades, officials also are making a strong commitment to plant biotechnology. As the world debates the promises and dangers of plant biotechnology, swinging between the optimism generated by a long list of breakthroughs and the pessimism caused by the backlash from consumer reticence in many parts of the world, a new source of plant biotechnology discoveries is emerging in what initially appears to be a most unlikely place: China. And, the discoveries being made are more than cosmetic transformations. China's research community has made a major investment into understanding the structure and function of the rice genome, they use agrobacterium to transform the cotton and rice plant, and new methods of transforming other crops.

Although China started its national plant biotechnology programme only in the mid-1980s, a number of years after most other developed countries, since the launching of its programme, it has grown fast and has taken a relatively unique path in the world. Unlike the rest of the world in which most plant biotechnology research is financed privately, China's government funds almost all research. According to a survey that we carried out of 22 plant biotechnology laboratories, the Ministry of Science and Technology increased investment in plant biotechnology from 16 million yuan in 1986 to 92.8 million yuan in 1999. After a number of adjustments

(see Huang *et al.*, 2002), it is estimated that China's total investment in plant biotechnology in 1999 was US $112 million in Purchasing Price Parity (PPP) terms. Expenditures of this level demonstrate the seriousness of China's commitment; in 1999, for example, China outspent all other developing countries combined.

But China's leaders have not stopped there and in recent years they have increased their commitment to plant biotechnology. In 2000 China's top leadership decided to more than quadruple funding between 2000 and 2005. By 2003 according to a recent survey by the Center for Chinese Agricultural Policy, China was spending about US$300 million. If the government meets its original goal, it will be spending about half a billion dollars per year and will be close to outspending the US government on plant biotechnology research.

Using the funds China's scientists have applied advanced biotechnology tools to the field of applied plant science, regularly working on the synthesis, isolation and cloning of new genes and genetic transformations. After the initiation of a research programme on rice functional genomics in 1997, researchers have used AC/DS transposons and T-DNA insertion methods to create rice mutagenesis pools. Biotechnologists also have initiated functional genomics research for arabidopsis. Our survey of China's plant biotechnology laboratories demonstrated that by 2000 there were over 50 different plant species and more than 120 functional genes that have been used in plant genetic engineering. China has emerged as a global leader in the production of GM plants (although it almost certainly lags behind the industrialized world in functional genomics research).

China's scientists have also generated an impressive array of new technologies. Between 1996 and 2000, from 353 applications, China's Office of Genetic Engineering Safety Administration approved 251 cases of GM plants, animals, and microorganisms for field trials, environmental releases, and commercialization. Regulators also approved 45 plant biotechnology applications for field trials, 65 for environmental release, and 31 for commercialization. In recent years the pace of commercialization has slowed, but in part this is a reflection of China's leaders being careful and allowing its new regulatory system time to catch up with the rapid breakthroughs in the laboratories.

Breakthroughs on crops that have received little attention elsewhere (over 40 per cent of trials in the rest of the world involve GM maize) demonstrate the government of China's concern for food security. Transgenic rice resistant to stem borer (using Bt and CpTI genes), planthopper, and bacterial leaf blight (Xa21), three of China's major rice pests, have already been through at least two years of successful environmental release trials. Researchers have moved GM wheat (BYDV resistant) to field and environmental release trials. China's scientists also experiment with GM potato, peanut, and horticulture commodities. The nation's public-dominated research system has given China's researchers a strong incentive to produce GM crops that increase yields and prevent pest outbreaks. In industrialized countries 45 per cent of all field trials are for herbicide tolerance and improving product quality; only 19 per cent is for insect resistance (Courmanche and Pray, 2001). In contrast, in China more than 90 per cent of field trials target insect and disease resistance.

## The emergence of commodity markets

Price and market reforms have been key components of China's transition strategy in the nation's effort to shift from a socialist to a market-oriented economy. The policies have only been implemented, however, in a gradual way (Sicular, 1995). For example, the initial price and market reforms initiated in the late 1970s were modest in scope. At that time the initial reforms were only aimed at raising farm level procurement prices and allowing a small amount of local trade. These specific reform policies included gradual increases in agricultural procurement prices toward market prices, reductions in procurement quota levels, the introduction of above quota bonuses for cotton, tobacco and other cash crops, negotiated procurement of surplus production of rice, wheat, maize, soybean, edible oils, livestock, and most other commodities at price levels higher than those for quota procurement, and flexibility in marketing of surplus production of all categories of agricultural products by private traders. It is interesting that in the initial years there was little effort to move the economy to one in which most resources and factors were allocated according to market price signals.

Over time the government's position on market reform has gradually evolved. As officials in charge of the overall economic reforms began to be committed to use markets as the primary means to allocate resources for the economy in general, the commitment to allowing markets in agriculture also deepened (Sicular, 1995). Since the 1980s, China's reformers have further reduced the level of the mandatory delivery quotas, allowing farmers more freedom in their marketing decisions. Officials also have gradually commercialized the state grain system, reduced the rules prohibiting trade across provinces and increasingly allowed the entry of private traders (Rozelle *et al.*, 2000). If the grain system had committed itself to carrying out all of the reforms and did not retrench, there is no reason to believe that markets should not have emerged sometime early during the reform era.

The special status that many leaders afford agriculture and its role in national food security, however, has made the implementation of grain policy variable across time. In fact, there have been at least three cycles between the mid-1980s and late 1990s during which officials liberalized commodity markets then retrenched. At different times reformers have encouraged the development of interprovincial grain markets then blockaded grain shipments between provinces. Policies have urged specialization and structural change during some periods and promoted self-sufficiency during others. And, even though private traders became a fixture in the countryside and city during the 1990s, they were prohibited from trading as late as the 1998. So while the overall policy was to encourage marketization, it is unclear if the roller-coaster policies have hindered the development of well-functioning markets.

In making an assessment of the health of the rural economy, it is important to understand how well China's markets are functioning. Markets – whether classic competitive ones or some workable substitute – increase efficiency by facilitating transactions among agents to allow specialization and trade and by providing

information through a pricing mechanism to producers and consumers about the relative scarcity of resources. With better markets, producers can increase their allocative efficiency and increase incomes.

In the rest of this section we use the data on prices from the State Market Administration Bureau and the Jilin Oil and Grain Information Center to describe China's agricultural markets. To do so, we first plot the data over time and examine how prices move together in markets in the same geographic region and in markets separated by long distances. Next, we examine transportation gradients in China's rice, maize and soybean markets. Finally, we use statistical tests to test for market integration.

### *Price trends*

According to our price data, despite the stop and go nature of marketing policies, China's markets appear to function relatively well. For example, maize prices in Northeast China track each other closely (Figure 13.4, panels A and B). In panel A we plot the Dalian domestic price versus the prices in the three Heilongjiang market sites (chosen because they are the furthest Northeast markets from Dalian). While the levels of price in the different markets vary over time, the Dalian domestic price remains about US$127/metric ton (mt) above the Heilongjiang price between December 2001 and February 2003. According to our interviews, the cost of shipping and handling of grain between Heilongjiang and Dalian is between US$126/mt to US$128/mt. During the same period, the prices in each of the three Heilongjiang markets move almost in perfect concert with one another. Similar patterns of price movements are found to exist between the two markets in western and central Liaoning and Dalian (panel B). In fact, the prices in the two Liaoning producing areas track each other even closer than the markets in Heilongjiang, a finding that perhaps is not surprising given the fact that Liaoning is a smaller province with better transportation and communication infrastructure.

The patterns of price movement among locations separated by greater differences within China display similar patterns of close co-movements (Figure 13.5, panels A and B). While prices have moved together since the mid-1990s between Dalian and Guangdong and between Dalian and Fujian, the tracking among markets appears to be even closer in recent years. Almost every turning point (a shift from low to high or high to low) in Guangdong and Fujian can be found in the Dalian market. The results from Figure 13.5, panels A and B, when linked with those from Figure 13.4, mean that prices in Heilongjiang appear to depend on shifts in feed demand and maize availability in Guangzhou and Fujian.

Similar patterns occur in the case of soybeans. The bottom two price series in panel A, Figure 13.6, trace the price trends for soybeans in Heilongjiang and Jilin. In fact, the two series are almost indistinguishable from one another, with Heilongjiang prices slightly lower for almost the entire period. The Guangdong price, the top line in panel A, also shows that prices move in concert with one another inside China's domestic market even though the markets are thousands of

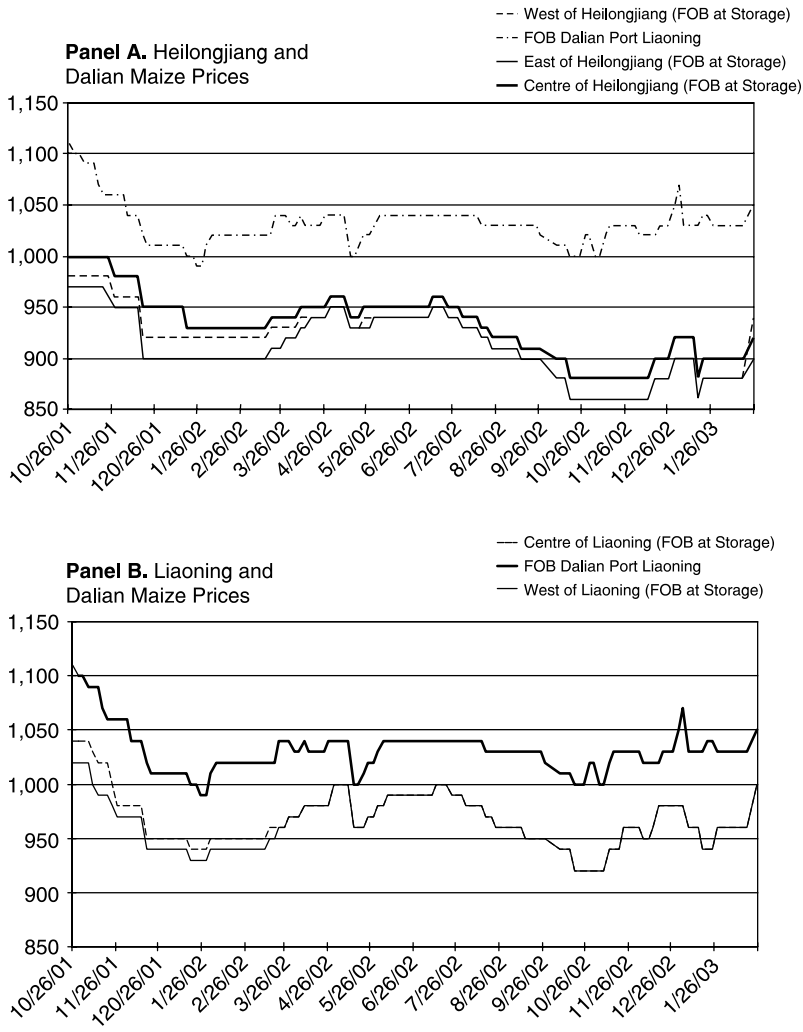
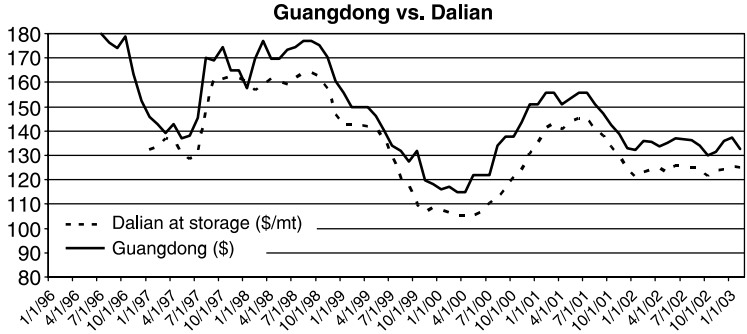



*Figure 13.4* Maize prices in Heilongjiang, Liaoning and Dalian (RMB/mt), October 2001 to February 2003.

*Data source*: Jilin Oil and Grain Information Center.

kilometers apart. In only two short periods – early 2000 and late 2002 – does that gap between the two markets deviate from a fixed margin which is almost equal to the transport price between the Northeast and the South. Panel B in Figure 13.6 shows that prices appear to move in nearly perfect concert with one another in the South. The prices throughout the entire period are so close that it is difficult to distinguish the individual price series.

Panel A. Guangdong and Dalian Maize Prices




Panel B. Fujiang and Dalian Maize Prices

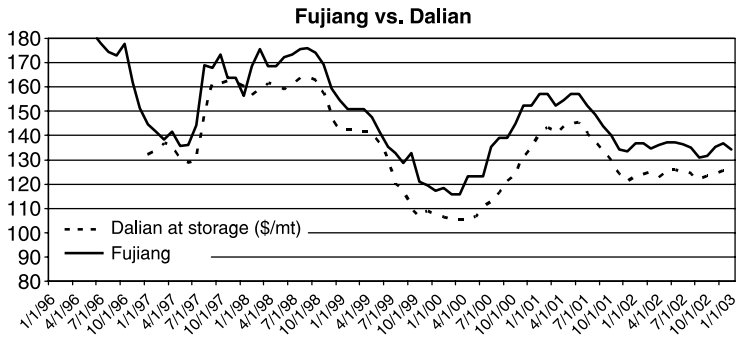



*Figure 13.5* Maize prices in Guangdong, Fujian and Dalian (RMB/mt), 1996 to February 2003.

*Data source:* Jilin Oil and Grain Information Center.

### *Transaction costs and transportation gradients*

When examining price relationships across China spatially, we can create transportation gradients. Transportation gradients plot prices according to the distance of each market from one of the nation's major ports. For example, Figure 13.7, panel A shows the relationship between the price of maize in Dalian and those in Liaoning, Jilin and Heilongjiang during post-accession period (December 2001 to February 2003). The downward sloping gradient (high in the port and lower as markets move away from the port) illustrates a price contour that is consistent with the existence of a functioning market. Indeed, the price in a market 1000 kilometers away from Dalian (e.g., the Jilin market) is, on average, about RMB 70/mt lower than the price in Dalian. In percentage terms, this means the price of Jilin corn is about 6 per cent lower than the price of corn in Dalian. The price in Heilongjiang is even lower. The same pattern occurs when examining rice prices in South China (Figure 13.7, panel B). In fact, similar

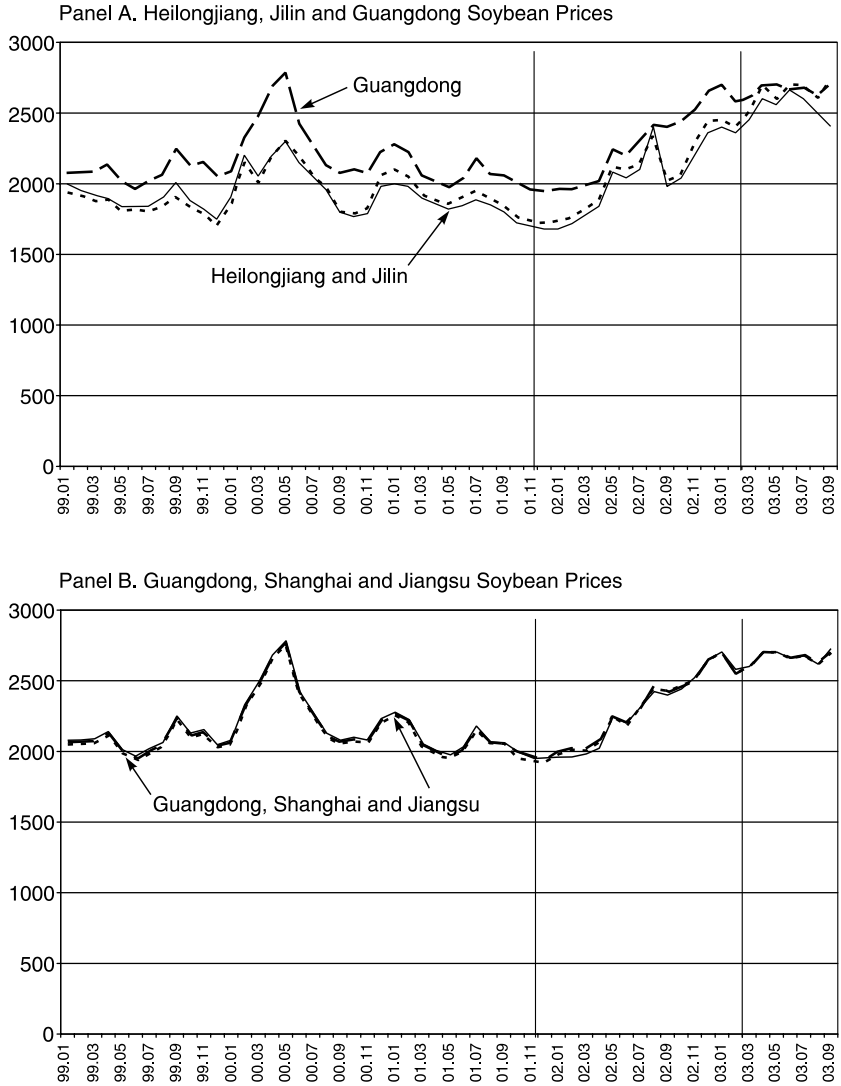



*Figure 13.6* Soybeans prices in Heilongjiang, Jilin, Guangdong, Shanghai and Jiangsu (RMB/mt), January 1999 to September 2003.

*Data source*: Jilin Oil and Grain Information Center.

figures can be shown no matter what crop is used for what time period (Huang *et al.*, forthcoming).

The improvement in the quality of China's markets is further illustrated by comparing the transportation gradients for China from different periods and by comparing those from China with those of a market-oriented economy, such as the United States (Table 13.3).

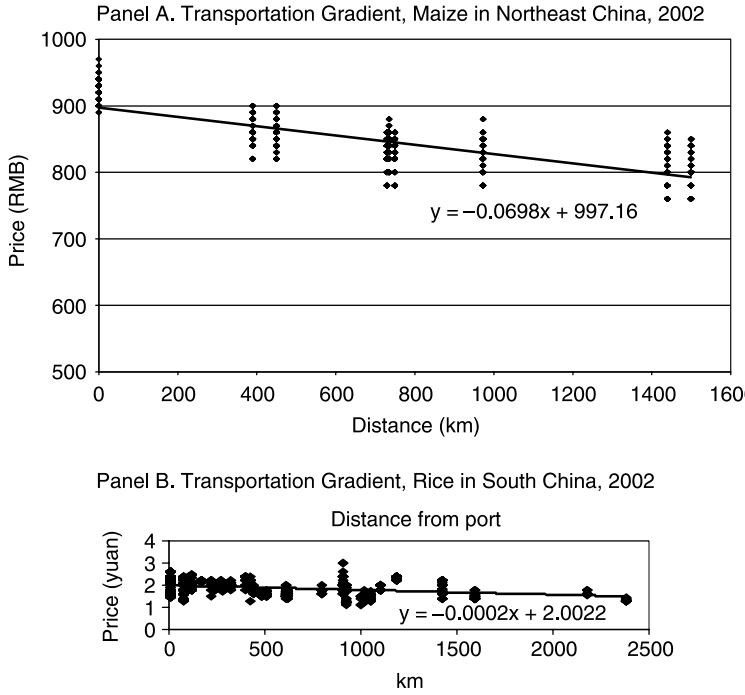



*Figure 13.7* Changes in maize prices across Northeast China as markets increase distances from the port of Dalian, 2000–2003.

*Data source*: Jilin Oil and Grain Information Center.

In making the comparisons, we find three pieces of evidence that support the emergence of markets. First, the magnitudes of the transportation/transaction costs are similar to those reported in Park *et al.* (2002). Using a completely different methodology, a method that uses a maximum likelihood estimator examining the price differences between markets when traders arbitrage away price difference between markets, almost identical estimates of transaction costs are found. Second,

*Table 13.3* Percentage change in price for every 1000 kilometres from Port City, 1998 to 2000

| | *Maize* | *Soybean* | *Rice* |
|---|---|---|---|
| China 1998 | –4% | –10% | –10% |
| 1999 | –4% | –11% | –9% |
| 2000 | –3% | –8% | –7% |
| US 1998 | –5% | –3.5% | na |

Figures for column 3 (rice, China) from Table 2 (and similar regressions for 1998 and 1999); figures for columns 1 and 2 (maize and soybeans, China) from regressions for main soybeans for China that are similar to those for rice. Figures for US from spot market prices reported by the Chicago board of trade for 15 markets in 1998.

the transportation gradients are becoming less steep over time (rows 1 to 3). Although we cannot pinpoint the exact source of the fall in the transportation gradient, the patterns are consistent with a marketing environment in which there is an improving infrastructure and more competitive markets. Finally, the results show that the transportation gradients in China are similar to those found in the US (rows 1 to 3 versus row 4). When plotting similar data and running similar regression on corn in the Mississippi valley we find a pattern of spatial price spread similar to those in China. In other words, assuming our findings are representative of average transportation gradients in China and the US, these results show that the time in which China's inland markets were isolated by poor transportation and other infrastructure weaknesses may be past. In other words, it appears as if the aggressive investment in roads and other infrastructure projects in the past decade has dramatically improved the ability of traders to move agricultural commodities, at least staple crops, around China at costs that rival those of the US.

### *Market integration in China*

In this section we use formal statistical-based tests to examine the degree of market integration in rural China's commodity markets. Using traditional cointegration analysis, we examine the extent to which prices in different pairs of markets move together over time. We conduct the analyses for several time periods, the early 1990s (using results from Park *et al.*, 2002), the late 1990s and the post-2000 per cent. We use our price series for rice, maize and soybeans. We can compare our more recent results with those in Park *et al.* (2002) who examines integration in the early 1990s, because we use the same techniques and the same data set.

#### *Results – Increasing integration during the 1990s*

The results of the cointegration analysis illustrate that China's markets indeed have steadily emerged since the early 1990s. The first way to see this is to compare the results from the market cointegration analysis from the late 1980s/early 1990s with those of the late 1990s (Table 13.4). In the middle part of the reform era (1988 to 1995), a time when markets were starting to emerge, between 20 to 25 per cent of markets showed signs that the prices were moving together during the study periods and sub-periods (Park *et al.*, 2002). According to the Park *et al.*, findings, although there were many market pairs in which prices did not move together, between the late 1980s and mid-1990s, there was evidence of rising integration.

Compared with the results from the early 1990s, China's markets, despite the stop and go marketing policies – have continued along their previous path of maturation. In the late 1990s examining the co-movement of prices among pairs of markets in our sample, we see a significant increase in the fraction of market pairings that are integrated. In fact, some markets in China are remarkably integrated. In the case of maize, for example, in 89 per cent of the cases, prices in one market move at the same time as in another (Table 13.5, column 2). This is up from only 28 per cent of the time in the early 1990s. The shares of market pairings that

*Table 13.4* Percentage of market pairs that test positive for being integrated based on Dickey Fuller test in rural China, 1988 to 2000

| *Commodity* | *1989–1995* | *1996–2000* |
|---|---|---|
| | *(Percent of Market Pairs)* | |
| Maize | 28 | 89 |
| Soybeans | 28 | 68 |
| Rice, Yellow River Valley (mostly japonica rice) | 25 | 60 |
| Rice, Yangtze Valley and South China (mostly indica rice) | 25 | 47 |

Results for two periods both use data from the State Market Administrative Bureau (SMAB). For results from 1989 to 1995 for maize and rice, see Park *et al*. (2002). Rice results are for the whole country in 1989–1995. Results from soybeans for 1989 to 1995 from Wang (1998). Results from 1996 to 2000 are by authors using Dataset 1.

exhibit increasing price integration also rise for soybeans, japonica rice and indica rice (rows 2 to 4).

### *Results – maize and soybeans 2000 to 2003*

The results of the cointegration analysis for maize in the post-2000 period also support both our descriptive findings and the conclusions of the transportation gradient analysis. In fact, markets during the recent several years function remarkably well in integration terms. For example, all pairs of markets in the Northeast are integrated in a statistically significant way (Table 13.5). Compared to the results in the late 1990s (reported in Table 13.4, column 2) our analysis shows that during the post-2000 period maize markets in China have continued to become more integrated. In addition, the other pairs of key maize markets on the national level, for example, between Dalian and Guangzhou and Dalian and Fujian also are integrated (results not shown). The integration of these markets is notable because in many cases, the pairs of markets are separated by more than 1000 kilometers. Compared with the late 1990s, the percentage of markets that are integrated rose (from 89 per cent to 93 per cent).

Finally, soybean markets in the post-2000 period are also integrating rapidly (results not show; see Huang *et al.*, forthcoming). According to our results nearly all of China's major soybean markets are now integrated with both the major market in China's main production region – Heilongjiang, and the major market in China's main consumption region, Guangdong.

When taken as a whole, the integration analysis is consistent with our descriptive results and the transportation gradient analysis: markets are performing better over time. Perhaps the most interesting finding is that the improvements in markets have occurred despite the policy efforts of certain government leaders during certain periods of time. The lesson appears to be clear: The power of markets has become so strong that they continue to show price integration despite policy intervention attempts. As such, leaders should begin to try to use markets to execute their policy rather than try to work against them.

*Table 13.5* Cointegration tests on northeast maize markets and Dalian market

| *Region* | *Test statistics* | *Lags* | *5% Critical value* | *Conclusion* |
|---|---|---|---|---|
| ***Augmented Dickey–Fuller tests*** | | | –2.89 | |
| 1. Center HLJ | –1.98 | 9 | | Each one is unit root and Proved to be I(1), stationary at 1st difference |
| 2. East HLJ | –1.99 | 9 | | |
| 3. West HLJ | –1.78 | 9 | | |
| 4. Center JLN | –1.99 | 9 | | |
| 5. East JLN | –1.72 | 9 | | |
| 6. West JLN | –1.62 | 9 | | |
| 7. Center LNG | –2.24 | 10 | | |
| 8. West LNG | –2.07 | 10 | | |
| 9. Dalian port | –2.80 | 16 | | |
| ***Augmented Dickey–Fuller tests for pair markets*** | | | | |
| 1. Center HLJ/Dalian | –3.34 | 9 | | All pair markets are cointegrated Dalian market is integrated with all other regional markets. |
| 2. East HLJ/Dalian | –3.49 | 9 | | |
| 3. West HLJ/Dalian | –3.16 | 9 | | |
| 4. Center JLN/Dalian | –3.49 | 9 | | |
| 5. East JLN/Dalian | –3.24 | 9 | | |
| 6. West JLN/Dalian | –3.33 | 9 | | |
| 7. Center LNG/Dalian | –3.98 | 9 | | |
| 8. West LNG/Dalian | –3.84 | 9 | | |

Augmented Dicky–Fuller test was implemented over the pair markets.
Guass program file "adf-test.prg" is used.
Data set used: dataset 2. Price series is bi-weekly and data are analysed at the market level (that is, there are more than one observations per province).

More fundamentally, our results also offer additional evidence of the power of China's gradual method of transition. As argued by McMillan (1997), China's gradual market reform has really been one of entry-driven competition. In the case of China entry has come from both the commercialization of the state and the emergence of a private trading sector. In doing this, China enfranchised millions of individuals to be involved in commodity trade. While this has produced the rise in integration and fall in transaction costs that has been documented in the chapter, it has also eroded the power of the state to control the markets with the traditional command and control methods. Our results suggest that if the nation's leaders want to control markets in the future, they are going to have to devise new ways to intervene, ones that use indirect methods instead of trying to suppress traders. There are now just too many traders to deal with as shown by the integration trends that continued to increase even when the nation tried to stop trading.

## Land markets

In order for the rural economy as a whole to reap the benefits from better commodity markets and increased migration opportunities well-functioning land rental

markets are essential. And, as discussed above, in some sense since the hands of China's policymakers are tied, at least in terms of being unable to support agricultural prices at an above market rate, it is imperative that households that have not been able to move into the migrant labour force, that is non-migrants, are able to gain access to additional land. Active land rental markets, however, can by no means be taken as given. On the contrary, there may be barriers to entry into markets arising from high transaction costs, wealth constraints to asset ownership or education (deJanvry *et al.,* 1991). As a consequence, there are conceptual doubts about the ability of land markets to contribute to a reduction in poverty (World Bank, 2003). Since well-developed property rights are needed to facilitate the functioning of land markets, they will be of little use in the development of a nation, a time during which the rural economies of most nations are plagued by problems of poor tenure security and limited land titling. Mirroring the discussions in the general development literature, in China scholars debate the nature of land markets (Benjamin and Brandt, 2002).

### *Data for land rental market analysis*

To examine how well China's land markets are working, we use two data sets. First, we use data from a survey of 780 households from 31 villages in six counties in Hebei and Liaoning that was conducted in the summer of 1995. Hebei and Liaoning provinces, located in North and Northeast China, are two of China's major agricultural provinces, and the six sample counties are located in major agricultural regions of the two provinces. Most agricultural producers in the sample counties depend on grain or cash crop production. Farmers primarily grow maize, which accounts for about 70 per cent of the total sown area, but also cultivate soybeans, rice, and cotton. For each of the surveyed households, enumerators recorded detailed information about household characteristics and agricultural production activities. Total landholdings of each household were enumerated on a plot-by-plot basis. After obtaining basic information about each plot, the supervisor of the enumeration team selected two plots from each household to investigate more carefully.

The other data used for the study come from China's rural Household Income and Expenditure Survey (HIES), a nationwide survey of rural households carried out annually by China's National Statistical Bureau. Like most household surveys, the sample uses a two-stage sampling procedure. In the first stage, sampling villages are drawn randomly from the survey. Sample villages in 2001 came from 26 provinces. In the second stage, 10 households were drawn from each administrative village in the sample using an equal distance sampling methodology. According to interviews at the National Statistical Bureau, the sampling error for the survey does not exceed 3 per cent at a 95 per cent confidence level.

While the main focus of the HIES is on a detailed recording of the household's consumption and production activities, each year the survey team undertakes a series of special interviews with the household that provide information on a number of other variables. In 2001, the NBS added a one-time set of questions related to the

household's land rental activities. In particular, enumerators asked households about whether they rented land in or out and if they did, the size of the rental transaction. We use a mixture of panel data and cross-sectional data for our analysis.

### *Transfer of rental right*

*Zhuanbao*, literally 'passing on a contract', refers to the transfer of land-use rights between two households and is comparable to the notion of land rental. In the 1980s and early 1990s, transfers were typically short-term and usually entailed the payment of a fee and/or the assumption of tax and quota liabilities by another household in return for the use of the land. In 1995, 71.6 per cent of villages reported that households had complete freedom to transfer land use rights, about the same as in 1988 (Table 13.6, column 1). In the remaining 28.4 per cent of the villages, households faced some sort of constraint, most often in the form of restrictions on renting to non-villagers, or the need for households to obtain prior authorization from village leaders. Leaders only rarely impose a complete moratorium on rental transactions.

Despite the high percentage of villages reporting that households have unconstrained rights to allow other households to use their land, farmers rent in and out a remarkably low percentage of their land (Table 13.6, columns 2 and 3). In 1988, only one-half of 1 per cent of cultivated land was rented in rural China; nearly

*Table 13.6* Non-residual property rights in China's villages, 1988 and 1995

| | *Unencumbered right to rent (% of villages)* | *Percentage of land rented in 1988* | *Percentage of land rented in 1995* |
|---|---|---|---|
| ***Province*** | | | |
| Zhejiang | 93.8 | 1.6 | 6.9 |
| | | (3.3) | (10.3) |
| Sichuan | 93.8 | 0.2 | 2.1 |
| | | (0.5) | (2.6) |
| Hubei | 59.4 | 0.3 | 3.6 |
| | | (1.1) | (8.3) |
| Shaanxi | 65.6 | 0.8 | 2.2 |
| | | (2.1) | (2.9) |
| Shandong | 46.5 | NA | 1.1 |
| | | | (1.8) |
| Yunnan | 66.7 | 1.3 | 0.9 |
| | | (0.5) | (2.2) |
| Hebei | 80.0 | 0.3 | 2.1 |
| | | (0.6) | (2.2) |
| Liaoning | 62.3 | 0.1 | 3.6 |
| | | (0.3) | (5.0) |
| Total | 71.6 | 0.6 | 2.9 |
| | | (1.8) | (5.8) |

Standard errors are reported in parenthesis.

*Source*: Authors' data; Brandt *et al*., 2002.

three-quarters of villages reported no land rental. By 1995, although more than 75 per cent of local leaders reported rental activities in their villages, farmers still rented less than 3 per cent of their land, most of which occurs between relatives.

### *China's emerging markets for cultivated land in 2001*

The descriptive statistics produced from the other, national level data for 2001 generally are close to those for the overall figures generated by SSB and are broadly supportive of our hypotheses on the productivity and equity effects of the emergence of land and labour markets in China. For example, Table 13.7 provides information for all of China and by region on the household's income composition, the participation of its members in different types of economic activities and its land endowments and rental market participation. Above all, the average rural income per capita levels for China (2681 – row 1) is almost the same as in the 2001 statistical yearbook publication (SSB, 2002). The national shares of income from agricultural production (37 per cent) and land holdings per capita (1.62 mu), two variables also reported regularly in published statistical sources, are nearly the same as the published figures (SSB, 2002). Our data also show how diversified

*Table 13.7* Key indicators of labour and land market activity in China's main regions, 2001

| | *All China* | *North and Northwest* | *Coast* | *Central* | *South West* |
|---|---|---|---|---|---|
| ***Income level (Yuan) and composition (%)*** | | | | | |
| Mean per capita income | 2681 | 2646 | 3894 | 2392 | 1794 |
| Agric. production | 37 | 38 | 28 | 41 | 41 |
| Wage employment | 25 | 28 | 31 | 21 | 19 |
| Remittance | 9 | 6 | 10 | 13 | 8 |
| Non-farm self employment | 29 | 28 | 31 | 25 | 32 |
| ***Participation in activities (%)*** | | | | | |
| Households with non-farm enterprise | 10.7 | 7.3 | 14.4 | 11.1 | 9.2 |
| Households who migrate | 37.0 | 25.0 | 35.0 | 47.0 | 37.0 |
| Months in non-farm activity | 10.0 | 8.3 | 13.7 | 9.2 | 7.6 |
| Months spent in migration | 4.1 | 2.3 | 4.5 | 5.4 | 3.6 |
| ***Agricultural endowments*** | | 32 | 53 | 59 | 46 |
| Land endowment | 1.62 | 2.14 | 1.00 | 1.31 | 1.37 |
| Share of households renting-in | 9.50 | 7.10 | 9.40 | 10.40 | 7.50 |
| Share of households renting-out | 6.20 | 4.90 | 8.80 | 5.10 | 5.70 |
| Rented to own land ratio[a] | 0.51 | 0.48 | 0.59 | 0.50 | 0.44 |
| No of households in sample | 54 590 | 12 390 | 14 680 | 14 860 | 12 660 |

The *North and Northwest* Region includes the provinces of Hebei, Shanxi, Liaoning, Henan, the *Coastal Region* includes Jiangsu, Zhejiang, Fujian, Shandong, and Guangdong, the *Central Region* includes Anhui, Jiangxi, Hubei, Hunan, and Guangxi, and the *Southwest* includes Sichuan, Guizhou, Yunnan, Shaanxi, and Gansu.

[a]Only for households who are renting in.

*Source*: Own computation from the NBS national 2001 household survey; Deininger *et al*., 2004.

China's rural income sources are in 2001. Although agriculture still makes the largest contribution to overall rural household income (37 per cent), it is followed by income from local wage employment and migration (25 + 9 per cent) and local non-farm self employment (29 per cent).

With information from the survey data, the emergence of land markets is confirmed. The 2001 rental market question from the SSB shows that 9.5 per cent of households nationwide rented in land in 2001 while 6.2 per cent rented land out. Although there are considerable regional differences, there are still non-trivial amounts of rental in all regions. Around 10 per cent of households rented in land in China's central and coastal regions. About 7 per cent of those in other parts of China did so. Clearly across China land rental activity is becoming increasingly common and approaching those in more market-oriented economies.

At a number of different levels of disaggregation our data not only show rising levels of land rental, they show that there is a positive correlation between activities in the land and labour markets. Across China's major regions, the ones that have the highest levels of migration (central region and coastal region) also have the highest levels of rental (Table 13.7, rows 8 versus 10). Correlations between the share of labour that is in the migrant labour force and share of cultivated land that is rented is more than 0.80. It is more than 0.90 when including migration and other types of off-farm activities. Moreover the trends at the regional level are supported by province-level data. For example, rental markets tend to be more active in the provinces in which out-migration is most common (e.g., Jiangxi, Henan, Hubei, Hunan and Anhui). The relationship is also evident in the coastal region if the definition of off-farm employment is expanded to include both migration and local wage earning. The correlation coefficient between migration and land rental at the province level is 0.54.

Examining the differences among households in Table 13.8 – that is, among those that rent in, rent out and those that do not rent in or out (autarkic household) – supports the findings from Table 13.7 on the relationship between migration and land rental as well as shows that the emergence of land markets helping those with less land endowment (T-test results show that households who rent out land spend significantly more time in migration and have significantly less land holdings than those who rent in land. Both tests are at 1 per cent significant level). According to our data, those that rent out have slightly larger per capita land endowments than the mean (row 2). Participating in land markets also can be seen to allow those renting in to increase their operated area significantly above the average even though their original endowment is significantly below the mean (row 3).

Our data also indicate that land markets are pro-poor (Table 13.8). Households renting out, when compared to those that rent in, have the highest level of non-farm assets (557 versus 237 – row 5). Even more strongly, per capita income of those renting out (3024) is higher than those that rent in (2636 – row 7).

The descriptive evidence is also suggestive of a link between non-agricultural activity and land rental market participation (Table 13.8). It can be seen that once households allocate more of their available labour time to work off the farm, the

*Table 13.8* Asset holdings and economic activities of households renting in and renting out land in 2001

| | *By households' rental market participation* | | | |
|---|---|---|---|---|
| | *All China* | *Rent in* | *Rent out* | *Autarkic* |
| Number of household | 15873 | 3332 | 2590 | 9951 |
| Owned land per capita | 1.44 | 1.35 | 1.65 | 1.43 |
| Operated land per capita | 1.50 | 1.98 | 1.09 | 1.43 |
| Original value of agricultural assets | 775 | 812 | 740 | 772 |
| Original value of non-farm assets | 419 | 237 | 557 | 450 |
| Households owns draft animal (%) | 31 | 38 | 26 | 31 |
| Per capita income (¥/person) | 2686 | 2582 | 3024 | 2636 |
| Agricultural income (%) | 38 | 52 | 31 | 40 |
| Local wage income (%) | 33 | 27 | 35 | 31 |
| Non-farm self employment income (%) | 17 | 12 | 21 | 18 |
| Remittance income (%) | 11 | 9 | 13 | 11 |
| Months spent in migrating | 3.7 | 3.6 | 4.7 | 4.0 |
| Of which head (%) | 18.0 | 12.8 | 19.1 | 17.5 |
| Number of months in non-farm activities | 10.0 | 8.7 | 12.2 | 9.9 |
| Of which head (%) | 33.3 | 31.0 | 33.6 | 34.3 |

propensity to rent out land increases. To see this we note that households who rent out spend on average 4.7 and 12.2 months in migration and non-agricultural self employment as compared to 3.7 and 9.9 months for autarkic households (rows 12 to 15). This illustrates the importance and potential linkages between land and labour markets which we aim to explore econometrically below (also productivity effect). In support of the time allocation contours, income composition differs systematically between those who rent in and those who rent out (rows 8 to 11). The former receive the most important share of their income from agriculture (51 per cent) with lower importance of non-farm employment (40 per cent) and remittances (9 per cent). In contrast, the opposite is true for the latter who obtain 70 per cent of their income from non-agricultural sources. Hence, out data show strong support for a pattern of land rental that is not only making the sector more efficient (by providing land to households that are more focused on farming by shifting land from farmers that are participating in the off-farm sector, it also is pro-poor. Such a pattern is exactly what is needed in an economy such as China's that is generating higher incomes for many households in the off-farm sector, but at the same time is allowing those that are left behind to get access to more land.

## Conclusion

We have painted a positive picture of the state of rural China's economy during the first years of the 21st century. In an era in which a large number of China's

households are beginning to become connected with the off-farm labour force, leaders and scholars are beginning to become concerned about whether or not the shift is sustainable. The fear is that after China's commitment to the WTO, during a period of time in which its leaders are not able to raise agricultural prices substantially as a way to support those left behind in rural areas, that the rural economy is not organized in a way that will allow the nation's sustained growth and structural transformation. In answering this question, we examine whether or not China's current system is able to raise productivity of agricultural resources, provide a marketing environment that will allow for specialization and rational allocation of resources and create markets for cultivated land that will allow households that still have not got a job off the farm access to more land for use in agriculture.

In fact, in looking at each of the three areas we find that China appears to be capable of generating long run, sustained growth. In the future, technology-driven TFP growth will be one of the main forces that raises return in the agricultural sector. Its conventional system appears to be more than capable of generating new technologies – in sufficient quantities and of sufficient quality, both conventional and those created by biotechnology. The analysis of commodity markets showed that markets in China are becoming remarkably integrated – across space and over time; between coastal and inland regions and between county market seats and villages (even in remote areas). Finally, although the emergence of land markets has been fairly recent, in the late 1990s, they appear to have begun to develop quickly and been allowing increases in both efficiency and equity. Land across China has begun to move from those that specialize in farming and those with ties to the migrant labour force. The poor and those with less land endowments are also finding land markets are providing them with access to land. In summary, according to all three indicators – agricultural productivity, the emergence of commodity markets and the emergence of cultivated land markets – China is making progress in beginning the nation's structural transformation.

Of course, these accomplishments are not enough and also do not mean that the lives of most farm families in China are completely fulfilled. China has a long way to go in making its rural environment a nicer place to live. At similar points in their development processes, Japan, Korea and Taiwan launched enormous rural development campaigns aimed at making rural areas nice places to live. Billions of dollars were invested. The investments were typically run through and were managed by the village itself and this required a transparent, accountable fiscal system. At the same time, other Asian countries developed ways to make financial markets more responsive to farmer demands. If China is to make progress on these fronts, which are almost certainly just as necessary as a steady supply of technology and well-functioning land and labour markets, leaders need to push forward fiscal and financial reforms, policy efforts that in the past have proved elusive. From this perspective then, China's efforts to date in increasing access of farmers to technology, commodity markets and rental possibilities are necessary but not sufficient.

*Appendix Table 1*. Decomposition of the sources of wheat TFP growth in China

| | | *1981–1984* | | | *1984–1995* | | |
|---|---|---|---|---|---|---|---|
| | *TFP elasticities*[a] | *Factor annual growth rate*[b] | *Sources of growth* | | *Factor annual growth rate* | *Sources of growth* | |
| | | | *Rate*[c] | *Percent*[d] | | *Rate* | *Percent* |
| Varietal turnover (VT2) | 0.33 | 19.00 | 6.26 | 49.29 | 8.23 | 2.72 | 247.27 |
| Extension | 0.09 | 2.33 | 0.21 | 1.65 | 3.96 | 0.36 | 32.7 |
| Flood index | –0.03 | 9.60 | –0.29 | –2.26 | 3.36 | –0.10 | –9.09 |
| Drought index | –0.04 | –19.18 | 0.77 | 6.03 | 3.66 | –0.15 | –13.6 |
| Irrigation index | –0.29 | 0.17 | –0.05 | –0.41 | 1.71 | –0.50 | –45.50 |
| Residual | | | 1.96 | 54.30 | | –3.7 | –211.78 |
| Actual growth rates | | | 12.72 | 100 | | 1.10 | 100 |

[a]TFP elasticity with respect to each factor is calculated on the basis of coefficients from wheat model in Table 13.5.
[b]TFP and factor growth rates are computed by a least square estimate.
[c]Growth rate contributed by each factor is calculated by multiplying factor growth rate (column 2) by elasticity (column 1).
[d]The percentage of total TFP growth explained by each factor is the corresponding figure in column 3, divided by the total growth rate of TFP (which for the period of 1981–90 was 9.45 per cent).

*Appendix Table 2*. Decomposition of the sources of maize TFP growth in China

| | | *1981–1984* | | | *1984–1995* | | |
|---|---|---|---|---|---|---|---|
| | *TFP elasticities*[a] | *Factor annual growth rate*[b] | *Sources of growth* | | *Factor annual growth rate* | *Sources of growth* | |
| | | | *Rate*[c] | *Percent*[d] | | *Rate* | *Percent* |
| Varietal turnover (VT2) | 0.40 | 17.66 | 7.06 | 44.37 | 8.00 | 3.20 | 160.80 |
| Extension | –0.38 | 2.33 | –0.89 | –5.56 | 3.97 | –1.51 | –75.81 |
| Flood index | –0.03 | 13.23 | –0.40 | –2.49 | 1.99 | –0.06 | –3.00 |
| Drought index | –0.09 | –10.25 | 0.92 | 5.79 | 1.66 | –0.15 | –7.51 |
| Irrigation index | 0 | 0.56 | 0 | 0 | 1.59 | 0 | 0 |
| Residual | | | 4.30 | 42.11 | | –1.1 | –74.48 |
| Actual growth rates | | | 15.92 | 100 | | 1.99 | 100v |

[a]TFP elasticity with respect to each factor is calculated on the basis of coefficients from maize model of Table 13.5.
[b]TFP and factor growth rates are computed by a least square estimate.
[c]Growth rate contributed by each factor is calculated by multiplying factor growth rate (column 2) by elasticity (column 1).
[d]The percentage of total TFP growth explained by each factor is the corresponding figure in column 3, divided by the total growth rate of TFP (which for the period of 1981–90 was 9.45 per cent).

## Notes

1. Our methodological approach is similar to that of Rosegrant and Evenson (1992) in that we use standard Divisia index methods to calculate TFP. In essence, TFP measures the difference between aggregate output and aggregate inputs. It can be thought of as the rise in output that is not accounted for by inputs, and as such, is a measure of productivity from all (or total) factors.
2. A 'major' variety in our sample is any variety that covers at least 10 000 *mu* (or 667 hectares) in a province. Since our data base is built on this concept, we do not have full coverage. In fact, for the rice, wheat, and most of maize growing sample provinces, the proportion of area covered by 'major' varieties exceeds 90 per cent in each province. Only in some of the southern soybean provinces, does the coverage area fall.
3. Not surprisingly, the spatial variations widen when we disaggregate regions (Appendix Table 1). For example, 20 per cent of households in Zhejiang Province rented in land. During the same year, only 2.9 per cent of households in Gansu did so.

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# 14 Domestic price integration and economic performance in China

*Sandra Poncet*

## Introduction

The issue of China's domestic market integration takes on particular importance since the country joined the World Trade Organization. Empirical works often recognize the existence of local protectionism along the reform course and treat Chinese provinces as distinct due to their autonomy and the presumed limited economic integration among them.[1]

However, authors do not agree on the evolution of market performance in China and specifically on whether or not the deepening of market economic reforms in the 1990s has led to greater domestic integration. Assessments of market performance and most importantly of its development have been mixed.

On the one hand, observers acknowledge the active promotion of transport infrastructure building by Chinese central authorities. Naughton (1995) furthermore underlines the efforts made in creating a unified competitive marketplace notably through the development of private and collective sectors and price liberalization. On the other hand, not only do most studies conclude that there is a general lack of integration between regional markets (Cheng and Wu, 1995; Zhou *et al.*, 2000) but also recent articles by Young (2000) and Poncet (2002, 2003) argue that China's domestic markets became more fragmented during the 1990s.

This study aims at bringing a definite answer to this debate by relying on a very disaggregated data set of prices. We focus on price dispersion rather than trade flows that are typically examined in the literature through gravity models to compute time varying provincial all-inclusive indicators of market integration. We use a three-dimensional panel of monthly prices on seven homogeneous agricultural products (rice, corn, egg, peanut, hog, beef and mutton) from 170 individual market sites across 28 Chinese provinces between January 1987 and December 1997.

As put forward by Parsley and Wei (2001), the study of cross-sectional dispersion of common currency price differentials is a very useful way to study goods market integration. It has a theoretical background and does not suffer from the classical limitations of the trade flow-based approach. Indeed, the connection between market integration and trade flows can be rather loose. The volume of trade depends not only on gravitational factors (size, distance, etc.) but also on the

degree of substitutability of each partner's output. All else equal, two countries each producing low substitutable output may trade more had they produced high substitutable output. This may hold even if trade barriers are lower in the latter case. Engel and Rogers (2000) further argue that in the traditional trade theory, the absence of trading costs does not imply a necessarily large volume of trade since it also depends on such things as factor endowments or market size. The volume of flows could be used as an efficient measure of openness only if the evolution of these other factors beside integration were accurately controlled for.

Prices reflect changes in market integration whether trade occurs or not and whatever the degree of substitutability of output, market size and factor endowments. It is the potential for arbitrage that dictates the range of price fluctuations.

We adopt a price-based approach and measure market integration within China focusing on observed deviations from the Law of One Price for a set of homogeneous agricultural products. This procedure draws from the original argument of Heckscher (1916) that the existence of costs of arbitrage imposes an inequality constraint between prices in two locations. Greater market integration (lower tariffs, reduced transport cost and other costs of arbitrage) unambiguously translates into a lower dispersion of prices of identical goods.

We argue that the primary culprit behind China's apparent lack of market integration is the presence of provincial borders that divide the Chinese domestic market. We borrow from the border effect literature pioneered by Engel and Rogers (1996) and investigate how provincial border-related trade barriers prevent price arbitrage. In integrated economies, all else being equal, the relative position of markets, especially the existence of a border separating them should not affect their relative price.

Time-varying provincial border effects are computed to assess how market performance evolves over time in China. They are then introduced in the traditional growth regression framework, using the GMM estimator, to show how market fragmentation affects GDP and agricultural value-added growth. As far as we know, this chapter is the first that uses this methodology on this topic.

The impact of Chinese provinces' borders on the inter-market price fluctuations does not appear to vanish over time, putting into question the capacity of the reforms to enhance market integration within China.

The empirical analysis of the impact of market integration on economic performance confirms the detrimental feature of spatial discontinuities. We find strong and robust evidence of a negative effect of provincial market fragmentation on both per capita agricultural value-added growth and global per capita GDP growth.

This chapter proceeds as follows: the next section briefly describes the reforms that affected market development and reviews the existing work on regional market integration in China. The 'Empirical methodology and estimation' section develops the method used to measure provincial market integration and proceeds to the empirical estimation. The 'Market integration and growth' section presents and estimates a formal analysis of the impact of market integration on the economic performance of Chinese provinces. The last section concludes.

## Chinese domestic market integration

### *Market reforms in China*

A comprehensive description of the Chinese reforms, even one focused solely on the evolution of China's price system and agricultural markets is well beyond the scope of the chapter. The reader is directed to Sicular (1995), Watson (1994) and Rozelle (1996) for three well-regarded studies. Here we quickly summarize some of the most important policy shifts that directly affected market development over the period 1987–1997 in order to anticipate and interpret the estimation results. The material in this section is heavily drawn from the very comprehensive summary of policies influencing the agricultural market development given in Park *et al.* (2002) and Zhou (2001).[2]

The economic reforms initiated by China in the late 1970s were designed in part to promote domestic market competition and to establish strong internal market linkages across its autarkic provinces. Applied to agriculture, they consisted of two transitional stages: decollectivization of agricultural production began in the late 1970s followed by market liberalization in the mid-1980s. The market liberalization process did not go smoothly in China. Some difficulties in the implementation of reforms[3] materialized in periods of economic overheat and forced some episodes of policy retrenchments.

The pricing and marketing liberalization policy began slowly and proceeded unevenly in China. Early measures essentially concerned non-strategic commodities (non-staple crops such as fruits and vegetables and livestock) and hardly touched upon major crops (grain). However as the state officially approved the emergence of a free market system and allowed private trading for surplus output of almost all categories of agricultural products, the foundations of the state marketing system began to be undermined (Huang and Rozelle, 2002).

At this first stage, reforms benefited producers and brought about a dramatic growth in production. The state was encouraged to take a bolder approach to agricultural reforms from 1985. Reforms intending to limit radically the state interventionism and further enlarge the role of the market allocation went ahead, albeit in a stop-and-go manner (Sicular, 1995; Park *et al.*, 2002). The sharp drop in agricultural production growth and food price inflation forced the new policy into a halt at the end of the 1990s. Local government officials quickly reinstated market controls to protect the purchasing power of their residents (especially urban ones). Once production and prices stabilized in the early 1990s, market liberalization policies resumed again with widespread commercialization reforms and almost complete elimination of quotas and rationing. The policy was interrupted again at the end of 1993 when food price inflation re-appeared. The state, concerned about its lack of control as prices continued rising despite macro-adjustment measures such as the release of stocks, tried to recontrol market prices by issuing price ceilings and limiting private merchants[1] purchases and sales (Zhou, 2001). Early in 1995, the establishment of the 'provincial governor responsibility system' aimed at encouraging grain self-sufficiency

at the provincial level. It was followed by further private trade restrictions and prices controls.

Park *et al.* (2002) describe the reform process over the period 1988–1995 as effective market liberalization interrupted by two episodes of policy retrenchments in 1988–1989 and in 1994–1995. In their empirical study, they sub-divide their eight-year time frame into two-year subperiods and consider the first and last periods as periods of policy retrenchment in contrast to the periods of liberalization.

Whether the reform process has so far been successful in promoting market integration in China is an issue of debate. A limited number of studies moved beyond the anecdotal reports of either worsening market segmentation or successful trade liberalization in China.

In the next section, we briefly review the few studies that provide systematic evidence on the development of the Chinese national market.

### *Literature review on market integration in China*

Empirical studies on the integration of markets in China remain scarce. They mainly consist of tests of price integration on single products,[4] so that the findings can hardly be generalized. Overall, the literature fails to provide a definite answer on the magnitude and evolution of the degree of Chinese domestic market integration.

The various studies find contradictory results regarding both the level and the evolution of market performance within China. Different data coverage (regions, products and periods) as well as the use of various analytical techniques contribute to the mixed results found. Wu (1994), Zhou *et al.* (2000), Cheng and Wu (1995) and Young (2000) conclude on a general lack of integration. On the other hand, Rozelle *et al.* (1997), Huang and Wei (2001), Park *et al.* (2002) and Huang and Rozelle (2002) argue that, despite the existing institutional restrictions, the level of integration is quite high.

A major drawback of these studies is that they fall short of examining changes over time, as they do not compute indicators of market performance for various time periods. Most of them only look at whether or not a given product market is integrated for a given period. At best, they estimate the average speed of price convergence for a given product over a specific time period.

One exception is Park *et al.'s* (2002) study of arbitrage in China's grain markets. The authors employ a maximum likelihood procedure to estimate a parity-bounds model of interregional trade for four subperiods 1988–1989, 1990–1991, 1992–1993 and 1994–1995 using trimonthly provincial prices of rice and maize. Their model allows them to estimate three different measures of national market development for each subperiod: the arbitrage rate, the transaction costs and the autarky rate. They find that only 20 to 25 per cent of markets showed signs that the prices were moving together. Large parts of the country, especially poorer areas, were not completely integrated. They show evidence of rising integration between the late 1980s and mid-1990s. Huang and Rozelle (2002) update this

study for the period 1996–2000 in an effort to understand how WTO will affect the agriculture sector in China. They argue that the number of integrated markets increased greatly. The concordant results found by Park *et al.* (2002) and Huang and Rozelle (2002) (and previously by Rozelle *et al.* (1997)) may however be biased due to the use of average prices at the provincial level instead of prices from individual market sites as put forward by Zhou *et al.* (2000). Moreover, their results rely exclusively on two specific grain products, casting doubts on the fact that their findings can be generalized.

Generally, the tests of price integration in China constitute a small part of larger studies of the functioning of a specific agricultural produce market. Very few studies actually evaluate the global degree of integration of the Chinese national market based on several different agricultural products or even on a mix of agricultural and manufactured products.

Young (2000) looks at the average trend of inter-provincial price dispersion for consumer goods, industrial materials and agricultural goods. His study is based on province-level price series for a large number of individual goods.[5] He estimates time trends in regional prices separately for each group (as they come from different data sets). He considers that higher price dispersion reflects lower integration on the ground that *ceteris paribus*, trade barriers, which segment markets, will increase the variation of prices across those markets.[6] In all groups does he observe a divergence in regional prices in the late 1980s, followed by fluctuating rounds of convergence and divergence (without overall trend) during the 1990s. He argues that these bouts of falling and rising dispersion are consistent with trade wars that are periodically suppressed by central intervention and thus with worsening market segmentation in China.[7]

The author concludes that his results are coherent with a movement towards regional autarky. He considers that, over the past 20 years of economic reform, China has evolved into 'a fragmented internal market with fiefdoms controlled by local officials'.[8]

Such a claim was received with scepticism by China's specialists. If authors do not deny the existence of local protectionism in China along the reform course they argue that it was especially severe in the late 1980s and early 1990s and that it has waned as reforms went ahead and market competition intensified. Young's study is particularly challenged on the ground of the high aggregation level of the data he uses and therefore the vulnerability of his conclusions. Huang and Wei (2002) argue that if Young's claims of non-converging trend of interregional price differences are valid for the constructed 'industrial material price' series and the 'agricultural market price' series, they are not necessarily true at the individual goods level.[9]

The authors actually rely on a panel of monthly prices for 44 goods across 35 cities from January 1990 to June 1997. They approach the dataset at the individual product level to understand local protectionism in China. While they reproduce Young's results at the aggregated level, they obtain opposite results when working at the individual goods level as most of the goods in their sample display a clear trend of convergence over the 1990s, with the convergence rate to

increase over time. Using a panel unit root analysis, they find mean-reverting tendency for the inter-regional price differentials for most of the goods in their sample.

In fact, when considering Chinese domestic market integration, the real issue is not only how well integrated are provincial markets but also and foremost in which direction it is moving and how it varies across regions. This chapter relies on a price-based approach to compute provincial all-inclusive indicators of market integration between 1987 and 1997.

## Empirical methodology and estimation

### *Empirical methodology*

Measuring market integration based on the study of deviations from the Law of One Price (LOP) has been the focus of a dense literature.

As Engel and Rogers (1996) argue, "the failure of prices of similar goods to equalize between sites is a sign that the markets are not completely integrated". Indeed, a fundamental proposition of economic theory is that in the absence of transaction costs, taxes and other barriers to cross-city trade, identical goods must sell for the same price.[10] Prices will fail to equalize when there are barriers to the free flow of goods. As such, a comprehensive measure of how well two markets are integrated is how closely prices adjust to each other in those markets.

A first simple explanation for deviations from the LOP focuses on costs of arbitrage. As recognized first by Heckscher (1916), prices $P$ for a similar good may differ between cities due to costs of arbitrage, most importantly due to transportation costs that impose a lower bound on the differentials before arbitrage takes place. The presence of costs $C$ of transporting the tradeable good imposes two inequality constraints on the prices of an identical good, $_k$, in two different locations $i$ and $j$:

$$\ln P(i,k,t) + \ln C(ij,k,t) \geq \ln P(j,k,t) \tag{14.1}$$

and

$$\ln P(j,k,t) + \ln C(ij,k,t) \geq \ln P(i,k,t). \tag{14.2}$$

We thus obtain a band of no-arbitrage equal to:

$$-\ln C(ij,k,t) \leq \ln P(i,k,t) - \ln P(j,k,t) \leq \ln C(ij,k,t). \tag{14.3}$$

Intuitively, as argued by Parsley and Wei (2001), any particular realization of the price differential $Q(ij, k, t) = \text{In } P\ (i, k, t) - \text{In } P\ (j, k, t)$ may not be zero and can either be positive or negative without triggering arbitrage as long as $|Q(ij, k, t)|$ is less than the cost of arbitrage.

Parsley and Wei (2002) use the distribution of the observed price differentials to gauge the degree of market integration. They focus on the width of the no-arbitrage zone for a wide array of location pairs and time periods.

The implicit assumption here is that the volatility measure is proportional to the true range of no-arbitrage across time and across different pairs of locations. The existence of arbitrage costs does not imply any particular realization of relative prices but defines a range within which $Q(ij, k, t)$ must fall.

Our strategy in this chapter is to investigate the importance of border effects as impediments to arbitrage based on the analysis of a measure of the dispersion of $Q(ij, k, t)$ through time.

We follow these authors in studying the feasible range of deviations of the LOP based on measures of volatility such as the standard deviation or the inter-quartile range of the empirical distribution of the price dispersion.

Our application to Chinese market development specifically aims at studying the spatial discontinuities implied by provincial borders. As such, in addition to considering transportation costs, we examine border-related impediments to price arbitrage. Our empirical method relates to the border effect literature. This literature was established by Engel and Rogers (1996) who analyse price dispersion between US and Canadian cities and find that price variation is much higher for two cities located in different countries than for two equidistant cities in the same country.[11] The border effect measures the extent that border-related trade barriers prevent price arbitrage since, in integrated markets, borders should not have any impact on relative price dispersion.

The basic hypothesis is that in the absence of market segmentation, the dispersion of the relative price of a similar product between markets should not be influenced by their respective regional location once transportation costs between them is controlled for.

However various studies on price patterns underline that the border matters.[12] Main contributions include studies of Engel and Rogers (1996) on the US and Canadian border, Engel and Rogers (2001) on European market integration, O'Connell and Wei (2002) on price differences across US cities as well as Parsley and Wei (2001) on the border effect between US and Japan. They all find large border effects, however, declining over time.

In an international setting, cross-border arbitrage is mitigated by exchange rate fluctuations, transaction costs such as tariffs, differences of language and rules of law.[13] Within a country, not only are currency exchange rates between different regions fixed at one, but other key culprits for international failure of the LOP are not relevant. Inter-regional price dispersion essentially reflects domestic trade barriers such as transportation or marketing costs and market segmentation and thus provides a means to evaluate the degree of domestic market integration. Indeed, in a national market fragmented by interregional barriers, the LOP will fail and the inter-regional price differential will not die out over time.

In China, the exchange rate is credibly fixed at one and despite the vast territory, homogeneity of institutional market arrangements, language and culture prevails. Moreover, Chinese authorities have undertaken great efforts since the end of the 1970s and especially since 1992 to transform the economy from a system with fixed prices and planned inter-regional economic relations to one where inter-regional relations are supposed to be guided by liberalized prices and free market forces.

To the extent that prices of comparable goods differ within China, these differences should be explained by transportation costs that eliminate arbitrage opportunities and should in no way be related to the regional position of the markets. The variation of the price should be the same for two markets located in different provinces as for two equidistant markets in the same province. At least the importance of regional borders in explaining price dispersion across China's locations should diminish over time, in relation to the reform progress.

### *Data*

This research relies on a unique very disaggregated price dataset compiled by the survey centre of the Research Centre for the Rural Economy (unpublished) that spans January 1987 through December 1997. Exactly 170 sites from 28 of China's provinces report prices of different agricultural commodities every 10 days. The prices are the average price of transactions that day in the local periodic market. We compute monthly price as the average of the three prices over a given month.

The list of the various markets by province covered by the dataset appears in Table 14.1. As the dataset only covers two cities in the province of Qinghai, we decided not to compute the border effect for Qinghai, but keep the data of Qinghai cities in the sample. We study all bilateral price comparisons allowed in our dataset. Thus, we go beyond most studies that compute relative price after picking one location as the reference. There are 14 365 market pairs [ $= (170 \times 169)/2$] – each with monthly time periods between January 1987 and December 1997. Therefore, for each of the agricultural goods, the vector of relative price contains a potential 1 896 180 observations [ $= 14\,365 \times 11 \times 12$].

As our focus in this study is on the arbitrage of prices over time we need to concentrate on homogeneous and non-seasonal goods. We therefore disqualify exotic fruits, highly perishable products as well as heterogeneous products. Additionally, not all goods are available in each time period and the spatial coverage varies hugely between products. Since we are interested in both cross-sectional and time series variation, we decide to concentrate on the seven goods where data are the most available, namely rice, corn, peanut, egg, hog, beef and mutton.[14]

Our dataset is exceptional in the sense that it covers several markets in each province. We argue that the border of a given economic entity should be calculated based on the direct comparison of price dispersion of cross-border market pairs with that of domestic market pairs. In this chapter, intra-provincial price dispersion is matched against cross-border price dispersion for each specific border to compute provincial border effect.

We denote as *P(i, k, t)*, the yuan price of good $k$ in market $i$ at time $t$. Let $t = 1, 2, \ldots, M$ denote a particular month and year in which the price is computed.

For a given city pair $(i, j)$ and a given good $k$ at a time $t$, we define the price difference as:

$$Q(ij, k, t) = \ln P(i, k, t) - \ln P(j, k, t). \tag{14.4}$$

*Table 14.1* List of markets

| *Province* | *Markets* |
|---|---|
| | ***Coast:*** |
| Beijing | Bei Wanzhuang, Pinggu, Daxing, Fangshan |
| Tianjin | Zishuidao, Jinghai, Nanjiaoqu, Jixian |
| Hebei | Shi Jiazhuang, Baoding, Cangzhou, Baxian, Linzhang, Dingxian, Zhunhua |
| Shanghai | Shiliupu, Nanhui, Jinshan, Songjiang |
| Jiangsu | Nanjing, Suzhou, Huaiyin, Suixian, Taixing, Wuxian |
| Zhejiang | Hangzhou, Ningbo, Wenzhou, Xiaoshan, Putuo, Huangyan, Yiwu |
| Fujian | Xiamen, Xiamen, Quanzhou, Longhai, Fu'an, Changting, Putian |
| Shandong | Jinan, Zibo, Yantai, Laiyang, Liaocheng, Yidu, Tai'an, Mengyin |
| Guangdong | Guangzhou, Zhanjiang, Huizhong, Shunde, Dianbai, Puning |
| Guangxi | Nanning, Liuzhou, Guilin, Linshan, Guixian, Zhongshan, Yishan, Pingguo |
| Liaoning | Shenyang, Anshan, Jinzhou, Gaixian, Jinxian, Chantu |
| | ***Centre:*** |
| Shanxi | Taiyuan, Changzhi, Houma, Wenxi, Taigu, Gaoping, Hongtong |
| Jilin | Changchun, Jilin, Siping, Gongzhuling, Jiaohe, Jiutai, Heihekou |
| Anhui | Hefei, Benbu, Ma'anshan, Changfeng, Liu'an, Suxian, Xuancheng |
| Jiangxi | Nanchang, Jingdezeng, Jiujiang, Nankang, Yugang, Taihe, Guangfeng |
| Henan | Zhengzhou, Kaifeng, Luohe, Linbao, Minquan, Miyang, Linxian |
| Hubei | Wuhan, Huangshi, Shashi, Yingshan, Xianning, Zhaoyang, Tianmen |
| Hunan | Changsha, Hengyang, Xiantang, Youxian, Dongkou, Jiahe, Nanxian, |
| I. Mongolia | Huayuan |
| | Huhehaote, Baotou huancheng, Jining, Tongliao, Ningcheng |
| | ***West:*** |
| Heilongjiang | Ha'erbing, Mudanjiang, Qitaihe, Wuchang, Ning'an, Zhaodong, Baiquan |
| Sichuan | Chengdu (Dongchenggenxia and longtanshiJianyang), Chongqin |
| Guizhou | (Xuetianwan), Chongqin (Huaiyuan), Jianyang, Mianyang |
| Yunnan | Guiyang, Bijie, Huangping, Liuzhi |
| Shaanxi | Kunming, Gejiu, Baoshan, Xuanwei, Dali, Yuxi |
| Gansu | Xi'an, Baoji, Xianyang, Zhouzhi, Suide, Pucheng, Chenggu |
| Qinghai | Lanzhou, Tianshui, Qinyang, Wuwei, Wenxian, Longxi |
| Ningxia | Xining, Ledu |
| Xinjiang | Yinchuan, Wuzhong, Zhongwei, Pingluo |
| | Wulumuqi, Shihezi, Hami, Akesu, Qitai |

We compute first the difference of $Q(ij, k, t)$, denoted $q(ij, k, t)$, in order to take into account potential non-stationarity. Engel and Rogers (1996, 2000, 2001) show that qualitatively the same results are obtained whether using the standard deviation of the 12-month ahead forecast error[15] and using the standard deviation of the first difference of $Q(ij, k, t)$.[16] As noted by Engel and Rogers (2000), relative price is theoretically not expected to have a unit root. In practice, however, even if it is stationary, it is so persistent that there is very little evidence that price series converge. The authors consider the volatility of the first difference of relative price as the measure that enhances the reproducibility of their findings.

Let $DLOP(q(ij, k, s))$ denote the Deviation from the Law of One Price of $q(ij, k, t)$ over the year $s$. We gauge this deviation by the most widely used measure of

*Table 14.2* Summary statistics by province

| *Province* | *Relative price dispersion by province* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *Standard deviation* | | | | *Inter-quartile* | | | |
| | *Observation Nb* | | *DLOP[q(ij, k, s)]* | | *Observation Nb* | | *DLOP[q(ij, k, s)]* | |
| | *inter* | *intra* | *inter* | *intra* | *inter* | *intra* | *inter* | *intra* |
| Beijing | 21 674 | 199 | 96.69 | 90.08 | 25 292 | 246 | 102.68 | 92.66 |
| Tianjin | 21 995 | 205 | 92.77 | 85.87 | 25 151 | 240 | 104.44 | 97.29 |
| Hebei | 36 532 | 701 | 94.49 | 86.50 | 40 456 | 764 | 104.68 | 98.82 |
| Shanxi | 35 577 | 618 | 100.24 | 98.56 | 41 720 | 748 | 107.60 | 102.48 |
| Inner Mongolia | 19 255 | 154 | 99.94 | 92.44 | 21 530 | 169 | 115.16 | 111.27 |
| Liaoning | 26 637 | 317 | 94.33 | 84.14 | 30 035 | 354 | 102.15 | 82.53 |
| Jilin | 37 545 | 690 | 93.61 | 80.77 | 41 949 | 776 | 102.99 | 84.31 |
| Heilongjiang | 33 495 | 539 | 95.85 | 84.07 | 37 145 | 589 | 109.08 | 99.09 |
| Shanghai | 18 304 | 175 | 91.51 | 81.55 | 20 584 | 189 | 98.79 | 84.55 |
| Jiangsu | 38 313 | 721 | 92.35 | 78.47 | 42 735 | 798 | 103.03 | 87.78 |
| Zhejiang | 38 112 | 776 | 93.11 | 84.01 | 43 269 | 881 | 102.09 | 92.59 |
| Anhui | 41 039 | 872 | 98.41 | 95.76 | 46 202 | 972 | 110.84 | 110.82 |
| Fujian | 33 729 | 554 | 88.12 | 71.98 | 38 224 | 646 | 94.54 | 73.17 |
| Jiangxi | 35 279 | 719 | 100.76 | 101.73 | 39 724 | 811 | 113.13 | 116.11 |
| Shandong | 54 173 | 1598 | 97.85 | 89.58 | 58 961 | 1661 | 112.06 | 107.76 |
| Henan | 26 833 | 362 | 95.79 | 99.35 | 30 731 | 443 | 107.33 | 105.37 |
| Hubei | 34 591 | 624 | 96.21 | 91.64 | 39 705 | 731 | 105.04 | 97.06 |
| Hunan | 39 859 | 835 | 97.63 | 94.45 | 44 137 | 888 | 112.12 | 115.27 |
| Guangdong | 31 892 | 468 | 91.62 | 80.20 | 36 231 | 551 | 96.16 | 77.76 |
| Guangxi | 36 686 | 674 | 95.63 | 88.15 | 40 881 | 746 | 104.56 | 98.64 |
| Sichuan | 28 463 | 373 | 90.69 | 76.47 | 32 494 | 442 | 99.49 | 79.16 |
| Guizhou | 24 508 | 271 | 94.31 | 84.00 | 27 369 | 304 | 102.57 | 91.07 |
| Yunnan | 38 630 | 735 | 90.13 | 78.99 | 41 912 | 765 | 100.59 | 88.45 |
| Shaanxi | 38 373 | 737 | 101.74 | 103.61 | 43 783 | 863 | 117.27 | 122.26 |
| Gansu | 30 642 | 474 | 99.67 | 103.19 | 35 238 | 545 | 109.45 | 116.89 |
| Ningxia | 31 046 | 473 | 98.30 | 91.60 | 34 606 | 504 | 109.19 | 106.99 |
| Xinjiang | 16 007 | 94 | 94.21 | 73.30 | 18 067 | 106 | 105.69 | 82.14 |

Columns display the mean values of the annual dispersion of changes in the relative price, DLOP[$q(ij, k, s)$] over the period 1987–1997 between location $i$ and $j$ when either $i$ or $j$ is located in the province considered. Numbers are multiplied by $10^3$.

dispersion that is the standard deviation of the empirical distribution of *q(ij, k, t)*. It corresponds to the width of the no-arbitrage zone and thus proxies the degree of market fragmentation.

Table 14.2 reports average dispersions from the LOP for each provincial border. The number of observations is also given. We report averages for pairs of cities that (i) are both in the province (intra-provincial pairs) and (ii) lie on opposite sides of the provincial border (only one of the markets is located in the province). In almost all provinces, average price dispersion (whatever the measure used) of *q(ij, k, t)* is lower for pairs of markets that are both located within the province than for pairs of markets that lie across the border.

***Empirical estimation***

Our regression attempts to explain *DLOP(q(ij, k, s))*, the dispersion of price changes for a given market-pair *(i, j)* and good *k* over year *s*. It further aims at investigating whether dispersion is greater when the two markets *i* and *j* lie on the opposite sides of the provincial border than when they are both located in the same province.

We estimate the equation:

$$\begin{aligned}\mathrm{DLOP}(q(ij,k,s)) \;=\; & \sum_k \sum_s \beta_s^k + \sum_s \sum_{x=1}^{z} \lambda_s^x D_s^x \\ & + \sum_k \sum_s \phi_s^k \; distance_{ij} + \sum_k \sum_s \psi_s^k \; distance_{ij}^2 \\ & + \rho border_{ij} + \varepsilon_{ij}. \qquad (14.5)\end{aligned}$$

We allow the relative price dispersion to vary from market to market considering that prices in some markets could be more volatile than the average due to idiosyncratic measurement error or seasonalities there. $D_x$ is a dummy variable for each market in our sample. For each market pair (*i, j*) the dummy variables for market *i* and market *j* take on values of 1. We introduce yearly market dummies.

Because the different goods may have different degrees of price volatility every year, we include yearly dummy variables $\beta_s^k$ for each product *k*.

Let $distance_{ij}$ be the real road distance in kilometres between cities *i* and *j* and $distance_{ij}^2$, its squared value. We hypothesize that the variability of relative price will be larger the greater the distance between locations. As in gravity model of trade, we postulate following Engel and Rogers (2001) a concave relationship between $distance_{ij}$ and *DLOP*(*q*(*ij, k, s*)) and thus expect $\psi > 0$ and $\phi < 0$. We consider a concave relationship between the volatility of *q*(*ij, k, t*) and distance because shipping costs do not rise linearly with distance: at shorter distances shippers might employ a truck that would not be economical over longer distances. As different transport costs apply to the agricultural products and as transport costs may evolve over time, we allow yearly specific coefficients on *distance* and $distance^2$ for each good.

A huge effort was put in the measure of the real distance between cities. Distances are computed following the shortest itinerary and the most rapid roads based on very detailed maps. This method helps to control the fact that communication and transportation convenience varies enormously across and within provinces.

The dummy variable $Border_{ij}$ is equal to 1 if markets *i* and *j* are located in different provinces. The literature on border effect traditionally studies a single border (e.g., US–Canada border in Engel and Rogers (1996), US–Japan border in Parsley and Wei (2001)). Here the innovation lies in that we study the impact of the individual borders for each one of different provincial economic entities in China. The border effect is intended to capture the additional deviation from the LOP due to the crossing of a provincial border. It is therefore computed as the difference between the average price deviation for intra-provincial market-pairs and

cross-border market pairs for a given province. It implies that equation (14.5) needs to be run for each province separately, that is considering only market pairs in which at least one market lies in the province.

As a first step, we however conduct the equation on the entire dataset. The estimation of equation (14.5) on all market pairs whatever the province they lie in may give us some valuable insights as it can draw a rough picture of the overall market development. It not only tests the global significance of our model but also provides results that are directly comparable to those found in other studies. As our interest is in studying the evolution of the border effect over time, we decompose our sample into yearly sub-periods and estimate equation (14.5) separately for each of them. We opt directly for a specification that allows a specific quadratic impact of distance on price dispersion by product.

Table 14.3 reports the results of equation (14.5) on separate years.

We consider standard deviation as our measure of dispersion of $q(ij, k, t)$. As a robustness check we also consider the inter-quartile range between the 75th and the 25th quartiles in the lower panel. The results are very similar whether volatility is measured as the standard deviation or as the inter-quartile spread.

The border effect also enters positively and significantly in the regression. We found the impact of provincial border to be substantial, that is controlling for distance, markets on opposite sides of regional borders feature substantially higher differences in commodity prices than do cities on either side of the border. This result confirms that market segmentation caused by provincial borders plays a significant role in the failure of the LOP.

The size and the evolution over time of the overall border effect estimates are coherent with the evolution of the market reforms and market performance over the period in China as described in Park *et al.* (2002). Greater border effects are found in 1988–1989 and 1994–1995. Our results stress that border-related costs of arbitrage persist over the 1990s.[17]

We move ahead and estimate equation (14.4) on different sub-samples depending on the location of the markets. This method allows to measure the specific impediments to price arbitrage induced by each individual provincial border.

We compute the border-related deviation from the LOP for each specific province by examining the dispersion of relative price for market pairs in which at least one market lies in that province.

Table 14.4 displays the average border effect for each province. The border effect for province $P$ is obtained from the regression of equation (14.5) on the sub-sample of observations for which either market $i$ or market $j$ belongs to province $P$.[18] We compare the no-arbitrage bandwidth when the two markets are located on different sides of the border with that when both markets lie inside the province. The border dummy captures the additional costs of arbitrage implied by crossing the specific provincial limits, once distance is controlled for.

The coefficient estimates obtained for border effects are in line with the results obtained when running regressions on the entire dataset.

We find the impact of borders on price dispersion to vary greatly between provinces. The results shed light on the spatial disparities of market integration. All

*Table 14.3* Regressions relating price volatility to distance and the border over time

| | *87* | *88* | *89* | *90* | *91* | *92* | *93* | *94* | *95* | *96* | *97* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *Standard deviation* | | | | | |
| *Distance* | | | | | | *By product* | | | | | |
| *Distance*$^2$ | | | | | | *By product* | | | | | |
| Border | 2.62$^{***}$ | 4.23$^{***}$ | 7.76$^{***}$ | 0.04 | 7.99$^{***}$ | 4.30$^{***}$ | 5.32$^{***}$ | 5.72$^{***}$ | 4.45$^{***}$ | 1.13 | 3.68$^{***}$ |
| | (0.88) | (1.12) | (1.23) | (1.24) | (1.45) | (1.44) | (1.61) | (1.63) | (1.44) | (1.46) | (1.43) |
| $R^2$ | 79.83 | 73.95 | 68.67 | 71.13 | 74.43 | 66.20 | 70.28 | 64.09 | 71.57 | 74.15 | 76.06 |
| Observations nb. | 63 484 | 55 871 | 49 160 | 43 448 | 47 616 | 43 522 | 34 548 | 26 184 | 30 689 | 28 055 | 32 183 |
| | | | | | | *Inter-quartile range* | | | | | |
| *Distance* | | | | | | *By product* | | | | | |
| *Distance*$^2$ | | | | | | *By product* | | | | | |
| Border | 3.31$^{**}$ | 4.43$^{***}$ | 10.12$^{***}$ | 0.00 | 4.91$^{**}$ | 4.25$^{***}$ | 6.69$^{***}$ | 5.56$^{**}$ | 5.87$^{***}$ | 2.33 | 5.42$^{**}$ |
| | (1.53) | (1.62) | (2.04) | (1.97) | (2.21) | (2.13) | (2.48) | (2.57) | (2.20) | (2.33) | (2.21) |
| $R^2$ | 70.88 | 76.16 | 67.04 | 67.51 | 70.22 | 66.56 | 66.56 | 72.32 | 69.61 | 74.79 | 68.17 |
| Observations nb. | 63 636 | 64 130 | 57 520 | 48 079 | 54 149 | 39 305 | 39 305 | 30 035 | 33 681 | 31 339 | 34 465 |

Columns display the mean values of the annual dispersion of changes in the relative price, DLOP [$q(ij, k, s)$] over the period 1987–1997 between location $i$ and $j$ when either $i$ or $j$ is located in the province considered. Numbers are multiplied by $10^3$.

*Table 14.4* Regression results by province

| *Province* | *Provincial border effects* |
|---|---|
| Beijing | 0.07 |
| Tianjin | 2.24 |
| Hebei | 2.85*** |
| Shanxi | 4.05*** |
| I. Mongolia | 10.86*** |
| Liaoning | 2.10 |
| Jilin | 3.05*** |
| Heilongjiang Shanghai | 2.20 |
| Jiangsu | 0.67 |
| Zhejiang | 6.06*** |
| Anhui | 4.75*** |
| Fujian | 3.06*** |
| Jiangxi | 7.63*** |
| Shandong | 4.77*** |
| Henan | 6.46*** |
| Hubei | 0.60 |
| Hunan | 4.04*** |
| Guangdong | 3.86*** |
| Guangxi | 3.05** |
| Sichuan | 3.46*** |
| Guizhou | 6.91*** |
| Yunnan | 7.49*** |
| Shaanxi | 3.68*** |
| Gansu | 3.51*** |
| Ningxia | 3.74*** |
| Xinjiang | 8.09*** |
| | 9.47** |

***'**'* Significance at 1 per cent, 5 per cent and 10 per cent level. Coefficients are multiplied by $10^3$.

coefficients are positive and almost all are significant at the 5 per cent confidence level. A positive coefficient corresponds to a higher relative dispersion associated to the crossing of the provincial border over the period 1987–1997. Findings of non-significant average border effects over the entire period 1987–1997 do not imply that there are no border-related trade costs for each year of the period. The border effects can indeed be significantly positive in some years.

The hierarchy of average provincial border effects appears consistent with province features and profiles stated in various studies such as Goodman and Segal (1994), Yang (1997) and Cheung *et al.* (1998) and in stories on trade tensions. Lowest border effects and thus higher economic integration with the rest of the territory are found for the coastal provinces of Guangdong, Liaoning and Hebei province and for three coastal municipalities (Shanghai, Beijing and Tianjin). In China, the coastal dimension not only encompasses more developed transport infrastructure but also higher engagement in economic liberalization and restructuring. Our results confirm that more liberalized coastal provinces logically

display lower impediments to trade. The three provincial-level cities are important harbours and privileged exchange places (stock exchange in Shanghai). It is furthermore necessary to understand that the borders of these provincial-level cities are artificial in the sense that these cities are separated administratively from their periphery (Hebei province for Beijing and Tianjin, and Jiangsu and Zhejiang for Shanghai). The natural influence zone of these cities, which are important industrial and consumption centres, goes much further than their administrative borders. As a matter of fact, the area covering the south of Jiangsu, the north of Zhejiang, and the city of Shanghai constitutes a coherent economic zone that corresponds to the Yangtze delta. The three municipal cities as well as their neighbouring provinces rank among the provinces with low border effects. Their arbitrary administrative borders that separate artificially the city core from their periphery induce no additional deviation from the LOP.

On the other hand, landlocked and depressed western provinces are characterized by greater impact of their borders on price dispersion: Inner Mongolia, Guizhou, Sichuan, Ningxia and Xinjiang provinces have border effects that are far higher than the other provinces. Western provinces tend to have larger border effects. The findings of greater discontinuities in the western part of China and the hierarchy of the provincial indicators of market integration are very much coherent with the entire literature on Chinese market development.

The coastal province of Fujian also distinguishes itself by high impediments to price arbitrage. This result can probably be explained by geographical and cultural factors. This mountainous province is bordered in the north by the high chain of Wuxi Shan, so that Fujian is physically isolated from the rest of China, all the more that until recently no railway line connected Fujian and neighbouring Guangdong. Huge disparities divide these two provinces into a liberalized and high-growth coastal fringe and an autarkic and remote mountainous inside. Fujian actively participated in trade conflicts on various goods such as the 'silkworm cocoon war' and 'grain war' that occurred at the end of the 1980s. They resorted to various protectionist measures to protect their home products from the competition of goods from their dynamic neighbours. Long (1994) moreover argues that the proximity with Taiwan has played against market integration with the rest of China. The long ban on ties with the enemy island induced poverty and tension in the neighbouring Chinese provinces that tend to explain why they resorted as numerous interior provinces to protectionist measures. Furthermore, when trade was finally allowed between Fujian and its natural partner Taiwan, it may have developed at the expense of relations with other provinces.

The low border effects for Henan, Hubei and Hunan are in line with the central position of these provinces. They are located in the core of China, at the crossroads of the country's two main transport axes: North–South and East–West.

We need to ensure the quality and the significance of our estimates. We can legitimately doubt that the model based exclusively on prices of agricultural products can provide us with reliable indicators of overall market integration. We test if our indicator is representative of trade impediments applied by a province. We compute its correlation coefficients with other measures of trade barriers available

in the literature. Poncet (2002) studies the trade-diminishing impact of provincial borders in 1992 and 1997. She relies on inter-provincial trade flows to compute provincial border effects. We find a significant correlation coefficient of 45 per cent between the two measures.

Our interest is in studying the evolution of the border effect over time and its impact on economic activity. As a final step, we decompose each provincial border effect over time to assess the evolution of the economic integration of each specific province. We compute yearly border effects. Regressions are made separately for each province. Our results help to conclude about the market development in China and to highlight provincial specificities.

The border effects by province and time periods can be considered as all-inclusive indicators of impediments to price arbitrage and thus of lack of market integration.

All border effects are not always significant at the 10 per cent level. As already underlined in the general regression, our measure of the discontinuities in the price arbitrage process induced by the border is higher at the end of the 1980s and mid-1990s for most provinces.

The vector of these coefficients by province and years constitutes our indicator of fragmentation that will be used in the next section. We only consider significant coefficients at the level of 10 per cent.

## Market integration and growth

We turn now to the effect of market integration on growth. We introduce our indicators of provincial economic fragmentation estimated in the previous section in the traditional cross-country empirical framework.

Several studies analyse China's provincial growth dynamics. Most of them focus on trade openness, foreign direct investment, fiscal decentralization or infrastructure (Wang and Yao, 2003; Young, 2000; Zhang and Zou, 1996). None of them focuses on the impact of domestic market development. As far as we know this is the first empirical study of the role of market integration within China on economic performance.[19]

### *The model*

We use a dataset of 28 provinces and six sub-periods between 1987 and 1997 to study the impact of market integration on economic performance. We single out the year 1987 and then look at two-year sub-periods between 1988–1997, respectively 1988–1989, 1990–1991, 1992–1993, 1994–1995 and 1996–1997. We estimate the growth equation:

$$y_{i,t} = \alpha_0 y_{i,t-T} + \alpha_1 X_{it} + \alpha_2 MF_{it} + \eta_i + \gamma_t + \varepsilon_{it}, \tag{14.6}$$

where $y_{it}$ is log-level of real per capita GDP in province $i$ at time $t$, $y_{i,t-T}$ is its lag $T = 2$ years ago, $X_{it}$ is a set of control variables in logarithm which are measured as averages over the two-year period between $t$ and $t - T$ and $MF_{it}$ is the provincial

Market Fragmentation (MF) indicator estimated in the previous section. The fixed effect model consists of an unobservable province fixed effect that is constant over time $\eta_i$, an unobserved period effect that is common across provinces $\gamma_i$ and a component that varies across both provinces and periods which we assume to be uncorrelated over time $\varepsilon_{it}$.

This equation confronts us with four econometric problems. First, $MF_{it}$ is the co-efficient on the border effect that has been estimated in the previous section for province $i$ and time period $t$. It is therefore measured with error as it is fitted with a standard deviation. Second, the introduction of the lagged dependent variable together with fixed provincial effects renders the OLS estimator biased and inconsistent as the lagged dependent variable is correlated with the error term even in the absence of serial correlation between $\varepsilon_{it}$. The third difficulty is that of omitted variables. Differences in economic growth across China reflect a variety of factors other than market lack of integration. To the extent that these factors are correlated with the border effect, the significance of $MF_{ij}$ in the growth regression that omits these factors may simply reflect market fragmentation serving as a proxy for other policies and institutions that are conducive to growth. Finally, most of the explanatory variables ($MF_{ij}$ as well as traditional control variables) may be endogenous with respect to economic growth. Notably, provinces may choose to liberalize, reduce impediments to price arbitrage and promote inter-provincial trade when growth performance is good.

The next section presents the Generalized Method of Moments (GMM) that controls these four empirical problems.

### *The methodology*

The GMM is the prominent way to address the problems of estimating growth regressions.

The first difference GMM estimator was originally developed by Arellano and Bond (1991) and was first introduced in the growth literature by Caselli *et al.* (1996). The basic idea is to estimate equation (14.6) in differences, using appropriate lags of the right-hand-side variables as instruments.

The first difference procedure removes unobserved individual specific effects $\eta_i$ so that estimates are no longer biased by time-invariant omitted variables.[20]

The use of instrumental variables allows consistent estimation of the parameters even in the presence of measurement error and endogenous right-hand-side variables (such as investment and schooling rates and the indicator of market integration in our context of economic growth). The critical identifying assumption is that the time-varying error terms $\varepsilon_{it}$ in the original level equation are serially independent. In that case, lagged levels of right-hand variables may be used as instruments of the subsequent first differenced variables.

### *Empirical estimation*

Our measure of market integration relies on a three-dimensional panel of prices of only agricultural prices. As a first step, it is therefore interesting to investigate

*Table 14.5* Variable definitions

| *Variable* | *Definition* |
|---|---|
| Income per capita | Real GDP per capita. Provincial GDP is deflated using provincial CPI |
| Investment rate | Ratio of fixed investment to GDP |
| Schooling | Share of population with at least primary education computed based on a permanent inventory procedure by Démurger (2001) |
| Importance of private sector | Share of non-state investment in total investment |
| Foreign direct investment | Ratio of FDI to GDP |
| Market fragmentation | Estimated coefficient on border effect based on deviations from the Law of One Price |
| Agricultural GDP per capita | GDP of primary sector divided by population |
| Investment in agriculture | Total power of agricultural machinery in kW divided by total sown area in ha |

*Sources*: *State Statistical Bureau*, various years and *China Statistical Yearbook*, Beijing. Comprehensive statistical data and materials on 50 years of new China (2000).

the impact of our indicator of border-related trade costs on real growth of agricultural GDP per capita.

The vector of control variables $X_{it}$ is defined according to the augmented Solow model as proposed by Mankiw *et al*. (1992). We introduce the increase in total power of agricultural machinery as a proxy for physical capital and the share of the population with more than primary schooling as a proxy for human capital.

Our basic equation includes four explanatory variables: the initial GDP of the primary sector per capita, the rate of investment in agricultural machinery power, the schooling variable and our indicator of market fragmentation computed previously in this study based on the deviation from the LOP. We use the contemporary values of these last three variables as well as of other control variables introduced later to test the robustness of the model.

The variable definitions and their statistical sources are presented (Table 14.5).

The consistency of the GMM estimator depends on whether lagged values of the explanatory variables are valid instruments in the growth regression. We address this issue in considering two specification tests suggested by Arellano and Bond (1991).

The overall validity of the instruments can be tested using the standard Sargan test of over-identifying restrictions.[21] It analyses the sample analogue of the moment conditions used in the estimation process. The figures reported in the table for the Sargan test are the $\chi^2$ values for the null hypothesis, valid specification.

We also report tests for the absence of first-order and second-order serial correlation in the first-differenced residuals. If the disturbances $\varepsilon_{it}$ are not serially correlated, there should be evidence of significant negative first-order serial correlation in differenced residuals and no evidence of second-order serial correlation. Second-order serial correlation of the differenced residual indicates that the

*Table 14.6* Regression results on fragmentation and agricultural GDP

| | *Eq.(14.1)* | *Eq.(14.2)* | *Eq.(14.3)* | *Eq.(14.4)* |
|---|---|---|---|---|
| | *Within* | *GMM* | *GMM* | *GMM* |
| Initial income | 0.29*** | 0.29* | 0.27* | 0.29*** |
| | 0.19 | 0.15 | 0.15 | 0.19 |
| Investment rate | 0.20** | 0.13** | 0.14** | 0.19*** |
| | 0.08 | 0.06 | 0.07 | 0.07 |
| Education | 1.38*** | 1.30*** | 1.36*** | 1.21*** |
| | 0.49 | 0.47 | 0.49 | 0.49 |
| Market fragmentation | –0.39*** | –0.32*** | –0.33*** | –0.37*** |
| | 0.10 | 0.09 | 0.08 | 0.10 |
| Foreign direct investment | | | 0.01 | 0.01 |
| | | | 0.03 | 0.02 |
| Private sector importance | | | | 0.05 |
| | | | | 0.05 |
| $R^2$ | 0.98 | | | |
| Time dummies | Yes | Yes | Yes | Yes |
| Sargan test | | 22.2 | 16.4 | 15.7 |
| AR(1) test | | –2.74*** | –2.39*** | –2.81*** |
| AR(2) test | | 0.85 | 0.76 | 0.65 |
| Observations nb. | 135 | 135 | 135 | 135 |
| Provinces nb. | 27 | 27 | 27 | 27 |

Heteroscedasticity-consistent standard errors are reported in parentheses.
***, **, * Significance at 1 per cent, 5 per cent and 10 per cent level.

original error term is serially correlated and thus that the instruments are misspecified. On the other side, if the test fails to reject the null hypothesis of no second-order serial correlation, we conclude that $\varepsilon_{it}$ is serially uncorrelated and the moment conditions are well specified.

The Sargan test of overidentifying restrictions does not indicate a serious problem with the validity of the instrumental variables. Failure to reject this null hypothesis of no second-order serial correlation shown by the insignificance of test statistics gives further support to the model.

Results appear in Table 14.6. The first regression (column 1) relies on the provincial fixed effect (within) estimator with standard errors that are robust to heteroscedasticity. The remaining columns present the regression results using the one-step GMM estimators, with standard errors that are not only asymptotically robust to heteroscedasticity but have also been found to be more reliable for finite sample inference (Blundell and Bond, 1998).[22]

Our indicator of market fragmentation enters as a significant and robust negative determinant of agricultural GDP per capita. Its impact on agricultural GDP growth appears to be quite high. The two indicators of advancement in reforms (openness to Foreign Direct Investment (FDI) and importance of the private sector) however fail to enter significantly in the regression. These results may be due to the lack of indicators that are specific to agriculture.

*Table 14.7* Regression results on fragmentation and per capita GDP

| | *Eq.(14.1)* | *Eq.(14.2)* | *Eq.(14.3)* | *Eq.(14.4)* |
|---|---|---|---|---|
| | *Within* | *GMM* | *GMM* | *GMM* |
| Initial income | 0.82*** | 0.64*** | 0.86*** | 0.88*** |
| | 0.05 | 0.10 | 0.06 | 0.06 |
| Investment rate | 0.08** | 0.27*** | 0.22*** | 0.16*** |
| | 0.04 | 0.03 | 0.04 | 0.04 |
| Education | 0.41* | 0.61** | 0.43 | 0.69** |
| | 0.25 | 0.33 | 0.30 | 0.32 |
| Market fragmentation | –0.11* | –0.16** | –0.10* | –0.12* |
| | 0.06 | 0.08 | 0.06 | 0.07 |
| Foreign direct investment | | | 0.03*** | 0.04*** |
| | | | 0.01 | 0.01 |
| Private sector importance | | | | 0.08** |
| | | | | 0.04 |
| $R^2$ | 0.98 | | | |
| Time dummies | Yes | Yes | Yes | Yes |
| Sargan test | | 19.25 | 21.59 | 18.47 |
| AR(1) test | | –1.78* | –2.75*** | –2.38** |
| AR(2) test | | –0.43 | –1.25 | –1.49 |
| Observations nb. | 135 | 135 | 135 | 135 |
| Provinces nb. | 27 | 27 | 27 | 27 |

Heteroscedasticity-consistent standard errors are reported in parentheses.
***, **, * Significance at 1 per cent, 5 per cent and 10 per cent level.

It is interesting to ensure that the positive impact found of market integration on growth of agricultural GDP per capita also applies when looking at the real growth of GDP per capita.

We conduct exactly the same estimations used for agricultural GDP but this time use the real GDP per capita as the explained variable. Table 14.7 presents the results of the regression on provincial income per capita. We introduce the investment rate as a proxy for physical capital and the same variable as in the previous case: the investment rate, the schooling variable and our indicator of market fragmentation.

Our indicator of market fragmentation enters significantly with a negative sign in all regressions. Its impact on per capita GDP growth appears to be much smaller than on agricultural GDP growth. This result appears coherent with the fact that our indicator is computed exclusively on information from the primary sector. It is however interesting to see that our indicator is also a significant determinant of global income growth. It also proves very robust to the inclusion of control variables such as financial openness and the importance of the non-public sector.

Our results underline that the larger a province's border effect (thus the lower its economic integration with the rest of the country) the lower its economic growth. These findings prove the detrimental impact of market segmentation on growth in China. By extension, it underlines the counter-productive effect of protectionist policies adopted by provincial authorities along the reform course.

As detailed in Kumar (1994) and Chinese Economic Studies (1993), provincial governments used their new and increased powers acquired with the decentralization to protect their local markets from outside competition. The ultimate objectives were to promote the development of infant industries and to limit the undesired social and economic effects of the reform such as increased unemployment, falling profits, and widespread bankruptcies. In some ways, local protection measures were put in place to protect the economic performance of the local economy.

Our results indicate that resorting to protections had exactly the opposite results. They prove the failure of local governments to promote growth through trade barriers. Alternatively, they make the case for greater trade and price liberalization in order to strengthen per capita income.

The physical capital accumulation variable enters significantly and with the expected positive sign in the regression. The proxy for human capital accumulation also appears with a significant positive.

We find strong evidence of conditional (or beta-) convergence. The coefficient estimates of the lagged dependent variable are always significant and smaller than unity. The convergence rate is computed as $-\ln(\alpha_0)/T$ where $T = 2$ is the time period and $\alpha_0$ is the coefficient of the initial real GDP per capita.

We introduce several variables to test the robustness of our relation between market integration and economic growth. They all enter with the expected sign. Column 3 reports the results when the share of FDI to GDP is added as an explanatory variable. A proxy of the importance of the non-state sector is introduced in column 4. They both enter with a positive and significant coefficient. These results are coherent with the recognition that more advanced provinces in the transition process achieve higher economic growth.

Our results stress the counter-productive impact of discontinuities in the Chinese domestic market. They confirm the beneficial impact of the liberalization process and the necessary fight against provincial protectionism.

## Conclusion

This chapter empirically examines the effect of market integration on economic performance in China. We use a traditional growth regression framework, estimated with the GMM method.

We rely on a new approach in that we focus on price dispersion rather than trade flows that are typically examined in the literature in order to measure provincial market integration.

We compute provincial indicators of domestic market fragmentation based on the distribution of price deviations from the LOP. We rely on a very detailed price dataset covering seven individual agricultural goods, between 1987 and 1997 across 170 cities of 28 provinces.

We find the economic importance of the Chinese provincial borders to be substantial as they are significant explanatory variables in accounting for observed deviations of the Law of One Price. Moreover their impact on the width of the

no-arbitrage zone did not decrease over time between 1987 and 1997, putting into question the capacity of the reforms to enhance market integration within China.

Our results stress the counter-productive impact of discontinuities in the Chinese domestic market in terms of both per capita agricultural GDP and global economic growth. They confirm the beneficial impact of the liberalization process and the necessary fight against provincial protectionism.

## Notes

1. Branstetter and Feenstra (2002) in their study of the Chinese trade and FDI liberalization process consider provinces to be independent political entities on the ground of their trade policy autonomy and their low integration.
2. These papers describe government policies with a specific focus on grain, however they can affect trade in any goods.
3. Problems included persistent distortions, continuous rise in prices, perceived lack of control by provincial authorities and worsening regional protectionism.
4. They typically study single agricultural products like rice (Wu, 1994; Zhou *et al.*, 2000), maize (Cheng and Wu, 1995) or wool (Findlay, 1992).
5. He relies on four different data sets: (1) annual data on the retail prices of 305 consumer goods in 30 cities for the period 1986–1993, (2) annual data on the prices of 130 agricultural goods in 30 provinces during the period 1986–1993, (3) monthly data on the market prices of 49 industrial materials in 36 cities for the period 3/90 to 5/99 and (4) monthly data on the market prices of 33 agricultural products in 36 cities for the period 6/93 to 5/99.
6. He takes the simplest approach to the analysis of actual prices unbalanced panels, regressing the In of the standard deviation of the In prices of each product in each time period on a complete set of product and time dummies, using the repeated observations of the product standard deviations to infer trends in the overall dispersion of prices.
7. The author notes that these fluctuations are not driven by changes in the overall rate of price inflation as no significant positive effect of product inflation is found on price dispersion.
8. His argument is also based on another piece of evidence relating to interregional dispersion of output. The author finds a declining trend in the dispersion of the interprovincial output structure during the reform period. He holds it as evidence of a widespread convergence in the structure of output that he attributes to industrial duplication by provinces and internal market fragmentation. His finding of simultaneous divergence of regional labour allocations and labour productivities parallel to this convergence of regional relative outputs makes him rule out that output movements are driven by free markets forces and comparative advantages.
9. They argue that even if most of the goods have a downward price dispersion trend, it takes just one non-convergence series with persistent and large enough price dispersion to make the average series non-converging, because a statistical mean is sensitive to outliers.
10. Trade impediments can be geography-related such as the transport distance between the two markets as emphasized in the gravity models. They also encompass all formal (tariffs and quotas) and informal (consumer bias, business networks) barriers.
11. They use Consumer Price Index data for US cities and Canadian cities for 14 consumer products between 1978 and 1994 to examine the nature of the deviations from the LOP. They find that US and Canadian markets are more segmented than can be explained by the physical distance between the locations. The variation of the prices is much higher for two cities located across the border than for two equidistant cities in the same country.

12. This price-based literature is the complement of the recent literature focusing on border effects in trade within and between countries. Main contributions include McCallum (1995), Helliwell (1996), Wei (1996), Wolf (2000), Head and Mayer (2001) and Anderson and Van Wincoop (2003). These studies all find that the border matters in the sense that trade between countries is less intense than trade between their constitutive units, after taking into account the relative sizes and distance.
13. Significant national border effects typically emphasize that markets (non-traded marketing services, distribution networks, labour) are structured along national lines.
14. Rice is a major crop in China accounting for around one fifth of total area sown to grain and two fifths of total grain output. Pork is the Chinese traditional meat product and it is consumed all over the country. Though it decreases year by year, the proportion of pork output in total meat output still accounts for 60 per cent, and pork is a very important product in Chinese people's lives.
15. The relative price is thus modelled as a stationary 6th-order autoregressive process, with 12 monthly seasonals.
16. The authors acknowledge that this result may seem surprising as $Q(ij, k, t)$ is expected to be a stationary variable.
17. The non-significance of the average border effect in some years does not necessarily imply that border-related transaction costs are null for all provincial borders. Indeed, the regression does not compare the cross-border price dispersion with the intra-provincial price dispersion accurately.
18. The border effect is the estimated coefficient on the dummy variable that is equal to 1 when $i$ and $j$ lie on opposite sides of the border of province $P$.
19. Our logic relates to that of Boyreau-Debray (2002) which investigates the role of financial wealth.
20. Permanent additive measurement errors are also absorbed into the time-invariant individual effects.
21. The Sargan test is based on the heteroscedasticity-consistent two-step GMM estimator.
22. In finite sample samples, the asymptotic standard errors associated with the two-step GMM estimators can be seriously biased downwards and thus form an unreliable guide for inference.

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# 15 Urban unemployment in China

## Some stylized facts

*Zhongmin Wu*

### Introduction

Over the past two decades, China has undergone significant economic reform. It has been largely transformed from a centrally planned to a market-oriented economy. Development in Eastern Europe suggests that such economic transition can lead to rising unemployment, as inefficient producers cease operating or have to shed surplus labour (Fu *et al.*, 1993). China is no exception. Apart from the large number of rural-to-urban migrants and unemployed people, recent reforms of the state-owned enterprises have also led to a large number of laid-off workers.

Before the economic reform, it had not been admitted that unemployment existed in China. The logic was that socialism guarantees everybody food, housing and a job. Therefore, China had full employment. If some people did not have a job and wanted one, they were classified as 'waiting for employment'. Since the economic reform, unemployment has gradually been accepted and in 1994 China began to use the word 'unemployed'. In 1949 at the beginning of the People's Republic of China, there were 4.742 million unemployed and the unemployment rate was 23.6 per cent. The high unemployment rate was due to the anti-Japanese war and the civil war. The economy of the Kuomintang had almost collapsed. In 1952 the number of unemployed fell to 3.766 million and the unemployment rate to 13.2 per cent. After China finished the transformation to socialism, the number of unemployed fell to 2.004 million and the un-employment rate to 5.9 per cent in 1957. Disaster began from the 'Great Leap Forward' in 1958. China tried to realize the economic revolution in order to overtake Britain. From 1959 to 1963 China had a very difficult time both economically and politically. After the economic recovery in 1965, 'the Cultural Revolution' began. The slump in the economy could not afford school leavers to be employed. So from 1966 to 1977 about 17 million urban youth (the Red Guard) went to the rural areas to be re-educated by the peasants in response to Chairman Mao's call. Some of them did not finish even the junior middle school and they spent most school time on 'revolution' rather than study. After the economic reform of 1978, they gradually returned to the urban areas. They had been recruited through the government's intervention, although some of them were not qualified and poorly educated. They now form the majority of the laid-off

workers in contemporary China. From that time open unemployment changed to hidden unemployment and underemployment.

## Regional patterns

### *Regional unemployment rate in the west has been much higher than that in the east*

In 1996 the People's Republic of China had 30 provinces, municipalities and autonomous regions. Among the 30 provinces, municipalities and autonomous regions, 12 are in the east coastal region, nine are in the central region and nine are in the west. Unemployment data for Tibet are not available. For the period of 11 years of 1988–1998, the six provinces with the highest average provincial unemployment rates were Qinghai, Ningxia, Gansu, Guizhou, Sichuan and Inner Mongolia. They are all in the interior, five in the west region and one in the central region. The eight provinces with the lowest average provincial unemployment rates were Beijing, Shanxi, Tianjin, Hebei, Jilin, Shanghai, Jiangsu and Guangdong. Six of them are coastal provinces in the east and two are in the central region; none of them is in the west. The provincial unemployment rates increase from east to west. The unemployment rate in the west has been much higher than that in the east. All the highest unemployment rates occur in the west region and they are significantly higher than those of the east coastal and central regions. The lowest unemployment rates occur only in the east coastal and central regions (Wu, 2004b).

## Unemployment with Chinese characteristics

### *The rural labour force is outside the purview of unemployment statistics*

The unemployment rate in China is called the urban registered unemployment rate. The term 'registered unemployed persons' only refers to the persons who are registered as permanent residents in the urban areas engaged in non-agricultural activities. The number of registered unemployed was only 5.95 millions (3.1 per cent of the urban labour force) at the end of 2000 (China Labour Statistical Yearbook, 2001, p. 67). The rural labour force is outside the purview of unemployment statistics.

### *The laidoff workers are not counted as unemployed*

To reduce explosive political potential, several new categories of joblessness were created in addition to the registered unemployed. Thus, there are *xiagang* (laid-off workers) – employees who have been laid off but still have some link with the enterprise. Official sources put the number of laid-off workers at 9.11 millions at the end of 2000 (China Labour Statistical Yearbook, 2001, p. 402). The laid-off workers are

not counted as unemployed as they still maintain a close link with and obtain a minimum payment from the enterprises. Such workers are not required to register for unemployment in order to obtain benefits from the state or their firms (Gu, 1999).

### *Unemployment is persistent in China*

Compared with OECD countries, regional unemployment of China is more persistent than that of Australia and the USA, less persistent than that of the UK and Italy and similar to that of Canada, West Germany and France. Empirical evidence from both panel data and time series data analysed by Wu (2003) suggest three important findings: first, provincial unemployment is more persistent than aggregate unemployment. Since there are reasons to believe that wage flexibility is higher at the national than at the regional level, regional relative unemployment is likely to be more persistent than aggregate unemployment. Second, youth unemployment is less persistent than total unemployment. The young unemployed are mainly school-leavers actively searching for their first job. The people who fail to keep their jobs are primarily the adult unemployed. They find it difficult to maintain their skills and have disadvantages in learning new skills compared with young people. Third, although the west region has the highest provincial unemployment rate, it has the lowest persistence of regional unemployment. The fastest growing employment observed in the west region may give some explanations for this. To explore the sources of this unemployment persistence, a panel data method has been developed. The higher the share of industry output by the state and collective sectors, the greater the persistence of regional unemployment. The private sector is currently the main employment destination for the jobless and has acted to reduce unemployment persistence.

## National trends

### *Youth unemployment forms the majority of the total unemployment stock*

Since the laid-off workers are not counted as unemployed, most of those measured unemployed comprise school-leavers (Figure 15.1). Over the last 20 years, 70 per cent of total urban unemployed were aged between 16 and 25. Hence, the majority of officially recognized unemployed people are school leavers in the cities. Youth unemployment data are more reliable compared with adult unemployment data in China, as the former are not distorted by the exclusion of significant numbers of adult laid-off workers from the more familiar unemployment statistics (Wu, 2004a).

Table 15.1 shows that in 1998 among the 5.71 million urban unemployed 54.7 per cent were 16–25 years old. In the meantime among total employees (both urban and rural) only 20.1 per cent were 16–25 years old. The majority of adult jobless are laid-off workers and are not counted as unemployed because they are still affiliated to their enterprise.

*Table 15.1* The age level of urban unemployed in 1998 (millions)

| | *Unemployed* | *Total employees* |
|---|---|---|
| Total number | 5.71 | 699.57 |
| Grouped by age | | |
| 16–25 years old | 54.7% | 20.1% |
| 26 years old and above | 45.3% | 79.9% |

*Source*: *China Statistical Yearbook* 1999; *China Labour Statistical Yearbook* 1999.

### *The majority of the unemployment inflow comprises school-leavers*

The labour market in China is rigid and inflexible. The most important reason for rigidity is the political constraints against both official dismissals and the closure of loss-making state enterprises. The employee protection regulations in China safeguard mainly adults. Even though they have been laid off, they still do not count as unemployed. So only a few of the measured unemployed have had previous employment. Figure 15.2 shows this clearly. Although the unemployment inflow from employment only accounts for a small percentage of the total unemployment inflow, it does increase gradually from 1992. The labour market in China is more flexible than before Deng Xiaoping's visit to South China in 1992 after which the economic reform of China was accelerated and more open-door policies adopted.

### *The majority of the unemployment outflow is to employment*

In the meantime the majority of the unemployment outflow is to employment, not out of the labour force. As shown in Figure 15.3, from 1978 to 1998, nearly 70 per cent of urban unemployed were young and school-leavers while the majority of the unemployment outflow was to employment, not out of the labour force.

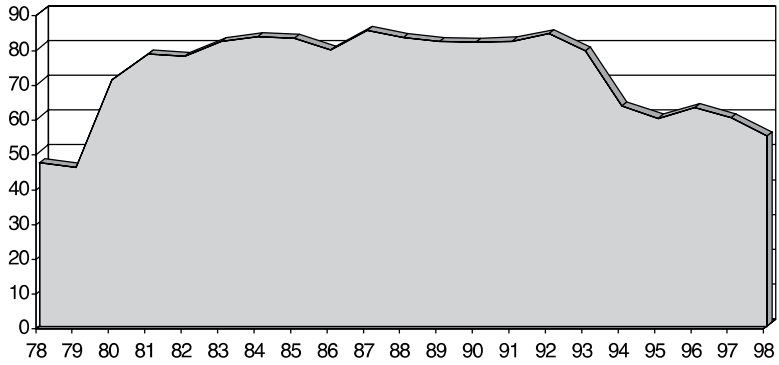


*Figure 15.1* Youth unemployment as a proportion of total unemployment.

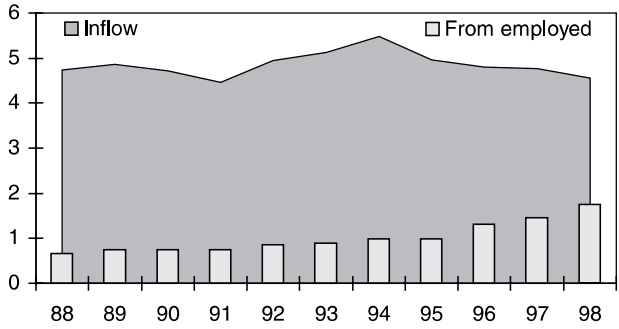


*Figure 15.2* Unemployment inflow and inflow from employment (millions).

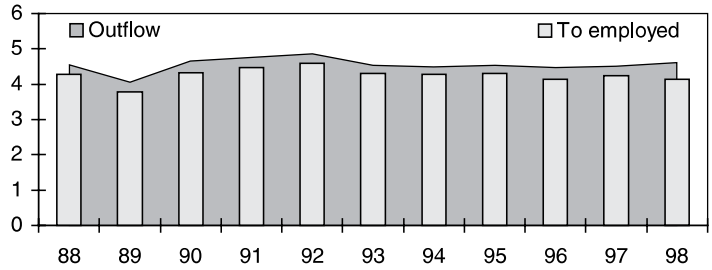


*Figure 15.3* Unemployment outflow and outflow to employment (millions).

### *Long-term unemployment (13 months or more) counted for about one third of total unemployment*

Figure 15.4 shows average unemployment duration in 1996. Long-term unemployment (13 months or more) counted for about one third of the total unemployed. Sixty per cent of the total urban unemployment had been jobless for 7 months or more. Only 14 per cent of total unemployment had been jobless for 3 months or less.

### *Less educated people are more likely to be unemployed*

Table 15.2 shows the education level of laid-off workers, urban unemployed and migrants. Normally urban residents get more education than rural people and the younger generation gets more education than the older generation. The laid-off workers and unemployed are overwhelmingly urban residents while the migrants are mainly from rural to urban areas. Since more than 70 per cent of total employees are rural employees, the education level of laid-off workers and the un-employed is much higher than that of migrants and total employees. However,

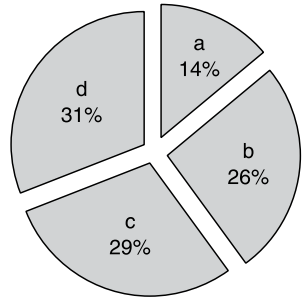


*Figure 15.4* Unemployment duration.
(a) 1–3 months; (b) 4–6 months; (c) 7–12 months; (d) 13 months and more.

*Table 15.2* Education levels of laid-off workers, unemployed, and migrants (millions)

| | *Laid-off workers* | *Unemployed* | *Migrants* | *Total employees* |
|---|---|---|---|---|
| Total number | 8.77 | 5.71 | 44.24 | 699.57 |
| Group by education | | | | |
| Junior Middle School and below | 57.0% | 56.4% | 89.5% | 84.6% |
| Polytechnic School, Senior Middle School and Technical School | 35.9% | 37.6% | 9.8% | 11.9% |
| College and above | 7.0% | 6.0% | | 3.5% |

*Sources*: *China Statistics Yearbook* 1999, *China Labour Statistics Yearbook* 1999: Zhang, 1995.

the education level of the laid-off workers and unemployed is still very low. More than 56 per cent of the laid-off and unemployed have education at or below the junior middle school level. Older women are most likely to be poorly educated, the most likely to be laid off and the least likely to be re-employed. In 1996, among the total of 8.15 million laid-off workers, 41.8 per cent were unskilled workers and apprentices, only 1.7 per cent were engineers and technicians, 4.7 per cent were service personnel, 3.4 per cent were administrative personnel, and the rest comprised 48.4 per cent (China Labour Statistical Yearbook 1997). The job market has become increasingly gloomy owing to a substantial labour surplus. It is especially hard for people with no special skills. The people at most risk of being laid-off are unskilled manual employees.

## Ownership diversification

### *The unemployment inflow from employment by ownership*

In China there are three kinds of ownership: state owned, urban collective owned and 'other ownerships'. The latter include enterprises joint owned, shareholding, foreign funded and funded by entrepreneurs from Hong Kong, Macau and Taiwan, private

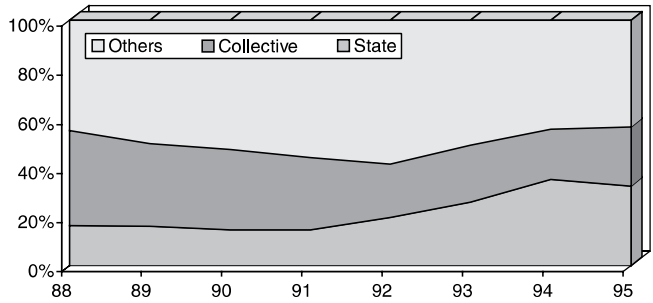


*Figure 15.5* Unemployment inflow from employment by ownership.

enterprises and individuals. The employment of 'other ownerships' – the private sector – has increased greatly since 1992 reflecting a boom in the private sector. Before 1992 only a small percentage of the unemployment inflow from employment belonged to the state sector. But since 1992, this figure has become larger and larger as economic reforms have reached the labour market. But 'other ownership' is still the number one source for the unemployment inflow from employment (Figure 15.5).

***Unemployment outflow to employment by ownership***

After Deng Xiaoping's southern tour of inspection in 1992, the economic reforms and open-door policies were reinforced. Since then, the unemployment outflow to employment in both the state and collective sectors has decreased while the unemployment outflow to employment in the 'other ownership' sector has increased. In 1998 more than 64.5 per cent of the unemployment outflow went to the 'other ownership' sector. 'Other ownership' became the major sector absorbing the unemployed (Figure 15.6).

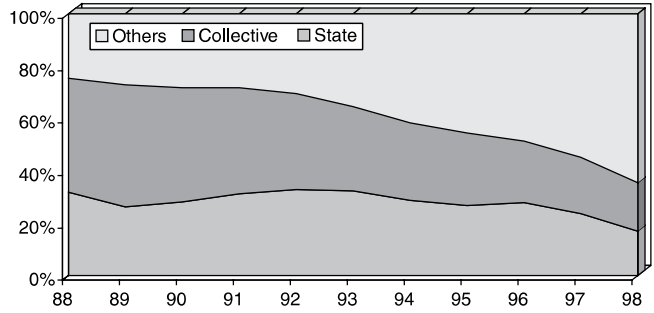


*Figure 15.6* Unemployment outflow to employment by ownership.

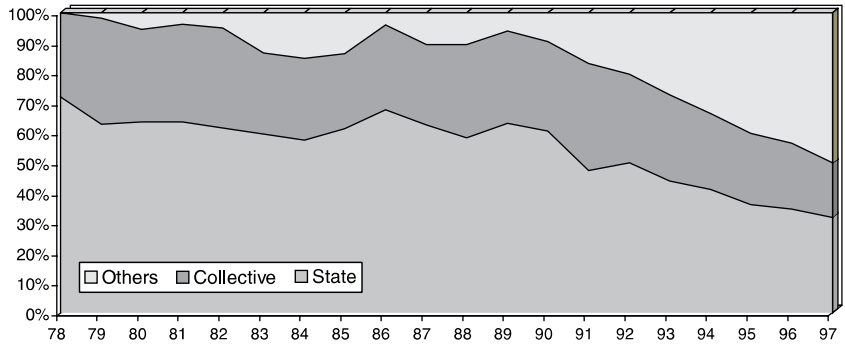


*Figure 15.7* New urban employees by ownership.

The reform of China involves the transformation from socialism to the market economy. Its purpose is to increase productivity and efficiency resulting in more private enterprises and more output by the private sector. Compared with the state and collectively owned units, 'other ownership' units are contributing an increasingly large proportion of government tax revenues and are providing jobs to ever more workers. In 1998, 'other ownership' businesses hired more than 48.97 million workers, overtaking collective units (COEs) (19.63 million) and becoming the second most important sector in terms of employment.

Yin (1998) mentions that most employees in SOEs still hesitate to move to private enterprises (PEs) owing to uncertain job prospects and a reduction in employee welfare in the private sector. There are no statistical data indicating massive labour movements from SOEs to PEs, although it is widely observed that 'waiting' workers find part-time or temporary jobs in PEs. Hu (1997) argues that since involuntary layoffs were officially discouraged as socially undesirable, the only practical means by which SOEs can trim their redundant workforce is through voluntary labour exit to the private sector. The non-transferable pension, medical care, and housing benefits, however, provide strong disincentives to such labour mobility. However, the percentage of new urban employees in the 'other ownership' sector has increased rapidly since 1992 and the percentage of new urban employees both in SOEs and in COEs has decreased quickly (Figure 15.7).

Table 15.3 shows that in 1998 more than two thirds of laid-off workers came from the state sector and only one third of the unemployment inflow from employment were state-owned business employees. Workers were laid off primarily in the state sector as a result of economic reform. Only 3.5 per cent of the laid-off workers came from 'other ownership', but 43.4 per cent unemployment inflow was from 'other ownership'. The state sector gave more chance to new urban employees (31.8 per cent) than the unemployed (20.0 per cent). 'Other sector' employment becomes the main destination for the unemployed (61.7 per cent) and new urban employees (50.1 per cent). Although more than 70 per cent of migrants get jobs in 'other ownership', nearly 20 per cent of them get jobs in the state sector.

*Table 15.3* Grouped by ownership (millions)

| | *Laid-off workers* | *Unemployed inflow from employment* | *Unemployed outflow to employment* | *New urban employees* | *Migrants* |
|---|---|---|---|---|---|
| Total number | 8.77 | 1.75 | 4.13 | 7.10 | 44.24 |
| Group by ownership | | | | | |
| State owned | 67.8% | 32.5% | 20.0% | 31.8% | 19.3% |
| Collective owned | 28.7% | 24.1% | 18.3% | 18.0% | 9.2% |
| Other ownerships | 3.5% | 43.4% | 61.7% | 50.1% | 71.4% |

*Sources*: *China Labour Statistical Yearbook* 1997–1999, Zhang *et al*., 1995.

In 1998 the Chinese government launched three guarantees for the jobless. The First Guarantee was to workers laid off for three years who were to go to re-employment service centres for re-training. During the three-year period, they qualify for medical care and basic living allowance from the enterprise. The Second Guarantee was two-year unemployment benefit. After three-years' lay-off, workers can claim unemployment benefit from a social insurance organization for two years. The Third Guarantee was the minimum urban living allowance. After two years' unemployment benefit, they can only claim the minimum urban living allowance from a civil administration organization.

## Conclusion

The government has come to the point where it must find a solution to the growing unemployment rate which presents an increasing threat to the nation's economic and social development. From this research it is clear that the government should set different targets for different regions. As economic reform develops, larger parts of the state sector will be allowed to streamline and go bankrupt. So more and more surplus labour will be laid off. Most of these will lack qualifications for re-employment and may only be fit for manual work. An urgent solution to these problems is required both politically and economically.

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# 16 Crossing which river and feeling which stones? China's transition to the 'New Economy'[1]

*Richard Sanders and Yang Chen*

## Introduction

In the last 25 years of transition, China has been 'crossing many rivers' in its quest for development. Not only has China had to develop a competitive manufacturing capacity more or less from scratch, but, in order to be a global economic power at the forefront of technology it has had to grasp the 'New Economy' *at the same time*. We argue in this chapter that China has, so far, been successful in both tasks. We argue, however, that what successes have been achieved have not been the result of crudely replacing the 'plan' with the 'market'. Rather we argue, with empirical examples, that China's recent path to development of the 'New Economy' under Deng Xiaoping and his successors, has been underpinned by institutional arrangements laid down under Mao Zedong and subsequently nurtured by the state, despite frequent rhetorical claims to the contrary. We argue that in order to 'cross the river' to the New Economy, China has moved gradually and pragmatically, has been 'feeling the stones' of 'fuzzy property rights' and 'public entrepreneurship' and that without these very Chinese path-dependent elements of its institutional environment, would still only be half-way across.

China has, since the reforms, undergone intensive transformation in terms of industrialization and urbanization; at the same time, it has experienced transition from 'the plan' to 'the market' and from isolation to gradual integration into the world economy. Starting as a low-income 'non-core innovator' country, China has encountered the challenges of developing an 'old' manufacturing economy, mass-production and the New Economy simultaneously in a uniquely short period. We argue that a 'catch-up' strategy relying on technological diffusion alone has its inherent limits for China and that China's government has taken an active approach to the challenges, fostering new and high-technology industries to provide breakthroughs in sustaining economic growth subsequent to the initial industrialization period.

Instead of following the somewhat tired dichotomy of 'the free market versus government intervention' and the deterministic approach of the neo-classical property rights school to interpret the transition of new high-technology industries in China, we adopt in this study an institutional approach to change. In so doing we argue that China has coped with the dual challenges of economic development and institutional transition simultaneously within its unique 'contextual circumstances'

and that gradualism and pragmatism have turned out to be the 'path-dependent' solutions for China to deal most successfully with the 'churn' of transition. We argue that the 'transitology'[2] of China, has, from the very beginning, involved pragmatic attempts at wealth creation, welfare improvement and growing efficiency by the most appropriate available means within the extant contextual circumstances rather than by blindly following textbook models.

The current situation shapes the institutions of tomorrow and, as a result, institutional change cannot be explained in abstract from past institutional arrangements. Thus we argue that, with regard to China, the institutional framework of the Mao era (1949–1976), with its features of rigid party/state governance structures and the political norm of the collective good, shaped both the evolution of the new institutional framework and the nature of the market in China-in-transition under Deng Xiaoping and his successors (1978–present).

In the first part of the chapter, our analysis of the New Economy in the context of China-in-transition presents the contextual circumstances in which China has recently found itself. In the second part, based upon an institutional approach to change, we present the process through which the high-tech sectors in China have evolved. We discuss the role of government in fostering institutional innovation, highlighting the policymaking and management of two major government projects in the post-reform era under Deng Xiaoping and Jiang Zemin: The National High Technology Research and Development Programme of China (863) and The Torch Programme. We argue that the springboard for growth of the high-tech sectors in China in this period was the science and technology and R&D capabilities that had accumulated under Mao in which the unique 'government–industry–university' partnership was originally forged. China's prior institutional framework allowed government and the universities to engage in activities that went far beyond basic research and which became the early driving forces for product development and commercial adventures in high-tech sectors.

In the final part, we present the evolutionary process of university high-tech spin-offs that have been characterized by 'fuzzy property rights' and 'public entrepreneurship', and in arguing that these concepts have been the crucial stones which have allowed China to cross the river to the New Economy attempt an explanation of the recent 'path dependence' of the Chinese high-tech sector.

## China-in-transition and the New Economy

China's rates of economic growth in the past 20 years have been little short of heroic. With products labelled 'made in China' ranging from labour-intensive low value-added goods such as toys and textile goods to high-tech high value-added computing and telecommunications products flooding world markets, some western observers argue that China has successfully turned itself into the workshop of the world. However, according to a recent Global Competitiveness Report (Cornelius *et al*., 2002), China remains classified as a low-income 'non-core innovator' country. Its authors adjust China's competitiveness by taking out the part of growth that is related to the 'catch up' phenomenon. Because the latter is

temporary, its authors argue, it disappears once low-income countries have caught up with richer economies and should therefore be ignored. Thus, according to that report, China's competitiveness ranks only 38th out of 80 countries and only 63rd in terms of technology.

For China, grasping the New Economy involves profound transformation of all industries. Such a change is equivalent in scope and depth to the rise of the manufacturing economy in the 1890s and the emergence of the mass-production, corporate economy in the 1940s and 1950s in the West. It has taken western developed economies a span of two centuries to go through the various stages of transformation. However, post-reform China has encountered the challenge of devel- oping a mass-production manufacturing economy more-or-less from scratch in a significantly shorter time span (no more than 20 years or so) while at the same time engaging in its transformation into a New Economy.

New growth theory identifies technological change as a key factor in economic development and technology is given a high weighting in gauging a country's competitiveness, requiring, first and foremost, an analysis of the extent to which that country is able to achieve technological progress. The way technology affects economic growth is dependent on the level of economic prosperity a country has already achieved.

Porter (1990) identifies three stages of economic development: factor-driven, investment-driven and innovation-driven. In his analysis, at early stages of economic development and once a country has exhausted the benefits of low-cost factors of production, a country's ability to launch its economy on a steeper growth path depends primarily on the transfer of technology from abroad. According to the Global Competitiveness Report (Cornelius *et al.*, 2002), developing countries that have experienced rapid economic growth are typically those that are successful in rapidly absorbing and disseminating the advanced technologies and capital of the more technically advanced countries – a process known as *technological diffusion.* This process of 'catch-up' is very important for developing countries but for any country to advance further it is necessary to achieve a new competitive advantage by developing unique products and processes at the global technology frontier.

As a large developing country, China has faced the challenge of balancing the needs of development of high and new technology industries with traditional industries, of capital- and technology-intensive industries with labour-intensive industries. But unlike in 'core innovator' countries where, as the New Economy develops, increases in manufacturing productivity lead to a decline in the number of factory jobs and their share in total employment, in China it has been necessary to ensure the sustainable growth of both traditional and new industries of mass production at the same time as promoting the New Economy given the need to absorb the vast numbers of endogenously displaced workers from agriculture.

Yet in order to maintain the efficiency of the traditional industries, it is necessary to transform them with high and new technology. Manufacturers who use more high technology in their production processes export more and are more

productive than manufacturers who do not. Meanwhile, it is important to accelerate the development of the high-tech industries, the modern service sector and to enlarge the proportion of the tertiary industry in the national economy. Thus the ongoing process of industrialization of China is *intertwined* with the rise of the New Economy.

As a non-core innovator country, technology transfer has played a considerably more important role than innovation in China's development in the last 20 years. China has actively participated in international economic and technological cooperation and competition and has opened up to the outside world. China's relations with Taiwan, Hong Kong and Singapore, classified as 'core innovator' countries in 1990s, have provided important channels through which China has gained access to the global technology frontier. Yet while China has achieved very high rates of growth, 'catch-up' growth with reliance on *technological diffusion* has had its inherent limits and constrains the international competence of the mass-manufacturing sectors.[3] As a result, the Chinese government has recently proposed a strategy for accelerated development by 'taking a new road to industrialization'. In President Jiang Zemin's speech at the 16th Party Congress in November 2002, he concluded by arguing that China needed to "take a new road to industrialization and implement the strategy of rejuvenating the country through science and education and that of sustainable development. We must give priority to the development of the information industry and apply IT in all areas of economic and social development. We must develop high and new technology industries to provide breakthroughs in stimulating economic growth."

In taking this 'new road to industrialization', the Chinese government is thus reinforcing a strategy based upon a consideration of the context of China as a developing country while at the same time accommodating the challenge of the New Economy.

## Gradualism and pragmatism as guiding principles

In 1992, the Fourteenth National Party Congress defined the fundamental goal of Chinese 'transition' as the establishment of a 'socialist market economy' through *reform, opening up* and *modernization.* However, given the diversity of issues involved in the transitional process, in terms of policy strategy and theoretical base, there was no standard textbook for Chinese policymakers to go by. Csaba (2002, p. 3) pinpoints the similar circumstances that puzzled policymakers engaged in the transition of the Soviet economy and eastern European countries: "(western) academic – and especially macroeconomic – departments had little idea, if any, about command economies in general and the social context of Central and Eastern Europe in particular". Thereafter, as Murrel (1995) argues, "the lack of knowledge of the specific post-communist context tended to be 'remedied' by reliance on a direct application of textbook solutions, without much care about the institutional or historic context into which these insights were to be transposed". The policies, with uncritical reliance on 'standard, pre-cooked solutions' adopted by some transitional countries in the 1990s,[4] as Csaba argues, led to a neglect

of the "*contextual circumstances*", which "determine the success or failure of the application of a proven theoretical insight to policy-making." (Stiglitz, 2000, pp. 552–557).

China's experience, described by Naughton (1995) as 'growth out of plan', has been repeatedly contrasted with neo-liberal shock therapy. One of the characteristics of China's reform, as Fan Gang (1994, 2002) has argued, is that China has had to handle the dual challenge of 'development' and 'transition' simultaneously. Regarding the relationship between the two, as Deng Xiaoping once indicated, 'development is the fundamental principle' while the ultimate purpose of 'reform' or 'transition' in China is to facilitate economic development and improve people's living standards. Yet 'transition' is not simply a linear process in which the backbone of 'the plan' is broken and replaced by the spine of 'the market'. Economic prosperity *and* social stability have been dual principles of the reform. The transitology of China has, from the very beginning, never been concerned with transition *per se*, nor has it focused on the creation of capitalism or the search for the optimal allocation of resources through privatization, but on a *pragmatic* search for wealth creation, welfare improvement, growing efficiency *and* social harmony.

An analysis of China's gradualism as a pragmatic 'bottom up' process emphasizes the importance of local conditions and initiatives rather than textbook blueprints as the key determinants of change. Lifting and relaxing the ideological constraints encouraged local tests and trials and once they were perceived as serving the principles of economic prosperity and social stability, the Party/State pragmatically authorized and legalized them. As Gang Fan concludes: "In short, the definition and contents of 'the socialist market economy' (in China) change over time according to the changing circumstances. Talking only about 'what is achievable and acceptable' without specifying a 'final destination' (has) its pragmatic virtues and saves a lots of political costs" (2002, p. 9). In appraising the 'bottom up' process, the most important feature of China's 'gradual' or 'incremental' approach to institutional transformation so far has been "the development of the market-oriented non-state sector, not the reform of the state sector … the development of new sectors and associated changes to the economic structure (have) had to create and improve the conditions for the reform of the old sector" (Gang Fan, 2002, p. 6).

## Institutions and the development of China's high-tech sector

> *"The situation of today shapes the institutions of tomorrow through a selective, coercive process, by acting upon men's habitual view of things." – Veblen (1899: 190)*

Institutions involve rules, constraints, practices and ideas that can *mould* individual purposes and preferences in different ways. Menger's 'bottom up' approach (1988) first analyses the role of constraints in institutional evolution, proposing that habit formation greatly enhances the formation and stability of institutions. The process of habit formation, resulting from institutional channels and constraints,

is described as *reconstitutive downward causation* by Hodgson and Knudsen (2001), in which institutions and constraints have a capacity to mould individual preferences. Once habits become established they become a potential basis for new intentions or beliefs. As a result, shared habits become, dialectically, the constitutive material of institutions, providing them with enhanced durability, power and normative authority (Hodgson and Knudsen, 2001).

The market itself is an institution (Hodgson, 1988; Loasby, 2000). "The market involves social norms and customs, instituted exchange relations, and – sometimes consciously organized – information networks that themselves have to be explained. All market and exchange relations themselves involve complex rules and cannot be institution-free" (Hodgson and Knudsen, 2001: 114). As Viktor Vanberg (1985: 75) puts it: "What we call a market is always a system of social interaction characterized by a specific *institutional framework,* that is, by *a set of rules* defining certain restrictions on the behaviour of market participants".

### *The tiao kuai system*

Although few civil high-tech industries producing commercial products in the west existed in China at the end of the Mao era, this did not entail a lack of development of modern science and technology under Mao. On the contrary, state education and research institutions were established and developed under the *tiao kuai* system.[5] However, most R&D capacity was concentrated in the military and defence industries which were given top priority at that time. The then planned system was highly efficient in terms of mobilizing available sources to complete key projects, notably in successfully launching 'two missiles and one satellite' in the 1960s and early 1970s. And by the end of the Mao era in 1976, China had established R&D capability with teams of scientists and researchers based mainly at universities and research institutes attached to respective industrial ministries. Under the system of planning, R&D units conducted academic and research projects assigned within their *tiao* or *kuai* systems, which received the allocated funding from the central fiscal plan and then distributed it to units accordingly. All universities and research institutes were (and most still are) state-owned and research projects were conducted collectively in highly organized project units. Therefore, instead of relying on markets for the allocation of labour, technology and capital as 'a set of rules' *moulding* economic actors behaviour under market-oriented institutional arrangements, the planned *tiao kuai* system relied on rigid political and administrative forces which constituted the 'rules' governing participants' behaviour. The institutional arrangements and norms of 'party/state' provided the springboard from which the later reform started. At the micro level, the accepted norms and habits under the 'party/state' structure stressed the collective good and individualism was viewed as politically incorrect.

However, under Deng Xiaoping's leadership from the early 1980s, ideological constraints were gradually lifted and the strategic priority was shifted from political struggle towards economic construction. At the macro level, change began by incorporating market principles progressively into the rigid planning system. The

reform of administrative institutions followed the policy of 'releasing rights and sharing benefits', starting from the reform of fiscal policies allowing local government to retain local tax revenues. The economic structure was adjusted by transforming parts of the military and construction industries into civil production and stressing the importance of developing the tertiary sector previously neglected under Mao. At the micro level, the non-state-owned sector was allowed to develop and State Owned Enterprises (SOEs) were allowed to generate and retain capital. People were allowed to pursue their individual interests.

From the very beginning, Deng Xiaoping emphasized the importance of science and education for the economic development of China. The first National Science and Technology Forum was held in spring 1978, later referred to as 'the spring of science and technology', which accepted the need to apply the R&D strength that had accumulated under the Mao era in civil sectors to serve the long-term development objectives of the 'Four Modernizations' of China. This process was intertwined with the transition from planning to the market which started with the incorporation of competition and market principles into the system and which gradually progressed by building up market-oriented institutional infrastructures. It was a 'reconstitutive downward' process. People whose lives had been spent in military and political struggle gradually adjusted to the market economy. Meanwhile, in the science and technology sector, the institutional need was to bring together the technological strength already developed within public research institutes with the opportunity-seeking, flexible entrepreneurship that characterized the traditional Chinese model of doing business. This required an accommodation between the cultures of bureaucracy and enterprise and necessitated the establishment of an institutional norm of *entrepreneurship*. Nonetheless the formation of any new norms were constrained and 'moulded' by the prior planning system and the norm of the collective good.

### *The role of government and China's 'contextual circumstances'*

According to the World Competitiveness Report, "government plays an inevitable role in economic development. Universities, schools, infrastructure providers and other national and local institutions must not just develop and improve their capabilities, but must also become more connected to the economy and better linked with the private sector" (World Economic Forum, 2002). However, the nuances of the economic role of 'government as a variable' and 'the interests and roles of government officials' have particular implications not only in different countries but also in distinct periods within the same country and should be interpreted within different 'contextual circumstances' (Stiglitz, 2000).

In the case of China's science and technology sector, at the initial stage of reform and transition in the 1980s, the challenge came on two fronts, on the one hand developing science and technology *per se* to catch up with world leaders while, on the other, transforming the technological strength that had developed within public research institutes into 'productivity' and to serve the pragmatic needs of improving people's living standards.

When the reform started at the end of the 1970s, the state sector was the dominant force in the Chinese economy, which, in 1978, contributed 76 per cent of GDP, with the collective sector contributing the other 24 per cent. Throughout the 1980s, the non-state sector, Township and Village Enterprises (TVEs) in particular, flourished and increasingly contributed to economic growth in China. Thus, under the circumstances of a lack of a private sector and of market-oriented institutions, the development of the high-tech sector was initiated by public research institutions within the planned economy. But the non-state sector began to outperform the state sector aided and abetted by two key government initiatives – the 863 programme and the Torch programme.

### *The 863 programme*

In order to narrow the gap between China and high-technology frontiers, the Chinese government launched The National High Technology Research and Development Programme of China, referred to as the 863 programme (representing March 1986, the date it was initially proposed). The policymakers of the initial programme took the China context into consideration when they made the plan. As a large low-income developing country, China was not capable of investing full-scale into new high-technologies and it was impossible (and, indeed, not necessary) for China to compete with leading developed countries in every high-technology front. Therefore, the programme followed the guideline of adopting high technology according to the pragmatic demands and capacity of China, initially selecting seven priority areas (biotechnology, information, automation, energy, advanced materials, laser and space) covering 15 subject topics as national key projects. The programme currently covers 20 subject topics selected from eight priority areas.

The programme learned the lessons of developed countries' high-tech programmes but incorporated them with China's mass mobilization system nourished in the Mao era. Based on extant institutions, the policy and management systems of the programme can be described as a 'high-tech programme with Chinese characteristics' in a number of aspects.

First and foremost, under state direction, the universities, colleges and research institutes were the key forces employed to conduct projects nationwide. As indicated in the latest statistics from the Ministry of Science and Technology (MOST), the host institutions of projects under the programme in 2001 were distributed in 28 provinces, municipalities and autonomous regions across the country. More than 20 000 researchers and administrative staff from over 3000 research institutions, universities and enterprises across the country were involved[6] (863 Programme Annual Report, 2001).

Second, the funding system involved direct appropriation of central government funds to key projects, circumventing the bureaucracy and other obstacles of the then planned fiscal and financial systems that otherwise might have slowed down the programme. Reforms led to the allocation of funding directly to the projects rather than to the 'directing units' (*zhu guan danwei*) of the universities'

research institutions, which belonged to different *tiao* and *kuai*, thereby putting limited sources together to pinpoint the project.

Third, the management of the programme was based on an expert management system established under MOST. This involved a field expert committee (FEC) and a priority expert group (PEG), the former responsible for supervision, evaluation and consultation regarding the implementation of projects in a specific field, the latter responsible for organizing the technical direction and process control.

The 863 programme can claim success on a number of fronts. First, it has narrowed the gap between China and high-tech frontiers. In the biotechnology sector, new varieties of plants with high yields and tolerance have been developed. Breakthroughs have been made in developing new medicines, vaccines and gene therapy and in protein engineering. The government approved the first China-made anti-AIDS drug for clinical testing and China's human genome sequencing project was incorporated in the framework of the International Cooperation Programme. In automation technology, a breakthrough was made in the intelligent robot (IR) project and home-made robots were used in manufacturing industries; a project involving robots working at sea at depths of 6000 metres was successfully completed, allowing China to conduct scientific research in 97 per cent of the oceans of the world.

Second, under the 863 programme, breakthroughs in high-tech frontiers and applied technologies have provided China with strategic home-supplied technologies and products to compete with overseas multinationals, breaking their monopoly and technology constraints, specifically in the areas of ICT including intelligent computer systems, optoelectronic device and systems integration technology, information acquisition and processing techniques.

Third, the programme has promoted commercialization and industrialization of completed projects. The implementation of high technologies has reshaped traditional industries and enhanced the productivity and the competence of China's manufacturing sector. The breakthroughs in information technology, biotechnology and other high-tech sectors have provided China with opportunities to build up its own New Economy sector.[7]

Fourth, the 863 programme has nurtured a new generation of leading scientists. The programme invested heavily in basic research and sponsored 70 per cent of the papers in computing science published and presented by Chinese scientists in international journals and conferences. Within ten years, there were more than 30 000 scientists involved in the programme receiving funding, providing the backbone of China's science and technology development.

### *The Torch programme*

In August 1988, MOST launched the Torch programme. While the 863 programme put emphasis on long-term R&D in the strategic and cutting-edge high-tech sectors, the main mission of the Torch programme was to focus on the *application* of completed R&D and on the commercialization of market-oriented technologies that would benefit business quickly. In terms of administration and

management, while all 863 programme projects were (and still are) monitored and directed by MOST at central government level, the Torch programme is administered at both central and local level.

Between 1988 and 1999, the Torch programme made significant progress with a total of 18 888 projects completed, 5045 classified as 'nation level projects'. The scientific breakthroughs under the 863 programme and the pragmatic application of schemes under the Torch programme provided the essential foundation for the formation of clusters of high-tech industries.[8]

In order to bridge the gap between basic R&D and commercialized applications, the government adopted the method of fostering Science and Technology Industrial Parks. At the same time, MOST instituted a network of High Technology Development Zones (HTDZ) across China to facilitate the Torch plan and support the commercialization of basic R&D at local level.[9]

The programme was (and is) *state-led*, collectively conducted through cross-ministry co-operation. In contrast to 863, the Torch programme covers lower but wider technology areas and has been conducted by both central and local authorities but, as with 863, in addition to the establishment of new institutions, the programme initially relied upon extant institutions, including the *tiao* and *kuai* system.

High-tech companies registered in HTDZs under the Torch programme benefited from a range of favourable policies. In terms of taxation, for the purpose of stimulating the development of applied technology and promoting its commercialization and industrialization, MOST and the State Bureau of Taxation consistently provided significant tax breaks. With regard to financial arrangements, from 1990 MOST and the China Industrial and Commercial Bank, Construction Bank and Agricultural Bank jointly issued regulations that favoured high-tech companies in the provision of special loans for R&D and applied high-tech projects. In terms of customs policy, high-tech companies registered in HTDZs were allowed to set up duty-free storehouses and manufacturing plants within the zone. In 1991 MOST issued new regulations that simplified the application process for going abroad from high-tech company chiefs. Meanwhile, cross-ministry co-operation has played a key role in fostering the cluster of high-tech industries. For example, in 1998 six ministries, including the State Planning Committee, Ministry of Education, MOST, Ministry of Electronic Industry, China Academy of Science and the Bureau of Technology Supervision, worked together on a national strategy to foster the development of the software industry primarily in HTDZs.

As with the 863 programme, the implementation of the Torch programme has fundamentally relied on R&D strengths in the universities and research institutes. Indeed, one of the main missions of HTDZs has been to provide guidance and support for academics from university and research institutes to 'commercialize' their research outcomes. Most HTDZs were established in university districts.

MOST and the Ministry of Education, the governing body of 32 top Chinese comprehensive universities, built up strategic cooperation. Under their joint direction, the 'University Science and Technology Park' (USTP) project was established in 1995 for the purpose of fostering technology innovation and cluster formation.[10]

With the aim of attracting overseas Chinese scholars, 25 Business Hatches for Overseas Scholars were set up hand-in-hand with USTPs to provide business start-up opportunities for overseas Chinese, especially for those who left university for adventures abroad and obtained frontier technologies in western countries.

The Torch programme instituted a new management system to include HTDZ Management Committees. Unlike extant government functional departments, the committees were originally set up as NGOs, the nature of which was close to that of an agent, functioning as a connection between the academic and business worlds. They became the creature of the needs of both 'development' and 'transition', facilitating the development of high-tech businesses following market principles.

The HTDZ Management Committees were a hybrid of the transition process, originating from the old system as a 'market force', yet incorporated into the 'old' system as 'new' blood.[11] By nature, they were 'semi-authority, semi-entrepreneur' institutions. Entrepreneurially, they have, indeed, pursued their own economic interests as market actors. However, they have taken the advantage in terms of access to limited sources. The HTDZs, unlike old institutions, have been encouraged to function as enterprises rather than as purely bureaucratic organizations.[12]

### *China's government–industry–university partnership*

The development of the high-tech sector owes much to the reforms, but also drew heavily upon the accumulated capacity of science and technology built up under Mao. For much of the reform period that followed the Mao regime, the norms and methods of the past prevailed in governance and administration, serving as the principal instruments by which successive reforms incorporated market principles into the extant system.

Institutional arrangements constrain individual habit and behaviour. In China, the reforms allowed research institutes to pursue units' benefits and individual researchers' chase once wealth was no longer regarded as a vice. The capacity to generate profit (*chuang shou*) by turning research outcomes into commercial ventures turned out to be an assessment criterion as important as basic academic achievements for promotion, both political and academic, within the system. The interplay of these forces helped to create new positions for individuals and gave them an opportunity to play a part in the new order. As a result, the direct and indirect consequences of the reforms had the effect of creating new interests and groups, some with an explicit commitment to the reforms themselves, others seeking to find a role as the reforming measures began to erode their hitherto secure status.

Central government policies played a vital role in creating an appropriate environment to foster the transformation of S&T research outcomes into commercial ventures. The nature of the process, like the nature of the reform process generally, was that of trial and error without a uniform style. Fostering business ventures from previous state-owned and state-operated research institutes turned out to involve an interplay between transforming a 'work unit' *(danwei)* under the plan into an 'enterprise' in the market and converting technology into commercial products.

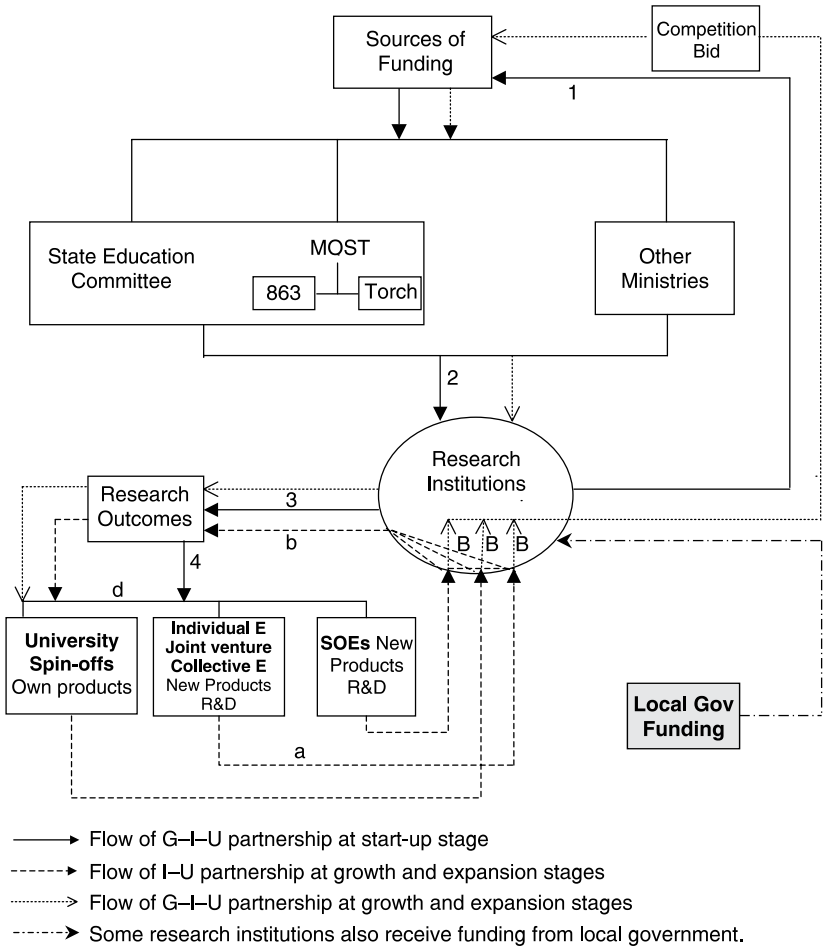


*Figure 16.1* Government–industry–university partnership.

*Notes:*
MOST: Ministry of Science & Technology
SOE: State Owned Enterprises
E: Enterprises
HTDZs: High-tech Development Zones

*Source*: Compiled by authors.

Research institutes and individuals were encouraged to co-operate with industry, first with SOEs and thereafter with the non-state sectors. The reforms were implemented at different rates, depending upon the initiative, energy and norms of the local officials, university leaders and scientists. It was a process which involved education and S&T officials, R&D leaders and otherwise well-connected individuals within the system using the capital and influence they had accumulated

within the administrative system and S&T worlds of the previous era to pursue business ventures in the new one. The practical consequences of the reforms were less clear-cut and took time to emerge, often shaped by the personalities involved. As a result there were diverse forms of business venture, including industry–university (research institute) partnerships which varied not only for businesses developing in different regions and from different universities, but also for businesses *originating from the same university*.

Figure 16.1 shows the evolution of high-tech business sectors. The heavily dashed flows indicate the circumstances at the start-up stage of the enterprises: at this stage in 1980, the SOEs were major industrial partners in transforming research outcomes into products in traditional industrial sectors while universities established directly supervised spin-offs to launch products in brand new high-tech sectors. The lightly-dashed flows indicate the growth and expansion stages of high-tech sectors. Industry–university partnerships were established with the surge of new industrial enterprise formation involving mainly non-state-owned firms. Market reforms created intense competition and pressure for technological innovation. Both state and non-state enterprises increased investment into R&D with the accumulated capital and hunted for new technologies from research institutions. The dotted flow shows the process whereby the established high-tech enterprises, regardless of the nature of ownership, co-operated with research institutes and jointly bid for government funding for further innovation. The solid flow indicates the goal and function of local government and local HTDZs' roles in regulating the growing forces of high-tech enterprises.

In terms of the changing nature of ownership, development proceeded through gradual reassignment of specific property rights within the party/state administrative hierarchy (from higher government agencies to lower government agencies and from government agencies to enterprises, managers or individuals). In the past two decades, it has occurred gradually and has changed along different paths in different sectors and regions over time. The evolution of high-tech enterprises has intertwined with the uneven patterns of reform and change among different sectors and among different scales of enterprise. As ownership has moved gradually away from traditional forms of state and collective toward a mixed economy, high-tech enterprises have been pervaded by various forms of ownership over time: reformed state and collective, forms of private enterprise – the family firm, the elite industrial empire, and the private companies owned by government agencies and enterprises.

In Figure 16.1, the heavy-dashed flow illustrates the power of the administrative hierarchy that specified and enforced property rights at the early stage of reform, given the lack of market institutions and non-state sectors. Stages 1 to 3 represent the procedures involved in applying for allocated funding under the planned system. The crucial change came at stage 4: the decentralization and reformed institutional environment allowed those who had inventions the opportunity to explore new formats for the development of production technology encompassing different configurations of property rights. With the creation of market institutions and the incorporation of non-state sectors, mechanisms to specify and enforce property rights were gradually decentralized alongside the expansion of high-tech enterprises.

***Characteristics of university spin-offs***

China's high-tech industries have from their inception been dominated by spin-offs (Baark, 1994; Gu, 1994). China's prior institutional framework allowed government and the universities to engage in activities that went far beyond basic research and which became the early driving forces for product development and commercial adventures. Unlike their western counterparts, Chinese universities have set up departments of 'industrialization' and 'industrial-academic-research' (*chan-xue-yan*) committees to organize and develop business spin-offs. These spin-offs represent a fundamental institutional innovation which alters the organizational relationship between R&D and entrepreneurship. Table 16.1 shows the evolution of university high-tech spin-offs in China in terms of property rights arrangements, management style and organizational structure.

Universities, research institutions and their governing bodies played a crucial role in the start-up of high-tech spin-offs in terms of providing financial support. The Torch programme identified spin-offs as the preferred strategy to commercialize technology resources. Universities have not only acted as organizers and liaisers but have also converted themselves into corporations. Most high-tech spin-offs were registered as 'collectives with a supervising unit' (Gu, 1994), even when the universities and other public institutions they initially belonged to were involved in senior management and remained as ultimate controllers in terms of voting rights by shares, even after they had grown into multinational publicly listed companies.

Property rights arrangements in university high-tech spin-off ventures were fuzzy at the start-up stage and continue to remain unclarified. The paradox is that university spin-offs have performed impressively through intense competition in innovation-based sectors, their growth dependent upon the sophistication of clusters, company strategies and strong operating practices, despite the inadequately developed micro-economic business environment[13] and the unclarified institutional arrangements.

For the purpose of interpreting the above paradox, we examined the evolutionary process of university spin-offs. We conducted a survey of 23 high-tech companies initiated as university spin-offs listed on the two Chinese stock exchanges (see Table 16.2). These high-tech shareholding corporations were ultimately controlled and owned by universities and state research institutions and were listed among the top 100 publicly listed high-tech companies at the end of 2001.[14] The research observed the change of ownership and control in terms of the major players involved (Sanders and Chen, 2003).

Table 16.3 identifies key sample universities in our study. Most universities in charge of publicly listed companies are leading comprehensive universities under the direction of the State Education Committee (SEC), the rest are either directly controlled by parent industries (*zhuguan bu*) or supported by local government. Almost all sample university companies are located in the regions receiving most government funding for S&T and high-tech projects and are mainly engaged in ICT, computing science and biotechnology.

University PLCs were initiated as university spin-offs as a result of the commercialization and industrialization of research outcomes described previously in

*Table 16.1* Development stages of high-tech spin-offs

| | *Period* | *Property rights* | *Ownership* | *Management style* | *Organizational structure* |
|---|---|---|---|---|---|
| 1 *Start-up* | 1980–92 | Contract Responsibility/ Contract leasing | The reformed collective firms | University DM Individual Entrepreneurial | Unstructured |
| 2 *Survival* | Early to mid 1990s | Contract Responsibility/ Contract leasing | Contracted public firms/ leased public firms | University SM Individual Entrepreneurial | Simple |
| 3 *Growth* | 1992 onwards | Joint Stock | Mixed ownership (Including private) | Entrepreneurial, Co-ordination | Functional, Centralized |
| 4 *Expansion* | 1992 onwards | Joint Stock Shares offered on stock exchanges | Mixed ownership (Including private) | Inception of Professional Administration | MES Decentralized |
| 5 *Maturity* | Mid to late 1990s | Joint Stock Shares offered on stock exchanges | Mixed ownership (Including private) | Professional Administration | MES, Multinational decentralized |

DM: Direct Management, SM: Supervised Management, MES: Modern Enterprise System.
Compiled by the authors (see Sanders and Chen, 2003).

*Table 16.2* Largest shareholders of spin-offs in the 23 universities researched

| *Share title* | *Shareholder* | *Percentage* | *Nature of share* |
|---|---|---|---|
| 1 Beijing University High-tech | Shenzhen Beijing University High-tech Investment Ltd | 37.94 | Designated and State-owned Legal Person |
| 2 Zhong KeJian | Shenzhen KeJian Group Ltd[16] | 29.01 | Creator State-owned Legal Person |
| 3 Nankai Guard | Tianjin Nankai Guard Group Ltd | 47.38 | State-owned Legal Person |
| 4 Ziguang Guhan | Tsinghua Ziguang Group Ltd | 21.44 | State-owned |
| 5 Tianjin University Tianjin Finance | Tianjin University | 33.41 | State-owned Legal Person |
| 6 Zhejiang University HaiNa | Zhejiang University Enterprises Group Share Control Ltd | 62.44 | State-owned Legal Person |
| 7 Tsinghua Ziguang | Tsinghua Ziguang Group Ltd | 62.11 | Creator State-owned |
| 8 Huagong Science and Tech | Huazhong University of Science and Technology | 67.95 | State-owned |
| 9 Qinniao Huaguang | Beijing University Qinniao Sci & Tech Ltd | 25.41 | State-owned |
| 10 Tsing Hua TongFang | TsingHua University Enterprises Group | 50.4 | State-owned |
| 11 Yunnan University Science and Technology | Yunnan University Science Industry and Trade Group | 20.95 | State-owned Legal Person |
| 12 Founder Tech | Beijing University Founder Group | 7.02 | Transferable A Share |

*(Continued)*

*Table 16.2 (Continued)*

| *Share title* | *Shareholder* | *Percentage* | *Nature of share* |
|---|---|---|---|
| 13 Fudan University Fuhua | Fudan University | 32.74 | State-owned Legal Person |
| 14 Qinniao Tianqiao | Beijing University Qinniao Ltd | 20.88 | Legal Person |
| 15 Jiaoda NanYang | Shanghai Transportation University | 43.7 | State-owned Legal Person |
| 16 China High-tech | | | |
| 17 Zhejiang University WangXin | Zhejiang University Innovation Technology Co.Ltd | 22.63 | State-owned Legal Person |
| 18 JiaoDa Tech | Xian Transportation University Enterprises Group | 29 | Transferable A Share |
| 19 Tongji Science & Tech | Tongji University | 45.16 | Creator Legal Person |
| 20 Flame Tech | Wuhan Institute of Telecommunication Sci. | 70.49 | State-owned Legal Person |
| 21 Dong ruan Gufeng | Dongbei University Software Group Ltd | 35.20 | State-owned Legal Person and Public |
| 22 Zhongke Yinghua | China Academy of Science Changchun Applied Chemistry Science Ltd | 33.36 | State-owned |
| 23 Jiaoda Angli | Shanghai Transportation University | 16.5 | State-owned |

*Table 16.3* Leading universities engaged in spin-offs

| | *City* | *Status* | *No. PLCs* | *Industries* |
|---|---|---|---|---|
| Beijing University | Beijing | LC | 4 | ICT, CS, BT |
| Qinghua University | Beijing | LC | 2 | ICT, BT, MT |
| Fudan University | Shanghai | LC | 1 | Mixed |
| Shanghai Transportation University | Shanghai | LC | 2 | Mixed |
| Tongji University | Shanghai | LC | 1 | BT |
| Zhejiang University | Hangzhou | LC | 2 | ICT |
| Nankai University | Tianjin | LC | 1 | MT |
| Tianjin University | Tianjin | LC | 1 | ICT |
| Dongbei University | Shenyang | LC | 1 | ICT, CS |
| Xian Transportation University | Xian | LC | 1 | ICT |
| Huazhong University of Sci & Tech | Wuhan | LC | 1 | CIMS, MT |
| Wuhan Institute of Telecommunication Sci. | Wuhan | ML | 1 | ICT |
| Yunnan University | Kunming | LL | 1 | BT |
| Chinese Academy of Science | Various | ML | 2 | ICT, BT, MT |

LC: Leading Comprehensive University under State Education Committee; ML: Leading University under direction of the Ministry; LL: Leading University under direction of local government; ICT: Information Communication Technology; MT: Material Technology; BT: Biotechnology.

*Sources*: Compiled by the authors (see Sanders and Chen, 2003, p. 43).

this chapter. They had the following common features from start-up in the 1980s and early 1990s: (i) they started with the constraints of lack of skilled labour, technology and capital, (ii) their products relied primarily on the technology and know-how of the original founders who often were leading academics and employees of the university who remained in their life-long jobs while undertaking commercial activities outside the scope of their formal work, (iii) the founders used offices, laboratories, research students and other university resources for the development of the firm, (iv) their R&D breakthroughs were originally conducted under government programmes, and very often the research outcomes of state-funded projects and (v) the founders normally received no subsequent financial support from the university, although university directors and department heads contributed to the firm through programmes such as the Torch programme to grant loans to launch the venture, market the products through the university's network and exempt the company from heavy tax.

At the initial stage, given the lack of legal recognition of the ownership rights of such kinds of enterprise and given that the success of the company was as yet unknown, neither the university directors nor the founders of the firm tried to specify ownership details in a formal contract. Neither were there any extant legal norms and institutions on which they could rely. Thus the definition of the nature of these high-tech spin-offs has remained a 'grey area', different from the state-owned enterprises (SOEs) but not legally distinguished from the traditional SOEs nor recognizable as 'collective enterprises'.

Our empirical study of university spin-offs indicates the *bargained* nature of their property rights. With regard to the right to residual income, from the time the company began making a profit, profit-sharing arrangements were bargained annually and worked out informally through discussion between the university director and the head of the company. Yet with regard to the rights of control and utilization of the company, the founder managers often exercised enormous personal power over the firm. The university exercised a limited degree of control over the appointment of the general manager, often the result of informal bargaining between the university and the appointee him/herself. Ultimately, the university retreated from the productive function, strategic decisions and employment contracts of the company, leaving the rights of control in the hands of the founder. We agree with Francis (1999) that the bargaining of property rights may have helped the spin-offs resolve problems of entrepreneurship, resource allocation, investment, soft budget constraints and other institutional and economic challenges at the initial stage while the university authority remained the legitimate owner of the company, often holding the majority share in the company.

The question of fuzzy property rights has led to the difficulty of defining the nature of shares, thus leaving the rights of control and the ultimate owner of company a perennial source of dispute. Table 16.2 indicates the current largest shareholder of sample PLCs. There are five different titles of shares which are in use to describe, *de facto,* the same type of shares: Designated and State-owned Legal Person, Creator State-owned Legal Person, State-owned Legal Person, Creator State-owned, and State-owned. These terms are used to refer to shares held by governmental agencies or authorized institutions on behalf of the state. The use of different titles incorporating 'creator' and 'legal person' titles implies the possibility of designating rights of shares to 'collective' groups and 'individuals'. It is not unusual for the same shares which, according to companies' annual reports, were defined as 'state-owned shares' a year ago, to be classified as 'legal person shares' or 'creator legal person shares' in the next year's report, or, to be simply left undefined. The solution to the problem, as an exogenous issue, depends on the change of macro-institutional arrangements, which involves further lifting of political and ideological constraints and the evolution of market institutions. As an endogenous issue, its resolution relies on the bargaining power and vision of individual entrepreneurs.[15] The crucial challenge at the current stage is to successfully balance the 'selective incentives' for individuals to maintain the 'collective strength' of R&D and stimulate further innovation by the reallocation of property rights.

***Public entrepreneurship***

Schumpeter (1961 [1911]) was the first to explore the entrepreneurial function and its role in social change. The very core of the 'Schumpeterian entrepreneur' rests on the importance of vision and imagination for overcoming uncertainty (Kuhnert, 2001: 14). Piatkowski (2002) argues that building elements of entrepreneurial society is vital for post-socialist countries to take opportunities for achieving economic growth.

As stated above, almost all directors and top managers of university spin-offs were leading academics and employees of the university who remained in their life-long jobs while undertaking commercial activities outside the scope of their formal work. When they started their businesses, there were no contracts clearly defining property rights and there lacked selective incentives for their behaviour. There were costs, not just benefits, and risks at the initial stage of creating a business-oriented organization from scratch when it was uncertain what the political and economic outcomes and rewards would be. According to one of the basic neo-classical assumptions, rational individuals do not act to achieve common or group interests, rather there are attracted to 'free ride'. In that light, why were those leading academics in China willing to bear the high costs of creating business organizations for the collective good?

Olson's concept of 'public entrepreneurship' helps to resolve this puzzle (1987). Relying on an institutional approach involving 'a shift of perspective from the determinism of conventional physics … to the non-teleological, creative, and non-determined nature of evolutionary process' (Buchanan and Vanberg, 1991, p. 68), we gain an evolutionary perspective of the growth of university spin-offs and step towards an explanation of the phenomenon.

How did the then institutional framework mould individual behaviour toward socially beneficial decisions and thereby cause individuals to act as *public entrepreneurs*? As Krusselberg (1969) indicates: "When a decision cannot be based on incontestable facts, entrepreneurs make use of their own theories about the reality surrounding them, of their value systems, subjective interpretations of received information, and the conclusions they thus derive with regard to their future actions. In this sense decisions under uncertainty always contain a 'political element'" (1969: 107 [Kuhnert's translation, 2001]).

The institutional framework directed individuals to socially beneficial decisions. Specifically, the legacy, derived from the Mao period, of pursuing the collective good prior to individual benefit had a crucial influence on their behaviour. However, while people were no longer judged politically progressive or backward simply by whether they owned property or how much property they owned as they had been under Mao, they *remained* judged by their political awareness and consequently by *how* they acquired and used their property and by *ho*w they contributed to the cause of building 'socialism with Chinese characteristics' through their work. We argue that, in this one crucial aspect, fuzzy property rights helped them cope with economical uncertainty: on the one hand, such fuzzy rights allowed the collective unit, not the individual, to bear the prospect of any business failure and on the other, such fuzzy property rights helped individuals to avoid ideological

puzzles and constraints which existed during the early stages of reform. The set of institutional arrangements that allowed individuals to take different and even contradictory actions thus helped them to cope with the *ideological* uncertainty of the transition.

According to Shackle (1964: 6), human beings are "liberated by the non-existence of any objective future to invent it in an image chosen by them from a range of possibilities constrained only by the orderliness of nature and the facts of their own present circumstances". Kuhnert (2001) summarizes: "Innovative actions must be based on a mental picture of the future. Ex ante 'opportunities' exist only in the mind of the entrepreneur. Thus, the issue is not 'opportunities which others have not yet noticed' (Kirzner, 1973: 81) but rather the invention of opportunities by a certain subjective way of interpreting the information that is present in one's environment".

In the early stages of reform, *public entrepreneurs* in China had to deal with 'uncertainty', with the 'imperfect' knowledge of the 'right' way and of the unintended consequences of actions taken to realize desired outcomes. We have identified in our survey that individual rewards for public entrepreneurs in China, particularly in terms of the range of shares for creators and incomes generated from them, varied significantly. In exchange for the investment of their time, resources, skills and capital, they expected power, honour, fame and a change of social status. Some pursued substantial control of the company and began to transform themselves into individual entrepreneurs. Such transformation was not static as it took place under the twin pressures of growth and increased competition. But in order to mobilize investments and opportunities beyond the capacity of relatively small-scale individual firms, individual entrepreneurs developed new forms of shareholding structure associated with mixed ownership and thereby regained 'public' status. And in so doing, those *individual* public entrepreneurs operated to further the *collective* good.

## Conclusion

While the 'New Economy' offers great potential for sustainable economic growth, the full potential of the 'New Economy' cannot be achieved without establishing a new framework for public policy. Less-developed post-socialist countries like China have to cope with the challenges of developing the 'old economy' and fostering the 'new' simultaneously and there is thus a need for government policy to balance the process of 'development' and 'transition'.

Since science-based high technology becomes the driving force of the 'New Economy', this chapter has examined the development of high-tech industries in China in the past two decades in which China's government has taken an active approach to taking the 'new road to industrialization' and fostering the 'New Economy'. We argue that efforts to move quickly to the theoretically optimal condition may entail unacceptably high social and political costs. Thus, gradualism and pragmatism as key principles of the reform process generally in China have been applied to the evolution of high-tech industries there.

Government policy has explicitly encouraged R&D and commercialization of technological resources. Policies such as the 863 and Torch programmes have been adopted to encourage the transformation of accumulated R&D capacity into profit-making ventures. Policies have been implemented both through the extant institutional system and by incorporating new institutions, such as the High Tech Development Zones, whenever it has been necessary. Government policies have encouraged the development of high-tech spin-offs from universities and other public research institutions.

We argue that what is optimal in theory is not necessarily achievable in the real world and that, as a result, the set of institutional arrangements that allows different and even contradictory individual actions to occur may help to cope with the uncertainty of transition. We have identified the key 'path-dependent' features of China's high-tech spin-offs, fuzzy property rights and public entrepreneurship, and argue that these features have been the critical 'stones' which have helped China to 'cross the river' to the New Economy.

## Notes

1. For the purposes of this chapter, we propose to understand the New Economy as being differentiated from the old by the following features: (1) knowledge as its critical factor of production, (2) science-based high technology as its driving force, (3) innovation as its spirit, and (4) globalization as its economic environment.
2. This concept is associated with Laszlo Csaba (2002).
3. For example, Chinese DVD manufacturers are the leading producing force of DVDs, however, the 'core' technologies and patents of DVDs are held by an international DVD manufacturing union of six multinationals from Japan and Europe – the 6Cs. Chinese manufacturers hold only six core patents out of 32, although they have claimed the most patents in non-core technology and design of DVDs. Therefore, Chinese manufacturers have to pay $10 as a patent fee to 6Cs for every DVD they sell.
4. For example, voucher privatization in Russia in 1992–1994, privatization of public utilities in Hungary in late 1995, the introduction of the private pension system in Kazakhstan in 1999.
5. *Tiao* and *kuai* (vertical and horizontal) was the administrative structure of China under the planned system. All functional ministries and line industries under the direct control of the central government through the State Council were *Tiao* systems which within themselves had administrative hierarchy from the central to grass roots. *Kuai* referred to the local authority that governed the local functional departments and industries. In this study, universities and research institutions directly controlled by the State Education Committee, Ministry of Science and Technology and other ministries are defined as *Tiao* units and those governed by local authorities are classified as *Kuai* units.
6. The top ten regions in terms of R&D funding accounted for 85 per cent of the national total and in terms of project number accounted for 84 per cent. Beijing, the top region in terms of project numbers had a 40 per cent share of the national total; Shanghai ranked second with 11 per cent, Hubei third with 6 per cent. Many of the best Chinese universities and research institutes, including 32 of those which are classified as *bu shu yuanxiao* (under the direct leadership and control of the Ministry of Education), or which are directly controlled by Ministries, are based in these top three regions: Beijing, Shanghai and Hubei (province capital Wuhan).
7. The programme established bases and projects to facilitate the *application* of research outcomes and university–industry partnerships were encouraged. For example, in the

Automation Technology sector, Contemporary Integrated Manufacturing System (CIMS) technology which started from scratch at the outset of the 863 programme had within ten years established ten CIMS training centres nationwide and given CIMS training to 400 000 people including 37 000 chief engineers and company experts. The CIMS Centre at Tsinghua University and Huazhong University of Science and Technology were awarded University Lead Awards by the Society of Manufacturing Engineers (SME) in 1994 and 1999 respectively. Their achievements made China only the second country to receive the award more than once, the USA being the other. CIMS technology has been applied widely in 11 industries including China's key exporting engines, including the textile, electronic and machine tool industries and has provided a competitive advantage for Chinese products.

8. In the ICT area, leading companies including Huawei Technology, ZTC, Great Dragon Technology and Giant Tang Technology formed a cluster of Chinese telecommunication equipment manufacturers capable of competing with multi-national giants Northern Tel, Cisco on international markets. With seven semiconductor companies, China is currently the second largest manufacturing power of computer chips, America being the first.
9. The Shenzhen High Technology Industrial Park was opened in July 1985. In May 1988, the State Council approved the establishment of the first national level High Technology Development Zone – Beijing HTDZ. Thereafter, through 1991 to 1997, the State Council permitted the establishment of 52 other national level HTDZs, located in 29 provinces, autonomous regions and municipalities. HTDZs in China have made rapid progress throughout the 1990s. By 1999, there were 17 498 high-tech companies registered in 53 HTDZs, which hired 2.21 m employees, the industrial turnover exceeded 600 billion Yuan, generating 85.6 billion Yuan in the form of profits and taxes.
10. During the 9th Five-Year Plan, relying on 67 universities' R&D forces, 22 University Science and Technology Parks were established. There were 2778 companies registered within the parks attracting an investment total of 17 billion Yuan. In 2000, the total sales of the parks was more than 25 billion Yuan, with an increase of 91.6 per cent in 12 months. Registered companies developed 2191 new products and obtained 4813 intellectual property rights and registered patents.
11. Starting as a semi-official institution, poorly equipped with limited staff, the HTDZ Management Committee played the role of 'official' agent. With central government's increasing emphasis on the high-tech sector, the fast expansion of HTDZs and the robust growth of business within HTDZs, in February 1995, seven years after the first HTDC opened, the State Council finally approved the HTDC Management Committee, which governed 26 HTDZs at the time, with the status of '*shiye* (governing) unit' equivalent to the status of the science committee at local level. With the growing importance of HTDZs in local politics and economics, the HTDZ Management Committee was granted a higher bureaucratic position, the head of the committee, very often, being deputy Mayor of the city.
12. Acting in their semi-official function, HTDZs organized training courses for high-tech enterprises to adopt market-oriented systems, acting as both 'organizer' and 'referee' of the reform. Various training courses on modern enterprise and share systems were delivered through the HTDZ system. However, the HTDZ Management Committee turned out to be a 'player' as well. In 1994, Zhongshan Torch HTDZ was, as the first of 53 HTDZs, transformed into a public company and floated on the Shenzhen Stock Exchange in 1995.
13. To include the extent of bureaucratic red tape, the quality of infrastructural facilities, the condition of governance, the lack of sophistication of market institutions, constraints on the liberation of trade and quality of S&T research institutions and police protection of business.
14. All samples are shareholding corporations listed and trade on Shanghai Stock Exchange (SHSE), Shenzhen Stock Exchange (SZSE) and Hong Kong Stock

Exchange (HKSE). Data of all companies included in this research project are obtained from the China Securities Regulatory Commission (CSRC) official database and various data relevant to companies.

15. For instance, the process of defining the ultimate owner of Founder Group, which originated from Beijing University, has been going on for three years and still remains unsettled.
16. Shenzhen KeJian is a state-owned subordinate unit of the China Academy of Science.

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# 17 TVE development in China

## Lessons from Golden Cat Cement[1]

*Ian G. Cook and Hantang Qi*

### Introduction

This chapter focuses on Chinese Township and Village Enterprises (TVEs) in general and Suzhou Golden Cat Cement Company in particular. TVEs have played a significant role in contemporary China's transformation from the underindustrialized inward-looking collectivized peasant society of the Maoist period through to the industrialized outward-looking marketized economy under the leadership of Deng Xiaoping and his successors (see, e.g. Murray, 1994; Yabuki and Harner, 1999; Cook and Murray, 2001; Qi, 2004). TVE output, for example, was by 1990 ten times that of 1980, and the TVE share of China's total industry had risen to 31.8 per cent compared to a mere 10.5 per cent in 1980 (Field, 1996). We begin by setting the context of change via summarizing the role of TVEs in China's development trajectory before analysing the changing nature of cement production in China since the establishment of the People's Republic of China (PRC) in 1949. Then we zero in to an original in-depth case study of a successful TVE in Jiangsu Province in order to tease out the specific factors that underpin the growth of TVEs. This particular TVE is Suzhou Golden Cat Cement Company, located in Jinshan Township, Wu County, Suzhou City. The methodology of case study research is also explained. Factors analysed in the success of this TVE include the role of central government policy, local government initiatives, market conditions, the role of finance, and entrepreneurial skills. The situation of TVEs has become more problematic in recent years, especially following China's entry to the WTO in December 2001. This case study is particularly important because it shows clearly that new strategies can indeed be developed to meet contemporary conditions and sustain TVE growth. However, the TVE faced a number of problems in developing its strategy, and thus, we argue, it provides wider lessons for policymakers in China and elsewhere.

### TVEs in China's development trajectory

Following the death of Mao Zedong in 1976 and the brief struggle with the 'Gang of Four', the Chinese government, under the leadership of Deng Xiaoping, began from 1978 to introduce the wide-ranging reforms that have led to the dramatic

transformation of China since that time. Key aspects of the reforms included the 'Open Door Policy' with the accompanying 'Four Modernizations' of industry, agriculture, defence plus science and technology, taken together. A feature of these new policies was the shift from the previous emphasis on collectivism in agriculture towards a 'household responsibility system' which stimulated individual input, investment of time, money and energy and thus high output (Leeming 1985; Croll, 1988; Qi, 2004). Broadly, this had a two-fold effect, providing an accumulation of both surplus labour, 'freed up' from underemployment in the pre-existing communes, and also of surplus capital as rural incomes soared. These surpluses were directed at the local level into 'new' TVEs. Their predecessors were primarily the small-scale commune and brigade enterprises (CBEs), and Leeming (1985) and Qi (2000a) for example, trace their development over time. This movement to TVEs was guided by local government, which was given increased autonomy in decision-making. A new spirit of entrepreneurialism was unleashed, in which 'to get rich is glorious' became suddenly not only acceptable but also actively encouraged.

In more detail, Gao and Chi (1997) state that the development of 'township enterprises' (there is some variability in the terminology employed, including 'VTEs' for example. For a detailed discussion of the concept of TVEs and the various terms adopted to describe the concept, see Chapter 4 in Qi, 2000b) went through four stages since the inception of reform. These were:

1. 1980–1984: when the invigoration of the rural economy via the measures noted above led to farmers engaging in non-agricultural pursuits. In 1983, total output value was 101 billion yuan.[2] CBEs were renamed TVEs in 1984.
2. 1985–1988: a period of 'fluctuations in agricultural production' but one in which, nonetheless 'TVEs flourished, the rural economy enjoyed comprehensive development and farmers incomes soared' (p. 168). Given the dip in grain production after the peak year of 1984, there were calls for less support for TVEs in favour of greater support for production of grain. But such calls went unheeded: 'the development of TVEs went full steam ahead, and their total output value was RMB 645.9 billion yuan in 1988' (p. 169), more than six times that of 1983.
3. 1989–1991: an 'adjustment' period in which credit was squeezed, rural incomes stagnated and although grain production increased, TVEs faced difficulties. TVE growth continued, but at a slower rate, with total output value reaching 1100 billion yuan in 1991. This was a time across China when the whole future of reform was uncertain, and regional contrasts in TVE growth and incomes became more apparent. This will be dealt with further below.
4. 1992–: It was Deng Xiaoping's famous southern China tour in 1992 which got the reforms back on track, and TVEs among others were re-energized. Many TVEs became export-oriented, enabled via foreign investment in many cases, and the TVE sector became a major force in the national economy. Unlike State Owned Enterprises (SOEs), for example, which suffered from bureaucratic interference from government and were capital-intensive, TVEs

> 'had their own decision-making power and took full responsibility for their own profits and losses, which equipped them to participate in market competition' (p. 171); further, they were labour-intensive rather than capital-intensive. This meant that they could utilize China's vast rural labour supply, to the benefit of the TVEs themselves, but also to the wider rural situation where labour was becoming increasingly surplus to the requirements of agriculture.
>
> By 1996:
>
> township (formerly communal) enterprises have become the mainstay of the rural economy. Their value-added output in 1996 reached 1700 billion Yuan, accounting for 60 per cent of rural added value output and 30 per cent of the country's GDP (Cook and Murray, 2001, *op. cit*., p. 113).

Their role in labour absorption was crucial. When Deng Xiaoping came to power in 1978, equivalent enterprises in the communes totalled 1524 000 and had a total payroll of 28 266 000. By the end of 1997, there were 20 149 000 TVEs employing 130 504 000 (Wang Mengkui, 2000). In providing these 100 million new jobs, they contributed markedly to the rural development process, and thus to political stability in China more generally.

But, notwithstanding this marked success, by the late 1990s there were increasing pressures upon TVEs, which 'have reached a plateau and need to change direction' (Cook and Murray, 2001, *op. cit*., p. 113). As these authors point out, the negative features of TVEs include:

- slow growh in their exports, only 2.5 per cent in 1998;
- 15 per cent loss-making as a result of sluggish market conditions and the impact of the Asian financial crisis;
- low-tech equipment and infrastructure which constrains future growth;
- low levels of training and overuse of unskilled manual labour;
- small premises, often employing 6–7 people, and as one official put it, 'little different from the village workshops of several decades or even centuries ago' (Chen Jianguang, a senior official of the TVE Bureau of the Ministry of Agriculture, cited in *ibid*., p. 113);
- environmental pollution, which led for example to a government crackdown on 5000 small paper mills, tanneries and dye factories along the seriously polluted Huaihe River in North China;
- taking up of valuable agricultural land.

TVEs also contribute to growing regional disparities across China. The most successful TVEs have been located in the coastal region, especially in Guangdong Province in the south, Shanghai, Jiangsu and Zhejiang at the mouth of the Yangtze, and Beijing and Tianjin in the north, while Liaoning in the north and Fujian in the south also feature highly (Gao and Chi, 1997, *op. cit.*; Yabuki and

Harner, 1999, *op. cit.*). In these areas, average TVE wages are higher, as is the proportion of TVEs, their technological and managerial sophistication, capital investment and involvement in exports. In contrast, the proportion of SOEs is lower. The GINI coefficient is a measure of regional disparity, and increased for average TVE monthly wage rates from 0.12 in 1988 to 0.28 in 1995. In 1988, these average monthly wages ranged from lows of 67.17 yuan in Sichuan and 68.14 yuan in Shaanxi to 146.87 yuan in Guangdong and 125.11 in Beijing. By 1995, the lows were 64.59 yuan in Shaanxi and 69.34 yuan in Gansu while the highs were 326.75 yuan in both Beijing and Tianjin (Cook and Murray, 2001, *op. cit*., p. 88), indicative of a regional gap which is increasing as the reforms continue apace.

Such problems as these will be exacerbated now that China was at long last allowed entry into the World Trade Organization (WTO), in late 2001. WTO entry brings both threats and opportunities. The threat comes from international competition as tariff barriers and other restrictions on overseas companies are removed. For China, as with many other countries, this competition comes from two contrasting directions. One is from competing low-wage economies, which for China would be those of Bangladesh or Vietnam for example. The other is from high-tech economies such as those of Japan or Western Europe from where high-quality imports appeal to domestic Chinese consumers, with diverse brands such as Sony, Benetton, Ferrari, Chanel, and Gucci for example. In contrast, the opportunities are for new export markets for products, especially in labour-intensive areas such as textiles and garments (Wang Mengkui, 2000, *op. cit.*). Efficiency will be increased and Chinese analysts are optimistic that growth of GDP will therefore be higher by 1.5 per cent seven years after WTO entry (*ibid.*). Enterprises, including TVEs, must be geared up to take such opportunities via global trading links and it is highly probable that Overseas Chinese Networks (OCNs) will continue to play a major part in facilitating access to new markets, as they have done since the beginning of the reform period. Because many TVEs are, as shown above, too small and unsophisticated in their operation they will fall by the wayside as WTO impacts on rural areas. Those that survive will be required to improve their managerial and technological capacity and to network effectively not just in the local area but, increasingly, nationally and globally. It is in the light of these changing pressures on TVEs that we now move on to focus on the cement industry in China, to complete the context in which the case study company operates.

## The cement industry in the PRC

In 1949, when the PRC was established, China's economy was in a parlous state, adversely affected by years of strife, including the war with Japan and the Civil War between the Communist Party and the Guomindang. The first priority, therefore, was to reconstruct and develop the industrial base, initially on Soviet lines and then, via such controversial policies as the Great Leap Forward (GLF) and the later Great Proletarian Cultural Revolution (GPCR), Maoist policies were

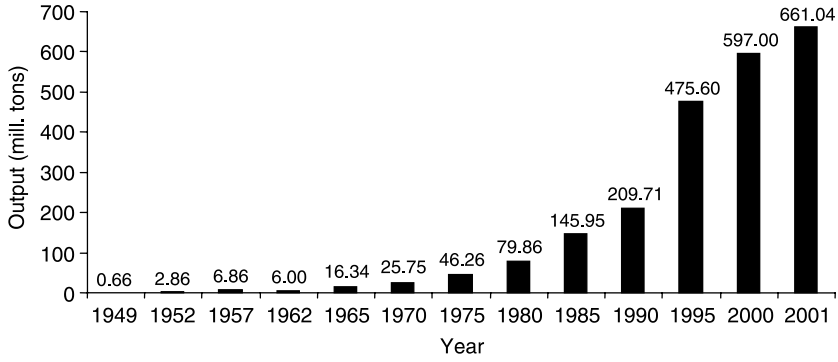


*Figure 17.1* Cement production in the PRC 1949–2001.

*Source*: Freeberne, M. (1971), The People's Republic of China, Chapter 5 in East, W. G., Spate, O. H. K., and Fisher, C.A. (eds), *The Changing Map of Asia* (*5th ed.*), London: Methuen, pp. 341–447; *China Statistical Yearbooks 2000 and 2002*, Beijing: China Statistics Press.

applied. Since 1978, of course the PRC has been opened up as shown above, firstly under the leadership of Deng Xiaoping and then his successors. The cement industry has had a small but significant role in all of these policy changes, in that the construction of roads, industrial plant and housing for instance has been important regardless of policy, and has required cement input. Figure 17.1 shows the changing output of cement from 1949–2001, from the insignificant total in 1949 through to quick recovery as the economy was rebuilt, retrenchment in the early 1960s after the GLF, and then steady advance despite the excesses of the GPCR. But it is the amazing transformation of China in recent times that really stands out in the data, with output more than doubling during the 1980s to reach nearly 210 million tons in 1990, and then almost tripling again to reach 597 million tons in 2000. By 2001, cement production in the PRC was just over 661 million tons. *Beijing Review* reported 820 million tons of cement consumed in China in 2003, 55 per cent of the world's total cement consumption (http://www.bjreview.com.cn/200406/Business-200406(F).htm).

A major report on China's cement industry was produced in 2002, commissioned by the World Council for Sustainable Development (Soule *et al.*, 2002). By 2000, the authors note that China had 36 per cent of world cement production, and 35 per cent of world consumption. In contrast, the next three major producers, the United States, India and Japan had less than 20 per cent of production between them. These high percentages for China bear testament to what Cook has elsewhere called the 'concretization of the earth' as China's urban development exhibits a tremendous rate of growth (Cook, 2000; Cook and Murray, 2001, *op. cit.*). The targets for Chinese production and consumption are even higher, with 40 per cent of world consumption aimed for by 2010, while production targets were set at 660 million tons in 2005, 750 million tons by 2010 and 800 million tons by 2015 (Soule *et al.*, *op. cit.*). Note that the figure for 2001 shown in Figure 17.1 already exceeds the stated target for 2005. Infrastructure will use 40 per cent of consumption, such as that

required for the Beijing Olympics in 2008, freeway, office and bridge construction. In line with the location of most of this development, it is the coastal provinces that dominate cement production, with Shandong being the biggest producer in 2001 with nearly 73 million tons, followed by Guangdong with over 60 million. Then comes Jiangsu, the home of Suzhou Golden Cat Cement Company, with nearly 52.5 million tons of cement production (*China Statistical Yearbook*, 2002).

The Soule report also notes that China has too many small cement producers in comparison to most other countries. There were only ten producers in China with a cement output of more than one million tons. These small producers are inefficient producers and high-level polluters via production of industrial particulates (dust), 40 per cent of China's total, and coal burning. TVEs accounted for 50 per cent of producers. In 1999, the PRC Government decreed that 6000 of these should be closed, especially 2000 which were illegal entities and producers of poor-quality cement. How much closure has taken place is difficult to assess due to resistance by local leaders and fears of political instability from resultant unemployment, factors that have been seen for attempted closures of high-polluting small plants in other industries such as paper production (see Murray and Cook, 2002, 2004 for more details of China's environmental concerns).

## Methodology

The selected case study was originally chosen as one of a sample of seven case study TVEs in China (Qi, 2000b). For the benefit of other researchers, the Appendix spells out some of the general difficulties of research on a Chinese TVE. Introduction to this particular enterprise was made via Chen Zhihong, Research Fellow of Shanghai Academy of Social Sciences and Li Meikun, Secretary to the Mayor of Suzhou, near which the TVE is located. These individuals acted as 'matchmakers', as part of the process of *guanxi* (personal connection, networking) which is crucial to both life in general and research in particular in China. The company was then visited on several occasions over a period of five years, including a reciprocal visit of key personnel to the UK, and interviews held with the key actor, Sun Jinnan, and other high-level managers. The most recent visit involved both authors in June 2001. The approach taken is phenomenological (Easterby-Smith *et al*., 1991), based on developing mutual trust between researcher and researched, and focused on analysis of "the unique and the different rather than [a] search for central tendencies in a population of firms … A longitudinal study of the outlier firm would identify not only the vision and the unique strategy but also the means by which it was made sustainable, and the dynamics of the shifts and changes" (Aharoni, 1993).

This case study method is qualitative; its strengths include the depth and richness of the 'data' provided. Miles (1983, p. 117) puts it as "qualitative data are attractive for many reasons: they are rich, full, earthy, holistic, 'real' ", and enable the researcher to gain more insight than is possible from a more positivistic, quantitative study of a large number of cases (Cooper and Branthwaite, 1977; Moser and Kalton, 1971). Van Maanen (1983, p. 9) suggests that qualitative methods can provide "an array of interpretive techniques which seek to describe, decode,

translate, and otherwise come to terms with the meaning, not the frequency, of certain more or less naturally occurring phenomena in the social world" while Easterby-Smith *et al.* (1991, *op. cit*., p. 32) argue that qualitative methods have the ability to look at change processes over time, to understand people's meanings, to adjust to new issues and ideas as they emerge, and to contribute to the evolution of new theories. They also provide a 'natural' rather than artificial means of gathering data.

A qualitative approach of course also has weaknesses: the analysis of the information collected can be lengthy and time-consuming, the analytical techniques employed may be subjective and over-personalized, and can require a high level of interpersonal and communication skills on the part of the researcher (Gummesson, 1991; Hart, 1989). The present authors argue that the qualitative case study approach is highly appropriate on this occasion because the behaviour and development trajectory of a TVE is otherwise not highly amenable to analysis, and in particular because the context in which the TVE has developed can be revealed more clearly via in-depth follow-up research of the type applied to this particular case study. In sum, there are three major reasons why the case study is best for this research:

- Strategic issues are inherently contextual (Pettigrew, 1987, 1990), thus it is imperative to link the strategic development of Chinese TVEs with their general and relevant contexts or environments. This calls for detailed case study.
- Second, mainly related to the residency and ownership constraints the overwhelming majority of Chinese TVE managers were local peasants and few of them have been exposed to management education. Thus the researcher needs to communicate face-to-face with the managers in Chinese TVEs to gain an understanding of what they mean and perhaps explain what the researcher wants to know. This essentially excludes the usability of questionnaire-type survey and permits only in-depth interviews. Based on the exploratory nature of the study, the contemporary nature of the phenomenon, the lack of control by the researcher over the strategic process of Chinese TVEs, case study approach is chosen as the most appropriate method for this research. Indeed, case research is a useful strategy for studying processes in companies and also for explanatory purposes (Gummesson, 1991, *op. cit*., p. 75).
- Last but not least, the TVE sector will remain crucial to China and hence making sense of its development in strategic terms is a priority task. Inevitably, and despite the difficulties of doing so, this means analysis at the *organizational* level, i.e. as a case, since it is here that the sustainability of its historic success will be tested.

Representativeness of this TVE is worthy of consideration, especially given that positivistic researchers worry about the potential unrepresentativeness of small samples or case studies in qualitative research (Smith, 1991). However, representativeness in a statistical inference sense may be quite separate from logical inference (Mitchell, 1983), and we concur with Silverman (1985) who argues for the importance of explanatory power in the selection of a sample. Indeed, 'deviant'

cases may be chosen, as analytic induction suggests, to demonstrate the limits to generalization reached by a possible representative sample. The presentation of the case will be limited to that material which most effectively reveals the theoretical principle investigated, for just as the 'best' cases are employed, so are the 'best' elements within each case. Golden Cat is *not* representative of many Chinese TVEs, for it is (a) highly successful, and (b) now a large company with good international connections. But these attributes, we would suggest, are precisely what make a focus on this TVE so rewarding as a policy exemplar with lessons for other TVEs in China and, indeed, elsewhere.

## Case study: Suzhou Golden Cat Cement Company Ltd

The TVE now known as Suzhou Golden Cat Cement Company Ltd (SGCCC) predates the reform period, being founded originally as Jinshan Cement Plant (JCP) in 1974 in Jinshan Township, Wu County, Suzhou City, Jiangsu Province. It was only a small cement company during the 1970s, with an annual output which had reached a mere 20 000 tons in 1978 (Qi, 2000b, p. 232). Under the dynamic entrepreneurial leadership of Sun Jinnan, then the local Chinese Communist Party secretary in Fenghuang Village within Jinshan Township, JCP developed via a series of 'great leaps forward' (cf the famous Great Leap Forward of 1958 and coincidentally a term used by Yabuki and Harner (1999, *op. cit.*) to describe the rise of TVEs more generally) to become a marked success story. These leaps are:

1. *First leap forward 1974–86*: Sun Jinnan was appointed Plant Director in 1974, when the enterprise was part of Mudu Commune. He soon established that local demand for cement exceeded supply and therefore set out to double capacity via a new rotary kiln. This cost ¥4 million, a great investment at that time. When pressed on how exactly this capital was raised, Yu Jinhua, the current Vice General Manager, stated that it came from four main sources: Chinese government funds, self-raised funds, a bank loan and up-front cash for promised delivery of the product (Yu Jin Hua, 2001). Given the national changes introduced by Central Government in the 1980s, which led to an increased pace of construction and hence demand for cement, this investment paid off handsomely. By 1983 the plant's capacity reached 50 000 tons. Further funds of ¥13 million were then obtained from government and bank loans to add another kiln that raised production levels to 200 000 tons per annum. This was 20 times the output of 10 000 tons in 1974. This great leap had come about due to such factors as the strategic vision of Sun Jinnan, coupled with his entrepreneurial drive and flair for fund-raising, as well as the wider context of the reform period. By 1986, JCP had become the leading cement producer in Suzhou, and was officially designated a medium-sized TVE (Qi, 2000b, *op. cit.*, p. 237).
2. *Second leap forward 1986–93*: Suzhou City Centre is only about 90 km from Shanghai; the cement company is even nearer, about 85 km from Shanghai.

Shanghai's expansion in the late 1980s meant a high demand for cement, and the TVE was supported financially by the Shanghai Municipal Construction Bureau who sought to ensure a regular supply of cement. An investment of ¥40 million was planned, to add 250 000 tons capacity. However, this was stymied by government edict in 1989, the year not only of Tiananmen but also of severe inflationary and other pressures on the PRC. A 'macro-adjustment' (*hongguan tiaokong*) was made, which curtailed construction. The impact on the enterprise was marked as 'the price of cement fell by half and Jinshan laid off a third of its labour force' (*ibid*., p. 238). This should have marked a period of retrenchment, but paradoxically:

> During the next difficult 12 months Sun Jinnan, by now the General Manager, changed the project by upgrading the technology to match that of the leading SOEs and at the same time to increase quality and energy efficiency. In 1990, construction of the plant restarted and was successfully completed in 1991 (*ibid.*).

This period warrants further analysis. As the managers put it, this was the time when it chose to 'swim against the tide', by increasing investment at the time when other companies were limiting theirs. There can be no doubt that the key factor was once again the management ability, courage and strategic vision of Sun Jinnan. Yu Jin Hua (2001, *op. cit.*) elaborated on this by reference to three different aspects of Sun's contribution: first, his personal drive and ability to get things done; second, his analysis which had convinced him that economic growth was cyclic; third, related to this, and where his courage manifested itself most clearly, that it was in a *recession* that it was the best time to expand. The result of this expansion was that the enterprise was in a superb position to take advantage of the turnaround that came in the early 1990s. By 1993, the investments that were made meant that Jinshan's output had reached 700 000 tons per annum. The Company attained the 'number one ranking' of TVEs in this sector (Qi, 2000b, *op. cit*., p. 238).

3. *Third leap forward 1993–*: The third leap takes us to the present day. Stimulated by Deng's South China tour in 1992, enterprises were encouraged by Central and Provincial Government to 'take an enormous leap forward'. Jiangsu Provincial Government saw the Jinshan Cement Company as 'a prime candidate to become a nationally renowned cement corporation' (*ibid.*). Therefore, in 1993 the Company began construction of a one million ton cement complex at a cost of ¥600 million. The Jinshan Cement Plant became the core of a bigger company, Jiangsu Golden Cat Industrial Group, with Sun Jinnan as Chairman, General Manager and chief fundraiser. As with the second leap, this period too was marked by setbacks that had to be overcome. In brief, the Company sought to expand its activities via a policy of internationalization/globalization. In the late 1990s, Suzhou Golden Cat Cement Company Ltd was established, with Suzhou Cement Company as the central element, producing 1.7 million tons of cement in 1998 with profits exceeding

10 per cent of sales. It has now become a Sino–foreign joint venture within a complex web of shareholding and companies within China and overseas, including Swiss, Singaporean, Taiwanese and New Zealand components. The implications of this will be dealt with further in the next section. Employment in the company is now over 2000 people, 2140 in July 2001, making it one of the largest and most successful TVEs in China.

## Analysis: Similarities and contrasts between the national trends and case study

Table 17.1 summarizes the contrasts between the time period established by Gao and Chi for TVEs across China and that suggested by the case study. The table makes interesting reading. In the case study, there is explicit acknowledgement that the process of expansion began sooner, when the company was a commune enterprise. Gao and Chi are typical of post-Mao analysts who present a marked schism between the Maoist and Dengist periods, and thus underplay continuities

*Table 17.1* Contrasting developmental stages, national versus case study

| *National stages* | *Key features* | *Case study stages* | *Key features* |
|---|---|---|---|
| 1980–1984 | Early development. Rural economy invigorated by reforms. Production team enterprises become TVEs | 1974–1986 | First leap forward. Investment and expansion. Reforms accelerate planned expansion. Strategic vision of Sun Jinnan |
| 1985–1988 | Growth period. Increased labor absorption. Outstripped agriculture in total output value | 1986–1993 | Second leap forward. Retrenchment followed by accelerated expansion. Key role of Sun Jinnan |
| 1989–1991 | Adjustment period. Credit squeeze. Rural incomes stagnate. TVEs face difficulties. Regional contrasts emerge | | |
| 1992– | Rapid growth. Reforms accelerated. TVEs become major force | 1993– | Third leap forward. Expansion to major company with strong international links. Becomes Sino–foreign joint venture |

*Sources:* Gao and Chi (1997); Qi (2000b).

between the two eras (such as the continued key role of the Chinese Communist Party for example). The next major contrast is between the end of stage two for enterprises at the national level, in 1988, followed by the period of adjustment contrasting markedly with the continuation of Jinshan's second leap forward to 1993. For the case study, the 'swimming against the tide' was a marked and unusual feature that highlights the role of the individual vision of the key actor, Sun Jinnan. At the national level, most enterprises retrenched; JCP actually expanded. This is why the 1992 date which is so crucial for other TVEs in China, meant little to our case study in that expansion to become a major company was already well under way. Instead, it is 1993 that is recognized as a key date, when internationalization became such a major feature of Jinshan Cement Plant's activities.

Notwithstanding these contrasts in the time frames, there are noted similarities between the two levels. Finance has been a key element. At the national level, central government has played a major role in setting the preconditions for finance to flow to TVEs, facilitated by local cadres and officials at the local level. Our analysis of the case study suggests that finance was obtained not *because* of central government policy, but rather in spite of it. This was true especially in the period of macro-adjustment, when JCP sought finance in a period of recession. Also, at the national level, market conditions played an important part in TVE expansion; this is also true of the case study. The difference with the latter, however, is that the product, cement, is linked to urban rather than rural expansion as it facilitates infrastructure growth in the burgeoning cities. Labour absorption was another common factor across the two levels of analysis. Finally, in this section, a key factor that seems to have been underplayed at the national level is entrepreneurialism. There is no doubt that the strategic vision, drive and skills of Sun Jinnan were a crucial factor in JCP's expansion. Other entrepreneurs will also be important elsewhere, but there must surely be few who have played such a fundamental role, especially in periods of setback.

## The challenge of the future: lessons from Golden Cat

"In the next 10 to 20 years, China will be faced with the double challenge of industrialization and globalization" (Wang, 2000, *op. cit*., pp. 365–366). Meeting this double challenge will, for TVEs along with other forms of enterprise in China, require such changes as increased capitalization and scale of enterprise, increased networking at a variety of scales from local to global, improved managerial and technological expertise, an increased concern for quality of output, and an improved environmental consciousness and action (Cook and Murray, 2001, *op. cit*.; Wang Yanzhong, 1999). These and other changes will be difficult for many enterprises to make. And yet, our analysis of this company shows that these are not impossible to achieve. Let us consider each in turn.

### *Increased capitalization and scale of enterprise*

As shown above, this occurred during each of the three great leaps forward noted by the Company, with SGCCC becoming one of the largest TVEs in China. We

have already shown that output increased enormously from 1974 to 1998, but this was due to plant size increasing markedly, rather than to a proliferation of new kilns. The drive to increase size of kiln largely came about due to the macro-adjustment period discussed above. There are now six kilns in total, including a new one opened in 2001, but they are on a huge scale compared to the original plant which produced a mere 10 000 tons in 1974. Indeed, in coming years, these six kilns will be replaced by two of a new design. Within Suzhou generally, there are currently 50 cement factories but the authorities wish to reduce this number to ten, albeit with a total production of three million tons per annum. This drive for rationalization is found more generally within China, with our interviewees informing us that due to WTO entry, the Chinese government is encouraging closure of small plants in favour of expansion of larger ones, and the Soule report also makes this point, as shown above. Another feature of this process is that since the 1990s, capitalization has utilized foreign investment in contrast to the earlier emphasis on Chinese finance, whether from government or banks. Foreign investment is from a variety of sources and countries, therefore ensuring that a degree of autonomy is maintained, although foreign investors now play an important role (see next sub-section).

### *Increased networking at a variety of scales from local to global*

Figure 17.2 details the complex networking which now underpins the operation of SGCCC. Our research establishes that Golden Cat deals mainly with Mudu Town Government that owns its parent company in China, the Jiangsu Golden Cat Industrial Group Company, and also with *each* of the components shown in the figure.

We were informed, for example, that Holcim is especially important for it holds 26 per cent of the 50 per cent foreign investment in the TVE, therefore meetings must be held regularly between their executives and those of SGCCC to agree policy directions.

When asked why SGCCC moved to internationalize/globalize in this way, Mr Yu informed us that it was due to several reasons. The first was the influence of links to Shanghai which was itself affected by globalization and also contributing to it. The second was in order to share risks within a larger-scale development. Globalization offers a sophisticated TVE such as this one the opportunity to diversify its activities and reduce the risks as and when an economic downturn affects its core business of cement production. A third reason was the potential benefits to Mudu Town of increased local financial revenue and alleviation of employment pressures. Globalization is seen by the town not as a threat but as an opportunity. There was also another reason that is more appropriately dealt with in the next sub-section.

### *Improved managerial and technological expertise*

Another reason for internationalization/globalization of Golden Cat activities was the desire, in common with many other Chinese enterprises, not just TVEs, to

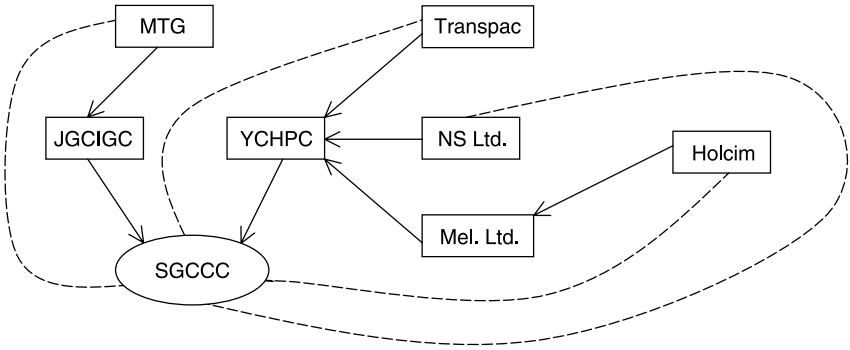


*Figure 17.2* Local–global interactions of Suzhou Golden Cat Cement Company Ltd.

*Notes:*→ denotes ownership, ---- denotes the relationship Golden Cat actually deals with: MTG: Mundu Town Government; JGCIGC: Jiangsu Golden Cat Industrial Group Company, (China); YCHPC: Yangtze Cement Holdings Pte Company, (Singapore); SGCCC: Suzhou Golden Cat Cement Company Ltd; Transpac: Transpac Capital Pte Ltd., Shareholders (Singapore); NS Ltd.: Na-Steel Ltd. (Singapore); Mel Ltd.: Melbourne (New Zealand) Ltd.; Holcim: The largest cement company in the world (Swiss).

acquire improved managerial skills and technological inputs from overseas. This would in turn ensure that the TVE could maintain its leading position locally, and also be ready to face global market conditions. Our research establishes that the company has succeeded in acquiring greater expertise in both fronts, but that this process has not been straightforward. For example, a major difference with other products, and other TVEs, is that there is not a major global cement market, according to a SGCCC international analyst, Mr Chao. He argues that cement is more of a local product, one that with low Chinese labour-costs should be able to see-off international competition. Nonetheless, as with other manufactured goods there is competition in terms of both price and quality, and this is manifest in terms of pressures to shed labour on the one hand and to improve technological input on the other. Soule *et al*. support this perspective in their analysis, noting that profit margins in cement production are very low and that prices have fallen 25 per cent in recent years.

We showed above the labor-shedding that took place during the second leap forward in the Company. This was particularly painful because the Company had grown from a commune origin and as a TVE was not only a major employer of local labour, but was run and owned by people from the township or the wider province. Today, the establishment of the company as a joint venture has led to the ownership being globalized, but 90 per cent of the employment is still localized, involving employees from five townships.

This divergence of ownership and employment caused severe tensions in the second half of the 1990s as two overseas managers were brought in, consecutively because the first one failed, at the instigation of the overseas partners. In the process, Mr Sun was removed from day-to-day involvement in management. The new managers sought, each in turn, to shed labour, and the company faced severe

difficulties because each of these new managers, a New Zealander and then a Taiwanese, 'did not understand Chinese conditions' according to local contacts. They lacked Sun Jinnan's networking skills and his ability to leverage funds from a wide range of sources. "In effect, the company's network, the main resource of its sales contracts and strategic intelligence, was devalued" as Qi puts it (Qi, 2000b, *op. cit*., p. 265). Eventually, the problems with these overseas managers proved such that Mr Sun was reinstated as General Manager as well as being Chairman of the Board.

Of course, this did not remove these pressures to keep costs down, but today, according to Wu Xiaodong, Manager of the General Manager's Office, they are dealt with more sensitively (Wu Xiaodong, 2001). Thus, downsizing is done in two main ways, via early retirement at 50 years of age rather than 60, with those involved receiving a lump sum of ¥1000 plus a small pension of ¥25 per month. This seemed to us a very small amount, but these are local employees all of whom have land on which to live. Also, employees from other provinces are generally hired on temporary contracts only, therefore these are not renewed if labour shedding is required. The case study material therefore offers a caution both to the potential over-reliance on foreign expertise if this means neglect of local expertise, and also a warning about potential impact on labor absorption in the TVE sector.

### *An increased concern for quality of output*

As China modernizes, so consumers of all types demand better-quality products. This is also the case in the construction industry, where better-quality steel and cement is increasingly required. SGCCC, accordingly, have improved the quality of cement produced, largely as the result of the downturn of 1989–1990. The scale of kiln was increased, as shown above, but also the quality of output was improved. For this to be possible, investment at a high level has been required, investment that has been sustained through to the present day, with the new kiln, opened in 2001, being self-financed.

### *An improved environmental consciousness and action*

Environmental quality too will undoubtedly become a key element in a more sophisticated, modern China, as it has in other countries (Murray and Cook, 2002, 2004, *op. cit.*). Cement is obviously associated with dust, dirt and grime. One of the authors had never before visited a cement works, but expected it to be a dirty, unhealthy experience. This turned out to be far from the truth thanks to the measures already taken by SGCCC to improve environmental standards. There are two main positive features of SGCCC's environmental policy: the first is the use of waste heat from the kilns to produce electricity to be used in the plant; the second is the use of giant dust absorbers on the kilns that absorb 90 per cent of the dust. The plant has a relatively high-quality environment; landscaping is also a feature as is the use of water sprays to dampen down dust. Such policies have been developed for some years, and the new kiln that was planned to open in 2003

is designed to reach European levels of waste emissions. The only real problem that the plant faces is the cost issue, for the best environmental technology is relatively expensive. However, management seems to be genuinely committed to improving the plant's environment within these cost constraints, and to 'deal sensibly with environmental questions' as Mr Yu put it. In all, the environment in the plant today, is better than 10 years ago, and is better than even two years ago.

Despite this environmental awareness and environmental action, there are potential conflicts at the local level. Suzhou is an ancient city, 2500 years old, associated with prosperity and the slogan 'Up in heaven there's a paradise, down on earth there's Suzhou and Hangzhou' (*shang you tiantang, xia you suhang*). Famous for its urbane, sophisticated lifestyle, "elegant classical gardens, the old-fashioned houses and delicate bridges ... have made the city full of eternal and poetic charm" (www.travelchinaguide.com/studying in China/Suzhou, 2001, p. 1).

The other side of the coin is that by the early 1990s, according to Suzhou's official website, the reform period had led to Suzhou being second only to Shanghai in the Yangtze delta "in terms of the supply of merchandise for export, the foreign trade volume, the number of enterprises with foreign funds, the amount of contract foreign investment and overseas representatives offices and subsidiaries" (www.chinavista.com/Suzhou Vista/Investment, 2001, p. 1). This had been achieved via the combination of a number of advantageous factors which include its intrinsic attractiveness as a place of business and residence, its excellent location with superb transport links, and active policies pursued by the municipality as an example of 'local state corporatism' which is a key element in local development (Gu Chaolin *et al.*, 2001). These latter policies included the setting up a wide range of development zones including the joint venture China–Singapore Suzhou Industrial Park (CSSIP). By the end of 2000, 76 of the world's top 500 transnational companies had invested in Suzhou, utilized foreign direct investment (FDI) had reached over US$20 billion, and the total GDP of Suzhou was US$18.8 billion (*SIP Facts and Figures*, 2001, p. 1). Suzhou's FDI was ranked 3rd for the whole of China in 1999, behind Shanghai and Guangzhou, but ahead of Tianjin, Beijing, and the SEZs of Shenzhen and Xiamen (*ibid*., p. 2). The city has become a marked success story even among many such success stories in China's 'gold coast'.

This success has led to contradictory pressures on SGCCC. Tourism is a major contributor to the local economy, for example, and no matter how well masked and run, a cement works is hardly a scenic spot! But the product is necessary for developments such as those in CSSIP with its high-quality residential and industrial construction, as well as the new expressways that link major developments. Also, SGCCC provides a good source of local employment and tax revenue. Our interviewees told us that Suzhou Environmental Protection Department does not want the plant to be developed further. However, not surprisingly, the Suzhou Economic and Trade Commission is keen on further expansion. Currently, SGCCC provides ¥50 million in local taxes, and this is set to double. These conflicts at the city-level are also found more locally. Until recently, Mudu Town where the plant is located, was relatively remote from the main scenic spots. Now, however, the town has its own website (http://www.mudu.com.cn) and is seeking to attract tourists. Once

again, there are tensions, therefore, between competing land uses at the local as well as the city level. The company's own website, however, makes much of the awards given to it by Jiangsu Province, including 'Famous Star Enterprise of the Province' and 'Advanced Environmental Protection Enterprise of the Province' (www.goldencatcement.com) and it will no doubt be able to utilize its contacts in the Province hierarchy to obviate and deflect criticisms at the local level.

## Evaluation and conclusion

As we have shown, Suzhou Golden Cat Cement Company Ltd is a major TVE success story. From proverbial humble beginnings it is now one of the top cement producers in China. Its success via its 'three great leaps' was neither straightforward nor inevitable. Energized and motivated via the drive and personality of Sun Jinnan, the company, somewhat paradoxically, thrived when others were languishing, and invested when others divested. In the process, the TVE demonstrated a sound strategic vision and the tenacity to overcome obstacles. The authors believe that the future of the company should be assured for the following reasons analysed in this paper:

1. It has already responded to contemporary pressures of change by going global, increasing the size of plant and guaranteeing sources of investment. It is forward-looking, not least in terms of environmental quality that will increase in importance as local pressures for change are exerted.
2. Despite the PRC's accession to the WTO, cement is likely to remain a more localized product than many others such as steel or vehicles due to its bulk, low Chinese labour costs, and local demand. Soule and his colleagues confirm this by noting that WTO entry will impact 'only marginally' on the cement industry; transport costs are too high, while tariff barriers are also important. However, they note that foreign builders are now being allowed to compete in China so they may wish to bring in their own suppliers from overseas.
3. SGCCC benefits from well-established strategic networks at the local, regional and international level. These will continue to provide the necessary information and contacts that will enable the company to sustain its development trajectory. In January 2004 the holding of Singapore Yangtze Cement Holding Company was sold for US$27.45 million to the Huaxin Cement Company Limited, a much larger concern that has a production capacity of ten million tons per annum. Holcim is also a major investor in this Company therefore Golden Cat's prospects are unlikely to be adversely affected, indeed the opposite is likely as they benefit from Huaxin's greater contacts and clout.

In general, China's TVEs have much to do in order to survive and prosper in a post-WTO situation. They require improved commercial acumen, sophisticated management and higher levels of capital and technology in order to face increased competition. SGCCC shows that it is feasible to acquire such attributes. The case study also shows, however, that problems remain, not least the local

context in which TVEs are embedded, a context which gives rise to specific pressures of ownership, employment and environmental concerns across China. For policymakers concerned with TVE expansion, the trick will be to ensure maximum benefits from overseas investment, WTO entry, access to new markets and other opportunities, while nevertheless ensuring that local employment levels and decision-making are sustained despite the conflicting pressures of increased efficiency and global demands on the one hand compared to local needs and requirements on the other. This case study demonstrates that much is possible, but that questions of local conditions will remain salient to future prospects.

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## Appendix: Problems of undertaking research on Chinese TVEs

- *The lack of a tradition of research* of this type between Chinese enterprises and Chinese scholars. The latter are seen to have a responsibility to help organizations and in this situation their research is more akin to problem solving, or consultancy. It took time to convince enterprises that this was neither 'spying' on the one hand, nor 'consultancy' on the other.
- *Lack of support from Chinese bureaucracy*, a well-known difficulty.
- *Problem of gaining access to companies*, the most serious difficulty, as noted by others in China and Eastern Europe (Brown and Porter, 1996; Pollert, 1999). Most TVEs do not want to be research objects, partly because they are unsure of what would be caused to them, including a sensitivity over foreign affairs. But some companies welcome visitors worth respecting in their eyes, such as those who enjoy popularity, and those with a high educational background, or even those with a foreign background. *Guanxi* here serves as a guarantee to the company researched that no harmful effects will be brought about, and at the same time is a binding force to the researcher that he will not do anything against the company. Of course, the researcher is encouraged to do anything helpful to the company, for example introducing foreign investment. Either party will lose friends if he/she violates 'the rule of the game'.
- *Problem of gaining access to key personnel*, who are extremely busy with running their companies, opening up new markets and social intercourse with 'useful people', such as officials from government and banking institutions,

important customers, and so on. This is why a long period of interaction with a company is crucial. Interviews with other concerned people in the sample companies were also conducted, and this was a must when the 'number one' person was not available for long interviews.

- *Difficulty in getting useful data,* because most Chinese TVEs do not have complete and authentic financial and other records, and this is especially true for small-sized companies. Often a TVE will keep two account books, one authentic and of top confidentiality; the other for show and formalism only. Some companies lower the figure of profits, turnover, etc. for the sake of evading taxation. Some other companies do the opposite in order to obtain a variety of honours. Another factor that explains this phenomenon is the ignorance of financial management and file management and the quality of information provided may be disappointing.
- *Lack of relevant literature in academic publications,* because most of the TVE-related literature in both Chinese and English discusses the topic from the angle of the macro-economy. For example they discuss TVEs in relation to property rights, ownership, finance and banking. It is very rare to find the TVE-related literature in the area of management, let alone strategic management. This condition multiplied the difficulties to this research, though it also means that the results obtained are original and highly useful.

*Source*: Amended from Qi (2000b).

## Notes

1. The exchange rate for the Yuan during that period was approximately 9 to the $US.

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