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International Corporate Governance

Kose John
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Editors

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INTERNATIONAL CORPORATE GOVERNANCE

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INTERNATIONAL CORPORATE GOVERNANCE

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CONTENTS

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OWNERSHIP STRUCTURE AND POWER: EVIDENCE FROM US CORPORATIONS

Nilanjan Basu, Imants Paeglis and
Mohammad Rahnamaei

ABSTRACT

We examine the influence of ownership structure on a blockholder's power in a firm. We first describe the presence and ownership stakes of blockholders in a comprehensive sample of US firms. We develop a measure of the influence of the ownership structure on a blockholder's power and show that an average blockholder loses 12% of her potential
^emr_printlogin=p.ragu power due to the presence and size of the ownership stakes of other blockholders. Further, the influence of ownership structure varies systematically with a blockholder's rank and identity, with the second and nonfamily manager blockholders experiencing the largest loss of power.

Keywords: Blockholders; ownership structure; power; shapley value

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INTRODUCTION

Much of the ongoing debate about the ownership structure of American corporations has focused on the presence of blockholders (or the lack thereof).[1] Beyond it, we know surprisingly little about the ownership structure of US firms.[2] How prevalent are firms with multiple blockholders? What influence does the presence of fellow blockholders have on a blockholder's power? Does this influence vary with observable blockholder characteristics? The extant literature provides very little guidance on these issues. In this paper, we fill this gap in the literature by examining the influence of ownership structure on a blockholder's power. First, we provide a comprehensive description of ownership structures of American corporations in terms of the number of blockholders as well as their ownership stakes.[3] Second, we show that, due to differences in ownership structures, blockholders with similar ownership stakes may have significantly different power in the firm. Finally, we show that the influence of ownership structure on a blockholder's power varies systematically with her rank and identity. A secondary issue that we address pertains to the differences between the ownership structures of younger and smaller firms compared to older and more mature firms. Throughout our analysis, we focus separately on these two groups of firms and note the differences and similarities between their ownership and power structures.

Consider the following three examples that highlight some of the variation in the ownership structures of our sample firms. First, on March 22, 1999, Qwest Communications International Inc., an S&P500-listed telecommunications company, had two blockholders. The company's founder, Philip F. Anschutz, owned 45.7% of the outstanding shares and FMR Corp (Fidelity Management and Research Corp) owned 6.2%. Second, as of May 15, 2003, the ownership structure of eLinear Inc. (information technology solutions provider founded in 1995) was as follows: Kevan M. Casey, President of the company, owned 45%; Tommy Allen, Senior Vice President and Director, owned 45%; and Jon V. Ludwig, CEO and Chairman of the board, owned 6% of the shares. Third, as of March 8, 1996, General Dynamics, an S&P500-listed aerospace and defense company, had the following five blockholders. The Crown and Goodman families owned 12.9% of the outstanding shares, FMR Corp – 9%, Warren E. Buffett and affiliates – 7.7%, Delaware Management Holdings, Inc. – 5.6%, and The Northern Trust Company, acting as the trustee of the General Dynamics Corporation Savings and Stock Investment Plan, – 9.5%.

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The above examples illustrate some of the findings of this paper. First, we find a large variation in the number of blockholders across our sample firms – from firms with no blockholders to firms with 10 blockholders. Second, we show that, even after controlling for the number of blockholders, there is a large variation in the ownership stakes of various blockholders. These variations in the ownership structure have a direct and significant influence on the power wielded by a blockholder in a firm.

Intuitively, the power of a particular blockholder depends upon two factors: (1) the size of her ownership stake and (2) ownership structure (i.e., the presence of other blockholders and the size of their ownership stakes). While power generally increases with the level of ownership, the ownership structure can either moderate or magnify this influence. Compare, for example, the case of Mr. Anschutz with that of Mr. Casey in the Qwest Communications and eLinear examples, respectively. Both of them hold ownership stakes of similar size. Yet, it is clear that the power wielded by Mr. Anschutz is quite different from that wielded by Mr. Casey, due to the presence and size of the blocks held by Mr. Allen and Mr. Ludwig.

In this paper, we use Shapley values (Milnor & Shapley, 1978) to measure the power wielded by each blockholder. In the Qwest Communications example, the founder's ownership stake of 45.7% translates into power of 82.9%, while the FMR Corp's 6.2% ownership stake yields only 0.8% power. This reflects the fact that the founder's stake will, in most situations, have the dominant influence on the outcome of voting and therefore the influence of FMR Corp on the outcome will be minimal. In the eLinear Inc example, any two of the three blockholders are able to form a majority coalition. Therefore, effective power is equally divided between the three blockholders implying that each has power of 33.3%. In this case, Mr. Casey and Mr. Allen lose from the ownership structure – their 45% ownership stakes translate into only 33.3% power. Mr. Ludwig, the CEO of the firm, on the other hand, is the gainer – his 6% stake translates into 33.3% power. Finally, the ownership structure described in the General Dynamics example leads to a distribution of power commensurate with the ownership stakes held by the blockholders. In particular, the power in this example ranges from 5.6% for Delaware Management Holdings, Inc to 14.2% for the Crown and Goodman families. To summarize, depending on the ownership structure, a particular individual may have either larger or smaller power than warranted by her ownership stake.

To identify the gainers and losers from the ownership structure, we introduce a measure of the influence of ownership structure on power.

In particular, for each blockholder in our sample, we calculate a Shapley value, assuming she is the only blockholder in the firm. This value, which we denote as the "benchmark Shapley value," describes the power a blockholder would have based on just her ownership stake. The difference between actual and benchmark Shapley values, which we refer to as "loss of power," measures a blockholder's gain or loss of power due to the presence and ownership stakes of other blockholders.[4]

The earlier examples highlight two aspects of the loss of power we document in this paper. The first is related to a blockholder's rank (based on the size of their ownership stake). The largest blockholders tend to experience a smaller loss of power, as compared to their lower-ranked counterparts. The rank of shareholders below the largest also has a significant influence on the loss of power. The reason for this becomes clear when comparing the Qwest Communications and eLinear examples. The smallest blockholders in both examples hold approximately equal ownership stakes in their respective firms. Their power, however, varies significantly. FMR Corp, the second blockholder in the Qwest Communications example, has almost no power, while the ownership stake of the CEO, the third blockholder in the eLinear example, becomes pivotal. This pattern – a significantly larger loss of power for the second blockholders as compared to their lower ranked counterparts – also holds for our sample firms in general.

The second aspect is related to the identity of the blockholder.[5] Most corporate blockholders tend to hold relatively small blocks and are usually present in firms that are characterized by the absence of an exceptionally large block (e.g., Delaware Management Holdings in the General Dynamics example). The power they wield is therefore commensurate with their ownership stake, implying a small loss of power. In contrast, individual blockholders have a far larger variation in the size of their blockholdings (e.g., the 45.7% block owned by Philip F. Anschutz vs. the 6% block owned by Jon V. Ludwig). Individual blockholders are also more likely to be present in a variety of ownership positions in a firm. They can be present as major (dominant) blockholders (like Mr. Anschutz in the Qwest example), as coequal blockholders (like Mr. Buffett in the General Dynamics example), or as minor blockholders (like Mr. Ludwig in the eLinear example). This variation in ownership stakes and ownership structures (e.g., the presence of a large blockholder) results in a larger variation in the loss of power experienced by the individual blockholders as compared to corporate ones. Once again, this pattern is representative of the broader sample, suggesting that the identity of the blockholder, corporate or individual, is related to the power they wield.[6]

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Our paper contributes to several streams of literature. First is the literature on ownership structure of US firms.[7] A long tradition, starting with Berle and Means (1932), suggests that blockholders are increasingly rare.[8] This has been disputed by the more recent work of Holderness (2009), Gadhoum et al. (2005), and Becht (2001).[9] This conflict in the literature highlights two distinct issues. First, the work of Berle and Means (1932) and Larner (1966) focuses on the largest corporations which are less likely to have blockholders present. In contrast, the more recent work of Holderness (2009), Gadhoum et al. (2005), and Becht (2001) uses more representative samples of US firms. Clearly, there are substantial differences between the larger index-listed firms and the much smaller firms that are more representative of the average US firm.[10] The second and more troubling issue is highlighted by the differences in the results reported by Holderness (2009) and Becht (2001). As stated by Holderness (2009), his "sample is essentially a random subset of Becht's sample." Yet he reports that 96% of his sample firms have a blockholder while the corresponding number for Becht (2001) is only 56%. Therefore, he concludes that the only source of the discrepancy between the two sets of results could arise from potential biases in the data provided by Disclosure.[11] In this paper, we attempt to remedy these two biases by looking at two widely different, hand-collected samples of US firms – newly public and S&P500-listed ones.[12] We find that in the newly public (S&P500) sample, 97.7% (81%) of firm-years have at least one blockholder present and that 80.2% (56.7%) of firm-years have more than one blockholder present.[13] Our findings are similar to those of Basu, Paeglis, and Rahnamaei (2015) and indicate a rather high prevalence of blockholders in the US firms, implications of which merit further exploration.

More importantly, we contribute to the literature on the differences between ownership and power. A number of studies recognize this difference and use Shapley value to capture the voting power of a particular blockholder (see, e.g., Baker & Gompers, 1999; Eckbo & Verma, 1994). Other studies in finance use Shapley value as a measure of dispersion between the ownership stakes of the largest and the second largest blockholders (see, e.g., Laeven & Levine, 2008; Maury & Pajuste, 2005), or as a measure of the probability of a control contest (see, e.g., Nenova, 2003; Zingales, 1994). On the other hand, a large number of studies continue to use the ownership of blockholders as a proxy for the power wielded by them. It is, therefore, pertinent to ask whether there is a significant difference between the power wielded by a blockholder and her ownership stake. To our knowledge, this is the first paper to explicitly study the determinants

of the difference between ownership and power. Our measure of the influence of ownership structure on a blockholder's power allows us to quantify the part of a blockholder's power that depends on the presence and ownership stakes of other blockholders. In particular, we find that an average blockholder loses 12% of her potential power. Further, we show that the loss of power is related to the rank and identity of the blockholder. In particular, we find that blockholders ranked second lose, on average, 19.3%, while nonfamily manager blockholders lose, on average, 18.5% of their potential power.[14]

The study closest to ours is that by Basu et al. (2015). While they also document the presence and number of blockholders for their sample (of all CRSP- and COMPUSTAT-listed firms), the main focus of their paper is the influence of insider power on firm value. This study differs in several ways. First, we focus on the determinants rather than consequences of the difference between ownership and power. Second, in order to better examine these determinants, we exploit the unique features of our sample and compare the mature and index-listed firms to their newly public counterparts. Third, we use a more detailed classification of blockholders for our tests of the determinants of the difference between ownership and power.

The remainder of this paper is organized as follows. The section "Data and Sample Selection" describes the data used in this study. The section "Empirical Tests and Results" provides the empirical tests and discusses the results. The section "Discussion and Conclusions" concludes this paper.

DATA AND SAMPLE SELECTION

Sample Selection

To provide a comprehensive view of the ownership structures of American firms, we use two different samples of publicly traded US firms – the newly public and the S&P 500-listed firms. These two samples represent two opposite ends of the spectrum with the first representing small and young firms and the second large and mature firms. The sample of newly public firms is obtained as follows. We start with all US IPOs of common equity between 1993 and 1996, obtained from the SDC/Platinum New Issues database.[15] We eliminate REITs, closed-end funds, unit offerings, equity carve-outs, financial firms (those with SIC codes between 6000 and 6999), utilities, foreign firms, leveraged buyouts, and roll-ups. We also eliminate

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firms that are not found in the Center for Research in Security Prices (CRSP) or COMPUSTAT databases. Finally, we remove firms for which there is a discrepancy between the first date of trading provided by CRSP and SDC. We are left with a total of 1,448 firms.

We then follow these firms for up to 12 years after the IPO or until delisting, whichever comes first. Panel A of Table 1 reports the distribution of our newly public firm sample by post-IPO year. Of the 1,448 firms at the time of IPO, 389 survive until the 12th listing anniversary. Our total sample consists of 11,179 firm-year observations with available ownership data.

Our second sample consists of firms listed in the S&P500 index as of December 31, 1992. We then eliminate utilities as well as financial and

Table 1. Sample Selection and Distribution of Newly Public and S&P500 Firms by Year.

Panel A: Distribution of Firm-Years with Available Ownership Data by Post-IPO Year for the Newly Public Sample

IPO	Post-IPO Year												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
1,448	1,431	1,303	1,172	1,024	894	746	688	596	553	496	439	389	11,179

Panel B: Distribution of Firm-Years with Available Ownership Data by Year for the S&P500 Sample

Year																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
289[a]	375	370	357	352	344	326	307	292	283	280	278	276	262	253	240	4,884

The newly public firm sample consists of all US firms that went public between 1993 and 1996, obtained from the SDC/Platinum New Issues database. We eliminate REITs, closed-end funds, unit offerings, equity carve-outs, financial firms (those with SIC codes between 6000 and 6999), utilities, foreign firms, leveraged buyouts, and roll-ups. We also eliminate firms that are not found in the Center for Research in Security Prices (CRSP) or COMPUSTAT databases. Finally, we remove firms for which there is a discrepancy between the first date of trading provided by CRSP and SDC. We are left with a total of 1,448 firms. These firms are then followed for up to 12 years after the IPO or until delisting, whichever comes first. The sample of the S&P500-listed firms consists of the index constituents as of December 31, 1992, tracked for up to 16 years or delisting, whichever is earlier. We eliminate financial and foreign firms, as well as utilities. This leaves us with a sample 395 firms.

[a]SEC EDGAR provides corporate filings beginning in 1993; however, the coverage for 1993 is limited.

foreign firms. We then track these firms for up to 16 years or until delisting, whichever is earlier. Our total sample of S&P500 firms consists of 4,884 firm-year observations with available ownership data. Panel B of Table 1 shows the distribution of these observations over time.

Panel A of Table 2 describes characteristics of our sample firms. In terms of firm size, our median newly public firm is between 25th and 50th percentile of all COMPUSTAT- and CRSP-listed firms. This holds true for all three measures of firm size – market capitalization, total assets,

Table 2. Sample Characteristics.

Panel A: Firm Characteristics

	Newly Public Firms	S&P500 Firms	COMPUSTAT	
	Mean (Median)	Mean (Median)	Mean (Median)	75th percentile (25th percentile)
Market cap	552.70	11,548.33	2,722.24	1,141.62
	(116.21)	(4,084.50)	(298.98)	(78.22)
Total assets	351.38	11,696.18	2,416.58	1,155.80
	(90.74)	(4,436.96)	(256.86)	(61.91)
Sales	336.79	11,124.63	1,899.05	1,030.60
	(88.70)	(4,844.75)	(241.04)	(52.76)
CapEx/sales	0.177	0.058	0.133	0.107
	(0.045)	(0.041)	(0.047)	(0.023)
R&D/sales	0.601	0.024	0.617	0.169
	(0.004)	(0.005)	(0.051)	(0.008)
Debt/assets	0.207	0.256	0.238	0.365
	(0.103)	(0.245)	(0.199)	(0.025)
PPE/assets	0.225	0.320	0.303	0.461
	(0.145)	(0.275)	(0.224)	(0.098)
ROA	–0.006	0.151	0.031	0.149
	(0.080)	(0.143)	(0.081)	(0.016)
Firm age	18.71	67.37		
	(14.00)	(69.00)		

Panel B: Number of Blockholders and Their Total Ownership per Firm-Year

		Newly Public Firms	S&P500 Firms
Number of blockholders	Maximum	10.00	9.00
	75th percentile	4.00	3.00
	Mean	2.98	1.90
	Median	3.00	2.00
	25th percentile	2.00	1.00
Total blockholder ownership	75th percentile	59.60%	29.39%
	Mean	43.45%	20.24%

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Table 2. (*Continued*)

Panel B: Number of Blockholders and Their Total Ownership per Firm-Year			
		Newly Public Firms	S&P500 Firms
	Median	43.20%	17.55%
	25th percentile	26.80%	6.43%
Panel C: Blockholder characteristics			
Individual blockholders	*N*	13,083	1,353
	Percentage	(38.69%)	(14.51%)
Individual ownership	Mean	20.07%	20.48%
	Median	(12.40%)	(13.06%)
Corporate blockholders	*N*	20,730	7,970
	Percentage	(61.31%)	(85.49%)
Corporate ownership	Mean	10.91%	8.96%
	Median	(8.20%)	(7.60%)
Total blockholders	*N*	33,813	9,323

Panel A provides description of our sample firms by firm-year. All variables are as defined in Appendix B. The last two columns of Panel A report summary statistics for all of the COMPUSTAT- and CRSP-listed firms. Panel B reports the number of blockholders and their total ownership. In Panel B, firm-years with no blockholders are counted as having zero blockholder ownership. Panel C provides description of blockholder presence and ownership, based on their identity.

and sales. S&P500 firms, on the other hand, are close to the 95th percentile. In terms of growth opportunities (as measured by the ratio of capital expenditures to sales and the ratio of research and development expenditures to sales), median firms of both samples fall in the 2nd quartile. Newly public firms are also in the 2nd quartile based on leverage and asset tangibility, while the S&P500-listed ones are in the 3rd quartile. Finally, an average (median) newly public firm in our sample is 18.7 (14) years old, while their S&P500-listed counterparts are 67.4 (69) years old.

Blockholders and Ownership

Since the focus of this paper is on the power wielded by blockholders, we focus on the voting rights (as opposed to the cash flow rights) of shareholders. In cases where there are multiple classes of shares, we use the information provided in the company filings to calculate the voting rights for each blockholder. Appendix A provides an example of how we deal

with such situations. We define a blockholder as any entity owning more than 5% of voting rights as reported in the proxy statements.[16] We classify each blockholder as either individual or corporate. We classify a blockholder as an individual if shares are held either directly by her or by an organization controlled by her (or members of her family). All other blockholders are classified as corporate.

For each individual blockholder, we collect data on ownership stake, involvement in the management and governance of the firm, and status as a founder or a member of the founding family. We identify founders of newly public sample firms (and their family members) using information in the management and ownership sections of IPO prospectuses and subsequent proxy statements. Founders of the S&P500 sample firms, their descendants, and family members are identified using Hoover's Company Profiles and company websites. We treat ownership stakes held by all family members as one block.[17] We also further sub-classify each individual nonfamily blockholder based on her involvement in the management of the firm. Following governance literature, we consider an individual blockholder involved (not involved) in the management of the firm to be a management (an outside) blockholder.

To classify corporate blockholders, we first try to identify them in CRSP, Thomson 13F, and VentureXpert databases, or in various issues of *Pratt's Guide to Venture Capital Resources*. If a blockholder could not be found in either of these sources, we use *Factiva* and general internet searches by the blockholder's name. Based on the information collected, we classify corporate blockholders into the following categories. A corporate blockholder is classified as a financial institution if it operates in a financial industry. A corporate blockholder is classified as a manufacturing corporation if it belongs to a nonfinancial industry. Venture capital or private equity blockholders are those who are found in either VentureXpert database or in *Pratt's Guide*. Employee Stock Ownership Plans (ESOPs) are those identified as such in the proxy statements. Corporate blockholders that do not belong to any of the groups discussed above are classified as "other."[18]

EMPIRICAL TESTS AND RESULTS

Ownership Structure

Panel B of Table 2 provides summary statistics on the number of blockholders and their total ownership in our sample firms. In the newly public

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sample, the maximum number of blockholders is ten, and the mean (median) is 2.98 (3). The corresponding number for the S&P500 sample is 9, with a mean (median) of 1.90 (2). The mean (median) total blockholder ownership in the newly public sample is 43.45% (43.2%), while in the S&P500 sample it is 20.24% (17.55%). These percentages are similar to those reported in prior studies. For example, the total blockholder ownership in our newly public firm sample is similar to that reported by Holderness (2009) in his study of a random sample of publicly traded US firms. A similar blockholder ownership for the index-listed firms has been reported by, among others, Dlugosz et al. (2006).

In Panel C of Table 2, we report summary statistics at the firm-year-blockholder level. In the newly public sample, about 39% (61%) of all blockholders are individuals (corporations) who own, on average, 20.1% (10.9%) of the firm. Median ownership stakes of the individual and corporate blockholders are 12.4% and 8.2%, respectively. In the S&P500 sample, by contrast, almost 15% (85%) of the blockholders are individuals (corporations) who own, on average, 21.5% (9%) of the firm. Median ownership stakes of the individual and corporate blockholders are 13.1% and 7.6%, respectively.

Overall, two main patterns emerge from Table 2. First, as far as the number of blockholders is concerned, individual blockholders are more likely to be present in the smaller newly public firms, and corporate blockholders – in the larger S&P500-listed firms. Further, if individual blockholders are present, they tend to have larger ownership stakes as compared to corporate blockholders. This is true for both samples.

In Table 3, we describe the ownership structure of the newly public and S&P500-listed firms along two dimensions – the number of blockholders and the size of their ownership. Panel A (B) describes ownership structure of newly public (S&P500) firms. We find that blockholders are far less prevalent in the S&P500 firms. In the newly public sample, 2.3% of firm-years do not have any blockholder, while the same is true for as many as 19% of the S&P500 sample firm-years. Further, there is a significant variation in the number of blockholders in each sample of firms. Firms with more than three blockholders account for around a third of our newly public sample, but only for about an eighth of the S&P500 sample.

The largest blockholder, if present, controls, on average, 26% (15%) of the votes in a newly public (S&P500) firm. Not surprisingly, the ownership stake of the largest blockholder declines with the presence of additional blockholders. This decline, however, is more pronounced for the newly public firms. For the S&P500 firms, the ownership stake of the largest

Table 3. Ownership Structure of Newly Public Firms and S&P500 Firms.

	N		1st Blockholder	2nd Blockholder	3rd Blockholder	4th Blockholder	5th Blockholder	≥6th Blockholder
Panel A: Ownership structure of newly public firms								
No block	257 (2.30%)							
One block	1,956 (17.50%)	Mean	40.13%					
		Median	(37.50%)					
		Range	[5–99.72%]					
Two blocks	2,586 (23.13%)	Mean	28.89%	10.25%				
		Median	(24.10%)	(7.70%)				
		Range	[5–92%]	[5–49.23%]				
Three blocks	2,402 (21.49%)	Mean	24.20%	11.42%	7.38%			
		Median	(20.20%)	(9.47%)	(6.35%)			
		Range	[5.2–78.02%]	[5–45%]	[5–23.60%]			
Four blocks	1,889 (16.90%)	Mean	20.09%	11.64%	8.52%	6.58%		
		Median	(16.80%)	(10.20%)	(7.56%)	(5.95%)		
		Range	[5.2–68%]	[5.1–36%]	[5–21.7%]	[5–16.9%]		
Five blocks	1,142 (10.22%)	Mean	18.40%	11.56%	8.98%	7.17%	5.94%	
		Median	(15.30%)	(10.30%)	(8.29%)	(6.70%)	(5.60%)	
		Range	[5.7–65.07%]	[5.4–38.4%]	[5–22.85%]	[5–18.9%]	[5–14%]	
Six or more	947 (8.47%)	Mean	17.04%	11.30%	9.10%	7.73%	6.74%	5.88%[a]
		Median	(14.70%)	(10.60%)	(8.80%)	(7.34%)	(6.42%)	(5.64%)
		Range	[6.6–61.8%]	[5.7–32.3%]	[5.3–21.8%]	[5.05–17.3%]	[5–14.8%]	[5–12.5%]
Total	11,179	*N*	10,922	8,967	6,379	3,978	2,089	1,478
		Percent	(97.70%)	(80.21%)	(57.06%)	(35.58%)	(18.69%)	(13.22%)
		Mean	26.23%	11.13%	8.26%	7.02%	6.30%	5.88%
		Median	(19.00%)	(9.60%)	(7.49%)	(6.50%)	(5.97%)	(5.64%)

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Panel B: Ownership structure of S&P500 firms

No block	929							
	(19.02%)							
One block	1,184	Mean	17.49%					
	(24.24%)	Median	(9.26%)					
		Range	[5−87.13%]					
Two blocks	1,269	Mean	14.66%	7.56%				
	(25.98%)	Median	(11.11%)	(6.55%)				
		Range	[5.07−73.73%]	[5 −27.30%]				
Three blocks	805	Mean	12.77%	8.50%	6.41%			
	(16.48%)	Median	(11.10%)	(7.72%)	(5.90%)			
		Range	[5.46−62.19%]	[5.02−33.39%]	[5−15.51%]			
Four blocks	431	Mean	13.40%	9.01%	7.18%	6.00%		
	(8.82%)	Median	(12.46%)	(8.42%)	(6.71%)	(5.67%)		
		Range	[5.99−64.08%]	[5.16−22.03%]	[5.02−18.25%]	[5−10.11%]		
Five blocks	172	Mean	13.21%	9.49%	7.94%	6.76%	5.73%	
	(3.52%)	Median	(12.16%)	(8.91%)	(7.77%)	(6.44%)	(5.46%)	
		Range	[6.79−55.63%]	[5.56−17.45%]	[5.43−13.72%]	[5.04−13.31%]	[5−8.72%]	
Six or more	94	Mean	13.71%	10.33%	8.70%	7.58%	6.43%	5.78%[b]
	(1.92%)	Median	(12.87%)	(9.99%)	(8.37%)	(7.33%)	(6.24%)	(5.48%)
		Range	[7−30.32%]	[6.41−16.04%]	[5.74−14.02%]	[5.28−14.02%]	[5.17−12.81%]	[5.01−10.5%]
Total	4,884	*N*	3,955	2,771	1,502	697	266	132
		Percent	(80.98%)	(56.74%)	(30.75%)	(14.27%)	(5.45%)	(2.70%)
		Mean	14.90%	8.27%	6.95%	6.40%	5.98%	5.78%
		Median	(10.97%)	(7.47%)	(6.45%)	(5.97%)	(5.66%)	(5.48%)

Each firm-year is categorized based on the number of blockholders. The number of firm-years in each category as well as the corresponding percentage (out of the overall sample) is reported in the first column. The mean, median, and range of blockholder ownership for each rank are reported next. Last row reports the mean and median blockholder ownership for each rank.

[a]The mean, median, and range reported are based on 1,478 blockholders in 947 firm-years that have more than six blockholders.

[b]The mean, median, and range reported are based on 132 blockholders in 94 firm-years that have more than six blockholders.

blockholder remains remarkably stable for firms with three or more blockholders. Such a stability of the ownership stakes is also present for blockholders other than the largest.

There is also a significant degree of variation in the ownership stakes of blockholders even when keeping the number of blockholders constant. For example, the size of the second blockholder's ownership stake in the newly public firms with two blockholders ranges from 5% to 49.2%. The corresponding range for the S&P500 firms is 5–27.3%. A similar variation is present in firms with more than two blockholders, but the range is smaller. Overall, our findings are similar to those of Basu et al. (2015).

As alluded to in the section "Introduction," various blockholders are likely to have different preferences, which may lead them to choose different ownership stakes and different ownership structures. This suggests that the identity of a blockholder might be another important dimension of ownership structure. We describe the identity of blockholders in Table 4. In Panel A, we describe the identity of blockholders in the newly public firms. Almost a half of all individual blockholders in the newly public sample are founding families, while the remainder are managers and outsiders in almost equal proportions. A majority of the individual blockholders hold ownership stakes between 5% and 15%, with the exception of founding families who are also present in significant numbers in higher ownership brackets. The dominant types of corporate blockholders in the newly public firms are financial institutions (62.2%), venture capitalists (24.1%), and manufacturing firms (8.8%). A notable difference between the three types of blockholders emerges when comparing their ownership stakes. Financial institutions rarely hold ownership stakes above 25%, while manufacturing firms and venture capitalists do hold stakes in this range.

As can be seen from Panel B of Table 4, families represent 67.8% of all individual blockholders in the S&P500 firms, while outsiders account for 23.9%. Managers, on the other hand, are rarely present as blockholders in the S&P500 firms – they represent only 8.3% of all individual blockholders. The distribution of ownership stakes held by various blockholders is similar to that observed for the newly public firms – families are present in all ownership brackets while the ownership stakes of managers and outsiders are rarely above 25%. The dominant types of corporate blockholders in the S&P500 firms are financial institutions (86.6%) and ESOPs (7%). While the ownership stakes of financial institutions in the S&P500 firms are, as in the case of newly public firms, mostly below 15%, a sizable fraction of ESOPs hold shares above this level.

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Table 4. Blockholder Identity and Ownership.

Ownership	Individual				Corporate					
	Total	Family	Mangmt	Outsider	Total	Fin Ins	Manuf	ESOP	PE	Other
Panel A: Blockholder ownership, and identity in newly public firms										
5–15%	7,525	2,750	2,071	2,704	17,717	12,212	1,247	40	3,644	574
	(57.52%)	(42.09%)	(64.44%)	(81.06%)	(85.47%)	(94.64%)	(68.71%)	(58.82%)	(72.88%)	(60.81%)
15–25%	2,316	1,320	616	380	1,836	668	287	8	727	146
	(17.70%)	(20.21%)	(19.17%)	(11.39%)	(8.86%)	(5.18%)	(15.81%)	(11.76%)	(14.54%)	(15.47%)
25–35%	1,050	706	243	101	569	20	131	8	292	118
	(8.03%)	(10.81%)	(7.56%)	(3.03%)	(2.74%)	(0.16%)	(7.22%)	(11.76%)	(5.84%)	(12.50%)
35–50%	910	699	111	100	380	1	95	7	225	52
	(6.96%)	(10.70%)	(3.45%)	(3.00%)	(1.83%)	(0.01%)	(5.23%)	(10.29%)	(4.50%)	(5.51%)
50–100%	1,282	1,058	173	51	228	2	55	5	112	54
	(9.80%)	(16.19%)	(5.38%)	(1.53%)	(1.10%)	(0.02%)	(3.03%)	(7.35%)	(2.24%)	(5.72%)
Total	13,083	6,533	3,214	3,336	20,730	12,903	1,815	68	5,000	944
		(49.94%)	(24.57%)	(25.50%)		(62.24%)	(8.76%)	(0.33%)	(24.12%)	(4.55%)

Table 4. (*Continued*)

Ownership	Individual				Corporate				
	Total	Family	Mangmt	Outsider	Total	Fin Ins	Manuf	ESOP	Other
Panel B: Blockholder ownership and identity in S&P500 firms									
5–15%	761	446	73	242	7,492	6,706	95	419	272
	(56.25%)	(48.64%)	(64.60%)	(74.92%)	(94.00%)	(97.19%)	(65.52%)	(74.69%)	(74.73%)
15–25%	261	187	11	63	380	194	21	131	34
	(19.29%)	(20.39%)	(9.73%)	(19.50%)	(4.77%)	(2.81%)	(14.48%)	(23.35%)	(9.34%)
25–35%	90	79	6	5	52	0	13	7	32
	(6.65%)	(8.62%)	(5.31%)	(1.55%)	(0.65%)	(0.00%)	(8.97%)	(1.25%)	(8.79%)
35–50%	110	101	7	2	21	0	15	2	4
	(8.13%)	(11.01%)	(6.19%)	(0.62%)	(0.26%)	(0.00%)	(10.34%)	(0.36%)	(1.10%)
50–100%	131	104	16	11	25	0	1	2	22
	(9.68%)	(11.34%)	(14.16%)	(3.41%)	(0.31%)	(0.00%)	(0.69%)	(0.36%)	(6.04%)
Total	1,353	917	113	323	7,970	6,900	145	561	364
		(67.78%)	(8.35%)	(23.87%)		(86.57%)	(1.82%)	(7.04%)	(4.57%)

The table reports the distribution of various types of blockholders by the level of their ownership. The percentages in the first five rows (reported in brackets) are calculated based on the total number of observations in each column. The percentages reported in the last row are based on the total sample. Family blockholders are founders and members of their families. Management (Mangmt) blockholders are nonfamily blockholders who are officers of the firm. Outside blockholders are nonfamily blockholders who are not officers of the firm. Financial institutional (FinIns) blockholders are those operating in a financial industry. Manufacturing (Manuf) blockholders are corporate blockholders that belong to a nonfinancial industry. Employee Stock Ownership Plan (ESOP) blockholders are those identified as such in the proxy statements. Private equity (PE) blockholders are those found in either VentureXpert database or in *Pratt's guide*. Corporate blockholders that do not belong to any of the other four groups are classified as "other."

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Overall, three main conclusions emerge from the above discussion. First, there is a large variation in the number of blockholders. Second, there is a large variation in the ownership stake of blockholders even after controlling for their number. Third, we find a significant variation in the identity of individual blockholders, both across the ownership brackets as well as across the two samples.

Shapley Value

Our findings of a significant variation in the number of blockholders and the size of their ownership stakes described above suggest that the ownership stake of a particular blockholder may not be a good measure of the actual power she has in the firm. Obviously, the extent of a blockholder's influence in a firm is hardly observable. To formally capture this influence, we need a measure that captures two factors: (1) the size of the blockholder's ownership stake and (2) the presence and size of other blockholders' ownership stakes. Shapley and Shubik (1954) provide such an *a priori* measure of power for each blockholder in a decision-making body. In this paper, we use the oceanic formulation of Shapley value developed by Milnor and Shapley (1978). (For a detailed discussion on the calculation of Shapley values see Basu et al., 2015.)[19]

Shapley value calculation transforms the voting rights of a player into the capacity of that particular player to change the outcome of a voting session. In other words, the power of a particular player is defined as the percentage of times she casts the decisive vote. The oceanic formulation of Shapley value used in this paper also allows us to account for the widely held portion of the voting rights. For example, a 10% blockholder has a Shapley value of 11.1% when the other 90% of voting rights are widely held. The same 10% blockholder has Shapley value of 33.3% when there are two other blockholders with 45% stakes each.

Shapley Value and Ownership

We now analyze the relationship between Shapley value and blockholder ownership. Table 5 reports the Shapley value for blockholders in both samples controlling for the level of ownership. In the newly public sample, the minimum Shapley value for ownership levels of less than 40% is zero while the maximum Shapley value starts from 33% and after a small

Table 5. Shapley Value and Blockholder Ownership.

Ownership Range	Newly Public Firms					S&P500 Firms				
	N	Mean	Median	Minimum	Maximum	*N*	Mean	Median	Minimum	Maximum
5–10%	18,930	6.54%	6.54%	0.00%	33.33%	6,342	7.20%	6.89%	0.00%	12.51%
10–15%	6,312	12.16%	12.41%	0.00%	33.33%	1,911	13.22%	13.15%	0.00%	24.07%
15–20%	2,577	17.94%	18.69%	0.00%	28.65%	498	19.34%	19.61%	0.00%	30.25%
20–25%	1,575	24.41%	25.39%	0.00%	39.04%	143	26.49%	27.28%	0.00%	33.20%
25–30%	994	31.78%	33.22%	0.00%	42.65%	80	35.31%	36.50%	15.35%	42.68%
30–35%	625	40.54%	43.19%	0.00%	53.61%	62	44.41%	46.35%	26.03%	53.80%
35–40%	497	50.77%	54.08%	0.00%	66.56%	44	59.35%	60.75%	35.64%	66.19%
40–45%	395	65.93%	68.05%	18.86%	81.55%	63	70.59%	69.01%	43.05%	81.34%
45–50%	398	85.96%	87.50%	25.00%	100.00%	24	88.91%	87.95%	75.85%	99.45%
50–55%	329	100.00%	100.00%	100.00%	100.00%	26	100.00%	100.00%	100.00%	100.00%
55–60%	296	100.00%	100.00%	100.00%	100.00%	14	100.00%	100.00%	100.00%	100.00%
60–65%	278	100.00%	100.00%	100.00%	100.00%	13	100.00%	100.00%	100.00%	100.00%
65–70%	146	100.00%	100.00%	100.00%	100.00%	37	100.00%	100.00%	100.00%	100.00%
70–75%	128	100.00%	100.00%	100.00%	100.00%	22	100.00%	100.00%	100.00%	100.00%
75–80%	81	100.00%	100.00%	100.00%	100.00%	26	100.00%	100.00%	100.00%	100.00%
80–85%	55	100.00%	100.00%	100.00%	100.00%	13	100.00%	100.00%	100.00%	100.00%
85–90%	65	100.00%	100.00%	100.00%	100.00%	5	100.00%	100.00%	100.00%	100.00%
≥90%	132	100.00%	100.00%	100.00%	100.00%	0				

Blockholders are categorized based on their ownership stake in the firm and the mean, median, minimum, and maximum of Shapley values for various ownership ranges are reported for each sample.

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decline moves up to 66%. Small Shapley values are for minority blockholders in the presence of a very large (majority) blockholder, similar to the Qwest Communications Inc example. Maximum Shapley values at small ownership levels are minority blockholders who become pivotal between two large blockholders, similar to the eLinear Inc example. The range of Shapley values for a particular level of ownership is increasing, up to ownership levels close to 50%. In particular, for our sample firms an ownership level of 5% implies possible Shapley values between 0% and 33%. Note that the nonlinear relationship between ownership and Shapley value is first exponential (for ownership stakes of less than 50%) and then becomes a flat line at 100%, since a blockholder with more than 50% ownership stake has complete control regardless of her exact ownership stake (i.e., such blockholders have Shapley value equal to one).[20]

The relationship between Shapley value and ownership stake reported in Table 5 is consistent with our initial conjecture that variation in the ownership structure leads to a significant variation in the power of a particular blockholder, even when controlling for her level of ownership. In other words, there are blockholders who have power higher than that warranted by the size of their ownership stake and there are blockholders who have significantly less power than warranted by their ownership stake. This leads us to the question we address in the remainder of this section – who gains and who loses from the ownership structure? To answer this question, we use the loss of power (LP), defined as the difference between actual and benchmark Shapley values, to capture the influence of the ownership structure on a blockholder's power.

Benchmark Shapley Value, Ownership, and LP

Before proceeding, we would like to note two issues concerning our measure of the LP. First, the magnitude of the LP depends upon the level of the blockholder's ownership. By construction, the maximum LP at a particular level of ownership is equal to the benchmark Shapley value at that level. This implies that the maximum LP is increasing with the level of ownership. To reflect this dependency, we control for the level of blockholder's ownership in all of the subsequent tests. Second, also by construction, the LP for firms with only one blockholder is zero. This implies that inclusion of firms with a lone blockholder would bias downward our estimates of the LP. Therefore, from now on we will focus only on firms with at least two blockholders (i.e., the firms with nonzero LP).

Panels A and B of Table 6 summarize the LP for the newly public and S&P500 samples, respectively.[21] Several patterns emerge from Table 6. First, both the mean and the median LP are negative for all levels of ownership suggesting that most blockholders lose power due to the presence and the size of ownership stakes of other blockholders. This is not surprising since we have defined our benchmark based on the absence of additional blockholders, which intuitively translates into less competition and thus greater power for the blockholder in question. Second, both the mean and the median LP are statistically significantly different from zero for both samples for all ownership brackets. Third, the LP accounts for approximately 13.2% (4.8%) of the benchmark Shapley value for the newly public (S&P500) firms. This implies that, on average, the presence and ownership stakes of other blockholders reduce a blockholder's potential power by this percentage. Fourth, the LP is increasing (in absolute value) until ownership reaches 50%.[22] Fifth, blockholders who gain from ownership structure (i.e., those with positive LP) are those that own between 5% and 25% of a firm's equity. None of the blockholders that own over 25% of voting rights gains from ownership structure (i.e., LP is negative for all blockholders above this level of ownership). Sixth, a comparison of LP between the two samples reveals that blockholders in the S&P500 firms lose less power than do their newly public counterparts. In unreported tests, we find that the mean and median LP in the newly public firms is statistically significantly greater than that in their S&P500-listed counterparts for all ownership brackets. This might be due to the smaller number of blockholders and their lower total ownership in the S&P500 firms.

LP and Rank

In this section, we examine the influence of the blockholder's rank on her LP. We start by examining this influence in a univariate setting. For the sake of brevity, we combine third largest blockholders and those ranked below into a single group. The results of the tests of differences in the LP for blockholders of different ranks are provided in Table 7. The results for the newly public firms, reported in Panel A, suggests that second blockholders experience a significantly greater LP, compared to both the first as well as the lower-ranked blockholders. The average difference in the LP between the first and second blockholders ranges from 1.7% for the blockholders in the 5–15% ownership bracket to 33% in the 35–50% bracket. All differences are statistically significant at the 1% level. We also find that

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Table 6. Shapley Value and the Loss of Power.

Ownership Range	Shapley Value			Loss of Power						
	N	Actual	Benchmark	Minimum	25th Percentile	Mean	Median	75th Percentile	Maximum	% Loss
Panel A: Loss of power in newly public firms										
5–15%	24,589	7.90%	9.08%	−17.51%	−0.98%	−1.18%***	−0.45%***	−0.22%	26.95%	−13.22%
15–25%	3,985	20.24%	23.73%	−32.18%	−3.51%	−3.49%***	−1.71%***	−0.85%	7.64%	−14.65%
25–35%	1,497	34.61%	41.48%	−52.44%	−9.99%	−6.88%***	−3.60%***	−1.70%	−0.19%	−16.48%
35–50%	1,055	63.96%	72.69%	−71.97%	−10.58%	−8.74%***	−4.49%***	−1.92%	0.00%	−12.86%
50–100%	731	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	–
Total										−13.24%
Panel B: Loss of power in S&P500 firms										
5–15%	7,389	8.53%	8.94%	−14.52%	−0.38%	−0.40%***	−0.20%***	−0.10%	11.25%	−4.57%
15–25%	544	20.39%	22.15%	−25.58%	−1.32%	−1.76%***	−0.69%***	−0.31%	11.89%	−7.59%
25–35%	90	37.48%	42.59%	−27.44%	−4.93%	−5.11%***	−1.19%***	−0.60%	−0.22%	−11.94%
35–50%	63	71.08%	75.04%	−30.53%	−4.66%	−3.96%***	−2.34%***	−1.03%	−0.09%	−5.58%
50–100%	53	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	–
Total										−4.83%

For each ownership range, the means of Shapley and benchmark Shapley values are reported. For each blockholder, the benchmark Shapley value is calculated assuming that the particular blockholder is the only one in the firm. Loss of power is calculated as the difference between the actual and benchmark Shapley values. Observations for blockholders who are the only ones in a given firm-year are excluded. The last column reports the mean ratio of the loss of power to the benchmark Shapley value for each ownership range. The results of *t*-tests of the differences of mean from zero and nonparametric Wilcoxon tests of differences in medians from zero are reported.
*** Significance at 1% level.

blockholders ranked third and below experience a larger LP relative to the first blockholders, but smaller relative to the second blockholders. Again, all differences are statistically significant at the 1% level. Our results suggest that the second blockholders experience the largest LP at all levels of ownership. If the largest blockholder loses, on average, 5.2% of her potential power (as measured by the benchmark Shapley value), the second blockholders, on average, lose 23% of their potential power (results not reported) and those ranked third and below lose 12.1% of their potential power. Similar patterns also hold for the S&P500 firms (see Panel B of Table 7).

We now examine the influence of a blockholder's rank on her LP in a multivariate setting. In particular, we estimate the following piecewise linear regression equation:

$$\begin{aligned} Loss\ of\ power_i = {} & \beta_0 + \beta_1 Second_i + \beta_2 Third_i + \beta_3 Own5to25_i \\ & + \beta_4 Own5to25_i \times Second_i + \beta_5 Own5to25_i \times Third_i \\ & + \beta_6 \times Own25to50_i + \beta_7 Own25to50_i \times Second_i \\ & + \beta_8 Own25to50_i \times Third_i + \sum_{j=1}^{n} \alpha_j Year_{ji} \\ & + \sum_{k=1}^{m} \delta_k Industry_{ki} + \varepsilon_i \end{aligned} \tag{1}$$

All variables are as defined in Appendix B. Following Morck, Shleifer, and Vishny (1988), we use a breakpoint at 25% ownership.[23] As discussed earlier, LP for blockholders with ownership stakes above 50% is, by definition, zero. Thus, for this ownership range, LP does not vary with ownership and therefore, for all subsequent tests, we will use only observations with ownership less than 50%. As before, we also exclude all observations for which the LP is zero (i.e., firm-years with only one blockholder). We use two rank-related variables. *Second* is a dummy variable that takes on a value of one if the blockholder is ranked second in a particular firm-year, and zero otherwise. Likewise, *Third* is a dummy that takes on a value of one if the blockholder is ranked below the second in a particular firm-year, and zero otherwise. If, as predicted, second blockholders are associated with a larger LP, we would expect the coefficient estimates of *Own5to25* × *Second* and *Own25to50* × *Second* to be negative.

The results of the estimation of Eq. (1) are reported in columns (1) and (6) of Table 8 for the newly public and S&P500 firms, respectively. For

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Table 7. Summary Statistics of the Loss of Power by Blockholder Rank.

	First (F)			Second (S)			Third (T)			Difference					
	N	Mean	Median	*N*	Mean	Median	*N*	Mean	Median	ΔMean (*F*−*S*)	ΔMedian (*F*−*S*)	ΔMean (*F*−*T*)	ΔMedian (*F*−*T*)	ΔMean (*S*−*T*)	ΔMedian (*S*−*T*)
Panel A: Loss of power by rank in newly public firms															
5−15%	3,582	−0.31%	−0.23%	7,369	−2.04%	−0.63%	13,638	−0.95%	−0.47%	1.73%***	0.40%***	0.64%***	0.23%***	−1.09%***	−0.16%***
										(32.48)	(41.02)	(21.68)	(41.13)	(−32.20)	(−14.83)
15−25%	2,391	−1.39%	−1.06%	1,308	−7.49%	−4.36%	286	−2.74%	−2.10%	6.10%***	3.30%***	1.35%***	1.04%***	−4.75%***	−2.26%***
										(40.70)	(40.45)	(11.93)	(9.73)	(−10.80)	(−12.54)
25−35%	1,249	−4.71%	−2.92%	248	−17.78%	−15.87%	0	–	–	13.07%***	12.96%***	–	–	–	–
										(31.03)	(20.52)	–	–	–	–
35−50%	1,013	−7.43%	−4.15%	42	−40.27%	−37.11%	0	–	–	32.84%***	32.96%***	–	–	–	–
										(22.29)	(10.53)	–	–	–	–
50−100%	731	0.00%	0.00%	0	–	–	0	–	–	–	–	–	–	–	–
										–	–	–	–	–	–
Total	8,966	−1.99%	−0.57%	8,967	−3.45%	−0.93%	13,924	−0.98%	−0.48%	1.46%***	0.36%***	−1.01%***	−0.09%***	−2.47%***	−0.45%***
										(18.76)	(23.66)	(−23.86)	(−4.77)	(−45.76)	(−32.34)
Panel B: Loss of power by rank in S&P500 firms															
5−15%	2,109	−0.19%	−0.13%	2,685	−0.58%	−0.20%	2,595	−0.40%	−0.26%	0.39%***	0.08%***	0.21%***	0.14%***	−0.18%***	0.06%***
										(11.93)	(16.06)	(12.42)	(26.37)	(−5.65)	(8.69)

Table 7. (*Continued*)

	First (F)			Second (S)			Third (T)			Difference					
	N	Mean	Median	*N*	Mean	Median	*N*	Mean	Median	ΔMean (*F*−*S*)	ΔMedian (*F*−*S*)	ΔMean (*F*−*T*)	ΔMedian (*F*−*T*)	ΔMean (*S*−*T*)	ΔMedian (*S*−*T*)
15−25%	467	−0.74%	−0.58%	75	−8.27%	−2.43%	2	5.31%	5.31%	7.53%***	1.85%***	−6.05%***	−5.89%	−13.58%**	−7.74%**
										(17.54)	(12.79)	(−10.84)	(−0.37)	(−2.07)	(−2.32)
25−35%	79	−3.21%	−1.11%	11	−18.73%	−17.13%	0	–	–	15.52%***	16.02%***	–	–	–	–
										(9.60)	(5.05)	–	–	–	–
35−50%	63	−3.96%	−2.34%	0	–	–	0	–	–	–	–	–	–	–	–
										–	–	–	–	–	–
50−100%	53	0.00%	0.00%	0	–	–	0	–	–	–	–	–	–	–	–
										–	–	–	–	–	–
Total	2,771	−0.45%	−0.16%	2,771	−0.86%	−0.21%	2,597	−0.39%	−0.26%	0.41%***	0.05%***	−0.06%*	0.10%***	−0.47%***	0.05%***
										(7.05)	(8.41)	(−1.94)	(15.28)	(−8.52)	(6.55)

Mean and median loss of power for each ownership bracket is calculated based on all blockholders of particular rank in that ownership bracket. Ranks below the second are treated as a group. The results of *t*-tests of differences in means and nonparametric Wilcoxon tests of differences in medians are reported in the parentheses.
***, **, and * Significance at 1%, 5%, and 10% levels, respectively.

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Table 8. Loss of Power and Blockholder Rank.

	Newly public sample					S&P500 sample				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Own5to25	−0.195	−0.198	−0.195	−0.187		−0.088	−0.084	−0.088	−0.087	
	(28.94)***	(29.76)***	(15.74)***	(26.16)***		(11.03)***	(11.00)***	(4.54)***	(10.42)***	
Own5to25 × Second	−0.270	−0.258	−0.270	−0.263		−0.300	−0.210	−0.300	−0.292	
	(17.48)***	(18.40)***	(9.72)***	(16.03)***		(9.07)***	(6.76)***	(3.56)***	(8.38)***	
Own5to25 × Third	0.044	0.046	0.044	0.042		0.012	−0.002	0.012	0.022	
	(3.39)***	(3.86)***	(1.77)*	(2.96)***		(0.51)	(0.07)	(0.24)	(0.83)	
Own25to50	−0.220	−0.227	−0.220	−0.217		−0.112	−0.125	−0.112	−0.130	
	(11.67)***	(12.08)***	(6.89)***	(10.57)***		(3.17)***	(3.68)***	(1.84)*	(3.27)***	
Own25to50 × Second	−2.065	−2.039	−2.065	−2.094		−1.995	−2.351	−1.995	−1.939	
	(29.81)***	(33.63)***	(20.09)***	(27.95)***		(5.54)***	(6.08)***	(5.78)***	(5.27)***	
Second	0.003	0.008	0.003	0.002	−0.054	0.017	0.012	0.017	0.017	−0.024
	(1.72)*	(5.72)***	(0.93)	(1.46)	(17.99)***	(6.75)***	(4.85)***	(2.89)***	(6.19)***	(5.60)***
Third	−0.016	−0.015	−0.016	−0.016	−0.018	−0.006	−0.004	−0.006	−0.006	−0.000
	(14.67)***	(14.68)***	(7.61)***	(12.97)***	(6.13)***	(3.59)***	(2.77)***	(1.62)	(3.45)***	(0.02)
LnAssets				0.001					0.001	
				(3.92)***					(4.83)***	
PPE/Assets				−0.002					−0.006	
				(1.08)					(4.72)***	
Debt/Assets				−0.004					0.002	
				(4.55)***					(1.15)	
CapEx/Sales				0.000					0.003	
				(0.95)					(1.28)	
R&D/Sales				−0.000					−0.005	
				(1.15)					(2.26)**	
ROA				−0.005					0.008	
				(5.64)***					(2.99)***	
Adsale				−0.000					−0.062	
				(0.75)					(2.45)**	
Resid				−0.004					0.021	
				(0.36)					(0.56)	

Table 8. (*Continued*)

	Newly public sample					S&P500 sample				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Own					−0.238					−0.086
					(9.49)***					(3.85)***
Own × Second					0.700					0.559
					(16.65)***					(6.12)***
Own × Third					0.009					−0.149
					(0.16)					(0.71)
Own^2					0.063					−0.023
					(1.06)					(0.33)
$Own^2 \times$ Second					−3.579					−3.850
					(28.48)***					(8.60)***
$Own^2 \times$ Third					0.331					1.006
					(1.19)					(0.72)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.022	0.022	0.022	0.010	0.027	0.006	0.008	0.006	0.004	0.006
	(10.54)***	(18.73)***	(12.73)***	(2.18)**	(8.55)***	(3.59)***	(7.03)***	(2.59)**	(2.00)**	(2.72)***
Observations	31,126	29,991	31,126	27,591	31,126	8,086	8,019	8,086	7,476	8,086
Adjusted R^2	0.45	0.49	0.45	0.45	0.45	0.38	0.38	0.38	0.39	0.45

The dependent variable, LP, is the loss of power calculated for each blockholder. All observations with ownership greater than 50% are excluded. Columns (1)–(5) report results for the newly public firm sample, while those in columns (6)–(10) report those for the S&P500 firm sample. Columns (1) and (6) report the results estimated using a piecewise linear OLS regression with a 25% breakpoint. Samples in columns (2) and (7) exclude observations with Shapley value of zero. Columns (3) and (8) report the result of the estimations of OLS regressions with standard errors clustered by firm. Columns (4) and (9) report the results of the estimation of Eq. (1) with additional, firm-specific control variables. Columns (5) and (10) report the results of the estimation of a quadratic specification of Eq. (1). All variables are as defined in Appendix B. Heteroskedasticity-adjusted (White) standard errors are used in calculation of *t*-statistics that are reported in parentheses.
***, **, and * Significance at 1%, 5%, and 10% levels, respectively.

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the largest blockholder, consistent with the results of the univariate tests reported in Table 6, we find a negative relationship between the ownership stake of a blockholder and her LP. The coefficient estimates of *Own5to25* and *Own25to50* are negative and statistically significant for both samples. This negative relationship between the LP and a blockholder's ownership stake is even more pronounced for the second-largest blockholders. In particular, we find that the coefficient estimates of *Own5to25* × *Second* and *Own25to50* × *Second* are negative and statistically significant for both samples. Further, the coefficient estimate of *Own5to25* × *Third* is positive and statistically significant in the newly public sample, indicating a less steep relationship between ownership and the LP for blockholders ranked below the second in such firms. It should be noted, however, that the negative and statistically significant coefficient estimate of *Third* indicates that such blockholders lose more power relative to the largest ones. Overall, our results suggest that the second blockholders indeed lose significantly more power than any other blockholder.

Differences between mean and median LP reported in Table 6 imply that the distribution of LP is skewed. This suggests a possibility that our results may be driven by outliers. To address this potential concern, we exclude observations for which Shapley value is zero. Since, by construction, these are the observations that have the highest LP for each ownership range, by excluding them we are removing some of the extreme observations. We reestimate Eq. (1) using this reduced sample. The results are reported in columns (2) and (7) of Table 8 for the newly public and S&P500 firms, respectively. The results are qualitatively similar, but the adjusted R^2 are higher than those reported in columns (1) and (6) of Table 8.

It can be argued that our results might be influenced by the following two biases. First, since firms with relatively more blockholders are overrepresented in our blockholder level analysis they may unduly influence our results. Second, due to the panel nature of our dataset, it is likely that a certain degree of autocorrelation exists between multiple observations of the same blockholder over different years. This, in turn, may lead to inflated *t*-statistics. We address these potential concerns by clustering standard errors at the firm level, as suggested by Petersen (2009). Columns (3) and (8) of Table 8 report the coefficient estimates and the adjusted *t*-statistics. As expected, the adjustment reduces the significance of some of the coefficient estimates but does not qualitatively change our results.

So far we have focused only on the influence of ownership and identity on the LP. It is possible, however, that firm-specific characteristics, such as firm size, leverage, asset tangibility, and profitability are also related to

ownership structure. For example, large firms are less likely to have large blockholders, ceteris paribus. Firms with more tangible assets (lower growth opportunities) may find it easier to fund the new projects using debt rather than equity (Myers, 1977). Higher extent of debt financing will lead to a lower dilution and therefore larger ownership stakes in such a firm. Such differences in the ownership structure, in turn, can influence the LP.[24] In columns (4) and (9) of Table 8, we report the results of the reestimation of Eq. (1) with firm-specific control variables.[25] Overall, the inclusion of the firm-specific variables does not qualitatively change either the significance or the magnitude of the estimated coefficients of interest.

Finally, our main results presented so far have been based on a piecewise linear OLS specification. We have reestimated Eq. (1) using a quadratic specification. The results are reported in columns (5) and (10) of Table 8 for the newly public and S&P500 samples, respectively. Our conclusions remain qualitatively unchanged in this alternative specification. In particular, we find that the second blockholders lose more power, as compared to the largest ones, for almost the entire ownership range.[26]

LP and Identity

The identity of a blockholder can also have a significant influence on the LP. In particular, individual and corporate blockholders are likely to have different costs and benefits associated with holding a block. We now briefly discuss some of these costs and benefits and how they could lead to differences in the power wielded by the two blockholder types.[27]

The main difference between individual and corporate blockholders is their ability (or lack thereof) to use power for their own benefit. Individual blockholders, who are likely to be involved in management and governance of the firm, can use their power in the firm to extract private benefits of control (e.g., to engage in perquisite consumption or to hire their relatives). Corporate blockholders, however, are less likely to reap such benefits.[28] This implies that individual blockholders will trade-off higher power (and therefore increased private benefits) against the costs of holding a larger ownership stake. The main cost of a higher ownership stake for an individual blockholder is a lower degree of diversification (ceteris paribus). In other words, as her ownership stake in the firm increases, it is likely to account for an increasing fraction of her overall wealth. A majority of corporate blockholders, at the same time, are subject to a limit on how much of a firm's equity they can own.[29] As a result, they are effectively limited in their ability to hold an undiversified portfolio. The above discussion

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implies that individual blockholders will be more sensitive to the LP as compared to corporate blockholders.

Since corporate blockholders are more likely to have a short-term focus (relative to individual blockholders), the liquidity of the firm's stock is likely to be one of the most important considerations for them.[30] This implies that corporate blockholders are more sensitive to the costs associated with an illiquid block (Amihud & Mendelson, 1986), as compared to their individual counterparts. Consequently, corporate blockholders are likely to avoid illiquid firms, such as those with a large (long-term) blockholder (see, e.g., Brockman, Chung, & Yan, 2009). To put it differently, corporate blockholders are likely to have a preference for firms with a particular type of ownership structure. This preference, in turn, translates into a particular LP. Therefore, corporate blockholders will have a different trade-off between ownership and LP, as compared to individual blockholders.

In Table 9, we examine the differences in the LP between individual and corporate blockholders in a univariate setting. The results for the newly public firms, reported in Panel A, suggest that for ownership stakes below 35%, the individual blockholders experience a significantly larger LP as compared to the corporate ones. The mean and median differences are statistically significant at the 1% level for all but one test. The smaller LP experienced by the corporate blockholders in this ownership range is consistent with the notion that such blockholders, for diversification and liquidity reasons discussed above, tend to hold small stakes and avoid firms with a large (long-term) blockholder.

For ownership stakes above 35%, however, corporate blockholders experience a significantly larger LP. In this ownership range, our findings are consistent with the need for higher power as a compensation for the higher costs arising from an individual blockholder's undiversified portfolio.[31] The results for the S&P500 firms, reported in Panel B of Table 9, are qualitatively similar to those reported for the newly public firms, but the small sample sizes for corporate blockholders with ownership stakes above 25% make the results less reliable.

We now examine the differences in the LP between individual and corporate blockholders using the following regression specification:

$$\begin{aligned} Loss\ of\ power_i = {} & \beta_0 + \beta_1 \times Ind_i + \beta_2 \times Own5to25_i + \beta_3 \times Own5to25_i \times Ind_i \\ & + \beta_4 \times Own25to50_i + \beta_5 \times Own25to50_i \times Ind_i \\ & + \sum_{j=1}^{n} \alpha_j Year_{ji} + \sum_{k=1}^{m} \delta_k Industry_{ki} + \varepsilon_i \end{aligned} \tag{2}$$

Table 9. Summary Statistics of the Loss of Power by Blockholder Identity.

	Individual (I)			Corporate (C)			Difference			
	N	Mean	Median	*N*	Mean	Median	ΔMean (*I*−*C*)	*T*-stat	ΔMedian (*I*−*C*)	*Z*-stat
Panel A: Loss of power by identity in newly public firms										
5−15%	7,284	−1.36%	−0.51%	17,305	−1.11%	−0.43%	−0.25%***	(−7.98)	−0.08%***	(−10.64)
15−25%	2,201	−3.68%	−1.83%	1,784	−3.25%	−1.56%	−0.43%***	(−2.58)	−0.27%***	(−4.69)
25−35%	957	−7.23%	−3.98%	540	−6.25%	−3.12%	−0.98%**	(−2.35)	−0.86%***	(−3.55)
35−50%	735	−8.16%	−4.12%	320	−10.07%	−5.46%	1.91%**	(2.52)	1.34%***	(3.01)
50−100%	608	0.00%	0.00%	123	0.00%	0.00%	–	–	–	–
Total	11,785	−2.62%	−0.79%	20,072	−1.57%	−0.49%	−1.05%***	(−21.55)	−0.29%***	(−22.60)
Panel B: Loss of power by identity in S&P500 firms										
5−15%	646	−0.89%	−0.24%	6,743	−0.36%	−0.20%	−0.53%***	(−12.80)	−0.04%***	(−5.69)
15−25%	212	−3.01%	−0.76%	332	−0.95%	−0.65%	−2.06%***	(−5.54)	−0.11%***	(−2.91)
25−35%	67	−6.44%	−1.38%	23	−1.22%	−1.11%	−5.22%***	(−3.17)	−0.27%*	(−1.90)
35−50%	43	−4.02%	−2.03%	20	−3.83%	−2.53%	−0.19%	(−0.14)	0.49%	(1.23)
50−100%	47	0.00%	0.00%	6	0.00%	0.00%	–	–	–	–
Total	1,015	−1.79%	−0.36%	7,124	−0.40%	−0.21%	−1.39%***	(−23.29)	−0.15%***	(−12.75)

Blockholders are categorized based on their identity as either individual or corporate. A blockholder is classified as an individual if shares are held either directly by her or by an organization controlled by her (or members of the family). All other blockholders are classified as corporate. Mean and median loss of power for each ownership bracket are calculated based on all blockholders of particular identity in that ownership bracket. The results of *t*-tests of differences in means and nonparametric Wilcoxon tests of differences in medians are reported in the parentheses.

***, **, and * Significance at 1%, 5%, and 10% levels, respectively.

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All variables are as defined in Appendix B. The results of the estimation of Eq. (2) are reported in columns (1) and (8) of Panel A of Table 10 for the newly public and S&P500 firms, respectively. We find that the coefficient estimates of $Own5to25 \times Ind$ are negative and statistically significant for both samples. This suggests that, for a given level of ownership, individual blockholders lose more power as compared to corporate blockholders. The coefficient estimate of $Own25to50 \times Ind$ for the newly public sample is positive and statistically significant. This suggests that, at intermediate levels of ownership, individual blockholders in such firms tend to lose less power relative to their corporate counterparts.

We further examine if our conclusions regarding the influence of a blockholder's identity on her LP hold for various types of individual and corporate blockholders. We first compare the relationship between ownership and LP for each type of individual blockholder (family, managers, and outsiders) with that for all corporate blockholders. We do so by replacing (in Eq. (2)) the dummy variable for individual blockholder (Ind) with more narrowly defined dummies that proxy for the presence of a specific kind of individual blockholder. The results of these comparisons are reported in columns (2)−(4) and (9)−(11) of Panel A of Table 10 for the newly public and S&P500 samples, respectively.[32] We find that all coefficient estimates of $Own5to25 \times ID$ are positive and statistically significant, except for outsiders in the S&P500 sample (column (11)). The coefficient estimates of $Own25to50 \times ID$ are all positive and significant, except for nonfamily managers in the newly public firms. Overall, the results for different types of individual blockholders are mostly consistent with those reported in columns (1) and (8) of Panel A.

In a similar fashion, we now test the relationship between ownership and the LP separately for each type of corporate blockholder by comparing them to all individual blockholders. We will perform these tests only for subsamples with at least 100 observations. The results are reported in columns (5)−(7) and (12)−(14) of Panel A of Table 10 for the newly public and S&P500 samples, respectively. We find that all of the coefficient estimates of $Own5to25 \times ID$ are positive and statistically significant. The coefficient estimates of $Own25to50 \times ID$ for manufacturing and private equity firms in the newly public sample are both negative, but significant only for the former. The results are generally consistent across different types of corporate blockholders.

Overall, we find that a blockholder's identity has a significant influence on the relationship between her ownership stake and the LP, with individual (corporate) blockholders losing more power at low (intermediate)

Table 10. Loss of Power and Individual Blockholder Identity.

Panel A: Main Tests

	Newly Public Sample							S&P500 Sample						
	(1) Ind	(2) Family	(3) Mangmt	(4) Outsider	(5) Fin Ins	(6) Manuf	(7) PE	(8) Ind	(9) Family	(10) Mangmt	(11) Outsider	(12) Fin Ins	(13) Manuf	(14) ESOP
Own5to25	−0.194	−0.194	−0.194	−0.195	−0.254	−0.251	−0.251	−0.052	−0.054	−0.051	−0.051	−0.206	−0.193	−0.187
	(21.50)***	(21.53)***	(21.60)***	(21.71)***	(30.10)***	(29.90)***	(29.82)***	(8.11)***	(8.43)***	(8.01)***	(7.94)***	(7.68)***	(6.77)***	(6.64)***
Own5to25 × ID	−0.060	−0.042	−0.098	−0.093	0.091	0.080	0.033	−0.153	−0.182	−0.341	0.009	0.149	0.207	0.134
	(4.85)***	(2.89)***	(4.94)***	(4.22)***	(6.35)***	(2.37)**	(2.28)**	(5.54)***	(5.89)***	(2.89)***	(0.39)	(5.30)***	(3.39)***	(3.21)***
Own25to50	−0.313	−0.312	−0.312	−0.312	−0.122	−0.122	−0.125	−0.064	−0.074	−0.070	−0.072	0.008	0.109	0.110
	(6.53)***	(6.52)***	(6.52)***	(6.49)***	(5.24)***	(5.27)***	(5.38)***	(2.09)**	(2.36)**	(2.28)**	(2.29)**	(0.14)	(1.41)	(1.41)
Own25to50 × ID	0.192	0.198	−0.006	0.156	−0.261	−0.421	−0.005	0.065	0.137	0.209	−1.699		−0.148	−0.520
	(3.59)***	(3.61)***	(0.06)	(2.10)**	(0.48)	(2.87)***	(0.13)	(1.02)	(2.55)**	(1.20)	(8.96)***		(1.51)	(6.23)***
ID_Dummy	0.005	0.007	0.005	0.007	−0.008	−0.007	0.000	0.009	0.016	0.009	−0.008	−0.008	−0.022	−0.012
	(4.38)***	(4.84)***	(2.70)***	(3.90)***	(6.55)***	(2.22)**	(0.07)	(3.36)***	(5.51)***	(0.83)	(3.04)***	(3.21)***	(3.52)***	(3.05)***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.010	0.010	0.011	0.010	0.011	0.015	−0.024	0.000	0.001	0.002	0.002	0.010	0.009	0.004
	(4.92)***	(4.98)***	(5.14)***	(4.96)***	(4.76)***	(2.01)**	(0.84)	(0.09)	(1.60)	(2.08)**	(2.49)**	(3.73)***	(2.05)**	(0.82)
Observations	31,126	25,018	22,852	23,154	23,740	12,879	15,943	8,086	7,720	7,211	7,391	7,206	1,082	1,110
Adjusted R^2	0.22	0.21	0.24	0.22	0.21	0.22	0.22	0.26	0.26	0.25	0.28	0.26	0.50	0.51

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Panel B: Robustness Tests

	Newly Public Sample				S&P500 Sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Own5to25	−0.180	−0.194	−0.182		−0.050	−0.052	−0.054	
	(22.55)***	(12.18)***	(19.17)***		(8.64)***	(6.40)***	(7.80)***	
Own5to25 × Ind	−0.084	−0.060	−0.067		−0.127	−0.153	−0.156	
	(7.44)***	(2.65)***	(5.13)***		(4.93)***	(1.66)*	(5.34)***	
Own25to50	−0.336	−0.313	−0.304		−0.066	−0.064	−0.054	
	(7.08)***	(3.97)***	(5.61)***		(2.17)**	(2.06)**	(1.50)	
Own25to50 × Ind	0.195	0.192	0.178		−0.001	0.065	0.031	
	(3.69)***	(2.66)***	(2.98)***		(0.02)	(0.51)	(0.45)	
Ind	0.007	0.005	0.006	0.014	0.009	0.009	0.009	0.015
	(7.61)***	(2.36)**	(5.19)***	(5.89)***	(3.65)***	(1.10)	(3.28)***	(3.82)***
LnAssets			0.001				0.001	
			(3.96)***				(6.17)***	
PPE/assets			−0.003				−0.007	
			(1.69)*				(5.37)***	
Debt/assets			−0.006				0.001	
			(5.27)***				(0.86)	
CapEx/sales			0.000				0.005	
			(0.14)				(2.15)**	
R&D/sales			0.000				0.003	
			(0.26)				(0.87)	
ROA			−0.005				0.017	
			(5.16)***				(5.57)***	
Adsale			−0.000				−0.084	
			(0.13)				(2.94)***	
Resid			−0.012				0.036	
			(0.87)				(0.89)	
Own				−0.128				−0.041
				(4.17)***				(3.22)***
Own × Ind				−0.218				−0.266
				(5.74)***				(4.71)***

Table 10. (*Continued*)

Panel B: Robustness Tests

	Newly Public Sample				S&P500 Sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Own^2				−0.251				−0.043
				(2.52)**				(0.87)
$Own^2 \times Ind$				0.568				0.444
				(4.92)***				(3.10)***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.011	0.010	−0.002	0.007	0.002	0.000	−0.005	−0.000
	(5.62)***	(7.03)***	(0.32)	(2.70)***	(2.10)**	(0.08)	(1.98)**	(0.26)
Observations	29,991	31,126	27,591	31,126	8,019	8,086	7,476	8,086
Adjusted R^2	0.26	0.22	0.22	0.22	0.23	0.26	0.27	0.26

The dependent variable, LP, is the loss of power calculated for each blockholder. All models in Panel A are estimated using a piecewise linear OLS regression with a 25% breakpoint. All observations with ownership greater than 50% are excluded. Columns (1)—(7) of Panel A report results for the newly public firm sample, while those in columns (8)−(14) report those for the S&P500 firm sample. Samples used in columns (2)−(4) and (9)−(11) of Panel A include all corporate blockholders and the type of individual blockholder indicated at the top of the column. Samples used in columns (5)−(7) and (12)−(14) of Panel A include all individual blockholders and the type of corporate blockholder indicated at the top of the column. Columns (1)−(4) of Panel B report results for the newly public firm sample, while those in columns (5)−(8) of Panel B report those for the S&P500 firm sample. Samples in columns (1) and (5) of Panel B exclude observations with Shapley value of zero. Columns (2) and (6) of Panel B report the result of the estimations of OLS regressions with standard errors clustered by firm. Columns (3) and (7) of Panel B report the results of the estimation of Eq. (2) with additional, firm-specific control variables. Columns (4) and (8) of Panel B report the results of the estimation of a quadratic specification of Eq. (2). All variables are as defined in Appendix B. Heteroskedasticity-adjusted (White) standard errors are used in calculation of *t*-statistics that are reported in parentheses.

***, **, and * Significance at 1%, 5%, and 10% levels, respectively.

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levels of ownership. These general patterns also hold for most types of individual and corporate blockholders. While there appear to be differences between types of blockholders, examination of their significance and the underlying reasons behind them are beyond the scope of this paper.

As before, we also test the robustness of our results to the exclusion of observations with zero Shapley values, to clustering of observations, to additional firm-specific control variables, and to the use of a quadratic specification.[33] The results of these tests, reported in Panel B of Table 10, are qualitatively similar to those reported in Panel A of Table 10.

DISCUSSION AND CONCLUSIONS

There is a broad consensus in the literature that the ownership structure of a corporation plays an important role in its governance. In theory, outsider blockholders could discipline managers and ensure that they better serve the objectives of all shareholders. Alternatively, blockholding on the part of managers can better align their interests with those of shareholders. But how prevalent are blockholders? More importantly, what is their influence on the power of their fellow blockholders? Does this influence vary with observable blockholder characteristics? In this paper, we have provided preliminary answers to these questions.

We start by showing that US firms have a wide spectrum of ownership structures – from firms with no blockholders to firms with 10 blockholders and from firms with total blockholder ownership of 5–99.7%. We then document an implication of this variation in the number and ownership stakes of blockholders – a large variation in the power a particular blockholder has in the firm. For example, a 5% blockholder can have a power anywhere between 0% and 33%, depending on the presence and ownership of other blockholders in the firm. Using our measure of the influence of the ownership structure on a blockholder's power, we show that an average blockholder loses up to 12.5% of her potential power due to the presence and ownership stakes of other blockholders. Finally, we show that the LP varies systematically with two observable blockholder characteristics – rank and identity. In particular, we identify groups of blockholders that are more likely to lose power, such as second blockholders and nonfamily managers.

Our paper has several important implications for the field of corporate governance. First, we contribute to the ongoing debate about the presence

of blockholders in the US firms that has been mired by conflicting findings. As noted by Cheffins and Bank (2009), the prevalence of blockholders varies based on the size of the firm. Moreover, the differences in the findings of Holderness (2009) and Becht (2001) provide additional evidence of significant biases in vendor provided data on blockholders. We address these issues by using the more accurate hand-collected data described by Holderness (2009) with coverage comparable to the large sample studies such as Becht (2001). Our sample is also comprehensive in that it includes large, index-listed firms as well as smaller, newly public firms and as a result, we are able to document significant differences in the ownership structures between these two samples. Our findings suggest that both the sample selection and the data sources have a significant influence on a study's findings. The authors and readers should keep this influence in mind when interpreting and generalizing findings of a particular study.

Second, the significant influence of ownership structure on a blockholder's power documented in this paper suggests a need to look beyond the ownership stakes of various blockholders (or groups thereof). This is especially important as a large body of research in finance has tended to view ownership and power as synonymous. For example, a central issue in the extensive literature on the relationship between ownership and firm value is that of entrenchment – the point at which a blockholder gains sufficient power to be able to extract rents or otherwise expropriate minority shareholders. Intuitively, entrenchment depends on power of which, as we have shown, ownership is but an imperfect proxy. Our findings provide future researchers with a better idea of the limitations of the assumption that ownership is equal to power. In particular, it suggests specific cases when the difference between ownership and power is likely to be especially pronounced. This difference, and therefore, the need to control for it, will be more pronounced for studies looking at the entrenchment of a single blockholder (e.g., a firm's CEO as opposed to a group of blockholders, such as firm insiders), especially if the blockholder is not the largest one in the firm and is not a founder or a member of founding family. Further, the need to distinguish between ownership and power is likely to be more important for studies that use either a random sample or that of smaller and younger firms.

Third, our findings may provide a better understanding of the driving forces behind the results of the recent studies documenting the influence of both the number of blockholders and the dispersion of their ownership stakes on firm value. In particular, our findings suggest an intuitive interpretation of the prior results: that dispersion and the number of blockholders are but two factors that influence a blockholder's power.

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A "horse-race" test between these two variables and a direct measure of power could provide some insights as to the source of their influence. In particular, if the dispersion and the number of blockholders continue to have a significant influence even after the inclusion of a direct measure of power, their influence is likely to come from a source other than power. Also, it is worth noting that both of the measures used in the literature are firm-level variables, while the LP is blockholder-specific. This difference may be useful in interpretation of some of the results reported in prior studies. In particular, the interpretation of the ownership dispersion measure largely depends upon the rank of the blockholder in question – it is favorable for the largest blockholder (as there are less likely to be other blockholders with ownership stakes large enough to challenge her), but unfavorable for the lower ranked blockholders. Use of a direct measure of power could make interpretation of the results much easier. Preliminary evidence on these issues has been provided by Basu et al. (2015).

Fourth, our findings of a significant influence of a blockholder's identity on the LP suggest fruitful avenues for future research that may provide new insights into the uniqueness of some blockholders. For example, the growing literature on family ownership (see, e.g., Anderson & Reeb, 2003; Villalonga & Amit, 2006) is built on the assumption that family blockholders are unique in the disproportionate amount of power they wield in a firm. The preliminary evidence reported in this paper suggests that their unique influence could, at least in part, be driven by the ownership structure differences between family and nonfamily firms as reflected in a lower LP experienced by the family blockholders.

Finally, several caveats are in order: our treatment of blockholders does not take into account the potential alliances between blockholders, nor do we think that such consideration is viable. The aim of this paper is to merely distinguish between power and ownership and to shed light on any systematic patterns in the difference between the two. Moreover, in the absence of much research specifically addressing blockholder ownership and power, we largely confine ourselves to describing the nature of blockholder ownership and power. As a result, any investigation into the genesis of the ownership and power structures that we observe falls beyond the scope of this paper.

NOTES

1. Despite decades of research, the consensus is still far from being reached. The dominant paradigm, which can be traced back to Berle and Means (1932),

maintains that shareholding is diffuse in US firms. This, however, has recently been challenged by, among others, Holderness (2009), Gadhoum, Lang, and Young (2005), and Becht (2001), who find the blockholders to be much more prevalent than suggested by the dominant paradigm.

2. Notable exceptions are Dlugosz, Fahlenbrach, Gompers, and Metrick (2006), who report the average number of blockholders (and the identity of the largest) for their subsample of Execucomp firms, Konijn, Kräussl, and Lucas (2011), who report the identity of up to the fifth blockholder for the same sample, and Becht (2001), who reports the summary statistics of ownership stakes of the top five blockholders.

3. Our definition of ownership structure includes two dimensions – the number of blockholders present in a firm and the size of their ownership stakes.

4. We chose to use the term *loss of power* because for most blockholders in our samples the difference between actual and benchmark Shapley values is negative. Only about 2% of blockholders gain from the presence and ownership stakes of other blockholders.

5. Two of the reasons for the potential differences in the loss of power between individual and corporate blockholders are liquidity and diversification considerations. We will discuss these considerations in detail in the section "Empirical Tests and Results."

6. Note that our objective here is not to explain why or how blockholders of a particular identity gain or lose power. Our objective is more modest – to identify blockholders who gain and lose from the presence and ownership stakes of other blockholders.

7. See Cheffins and Bank (2009) for an excellent survey of this literature.

8. For example, Larner (1966) revisits Berle and Means' analysis of the largest 200 firms in the United States and concludes that they are increasingly controlled by management. Franks, Mayer, and Rossi (2009) note that less than 3% of the firms in the United Kingdom and the United States have a group of shareholders that controls a majority of the firm's equity.

9. Holderness (2009) finds that 96% of his sample firms have a blockholder, while the corresponding percentages reported by Gadhoum et al. (2005) and Becht (2001) are 60% and 56%, respectively.

10. See Cheffins and Bank (2009) for a discussion on the impact of firm size on blockholding.

11. This is not surprising given the many problems inherent in the off-the-shelf databases documented by Dlugosz et al. (2006).

12. An important contribution in this context is that of Dlugosz et al. (2006), who examine blockholders in a sample of the largest US firms from 1996 to 2001. In addition to our examination of the differences between ownership and power, we extend their work by using a sample that is more comprehensive in several ways. First, we include all firms, including those with multiple classes of shares. Second, we include the often ignored group of newly public firms and explicitly contrast their ownership structures with those of more established firms. Finally, we examine a longer time series extending for 12 years.

13. While there have been a number of studies on multiple blockholders in European firms (see, e.g., Laeven & Levine, 2008), the only study of US firms we are aware of is that by Konijn et al. (2011), who show that the dispersion of

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blockholder ownership stakes has a significant influence on firm value. Moreover, as noted by Edmans and Manso (2011), there are no studies that look at the factors that determine blockholder structure. By examining the identity, ownership, and power of multiple blockholders, we take the first steps in this direction.

14. It should be noted that the primary aim of this paper is to document the relationship between ownership and the loss of power. The choice of a particular ownership stake (and therefore the loss of power) is likely to involve, among other things, considerations of interactions between and strategic behavior of blockholders. As such, while interesting, these issues are beyond the scope of this paper.

15. Our choice of 1993−1996 IPOs as the basis of our sample is motivated by the limited availability of pre-1993 IPO prospectuses on Thomson Research, our source of pre-Edgar filings.

16. Securities and Exchange Commission (SEC) regulations require the disclosure of ownership positions of (1) all officers and directors and (2) all shareholders holding more than 5% of any class of shares.

17. Ownership stakes of family members are added together even if their individual ownership stakes fall below 5% of voting rights.

18. This category represents 4.55% (4.57%) of corporate blockholders in the newly public (S&P500) sample.

19. As discussed earlier, the Shapley value has been widely used in prior research related to blockholder power. An alternative to the Shapley value could be the Banzhaf measure suggested by Penrose (1946), Banzhaf (1965), and Coleman (1971). However, as noted by Freixas, Marciniak, and Pons (2012), the Shapley value is ordinally equivalent to the Banzhaf measure for most situations that would be engendered by a corporate voting game. Further, as found by Nurmi and Meskanen (1999), the values generated by the two measures are numerically very close to each other in many voting situations.

20. The observed pattern is similar to that reported by Basu et al. (2015).

21. For the sake of brevity, from now on we will report all the univariate tests using five different ownership brackets. The results are qualitatively unchanged when we split the ownership into the 18 different brackets used in Table 5.

22. Note that, by construction, loss of power is zero for any ownership stake above 50% because such blockholders always have a Shapley value of one and the presence of additional blockholders has no influence on their power.

23. We have also used breakpoints at 20%, 30%, and 35% ownership stakes. The results are qualitatively unchanged in these alternative specifications. For the ease of exposition, we will refer to the 5−25% ownership range as "low" and 25−50% ownership range as "intermediate."

24. While a blockholder's characteristics are likely to influence her loss of power, the examination of this influence is beyond the scope of this paper. As such the results reported in Tables 8 and 10 are indicative and can be further explored by future research that explores the influence of blockholder identity.

25. In our choice of control variables, we follow Himmelberg, Hubbard, and Palia (1999).

26. Note that the inflection points implied by the results reported in columns (5) and (10) of Table 8 are 6.6% and 6.1%, respectively.

27. Note that the below list of costs and benefits is by no means exhaustive. It is intended to sketch some of the likely differences between individual and corporate blockholders. We are not aware of any study, either theoretical or empirical, that has examined the relationship between blockholder identity and the loss of power. Our aim here is to provide preliminary evidence on this relationship and not to explain its genesis.

28. An exception is manufacturing corporations (see, e.g., Johnson, La Porta, Lopez-de-Silanes, & Shleifer, 2000, who provide examples of tunneling by corporate blockholders through transfer pricing).

29. There are external limits to the percentage of a portfolio company's shares certain corporate blockholders can own. For example, the prudent man rule (or its more modern form, the prudent investor rule) as implemented in the Employee Retirement Income Security Act of 1974 requires pension plans to diversify their assets. As specified in the Investment Company Act of 1940, in order to be considered diversified, at least three-fourths of a corporate blockholder's portfolio must be invested such that he does not own more than 10% of the securities of a particular firm.

30. This has been suggested by, among others, Graves and Waddock (1990) and Coffee (1991). We confirm this to be the case for our sample firms. In particular, holding period for an average individual blockholder in our sample is 6.5 years, while for corporate blockholders it is only 2.2 years.

31. Note also that, as reported in Table 4, the identity of corporate blockholders with the intermediate levels of ownership is significantly different from that of blockholders with low levels of ownership. In particular, there are very few financial institutions with intermediate levels of ownership. The motivation of, for example, manufacturing corporations is likely to be different from that of financial institutions. Manufacturing corporations may acquire a block in a firm to secure more favorable transfer pricing or to ensure access to a new technology it needs, while a financial corporation is unlikely to have such interests.

32. We do not interpret the coefficient estimates that have been estimated from fewer than 30 observations (as shown in Table 4).

33. For the sake of brevity, we report only the results of robustness tests based on the specifications reported in columns (1) and (8) of Panel A of Table 10. The results of other specifications are similar and are available from the authors upon request.

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APPENDIX A

Consider the ownership structure of Harry's Farmers Market, Inc. (see Table A1 that shows the ownership table from the company's 2000 proxy statement). As disclosed in the proxy statement, on the record date (May 2, 2000), 4,139,375 shares of Class A common stock and 2,050,701 shares of Class B common stock were outstanding and eligible to be voted at the annual meeting. Holders of Class A common stock were entitled to cast 1 vote for each share held, while holders of Class B common stock were entitled to cast 10 votes for each share held. This implies that holders of Class A shares were eligible to cast $4{,}139{,}375/(4{,}139{,}375 \times 1 + 2{,}050{,}701 \times 10) = 16.80\%$ of all votes, while the holders of Class B shares were eligible to cast the remaining 83.20% of votes. At the same time, the holders of Class A shares were entitled to $4{,}139{,}375/(4{,}139{,}375 + 2{,}050{,}701) = 66.87\%$ of cashflows, with the holders of Class B shares receiving the remaining 33.13% of cashflows.

Consider the ownership structure of Harry's Farmers Market, Inc. as disclosed in the ownership table of the company's 2000 proxy statement (see Table A1). The company' founder, Harry Blazer owns 38,000 Class A shares and 2,050,701 Class B shares. His voting rights, therefore, are $(38{,}000 + 2{,}050{,}701 \times 10)/(4{,}139{,}375 \times 1 + 2{,}050{,}701 \times 10) = 83.36\%$ of all votes, whiles his cashflow rights are $(38{,}000 + 2{,}050{,}701)/(4{,}139{,}375 + 2{,}050{,}701) = 33.74\%$. While John D. Branch, the company's Senior Vice President, CFO, and director owns more than 5% of Class A shares, both his voting rights (0.94%) and cashflow rights (3.74%) fall below 5%.

Table A1. Beneficial Ownership Table from the May 16, 2000 Proxy of Harry's Farmers Market, Inc.

Beneficial Owner	Shares Beneficially Owned		Percent of Class	Percent of Total Voting Power
	Class	Shares		
Harry A. Blazer	Class A common stock	38,000/1/	*	
	Class B common stock	2,050,701/2/	100.00	
	Total			83.36
Charles W. Sapp	Class A common stock	39,133/3/	*	*
Robert C. Glustrom	Class A common stock	189,999/4/	4.44	*
John D. Branch	Class A common stock	231,224/5/	5.36	*
Donald C. Pamenter	Class A common stock	–	–	–
All directors and executive officers as a group	Class A common stock	498,356/6/	11.16	
	Class B common stock	2,050,701	100.00	
(Six persons)	Total	2,549,057		84.12

This table sets forth information as of March 31, 2000, unless otherwise indicated, regarding the beneficial ownership of our equity securities by each person known by us to own more than 5% of any class of our voting securities, each director and nominee for director, each executive officer named in the Summary Compensation Table and all directors and executive officers as a group.

* Represents beneficial ownership of less than 1%.

APPENDIX B

Table B1. Variable Description.

Variable	Description
Own5to25	Equal to blockholder ownership if the ownership is below 25% or equal to 25% if the ownership is above 25%
Own25to50	Equal to zero if the ownership is below 25%, equal to ownership minus 25% if the ownership is between 25% and 50%, or equal to 50% if the ownership is above 50%
Own	Equal to the blockholder ownership
Own^2	Equal to the blockholder ownership squared
Ind	A dummy variable that takes on a value of one for individual blockholders and zero otherwise

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Table B1. (*Continued*)

Variable	Description
Family	A dummy variable that is equal to one for individual blockholders with family connections to the founder of the firm, and zero otherwise
Mangmt	A dummy variable that takes on a value ofone for individual blockholders that are managers in the firm, and zero otherwise
Outsider	A dummy variable that takes on a value of one for individual blockholders that are neither family nor managers of the firm, and zero otherwise
Corp	A dummy variable that takes on a value of one for corporate blockholders, and zero otherwise
Manuf	A dummy variable that takes on a value of one for public or private corporate blockholders in nonfinance industries, and zero otherwise
ESOP	A dummy variable that takes on a value of one for corporate blockholders that are identified as Employee Stock Ownership Plan in the proxy statement, and zero otherwise
Fin Inst	A dummy variable that takes on a value of one for corporate blockholders in financial industries, and zero otherwise
PE	A dummy variable that takes on a value of one for private equity or venture capital corporate blockholders, and zero otherwise
Second	A dummy variable that takes on a value of one for the second-largest blockholder in the firm, and zero otherwise
Third	A dummy variable that takes on a value of one for a blockholder ranked below second in the firm (i.e., third, fourth, etc. blockholders), and zero otherwise
Firm age	The number of years between either the year of incorporation or the start of operations, whichever is earlier, and the time of the proxy statement filing date
Market Cap	Total number of shares outstanding multiplied by the annual closing stock price
LnAssets	Natural logarithm of the book value of assets
Sales	Total turnover/sales
PPE/Assets	Ratio of total property, plant, and equipment to the book value of assets
Debt/ Assets	Ratio of the book value of debt to the book value of assets
CapEx/ Sale	Ratio of capital expenditure to net sales
R&D/Sale	Ratio of research and development expenditure to net sales
ROA	Ratio of operating income before depreciation to total assets
Adsale	Ratio of advertising expenditure to net sales
Resid	The idiosyncratic standard deviation calculated over 100 trading days ending on the day preceding the proxy statement filing date

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CHANGES IN CONTROLLING SHAREHOLDERS' HOLDINGS: DO THEY ENTAIL FINANCIAL TUNNELING?

Menachem (Meni) Abudy and Beni Lauterbach

ABSTRACT

We examine changes in controlling shareholder holdings, looking for evidence of financial tunneling (unfair wealth transfers from public investors to controlling shareholders). Our sample comprises yearly data during 2000–2011 on 75 large Israeli companies. We find that controlling shareholders are successful in timing the stock market – there exists a significant negative correlation between changes in the mean controlling shareholders' equity holdings and market return. There is also some evidence that controlling shareholders increase (decrease) their holdings before years of positive (negative) excess returns in their shares. However, statistically significant mean excess returns are documented only after decreases in controlling shareholders' holdings. Thus, we offer only limited support for the financial tunneling hypothesis.

Keywords: Controlling shareholders; financial tunneling

JEL classifications: G32; G34

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INTRODUCTION

Most public companies outside the United States and United Kingdom (and some of the U.S. and U.K. firms – see Holderness, 2009) have a control group (an individual, family, or coalition of a few dominant partners) that owns a large portion of the company's shares and controls the company's votes and decisions. The financial literature has identified a serious agency problem with this type of holding structure: the control group has the ability to extract from the company benefits for itself only ("private benefits"), at the expense of the rest of the shareholders (minority shareholders).

This study focuses on a particular form of private benefits extraction – financial tunneling. Our specific hypothesis is that controlling shareholders have superior "inside" information regarding the firm, and change their holdings and stake in the firm in accordance with this private information. When they know that the firm's share is underpriced, controlling shareholders increase their proportion in the firm, and vice versa when it is overpriced. By doing so, controlling shareholders profit at the expense of the "simple" public investors. On reflection, financial tunneling is essentially a generalization of the well-known insider-trading phenomenon.

While insider trading has been extensively studied, evidence on other financial tunneling instruments and on the overall phenomenon of financial tunneling has been scarce. Previous studies document specific mechanisms of financial tunneling such as insider trading (Hirschey & Zaima, 1989; Piotroski & Roulstone, 2005) or sales of equity stakes by the listed company to its controlling shareholders at below market prices (Cheung, Rau, & Stouraitis, 2006; Peng, Wei, & Yang, 2011). We contribute to existing literature by focusing on a variable that aggregates almost all financial tunneling processes – the total change in controlling shareholders' proportion in the firm. Given that the various alternative financial tunneling mechanisms are substitutes, financial tunneling might be most evident when studying the total change in controlling shareholders proportion in firm's equity.[1] We do not contend that it is not important to inquire how exactly, that is, by which "micro" mechanism, controlling shareholders financially tunnel. Rather, we argue that it is also interesting to examine the "macro" variable that aggregates most of these activities – the total change in controlling shareholders' proportion in firm's equity.

We offer three tests of the financial tunneling hypothesis. The first focuses on the general stock market trend: Do controlling owners exploit periods of decline in the stock market in order to increase their stake in the

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company and later on sell these surplus holdings to the public when the stock market rises? This first test is somewhat indirect because it can be argued that it just examines the general stock market timing abilities of controlling shareholders. The second and more direct test isolates large changes in controlling shareholders' holdings and inquires whether large increases (decreases) in these holdings precede years of positive (negative) excess returns in the firms' shares. The third test is related to the second one. If controlling shareholders exploit private information, the timing of large changes in controlling shareholders holdings would be "correct," that is in the year after an increase (decrease) in controlling shareholders holdings, the shares' excess return would be positive (negative, respectively).

Our sample comprises yearly data during 2000−2011 on 75 large closely held (yet publically traded) Israeli firms. Testing the financial tunneling hypothesis calls for data from a concentrated-ownership economy, where financial tunneling might be most visible, and Israel may suit our purposes well as it appears a "typical" closely held firms' economy − it ranks slightly above the median in Dyck and Zingales (2004) private benefits scale, and at the median in Laporta, Lopez-De-Silanes, Shleifer, and Vishny (2002) investor protection scale. Another advantage is that Israeli data on controlling shareholders holdings is relatively accurate and detailed.

The empirical results partially support the financial tunneling hypothesis. We document a significant negative correlation between the stock market annual return and the (across-firms) average change in controlling shareholders' holdings. Evidently, controlling shareholders increase their proportion in the firm when the stock market declines and decrease their proportion in the firm when the stock market rises. This "contrarian" strategy enriches controlling shareholders on average. The second test weakly supports the tunneling hypothesis, as we find (with marginal statistical significance) that the tendency of controlling shareholders to increase or decrease holdings depends on their firm share's excess return in the year after the holding change. Increases in controlling shareholders holdings are more likely before a year of positive excess returns. Our third test also partially supports the financial tunneling hypothesis. The signs of the mean excess returns after large changes in controlling shareholders' holdings are consistent with the financial tunneling hypothesis; however statistically significant excess returns are documented only for the case of a decrease in controlling shareholder holdings. Overall, given that our evidence is consistent with the financial tunneling hypothesis, we cautiously suggest that in some firms and on some occasions, controlling shareholders have engaged in financial tunneling.

The paper is organized as follows. The section "Background and Testable Propositions" offers some background on financial tunneling, and presents our tests. The section "Sample and Data" describes the sample and data. The section "Empirical Results" reports and discusses the empirical results, and the section "Summary and Conclusions" concludes.

BACKGROUND AND TESTABLE PROPOSITIONS

Jensen and Meckling (1976) were the first to formally define the agency problem of closely held firms: firm's controlling shareholders who dominate firm's vote (and decision making) have both an interest and the ability to exploit their power and extract private benefits from the company. The term "private benefits" was defined by Bebchuk and Kahan (1990) as any value, received or perceived by the controlling shareholders, that is not shared with the rest of the shareholders. Obviously, private benefits consumption by the controlling shareholders is generally at the expense of public shareholders who receive lower proceeds from the firm.

One of the mechanisms for extracting private benefits has been offered the name "tunneling" by Johnson, La Porta, Lopez-de-Silanes, and Shleifer (2000). According to Johnson et al. (2000), tunneling comprises two main activities: (1) "self-dealing" transactions, whereby controlling shareholders receive exaggerated compensation from the firm, and/or execute "related party" transactions with the firm at unfair prices that are favorable to them, and/or "front-run" on the company's most prospective investment opportunities; (2) financial transactions such as some sorts of private placements that eventually tend to exploit and discriminate the minority. Atanasov, Black, and Ciccotello (2011) refine a bit the tunneling definition by differentiating between cash flow tunneling, asset tunneling, and equity tunneling, where equity tunneling closely resembles financial tunneling (i.e., tunneling via financial transaction).

Atanasov et al. (2011) define equity tunneling as a change in the controlling shareholders' share in the firm at the expense of the minority shareholders, without directly influencing the company's operational activities. According to Atanasov et al. (2011), equity tunneling can take a variety of forms, including dilutive equity offerings (issuance of shares or securities convertible into shares, to insiders for below fair value); freezeouts (transactions in which insiders take the firm private) for less than fair market value; loans from the firm to insiders (which will not be repaid in a bad

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economy, and hence act partly as put options); sale of a controlling stake (without an offer to buy minority shares); repurchase of shares from insiders for more than fair value (diluting the value of the minority shares); and equity-based executive compensation that exceeds a market rate for services.

Existing literature on the phenomenon of tunneling is diverse.[2] However, only a handful of articles up until now have focused on non-insider-trading "financial tunneling." For example, Baek et al. (2006) find that in Korea the price discounts on private issues to controlling shareholders are higher than on other private issues. Atanasov et al. (2010) document ruthless expropriation of minority shareholders by controlling shareholders in Bulgaria via dilutions and freezeouts at unfair prices. Atanasov et al. (2010) also present evidence consistent with the hypothesis that following a corporate law reform in Bulgaria that curbed financial tunneling, cash flow tunneling has increased. This suggests that tunneling, including financial tunneling, has many venues that are substitutes and difficult to block.[3]

In this study, we depart from the "micro" analysis (i.e., from studies of individual financial tunneling mechanisms), and examine the "macro" picture, that is, the time series of total changes in controlling shareholders proportion in their firms. While we recognize the great and perhaps superior scientific value of "micro" studies, there are also advantages to a "macro" analysis. For if, different tunneling mechanisms are substitutes, the bottom-line aggregate numbers are most descriptive. Admittedly, some or even most of the changes in controlling shareholders holdings may not emanate from financial tunneling motives. However, the same criticism applies to the "micro" studies, where the specific mechanism may also serve legitimate business purposes ("propping") and not only financial tunneling. Anyway, it appears useful to examine also what the total and average changes in controlling shareholders holdings can tell us.

Specifically, we propose three empirical tests of financial tunneling. The first follows the mean changes in controlling shareholders holdings during years of stock markets rise (boom periods) and decline (bear periods). Periods of continued advance or continued retreat in stock markets may generate (at least on occasions) a temporary wedge between market prices and the shares' economic value. Consequently, controlling shareholders, who possess more accurate information about the company value, may exploit their superior private information to increase their proportion in the firm when shares are underpriced (typically in bear markets) and decrease their proportion in the firm when shares are overpriced (typically

at bull markets). If this contrarian activity of controlling shareholders is prevalent in reality, we expect to find a negative correlation between the market index yearly return and the mean yearly change in controlling shareholders proportion in publically traded companies.

The second test is more direct. We focus on large changes in controlling shareholders holdings. If financial tunneling plays a role in these significant holding changes then we expect a higher likelihood of holding increases before a year of positive excess return in the firm's share. We will employ a difference in proportion z-test to compare the proportion of holding increases in year t before a "good" (= positive excess return) year $t+1$ with the counterpart proportion before a "bad" (= negative excess return) year $t+1$.

The third and perhaps most direct test proposes that if changes in controlling shareholders holdings is driven by inside information, then following an increase (decrease) in controlling shareholder proportion in firm Y, its share would record significantly positive (negative) excess returns on average.

SAMPLE AND DATA

Our initial sample comprises all closely held companies included in the Tel Aviv-100 index at the beginning of year 2000. Tel Aviv-100 is a share price index of the 100 highest free-float stocks traded on the Tel Aviv Stock Exchange, and it is basically an index of the largest companies' shares traded on the Tel Aviv Stock Exchange. Also noteworthy, a closely held firm is defined by us as a firm in which controlling shareholders control over 40% of the vote.

From the initial sample, we exclude all dually listed companies, namely all companies whose shares were also traded on a foreign exchange (U.S. and U.K exchanges in our case). This is because controlling shareholders in dually listed firms, bounded by stricter United States or United Kingdom corporate governance rules, probably do not or cannot behave like the typical local control group. Dually listed firms also have different reporting standards, making their data not fully comparable to that of the local firms. We further omit three companies where the State of Israel was the controlling shareholder. Last, three more companies were excluded due to insufficient data.[4] The final sample comprises 75 closely held companies at the beginning of the sample period, and 73 closely held companies at the end.[5]

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Our data is yearly, and the sample period ranges from December 31, 1999 to December 31, 2011. The principal variable of this study, the holdings of controlling shareholders, is hand-collected from the companies' annual reports. Scanned annual reports are available to us (via Ifat, a data-base vendor). Article 24 of the annual report of Israeli firms details the holdings of large shareholders and reveals all relations between them. For example, if a family controls the firm via four different local or foreign private companies, Article 24 discloses the names of the individuals who are the ultimate owners, and any relations between them. Article 24 also provides information about voting agreements between large shareholders, hence partnerships in control (=voting coalitions) are relatively easy to detect. The explicit and detailed nature of Article 24 makes control group identification and measurement of controlling shareholders holdings in Israel fairly accurate and trustworthy, which is a major advantage of our data. Notably, we compile yearly data on controlling shareholders' vote percentage, and when calculating the vote percentage, we neutralize the treasury shares, so that the vote percentage would take into account only active shares.[6]

Monthly stock return data are collected from The Tel Aviv Stock Exchange internet site (www.tase.co.il). For companies that do not trade anymore on the Tel Aviv Stock Exchange, we resorted to stock return data from Predicta (a local data-base vendor).

Two sample or methodological comments are in order. First, in our second and third tests, looking at excess returns after changes in controlling shareholders' holdings, we narrow the sample to large holding changes only. We suspect that most small changes in controlling shareholders holdings are innocuous, that is may arise from personal liquidity or other non-tunneling related motives. Thus, in order to achieve some inference power, we filter out yearly changes of less than 1% in controlling shareholders holdings. Unfortunately, 58 of the 276 large holding changes in our sample are further excluded because in cases such as freezeouts (buying all company shares from the public) or initial public offers, stock price data in the year after and/or before the large change do not exist.

The second methodological issue concerns excess return estimation. For each large change "event," we fit the market model in the 36 months period including the change calendar year (year t) and the two calendar years surrounding it (year $t-1$ and year $t+1$). The 36 month period is methodologically sufficient for excess return estimation and it minimizes possible overlap between adjacent large changes in the same firm. The excess return in a particular month is estimated by the market model residual in that

month, and the excess return in a particular calendar year is approximated by the sum of firm's excess return in that year 12 months. One of the problems of the study is that we lack a clear event month. This is because most of our large changes consist of several changes in controlling shareholders holdings within a particular calendar year. Thus, our time measurement units are calendar years, which may be too gross for precise response estimation.

EMPIRICAL RESULTS

Table 1 presents the average vote percentage of controlling shareholders in our sample firms during the sample period (end of 1999 through end of 2011). Mean controlling shareholders vote exceeds 70% in each of the sample years and is generally on the rise during the sample period. Evidently, our sample comprises closely held firms with dominant controlling shareholders who can potentially engineer financial tunneling maneuvers.

The Correlation between Changes in Controlling Shareholders' Holdings and Stock Market Return

Our first empirical test examines the correlation between the annual change in controlling shareholders mean vote and the Tel Aviv-100 (market index) annual return. The financial tunneling hypothesis predicts a negative correlation between these two variables, that is, that the control group typically

Table 1. Mean Controlling Shareholders' Vote in Our Sample Companies: 2000–2011.

Year End	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Number of companies in the sample	75	75	75	75	75	74	73	73	73	73	73	73	73
The controlling shareholders average vote (in %)	72.07	72.68	73.91	74.49	74.33	74.65	74.95	74.17	75.81	77.95	77.75	77.09	77.55

The table documents end-of-calendar-year average vote of controlling shareholders in a sample of large closely held companies traded on the Tel Aviv-100 Index.

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increases its holdings during declining markets and decreases its holdings during rising markets.

Fig. 1 plots the average vote percentage of controlling shareholders in the sample companies and the level of the Tel Aviv-100 market index during 2000–2011. A strikingly clear negative correlation between the two variables can be observed – during periods of market decline (rise) the mean controlling shareholders vote increases (decreases).

Table 2 documents the Pearson and Spearman correlations between the annual returns on the Tel Aviv-100 Index and the annual changes in the mean vote percentage of the controlling shareholders. We present correlations in three overlapping cross-sections: the overall sample, subsample 1 (that omits two companies that became dually listed during the sample period), and subsample 2 (that further excludes a company that underwent a major debt settlement in 2010).[7]

Table 2 results demonstrate a statistically significant negative correlation between the Tel Aviv-100 returns and the mean annual percentage change

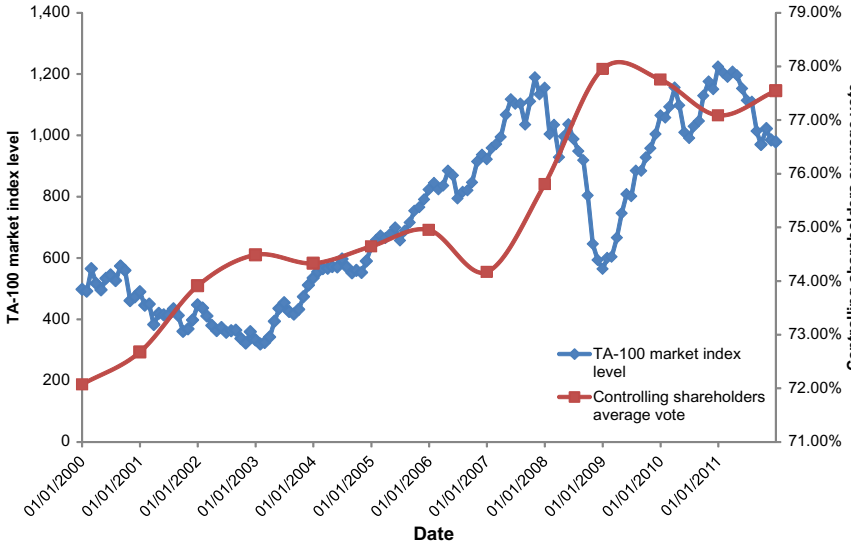

Fig. 1. A Time Series Plot of the Controlling Shareholders' Average Vote (in Our 75 Sample Firms) and of the Tel Aviv-100 Market Index Level. *Notes*: The average vote is measured at the end of every calendar year, while the Tel Aviv-100 Index values are at the end of every calendar month. The sample period is December 31, 1999 through December 31, 2011.

Table 2. Correlation Tests of the Timing Ability of Controlling Shareholders.

	Pearson Correlation			Spearman Correlation			Number of Companies
	Correlation coefficient	*t*-Stat	*p*-Value	Correlation coefficient	*t*-Stat	*p*-Value	
Overall sample	−0.59	−2.28	0.045	−0.76	−3.64	0.005	73−75
Subsample 1	−0.60	−2.34	0.041	−0.71	−3.21	0.009	73
Subsample 2	−0.61	−2.44	0.035	−0.71	−3.22	0.009	72

The table reports correlations between the annual return on the Tel Aviv-100 Index and the annual change in controlling shareholders average vote. The correlations are calculated based on 12 yearly observations (2000−2011). Sample 1 comprises 73−75 publically traded Israeli companies for the entire sample period. This is the study's main sample. Subsample 1 omits two companies that became dually listed during the sample period. (As a result, there are 73 companies for the entire sample period). Subsample 2 further excludes a company that underwent a major debt settlement in 2010.

in the controlling group's holdings, for all the samples we examined. Both the parametric Pearson correlation coefficient (between −0.59 and −0.61) and the nonparametric Spearman correlation coefficient (between −0.71 and −0.76) highlight a relatively strong negative correlation.

Table 2 findings show that the control groups in Israel exploit equity market fluctuations: increase their percentage in equity when the market is down, and decrease their holding percentage when the market is up. In doing so, controlling groups extract profits at the expense of the minority shareholders.

At this point, it is important to note that we cannot prove that the phenomenon of "increasing holdings when stock market prices are relatively cheap and decreasing holdings when stock market prices are relatively high" is planned ahead of time by controlling shareholders. It is possible that this negative correlation is forced upon controlling shareholders – during periods of decline they are often required to assist their firms, that is, to increase their holdings. And, during periods of growth, they (controlling owners) need external equity to expand the firm, thereby diluting their own holdings.

Moreover, all that Table 2 documents is successful "market timing" by the controlling shareholders on average.[8] How can we know, and why should one deduce that this nice market timing ability emanates from inside information about controlling shareholders own firms? It is equally

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conceivable that controlling shareholders are more rational, more experienced, and less myopic than the general public. Hence, in "poor" periods, when the public flees the market, controlling shareholders who have a longer-term perspective and view accumulate shares, and in "good" periods, when the crowd is buying shares enthusiastically and uninhibitedly controlling shareholders decrease holdings. This second contention in defense of controlling shareholders casts the blame on the general public. The public has mental weaknesses and behavioral biases that are exploited by smart traders such as the controlling shareholders. There is nothing unfair about it. It is fair game.

However, it is likely that the inside information about their own firm value helps controlling shareholders in their "contrarian" decisions. They often know when their shares are worth more (less) than market price and are less afraid to buy (sell) their shares during market shortfalls (boom periods). One can ask: If controlling shareholders were just smart traders, why do they invest in their own firm shares and not in the market portfolio? Perhaps they feel more comfortable in investing in their own firms because of the inside information they possess.

In sum, the findings of the correlation tests are consistent with the financial tunneling hypothesis. However, we remain unconvinced, as several other plausible interpretations exist. In the next section, we attempt more direct tests of financial tunneling.

The Relation of Changes in Controlling Shareholders Holdings to Firm's Excess Return

Financial tunneling is attractive for controlling shareholders when they have inside information about their firm that is not yet incorporated in market prices. If controlling shareholders foresee, based on inside information, a "better than expected" next year (hence, positive excess returns in next year), they might increase their holdings this year waiting for the abnormal appreciation next year. This is a financial tunneling act because controlling shareholders increased their holdings at below fair prices (or below full-information prices). A similar argument holds for decreases in controlling shareholders holdings ahead of disappointing or negative excess return years.

Empirically, we restrict our attention to the subsample of 218 large changes (changes of over 1%) in controlling shareholders holdings. This is because as explained in the section "Sample and Data", we expect less noise

and more powerful inference in this subsample. In total, there are 112 large holding increases and 106 large holding decreases in our subsample.[9] For each of the changes, we estimate the excess return in the year before, year of, and year after the change.

When the large holding change precedes a year with a positive excess return, the proportion of holding increases is 0.567, and when it precedes a year with a negative excess return, the proportion of holding increases is 0.471. Holding increases appear 0.096 (about 10%) more frequent before a "good" year of the company shares. The difference in proportions z-statistic is 1.4, implying that the null hypothesis of no relation between current holding changes and future excess returns can be rejected at the 10% significance level against the one-sided alternative that holding increases are more likely before a positive excess return year.

The finding that holding increases are more likely ahead of a positive excess return year is consistent with the financial tunneling hypothesis. However, it is also important to note the raw numbers. In the "ideal" conditions, that is, before a positive excess returns year, the frequency of holding increases (0.567) is close to 0.5 (the expected frequency under the no-relation null hypothesis). Hence, not only is the test z-statistic marginal, the effect itself also appears minute.

On reflection, it is possible that the problems of our sample, mainly the absence of a clear event date, generate our weak results. However, alternatively, it is also possible that controlling shareholders are reluctant to exploit their private information for the purpose of financial tunneling. The reluctance to financially tunnel may be a rational valuation-based controlling shareholder decision. For if financial tunneling is disclosed, controlling shareholder reputation is stained and firm share price declines. Perhaps controlling shareholders in our sample weighed the benefits of financial tunneling against its costs (i.e., against their own wealth loss given the decline in market price upon recognition of financial tunneling), and rationally decided to financially tunnel only rarely.

Our third test of the financial tunneling hypothesis is a variation of the second test. If some changes in controlling shareholders' proportion in firm's equity are motivated by inside information, we should observe positive excess returns on average in the period after controlling shareholders increased their holdings and negative excess returns on average after they decreased it.

Table 3 presents the mean excess returns in the year before, year of, and year after large changes in controlling shareholders holdings. Examining the decreases in controlling shareholders holdings (Panel A), a statistically

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Table 3. Abnormal Returns Around Changes in Controlling Shareholders Holdings.

	Number of Observations	Abnormal Return	*t*-stat
Panel A: Abnormal returns around decreasing transactions			
Preceding year (year $t-1$)	106	1.80%	0.78
Concurrent year (year t)	106	2.95%	1.14
Following year (year $t+1$)	106	−4.75%	−2.10
Panel B: Abnormal returns around increasing transactions			
Preceding year (year $t-1$)	112	−3.03%	−1.33
Concurrent year (year t)	112	1.66%	0.67
Following year (year $t+1$)	112	1.36%	0.56

The table reports the mean abnormal stock returns (AR in short) surrounding changes of more than 1% (in absolute value) in controlling shareholders vote. For each change event we run a monthly market model on the 36 months comprising calendar years $t-1$ through $t+1$ (where year t is the calendar year of the holding change). Monthly AR is defined as the residual of the market model regression, and we compute and present in the table the sum of the monthly ARs in each year. Results are shown for holding decreases and increases separately.

significant negative mean excess return of −4.75% can be observed in the year after large holding decreases. This supports the financial tunneling hypothesis.

However, when we examine the increases in controlling shareholders holdings (Panel B), we find a statistically insignificant mean excess return of 1.36% in the year after the large increases. The sign of this mean excess return is consistent with the financial tunneling hypothesis, yet the lack of statistical significance shows that the subsample of large increases in controlling shareholders holdings only weakly supports the financial tunneling hypothesis. It is possible that the small positive response is due to some contamination in the increased holdings sample. During the sample period, the average holdings of controlling shareholders increased. Thus, some of the "increase holdings" transactions may be benign and did not emanate from inside information.[10,11]

Before concluding, it is also interesting to examine the pre-change stock performance. Financial tunneling appears even more enticing for controlling shareholders when past excess returns on the firm's share are opposite in sign to the future expected excess returns. If next year expected excess returns are positive (negative) and previous-year excess returns are negative (positive), the psychological or behavioral stimulus for financial tunneling appears relatively strong.[12]

In Table 3, we observe that in the year before holding increases the mean excess return is negative (−3.03%) and in the year before holding decreases the mean excess return is positive (1.80%). Consistently with the above behavioral bias conjecture, controlling shareholders decrease their holdings after abnormal advances in their firm's share price and increase their holdings after their share price lags behind. However, both pre-change years' excess returns are statistically insignificant, preventing us from any meaningful inference on the behavioral bias conjecture.

SUMMARY AND CONCLUSIONS

We examine changes in controlling shareholders proportion in their firms, trying to unveil evidence of financial tunneling (unfair wealth transfer from public investors to controlling shareholders via financial transactions). Most of the financial tunneling mechanisms are substitutes; thus the aggregate change in controlling shareholders holdings may capture best financial tunneling maneuvers. We are the first to examine the total change in controlling shareholders holdings as a possible manifestation of financial tunneling.

Using a sample of yearly data during 2000−2011 on 75 large companies in Israel, an economy dominated by closely held firms, we document evidence consistent with the existence of financial tunneling. Our evidence comprises three tests. In the first test, we find a significant negative correlation between the general stock market return and the mean change in controlling shareholders proportion in the firm. Controlling shareholders act as contrarians. When the stock market falls, controlling shareholders increase their holdings and when market is on the rise they dilute their holdings.

In the second test, we find that the tendency of controlling shareholders to increase or decrease holdings correlates with their firm share's excess return in the year following the change in holdings. Increases in controlling shareholders' holdings are somewhat more likely before a year of positive excess returns.

Our third test also partially supports the financial tunneling hypothesis. The signs of the mean excess returns in the year after large changes in controlling shareholders' holdings are consistent with the financial tunneling hypothesis; however, statistical significance is achieved in only part of the cases.

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The successful timing abilities of controlling shareholders unveiled in this study provide them profits at the expense of the public, which raises the suspicion that it is an unfair zero-sum game, namely financial tunneling. Controlling shareholders may have exploited their inside information to expropriate wealth from innocent public investors. However, given that our evidence is sometimes statistically insignificant and provides only limited support to the financial tunneling hypothesis, we do not argue that we have shown that financial tunneling is a well-established phenomenon and a major problem.

It is possible that our "weak support" results are due to our sample problems. On the other hand, it is also possible that some controlling shareholders shy away from financial tunneling opportunities because they fear its potential negative impact on firm's reputation, the company share prices, and ultimately on their own (controlling shareholders) wealth value. In such a case, our weak supportive results may be common and recurring in future financial tunneling research as well. Clearly, despite our novel tests and new evidence consistent with financial tunneling, we have not settled the issue. The quest for more extensive tests and more evidence on financial tunneling continues.

NOTES

1. Changes in controlling shareholder holdings are particularly interesting in closely held firms. This is because in these firms there are several other mechanisms besides direct insider trading that may be exploited in financial tunneling attempts. For example, some financial transactions of the firms, such as seasoned equity offers, private placements, rights offering, transactions in Treasury shares and others, may also serve financial tunneling. Thus, it appears that the financial tunneling problem in closely held firms is more challenging than in disperse ownership firms.

2. Examples of studies include Atanasov et al. (2011), Bates, Lemmon, and Linck (2006), Atanasov, Black, Ciccotello, and Gyoshev (2010) (Bulgaria), Baek, Kang, and Lee (2006) (Korea), Bertrand, Mehta, and Mullainathan (2002) (India), Cheung et al. (2006) (Hong Kong), Berkman, Cole, and Fu (2010) (China), and Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008) (multi-country).

3. Financial tunneling has been previously researched in Israel too. Zlicha and Sherbi (2009) address rights issuance on the Tel Aviv Stock Exchange and find that consistent with Wu and Wang (2007)'s model, rights offering leads to a dilution in the minority shareholders' holdings. Interestingly, during periods of declining equity markets, the dilution of the public's holdings is especially large and significant. Hence, consistent with financial tunneling, controlling shareholders tend to increase

their share in the firms via rights issuance especially when their firms trade at cheap prices.

4. These companies traded during the sample period for less than a year.

5. Agis and Lippman became dually listed companies during the sample period.

6. There are six companies that, at least at the beginning of the sample, were dual-class (with controlling shareholders percentage in equity differing from their percentage in vote). In these companies, we add up the voting power achieved by each share class. We also examined the change in the controlling shareholders' equity percentage. The equity percentage results are almost identical to the vote-based results reported hereafter.

7. This debt settlement caused a significant involuntary decrease in the control group's holdings percentage. Therefore, we decided to examine the correlation excluding this company as well.

8. Note, however, that controlling shareholders trade in their own firm shares and not in the market index.

9. During the sample period, controlling shareholders' average holdings increased, hence the fact that we find slightly more increases than decreases is not surprising.

10. Similar results are obtained when we use only changes of at least 2% in controlling shareholders' vote.

11. Other possible reasons for the rather limited success in the third test may be identical to the reasons for the weak support of the financial tunneling hypothesis in our second test – see the above discussion. It is either that our tests are powerless or that controlling shareholders are reluctant to financially tunnel.

12. Note, however, that a rational agent would rely only on future expected excess returns.

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DEVOLUTION OF THE REPUBLICAN MODEL OF ANGLO-AMERICAN CORPORATE GOVERNANCE

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ABSTRACT

Business corporations (and unincorporated joint-stock companies) formed in Britain and the United States in the eighteenth century and the first half of the nineteenth century were lightly regulated by today's standards and, as startups, sold equity directly to investors without the aid of intermediaries, yet they suffered relatively few governance breakdowns. That is because republican government-style checks against the arbitrary power of any group of stakeholders (managers, blockholders, directors) suffused their founding documents (charters/constitutions, articles of agreement, bylaws), raising the expected costs of defalcation above the expected benefits. Over the latter half of the nineteenth century, however, the original checks disintegrated. They were functionally replaced twice, first by financial capitalism a la J. P. Morgan, then by corporate raiders and takeover specialists like KKR, but politicians neutralized the first and managers (and judges) the second, leaving many widely held

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corporations today under the control of CEOs/Board Chairmen who can self-deal with near impunity and have apparent incentives to do so. A return to the precepts of the republican model could help to improve governance outcomes in the future.

Keywords: Corporate governance; history of corporations; theories of governance

JEL classifications: G34; G38; O16

Governance of for-profit, joint-stock corporations began some four centuries ago in the Netherlands (De Jongh, 2011; Gelderblom, de Jong, & Jonker, 2011), but the modern corporate sector, in the sense of corporate domination of important industries like finance, manufacturing, mining, and transportation, is less than two centuries old (Hannah, 1976). Dutch precedents aside (von Nordenflycht, 2011), modern corporations and their governance are largely the products of Anglo-American economic and political thought and jurisprudence (Micklethwait & Wooldridge, 2003). Before the start of the U.S. Civil War in early 1861, thousands of business corporations – many with formal charters, others without – operated in both Britain and her erstwhile mainland North American colonies (Freeman, Pearson, & Taylor, 2012; Wright, 2014). By 1910, active business corporations in the United States numbered in the hundreds of thousands and those in Britain in the tens of thousands; other Anglo-American offshoots, like Canada, also had large numbers of corporations per capita relative to other countries, even wealthy, non-Anglo ones. By the eve of the Great War, in both the United States and Britain, corporate stocks were valued at around 200% of GDP, a figure significantly greater than that of Holland and roughly four times that of Germany or France and six times that of Russia, Japan, or Italy (Hannah, 2015).

Some early Anglo-American corporations were closely held and hence governed much like proprietorships or partnerships but even before the U.S. Civil War, thousands of corporations were each owned by scores, hundreds, and even thousands of stockholders spread across large geographical expanses made even larger, in real terms, by the high cost/low speed of long-distance communication (Wright, 2002c). [Telegraph and railroad networks began to arise in the latter part of the antebellum period but most messages were still sent by post or courier and took days to reach

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their destinations (John, 1995; Pred, 1973).] By 1850, there were over 250,000 shareholders in England alone (Freeman et al., 2012), and many thousands more in Wales, Scotland, Ireland; in America, the "corporation nation," by the Civil War over 100,000 men (and even a few women) had helped to charter one or more corporations, and of course many others had owned shares, including tens of thousands of people in Pennsylvania alone (Wright, 2014).

Like corporations today, early Anglo-American corporations (and unchartered joint-stock companies that asserted corporate powers) confronted the central problem of governance, that is, how to minimize the risk of expropriation of one group of stakeholders by another (Shleifer & Vishny, 1997). In fact, Adam Smith (Smith, 1776) and many others (Freeman et al., 2012; Wright, 2014) opposed the proliferation of corporations on the grounds that employees, managers, and directors too easily expropriated wealth from stockholders and company creditors. Moral hazard, or the proclivity to steal from others, may vary over time, place, and culture (Sylla & Wright, 2004), but was so strong in Britain and America in the seventeenth, eighteenth, and nineteenth centuries that people in both places expended considerable effort trying to thwart it. Britain's Glorious Revolution (1688), the American Revolution (1775–1783), and the movement for the U.S. Constitution (1787–1788) were manifestations of a desire to limit the ability of government to expropriate resources from stakeholders, including sovereign bondholders, residents, and taxpayers (McDonald, 1965; Pincus, 2009). Constitutional, fiscal, judicial, monetary, and political reforms convinced businesspeople (mostly men but a few women) in both places that their property was tolerably well protected from expropriation by governments foreign and domestic as well as from powerful private interests (Irwin & Sylla, 2011; Stasavage, 2003). Confidence in the security of property subsequently induced some businesspeople to increase the scale of their operations in search of market power and economies of scale (Smith, 1776; Wright, 2014).

As their businesses grew, Anglo-American businesspeople increasingly used the corporate form (or the unchartered joint-stock company, as was the norm in Britain until the nineteenth century) to solve problems that arose from increased scale and the concomitant multiplication of business partners. Anglo-American governments allowed corporations and unchartered joint-stock companies to assert the power of perpetual succession, or the ability of the business to continue operations despite changes in ownership, a power not possessed by common-law proprietorships and partnerships, which had to dissolve whenever an owner died or departed. *Ceteris*

paribus, the importance of obtaining perpetual succession increased directly with the number of partners (Hilt & O'Banion, 2009). Monitoring costs also increased in direct proportion to the number of partners, which points to the second advantage of corporations (again, and throughout, including unincorporated joint-stock companies), a rigorous system of governance modeled after recent innovations in political governance (Freeman et al., 2012; Wright, 2014).

In the eighteenth century, important British and American thinkers came to realize that humans were imperfect moral beings inclined to steal from others if the opportunity arose. The key to good political governance, they concluded, was not to attempt to attract "virtuous" leaders but to build institutions that would limit natural human depravity through republican government, especially its system of "checks and balances."[1] Scottish Enlightenment philosopher Hume (1742) argued "that, in contriving any system of government, and fixing the several checks and controls of the constitution, every man ought to be supposed a *knave*." Virginia planter Madison (1788) similarly concluded that "if men were angels, no government would be necessary … In framing a government which is to be administered by men over men, the great difficulty lies in this: you must first enable the government to control the governed; and in the next place oblige it to control itself."

In the United States, the men who created the first national and state political constitutions were among those who formed the first business corporations, and even those businesspeople not directly involved in the creation of constitutions were nevertheless well-versed in republican political theory because it suffused public discourse (Wright, 2002a). That familiarity with governance theory showed in the charters or articles of agreement (actually called constitutions by some), bylaws (akin to statutes), and other founding documents of the corporations they created. The founders of early Anglo-American joint-stock companies conceived of their creations as mini-republics (Freeman et al., 2012) or "bodies politick" in the language of the day (Oxford English Dictionary [OED], 2010). Rather than being primarily monitored from the outside, by government bureaucrats and independent auditors, they were primarily monitored internally by investors (stockholders, but also bondholders and other creditors *in extremis*), directors (elected stockholders), presidents (director-managers), and managers (salaried employees) (Wright, 2004a).

Day-to-day management generally fell to managers, and under them supervisors and foremen. Typically, any employee of responsibility, from bank cashiers to porters, were forbidden to engage in outside business

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activities and bonded at appropriate levels (Freeman et al., 2012; Wright, 2014). The availability and price of performance bonds of course provided important screening information: men with poor reputations had to pay a high price for their bonds or could not obtain one at all. Moreover, performance bond underwriters had incentives to monitor the personal circumstances of the men they bonded because the underwriters were on the hook for the value of the bond if the underwritten employee successfully raided the till. Bonds did not prevent all forms of employee theft but provided some reimbursement in the event of loss. Even more successful was the practice, in place at most banks and many other corporations, of 360 degree monitoring, which was elicited by rewarding employees who snitched on peers, underlings, and superiors (Bodenhorn, 2003). Most early corporations, when confronted with the potential cost efficiency of combining management positions, erred on the side of caution and refused to unite the offices for fear of reducing the quantity and quality of employee monitoring activities (Wright, 2014). In the United States, many corporations also paid what today are called efficiency wages (Campbell, 1993).

While employees continually monitored each other, directors monitored managerial activities on a weekly, bi-weekly, or monthly basis and provided them with strategic direction. (In fact, early observers often called the board of directors collectively "the direction," much as we today call managers collectively "the management.") Early corporate directors were independent in the sense that they were not salaried employees but rather stockholders. Aside perhaps from a per diem to cover the cost of attending meetings or a bonus for extraordinary effort, their remuneration came in the form of higher profitability. Directors tended to be substantial stockholders, especially in banks (Bodenhorn & White, 2014) but also in many manufacturers (Hilt, 2014) and other industries. Stockholders often pushed directors to invest much of their personal net worth in the company so that they would suffer great loss if they failed to monitor management sufficiently closely. Typically, the board of directors hired and fired managers and established their compensation, often subject to stockholder approval (Freeman et al., 2012; Wright, 2014).

The only common exception to the strict separation of directors from managers was the president, a director selected by the board (or sometimes directly elected by stockholders) to attend to business matters on a daily basis. Presidents were typically substantial stockholders but they also received a salary to compensate them for the considerable amount of time they spent monitoring employees. Directors fixed the compensation of the president, subject to stockholder approval, and they were rarely

extravagant. In fact, stockholders often nixed proposed presidential pay raises, paid important managers more than they paid presidents, and even cut presidential salaries in troubled times. The president was undoubtedly the most powerful position in the early Anglo-American corporation but his power was far from absolute. The board of directors could depose him and stockholders could vote him off the board and even regulate his outside business activities. His power waxed as he gained control of more shares but in direct proportion to his incentive to see the corporation thrive. Expropriation of shareholder wealth by presidents usually entailed finagling a board of directors comprised of shills, men beholden to the president, and with little at stake in the company (Freeman et al., 2012; Wright, 2014).

Early on, however, creating a shill board was no easy task because presidents did not control the proxy or election mechanisms. Stockholders controlled elections and elected directors based on voting rules. Elections could be contested, especially if a director was derelict of duty or the company (usually an American one) showed signs of distress, but they seldom were (Freeman et al., 2012; Wright, 2014). Scholars like Dunlavy (2004) imagined that early joint-stock corporations were akin to "democracies" but analysis of bylaws established that relatively few allowed one vote per shareholder, as she claimed. Instead, stockholders cast votes based on various formulas ranging from one vote per every two or more shares, to one vote per share capped at some limit, to one vote per share without limit (Freeman et al., 2012; Wright, 2014). Uncapped one vote per share voting rules became the standard by the mid-nineteenth century because the more restrictive formulas could be easily circumvented by assigning nominal ownership of shares to relatives, friends, neighbors, and other shills (Ratner, 1970; Rodrigues, 2006).

Board size was an important consideration. Big boards suffered from free-rider problems and a lack of individual accountability, but more board members meant more information and business connections on which the corporation could draw. Bigger boards were also more difficult for large stockholders or managers to control or co-opt. Board size therefore varied from company to company and industry to industry, with more directors serving British insurers, canals, and railways than manufacturers or gas or water utilities (Freeman et al., 2012; Wright, 2014).

Length of directors' terms was also important. Many corporations held annual elections for the entire board but others lengthened terms and staggered elections to prevent rapid takeovers. Terms of five years were not uncommon in large British companies but on both sides of the Atlantic, a

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director could be recalled before the end of his term for selling his stock, taking a directorship in another company, developing another conflict of interest, or just general bad behavior. Some corporations also imposed term limitations (Freeman et al., 2012; Wright, 2014).

At regularly scheduled meetings or special ones they called to attend to pressing issues, stockholders also voted on issues of importance, including amending the corporate charter, bylaws, or articles of agreement, or implementing major business projects like new branches, equipment, policy forms, or routes. Stockholders also controlled the corporation's capital structure by authorizing or rejecting increases in equity capital and corporate borrowing. Managers, directors, and the government all acknowledged that *stockholders owned the business and could dispose of it as they collectively saw fit*, per their voting rules. That meant that stockholders could tell managers what to do and what not to do. Stockholders also enjoyed selective information disclosure, meaning they could view and even audit the company's books and its physical assets and, at their own expense, direct outside experts to assess managers' plans. The mere threat of such stockholder activism was often sufficient to induce managers to share information with stockholders freely and to avoid implementation of controversial projects. In addition, if a corporation defaulted, bondholders automatically gained governance rights to ensure that their interests were represented, in which case they too became active monitors of both the management and the direction (Freeman et al., 2012; Wright, 2004a, 2014).

Early corporate bylaws contained checks against fraud designed to fill gaps in corporate charters by mandating details like where money was to be kept, who had access to it and how, who could examine the corporation's books and physical infrastructure, how records were to be kept, how many directors were needed to constitute a quorum, and when, where, and how stockholder meetings and corporation elections would be held. Good bylaws were widely copied and long-lived. The Farmers Bank of Bucks County's 32 bylaws of 1815, for example, became "best practices" and numerous banks operated under them, without significant loss, for a century or more. For gaslight companies, an early type of energy utility, the bylaws of engineer consultant John Jeffrey were widely used in the U.S. South and even abroad (Wright, 2014).

On both sides of the Atlantic, governments rarely interceded in corporate affairs except when called upon to protect the interests of investors. That meant that the quantity and quality of corporate financial statements available to the public was low (Banner, 1998). Significant amounts of trading in corporate securities took place nonetheless (Wright, 2002c, 2008),

domestically as well as internationally (Sylla, Wilson, Wright, 2006), because investors had access to two sources of good information, insider trades (Tighe & Michener, 1994) and dividend history. (Taxes were negligible and the need for reserves minimal, so profits were typically distributed to stockholders in the form of cash on a semiannual basis.) Both insider trades and dividends could be manipulated but typically only at a high cost (especially compared to accounting trickery today), so they were not regularly used to expropriate resources from investors.

Stockholders who could not find satisfaction within a corporation's governance structure could call on government to intercede when appropriate. Under the doctrine of *ultra vires*, Anglo-American governments could regulate a company they incorporated to the point of revoking its charter via the common-law writ of *quo warranto* if the corporation strayed beyond the activities listed in its charter. "No general capacity to act at discretion in pursuit of other objects, can be implied from the grant of corporate powers even in general terms" (Williams & Wall, 1835), so, for example, a turnpike company that wished to convert to a railroad had to obtain the assent of both the government and its stockholders before converting (Hovenkamp, 1991).

The republican model of corporate governance sought to raise the costs of expropriation above the expected benefits and in that was generally successful. Nevertheless, knaves and un-angelic men occasionally perpetrated frauds and were able to expropriate resources from various stakeholders. Almost invariably, successful corporate thieves exploited weaknesses in the governance structure of particular corporations, like the failure to mandate co-signed checks or to install a vault with a double simultaneous key lock mechanism, rather than exposing weaknesses in the republican theory of governance. Other fraudsters were caught *in flagrante delicto*, suggesting that the checks in place were sufficient to prevent defalcation but insufficient to prevent attempted theft in all circumstances (Hilt, 2009; Wright, 2014).

Most early corporations, however, did not suffer serious governance ruptures. If they failed, it was because they proved insufficiently efficient in the face of competition, not because small stockholders encouraged excessive risk taking, large stockholders tunneled into assets (Johnson, LaPorta, Lopez-de-Silanes, & Shliefer, 2000), or managers engaged in any of the myriad techniques of shirking or self-dealing (Black, 2001). In fact, investors in early Anglo-American corporations had such confidence in the republican governance model that they regularly bought shares issued by *start up* companies *without* the aid of an investment bank or other

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intermediary, an event that almost never happens today[2] and that seems theoretically improbable (Baskin & Miranti, 1997). The key was that newly issued shares could be paid for in installments and abandoned almost at will, which turned them into de facto options. Well-governed companies called in their capital in short order while others saw their stream of equity investment dry up in direct proportion to managerial incompetence or governance flaws (Freeman et al., 2012; Wright, 2014).

After the U.S. Civil War, the republican model deteriorated as multiple governance checks were lost. The problem was not so much that ownership (stockholders) and control (management) diverged a la Berle and Means (1991) – ownership and management had separated at most corporations long before (Freeman et al., 2012; Hilt, 2008, 2014) – as that stockholders could no longer keep managers in line as easily or cheaply as they once had because they came to be seen (with some justification) as passive investors instead of owners, the *ultra vires* doctrine was pilloried as providing corporations with insufficient flexibility to respond to changing market conditions,[3] and managers came to control proxies, elections, and even stockholder meetings (Freeman et al., 2012; Wright, 2014).

Part of the problem was that as corporations got bigger, their stockholders became even more numerous and dispersed, which rendered it increasingly costly to mount effective campaigns against managerial overreach at the same time that each stockholder had more incentive to free ride (Freeman et al., 2012). Another problem was that the key conceit of the republican model of political as well as corporate governance checks against arbitrary power, gave way to the naïve notion that voting alone sufficed to minimize resource expropriation. After it became clear that corporate elections had turned farcical, defenders of the new status quo argued that liquid securities markets across both nations (Michie, 1999; Wright, 2002c) rendered republican checks unnecessary because stock and bondholders could, and indeed wanted to, simply "vote with their feet" by selling the securities of corporations they believed to be ill-governed or poorly managed. They were right, but only to the extent that potential investors could procure accurate information, a dim prospect for outsiders and small stockholders given the era's perspective on information disclosure (selective rather than full public) and the concomitant erosion of stockholder monitoring rights (Banner, 1998; Wright, 2014). Increasingly, companies used "complicated systems of book-keeping" that, "though not technically fraudulent" were nonetheless "misleading and deceptive" to outsiders (Wood, 1889).

By the late nineteenth century, the republican model of governance was largely a dead letter. Checks must be exercised if they are to be effective and increasingly stockholders were unable or unwilling to wield them, which allowed managers to dismantle them, not all at once in every company but at different times and rates as the circumstances of specific corporations allowed (Freeman et al., 2012; Wright, 2014). Thereafter, investors in both America and Britain protected themselves by looking to investment bankers with rock solid reputations, like J. P. Morgan, for guidance on which securities to buy and which to eschew. Morgan and other top bracket investment bankers ensured that their clients did not get taken, essentially acting as information intermediaries that monitored corporate management on behalf of investors in exchange for sundry fees (Chernow, 1990). That entailed placing "Morgan men" (investment bankers) on the boards of corporations that issued securities that Morgan (other investment banks) underwrote. The system, called "finance capitalism," aroused the suspicion of the public and the ire of some politicians because it created the appearance that Morgan and other big investment bankers controlled vast swathes of the economy. In practice, financial capitalism worked tolerably well precisely because it entailed monitoring and effective enforcement mechanisms (access to sources of external finance), *not* control (DeLong, 1991). Nevertheless, policymakers in both America and the United Kingdom dismantled financial capitalism in the interwar period, replacing it with state and national securities laws and other external controls (Baskin & Miranti, 1997; Cheffins, 2008; Roe, 1994).

During and after World War II, a buoyant economy and high profits hid governance weaknesses at many large companies in both the United States and the United Kingdom (Galbraith, 1971), but rumblings could be heard in the marked increase of "offensive" stockholder actions in the 1940s and the buyout actions of the so-called "white sharks" of the 1950s (Armour & Cheffins, 2011; Cheffins, 2008). When globalization began to take its toll on U.S. and U.K. corporate profits in the 1970s and 1980s, corporate raiders like Carl Icahn and leveraged buyout firms, like KKR, disciplined inefficient or self-dealing managers by making credible threats to buy control of their companies. Here, disgruntled stockholders made a difference by selling out (Giannetti & Simonov, 2006), which depressed stock prices until well-heeled or well-financed outsiders became well-assured of turning a profit by taking over troubled companies and disciplining, monitoring, and/or replacing management (Baker & Smith, 1998).

By the early 1990s, managers in both the United States and United Kingdom (Jenkinson & Mayer, 1992) had responded to this "market for

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corporate control" by vilifying takeover artists and developing poison pills and other governance mechanisms designed to keep them ensconced in power (Skeel, 2005). As a result, managers at large, publicly traded corporations again gained the upper hand (Wise, 2013). With the market for corporate control effectively stymied (Davis, 1991) at many corporations (Masulis, Wang, & Xie, 2007) and well-diversified investors little interested in specific acts of corporate malfeasance (Kahan & Rock, 2007), managers faced little resistance in the 1990s and 2000s when they began to self-deal via huge bonuses, backdated stock options, and golden parachutes (Bebchuk & Fried, 2004). Two major waves of corporate malfeasance, the accounting scandals at Enron and elsewhere early in the new millennium (Wise, 2013), and the massive risk taking by financial institutions that blew up in 2008, were both rooted in managerial self-dealing in the form of "I win, I win" management contracts (Carpenter, Cooley & Walter, 2011; Prins, 2011). A similar devolution occurred in Britain (Wise, 2013).

None of this is to say, of course, that all corporate managers will behave badly. Some are what republican theorists called "virtuous," meaning that they do not exploit governance weaknesses for self-gain and instead promote stewardship (long term viability) over mere (short-term) profit (Taft & Ellis, 2012). Examples include the presidents of mutual life insurance giant Guardian (Wright, 2004b) and the leaders of numerous large bank holding companies (Wright & Sylla, 2015), including BB&T (Allison, 2013). Of course, as described above, one of the main tenets of republican theory was that not all leaders are virtuous. If endowed with dictatorial powers, many leaders become "stationary bandits" and their behaviors can be modeled as such. In the classic treatment (Hillman, 2004), rational stationary bandits with long time horizons try to maximize the value of their domain (e.g., corporation) in order to maximize their own lifetime income, leading to a happy outcome for stockholders.

As explained by Goldberg and Milchtaich (2013), however, the real world is not so simple. Their model pits a dictator (CEO) against an asset owner (stockholder) who interact over several or many periods and may have different discount rates. In each period, the dictator can either invest in the business or confiscate it and stockholders can either accept the investment or not, but they cannot resist confiscation. The equilibrium with an open horizon (i.e., the passage of periods does not shorten the ruler's length of rule) is similar to that of Hillman. With a closed horizon (i.e., the number of periods cannot exceed some known constraint), by contrast, the equilibrium strategy for the CEO is to seize stockholder assets as soon as possible. One implication of the model is that corporate governance would

be improved if the position of CEO was made hereditary (and hence open horizon) but a more efficient and equitable solution would be to render expropriation by CEOs prohibitively expense by endowing stockholders with the power to resist confiscation.

Two scholars with presumably Dickensian surnames, Wise (2013) and Wright (2014), have recently argued that Anglo-American corporate governance could be improved through the imposition/re-imposition of checks against what the former termed the "dictatorial, military … authoritarian nature" of today's corporate managers, especially CEOs. Reforms from Sarbanes-Oxley to Dodd-Frank have not addressed the key problem with contemporary governance, the fact that management's power at many corporations is virtually unchecked, internally or externally. Of course variations in governance exist because Anglo-American governments do not mandate many of the details. As one would expect if the republican theory of governance is superior to other, later theories of governance, corporations with the strongest shareholder rights, that is, those with the most republican governance systems, perform better than those with the weakest rights (Gompers, Ishii, & Metrick, 2003).

Wise thinks that the United Kingdom and Germany can provide policymakers with ideas about the best checks to implement, while Wright argues that corporate America's own past practices could provide the best insights. Both agree that the goal is not to empower stockholders to run corporations but rather to provide them with tools adequate to protect their interests from managerial self-dealing and blockholder expropriation.

German corporations, for example, are led by two boards, one of which is composed entirely of non-managers (Wise, 2013). While a "bicameral" board accords well with Anglo-American political governance traditions (Lords/Commons; Senate/House), it may be too radical a departure for British and U.S. corporations, which have traditionally gotten by with a unitary or "unicameral" board and, when necessary, subcommittees (Freeman et al., 2012). What might make the most sense, then, is to retain the one board structure but to ensure that it is composed mostly, if not entirely, of "outside," "independent," or even "dissident" directors, men and women who are in no way beholden to management, especially on the audit committee. That would entail reformation of corporate elections so that management no longer controlled or event influenced them (Wright, 2014).

The German system also entails a large role for banks and other intermediaries which would entail, in the United States, a return to *fin de siècle* "financial capitalism." In other words, large investment funds that

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presumably have the expertise and incentive to monitor management, including hedge, mutual, and pension funds, would take the lead role in corporate governance, a la TIAA-CREF (TIAA-CREF, 2011) and some hedge funds. Legal reforms (Kahan & Rock, 2007) and cultural changes would be necessary, however, before most intermediaries could become effective monitors of management on behalf of individual investors (Macey, 2008).

It would be foolish to replicate early corporate charters and bylaws and expect them to work today, but it would be equally foolish to ignore the reasons underlying why those early corporate founding documents were so successful at limiting corporate governance scandals in an environment characterized by minimal external regulation. The key to improving corporate governance today, and in the future, is to find new checks against knavish and un-angelic behavior on the part of managers and blockholders.

NOTES

1. Note that small r republican should not be confused with America's current Republican party. Proponents of a republican form of government sought to balance the power of major stakeholders, including the monarch, landed aristocracy (House of Lords), and commoners (House of Commons) in Britain, and the president, the states (Senate), and citizens (House of Representatives) in the United States.
2. In the last few decades, some companies have issued shares directly to the public but they almost invariably had operating histories (Wright, 2002b).
3. Had the *ultra vires* doctrine been in force after World War II, the failure of many conglomerates tenuously glued together by empire building managers might have been prevented because they would not have been formed in the first place (Baker & Smith, 1998).

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TOWARD A BETTER MEASURE OF BANK CORPORATE GOVERNANCE

James E. McNulty and Aigbe Akhigbe

ABSTRACT

Directors help determine the strategic direction of a corporation and are responsible for ensuring the institution has a good system of internal control. Banking institutions without a strategic direction emphasizing sound lending practices that promote the long-run financial health and viability of the institution will be sued more frequently than peer institutions. Institutions that do not have a good system of internal control will also be sued more frequently. Hence, legal expense is a bank corporate governance measure. We compare the performance of bank legal expense and a widely cited corporate governance index in a regression framework to determine which better predicts bank performance. The regressions indicate legal expense is a much better predictor, hence a better measure of bank corporate governance. Regulators should require legal expense reporting and rank institutions by the ratio of legal expense to assets to help identify institutions with weak

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governance. Seven case studies illustrate the role of legal expense in corporate governance.

Keywords: Bank corporate governance; bank litigation; bank performance; internal control

JEL classifications: G21; G28; G34; G38

INTRODUCTION

Boards of directors are responsible for determining the strategic direction of a corporation (Adams, Hermalin, & Weisbach, 2010) and for ensuring the institution has a good system of internal control (e.g., Rezaee, 2009).[1] During the 2007–2008 US financial crisis, large institutions such as Countrywide, National City Corporation (NCC) and Washington Mutual, and many smaller institutions, failed because of aggressive lending practices and a weak system of internal control. Hence, corporate governance of commercial banks has emerged as a very significant research and regulatory issue in the aftermath of the crisis. Recent empirical research confirms the importance of governance – bank holding companies (BHCs) with better corporate governance had higher profitability and less real estate loan losses during the crisis (Peni, Smith, & Vahamaa, 2013; Peni & Vahamaa, 2012).

But there are important aspects of corporate governance of commercial banks *not* captured by existing corporate governance data. The index used as the primary corporate governance measure in Peni and Vahamaa (2012), and for a robustness test in the other study, is Brown and Caylor's (2006, 2009) very widely cited and widely used index.[2] The data covers 3,258 firms for 2005 and a slightly smaller number of firms for earlier years and are based on 51 components from Institutional Shareholder Services (ISS). In the Brown and Caylor corporate governance index, NCC (once one of the ten largest BHCs in the United States) ranks *first* among the 3,258 firms for 2005, with an index of 44. The average value of the index, as computed by the authors of the current paper, is 28.8.[3] This index thus suggests that NCC had the *best corporate governance of any firm in the United States* in the pre-crisis period 2003 through 2005. Brown and Caylor do not construct an index for 2006. In contrast, along with Countrywide, NCC was an aggressive, high-risk mortgage lender, and one of the first firms to experience serious financial problems at the early stages of the financial crisis because of very large losses on mortgages. NCC effectively failed in

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2008 and had to be merged with PNC Bank. NCC ranks second among 15 large BHCs in the ratio of our legal expense proxy to assets. (The legal expense proxy is described in the section titled "Legal Expense Proxy and Rankings"; the rankings are shown in Table 1.)

Wachovia also ranks very high by Brown and Caylor (2006, 2009) with an index of 34. An examination of Wachovia's litigation pattern in the pre-crisis period reveals several alleged breaches of contract involving small business loans during bank mergers, profitable arrangements with telemarketers who stole millions of dollars from depositors' accounts, resulting in a US Department of Justice investigation and a $178 million settlement, a major money laundering investigation, and large checks cashed without

Table 1. Ranking of Fifteen Large Commercial Bank Holding Companies by Legal Expense Proxy[a]/Assets.

Rank 2006	Symbol	Bank Holding Company	Litigation Expense Proxy 2006	Rank 2005	Rank 2004	Rank 2003	Rank 2002
1	JPM	JP Morgan Chase	.00329	1	1	1	1
2	NCC	National City	.00251	2	2	2	2
3	WFC	Wells Fargo	.00195	3	3	3	N/A
4	KEY	Key Bank	.00145	4	4	4	5
5	UB	Union Bank of California	.00121	6	7	9	4
6	CFC	Countrywide Financial	.00120	8[b]	9	7	6
7	WB	Wachovia	.00112	5	5	5[b]	3
8	BBT	Branch Banking and Trust	.00099	7	11	11	8
9	USB	US Bancorp	.00091	10	10	12	13
10	ZION	Zions Bancorporation	.00085	8[b]	6	8	7
11	BAC	Bank of America	.00074	11	14	5[b]	10
12	RF	Regions Financial	.00068	15	8	10	9
13	WM	Washington Mutual	.00066	13	12[b]	13	12
14	STI	Sun Trust Banks	.00062	12	12[b]	14	11
15	FITB	Fifth Third	.00028	14	15	N/A	N/A

N/A – Not available because auditing, consulting, and legal expenses are not reported separately by this particular BHC in this particular year.

[a]This is a legal expense proxy generally consisting of consulting, auditing and legal expense in the Annual 10K reports.

[b]Tied ranking.

proper signatures. Wachovia also failed in 2008 and was merged with Wells Fargo.[4]

Other highly ranked institutions failed in a similar fashion. Washington Mutual also has an index of 34 for 2005.[5] The regulatory lapses and corporate misdeeds that led to that institution's collapse were the subject of extensive Congressional hearings in April 2010. A US Senate review concluded that Washington Mutual and its subsidiary, Long Beach Mortgage, "polluted the financial system" with bad loans (Mollenkamp & Ng, 2010, p. C1). Indy Mac, another institution that failed because of extremely aggressive lending practices, has an index of 37. Brown and Caylor (2006) do not provide an index for Countrywide (a case we discuss below). Aggressive, high-risk lenders such as Countrywide were sued by community groups, state attorney generals, and individuals much more often than other institutions in the period prior to the crisis and hence had higher legal expense.

We advance a very simple proposition – *commercial banks that are sued repeatedly for the same reason have weaknesses in both strategic direction and internal control and hence do not have good corporate governance*. We develop a legal expense proxy that should be as good as, or superior to, Brown and Caylor's widely used index. The hand-collected index is compiled from data on noninterest expense from BHC 10K reports for the same period used by Brown and Caylor, that is, 2003 through 2005. *Hence, our fundamental Research Question is: Does our legal expense proxy predict commercial bank performance, loan losses, and stock returns as well as or better than the Brown and Caylor index?* We find that legal expense performs *better in all cases* that we examine. Legal expense has the correct sign and a higher level of statistical significance than the Brown and Caylor index in *each of the eight ordinary least squares regression equations* in which loan losses and other measures of bank performance are dependent variables. Corporate governance reflects the institutional culture and hence changes slowly (e.g., Adams et al., 2010). Thus, while our data only cover a three-year period to be consistent with these other studies, these data are reasonably representative of practices at banks in the important period leading up to the crisis.

Our results are consistent with the findings of Peni and Vahamaa (2012) and Peni et al. (2013) since a high *Governance score* is associated with better bank performance by some measures. But our results are also consistent with Adams and Mehran's (2003) finding that *bank corporate governance is different*. Our research raises another question *relevant to all corporate governance research*: *How can researchers construct better corporate governance*

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measures? Bank legal expense is a *continuous variable* focusing on the *results* of the governance process in terms of both strategic direction and internal control. Brown and Caylor (2006, 2009) and other researchers use a binary approach, coding various governance factors as zero for unacceptable and one for acceptable; the index is the total number of acceptable factors. We find that this approach does not work as well for commercial banks as our alternative index.

Federal regulators emphasize the importance of bank corporate governance. For example, considering just the Federal Reserve Board, a search of their website in April 2015 by one of the authors reveals at least 18 presentations on corporate governance by members of the Board of Governors since 2002 (see federalreserve.gov). In fact, a recent presentation by Governor Tarullo (2014) stresses the relation between governance and risk management that is also the theme of this paper. But regulators do *not* require that legal expense be reported on call reports, the balance sheet, and income statements that banks are required to submit each quarter. Legal expense is *a measure of the ethical climate within the institution*, a matter which is vitally important for effective corporate governance. If a bank is sued repeatedly for the same reason, say predatory lending, abusive mortgage servicing, or weaknesses in internal control, this should be reflected in legal expense consistently higher than peer banks. The existing regulatory system thus fails to use *data that banks could easily supply* from their income statements to help identify institutions with serious deviations from other institutions in the adequacy of, and compliance with, internal policies and procedures and norms for acceptable banking practice. Such data would inform directors, investors, and regulators about the corporate environment.

Adams et al. (2010) point out that corporate governance is complex because each corporation is different; optimal corporate governance for one institution may not be optimal for another of the same size. For this reason, we suggest that a fruitful approach to bank corporate governance research would be to combine case study evidence with empirical analysis. *Our case studies reveal the way excessive bank litigation reveals weaknesses in bank corporate governance*. Brickley, Smith, and Zimmerman (2002) argue that the ethical climate of the firm is of fundamental importance. To illustrate, many banks that avoided predatory lending prior to the crisis survived the crisis. As one example of better corporate governance, BB&T's Allison (2009) describes why that institution avoided high-risk mortgage lending. Managers considered the profits that such a lending strategy might produce as temporary, and the potential damage to their

consumers as harmful to the long-run health and reputation of the institution. Institutions that have other weakness in their operations that damage consumers, such as a failure to check signatures on checks, or a failure to handle consumer electronic funds transfers in a secure manner, are also sued more frequently than others. There are numerous examples of such cases, such as *Crescent City v. Bank of America* (2009), *Schadans v. Bank of America* (2006), *Faloney v. Wachovia* (2006), *Palm Beach Business Services v. Wachovia* (2006), *Rancy/Estate of Malbranche v. Wachovia* (2008), and *USA v. Payments Processing Center* (2006).[6]

Legal expense, which includes the expense of litigation against the bank, is included in "other noninterest expense" on the call report; it is not required to be reported separately by a bank unless the amount reaches a threshold that virtually all institutions never reach – one percent of total interest and noninterest income. Because federal regulators do not require reporting of legal expense as a separate item, bank directors do not receive reports showing how the legal expense of their bank compares with peer banks. The space for reporting is already on the call report but institutions are permitted to leave it blank.

Regulators should collect these data on the call reports and simply rank institutions by the ratio of legal expense/assets to identify institutions that are sued most frequently. Boards of directors of such institutions would then have critical information to use to raise questions about the strategic direction and internal control.[7] Our case studies and legal expense rankings develop this point in detail. A related theme is learning from litigation. Officers (especially compliance officers) and directors can learn about weaknesses in the organization through litigation against the bank. We develop this theme in our literature review.

High legal expense relative to peer banks is simply a red flag that tells regulators and directors if the institution in question deserves greater scrutiny. It should be emphasized that legal expense data cannot be used in isolation. The *pattern of litigation* against the firm needs to be analyzed in detail, as some of the case studies illustrate. The initial focus should be financial firms that are sued repeatedly *for the same reasons*.

The issues raised here are important both in academic research and in the actual regulatory oversight of banks. For example, *The Wall Street Journal* recently reported that in some cases regulators are sitting in on bank board of directors' meetings and asking questions of directors at these meetings. There is an even more controversial practice aimed at influencing corporate governance – in some of these cases federal regulators are attempting to influence the composition of the board (McGrane &

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Hilsenrath, 2015). It is possible that with better corporate governance measures, such as legal expense reported regularly and disclosed publically, regulators could refrain from such direct intervention in corporate governance and instead focus on results. Given the right information, directors may be able to make better decisions about the strategic direction of the organization and the system of internal control.

This introduction is followed by a literature review on corporate governance and also learning from litigation. Section "Lessons from Bank Cases" presents seven brief case studies. Section "Legal Expense Proxy and Rankings" describes the litigation expense proxy and presents rankings of fifteen large BHCs for 2002 through 2006. Section "Regression Equations and Their Rationale" presents the regression framework we use to compare the performance of our litigation expense proxy with that of the Brown and Caylor *Governance Score* index. The section "Data Sources" describes the data, section "Descriptive Statistics and Regression Results" presents descriptive statistics and the empirical results, and the last section concludes.

LITERATURE REVIEW: BANK CORPORATE GOVERNANCE IN THE AFTERMATH OF THE CRISIS AND LEARNING FROM LITIGATION

Corporate Governance

A comprehensive summary of recent corporate governance literature, Adams et al. (2010), reports corporate boards are the focus of serious scrutiny because of the governance scandals of the early 2000s, such as Enron and Worldcom. In these two cases alone, directors paid out of pocket (i.e., the amounts not covered by insurance) $31 million to resolve claims of their liability for the fraud involved. In addition, as of August 8, 2013, there were 76 lawsuits brought by the Federal Deposit Insurance Corporation (FDIC) against officers and directors of banks that failed during the 2007−2008 US financial crisis, and more lawsuits are expected after that date. The FDIC damages claims range from $3 million to $600 million, while the estimated cost of the bank failures in these 76 cases is $33.2 billion (Cornerstone Research, 2013).

Based on surveys of board members about what they consider their most important responsibilities, Adams et al. (2010) report that one of the

main functions of boards of directors is "setting the strategic direction of the company" (p. 64). In one survey, two thirds of directors agreed that was one of the functions they performed and 80% agreed they were "involved in setting strategy for the company" (p. 64). More directors agreed with that description of their duties than the description "overseeing, monitoring top management, CEO" (p. 64).

Research on corporate governance should consider the point that firms are complex. Adams et al. (2010) discuss this point:

> A further issue is that corporations are complex, yet, to have any traction, a model must abstract away from many features of real-world corporations. This makes it difficult to understand the complex and multifaceted solutions firms use to solve their governance problems. For instance, the optimal governance structure might involve a certain type of board, operating in a certain fashion, having implemented a particular incentive package, and responding in certain ways to feedback from the relevant product and capital markets. To include all of those features in a model is infeasible, but can we expect the assumption of ceteris paribus with respect to the nonmodeled aspects of the situation to be reasonable? The constrained answer arrived at by holding all else constant need not represent the unconstrained answer accurately.
>
> Yet another point, related both to previous point and to our emphasis on issues of endogeneity, is that, motivated by both a desire to simplify and to conform to institutional details, the modeler is often tempted to take certain aspects of the governance structure as given. The problem with this is that the governance structure is largely *endogenous;* it is, in its entirety, the solution reached by economic actors to their governance problems. (p. 62)

We consider this point in our empirical analysis by presenting both case study and empirical evidence. The case studies reveal the way excessive bank litigation reveals weaknesses in bank corporate governance.

An international conference of prominent current and former regulators, individuals from international financial institutions, major accounting and law firms, academia, and research institutions developed needed improvements in the corporate governance of financial institutions in the aftermath of the crisis (Institute of International Finance, 2009). Participants considered directors of financial institutions partly responsible for the crisis, and focused on limitations in directors' training, experience, and competence. Participants raised questions as to whether some directors understand how the complex financial industry operates. Views expressed included the need for boards of directors to meet higher expectations, to assume more responsibility and oversight, and to ask the right questions. Directors need to understand the difference between the forest of the overall risk exposure of the bank and the trees of day-to-day transactions and risk measurement. One view expressed was *the responsibility of directors to society as a whole, a*

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notion of a "moral capacity" that can be traced to Adam Smith. Gup (2007) presents a large number of examples of how weaknesses in corporate governance led to banking failures.[8] He quotes federal regulators on the lack of transparency in corporate governance at some institutions and the importance of an ethical approach. We return to the issue of transparency below.

Rezaee (2009) provides a comprehensive integration of corporate governance and ethics. He defines corporate governance as "a field in economics that investigates how to motivate management of corporations by the use of incentive mechanisms such as contracts, organizational design, and legislation" (p. 29). Corporate governance and ethics are closely related:

> Ethics in business assumes an important underlying postulate that the majority of the business leaders, managers and other personnel are honest and ethical in conducting their business and the minority who engage in unethical conduct will not prevail in the long term. Thus, the corporate culture and compliance rules should provide incentives and opportunities for ethical individuals to maintain their honesty and integrity and provide measures for the minority of unethical individuals to be monitored, punished and corrected for their unethical conduct. Companies should promote a spirit of integrity that goes beyond compliance to the letter of the law by creating a business culture of doing what is right. (p.20)

Rezaee notes that in theory well-governed companies should perform better than poorly governed companies. These advantages include a lower cost of equity capital because of the perception that there is less agency risk to shareholders, as well as lower systematic risk and lower idiosyncratic risk. As a result, at least eight corporate governance reporting agencies (some of which have only emerged in the past dozen years) evaluate corporate governance practices and reporting, and provide information to shareholders. These include ISS, the Council of Institutional Investors, and The Corporate Library.[9] Rezaee discusses weaknesses in bank corporate governance specifically in connection with the commercial bank and savings and loan failures of the 1980s and the resulting Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA). A General Accounting Office (1991) study of the corporate governance failures of the 1980s was one input to Congressional passage of FDICIA. The results of a number of empirical studies discussed by Rezaee (2009) are consistent with this theoretical notion.

> Prior research finds companies with higher corporate governance ratings/indexes outperform those with lower ratings as measured by stock returns. Other studies find that firms with higher corporate ratings have [a] lower cost of equity capital because of the lower agency risk to shareholders, lower systematic risk and lower idiosyncratic risk. (Rezaee, pp. 50–53)

Several studies not cited by Rezaee (2009) confirm the importance of transparency. Diamond and Verrecchia (1991) construct a theoretical model showing that reducing asymmetric information by revealing information to the public reduces a firm's cost of capital. Large investors are more likely to purchase the transparent firm's securities and these securities thus have increased liquidity. Baumann and Nier (2004) and Nier and Baumann (2006) apply this notion to the banking industry by constructing a bank disclosure index. They find that some publicly traded BHCs disclose much more information to investors than others and are thus more transparent. Nier and Baumann (2006) also find that more disclosure results in higher capital buffers. Hirtle (2007) extends this research and finds that more disclosure is associated with lower risk and higher risk-adjusted returns at BHCs.

Akhigbe, McNulty, and Stevenson (2013) test for the effect of transparency on bank performance directly using analyst following and the standard deviation of analyst earnings per share (EPS) forecasts to measure transparency. They reason that when the number of analysts following a BHC is larger, more information is available for investors so the BHC is more transparent. Greater transparency should result in less variance in analysts' forecasts of EPS. Larger forecast dispersion is associated with less transparent BHCs. They find that more transparent BHCs (those with greater analyst following and lower forecast deviation) are more profit efficient than other BHCs.

The corporate governance index constructed by Brown and Caylor (2006, 2009) is based on 51 components from ISS and covers 3,258 firms for 2005 and a slightly smaller number of firms for earlier years. The 51 components are all coded as zero or one depending on whether or not they demonstrate that the firm meets minimum acceptable corporate governance standards. They use Tobin's Q as their measure of valuation, and return on assets and return on equity as measures of firm performance. They demonstrate that their index is an improvement over others used in the literature and that indexes that measure stock exchange mandated corporate governance practices do not perform as well as their index. They also find that only a small number of the measures provided by corporate governance data providers are linked to valuation. In contrast to others, their index measures both internal and external aspects of corporate governance.

Peni and Vahamaa (2012) use the Brown and Caylor index as a measure of bank corporate governance and find that US BHCs with better corporate governance had higher profitability and less real estate loan losses during the 2007–2008 financial crisis. Peni et al. (2013) use an alternative corporate governance index and find the same relation; they use the Brown and Caylor index in a robustness test. However, an earlier Federal Reserve

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Bank of New York study (Adams & Mehran, 2003) based on 35 large BHCs and a sample of manufacturing firms finds that bank corporate governance is different from that of unregulated manufacturing firms for a number of reasons: The number of stakeholders is larger for banks (BHC stakeholders include investors, regulators, and depositors); regulators help determine directors' responsibilities because of concern for safety and soundness arising from the importance of banks to the economy as a whole; and the threat of hostile takeovers is absent for banks. Of course, not all of the nonbanking firms in the Brown and Caylor index are manufacturing firms, but this study highlights an important difference.

Systems of Internal Control

According to Rezaee (2009) the existence and adequacy of internal control is an important area for corporate governance practice and reporting. The Comptroller of the Currency [OCC] (1998) defines "good" internal control as a situation in a bank where "no one person is in a position to make significant errors or perpetuate significant irregularities without timely detection" (p. 2). The OCC notes that a broader definition of internal control includes

> the accuracy and reliability of accounting data … operational efficiency … *adherence to subscribed managerial policies* … a training program designed to aid personnel in meeting their responsibilities, and *an internal audit staff to provide additional assurances to management as to the adequacy of its outlined procedures and the extent to which they are being effectively carried out*. (p. 1, emphasis added)

A board audit committee is required of public companies under the Sarbanes Oxley Act (SOX) of 2002. Rezaee (2009) summarizes the responsibilities of the audit committee of the board to include, in addition to financial reporting, "the efficiency and effectiveness of operations" and notes that the committee should "evaluate the identified significant deficiencies and material weaknesses in internal control" (p. 128).

In the United States, according to SOX:

- Management must explicitly acknowledge in their annual report their responsibility for creating and maintaining a sufficient internal control system.
- Management must assess in their annual report the effectiveness of the system of internal control.
- The audit firm auditing the annual report must report on and attest to the assessment of internal control by management.

(Rezaee, p. 369)

The board's audit committee requires special attention at this point. Rezaee (2009) notes that "in the context of … agency theory, the audit committee can be viewed as an internal corporate governance mechanism" (p. 120). Much of this discussion revolves around internal control over financial reporting, which is *not* the subject of the present paper. Nonetheless, he defines the audit committee as

> A committee composed of independent, nonexecutive directors charged with oversight functions of ensuring responsible corporate governance, a reliable financial reporting process, *an effective internal control structure*, a credible audit function, an informed whistleblower complaint process, and *an appropriate code of business ethics* with the purpose of creating long-term shareholder value while protecting the interests of other stakeholders. (Rezaee, 2009, p. 120, emphasis added)

It must be emphasized at this point that while the audit committee concerns itself with financial reporting, the discussion of internal control that is relevant in the present paper is the broader definitions both those of the OCC and in the above discussion. We are *not* arguing that reporting legal expense would improve bank financial reporting. For example, the case studies in section titled "Lessons from Bank Cases" have nothing to do with financial reporting, but they do reflect weaknesses in the strategic direction of the institution and the system of internal control. These are the matters of concern in this research.

Rezaee (2009) also addresses the difficult issue of convergence in corporate governance across countries. He notes that some countries (e.g., France and Japan) have adopted some SOX-based required corporate governance procedures. Nonetheless, substantial cross-country differences remain. For example, in summarizing internal control requirements across six countries, he leaves the space blank for Australia, Canada, Germany, and Japan. The United Kingdom requirement is that the Board should "maintain a sound system of internal control to safeguard shareholders' investment and the company's assets" (p. 388). The requirement for Singapore is very similar. This point is important in the present context because the suggestion here that bank legal expense be reported and used as a measure of the adequacy of internal control should be applicable to other countries in addition to the United States.

Rezaee (2009) notes another responsibility of the audit committee having to do with the institution's code of ethics. "The audit committee is responsible for overseeing the establishment and enforcement of the company's code of ethical conduct to ensure that an appropriate 'tone at the top' policy is implemented to promote ethical conduct throughout the

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company" (p. 129). The Countrywide and NCC cases discussed in section "Lessons from Bank Cases" present examples relevant to this issue. These cases and others illustrate that, often, the tone at the top is important to bank litigation. Banks without good systems of internal control are more likely to be sued than other banks. Nonetheless, bank directors can learn from litigation against the institution. This leads to the notion of "learning from litigation" as discussed below.

The Wall Street Journal (McGrane & Hilsenrath, 2015) reports that increasingly over the last two years regulators are "questioning" bank directors, a process described as "Washington overseeing the overseers," as regulators consider whether directors are "adequately challenging and monitoring risk in the banking system." Directors argue they are not managers but are being held responsible if management does not perform properly. Bankers claim that these procedures will sharply reduce the willingness of directors to serve. Bank directors perform an essential function in the financial system, but the willingness to perform this function has also been undercut by a large number of lawsuits against directors for their performance during the crisis. We noted the FDIC lawsuits against bank officers and directors above.

We suggest that if regulators would implement one simple data collection procedure, directors would have much better information about how their mangers compare with those of peer banks in one of their most fundamental responsibilities, setting an appropriate strategic direction for the organization and maintaining a good system of internal control. These procedures would arguably be superior to having regulators sit in on board meetings, asking questions at such meetings, and attempting to determine the composition of the board. But these three procedures are all now in place.

Learning from Litigation

Barzel (2000) shows how litigation allows society to develop a better understanding of the rights and obligations of parties to a contract. Originally, parties often fail to specify all the relevant terms of the contract in writing. When conditions change, or an important event not covered by the contract occurs, the parties naturally disagree about how this should affect their relative performance, and litigation ensues. This and similar cases are ultimately resolved and incorporated into legal precedent and contracts, and litigation on these issues ceases. *Litigation thus produces a learning*

process in society as contracts incorporate a better delineation of the rights of each party.

Not all issues are litigated; in Barzel's analysis, selectivity makes the common law attractive to litigants. "The less clear the law, the greater the likelihood of litigation and the larger the parties' legal expenditures" (Barzel, 2000, p. 246). Settlement is more likely when the Court's ruling is predictable, and less likely when there is little precedent to use to predict the outcome. The process thus has self-correcting features.

The same process of learning and improvement should occur internally within the organization with bank litigation. Boards of directors should learn about their institution's weaknesses from litigation against the institution. As a result, they should be able to ask better questions of management, and the process should improve the operation of the institution. Dealing with weaknesses in internal control and improving the strategic direction of the organization represent essential corporate governance functions. Perhaps, some problems can be resolved with proper training for employees and improved policies and procedures. Regulators would also learn about an institution's weakness through the same legal expense reporting.

Barzel's notion of selectivity in litigation is very important here. Consider, for example, the aggressive, high-risk lending that preceded the financial crisis. Numerous studies show that only a small percentage of all disputes result in litigation. Community groups and state attorneys general have limited resources, so they naturally direct their attention to the most egregious lenders to establish precedent. In this regard, Bhagat, Bizjak, and Coles (1998) point out that incentives to settle differ substantially when a government agency initiates a lawsuit. The same point would hold for a community group. Corporations are expected to follow the net present value rule and settle when the expected value of costs are greater than the expected benefits of litigation, such as the reputational benefits of being exonerated by a jury. Government agencies have budgets and incentives that are set in the political arena, not by the market, and they would be expected to sue to establish a precedent or enforce a rule; the monetary benefits are of very little consequence. As they note, "government authorities may choose not to settle even if the settlement might be more efficient and cost effective for both the agency and the other party" (p. 9). Hence, if many banks are engaging in aggressive lending practices, the banks with the worst practices should have higher legal expense than their peers.

Bank directors clearly should have an interest in ensuring that good policies and procedures exist, that they are followed, that banks *incorporate the*

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lessons of litigation in these policies and procedures, and that the corporate culture is conducive to such a process of learning and improvement. In effect, directors are already expected to work with examiners to practice learning from litigation. *The Comptroller's Handbook: Litigation and Other Legal Matters* (Comptroller of the Currency, 2000) indicates that examiners and boards of directors bear significant responsibility to monitor an institution's litigation experience and expense:

> Examiners should consider whether individual suits concerning the same or similar issues evidence a *pattern or practice* at the bank that needs management's attention. If examiners find unanticipated risks or what appears to be a *recurring pattern* of litigation, they should discuss the matter with management and the board of directors. If necessary, examiners should request action plans to eliminate or mitigate the potential impact and exposure to the bank. (p. 6; emphasis added)

Hence, examiners and boards should determine the reasons for litigation patterns. These responsibilities would be easier to fulfill if the examiners and directors knew how an institution's legal expense compared with that of other banks.

LESSONS FROM BANK CASES

Five sets of cases (seven cases in total) illustrate the relation between bank litigation and corporate governance; one case also illustrates learning from litigation.

Bank Service Charges at Military Bases

The Wall Street Journal (Maremont, 2014) reported that four of the ten banks ranking highest nationally in the ratio of service charge income to deposits have a major military-base presence. Some banks benefited from overdraft fees paid by servicemen that were equivalent to loan rates as high as 3,500%. Fees sometimes pyramided as overdraft charges caused families and individuals to be short of cash and vulnerable to additional charges. Interviews with counselors reveal that young servicemen and their families are particularly dependent on overdrafts because they lack experience in budgeting and have not accumulated cash reserves. A retired admiral who heads a nonprofit counseling agency assisting soldiers had harsh words about the impact of such practices on the affected families.

A business strategy of profiting from young servicemen's lack of financial experience and expertise raises important ethical issues and also exposes banks to several types of risk. There is reputational risk in the local community, adverse national publicity from exposure of such practices in major national publications, criticism from nonprofit, community service agencies, and the potential for class action lawsuits. In this instance, a national consumer-rights class action law firm initiated an investigation of excessive fees and began a solicitation of affected serviceman in direct response to the *Journal* article (Hagens Berman, 2014). Additionally, if there were changes in bank regulation curtailing such practices, the banks could experience a significant decline in revenue.[10] Hence, excessive reliance on fee income as a business strategy may boost short-term earnings but erodes the long-run franchise value of a bank. As noted, a comprehensive literature survey concludes that directors are responsible for setting the strategic direction of an organization. Most observers would consider exploitation of US servicemen as a poor strategic direction for a federally insured financial institution. If a class action lawsuit were filed and litigated, and *if legal expense were reported*, the institution's officers and directors should come under greater regulatory scrutiny.

Aggressive Mortgage Lending: Countrywide and NCC[11]

Countrywide

The New York Times (Morgenson, 2007) reports an intense sales culture drove Countrywide's approach to mortgage lending, and the firm's business model came from the founder, Angelo Mozilo. Countrywide routinely encouraged borrowers to purchase homes that they clearly could not afford, and the commission structure rewarded such salesmen (loan officers) handsomely. Commission rates were as much as three times higher for subprime loans than for prime loans. A broker was typically paid $30,000 for making a one million dollar loan with prepayment penalties, up to six times the rate for traditional loans. Such commissions provided strong incentives to make riskier loans. Loans with prepayment penalties locked borrowers into high rates for up to three years. Investors paid more for loans with prepayment penalties since returns were locked in (Morgenson, 2007).

Countywide also attempted to place borrowers in higher risk categories than they belonged. The company discouraged loan officers from making Federal Housing Authority (FHA) loans, even when they were the most suitable for the borrower, because the company did not benefit as much. Thus, the commission structure encouraged moving borrowers to subprime

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loans even if they qualified for a better loan. An internal document produced by a former employee showed that, for a time, the company even fixed its computer system to exclude favorable items when a loan was priced, so the borrower would not qualify for the least expensive loan. The company encouraged sales people to make loans involving no down payment and no income verification. They also looked favorably on loans that left borrowers without adequate cash flow for food and living expenses.

Many community groups attempted to arrange renegotiated loans to enable homeowners to stay in their homes and allow banks to avoid the losses that occur when they repossess a home but Countrywide resisted these efforts (Schwartz, 2007). It also exaggerated the amount that it was owed in foreclosure, often by tens of thousands of dollars. Several judges in various parts of the country expressed outrage at evidence that Countrywide's attorneys routinely forged documents to justify higher recoveries and filed these false documents in court and judges repeatedly sanctioned Countrywide.

In March 2008 the Federal Bureau of Investigation (FBI) initiated an investigation into Countrywide. By June 2008 the company was the subject of investigations by the Securities and Exchange Commission, the FBI, and the Federal Trade Commission, which oversees loan servicing companies. It was also sued by numerous state attorneys general and community groups. The allegations include extremely loose underwriting practices, charging improper fees, misleading people about hidden fees, inflating amounts owed and failing to keep accurate records of balances, attempting to obtain money and property from debtors under false pretenses, filing inaccurate pleadings in bankruptcy court, and other abuses of the bankruptcy system,[12] boarding up a home without a judgment or a court order when the homeowner was actually current on the loan (see, e.g., Efrati, 2007; Morgenson, 2008a, 2008b, 2008c).

In June 2008 the State of Illinois filed suit against Countrywide and Angelo Mozilo personally, for fraud. The suit included many of the above allegations, and also suggested that several loans took only 30 minutes to underwrite. The Illinois Attorney General commented: "People were put into loans they did not understand, could not afford and could not get out of. This mounting disaster has had an impact on individual homeowners statewide and is having an impact on the global economy" (Morgenson, 2008c, p. C1). The Illinois case specifically notes the incentive structure of the company was structured to reward employees and brokers to sell the riskiest loans. Several years after Bank of America acquired Countrywide, *The Wall Street Journal* called the acquisition perhaps the worst merger in US corporate history (Ovide, 2011).

What about corporate governance? As noted, directors should help determine the strategic direction of a corporation. The very large increase in Countrywide's legal expense from 2004 to 2006 (see section "Legal Expense Proxy and Rankings") together with unfavorable peer group comparisons would have raised serious questions about these business practices. Was the company's business model sustainable in view of the litigation pattern? However, the data were not collected or analyzed.

National City

NCC of Cleveland, Ohio, also engaged in high-risk mortgage lending. Aspiring to be a "mortgage superpower" (Mezger, 2008b), NCC purchased First Franklin, a major subprime lender specializing in loans for borrowers with poor credit who could borrow only at high rates of interest in 2000. NCC also aggressively bought loans from mortgage brokers all over the country; many such brokers would have little interest in loan quality. In his 2001 annual report letter to shareholders, the institution's CEO stated that subprime loans have "greater lifetime value when held on the balance sheet" (Calvey, 2008). In 2003 mortgage lending was $30 billion, compared to $4 billion in 1999. Net income from mortgage lending was $1 billion, versus $50 million four years earlier. The CEO claimed his strategic plan was "wildly successful" (Mezger, 2008a); the bank was writing $130 billion in loans a year, and had become the sixth-largest mortgage lender in the country, just behind Washington Mutual and Countrywide.

By 2004 Ohio's delinquency rate was 35% above the national average. Ohio's foreclosure rate was slightly above the national average in 2000, then double the US average in 2002, and triple the average in 2004 (Mezger, 2008a). The foreclosure crisis in Cleveland and Ohio as a whole was the subject of public hearings as early as 2002. Cuyahoga County's Treasurer James Rokakis testified before Congress in March 2007 that mortgage defaults on loans made to financially strapped homeowners at high interest rates had pushed neighborhoods in Cleveland past the "tipping point" of urban blight. The number of mortgage foreclosures in the county had risen from 3,500 in 1995 to 7,500 in 2000 to 13,000 in 2006 (Turner, 2007). That the largest bank in the metropolitan area engaged in high-risk subprime lending most likely contributed in a major way. Unregulated mortgage brokers no doubt contributed to the situation (Turner, 2007); these are the brokers NCC solicited for loans. Like Countrywide, NCC fought responsible lending legislation, in their case they refusing to make loans in Cleveland, Toledo, and other cities considering such legislation.

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When serious problems in the subprime market developed in 2007, NCC was one of the first banks to report major losses. In August 2007, NCC suddenly had $11 billion of mortgage loans it could not sell and it suddenly stopped lending (Mezger, 2008b). *The Wall Street Journal* reported in early September 2007 that both Lehman Brothers and NCC were scaling back their mortgage lending business, cutting jobs, and taking third-quarter losses (Kingsbury, 2007; Wall Street Journal, 2007). The publicity about the loan losses created heavy withdrawals of uninsured deposits as early as September 2008, a month before the bank was sold. Senior bank officers worried about an "immediate liquidity crisis" (Murray, 2009). NCC, a 163-year-old institution at the time, was acquired by PNC Bank in October 2008. NCC's First Franklin was also a factor in the demise of Merrill Lynch. After paying $1.3 billion for First Franklin in 2006, Merrill declared the subsidiary worthless one year later and closed it completely (Mezger, 2008c).

NCC consistently ranks second among 15 large BHCs in the ratio of the legal expense proxy to total assets for each year from 2002 to 2006 (Table 1). In addition, its legal expense is consistently increasing relative to other large BHCs in the entire sample. If these data had been collected and analyzed, NCCs potential problems in the pre-crisis period would have been apparent to directors, regulators, and investors.

A Small Bank Sells a Piece of Land and Generates Prolonged and Costly Litigation

In *Joseph v. Liberty Bank* a bank sold a piece of land to Mr. Joseph under the representation that it was zoned commercial. When he learned that the land was zoned agricultural and was worth considerably less as a result, Mr. Joseph sued Liberty Bank. The difference in value was, at most, $15,000. There was no genuine issue as to the facts in the case. Nonetheless, the bank's board of directors decided to teach a lesson to any local attorney who sued a bank on a contingency. It dragged out the case, forcing it to be litigated twice, and then hired an attorney from outside the area at $400 per hour to contest every dollar of Joseph's attorney's legal expense. According to Mr. Joseph's attorney, this board of directors spent about $1 million to defend a case that arguably had no merit. Peer group analysis of litigation expense would, no doubt, have revealed this institution as an outlier. The federal bank regulatory system has no vehicle for identifying this board of directors for possible sanctions related to this

prolonged and wasteful litigation strategy because peer group legal expense data is unavailable. If the board of directors of a federally insured financial institution uses its resources (which are the byproduct of federal insurance) to pursue a personal agenda, the federal regulatory system should be able to identify and correct such practices.

Bank Policies and Procedures: Two Cases

Wallace v. Citrus Bank

Mr. John Wallace guaranteed a $1 million floorplan loan (a loan used to finance inventories of automobiles or boats) that Citrus Bank made to a yacht dealer in Vero Beach, Florida. The dealer defaulted, the bank lost the entire $1 million and sued Wallace for the entire amount. Mr. Wallace countersued the bank for negligence in the administration of the loan. Floorplan loans require extensive monitoring because the collateral can be moved. Hence, regular monthly floorplan inspections (matching serial numbers with a list of inventory to keep track of the collateral) are standard banking practice for such loans. However, Citrus Bank did only two floorplan inspections in a two and one-half year period. The bank's external auditors repeatedly urged the bank to do regular floorplan inspections, but to no avail. When asked about this matter in his deposition, the bank president replied that they didn't do any inspections because they had the guarantee.

The bank also failed to perfect its security interest in the collateral by inadvertently neglecting to renew a UCC lien, thereby allowing another lender to obtain a superior position. Again, the bank relied exclusively on the guarantee. The bank also allowed the yacht dealer to hold the titles on the yachts prior to sale, allowing the dealer to sell the vessels "out of trust," that is, without repaying the loan. After an extensive discovery process, this case was finally settled. The board of directors of this small bank never learned how their very large litigation expense compared with peer banks because regulators do not require banks to report this item. Had reporting and peer group analysis been required, management might have been subject to more scrutiny by the bank's board.

Monitoring loans is one of the basic economic functions of a bank. Thus, this bank's action in allowing the loan to go bad solely because it had a guarantee raises obvious ethical and bank management issues. Bank examiners may have been critical of management, but a peer group analysis of the bank's litigation expense would have made such a position much

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stronger.[13] As noted, directors are responsible for ensuring that management has a good system of internal control, the essence of which is adherence to a set of policies and procedures. Reporting of legal expense would again help reveal situations where corporate governance is inadequate.

State Employees Credit Union v. Howard

State Employees Credit Union v. Howard also raised issues about the institution's lending practices. Its lending manual suggested that loan officers should process 150 loans per month, which is about one loan per hour. The application itself would take almost one hour to complete accurately, but among other steps, loan officers were also asked to complete a 43-point checklist for each appraisal, and apply numerous other credit evaluation procedures for each loan. Many of these procedures were not followed. Loan officers also violated other required procedures. They allowed borrowers to select their own appraiser when federal regulations and internal guidelines specifically prohibited this practice. Appraisals were not reviewed by competent internal personnel. Loan officers also failed to check appraisals against recent purchase prices. These are required internal procedures, but since the internal review process prior to loan approval was minimal, loan officers could easily skip steps.

Inconsistencies such as these are revealed starkly when they are the subject of litigation. At the same time, the emotional atmosphere of a lawsuit may prevent meaningful change in a financial institution. To initiate a learning process from litigation, regulators could require examiners to ask the compliance officer of such an institution to report in writing how the institution changed its procedures.

Learning from Litigation: Securities and Exchange Commission v. Goldman Sachs

In an extremely well-publicized civil case (*Securities and Exchange Commission v. Goldman Sachs*, 2010), the SEC alleged that Goldman Sachs had committed fraud by misleading clients who purchased mortgage-backed securities that the SEC says were intended to fail. The overview of the case states in part:

> The commission brings this securities fraud case against Goldman, Sachs & Co. ("GS&Co.") and a GS&Co. employee, Fabrice Tourre ("Tourre"), for making materially misleading statements and omissions in connection with a synthetic collateralized debt obligation ("CDO") GS&Co. structured and marketed to investors. This synthetic

> CDO, ABACUS 2007-AC1, was tied to the performance of subprime residential mortgage backed securities ("RMBS") and was structured and marketed by GS&Co. in early 2007 when the United States housing market and related securities were beginning to show signs of distress. Synthetic CDOs like ABACUS 2007-AC1 contributed to the recent financial crisis by magnifying losses associated with the downturn in the United States housing market….
>
> Undisclosed in the marketing materials and unbeknownst to investors, a large hedge fund, Paulson and Co., Inc. ("Paulson") with economic interests directly adverse to investors in the ABACUS 2007-AC1 CDO, played a significant role in the portfolio selection process. After participating in the selection of the reference portfolio, Paulson effectively shorted the RMBS portfolio it helped select by entering into credit default swaps with GS&Co.

Subsequently, *The New York Times* detailed similar apparent conflicts of interest in Goldman's underwriting of securities for clients such as Washington Mutual, the University of Pittsburgh Medical Center, and the State of New Jersey (Morgenson & Story, 2010). Many of these institutions reported they would no longer do business with the firm.

While Goldman defended itself against the SEC charges, at its annual meeting it promised shareholders a thorough internal review of its business model as a result of the lawsuit and the other unfavorable publicity. The CEO, Lloyd Blankfein, told shareholders: "We understand that there is a disconnect between how we as a firm view ourselves and how the broader public perceives our role and activities in the market. To address this, we need a rigorous self-examination" (Story, 2010). This response reflects the learning-through-litigation theme of this paper.

LEGAL EXPENSE PROXY AND RANKINGS

Since banks do not report their legal expense on their call reports, we consider BHC annual 10K reports filed with the SEC to determine their legal expense. We are able to hand collect usable data on the legal expense proxy for 102 institutions for 2002–2006, the period prior to the financial crisis. Only 66 of these institutions have *both Governance Score* data available from Brown and Caylor and stock return data available from Center for Research in Security Prices (CRSP).[14]

BHCs can report noninterest expense in a format where litigation expense is part of "other noninterest expense," which includes an extremely large number of items. Ryan (2007) reports this approach meets all accounting and disclosure requirements. But econometric and peer group

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analysis of "other noninterest expense" would be meaningless. For these institutions, legal expense cannot be analyzed, even approximately. We exclude all BHCs following this accounting model from our study. Many BHCs provide a more detailed breakdown, reporting an item generally entitled "auditing, consulting and legal expense" or "professional fees." This item includes attorneys' fees in all cases; these would clearly be higher when a bank is sued more frequently. This item excludes settlements, which are reported separately. There are 102 institutions following the more detailed approach. Considering the point that BHCs use the same accounting firms, these data can be used for both the regression analysis and the case study rankings with assurance that the same or very similar items are being reported across the sample.[15] Of the institutions following the more detailed approach, 83 have stock return data available from CRSP. Of these, 66 also have data on *Governance Score* from Brown and Caylor's database. We eliminate firms with a wealth management, investment banking, or credit card orientation. (The litigation expense proxy is significantly higher at BHCs with this orientation.[16]) Table 1 presents data for 15 of the largest commercial-banking-oriented BHCs.

As shown in Table 1, Countrywide, NCC, and Wachovia rank very high by this legal expense proxy. NCC is consistently second among the 15 institutions. Eliminating JP Morgan Chase, where a significant part of legal expense is associated with investment banking activities (e.g., preparing documentation for securities offerings and assisting clients with mergers and acquisitions), rather than litigation, would make *NCC the highest ranking bank* for the entire period.

The raw data (not shown) indicate that Countrywide's legal expense, measured by this proxy, increased by 70% from 2005 to 2006, from $141 million to $239.1 million. *No other institution registered such a large increase*. Consistent with this, Table 1 shows that Countrywide ranks sixth among the 15 institutions for 2006, a substantial increase over 2005 and 2004. If legal expense had been reported quarterly, the upward movement would have been apparent to directors, as well as regulators and securities analysts, as early as 2005.[17]

The Federal Deposit Insurance Corporation [FDIC] (2004, 2014) defines various bank business models on the basis of balance sheet characteristics. For example, commercial lenders are banks with a minimum of 25% of total assets in commercial and industrial loans, real estate construction and development loans, and loans secured by commercial real estate properties. If regulators collect and disclose legal expense, peer

groups could be identified, such as commercial lenders, investment bankers, and mortgage bankers, as the FDIC has already done.[18] This is important because, as noted, investment-banking-oriented commercial banks appear to have higher legal expense some of which is not related to litigation.

REGRESSION EQUATIONS AND THEIR RATIONALE

Equations

As described in the section "Legal Expense Proxy and Rankings," we develop a legal expense proxy for commercial banks as an alternative to Brown and Caylor's (2006, 2009) widely used corporate governance index. Our fundamental Research Question is: Does our legal expense proxy predict commercial bank performance, loan losses and stock returns as well as or better than the Brown and Caylor index? While we have legal expense data for 2002 through 2006, we only consider the data for the period 2003–2005 since *Governance Score* is only available for that period. In all cases, we choose our explanatory variables from the period 2003–2005 to determine which variables *predict* performance and returns in advance. There are no contemporaneous variables in these regressions, which mitigates endogeneity problems. Put differently, simultaneous equation bias in these relations is mitigated by the lagged relationships that are estimated. The lags are long and variable and can be up to five years (2003–2008). The model is based on a behavioral relationship, not an accounting relationship.

We estimate two sets of two *almost identical* equations; *only the corporate governance variable is changed.*[19] As discussed extensively above, we consider *Legal Expense* to be a measure of bank corporate governance. Hence, to compare the performance of the two measures, we estimate four regression equations using various measures of loan losses and stock returns as dependent variables:

$$\begin{aligned} \textit{Loan Losses}/\textit{Assets}07 = f(&\textit{Legal Expense}/\textit{Assets}03-05,\ \textit{Assets}03-05,\\ &\textit{Financial Holding Co}.03-05,\ \textit{HHI}03-05,\\ &\textit{Market}/\textit{Book}03-05,\ \textit{Merger}03-05,\\ &\textit{ROE}03-05,\ \textit{Year}) \end{aligned} \tag{1}$$

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$$\begin{aligned} \textit{Loan Losses/Assets}07 = g(&\textit{Governance Score}03-05, \textit{Assets}03-05, \\ &\textit{Financial Holding Co.}03-05, \textit{HHI}03-05, \\ &\textit{Market/Book}03-05, \textit{Merger}03-05, \\ &\textit{ROE}03-05, \textit{Year}) \end{aligned} \tag{2}$$

$$\begin{aligned} \textit{Returns}07-08 = h(&\textit{Legal Expense/Assets}03-05, \\ &\textit{Non-performing Loans/Assets}03-05, \textit{Ln(Assets)}03-05, \\ &\textit{Market/Book}03-05, \textit{ROE}03-05, \textit{HHI}03-05, \\ &\textit{Financial Holding Co.}03-05, \textit{Merger}03-05, \textit{Year}) \end{aligned} \tag{3}$$

$$\begin{aligned} \textit{Returns}07-08 = j(&\textit{Governance score } 03-05, \\ &\textit{Non-performing Loans/Assets}03-05, \textit{Ln(Assets)}03-05, \\ &\textit{Market/Book}03-05, \textit{ROE}03-05, \textit{HHI}03-05, \\ &\textit{Financial Holding Co.}03-05, \textit{Merger}03-05, \textit{Year}) \end{aligned} \tag{4}$$

The dependent variables are:

- *Loan Losses/Assets07* = three measures of credit quality for 2007 relative to end-of-period assets for the same year: *Loan charge-offs/Assets07*, *Loan loss provisions/Assets07*, and *Non-performing loans/Assets07*. We also run the regressions using the same loan quality data for 2008.
- *Returns07-08* = abnormal-buy-and-hold returns (*Abhr07-08*, the difference between bank buy-and-hold returns and market-buy-and-hold returns), and buy-and-hold returns (*Bhr07-08*). Both are measured from January 1, 2007 to December 31, 2008.

The explanatory variables are:

- *Legal Expense03-05/Assets* = our legal expense proxy relative to total assets;
- *Governance Score* = Brown and Caylor's corporate governance index;
- *Ln(Assets)03-05* = the natural logarithm of total assets for 2003 through 2005;
- *Financial Holding Co.03-05* = an indicator variable equal to one for a BHC that is a financial holding company, and zero otherwise;

- *HHI03-05* = the sum of the squared market shares, a measure of local market concentration;
- *Market/Book03-05* = the market value of total BHC assets divided by their book value for 2003 through 2005;
- *Merger03-05* = an indicator variable equal to 1 for BHCs that were involved in mergers and acquisitions in the 2003−2006 period, and zero otherwise;
- *Non-performing Loans/Assets03-05* = non-performing loans/assets for 2003 through 2005;
- *ROE03-05* = the ratio of net income to the book value of equity for 2002 through 2006.
- *Year* represents two dummy variables, the first set equal to one for 2003, and the second set equal to one for 2004. 2005 is the default year.

Assets03-05 and *Market/Book03-05* are the Fama-French (1993) factors commonly used to analyze stock returns. *The non-performing loan variables are not the same*. *Non-performing Loans/Assets03-05* is an explanatory variable in Eqs. (3) and (4) while *Non-Performing Loans/Assets07and Non-Performing Loans/Assets08* are loan loss measures in Eqs. (1) and (2).

Consistent with Peni and Vahamaa (2012) and Peni et al. (2013) we postulate that weaker corporate governance is associated with higher loan losses and lower stock returns. Thus, we expect a positive relation when legal expense is used to measure bank corporate governance (because higher legal expense reflects weaker corporate governance) and a negative relation when *Governance Score* is used (because a higher *Governance Score* reflects stronger corporate governance).

Rationale for Control Variables and other Econometric Issues

The reasons for including the control variables in the above equations are as follows: *Ln(Assets)03-05* is included because banks of different sizes often have different lending strategies; these may produce a different loan loss experience and different stock returns; *Ln(Assets)03-05* is also a Fama-French (1993) factor. We include the Fama-French variables, *Ln (Assets)03-05* and *Market/Book03-05* in all four equations to be consistent. BHCs that formed a *Financial Holding Company* after passage of the Gramm-Leach Bliley Act in 1999 may also have a more aggressive business strategy.

HHI03-05 is included because, as discussed below, the *Hirschman Herfindahl Index* (HHI) has been found to be one of the more important

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variables affecting bank financial performance in many studies. *Merger02-06* is included because banks involved in a merger or acquisition may have a different loan loss experience than other banks. More importantly, they would have higher legal and accounting expenses as a result of the merger. Data on accounting expense is included in our legal expense proxy, so we need to control for the higher proxy that would be reported by a BHC involved in one or more mergers. *ROE03-05* is included because banks may be highly profitable in one period because of an aggressive lending strategy that may produce losses or lower profits in later periods. We include *Non-performing Loans03-05* in Eqs. (3) and (4) because previous loan losses may have a negative impact on stock returns. In general, these control variables are similar to those used to analyze bank performance and risk in other studies (e.g., Akhigbe & Martin, 2008; Berger & DeYoung, 1997; Berger & Mester, 1997; Peni & Vahamaa, 2012).

Ordinary least squares is the appropriate regression procedure since we are predicting out of sample.[20] High legal expense *in any year* from 2003 through 2005, or low Governance Score in any year, should be associated with weaker financial performance in 2007 and 2008. Brown and Caylor do not provide an index for 2006. Adams et al. (2010) note throughout their literature survey that corporate governance depends partly on institutional culture. Directors are generally appointed for terms exceeding one year. The composition of boards of directors, the strategic direction of corporations, institutional cultures, and policies and procedures all change slowly. Since *corporate governance changes slowly*, the data for 2003 through 2005 should provide a good measure of differences in corporate governance across banks in the pre-crisis period.

DATA SOURCES

We draw our data from four sources:

The *Legal expense proxy* is described in section "Legal Expense Proxy and Rankings".

Financial Crisis Buy and Hold Returns. We use simple buy-and-hold returns (*Bhr07-08*) and abnormal returns (*Abhr07-08*, as defined above) as additional measures of bank performance during the 2007–2008 financial crisis. We measure stock returns for the two-year period ending December 31, 2008.

BHC Balance Sheet and Income Statement Data. Data for non-performing loans, assets, book value, net income, and financial holding company come from the Federal Reserve Bank of Chicago's BHC database.

Mergers and Acquisitions. We use Lexis/Nexis to identify those BHCs that were involved in a merger or acquisition during the sample period 2003–2005.

DESCRIPTIVE STATISTICS AND REGRESSION RESULTS

Descriptive Statistics

Table 2 shows the descriptive statistics for the sample. First, we consider the two explanatory variables of interest and the dependent variables. *Legal expense* averages 0.13% and ranges from zero (rounded) to 0.77%. *Governance Score* has a mean value of 26.58 and ranges from 15 to 44. *Buy-and-hold-returns07-08* averages −40.99% and ranges from −96.12% to 39.99%. *Abnormal-buy-and-hold returns07-08* averages −2.34% and ranges from −56.12% to +79.99%. *Non-performing loans07* averages 0.51% and ranges from zero (rounded) to 3.11%. *Non-performing loans08* averages 1.17% and ranges from 0.10% to 8.55%. *Loan charge-offs07* averages 0.51% and ranges from zero (rounded) to 2.51%. *Loan charge-offs08* averages 1.09% and ranges from 0.09% to 8.43%. *Loan loss provisions07* averages 0.46% and ranges from −0.55% to 2.56%. *Loan loss provisions08* averages 1.53% and ranges from 0.11% to 8.14%.

The other explanatory variables for 2003–2005 and the data are: Loan charge-offs07 averages 0.51% and ranges from zero to 2.51%. *Loan charge-offs08* averages 1.09% and ranges from 0.09% to 8.43%. *Loan loss provisions07* averages 0.46% and ranges from −0.55% to 2.56%. *Loan loss provisions08* averages 1.53% and ranges from 0.11% to 8.14%.

Among the independent variables, *non-performing loans03-05* averages 0.56% and ranges from 0.01% to 5.68%. *Total Assets* of the BHCs in the sample average $52.3 billion. These BHCs range in size from $293 million to almost $1.3 trillion. Market/book02-06 averages 257% and ranges from 118% to 549%. *Return on equity* averages 19.46% and ranges from −3.66% to +40.99%. About 36.25% of the BHCs are part of a *Financial*

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Table 2. Descriptive Statistics.

Variables	*N*	Mean	Median	Minimum	Maximum
Legal Expense	160	0.0013	0.0011	0.0000	0.0077
Governance Score	160	26.5812	25.5000	15.0000	44.0000
Buy and Hold07-08	160	−0.4099	−0.4952	−0.9612	0.3999
Abnormal BHRs07-08	160	−0.0234	−0.0952	−0.5612	0.7999
Non-performing Loans07	153	0.0051	0.0039	0.0000	0.0311
Non-performing Loans08	148	0.0117	0.0088	0.0010	0.0855
Loan charge-offs07	153	0.0051	0.0031	0.0000	0.0251
Loan charge-offs08	148	0.0109	0.0079	0.0009	0.0843
Loan loss provisions07	153	0.0046	0.0034	−0.0055	0.0256
Loan loss provisions08	148	0.0153	0.0110	0.0011	0.0814
Non-performing Lns03-05	160	0.0056	0.0044	0.0001	0.0568
Assets ($millions)	160	52335.70	4424.50	293.00	1294312.00
Ln(Assets)	160	8.8170	8.3949	5.6801	14.0734
Market/Book	160	2.5668	2.4624	1.1780	5.4943
ROE	160	0.1946	0.1961	−0.0366	0.4099
HHI	160	0.2280	0.2055	0.0669	0.7100
Fin. Hold Co.	160	0.3625	0.0000	0.0000	1.0000
Merger	160	0.8625	1.0000	0.0000	1.0000

These descriptive statistics are based on data for 66 bank holding companies (BHCs) for 2003−2008. Bank legal expense is compiled from BHC annual 10K reports and expressed relative to total assets. Governance Score is Brown and Caylor's (2006, 2009) corporate governance index. Buy-and-hold returns and abnormal-buy and-hold returns are calculated from January 1, 2007 to December 31, 2008. The three measures of loan losses (non-performing loans, loan charge-offs, and loan loss provisions) are calculated separately for 2007 and 2008. The other variables are calculated for 2003−2005. They are non-performing loans, total assets and the natural logarithm of assets, market value/book value, return on equity, the HHI (a measure of market concentration), a dummy variable for BHCs that formed a financial holding company, and a dummy variable equal to one for BHCs involved in a merger.

holding company and 86.25% were involved in a merger or acquisition during the sample period.

Regression Results

We show the results of estimating Eq. (1) in Table 3. These results show that *the legal expense proxy for 2003−2005 predicts all three measures* of loan quality for both 2007 and 2008 with statistical significance at the one percent level. There are *no variables that are measured contemporaneously with the dependent variable* in these regression equations. Thus, the point

Table 3. Regression Results Relating Legal Expense to Non-Performing Loans, Loan Charge-Offs, and Loan Loss Provisions.

	Model 1 Non-perform. loans/assets 2007	Model 2 Loan charge-offs/ assets 2007	Model 3 Loan loss provisions/assets 2007	Model 4 Non-Perform. Loans/Assets 2008	Model 5 Loan charge-offs/ assets 2008	Model 6 Loan loss provisions/ assets 2008
	Parameter estimate	Parameter estimate	Parameter estimate	Parameter estimate	Parameter estimate	Parameter estimate
Legal Expense	1.7384***	1.3260***	1.4300***	3.5821***	3.1717***	2.9248***
	(6.07)	(5.42)	(4.69)	(4.11)	(3.68)	(2.87)
Ln(Assets)	0.0006***	0.0004***	0.0003**	0.0013***	0.0012***	0.0019***
	(3.94)	(3.23)	(1.92)	(2.69)	(2.51)	(3.31)
Market/Book	−0.0019***	−0.0017***	−0.0021***	−0.0041***	−0.0039***	−0.0019
	(−4.06)	(−4.23)	(−4.23)	(−2.90)	(−2.76)	(−1.16)
ROE	0.0042	0.0059	0.0085	−0.0001	0.0001	−0.0105
	(0.67)	(1.10)	(1.27)	(−0.00)	(0.01)	(−0.47)
HHI	0.0046**	0.0041**	0.0084***	0.0338***	0.0341***	0.0276***
	(1.94)	(2.05)	(3.36)	(4.69)	(4.79)	(3.28)
Fin. Hold Co.	0.0010	0.0010*	0.0013*	−0.0024	−0.0026	−0.0017
	(1.43)	(1.77)	(1.78)	(−1.12)	(−1.21)	(−0.66)
Merger	−0.0004	0.0001	0.0010	−0.0014	−0.0014	−0.0037
	(−0.43)	(0.17)	(0.95)	(−0.45)	(−0.47)	(−1.02)
N	153	153	153	148	148	148
Adjusted R^2	0.7129	0.6946	0.6539	0.5996	0.5722	0.6149
F-Value	41.56***	38.14***	31.85***	25.46***	22.85***	27.08***

These regressions are based on data for 66 bank holding companies (BHCs) for 2003 to 2008. The dependent variables are three measures of loan losses (non-performing loans, loan charge-offs, and loan loss provisions) for 2007 and 2008. The explanatory variables, all for 2003–2005, are bank legal expense compiled from BHC annual 10K reports and expressed relative to total assets, the natural logarithm of assets, market value/book value, return on equity, the HHI (a measure of market concentration), a dummy variable for BHCs that formed a financial holding company, and a dummy variable equal to one for BHCs involved in a merger. Two dummy variables for 2003 and 2004 are included but the coefficients are not shown; 2005 is the default year. The numbers in parenthesis are *t*-statistics.

The symbols *, **, and *** indicate statistical significance for the regression coefficients at the 10 percent, 5 percent, and 1 percent levels, respectively.

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that our legal expense proxy predicts all three measures of loan quality both *two and three years ahead* demonstrates empirically the strong relation between bank legal expense and future bank performance. Legal expense is a very important variable affecting credit quality. Legal expense partly reflects the efforts management has made to establish a good system of internal control, ensure adherence to well-established policies and procedures, and establish the proper culture and strategic direction for the organization.

The control variable, *Assets03-05*, is positive and significant at the one percent level in two of the 2007 equations and all three of the 2008 equations, indicating that larger BHCs had higher loan losses relative to assets in 2007 and 2008. *Market/Book02-06* is negative and significant at the one percent level in five of the six equations. BHCs with lower market values may have been incentivized to take greater risk in the pre-crisis period to bolster returns by engaging in aggressive lending strategies. *ROE* is not significant in any of the equations. The *HHI03-05* is positive and significant, generally at the five percent level or higher. *Merger* and *Financial holding company* are generally not significant.

The results of estimating Eq. (2) are shown in Table 4. The variables are the same as above except that we replace *Legal Expense* by *Governance Score03-05*, the Brown and Caylor corporate governance measure that is the subject of this research. *Governance Score* is negative and significant, as expected, so the results are very consistent with the findings of Peni and Vahamaa (2012) and Peni et al. (2013) that banks that had better corporate governance in the pre-crisis period had lower loan losses during the crisis. Nonetheless, *Legal Expense performance* is stronger than that of *Governance Score*. We return to this issue immediately below in our discussion of Tables 7 and 8 which contain a comparison of the coefficients of the two measures. Most of the control variables have signs and significance levels similar to the results in Table 3.

The results of estimating Eq. (3) are shown in Table 5. In that table, *Legal Expense03-05* predicts two measures of bank stock returns with high statistical significance. In the first regression, which uses buy-and-hold returns for 2007−2008 as the dependent variable, *Legal Expense03-05* is significant at the one percent level. In the second regression, which uses abnormal buy-and-hold returns for 2007−2008 as the dependent variable, *Legal Expense03-05* is also significant at the one percent level. Legal expense has the expected negative sign in both equations − higher legal expense in the pre-crisis period is associated with lower stock returns. Considering the control variables, banks with higher levels of

Table 4. Regression Results Relating Litigation Expense to Non-Performing Loans, Loan Charge-Offs, and Loan Loss Provisions.

	Model 1 Non-perform. loans/ assets 2007 Parameter estimate	Model 2 Loan charge-offs/ assets 2007 Parameter estimate	Model 3 Loan loss provisions/ assets 2007 Parameter estimate	Model 4 Non-perform. loans/ assets 2008 Parameter estimate	Model 5 Loan charge-offs/ assets 2007 Parameter estimate	Model 6 Loan loss provisions/ assets 2008 Parameter estimate
Governance Score	−0.0001*	−0.0001***	−0.0002***	−0.0002	−0.0002	−0.0003
	(−1.77)	(−2.42)	(−3.05)	(−1.36)	(−1.35)	(−1.53)
Ln(Assets)	0.0010***	0.0009***	0.0010***	0.0022***	0.0021***	0.0030***
	(4.03)	(4.11)	(3.75)	(2.96)	(2.84)	(3.49)
Market/Book	−0.0013***	−0.0012***	−0.0015***	−0.0029**	−0.0028**	−0.0008
	(−2.55)	(−2.81)	(−2.95)	(−1.96)	(−1.92)	(−0.49)
ROE	0.0052	0.0071	0.0103	0.0020	0.0022	−0.0077
	(0.74)	(1.20)	(1.45)	(0.10)	(0.11)	(−0.34)
HHI	0.0066***	0.0061***	0.0111***	0.0383***	0.0383***	0.0323***
	(2.46)	(2.74)	(4.14)	(4.92)	(5.03)	(3.67)
Fin. Hold. Co.	−0.0001	−0.0000	−0.0001	−0.0050**	−0.0049**	−0.0043*
	(−0.21)	(−0.03)	(−0.12)	(−2.06)	(−2.09)	(−1.57)
Merger	0.0001	0.0006	0.0016	−0.0001	−0.0003	−0.0025
	(0.13)	(0.69)	(1.45)	(−0.05)	(−0.10)	(−0.69)
N	153	153	153	148	148	148
Adjusted R^2	0.6444	0.6446	0.6240	0.5565	0.5364	0.5987
F-Value	30.60***	30.63***	28.11***	21.50***	19.90***	25.36***

The regressions are based on data for 66 bank holding companies (BHCs) for 2003–2008. The dependent variables are three measures of loan losses (non-performing loans, loan charge-offs, and loan loss provisions) for 2007 and 2008. The explanatory variables, all for 2003–2005, are Governance Score, Brown and Caylor's (2006, 2009) corporate governance index, the natural logarithm of assets, market value/book value, return on equity, the HHI (a measure of market concentration), a dummy variable for BHCs that formed a financial holding company, and a dummy variable equal to one for BHCs involved in a merger. Two dummy variables for 2003 and 2004 are included but the coefficients are not shown; 2005 is the default year. The numbers in parenthesis are *t*-statistics.

The symbols *, **, and *** indicate statistical significance for the regression coefficients at the 10 percent, 5 percent, and 1 percent levels, respectively.

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Table 5. Regression Results Relating Legal Expense to Buy-and-Hold Returns and Abnormal Buy-and-Hold Returns.

	Model 1 Buy-and-hold returns Parameter estimate	Model 2 Abnormal buy-and-hold returns Parameter estimate
Legal Expense	−86.6835***	−72.7365***
	(−2.99)	(−2.63)
Non-performing Loans	10.7258**	8.0194*
	(2.10)	(1.65)
Ln(Assets)	−0.0910***	−0.0557***
	(−6.22)	(−3.98)
Market/Book	0.0116	0.0333
	(0.28)	(0.85)
ROE	1.7638***	1.6082***
	(3.21)	(3.07)
HHI	−0.3086	−0.1403
	(−1.51)	(−0.72)
Fin. Hold Co.	0.1316**	0.0931*
	(2.12)	(1.57)
Merger	0.1277	0.1302
	(1.44)	(1.53)
N	160	160
Adjusted R^2	0.6303	0.1054
F-Value	26.06***	2.73***

These regressions are based on data for 66 bank holding companies (BHCs) for 2003 to 2008. The dependent variables are two measures of market returns, buy-and-hold returns and abnormal buy-and-hold returns, calculated for January 1, 2007, to December 31, 2008. The explanatory variables, all for 2003−2005, are bank legal expense, compiled from BHC annual 10K reports and expressed relative to total assets, non-performing loans, the natural logarithm of assets, market value/book value, return on equity, the HHI (a measure of market concentration), a dummy variable for BHCs that formed a financial holding company, and a dummy variable equal to one for BHCs involved in a merger. Two dummy variables for 2003 and 2004 are included but the coefficients are not shown; 2005 is the default year. The numbers in parenthesis are *t*-statistics.

The symbols *, **, and *** indicate statistical significance for the regression coefficients at the 10 percent, 5 percent, and 1 percent levels, respectively.

non-performing loans in 2003−2005 actually had higher stock returns in 2007−2008. In interpreting this result, we note that non-performing loans in 2003−2005 were modest, with a mean value of 0.56% of assets and a median of 0.42% (Table 2). Therefore, the sign of this coefficient should not be overemphasized. *Ln(Assets03-05)* is negative and significant at the one percent level in both equations. Thus, as in the previous set of results,

larger banks have worse performance – these banks have lower stock returns during the 2007–2008 financial crisis period. Two variables, the ratio *Market Value/Book Value03-05* and the *HHI* are not significant in either equation. *ROE03-05* is positive and significant at the one percent level, indicating that BHCs with a higher ROE in 2003–2005 also had higher stock returns during the crisis by both measures. BHCs that formed a financial holding company also had higher returns by both measures, with significance at the five percent level in one equation at ten percent in the other. It is important to note that even after controlling for factors reflecting more aggressive strategies (e.g., non-performing loans in the second equation), the legal expense proxy predicts stock returns with high statistical significance.

Table 6 shows the results of estimating Eq. (4) in which Brown and Caylor's (2006, 2009) index, *Governance Score03-05*, is used in place of *Legal Expense03-05*. Governance Score is not significant in either equation. Again, the results for the other variables are generally consistent with the earlier results in Table 5. The exception is *Non-performing Loans03-05* which is positive and significant in this equation but not in the earlier one. Again, since *Non-performing Loans* were modest in the 2003–2005 period one should not place much emphasis on this result.

Tables 7 and 8 compare the coefficients and significance tests for the legal expense proxy and Brown and Caylor's *Governance Score* index. *Legal expense* outperforms *Governance Score* in *all* tests. In Table 7, in the *Non-performing Loans07* equation, legal expense is positive and significant at the one percent level ($t = 6.07$), indicating higher legal expense (weaker corporate governance) is associated with higher non-performing loans. The results using *Governance Score* also support the notion that weaker governance is associated with poorer bank performance, but the results are weaker as statistical significance is at the five percent level ($t = 1.77$). For *Loan charge-offs/assets07*, legal expense is also positive and significant at the one percent level ($t = 5.42$) indicating that higher legal expense (weaker corporate governance) is associated with higher loan charge-offs. The results using *Governance Score* are also consistent with this relation at the one percent level of significance, but the level of significance is lower ($t = 2.42$). For *Loan loss provisions/Assets07*, both measures of corporate governance are again positive and significant at the one percent level, but the legal expense measure ($t = 4.69$) is stronger than *Governance Score* ($t = 3.05$). These results are extremely robust; they are *very similar when loan loss measures for 2008 are used*, as indicated in the table.

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Table 6. Regression Results Relating Governance Score to Buy-and-Hold Returns and Abnormal Buy-and-Hold Returns.

	Model 1 Buy-and-hold returns Parameter estimate	Model 2 Abnormal buy-and-hold returns Parameter estimate
Governance Score	−0.0095*	0.0014
	(−1.62)	(0.26)
Non-performing Loans	2.0624	1.3770
	(0.46)	(0.32)
Ln(Assets)	−0.0620***	−0.0572***
	(−2.83)	(−2.73)
Market/Book	−0.0076	0.0085
	(−0.19)	(0.22)
ROE	1.8168***	1.5782***
	(3.23)	(2.93)
HHI	−0.2924	−0.2058
	(−1.37)	(−1.00)
Fin. Hold Co.	0.1262*	0.1273*
	(1.89)	(1.99)
Merger	0.1144	0.1087
	(1.26)	(1.25)
N	160	160
Adjusted R^2	0.6136	0.0608
F-Value	24.34***	1.95**

These regressions are based on data for 66 bank holding companies (BHCs) for 2003−2008. The dependent variables are two measures of market returns, buy-and-hold returns and abnormal buy-and-hold returns, calculated for January 1, 2007, to December 31, 2008. The explanatory variables, all for 2003−2005, are Governance Score, Brown and Caylor's (2006, 2009) corporate governance index, non-performing loans, the natural logarithm of assets, market value/book value, return on equity, the HHI (a measure of market concentration), a dummy variable for BHCs that formed a financial holding company, and a dummy variable equal to one for BHCs involved in a merger. Two dummy variables for 2003 and 2004 are included but the coefficients are not shown; 2005 is the default year. The numbers in parenthesis are *t*-statistics.

The symbols *, **, and *** indicate statistical significance for the regression coefficients at the 10 percent, 5 percent, and 1 percent levels, respectively.

In Table 8, we compare the coefficients of *Legal expense* and *Governance Score* and their significance levels for the two equations where stock returns are dependent variables. In the *Buy-and-hold returns* equation, *Legal expense* is significant at the one percent level ($t = 2.99$), but *Governance Score* is not significant. In the *Abnormal buy-and-hold returns* equation,

Table 7. Comparison of Regression Results for Legal Expense and Governance Score: Non-Performing Loans, Loan Charge-Offs, and Loan Loss Provisions as Dependent Variables.

	Model 1 Non-perform. loans/assets 2007 Parameter estimate	Model 2 Loan charge-offs/assets 2007 Parameter estimate	Model 3 Loan loss provisions/assets 2007 Parameter estimate	Model 4 Non-perform. loans/assets 2008 Parameter estimate	Model 5 Loan charge-offs/assets 2008 Parameter estimate	Model 6 Loan loss provisions/assets 2008 Parameter estimate
Legal Expense	1.7384*** (6.07)	1.3260*** (5.42)	1.4300*** (4.69)	3.5821*** (4.11)	3.1717*** (3.68)	2.9248*** (2.87)
Governance Score	−0.0001** (−1.77)	−0.0001*** (−2.42)	−0.0002*** (−3.05)	−0.0002 (−1.36)	−0.0002 (−1.35)	−0.0003 (−1.53)

This table compares the regression coefficients and significance test for two corporate governance measures, bank legal expense and Governance Score from Tables 3 and 4. The numbers in parenthesis are *t*-statistics.
The symbols ** and *** indicate statistical significance for the regression coefficients at the 5 percent and 1 percent levels, respectively.

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Table 8. Comparison of Regression Results Relating Litigation Expense and Governance Score: Buy-and-Hold Returns and Abnormal Buy-and-Hold Returns as Dependent Variables.

	Model 1 Buy-and-Hold Returns (*Buy-and-Hold Returns07-08*) Parameter estimate	Model 2 Abnormal Buy-and Hold Returns (*Abnormal-Buy-and-Hold Returns07−08*) Parameter estimate
Legal	−86.6835***	−72.7365***
Expense	(−2.99)	(−2.63)
Governance	0.0095	−0.0001
Score	(−1.62)	(−0.26)

This table compares the regression coefficients and significance test for two corporate governance measures, bank legal expense and Governance Score from Tables 5 and 6. The numbers in parenthesis are t-statistics.
The symbol *** indicates statistical significance for the regression coefficients at the 1 percent level.

Legal expense is again significant at the one percent level ($t = 2.63$), while again, Governance Score is not statistically significant.

Considering the eight regressions summarized in Tables 7 and 8, *Legal Expense03-05* is significant at the one percent level in *all eight* equations. *Governance Score* is significant in the three equations using loan loss measures for 2007; in two of these equations, significance is at the one percent level. Governance Score is not significant in the 2008 loan loss equations or in the two stock returns equations. In the three 2007 cases where *Governance Score* is statistically significant, *Legal expense* outperforms in each case. These results are especially important because no previous literature identifies legal expense as a bank corporate governance measure.

CONCLUSIONS

There are important theoretical reasons why a good corporate governance index should predict bank financial performance. Institutions with a weak or flawed strategic vision, such as an emphasis on aggressive mortgage lending, will have poorer performance over time as loan defaults increase. A lack of a good system of internal control, also the province of corporate governance, also weakens performance. Financial institutions with an appropriate strategic direction and a good system of internal control, both

of which characterize good corporate governance, should perform better over time.

We develop a legal expense proxy compiled from BHC annual 10K reports as a measure of bank corporate governance. We find that this measure for 2003 through 2005 predicts bank performance for 2007 through 2009. We use regression analysis to compare the effect of Brown and Caylor's (2006, 2009) widely cited corporate governance index and the legal expense measure. The identical dependent variables in the first set of regressions are loan loss provisions/assets, loan charge-offs/assets, and non-performing loans/assets, each measured separately for 2007 and 2008, for a total of six regression equations for each governance variable. In the second set of regressions, the (again identical) dependent variables are buy and hold stock returns and abnormal buy and hold returns measured for 2007−2008 combined, for a total of two regressions for each governance variable. Hence, there are a total of eight regressions for each governance variable. The Brown and Caylor measure predicts loan losses but not stock returns. The legal expense variable predicts both. With respect to our Research Question, *the legal expense proxy performs better than the Brown and Caylor index in all eight cases*. We conclude that bank *legal expense is a better measure of bank corporate governance* than measures commonly used in the finance literature.

These results are consistent with the findings of Peni and Vahamaa (2012) and Peni et al. (2013) in that a high *Governance score* is associated with better bank performance. But they are also consistent with Adams and Mehran's (2003) finding that *bank corporate governance is different*. Our research also raises a broader methodological question relevant to *all* corporate governance research: *How can researchers construct better corporate governance data?* Bank legal expense is a *continuous variable* focusing on the *results* of the governance process in terms of both strategic direction and internal control. Brown and Caylor (2006, 2009) and other researchers use a binary approach, coding various governance factors as zero for unacceptable and one for acceptable; the index is simply the total number of acceptable factors. As noted, we find that this approach does not work as well for commercial banks as our alternative index.

Regulators consider good corporate governance at banks important, but they do not provide data that would both measure and facilitate it. Regulators should require the reporting of bank legal expense data on the quarterly call report and report peer group comparisons of legal expense/assets[21]. As boards of directors set the strategic direction for an organization they should monitor these data as part of their responsibilities, and, if

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necessary, facilitate learning from litigation. We show that institutions with severe financial problems during the crisis had high and disproportionate legal expense and/or unfavorable litigation patterns prior to the crisis. Countrywide, NCC, and Wachovia are notable examples. Had regulators and boards of directors of these and other institutions been aware of the weak corporate governance prior to the crisis, corrective action could have been implemented sooner.

Litigation provides a (hopefully rare) window of what goes on inside a bank. Whether an institution is sued more or less frequently than its peers reflects the ethical climate within the institution. Excessive litigation may reflect inadequate training, an aggressive culture, or a failure to give the appropriate degree of attention to developing and following policies and procedures for all areas of the bank's business. Bank supervisors and examiners, investors in bank securities, security analysts, and academic researchers could all benefit considerably from access to bank legal expense data. For example, analysts should be reluctant to issue favorable reports on banks with high legal expense and adverse litigation patterns. Excessive litigation would thus be reflected in securities prices, so there would be market discipline on firms with weak corporate governance.

Regulators should rank institutions by their ratio of legal expense to assets to identify those institutions that are sued most frequently. Peer groups could be identified, such as those following a commercial lending business model, as well as investment banking and mortgage banking, as the FDIC (2004, 2014) has already done. Boards of directors of such institutions and bank regulators would then have the information and the incentive to demand an improvement in the operation of the firm. We provide seven case studies and legal expense rankings to illustrate the relation between legal expense and corporate governance. This publicly available measure of bank corporate governance would be available in a timely manner. Corporate governance measures generally rely on publically disclosed data for exchange-traded firms. Most banks do not have publically traded equity and hence do not disclose such data. Hence, another advantage of these data is that the measure would be available for all institutions on a uniform basis.

NOTES

1. As discussed in our literature review, two thirds of directors surveyed in one study mentioned in Adams et al. (2010) agreed that "*setting* the strategic direction of the company" was one of their functions (p. 64, emphasis in original). Eighty

percent agreed they were "involved in setting strategy for the company" (p. 64). The survey covered all directors, not just bank directors.

2. As of April 2015, the 2006 paper has been cited 727 times since publication, and the 2009 paper has 139 citations, according to Googlescholar.com

3. This average is for all firms covered by Brown and Caylor. The average for our sample BHCs is 26.6 (Table 2).

4. The Wachovia litigation is discussed in detail in McNulty and Akhigbe (2014). The telemarketing case, perhaps the most egregious, is described in Duhigg (2008). McNulty and Akhigbe (2014) does *not* deal with corporate governance.

5. Our legal expense proxy also fails to identify Washington Mutual (WM) as a problem institution. It ranks 13th out of the 15 firms in 2006 and ranks low consistently throughout the period. Whether a more precise legal expense peer group analysis (e.g., thrift institutions) would provide an early identification of WM's weaknesses is impossible to determine since *the data were never collected*. WM was a thrift institution and, in theory, it may have been appropriate to assign it to a different peer group in the pre-crisis period.

6. The Payments Processing Center case is a Wachovia case.

7. In such cases, regulators could rate management as unsatisfactory using the CAMELS ratings. CAMELS is an acronym for Capital, Asset Quality, Management, Earnings, Liquidity, and Market Sensitivity. All federally insured institutions receive confidential ratings in each of these areas. Koch and MacDonald (2010) describe these ratings.

8. Gup's (2007) cases are all different from the ones presented in this paper.

9. Rezaee (pp. 51–53) provides names and website addresses for all eight of these services.

10. Many of the owners of the banks or BHCs involved refused to speak to the *Journal* about their practices.

11. This section is a shortened version of two case studies from McNulty and Akhigbe (2014).

12. The company also allegedly lost or destroyed more than half a million dollars in checks paid by homeowners in bankruptcy over a two-year period. There are 300 bankruptcy cases in western Pennsylvania alone where the types of issues discussed here were raised (Morgenson, 2008b).

13. Bank examination reports are not made public, so there is no way to determine if the bank was subject to any regulatory criticism for its administration of this loan.

14. We begin with a list of the top 150 BHCs for 2006 from the *American Banker*. We add all smaller BHCs for which we can locate an annual 10K reports. There are many additional, generally small, BHCs in the industry, but the smaller institutions do not have stock return data on CRSP, and/or they do not publish a 10K report showing legal expense. These two factors limit the initial sample to 83 institutions, of which 66 also have a *Governance Score* index.

15. In McNulty and Akhigbe (2014), we report the various descriptors used by each of the 83 BHCs and the number of institutions using each one. We find that there is a high degree of reporting consistency among the BHCs; most use the same or very similar terminology. It is clear from the descriptions that the data include payments to law firms *in all cases*. This expense measures the first step in the

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litigation process, and these payments to attorneys would be an ongoing expense until the matter is resolved. Settlements are generally reported as "other operating expense" in the 10K reports and hence are not included in the proxy.

16. We use the ratio of noninterest income to traditional spread income (net interest income) for 2006 as a measure of investment banking orientation. Data for net interest income and noninterest income are obtained from *Value Line*. Five investment-banking-oriented BHCs have a high ratio of noninterest income to net interest income, ranging from 2.85 to 9.60. These are excluded from our study. For BHCs with a commercial banking orientation, the ratio ranges from 0.75 to 1.09. JP Morgan Chase, with a ratio of 1.89, is the only BHC that is difficult to classify. With this exception, there is a clear separation between the two groups. At JP Morgan Chase a substantial part of legal expense is no doubt not related to litigation but to mergers and acquisitions and securities offerings. (We thank a former JP Morgan employee for this observation.)

17. High legal expense and a pattern of unfavorable litigation against the firm could trigger a series of unsatisfactory ratings on the "management" component of the CAMELS ratings. This might produce the appropriate change in governance.

18. Bank management textbooks have adopted the FDIC's approach to defining bank business models. See Koch and MacDonald (2010). The same peer groups could easily be used for legal expense reporting.

19. Governance Score is a rating from 1 to 51. It is independent of bank size so we do not create a ratio of *Governance Score* to total assets. The bank income and loan loss measures are dollar amounts which depend on bank size, so we scale these variables by total assets.

20. We have a panel of independent variables. Nonetheless, we cannot take advantage of panel techniques because we are predicting out of sample.

21. The ratio legal expense/revenue should also be reported. Revenue may be an important basis of comparison since both legal expense and revenue are financial flows derived from bank income statements. As discussed in McNulty and Akhigbe (2014), the regular disclosure of these ratios to bank managers could be accomplished by incorporating both ratios into the Uniform Bank Performance Reports. (These reports for individual banks are available at FDIC.gov.) This could also be accomplished by creating a separate corporate governance report containing these and possibly other governance related ratios.

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CORPORATE POLITICAL CONNECTIONS AND THE IPO PROCESS: THE BENEFITS OF POLITICALLY CONNECTED BOARD MEMBERS AND MANAGERS

Reza Houston and Stephen P. Ferris

ABSTRACT

In this study, we examine the relationship between political connections of private firms and the initial public offering process. Using registration statement information, we create a unique database of politically connected IPO firms. We find that political connections are substitutes to high-quality underwriters and big four auditors. Politically connected firms manage earnings more highly upward than non-connected firms prior to the public offering. Politically connected firms also exhibit less underpricing than non-connected firms. Finally, politically connected

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IPO firms have superior post-IPO returns relative to non-connected IPO firms.

Keywords: Political connections; investment banking; government policy; government policy and regulation

JEL classifications: G24; G34; G38; K21

INTRODUCTION

Firms that undertake an initial public offering are faced with the tasks of signaling the quality of the public offering to investors and meeting regulatory standards. A firm that initiates an initial public offering and cannot convince potential investors to purchase shares will likely cancel the offering. Firms have a number of ways to signal the quality of the offering to investors: underwriter quality (Booth & Smith, 1986; Carter & Manaster, 1990; Loughran & Ritter, 2004), auditor quality (Michaely & Shaw, 1995), venture capital investment (Megginson & Weiss, 1991), etc. One signal that has not been previously identified is the ability to attract former regulators or politicians to the firm.

Former regulators or politicians often have an intimate understanding of the procedures of regulatory agencies that oversee the firm. They can guide the firm's management through the public offering process. They often have relationships with current regulators that could provide the firm with non-public information. Former regulators who maintain relationships with individuals currently working at the Securities Exchange Commission might have a better understanding of how to draft the registration statement in order to reduce the likelihood that a successful investor lawsuit will emerge. Connections to current regulators can also help the firm avoid litigation associated with a false or misleading registration statement. The ability to hire a former government regulator or politician to the board or management team of a firm could be a strong signal of firm quality. The cost of the signal is represented by the opportunity cost of failing to appoint a technical or industry expert to the board.

Former regulators and politicians provide good monitoring of the firm because their reputation is valuable. Former regulators often rejoin regulatory agencies, accept political appointments, or get hired to additional board positions (Goldman, Rocholl, & So, 2009). By serving on the board

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or management team of a firm that destroyed investor wealth, these individuals would be harming their own reputation capital. Former regulators are less willing to serve firms which could harm their reputation capital. Therefore, they will only serve firms that they believe will maintain or enhance their reputation. Houston and Ferris (in press) examine public firms and find that former politicians serve firms that are larger and more profitable. Former government officials are likely to be attracted to private firms with high potential for generating cash flows and enhancing their prestige.

Firms which are able to signal quality to investors should not need to compensate investors for risk. This benefit of signaling is consistent with the credibility argument of Chemmanur and Paeglis (2005). Former regulators who choose to serve the firm have the ability to monitor and provide guidance but have the incentive to resign from the firm's board or management when they believe continued service will harm their reputational capital. Therefore, firms that hire these individuals should be more credible and have less underpricing in their initial public offering.

After the public offering is complete, newly public firms with political connections can be expected to outperform other firms for several reasons. These firms will maintain their relationships with current government officials after the public offering. Relationships with current regulators decrease the likelihood of litigation once the firm is publicly traded (Correia, 2014) and increase the value of the firm. Firms that maintain relationships with government agencies are more likely to receive government contracts (Goldman, Rocholl, & So, 2013). Firms that continue to employ former regulators are more likely to be bailed out and therefore have a lower cost of debt (Cheng & Milbradt, 2011; Dam & Koetter, 2012). Finally, firms which hire former regulators could also benefit from litigation avoidance stemming from the public offering. Former regulators, particularly those who previously served as members of the Securities Exchange Commission, might know how to construct the registration statement and interact with investors so as to avoid a lawsuit.[1]

Our results support the signaling hypothesis. Consistent with our expectations, larger, more prestigious private firms are able to attract former regulators and politicians. We document a negative relationship between our measure of political connections and other measures of IPO quality. This result is consistent with prior studies of IPO signal choices by management (Datar, Feltham, & Hughes, 1991; Hughes, 1986; Li & McConomy, 2004). Politically connected issuances are less underpriced than other issuances, even after controlling for other signals of quality.

The signal conveyed by the appointment of former government officials to the firm also appears to be credible. Consistent with the expectation that politically connected firms are less likely to avoid shareholder lawsuits, IPO firms which employ regulators and politicians to their board or management team manipulate earnings to a greater extent than do other IPO firms. Politically connected IPO firms also offer superior returns to investors over the first year, though not over longer time periods. The politically connected firms in our sample also exhibit larger asset growth in the three years around the public offering.

This study provides the first evidence of the value political connections provide to firms whose managers intend to undertake an initial public offering in the near future. The percentage of U.S. IPO firms which employ former regulators or politicians as board members or executive officers doubles from 17% to 34% between the first and last five years of our sample. This increasing prominence of former regulators or politicians suggests an increase in the value private firms see in former U.S. government officials. Our study shows a large portion of the value provided by these individuals comes from the increase in credibility of the firm's future issuance.

This study is organized as follows. In the section "Hypotheses Regarding New Equity Offerings and Corporate Political Relations," we develop our hypotheses. The data sources and sample construction are described in the section "Data Sources and Sample Construction." We present the empirical results in the section "Empirical Analysis" and conclude our discussion in the section "Conclusions."

HYPOTHESES REGARDING NEW EQUITY OFFERINGS AND CORPORATE POLITICAL RELATIONS

We determine the impact political connections have on initial public offerings. Former regulators or politicians (or lawyers) who are hired by the firm strengthen the relationships between the firm and current regulators, help the firm overcome regulatory concerns, monitor the firm, and provide a signal of the firm's quality. The ability to signal the firm's quality is most crucial during the public offering process. High-quality firms are less underpriced, which allows these firms to raise more capital (Beatty & Ritter, 1986; Boulton, Smart, & Zutter, 2011; Michaely & Shaw, 1995). After the public offering is complete, the quality of the firm should be apparent through its operating performance.

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Firms that are unable to signal their ability to offer new shareholders an appropriate return on their investment are often forced to price shares at a significant discount. Many firms use a combination of signals such as underwriter or auditor quality to attract investors (Loughran, Ritter, & Rydqvist, 1994; Megginson & Weiss, 1991). The hiring of former regulators signals that the firm can attract individuals who understand the public offering process. These individuals are often prestigious and can bring greater press coverage to the firm during the public offering.

Former regulators serve as effective monitors for the firm because their reputational capital is valuable to them. In addition to being appointed to other board positions, former politicians and regulators who serve firms often rejoin government agencies or run for public office at a later date. A poor public offering would lead to negative press coverage which damages the former politician or regulator's reputational capital and ability to regain public office.

Because former regulators provide a signal of the firm's quality prior to the public offering, their presence might give a firm the opportunity to employ an underwriter or syndicate that costs less and provides a weaker signal of firm quality. These underwriters charge higher fees but also signal the issue quality (Fang, 2005). This leads to the following hypothesis:

Hypothesis 1a. Politically connected firms are less likely than non-politically connected firms to employ highly ranked underwriters.

The signal which former regulators are able to provide concerning a firm's quality might replace the signal which top auditors provide to firms. It is possible that firms which would benefit from the signal a top 4 auditor would provide might instead choose to appoint a former regulator or politician to the board. We therefore hypothesize:

Hypothesis 1b. Politically connected firms are less likely than non-politically connected firms to employ a top 4 auditor.

Firms that are preparing to undergo an initial public offering have the incentive to inflate earnings in excess of actual cash flows. Inflated earnings should increase the interest of investors who solely examine the IPOs earnings but who are unaware of the increase in discretionary accruals. Prior research indicates that IPO firms have positive changes in discretionary accruals in the year prior to initial public offerings (Teoh, Welch, & Wong, 1998).

The inflation of discretionary accruals is a symptom of poor accrual quality. While the firm might be able to entice investors to pay a higher

price for shares in the IPO, the costs to poor earnings quality include increased cost of debt (Francis, LaFond, Olsson, & Schipper, 2005), an increase in the likelihood of litigation (DuCharme, Malatesta, & Sefcik, 2001), and increased auditor fees (Abbott, Parker, & Peters, 2006).

The possibility exists that the costs of earnings management are lower for politically connected firms. Dinç (2005), Claessens, Feijen, and Laeven (2008), and Faccio and Parsley (2009) find politically connected firms receive preferential access to credit. The resulting costs of shareholder lawsuits could also be lower (Correia, 2014). In this case, politically connected firms might be more willing to inflate earnings prior to the initial public offering than non-politically connected firms. We hypothesize:

Hypothesis 2. Politically connected firms use more earnings management prior to their initial public offering.

The ability to attract a former government official, who likely has regulatory experience, to serve as a director or manager of a firm, is a signal that the firm will provide investors an appropriate return on their investment. Public offerings which promise strong returns to investors require less underpricing (Loughran & Ritter, 2004; Lowry, Officer, & Schwert, 2010; Lowry & Shu, 2002). Underpricing provides compensation for the large risk associated with a new public issuance. We expect firms which are politically connected at the time of the initial public offering to be less underpriced than non-politically connected firms:

Hypothesis 3. Politically connected IPOs have less underpricing than non-politically connected IPOs.

Firms that are politically connected prior to the public offering might also have stronger financial and operating performance after the public offering for two reasons. First, the private firms that are able to attract former regulators are those with superior earnings quality. Second, former regulators might provide several direct benefits to the firm.

Former regulators will be attracted to the most prestigious firms. These firms should have higher profitability ratios and be larger than firms that are unable to attract former regulators. These firms should also have less need to inflate earnings around the public offering. After the public offering, these firms will have stronger financial performance and will not have to manage earnings downward.

Politically connected firms might be able to collude to a greater degree with government regulators after the public offering process. This collusion could decrease the cost of litigation and increase the future cash flows of

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the firm. Public firms with political connections also have a lower cost of capital (Boubakri, Guedhami, Mishra, & Saffar, 2012), a decrease in regulatory enforcement (DeHaan, Kedia, Koh, & Rajgopal, 2014), greater likelihood of receiving defense contracts (Goldman et al., 2013), better access to credit (Claessens et al., 2008), and greater likelihood of receiving a bailout (Duchin & Sosyura, 2012; Faccio, Masulis, & McConnell, 2006). Political connections are particularly valuable for firms in industries that are heavily regulated by the government (Hillman, 2005; Hillman & Keim, 1995). Both Goldman et al. (2009) and Houston and Ferris (in press) examine hirings of former regulators to U.S. firms and find positive investor responses to these events. A positive investor response indicates investors believe former regulators add value to U.S. firms when they are hired to either the board or the management team.

For these two reasons, both the post-IPO financial and operating performance of politically connected IPOs should be superior to the post-IPO financial and operating performance of non-politically connected IPOs. Previous research supports this expectation. We therefore hypothesize that:

Hypothesis 4a. Politically connected IPOs have better subsequent financial performance than non-politically connected IPOs.

Hypothesis 4b. Politically connected IPOs have better subsequent operating performance than non-politically connected IPOs.

DATA SOURCES AND SAMPLE CONSTRUCTION

Construction and Data for the IPO Sample

The financial and return data for this study comes from Compustat and CRSP respectively over the period 1997–2013. We begin our sample in 1997 because the political connections data is available from EDGAR starting around 1997.

The initial public offerings in this sample are provided by the SDC Platinum database. We impose the following filters to acquire the IPO data:

(1) The domicile nation of IPO firm is the United States
(2) The issuer/borrower public status is private
(3) The amount filed in all markets must be greater than $1 million

(4) Exclude all unit issues
(5) Exclude all unit investment trusts
(6) Exclude all closed-end funds
(7) SDC deal type is common

The SDC database provides data on the proceeds raised in the issuance, the underwriter, the auditor, and whether the firm is backed by venture capital. The restrictions listed above provide us with 2,661 possible IPO observations. Once exclude observations with missing accounting, return, or political connections data our sample consists of 1,863 initial public offerings.

Measures of Political Connections in the IPO Sample

We rely on registration statements provided by EDGAR for our data on political connections. Firms provide approximately a paragraph of biographical information on each director and executive in the registration statement. From this information, we determine whether each firm has a director or member of its management team that is politically connected.

We create three measures of political connections, with the first being the most restrictive. Each measure is a binary variable, with one indicating the firm as politically connected and zero indicating otherwise. Our first measure, POL1, is equal to one if a firm has a former politician or industry regulator on the board or management team. Our second measure, POL2, indicates whether the firm has a former politician, regulator, or high-ranking military officer on its board or management team. POL3 indicates a firm has a former politician, regulator, military officer, or non-general counsel lawyer on the board or management team.

Table 1. Descriptive Statistics of the IPO Sample.

	Measure of Political Connections								
	POL1			POL2			POL3		
SIC code	PC	NPC	*P*-value	PC	NPC	*P*-value	PC	NPC	*P*-value
Panel A: The number of IPOs by industry									
0000-0999	1	2	0.5540	1	2	0.5660	3	0	0.0666*
1000-1999	12	43	0.6960	12	43	0.7430	25	30	0.7945
2000-2999	49	209	0.7410	50	208	0.7640	114	144	0.2990

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Table 1. (*Continued*)

	Measure of Political Connections								
	POL1			POL2			POL3		
SIC code	PC	NPC	*P*-value	PC	NPC	*P*-value	PC	NPC	*P*-value
3000-3999	47	307	0.0007***	47	307	0.0004***	144	210	0.0065***
4000-4999	38	90	0.0030***	38	90	0.0050***	77	51	0.0023***
5000-5999	11	100	0.0070***	11	100	0.0060***	40	71	0.0153**
6000-7999	87	202	<.0001***	88	201	<.0001***	174	115	<.0001***
7000-7999	84	462	0.0020***	87	459	0.0040***	238	308	0.0455**
8000-8999	38	80	0.0004***	39	79	0.0003***	63	58	0.1628
9000-9999	1	0	0.0440***	1	0	0.0460***	1	0	0.2899
Regulated firms	125	292	<.0001***	126	291	<.0001***	251	166	<.0001***
Non-regulated firms	243	1203		248	1198		818	628	
Num. of obs.	368	1495		374	1489		1069	794	

	Measure of Political Connections								
	POL1			POL2			POL3		
Year	PC	NPC	*P*-value	PC	NPC	*P*-value	PC	NPC	*P*-value
Panel B: The number of IPOs per year									
1997	35	212	0.0180**	35	212	0.0129**	96	151	0.0049***
1998	29	132	0.5616	29	132	0.4942	60	101	0.0084***
1999	38	241	0.0053***	38	241	0.0035***	106	173	0.0009***
2000	24	188	0.0011***	25	187	0.0014***	71	141	<.0001***
2001	7	26	0.8318	7	26	0.8693	12	21	0.2091
2002	15	30	0.0205**	15	30	0.0246**	27	18	0.0812*
2003	14	37	0.1615	14	37	0.1824	32	19	0.0240**
2004	30	99	0.3003	32	97	0.1644	76	53	0.0057***
2005	29	82	0.0820*	29	82	0.1008	54	57	0.7496
2006	26	84	0.2916	26	84	0.3364	55	55	0.5416
2007	22	81	0.6736	23	80	0.5567	60	43	0.0206**
2008	6	11	0.1059	6	11	0.1156	11	6	0.1459
2009	13	25	0.0237**	13	25	0.0280**	27	11	0.0029***
2010	19	56	0.2153	19	56	0.2459	47	28	0.0061***
2011	15	56	0.7669	15	56	0.8215	42	29	0.0393**
2012	22	47	0.0099***	22	47	0.0126**	41	28	0.0380**
2013	24	88	0.6460	26	86	0.3923	62	50	0.0738*
Num. of obs.	368	1495		374	1489		879	984	

In this table, we report the number of observations by industry and year. Firms are separated into industries based on their main SIC code in SDC. Regulated firms are defined as firms with SIC codes between 4000-4999 or between 6000-6999. The *P*-values indicate the significance of the difference between the percentage of politically connected IPOs in the subsample and the population average.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels.

IPO Sample Description

Descriptive Statistics of the IPO Sample

In Table 1, we provide the descriptive statistics of our IPO sample. We measure political connections of each IPO firm using our three measures of political connections. Panel A provides the number of initial public offerings by industry. We separate industries by using the primary one-digit SIC code of each IPO firm provided by SDC Platinum. Panel B provides the annual number of IPOs separated by political connections. The IPO year is the year of the issuance date reported by SDC Platinum.

Panel A indicates firms in heavily regulated industries are more likely to hire former politicians or regulators. Approximately 30.0% of sample firms in the utilities (SIC codes 4000-4999) and finance, insurance and real estate (SIC codes 6000-6999) industries are politically connected according to our POL1 measure. This is significantly higher than the 20.2% of firms in other industries. Only 12.5% of firms in the retail (SIC codes 5000-5999) and manufacturing (SIC codes 3000-3999) industries have former politicians or industry regulators on their boards or management teams. Our use of the POL2 and POL3 measures indicate similar results. The large percentage of politically connected IPO firms in heavily regulated industries is consistent with the political connections of S&P 1500 firms (Houston & Ferris, in press).

Panel B indicates that the percentage of IPO firms with political connections varies by year. From 1997 to 2000, the percentage of sample firms with political connections is significantly lower than the sample average. However, firms with political connections represent a larger portion of IPO firms in several years later in our sample. According to the POL3 measure, a significantly larger portion of sample firms are politically connected in the last five years of our sample. One explanation for this result is that a larger percentage of public offerings from 1997 to 2000 were by technology firms than by firms in regulated industries. Technology firms currently face less regulatory oversight than other U.S. firms.

Our results indicate that the likelihood of an IPO firm being politically connected is dependent on the industry in which the firm primarily operates and on the time in which the firm's manager decides to undertake the public offering. Firms that interact with regulators more often are more likely to hire former politicians, former regulators, high-ranked military officers, or non-general counsel lawyers to serve as board members or managers. The number of firms that are politically connected during the public offering is increasing over the sample period, though these findings are likely explained by the technology bubble in the late 1990s and early 2000s.

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Table 2. Comparative Statistics of the IPO Sample.

	Measure of Political Connections					
	Mean			Median		
	PC	NPC	*P*-value	PC	NPC	*P*-value
Panel A: Comparative statistics of all IPO firms						
Total assets	585.5	292.5	0.0003***	104.2	41.9	<.0001***
Total equity	33.8	17.5	0.2684	−3.7	−0.2	0.0739*
Total sales	300.8	190.4	0.0137**	59.0	37.6	<.0001***
Cash/total assets	0.1801	0.2355	<.0001***	0.0902	0.1555	<.0001***
Return on assets	−0.1660	−0.2559	0.0046***	−0.0002	−0.0173	0.0450**
Return on equity	0.2339	0.2013	0.7430	0.1419	0.1892	0.6252
Debt/total assets	0.2798	0.2193	0.0024***	0.1513	0.0776	0.0019***
Num. of obs.	320	1338		320	1338	
Panel B: Comparative statistics of regulated IPO firms						
Total assets	864.2	808.8	0.7701	314.1	238.7	0.3292
Total equity	68.7	102.2	0.2968	17.3	19.3	0.2769
Total sales	217.9	267.9	0.4688	70.2	79.5	0.9632
Cash/total assets	0.1162	0.1282	0.5664	0.0424	0.0418	0.4740
Return on assets	−0.0310	−0.0385	0.7963	0.0056	0.0071	0.6425
Return on equity	0.3478	0.1997	0.3642	0.1345	0.1127	0.6928
Debt/total assets	0.3190	0.3057	0.7524	0.1284	0.1743	0.9546
Num. of obs.	103	241		103	241	
Panel C: Comparative statistics of non-regulated IPO firms						
Total assets	453.1	179.1	0.0013***	61.7	33.1	<.0001***
Total equity	17.3	−1.1	0.2751	−7.0	−8.3	0.3083
Total sales	340.2	173.4	0.0048***	49.3	33.0	0.0003***
Cash	0.2104	0.2591	0.0039***	0.1192	0.1887	0.0036***
Return on assets	−0.2301	−0.3037	0.0865*	−0.0091	−0.0668	0.1015
Return on equity	0.1799	0.2016	0.8651	0.1661	0.2280	0.5433
Debt/total assets	0.2611	0.2003	0.0060***	0.1604	0.0669	0.0034***
Num. of obs.	217	1097		217	1097	

This table reports the comparative statistics of the firms in the IPO sample. PC indicates politically connected firms. NPC indicates non-politically connected firms. We use three measures of political connections. Firms which are politically connected according to the first political connectedness measure (POL1) have at least one member of the board of directors or a manager who is a former politician and regulator. POL2 defines politically connected firms as those firms which have a former politician, regulator on their board or management team, or former high-ranking member of the military (0−7 or greater). POL3 defines politically connected firms as those firms which have a former politician, regulator, member of the military, or lawyer on the board or management team. Regulated firms are defined as real estate and banking firms (firms with SIC codes 4000-4999 or 6000-6999).

*, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Comparative Statistics of the IPO Sample

In Table 2 we report the comparative statistics between our politically connected and non-politically connected samples of IPO firms. We identify firms as politically connected if they have a former politician or regulator on their board or management team (POL1 = 1). In Panel A, we report the comparative statistics of our entire sample. In Panel B, we report the comparative statistics of only the firms with primary SIC codes between 4000-4999 and 6000-6999 provided by SDC Platinum. We refer to this as our regulated sample. In Panel C, we report the comparative statistics of the politically connected and non-politically connected firms that are not in our regulated sample.

In Panel A, we report that politically connected IPO firms are larger both in terms of total assets and total sales than non-politically connected IPO firms. Firms with former politicians or regulators also have less cash on hand as a percentage of total assets and are more heavily indebted in the year prior to the public offering. While we find firms in both samples have negative average and median returns on assets, the return on assets of politically connected firms at the end of the fiscal year prior to the issuance is less negative than that of non-politically connected firms.

Panel B indicates that there is no difference in the size, cash on hand, debt/total assets, or return on assets of politically connected and non-politically connected firms. The financial services and utilities firms in this subsample are significantly larger and less indebted than the average firm in our total full sample. Both the politically connected and non-politically connected regulated IPO firms have positive median return on assets, which differs from the non-regulated subsample in Panel C.

The average politically connected firm in the non-regulated IPO sample presented in Panel C is approximately 250% larger than the average non-politically connected firm in the subsample. Politically connected firms in the non-regulated subsample have lower cash/total assets than non-politically connected non-regulated IPO firms. Politically connected IPO firms in our sample are also higher debt/total assets ratios than non-politically connected firms.

The differences in the size, profitability, and debt ratios of the politically connected firms prior to the public offering versus non-politically connected firms prior to the offering is consistent with findings of Goldman et al. (2009) and Houston and Ferris (in press) on the differences between politically connected and non-politically connected firms. However, these

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papers do not distinguish between regulated and non-regulated firms. The lack of difference between politically connected and non-politically connected IPO firms in the regulated sample is likely due in part to restrictions on interest rates and prices charged to customers of banks and utilities that are represented in this sample.

EMPIRICAL ANALYSIS

The Relationship between Political Connections and Underwriter Quality

Table 3 reports the relationship between the underwriter ranking and political connections of IPO firms. In Panel A, we report the univariate tests between the two variables. In Panel B we report the multivariate tests of the relationship between political connections and underwriter ranking of IPO firms. We use three measures of underwriter rankings. All three measures are provided by Corwin and Schultz (2005).[2] The first measure is the Corwin and Schultz (2005) measure based on the proportion of offer proceeds underwritten by the underwriters in their sample. The second measure is Carter and Manaster (1990) rank based on updated data provided by Jay Ritter's website. The third measure is the Megginson and Weiss (1991) measure which is a ranking based on market share of offer proceeds. To compute this measure, the authors credit the proceeds from each offer to the lead underwriter.

Table 3. The Relationship between Political Connections and Underwriters.

	Measure of Political Connections								
	POL1			POL2			POL3		
	PC	NPC	*P*-value	PC	NPC	*P*-value	PC	NPC	*P*-value
Panel A: Univariate tests									
Underwriter ranking	4.6994	4.7796	0.7143	4.6659	4.7880	0.5757	5.1409	4.4274	<.0001***
Ritter rank	8.2180	8.2088	0.9169	8.1900	8.2155	0.7758	8.3533	8.0822	0.0001***
Megginson-Weiss reputation	6.8493	6.4569	0.4016	6.8071	6.4649	0.4614	7.3563	5.7894	<.0001***

Table 3. (*Continued*)

	Dep. Var. = Underwriter Ranking					
	Ordinary least squares			Tobit regression		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B: *Multivariate tests*						
B.1: *Corwin and Schultz (2005) measure of underwriter quality*						
Intercept	−35.0900***	−35.0600***	−35.2300***	−35.0904***	−35.0635***	−35.2256***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
POL1	−0.3300*			−0.3292*		
	(0.0636)			(0.0565)		
POL2		−0.3700**			−0.3716**	
		(0.0352)			(0.0303)	
POL3			0.1200			0.1236
			(0.3862)			(0.3731)
Reg	0.3100	0.2700	0.6200			
	(0.9097)	(0.9201)	(0.8196)			
Big 4	1.5100***	1.5000***	1.5300***	1.5061***	1.5035***	1.5319***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
ln(Proceeds)	4.6300***	4.6400***	4.5900***	4.6335***	4.6368***	4.5899***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Total assets	0.0000	0.0000	0.0000	−98.5255	−98.3317	−107.0712
	(0.2508)	(0.2515)	(0.2126)	(0.2378)	(0.2385)	(0.2000)
ROE	0.1000**	0.0900**	0.0900**	0.0950*	0.0945**	0.0932**
	(0.0260)	(0.0268)	(0.0292)	(0.0220)	(0.0227)	(0.0249)
Venture backed	0.7700***	0.7700***	0.8000***	0.7733***	0.7706***	0.7957***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Pre-IPO earnings dummy	−0.1200	−0.1200	−0.1200	−0.1221	−0.1214	−0.1184
	(0.4686)	(0.4711)	(0.4826)	(0.4563)	(0.4588)	(0.4705)
Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.41	0.41	0.40	0.10	0.10	0.10
Num. of obs.	1605	1605	1605	1605	1605	1605

	Dep. Var. = Ritter Ranking					
	Ordinary least squares			Tobit regression		
	(1)	(2)	(3)	(4)	(5)	(6)
B.2: *Ritter (modified Carter and Manaster) measure of underwriter quality*						
Intercept	−8.98***	−8.96***	−8.98***	−8.98***	−8.96***	−8.98***
	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)
POL1	−0.05			−0.05		
	(0.49)			(0.47)		
POL2		−0.09			−0.09	
		(0.23)			(0.22)	
POL3			0.07			0.07
			(0.30)			(0.25)
Reg	0.25	0.22	0.33			
	(0.83)	(0.85)	(0.80)			

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Table 3. (*Continued*)

	Dep. Var. = Ritter Ranking					
	Ordinary least squares			Tobit regression		
	(1)	(2)	(3)	(4)	(5)	(6)
Big 4	1.02***	1.02***	1.03***	1.02***	1.02***	1.03***
	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)
ln(Proceeds)	1.93***	1.94***	1.92***	1.93***	1.94***	1.92***
	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)
Total assets	0.00***	0.00***	0.00***	−142.08***	−141.57***	−144.67***
	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)
ROE	0.02	0.02	0.02	0.02	0.02	0.02
	(0.23)	(0.23)	(0.20)	(0.22)	(0.22)	(0.23)
Venture backed	0.48***	0.48***	0.49***	0.48***	0.48***	0.49***
	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)
Pre-IPO earnings dummy	−0.02	−0.02	−0.02	−0.02	−0.02	−0.02
	(0.74)	(0.74)	(0.80)	(0.73)	(0.73)	(0.76)
Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.40	0.40	0.40	0.15	0.15	0.15
Num. of obs.	1601	1601	1601	1601	1601	1601
	Dep. Var. = Megginson-Weiss Reputation					
	Ordinary least squares			Tobit regression		
	(1)	(2)	(3)	(4)	(5)	(6)
B.3: Megginson and Weiss (1991) *Measure of underwriter quality*						
Intercept	−66.66***	−66.63***	−66.77***	−66.66***	−66.63***	−66.77***
	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)
POL1	−0.37			−0.37		
	(0.36)			(0.34)		
POL2		−0.41			−0.41	
		(0.30)			(0.29)	
POL3			0.19			0.19
			(0.54)			(0.53)
Reg	0.43	0.39	0.78			
	(0.94)	(0.95)	(0.90)			
Big 4	1.99***	1.99***	2.01***	1.99***	1.99***	2.01***
	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)
ln(Proceeds)	8.56***	8.56***	8.50***	8.56***	8.56***	8.50***
	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)
Total assets	0.00	0.00	0.00	78.80	79.06	66.58
	(0.69)	(0.69)	(0.73)	(0.68)	(0.68)	(0.73)
ROE	0.16*	0.16*	0.16	0.16*	0.16*	0.16*
	(0.10)	(0.10)	(0.10)	(0.09)	(0.09)	(0.09)
Venture backed	1.57***	1.56***	1.60***	1.57***	1.56***	1.60***
	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)
Pre-IPO earnings dummy	−0.13	−0.13	−0.13	−0.13	−0.13	−0.13
	(0.73)	(0.73)	(0.73)	(0.72)	(0.72)	(0.72)
Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes

Table 3. (*Continued*)

	Dep. Var. = Megginson-Weiss Reputation					
	Ordinary least squares			Tobit regression		
	(1)	(2)	(3)	(4)	(5)	(6)
Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.32	0.32	0.32	0.06	0.06	0.06
Num. of obs.	1542	1542	1542	1542	1542	1542

This table examines the relationship between political connections and the quality of the underwriter used during the public offering. The *Underwriting Rank* is the ranking provided by ranking based on the proportion of offer proceeds underwritten by each underwriter, as listed in the final prospectus. This measure comes from the Corwin and Schultz (2005) dataset provided online (UWRANK_9702). All three measures of lead underwriter quality come from this dataset. The Megginson-Weiss (1991) ranks and Underwriting ranks are adjusted to account for underwriters that enter or leave the sample as a result of mergers and acquisitions. Underwriters involved in a merger are treated as a new entity after the merger. The Ritter measure is an updated version of the Carter-Manaster (1990) ranking. Panel A provides univariate tests of the difference between the Underwriter Ranking and political connections of the firm. PC indicates politically connected firms. NPC indicates non-politically connected firms. We use three measures of political connections. Firms which are politically connected according to the first political connectedness measure (POL1) have at least one member of the board of directors or a manager who is a former politician and regulator. POL2 defines politically connected firms as those firms which have a former politician, regulator on their board or management team, or former high-ranking member of the military (0–7 or greater). POL3 defines politically connected firms as those firms which have a former politician, regulator, member of the military, or lawyer on the board or management team. Regulated firms are defined as real estate and banking firms (Firms with SIC codes 4000-4999 or 6000-7999). *Reg* equals one if the firm is in a regulated industry. *Big_4* equals one if the firm employed a Big 4 auditor and zero otherwise. *ln(Proceeds)* is the natural log of the proceeds received from the IPO. *Total assets* are the firm's total assets in the year prior to the IPO. *ROE* is the return on equity in the year prior to the IPO. *Venture backed* equals one if SDC identifies a venture capitalist as investing in the firm prior to the IPO and zero otherwise. *Pre-IPO Earnings Dummy* indicates whether the firm had positive earnings in the year prior to the IPO. The R^2 reported for the Tobit regressions is the McFadden's R^2.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels.

In Panel A, we report the difference in underwriter ranking between politically connected and non-politically connected IPOs. We find an insignificant difference in each mean underwriter ranking when we separate our sample using the POL1 or POL2 measures. When we separate our sample based on POL3, we find politically connected firms have significantly higher underwriter rankings than non-politically connected firms.

In Panel B, we regress underwriter rankings on our variable of interest, control variables, and year and industry fixed effects. We follow Fernando, Gatchev, and Spindt (2005) in our multivariate methodology. We identify industries by using the primary two-digit SIC codes reported by SDC. The variable of interest in this panel is POL1, POL2, or POL3. In models

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(1), (2), and (3), we report the results of the OLS tests. We find a negative relationship between the Corwin and Schultz (2005) underwriter ranking and political connections. In models (4), (5), and (6) of Panel B, we report the results of Tobit regressions using the same model. The underwriter ranking in the Tobit regressions is censored at zero. The use of Tobit regression does not alter the significance of our results. Politically connected firms are less likely than non-politically connected firms to hire top-ranked underwriters.

The Corwin and Schultz (2005) measure avoids two problems plaguing the Carter and Manaster (1990) and Megginson and Weiss (1991) rankings. First, the Corwin and Schultz measure's dependence upon the value of proceeds makes it a more accurate measure of overall underwriter prestige. The Carter and Manaster (1990) ranking for instance, does not distinguish between the few top underwriters. All of the most prestigious underwriters receive a Carter-Manaster score of 9. Second, Unlike the Megginson and Weiss (1991) ranking, Corwin and Schultz (2005) base their measure on the share of the IPO proceeds underwritten by each underwriter regardless of whether the firm was the lead underwriter. The problems associated with these two measures could explain why we find marginally significant results when we regress the Ritter or Megginson and Weiss underwriter rankings on our variables of interest.

Table 4. Political Connections of IPO Firms and Top 4 Auditors.

	Measure of Political Connections								
	POL1			POL2			POL3		
	PC	NPC	*P*-value	PC	NPC	*P*-value	PC	NPC	*P*-value
Panel A: Univariate tests									
Top 4 Auditor	0.8438	0.8969	0.016**	0.8436	0.8971	0.0144**	0.8812	0.8914	0.5143

	Dependent Variable = BIG_4					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B: Multivariate test						
Intercept	−8.5868	−8.5865	−8.8247	−8.8846	−8.8558	−9.0395
	(0.9650)	(.9650)	(0.9641)	(0.9638)	(0.9639)	(0.9632)
POL1	−0.2524*			−0.0473		
	(0.0515)			(0.7725)		
POL2		−0.2455*			−0.0607	
		(0.0574)			(0.7080)	
POL3			−0.1208			0.0224
			(0.2728)			(0.8591)

Table 4. (*Continued*)

	Dependent Variable = BIG_4					
	(1)	(2)	(3)	(4)	(5)	(6)
Reg	−4.6527	−4.656	−4.5853	−4.2942	−4.3335	−4.0808
	(0.9811)	(0.9810)	(0.9813)	(0.9825)	(0.9824)	(0.9834)
POL1*reg				−0.6377**		
				(0.0237)		
POL2*reg					−0.5739**	
					(0.0398)	
POL3*reg						−0.6449**
						(0.0142)
ln(Proceeds)	1.6557***	1.6561***	1.678***	1.6663***	1.6652***	1.6875***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Total assets	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.7334)	(0.7406)	(0.7303)	(0.7494)	(0.7574)	(0.6769)
ROE	−0.0538	−0.0540	−0.0522	−0.0544	−0.0544	−0.0524
	(0.1112)	(0.1094)	(0.1203)	(0.1095)	(0.1091)	(0.1231)
Venture backed	0.6243***	0.6223***	0.6207***	0.6211***	0.6196***	0.6223***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Pre-IPO earnings dummy	0.1527	0.1544	0.1454	0.1587	0.1593	0.1487
	(0.2352)	(0.2303)	(0.2575)	(0.2186)	(0.2166)	(0.2492)
Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes
McFadden R^2	0.3858	0.3857	0.3837	0.3902	0.3893	0.3889
Num. of obs.	1658	1658	1658	1658	1658	1658

This table examines the relationship between political connections of IPO firms and the use of top 4 auditors during the public offering process. Panel A provides the univariate tests between the two variables. Panel B provides the multivariate tests. The dependent variable in Panel B is a binary variable where 1 = the firm has a top 4 auditor and 0 = otherwise. The regressions in Panel B are Probit regressions. PC indicates politically connected firms. NPC indicates non-politically connected firms. We use three measures of political connections. Firms which are politically connected according to the first political connectedness measure (POL1) have at least one member of the board of directors or a manager who is a former politician and regulator. POL2 defines politically connected firms as those firms which have a former politician, regulator on their board or management team, or former high-ranking member of the military (0−7 or greater). POL3 defines politically connected firms as those firms which have a former politician, regulator, member of the military, or lawyer on the board or management team. Regulated firms are defined as real estate and banking firms (firms with SIC codes 4000-4999 or 6000-6999). *Reg* equals one if the firm is in a regulated industry. *Big_4* equals one if the firm employed a Big 4 auditor and zero otherwise. *ln(Proceeds)* is the natural log of the proceeds received from the IPO. *Total assets* are the firm's total assets in the year prior to the IPO. *ROE* is the return on equity in the year prior to the IPO. *Venture backed* equals one if SDC identifies a venture capitalist as investing in the firm prior to the IPO and zero otherwise. *Pre-IPO Earnings Dummy* indicates whether the firm had positive earnings in the year prior to the IPO. R^2 is the McFadden pseudo-R^2.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels.

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Auditor Quality and Political Connections of IPO Firms

In Table 4 we examine the relationship between political connections and auditor quality. Our primary measure of auditor quality is an indicator variable for Big 4 auditors. If an auditor is a Big 4 accounting firm, Big_4 equals one; otherwise, Big_4 equals zero. In Panel A we provide the difference in the Big_4 variable between politically connected and non-politically connected firms. In Panel B, we provide our results from the multivariate analysis.

Politically connected IPO firms use a Big 4 auditor less on average than non-politically connected firms. Politically connected firms retain the services of a top quality auditor 84.4% of the time, compared to 89.7% of non-politically connected firms undertaking an IPO. This negative relationship between auditor quality and political connections exists when we expand our definition of politically connected to include firms that employ former high-ranking military officers. When we include firms that employ non-general counsel lawyers to our politically connected sample, the difference in means loses its significance.

In the multivariate analysis, we regress Big_4 on our measure of political connections, control variables, and year and industry fixed effects. The coefficients in models (1) and (2) support our findings from Panel A. These findings indicate a negative relationship between political connections and auditor quality. As expected, the relationship weakens when the measure of political connections is expanded to include former military officers and lawyers in models (2) and (3).

In models (4), (5), and (6) of Panel B, we examine the relationship between political connections and top quality auditors of firms in regulated industries. Our negative coefficient on the interaction term between political connections and Reg indicates this result is exacerbated when the politically connected firm is in a regulated industry.

Table 5. The Relationship between Political Connections of IPO Firms and Earnings Management.

	Dependent Variable = Discretionary Accruals					
	Jones (1991) Model			Dechow et al. (1995) Model		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: The relationship between signed accruals and political connections of IPO firms						
Intercept	−0.2688	−0.2552	−0.2729	−4.9169	−4.8895	−4.8089
	(0.9214)	(0.9254)	(0.9203)	(0.1649)	(0.1671)	(0.1742)

Table 5. (*Continued*)

	Dependent Variable = Discretionary Accruals					
	Jones (1991) Model			Dechow et al. (1995) Model		
	(1)	(2)	(3)	(4)	(5)	(6)
POL1	0.3665*			0.5003*		
	(0.0800)			(0.0657)		
POL2		0.3821*			0.5337**	
		(0.0650)			(0.0472)	
POL3			0.2585			0.4653**
			(0.1279)			(0.0348)
Reg	−0.4824	−0.4757	−0.5372	−0.4057	−0.3930	−0.4558
	(0.7795)	(0.7824)	(0.7552)	(0.8561)	(0.8605)	(0.8384)
Underwriter rank	0.0110	0.0113	0.0077	0.0287	0.0292	0.0232
	(0.7113)	(0.7031)	(0.7961)	(0.4560)	(0.4483)	(0.5473)
ln(Proceeds)	0.1165	0.1123	0.1081	0.7231	0.7159	0.6876
	(0.7330)	(0.7421)	(0.7523)	(0.1032)	(0.1066)	(0.1219)
Tot. assets	−0.0001	−0.0001	−0.0001	−0.0002	−0.0002	−0.0002
	(0.4023)	(0.4037)	(0.4363)	(0.2240)	(0.2239)	(0.2420)
Leverage	−0.2071	−0.2081	−0.1867	−0.7327*	−0.7343*	−0.6985*
	(0.4986)	(0.4964)	(0.5421)	(0.0655)	(0.0648)	(0.0790)
ROE	−0.0917*	−0.0905*	−0.0908*	−0.1123*	−0.1106*	−0.1112*
	(0.0516)	(0.0547)	(0.0542)	(0.0666)	(0.0705)	(0.0689)
Venture backed	−0.0484	−0.0467	−0.038	0.0019	0.0045	0.0235
	(0.8029)	(0.8098)	(0.8449)	(0.9941)	(0.9858)	(0.9258)
Big 4	0.2921	0.2892	0.2754	0.1050	0.1013	0.0792
	(0.3744)	(0.3790)	(0.4025)	(0.8057)	(0.8123)	(0.8527)
Secondary shares	−0.0269	−0.0269	−0.0029	0.1513	0.1510	0.1909
	(0.8829)	(0.8827)	(0.9875)	(0.5231)	(0.5238)	(0.4208)
Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.0586	0.059	0.0577	0.0826	0.0832	0.0838
Num. of obs.	909	909	909	909	909	909
Measure of Signed Disk. Accruals						
Panel B: Estimation of average treatment effect based on PSM						
Jones (1991)			0.3084			0.1901
Modified Jones			1.0108			0.0025***
Num. of obs.			174			

Dep. Var. =	First Stage Probit Regressions				Second Stage EM Regressions			
	Dep. var. = POL1				Dep. var. = POSITIVE			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Panel C: 2SLS regressions for earnings management								
Intercept	−5.6704***	−4.8954***	−5.7144***	−4.6911***	2.5784	2.1664	2.7125	1.3151
	(<.0001)	(0.0022)	(0.0001)	(0.0096)	(0.1255)	(0.2149)	(0.1006)	(0.4404)
Distance from DC	−0.0002***	−0.0002***	−0.0002**	−0.0002**				
	(0.0038)	(0.0042)	(0.0121)	(0.0121)				
Instrumental variable					2.0408*	2.6164**	2.3783**	2.1096**
					(0.0662)	(0.0198)	(0.0284)	(0.0364)

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Table 5. (*Continued*)

Dep. Var. =	First Stage Probit Regressions				Second Stage EM Regressions			
	Dep. var. = POL1				Dep. var. = POSITIVE			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Underwriter rank	−0.0115	−0.0052	−0.0164	−0.0113	0.0021	−0.0076	0.0064	−0.0050
	(0.5213)	(0.7776)	(0.4027)	(0.5795)	(0.8945)	(0.6300)	(0.7039)	(0.7675)
ln(Proceeds)	0.6484***	0.5386***	0.6789***	0.5340**	−0.3883	−0.4169*	−0.4643*	−0.3301
	(0.0002)	(0.0076)	(0.0004)	(0.0178)	(0.1096)	(0.0844)	(0.0558)	(0.1566)
Total assets	0.0000	0.0001	0.0000	0.0001	0.0000	−0.0001	0.0000	0.0000
	(0.5047)	(0.3273)	(0.5343)	(0.3337)	(0.6016)	(0.4799)	(0.6216)	(0.7370)
Leverage	−0.0247	0.0041	0.0181	0.0699	0.0262	0.0251	−0.0529	−0.0909
	(0.8893)	(0.9818)	(0.9280)	(0.7310)	(0.8653)	(0.8739)	(0.7539)	(0.5978)
ROE	0.0082	0.0126	0.0145	0.0216	−0.0078	−0.0098	−0.0135	−0.0152
	(0.7878)	(0.6844)	(0.6450)	(0.5054)	(0.7602)	(0.7056)	(0.6052)	(0.5671)
Venture backed	−0.1221	−0.1066	−0.0161	−0.0149	0.0705	0.0929	0.0416	0.0574
	(0.2706)	(0.3597)	(0.8989)	(0.9110)	(0.5112)	(0.3889)	(0.6939)	(0.5986)
Big 4	−0.0588	−0.0804	−0.0567	−0.0612	0.0735	0.0447	0.0929	0.0308
	(0.7593)	(0.6879)	(0.7832)	(0.7779)	(0.6640)	(0.8032)	(0.5979)	(0.8684)
Secondary shares	0.0516	0.0240	0.1047	0.0760	−0.1304	-0.0761	−0.1798*	−0.1075
	(0.6180)	(0.8282)	(0.3547)	(0.5329)	(0.1504)	(0.4286)	(0.0694)	(0.3029)
Time F.E.	No	No	No	Yes	No	Yes	No	Yes
Industry F.E.	No	No	Yes	Yes	No	No	Yes	Yes
R^2	0.0572	0.0709	0.1396	0.1561	0.0043	0.0333	0.0436	0.0677
Num. of obs.	909	909	909	909	909	909	909	909

This table examines the relationship between political connections of IPO firms and the use of earnings management. We use the Jones (1991) and Dechow et al. (1995) measures of discretionary accruals as our proxies for earnings management. In Panel A, we regress signed discretionary accruals on political connections and controls. PC indicates politically connected firms. NPC indicates non-politically connected firms. We use three measures of political connections. Firms which are politically connected according to the first political connectedness measure (POL1) have at least one member of the board of directors or a manager who is a former politician and regulator. POL2 defines politically connected firms as those firms which have a former politician, regulator on their board or management team, or former high-ranking member of the military (0–7 or greater). POL3 defines politically connected firms as those firms which have a former politician, regulator, member of the military, or lawyer on the board or management team. Regulated firms (*Reg*) are defined as real estate and banking firms (Firms with SIC codes 4000-4999 or 6000-6999). The *Underwriting Rank* is the ranking provided by ranking based on the proportion of offer proceeds underwritten by each underwriter, as listed in the final prospectus. This measure comes from the Corwin and Schultz (2005) dataset provided online (UWRANK_9702). *Big_4* equals one if the firm employed a Big 4 auditor and zero otherwise. *ln(Proceeds)* is the natural log of the proceeds received from the IPO. *Total assets* are the firm's total assets in the year prior to the IPO. *ROE* is the return on equity in the year prior to the IPO. *Venture backed* equals one if SDC identifies a venture capitalist as investing in the firm prior to the IPO and zero otherwise. *Secondary Shares* indicates whether the firm offered secondary shares during the IPO. In Panel B, we perform propensity score matching. In Panel C, we control for the endogenous relationship between earnings management and political connections using 2SLS. *POSITIVE* is a binary variable which equals one if the observation has positive discretionary accruals based on the Kothari et al. (2005) measure.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Earnings Management and Political Connections

OLS Regressions

In Table 5, we examine the relationship between earnings management and political connections prior to the issuance date. We employ the Jones (1991) model and Dechow, Sloan, and Sweeney model (1995). The Dechow, Sloan, and Sweeney (1995) model is a modified version of the Jones (1991) model. Discretionary accruals are the most common proxy for earnings management. In Panel A, we regress signed discretionary accruals on political connections, control variables, and year and industry fixed effects.

Jones (1991) measures discretionary accruals as a portion of total accruals. Total accruals are measured in the Jones (1991) model as:

$$\mathrm{TA}_t = [\Delta \mathrm{CA}_t - \Delta \mathrm{Cash}_t] + [\Delta \mathrm{CL}_t - \Delta \mathrm{CLD}_t - \Delta \mathrm{ITP}_t] - \mathrm{DEP}$$

$\Delta \mathrm{CA}_t$ indicates the change in current assets from year $t-1$ to year t. $\Delta \mathrm{Cash}_t$ indicates the change in cash from year $t-1$ to year t. $\Delta \mathrm{CL}_t$ indicates the change in current liabilities from year $t-1$ to year t. $\Delta \mathrm{CLD}_t$ is the change in total value of the current maturities of long-term debt and $\Delta \mathrm{ITP}_t$ is the change in income taxes payable from year $t-1$ to year t. DEP_t is the depreciation and amortization expense of the firm in year t. Total accruals divided by lagged total assets is regressed on

$$\frac{\mathrm{TA}_{i,t}}{A_{i,t-1}} = \alpha_i \left[\frac{1}{A_{i,t-1}}\right] + \beta_{1i} \left[\frac{\Delta \mathrm{Rev}_{it}}{A_{i,t-1}}\right] + \beta_{2i} \left[\frac{\Delta \mathrm{PPE}_{i,t}}{A_{i,t-1}}\right] + \varepsilon_{it}$$

And discretionary accruals are defined as the prediction error u_{ip} in

$$u_{ip} = \frac{\mathrm{TA}_{i,p}}{A_{i,p-1}} = \left[\alpha_i \left[\frac{1}{A_{i,p-1}}\right] + \beta_{1i} \left[\frac{\Delta \mathrm{Rev}_{ip}}{A_{i,p-1}}\right] + \beta_{2i} \left[\frac{\Delta \mathrm{PPE}_{ip}}{A_{i,p-1}}\right]\right]$$

where TA_{it} = total accruals for firm i in year t; $\Delta \mathrm{REV}_{it}$ = change in total revenue of firm i from year $t-1$ to year t; PPE_{it} = property, plant, and equipment of firm i in year t; $A_{i,\ t-1}$ = total assets of firm i in year $t-1$; ε_{it} = error term for firm i in year t.

Dechow et al. (1995) adjust the Jones measure of discretionary accruals by subtracting net receivables from the total accruals equation such that

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$$\frac{\mathrm{TA}_{i,t}}{A_{i,t-1}} = \alpha_i \left[\frac{1}{A_{i,t-1}}\right] + \beta_{1i}\left[\frac{\Delta\mathrm{Rev}_{it} - \Delta\mathrm{REC}_{it}}{A_{i,t-1}}\right] + \beta_{2i}\left[\frac{\Delta\mathrm{PPE}_{it}}{A_{i,t-1}}\right] + \varepsilon_{it}$$

The inclusion of the change in receivables into the Jones (1991) model allows us to account for the managerial decision whether recognize revenue on cash sales.

In later tests, of the relationship between political connections of the firm and the use of earnings management during the IPO year, we employ a third, binary measure of earnings management. In order to show the robustness of our results, we report the results from two-stage least squares tests in Panel C of Table 5. In the first stage of our regression, we perform Probit regressions. Wooldridge (2009) indicates both stages of a two-stage least squares regression should employ the same econometric analysis. Therefore, for our third measure, we follow Kothari, Leone, and Wasley (2005) and include a performance measure in the total accruals regression.

$$\frac{\mathrm{TA}_{i,t}}{A_{i,t-1}} = \alpha_i \left[\frac{1}{A_{i,t-1}}\right] + \beta_{1i}\left[\frac{\Delta\mathrm{Rev}_{it} - \Delta\mathrm{REC}_{it}}{A_{i,t-1}}\right] + \beta_{2i}\left[\frac{\Delta\mathrm{PPE}_{it}}{A_{i,t-1}}\right] + \Delta\mathrm{ROA}_{it} + \varepsilon_{it}$$

This Kothari et al. (2005) measure allows us to create a binary variable POSITIVE which equals one if the performance-matched earnings management of the IPO firm is positive.

In Panel A, we regress each signed measure of discretionary accruals on our measures of political connections, a set of control variables, and year and industry fixed effects. We follow Lee and Masulis (2011) when constructing our model. We find politically connected firms have higher signed discretionary accruals than non-politically connected firms, regardless of the discretionary accruals measure. The relationship is only marginally significant in model (3), which provides the relationship between signed discretionary accruals and our broadest measure of political connections.

Endogeneity Concerns

The decision to appoint a former politician or regulator to the board is potentially endogenous in several ways. Firms that a top underwriter or have venture backing might not feel the need to appoint former regulators or politicians to the board or management team prior to the public offering since the marginal benefit the signal of their hiring provides could be negligible. In addition, management of firms that are most likely to inflate

earnings in the year prior to the public offering might also be engaged in other unethical practices and therefore could benefit from connections to current regulators or politicians. In this case, it is unclear whether a firm with strong connections to regulators chooses to inflate earnings ex post or whether firm management appoints politically connected individuals to the board or management team with the expectation these individuals will help the firm avoid regulatory action.

We propose propensity score matching and 2SLS to address endogeneity concerns. In Panel B of Table 5, we follow Lee and Masulis (2011) and use propensity matching to compare earnings management of politically connected and non-politically connected IPOs. In Panel C, we perform two-stage least squares regression in order to control for the endogenous relationship between political connections and earnings management.

Propensity score matching allows us to control for factors not controlled for by prior researchers, including Kothari et al. (2005). Prior studies indicate firm size, cash flow, leverage, underwriter ranking, and venture capital backing (DeFond & Jiambalvo, 1994; DeFond & Subramanyam, 1998; Lee & Masulis, 2011; Perry & Williams, 1994) are all related to discretionary accruals.

Our propensity score matching method follows the two-stage procedure of Rosenbaum and Rubin (1983) and Lee and Masulis (2011). In the first stage, we regress our variable of political connections (POL1) on a set of predictors of firm political connections:

$$\begin{aligned}\mathrm{POL1}_{i,t} = {} & \beta_0 + \beta_1 \mathrm{UW\_RANK}_{i,t} + \beta_2 \ln(\mathrm{proceeds})_{i,t} + \beta_3 \mathrm{TA}_{i,t} + \beta_4 \frac{\mathrm{Debt}}{\mathrm{TA}_{i,t}} \\ & + \beta_5 \mathrm{ROE}_{i,t} + \beta_6 \mathrm{Venture}_{i,t} + \beta_7 \mathrm{BIG\_4}_{i,t} + \beta_8 \mathrm{Secondary\_shares}_{i,t} + \varepsilon_{it}\end{aligned}$$

The $\mathrm{UW\_RANK}_{i,t}$ is the rank of the underwriter of firm i in year t as measured by Corwin and Schultz (2005). $\mathrm{Proceeds}_{i,t}$ is the total proceeds raised from the issuance. $\mathrm{TA}_{i,t}$ is total assets of the firm in the year prior to the IPO. $\mathrm{Debt}_{i,t}$ is the total debt of the firm. $\mathrm{ROE}_{i,t}$ is the firm's return on equity in the year prior to the IPO. $\mathrm{BIG\_4}_{i,t}$ equals one if the firm hired a Big Four auditor during the IPO. $\mathrm{Secondary}_{i,t}$ equals one if the firm issued secondary shares during the issuance.

The first Probit regression provides a propensity score of being politically connected for each IPO observation. Each politically connected IPO observation is matched to the non-politically connected IPO observation in the same year and industry with the closest propensity score.

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In the second stage of the method, we compare the mean discretionary accruals and signed value of discretionary accruals of politically connected observations and their matching observations. In the year of the public offering, the mean difference in the absolute value of discretionary accruals of politically connected firms and their matching IPO observations is positive regardless of the measure of earnings management. Our results indicate that politically connected IPO firms manage earnings far in excess of their matched firms prior to the public offering. This result is consistent regardless of the measure of discretionary accruals and persists in the test of medians. Politically connected IPO firms manage earnings upward to a greater extent than their matched firms.

In Panel C of Table 5 we use two-stage least squares regression to control for the endogenous relationship between earnings management in the year prior to the IPO and the appointment of a politically connected individual. We introduce distance from Washington, DC as an instrumental variable. This variable is defined as the straight-line distance between the state where the firm is headquartered and Washington, DC. Firms that are closer to DC should derive more value from politically connected individuals since these individuals have a shorter distance to travel to interact with current regulators and politicians. However, there is no evidence that firms located closer to Washington, DC are more likely to inflate or deflate discretionary accruals.

In the first stage of the two-stage least squares regression, we find a negative relationship between political connections and distance to DC, indicating that firms that appoint former politicians or regulators to the board of directors are located closer to Washington. Next, we use the Kothari et al. (2005) measure of signed discretionary accruals to create the binary variable POSITIVE which is equal to one if the Kothari et al. (2005) measure of matched discretionary accruals is positive. This indicates that the IPO firm has managed earnings to a greater extent than a firm with similar return on assets. We regress this variable on our instrumental variable and control variables. We find a positive relationship between the instrumental variable and discretionary accruals. Our finding indicates that once we control for the endogeneity in the relationship between political connections and earnings management, our instrumental variable of political connections is positively related to signed discretionary accruals. This finding indicates that politically connected firms still engage in more earnings management than non-politically connected firms even after we control for other factors that could influence both variables.

Table 6. Underpricing of Politically Connected and Non-Politically Connected IPO Firms.

	Measure of Political Connections								
	POL1			POL2			POL3		
	PC	NPC	*P*-value	PC	NPC	*P*-value	PC	NPC	*P*-value
Panel A: Univariate tests									
Raw 1 day return	21.70%	32.50%	0.0050***	22.82%	32.28%	0.018**	26.01%	34.07%	0.0453**
Value weighted abnormal return	21.67%	32.57%	0.0047***	22.79%	32.36%	0.0170**	26.05%	34.14%	0.0444**
Equal weighted abnormal return	21.60%	32.51%	0.0046***	22.72%	32.29%	0.0168**	26.00%	34.05%	0.0451**
Num. of obs.	154	670		157	667		367	457	

	Dependent Var. = Percentage Return from the Offer Price to First-Day Closing Price			
	(1)	(2)	(3)	(4)
Panel B: Multivariate test				
B.1: Politicians and regulators				
Intercept	−3.3194***	−3.344***	−3.3454***	−3.2886***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
POL1	−0.0964*	−0.0961*	−0.0953*	−0.0955*
	(0.0693)	(0.0703)	(0.0728)	(0.0719)
Underwriter rank	0.0247***	0.0236***	0.0238***	0.0236***
	(0.0008)	(0.0017)	(0.0015)	(0.0017)
ln(Proceeds)	0.4908***	0.4874***	0.4885***	0.4759***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Debt/total assets	−0.1662**	−0.1637**	−0.1617**	−0.1799**
	(0.0329)	(0.0359)	(0.0384)	(0.0237)
ln(total assets)	−0.1283***	−0.1281***	−0.1296***	−0.1193***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Reg		−0.0271	−0.0300	−0.0082
		(0.9618)	(0.9577)	(0.9884)
Big 4		0.0636	0.0637	0.0613
		(0.4419)	(0.4412)	(0.4588)
ROE			−0.0088	
			(0.4356)	
ROA				−0.0497
				(0.2943)
Venture backed	0.0851	0.0802	0.0786	0.0700
	(0.0792)	(0.1005)	(0.1080)	(0.1599)
Techboom	0.1516***	0.1463***	0.1471***	0.1497***
	(0.0015)	(0.0024)	(0.0023)	(0.0020)

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Table 6. (*Continued*)

	Dependent Var. = Percentage Return from the Offer Price to First-Day Closing Price			
	(1)	(2)	(3)	(4)
Industry F.E.	Yes	Yes	Yes	Yes
R^2	0.1935	0.1941	0.1948	0.1953
Num. of obs.	824	824	824	824

This table examines the relationship between political connections and underpricing of IPO issuances. Panel A provides univariate tests of the relationship between underpricing and political connections. Panel B provides multivariate tests of the same relationship. PC indicates politically connected firms. NPC indicates non-politically connected firms. We use three measures of political connections. Firms which are politically connected according to the first political connectedness measure (POL1) have at least one member of the board of directors or a manager who is a former politician and regulator. POL2 defines politically connected firms as those firms which have a former politician, regulator on their board or management team, or former high-ranking member of the military (0−7 or greater). POL3 defines politically connected firms as those firms which have a former politician, regulator, member of the military, or lawyer on the board or management team. Regulated firms (*Reg*) are defined as real estate and banking firms (Firms with SIC codes 4000-4999 or 6000-6999). The *Underwriting Rank* is the ranking provided by ranking based on the proportion of offer proceeds underwritten by each underwriter, as listed in the final prospectus. This measure comes from the Corwin and Schultz (2005) dataset provided online (UWRANK_9702). *Big 4* equals one if the firm employed a Big 4 auditor and zero otherwise. *ln(Proceeds)* is the natural log of the proceeds received from the IPO. Ln(*Total assets)* is the natural log of the firm's total assets in the year prior to the IPO. *ROE* is the return on equity in the year prior to the IPO. *Venture backed* equals one if SDC identifies a venture capitalist as investing in the firm prior to the IPO and zero otherwise. *Secondary Shares* indicates whether the firm offered secondary shares during the IPO.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Underpricing and Political Connections

In Table 6, we examine the relationship between political connections and IPO underpricing. We measure underpricing as the one-day return on the day the firm's shares are first traded. In Panel A, we report the univariate statistics. In Panel B, we provide the univariate tests. We report unadjusted or raw returns, equal weighted abnormal returns, and value weighted abnormal returns. To determine the equal and value weighted returns, we subtract the daily return on the equal weighted or value weighted S&P 500 index from the return of the stock.

The average value weighted return of politically connected firms (POL1) on the first day of trading is 21.70% compared to 32.50% for non-politically connected IPO firms. The difference in underpricing is progressively smaller for the second and third measure of political connections.

In the multivariate analysis, we find a significant and negative relationship between our primary measure of political connections and underpricing. The relationship between the broader measures of political

connections and underpricing (POL2 and POL3) are consistent, but the negative relationship between the political connections variables in these panels is marginal.

The relationships between control variables and underpricing are consistent with prior studies. Larger issuances, measured by the natural log of IPO proceeds, are underpriced to a greater degree than smaller issuances. Large firms, as represented by the natural log of total assets, underprice less than small firms. To control for the technology bubble of the late 1990s, we introduce a binary variable called *Techboom* which equals one if the IPO occurred in 1998–2000 and equals zero otherwise. Issuances during the technology bubble were underpriced to a greater extent than other issuances in our sample. We measure firm debt with the total debt to total assets ratio. Managers of heavily indebted firms underprice to a lesser extent.

Long-Term Financial Performance

Next we compare the long-term financial performance of politically connected and non-politically connected firms post-issuance. A long list of authors have examined financial performance of politically connected firms both in the United States and abroad (Goldman et al., 2009; Houston & Ferris, in press), but this is the first paper to examine post-IPO returns. In Table 7, we follow the methods of Fan, Wong, and Zhang (2007) to determine whether politically connected IPOs outperform non-politically connected IPOs. Like Fan, Wong, and Zhang (2007), we use monthly return data.

In Panel A of Table 7, we report the univariate statistics of the long-term financial performance. We use monthly data from CRSP. To calculate the equal/value weighted index-adjusted returns, we subtract the equal/value weighted S&P 500 return from the IPO return over the same period. While our sample of non-politically connected firms exhibits post-issuance returns insignificant from zero in the first year after the public offering, politically connected firms exhibit positive abnormal returns over the first year regardless of the measure of returns. The average value weighted returns over the six months and year post-issuance for politically connected firms is 8.40% and 8.58%, respectively compared to −5.08% and −9.40% for non-politically connected firms over the same period.

In Panel B, we regress the value weighted abnormal post-IPO returns on the first political connections variable, POL1, control variables, and year fixed effects. The positive coefficient on POL1 indicates that politically connected firms outperform other firms post-issuance. The result is significant

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Table 7. Long-Term Post-IPO Financial Performance.

	PC (%)	NPC (%)	*P*-value	Number of Obs.
Panel A: Univariate statistics				
A.1: Value weighted returns				
Cumulative 1 month	0.78	1.25	0.8493	795
Cumulative 2 months	7.48	0.88	0.1295	790
Cumulative 3 months	7.56	1.45	0.2447	787
Cumulative 6 months	8.40	−5.08	0.0671*	772
Cumulative 9 months	11.67	−8.05	0.0363**	749
Cumulative 1 year	8.58	−9.40	0.0592*	731
Cumulative 2 years	9.38	−0.20	0.4862	643
Cumulative 3 years	10.39	1.73	0.5691	547
A.2: Equal weighted returns				
Cumulative 1 month	1.14	1.60	0.8505	795
Cumulative 2 months	7.39	1.07	0.1456	790
Cumulative 3 months	7.44	1.83	0.2931	787
Cumulative 6 months	8.44	−4.41	0.0933*	772
Cumulative 9 months	9.76	−8.21	0.0447**	749
Cumulative 1 year	6.47	−9.35	0.0842*	731
Cumulative 2 years	3.67	−1.89	0.6837	643
Cumulative 3 years	−5.34	−4.66	0.9634	547
A.3: Raw returns				
Cumulative 1 month	1.65	1.86	0.9343	795
Cumulative 2 months	8.47	1.62	0.1297	790
Cumulative 3 months	9.10	2.87	0.2631	787
Cumulative 6 months	13.43	−0.91	0.0824*	772
Cumulative 9 months	19.20	−3.48	0.0395**	749
Cumulative 1 year	17.35	−3.99	0.0497**	731
Cumulative 2 years	19.32	11.96	0.6599	643
Cumulative 3 years	16.24	12.29	0.8139	547

Table 7. (*Continued*)

	Dependent Var. = Value Weighted Cumulative Abnormal Returns							
	1 month	2 months	3 months	6 months	9 months	1 year	2 years	3 years
Panel B: Regression results of the effects of politically connected individuals on post-IPO stock performance								
B.1: No fixed effects								
Constant	0.012	0.007	0.039	−0.094	−0.152*	−0.285***	−0.255	−0.332
	(0.644)	(0.864)	(0.486)	(0.162)	(0.054)	(0.002)	(0.240)	(0.154)
POL1	−0.005	0.069*	0.066	0.121*	0.182**	0.146*	0.068	0.047
	(0.848)	(0.059)	(0.192)	(0.052)	(0.012)	(0.078)	(0.721)	(0.811)
Market/Book	0.000	0.000	0.000	0.000	0.000	0.000	−0.001	−0.002
	(0.953)	(0.666)	(0.728)	(0.339)	(0.423)	(0.387)	(0.802)	(0.411)
Debt/assets	−0.059*	−0.075	−0.071	−0.029	−0.099	−0.167	−0.145	−0.32
	(0.079)	(0.144)	(0.316)	(0.738)	(0.328)	(0.147)	(0.593)	(0.257)
ln(total assets)	0.003	0.005	−0.002	0.013	0.025	0.061***	0.077	0.116**
	(0.639)	(0.650)	(0.898)	(0.445)	(0.216)	(0.008)	(0.157)	(0.048)
Reg	0.004	−0.020	−0.012	0.043	0.007	−0.048	−0.137	−0.180
	(0.898)	(0.677)	(0.863)	(0.603)	(0.939)	(0.664)	(0.597)	(0.496)
R^2	0.004	0.008	0.004	0.009	0.014	0.018	0.004	0.010
Num. of obs.	795	790	787	772	749	731	643	547

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	Dependent Var. = Cumulative Abnormal Returns							
	1 month	2 months	3 months	6 months	9 months	1 year	2 years	3 years
B.2: Year fixed effects								
Constant	0.034	0.044	0.18	0.038	−0.273	0.025	−0.214	−0.467
	(0.521)	(0.597)	(0.126)	(0.819)	(0.376)	(0.903)	(0.724)	(0.330)
POL1	−0.005	0.066*	0.066	0.115*	0.161*	0.107	0.048	0.037
	(0.824)	(0.076)	(0.196)	(0.062)	(0.024)	(0.194)	(0.799)	(0.851)
Market/book	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000
	(0.923)	(0.636)	(0.785)	(0.419)	(0.594)	(0.561)	(0.498)	(0.943)
Debt/assets	−0.056	−0.069	−0.063	−0.034	−0.091	−0.146	−0.289	−0.510*
	(0.108)	(0.187)	(0.382)	(0.692)	(0.369)	(0.206)	(0.288)	(0.077)
ln(total assets)	0.002	−0.001	−0.008	0.009	0.012	0.038	0.080	0.139
	(0.828)	(0.946)	(0.601)	(0.643)	(0.593)	(0.125)	(0.178)	(0.031)
Reg	0.007	−0.014	−0.003	0.034	−0.011	−0.067	−0.076	−0.152
	(0.833)	(0.787)	(0.971)	(0.683)	(0.907)	(0.550)	(0.768)	(0.570)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.015	0.021	0.024	0.058	0.08	0.065	0.063	0.041
Num. of obs.	795	790	787	772	749	731	643	547

In this table, we provide both univariate and multivariate tests of the long-term post-IPO financial performance of politically connected and non-politically connected firms. In Panel A, we report the raw returns. We use the equal weighted and value weighted S&P 500 index to calculate cumulative abnormal returns. In Panel B, we report the multivariate results. In the multivariate tests, we regress value weighted cumulative abnormal returns on POL1 and a series of control variables. Reg equals one if the firm has a primary SIC code between 4000-4999 or 6000-6999. We report our results using no fixed effects and year fixed effects.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels.

over two-month, six-month, nine-month, and one-year time horizons but marginally significant over other time periods. The introduction of year fixed effects does not impact the significance of these results.

Table 8. Calendar-Time Fama and French Three-Factor Model Portfolio Regressions of Politically Connected Firms.

	Equal Weight					Value Weight				
	Alpha	*t*-stat	*P*-value	Adj. R^2	Num. of obs.	Alpha	*t*-stat	*P*-value	Adj. R^2	Num. of obs.
Panel A: Politically connected IPOs										
POL1	0.80	1.75	0.08*	0.56	201	0.81	1.66	0.10*	0.55	201
POL2	0.82	1.78	0.08*	0.55	201	0.84	1.69	0.09*	0.54	201
POL3	0.65	1.62	0.11	0.65	203	0.62	1.46	0.15	0.64	203
Panel B: Non-politically connected IPOs										
POL1	0.40	1.01	0.31	0.68	203	0.55	1.18	0.24	0.67	203
POL2	0.39	0.99	0.32	0.68	203	0.54	1.16	0.25	0.67	203
POL3	0.23	0.55	0.58	0.67	203	0.57	1.13	0.26	0.65	203

In this table, we use the Calendar-time portfolio regression approach of Mitchell and Stafford (2000) to determine whether politically connected IPOs outperform other firms. In Panel A, we create a portfolio based on the politically connected firms and regress the portfolio against the Fama-French (1993) three-factor model. In Panel B, we create a portfolio based on the non-politically connected firms during the 36 months after the IPO. The Alphas are the three-factor alphas from the time-series regressions.
*indicates significance at the 10% level.

In Table 8, we create calendar-time portfolios of politically connected and non-politically connected IPO firms post-issuance. This method is introduced by Mitchell and Stafford (2000). We report both the equal weighted and value weighted returns. We regress the excess portfolio returns on the Fama and French (1993) three-factor model. The alphas reported in Table 9 are the time-series alphas from the regression.

We report the alphas of the politically connected portfolio in Panel A and report the alphas of the non-politically connected portfolio in Panel B. We find positive and significant alphas during the sample period, indicating the portfolio comprised of politically connected firms post-issuance outperforms the market. The time-series alphas produced by the non-politically connected portfolio are also positive, but not statistically significant. This result provides further evidence to our hypothesis that politically

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Table 9. Univariate Tests of Post-IPO Financial Performance.

	POL1			POL2			POL3		
	PC	NPC	*P*-value	PC	NPC	*P*-value	PC	NPC	*P*-value
Change in ROS (%)	0.226	0.259	0.750	0.213	0.263	0.637	0.279	0.233	0.588
Growth in sales ($ millions)	140.482	99.293	0.007***	142.281	98.710	0.004***	136.465	84.425	<.0001***
Growth in earnings ($ millions)	5.939	−2.146	0.028**	5.284	−2.015	0.047**	1.550	−2.252	0.157
Change in ROA (%)	0.059	0.070	0.684	0.060	0.070	0.724	0.057	0.076	0.409
Growth in total assets ($ millions)	204.213	148.884	0.008***	201.725	149.296	0.011**	193.032	133.432	<.0001***
Total assets post-IPO ($ millions)	502.665	297.045	0.000***	496.128	297.913	0.000***	453.071	245.769	<.0001***
ROA post-IPO (%)	−0.071	−0.115	0.075*	−0.079	−0.113	0.176	−0.091	−0.118	0.179
Num. of obs.	137	575		139	573		312	400	

In this table, we provide univariate tests of accounting performance for politically connected and non-politically connected IPO firms. We measure these variables the same way as Fan et al. (2007). Change in ROS is the difference in the return on sales in the year before the IPO year and the return on sales in the year after the IPO year. Change in ROA is measured the same way. Growth in sales is the difference between the average sales in the three years after the IPO year and the average sales in the three years prior to the IPO year. Growth in earnings (net income) and growth in total assets are measured in the same manner. Total assets post-IPO is the average total assets of the firm in the three years after the IPO year. ROA post-IPO is the average ROA in the three years after the IPO year.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels.

connected firms outperform non-politically connected firms after the initial public offering.

Long-Term Post-IPO Accounting Performance

We report the univariate and multivariate tests of post-IPO operating performance. In Table 9 we report the univariate changes in various measures of operating performance from the year prior to the public offering to the year after the offering. In Table 10 we report the results of the multivariate regressions.

We measure operating performance in several ways. The change in return on assets in the year of the public offering, t, is measured as:

$$\Delta \mathrm{ROA}_t = \mathrm{ROA}_{t+1} - \mathrm{ROA}_{t-1}$$

The return on sales is measured in a similar fashion. The growth in sales, earnings (net income), and total assets are measured as the difference in each measure from the year prior to the issuance year to the year after the issuance. Finally, we report average return on assets and total assets over the three years after the year of the public offering.

Our univariate results indicate that politically connected firms experience larger growth in sales and total assets. Firms that do not hire former politicians or regulators have an average decline of $2.15 million in net income over the two years around the public offering. Politically connected firms see an increase of $5.94 million around the same period.

While the average firm in our sample has negative return on assets, politically connected firms have less negative return on assets. Firms that appoint former politicians or regulators to the board or management team have average return on assets of 7.1% over the first three years after the initial public offering. This result is marginally significant when we separate our sample using the POL2 or POL3 measures.

Table 10. Regression Results of the Effects of Politically Connected Individuals on Post-IPO Accounting Performance.

	Change in ROS	Growth in Sales	Growth in Earnings	Change in ROA	Growth in Assets	Post-IPO Total Assets	Post-IPO ROA
Constant	0.530	4.075	−22.303	3.843	10.91***	−768.841***	−0.277
	(0.513)	(0.127)	(0.316)	(0.332)	(0.000)	(0.000)	(0.108)
POL1	0.032	−0.026	1.252	−0.338	0.724**	41.681	−0.008
	(0.772)	(0.942)	(0.681)	(0.533)	(0.038)	(0.134)	(0.719)

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Table 10. (*Continued*)

	Change in ROS	Growth in Sales	Growth in Earnings	Change in ROA	Growth in Assets	Post-IPO Total Assets	Post-IPO ROA
Reg	−0.129	−0.281	−4.410	0.434	0.534	37.026	−0.023
	(0.395)	(0.574)	(0.289)	(0.558)	(0.261)	(0.330)	(0.479)
Market/ book	0.000	0.001	−0.006	−0.001	0.000	0.118	0.000**
	(0.717)	(0.712)	(0.679)	(0.688)	(0.783)	(0.370)	(0.031)
Debt/ assets	0.071	−0.451	2.985	4.671***	−0.202	−39.227	−0.05
	(0.649)	(0.379)	(0.485)	(0.000)	(0.679)	(0.315)	(0.129)
ln(total assets)	−0.123***	−0.601***	6.765***	−0.912***	−1.368***	246.882***	0.057***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year F. E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.048	0.133	0.210	0.111	0.330	0.631	0.239
Num. of obs.	709	709	709	709	709	712	712

In this table, we perform multivariate regression to examine the post-IPO performance of politically connected and non-politically connected IPOs. Change in ROS is the difference in the return on sales in the year before the IPO year and the return on sales in the year after the IPO year. Change in ROA is measured the same way. Growth in sales is the difference between the sales in the year after the IPO year and the sales in the year prior to the IPO year. Growth in earnings (net income) and growth in total assets are measured in the same manner. Total assets post-IPO is the average total assets of the firm in the year after the IPO year. ROA post-IPO is the average ROA in the year after the IPO year.

** and *** indicate significance at the 5% and 1% levels.

In Table 10 we regress each measure of operating performance on the POL1 measure and control variables. While the coefficients on POL1 indicate a positive relationship between political connections and change in the return on sales, the change in earnings, and change in return on assets, these results are not significant. We find politically connected firms have significantly larger growth in total assets than non-politically connected firms around the public offering. The inclusion of year fixed effects does not alter our results. There is little evidence to support the hypothesis that politically connected firms have superior subsequent operating performance around the initial public offering.

CONCLUSIONS

In this paper, we examine the difference in politically connected and non-politically connected firms during the initial public offering process. The

ability to attract a high-ranking politician or regulator should be viewed as a signal of firm quality. We examine whether the appointment of politicians or regulators to the board or management team prior to the public offering is a substitute to other signals of quality. We also examine whether the signal firms provide by appointing former politicians or regulators allows them to underprice less than other IPO firms. Finally, we examine the post-IPO performance of firms that are politically connected and determine whether these firms outperform other IPOs.

We find evidence supporting the hypotheses that firms that have former politicians, regulators, military officers, or lawyers on their board or management team hire lower quality underwriters and auditors, indicating that there is some evidence these signals are substitutes.

We find strong evidence indicating politically connected firms have significantly greater earnings management in the year prior to the IPO than non-politically connected firms. This supports the hypothesis that firms that are able to attract former politicians have less to fear from poor earnings quality than non-politically connected firms in the United States.

Our results indicate that firms which hire former politicians and regulators are less underpriced than the other U.S. IPOs. While this relationship retains only marginal significance when we measure connectivity with POL2 and POL3, the results for our most stringent measure of political connections support the hypothesis that connections to politicians and regulators serve as a signal of IPO quality and reduces the information asymmetry associated with the issuance.

Finally, we examine the post-IPO performance of the firms in our sample and find evidence that politically connected firms have positive long-term abnormal returns. Firms without connected individuals have abnormal returns that are negative or insignificantly different from zero. However we find no difference between the post-IPO operating performances of these two groups.

Taken together, our results suggest that former regulators and politicians provide a signal of IPO quality to investors, and this signal is supported by the post-issuance performance. One future extension to this paper could examine whether the appointment of former heads of regulatory agencies provides a stronger signal than the appointment of other politically connected individuals. Because these individuals likely have superior regulatory knowledge and political connections, a stronger signal associated with these individuals should complement post-IPO performance superior to that of other politically connected IPO firms.

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NOTES

1. Section 11 lawsuits require that the firm made untrue statement or omitted a material fact in the registration statement. These lawsuits can be filed by any investor who purchased shares. Section 12 lawsuits, which are less common, stem from false statements in either the prospectus or oral communication.
2. These underwriter ranking data can be obtained from Professor Corwin's website. The authors provide a sample of 669 underwriters.

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INTERNAL CORPORATE GOVERNANCE: THE ROLE OF RESIDUAL INCOME IN DIVISIONAL ALLOCATION OF FUNDS

Dobrina Georgieva

ABSTRACT

Internal capital markets of diversified firms have been associated with inefficient allocation of investment funds across divisions, leading to value losses. Utilizing a sample of diversified firms that adopted or eliminated Residual Income (RI) plans between 1990 and 2009, we show that adoptions of these plans mitigate investment distortions and lead to value gains. Following the adoption of RI plans, diversified firms start allocating investment funds based on growth opportunities of their divisions. RI plan adopters lower their divisional investment levels, especially in segments with below-average growth opportunities. The overall investment allocation efficiency improves, and the diversification discount diminishes after the adoption of RI plans. However, RI plans appear to be used only as temporary tools for assessing corporate performance. The plans are

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adopted primarily by firms expected to immediately generate plan bonuses for management, and they are frequently eliminated by firms with bad accounting performance and low managerial bonuses. The study contributes to the literature on organizational efficiency, internal capital markets, and on the importance of measures based on economic profits or RI.

Keywords: Internal capital markets; residual income; diversification; investment efficiency

JEL classifications: G32; G34

INTRODUCTION

The purpose of this paper is to study the use of Residual Income (RI) as an incentive mechanism and its role in divisional allocation of funds. Previous research suggests that RI plans have the potential to improve the internal capital allocation process (e.g., Baldenius, Dutta, & Reichelstein, 2007; Dutta & Fan, 2009). These plans reward managers only if their earnings exceed a charge for the capital they employ, since RI is defined as Earnings minus capital cost × invested capital. RI plans are expected not only to reward profits, but also to penalize one of the most crucial sources of losses for diversified firms – overinvestment in unprofitable divisions (Berger & Ofek, 1995; Ozbas & Scharfstein, 2010; Rajan, Servaes, & Zingales, 2000). Capital charges in the plan formulas can diminish managerial rent-seeking and politicking for extra investment regardless of project profitability, especially since capital charges are division-specific (more risky divisions can be charged higher cost of capital), and increase with invested capital.

The inefficiencies of multidivisional firms have been attributed to opportunistic behavior of divisional managers, arising due to informational asymmetry between divisions and headquarters (Jensen & Meckling, 1992). These problems are compounded by the difficulties in assessing divisional performance when there are differences in divisional risk and capital use. So far, research on the impact of divisional incentives and on measuring of divisional performance is limited and mainly related to issues of accounting divisional disclosure (e.g., Bens, Berger, & Monahan, 2011; Berger & Hann, 2007; Bouwens & van Lent, 2007; Chen & Zhang, 2003, 2007; Keating, 1997).[1] We expect that since RI plans are designed to measure

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and reward divisional performance, they can be particularly beneficial to multidivisional firms, and our findings can document the link between RI use and performance improvements.

Internal capital markets are supposed to help undertake profitable investments that would not have been funded by external capital markets.[2] However, internal capital markets may fail to allocate capital properly. Ozbas and Scharfstein (2010), Shin and Stulz (1998) and Rajan et al. (2000) empirically document that poorer performing, low growth opportunity segments (i.e., divisions; both terms will be used interchangeably throughout the paper) of diversified firms inefficiently attract extra investment funds at the expense of more profitable, faster growing segments. These outcomes are the result of a variety of investment distortions such as intensified agency problems (Bernardo, Luo, & Wang, 2006; Laeven & Levine, 2007), CEO private benefit consumption (Datta, D'Mello, & Iskandar-Datta, 2009), rent-seeking behavior of divisional managers (Rajan et al., 2000; Scharfstein & Stein, 2000), their relative influence (Cremers, Huang, & Sautner, 2011), CEO's attempts to appease divisions unrelated to his/her experience with extra capital allocations (Xuan, 2009), disproportionate focus on the performance of newly acquired units (Schoar, 2002). The above value-destroying behaviors may explain why diversified firms sell at a "diversification discount" of about 15% compared to the values of their divisions as stand-alone units (e.g., Berger & Ofek, 1995; Dos Santos, Errunza, & Miller, 2008; Hoechle, Schmid, Walter, & Yermack, 2012). In turn, increases in focus are rewarded with higher share prices (Comment & Jarrell, 1995; Daley, Mehrotra, & Sivakumar, 1997; John & Ofek, 1995), and are accompanied by more efficient investment decisions (Ahn & Denis, 2004; Burch & Nanda, 2003; Chen, 2006; Dittmar & Shivdasani, 2003; Gertner, Powers, & Scharfstein, 2002).

Despite apparent inefficiencies, diversified firms as a form of organizational structure survive and often thrive in today's economy. Rajan et al. (2000) find that 40% of diversified firms trade at a diversification premium. Consequently, firms apparently possess mechanisms that mitigate the problems of internal capital markets and facilitate synergies from a diversified organizational structure. Indeed, previous work has attempted to look for such corrective tools. For example, Datta et al. (2009) document that stock grants may motivate managers to make better internal capital allocations. Lin, Pantzalis, and Park (2007) show that active corporate risk management can lower information asymmetries that cause diversification losses. On the other hand, many traditional governance and monitoring mechanisms fail to work properly in multidivisional firms. Most importantly, bonuses based on company-wide performance and stock options may not

be appropriate incentive mechanisms as they hinder assessment of relative contribution of a single-divisional manager toward value creation by the whole firm (Keating, 1997).[3]

Despite the potential benefits, some studies question whether RI plans create value (Biddle, Bowen, & Wallace, 1997). In addition, RI plan adoption has some risks for diversified firms. Internal capital markets may be adversely affected by adoption of these plans if they exacerbate the tension between seeking greater individual business unit efficiency versus collaborating for firm-wide synergies. The plans can lead the manager to be too narrowly focused solely on his/her own projects, with damaging consequences for the firm as a whole. Thus, RI plans can introduce a new form of politicking, as managers avoid cooperation and expend effort in passing off shared costs and assets. Therefore, the main hypothesis tested in this paper is the empirical question whether RI plans improve allocation efficiency of the internal capital markets in a diversified firm, and whether they add value to the firm as a whole.

Based on a sample of 89 diversified firms that adopted RI plans between 1990 and 2001, with follow-up until 2009 for possible plan elimination, our main results are:

(1) RI plan adoptions lead to significant performance improvements for diversified firms, but not for single-segment (i.e., focused) companies.
(2) For diversified firms, segment-level investment after the adoption of the RI plan is significantly positively related to segment-level growth opportunities (while the investment was unrelated to segment-level growth opportunities before the plan was adopted). RI plan adopters also reduce their investment, especially in segments with below-average growth opportunities.
(3) The overall efficiency of investment by diversified RI plan adopters significantly improves during the post-adoption period. In addition, while overall investment efficiency was negatively related to the dispersion of divisional growth opportunities before RI plan adoption (similarly to Rajan et al., 2000), post-adoption investment efficiency is less affected by the dispersion of divisional growth opportunities.
(4) After RI plan adoption, diversification discounts of multidivisional adopters shrink compared to the discounts of similarly diversified non-adopters. Diversification discount reduction is linked to the increase in overall investment allocation efficiency and to the reduction of the negative impact of dispersion of divisional growth opportunities during the post-adoption period.

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Arguably, firms adopt RI plans because they find such plans advantageous compared to the alternative "traditional" compensation plans (stock options, bonuses). We find that RI plans are primarily implemented by large diversified firms that can benefit from post-adoption improved efficiency of internal capital market. The large firms could also absorb the potentially high expenditures related to adoption.[4] In addition, we find that firms appear to implement such plans mainly if management gains by adoption. Adopters are more profitable, have lower levels of cash reserves (i.e., assets that are less likely to beat cost of capital targets), and invest less. At the same time, RI plans are frequently dropped by firms whose managers likely no longer gain from the plans – companies with bad accounting performance, low managerial bonuses, and high cash reserves. Ultimately, our evidence is consistent with RI plans being a valuable, but only temporary tool for measuring firm performance and affecting managerial incentives.

It is difficult to distinguish between well-performing firms that adopt RI plans, and firms that perform well *because* they adopted those plans. In order to capture the endogeneity of plan adoptions, we repeat the analysis for subsamples of "expected adopters" (adopters expected to implement RI plans) versus "unexpected non-adopters" (firms that do not adopt RI plans despite being expected to do so). Investment allocation improvements and value gains remain significant (and generally increase) for the "expected adopters," suggesting that the adoption of such plans directly leads to the better performance. We also find that CEO turnovers are not significantly related to investment efficiency or value changes in RI plan adopting firms. In addition, the RI plans were not likely triggered by takeover threats, as no adopters were targeted for acquisition during the three years before the adoption.

Overall, the findings of our study suggest that RI plan adoption mitigates deficiencies of internal capital markets and improves organizational efficiency. Diversified adopters realize investment efficiency improvements and value gains. Furthermore, the finding that RI plans help primarily diversified (but not focused) firms is consistent with the argument that the plans are beneficial primarily because they are a *segment-specific* (i.e., allowing for unique segment risk-related hurdle rates) RI mechanism for measuring performance. RI plans affect the CEO, top executives, and all divisional managers, not just a subset. In addition, the bonuses based on the performance of a particular divisional head are primarily affected by the RI earned by his/her division, while considering the unique divisional risks. So, our results support research documenting the importance of

RI-based measures (e.g., Barniv, Hope, Myring, & Thomas, 2009; Dutta & Fan, 2009; Dutta & Reichelstein, 2005; Hogan & Lewis, 2005), and segment-specific hurdle rates in particular (e.g., Baldenius et al., 2007).

The rest of the paper is organized as follows. Next, we formulate hypotheses regarding the impact of plan adoption on functioning of internal capital markets. In the subsequent section, we describe our data. The analysis and findings are presented in penultimate section, and the last section concludes.

IMPACT OF RI PLAN ADOPTION ON INVESTMENT, ALLOCATION EFFICIENCY, AND VALUE GAINS ASSOCIATED WITH INTERNAL CAPITAL MARKETS

Advantages and Disadvantages of RI Plan Adoptions

The concept of RI has been made operational since the 1950s. Recently, however, it has gained greater acceptance as consulting firms such as Stern Stewart (who refer to it as EVA^{TM}, Economic Value Added), Boston Consulting Group, and KPMG have advocated its use. Economic profits are conceptually tied to the widely accepted Net Present Value (NPV) rule. They measure firm performance by comparing actual profits to required profits, which depend on the capital employed and the risks to which the capital is subjected to. The more risky firm's business is, and the more capital it uses, the greater the profits the manager must generate to create positive "economic profit."

Garvey and Milbourn (2000) argue economic profits have an information content going beyond that of prices and accounting profits, and integrating RI plans into factors affecting managerial compensation improves efficiency of incentive contracts. In addition, practitioners have for long linked the use of economic profit to value creation (e.g., Bacidore, Boquist, Milbourn, & Thakor, 1997; Desai, Fatemi, & Katz, 2003; Ehrbar & Stewart, 1999; Milano, 2000; O'Byrne, 1996; Riceman, Cahan, & Lal, 2002). Hogan and Lewis (2005) test advantages of RI plans by studying post-adoption performance of a sample of 108 companies that adopted such plans from 1983 to 1996. Adopters experience reduction in invested capital and improvements in operating performance, but performance gains are similar to those experienced by matching firms. Significant post-adoption differences appear only after the authors restrict their analysis to subsamples of expected adopters (based on pre-adoption performance,

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compensation structure, and financing) in comparison to firms that were expected to adopt RI plans but chose not to do so.

RI plans also have critics. While Wallace (1997) shows that managers compensated based on RI plans indeed reach the plan targets, Fernandez (2001) argues that the plan levels are poor predictors of market value. Biddle et al. (1997) document that the plan changes are worse predictors of stock returns compared to earnings, Dechow, Hutton, and Sloan (1999) argue that RI-based valuation models provide only minor improvements over models based on discounted dividends, and Barniv et al. (2009) show a negative relation between analyst recommendations and RI. RI plans are argued to create excessive focus on short-term profitability, and blamed for rushed asset sales and layoffs as managers attempt to reduce capital charges. These plans have also been criticized as difficult to apply due to their complexity and many adjustments (e.g., O'Byrne & Young, 2009). Consequently, some adopters tend to implement simplified versions of RI plans that do not conform to the theory (Weaver, 2001).

Overall, existing research on RI plan adoption benefits offers mixed conclusions. Most importantly, to our knowledge, the impact of RI plan adoption on internal capital markets has not been studied yet. Our study should also complement the research on the efficiency of RI measures (e.g., Barniv et al., 2009; Hogan & Lewis, 2005) and segment-specific hurdle rates in particular (e.g., Baldenius et al., 2007).

Advantages and Drawbacks of Organizational Structures Based on Internal Capital Markets

Since the boom of conglomerate diversifications in 1950s, previous research has recognized benefits of internal markets. Early studies argued that these markets allocate resources more efficiently compared to free (external) markets (Weston, 1970). Internal capital markets were claimed to facilitate adoption of profitable investments that would not have been funded by external capital markets, arguably due to information asymmetry between company insiders and outside investors (Fluck & Lynch, 1999; Gertner et al., 1994), as well as agency costs of financing (Stulz, 1990). Lewellen (1971) argued that diversified companies generate larger tax savings due to greater debt capacity. Majd and Myers (1987) also predict tax savings due to diversified firm's ability to net profits and losses of different divisions. Borghesi et al. (2007) show that mature firms in stagnant industries gain by diversification. Gopalan and Xie (2011) and Yan, Yang, and Jiao (2010)

document easier access to external and internal capital by diversified firms in tightened market conditions or distress.

More recently, research has focused on the analysis of internal capital market deficiencies. Internal capital markets tend to allocate capital suboptimally compared to the external markets. Ozbas and Scharfstein (2010) show that segment investment in diversified firms is insensitive to segment growth opportunities. This failure is primarily due to agency costs (Laeven & Levine, 2007), as well as costly information asymmetry between CEO and divisions (Jensen & Meckling, 1992, 2009) resulting in a variety of investment distortions. Worse-performing divisions may attract extra investment funds at the expense of their better performing counterparts thanks to divisional managers' rent-seeking behavior aimed at receiving higher compensation (Scharfstein & Stein, 2000), and their tendency to finance defensive inexpropriable divisional investments (Rajan et al., 2000). Cremers et al. (2011) indeed document that more influential divisional managers receive more investment funds. Many of the inefficiencies can be directly attributed to CEO actions such as private benefit consumption (Datta et al., 2009), inefficient post-succession (Xuan, 2009) and post-acquisition (Schoar, 2002) behavior.

The monitoring mechanism failures and investment deficiencies may explain findings of Berger and Ofek (1995) that diversified companies sell at a "diversification discount" as high as 15% with respect to the value of divisional assets as self-standing entities.[5] Focus-increasing corporate events are also typically accompanied by positive stock price reactions (Comment & Jarrell, 1995; Daley et al., 1997; John & Ofek, 1995) and more efficient investment allocation (Ahn & Denis, 2004; Burch & Nanda, 2003; Chen, 2006; Dittmar & Shivdasani, 2003; Gertner et al., 2002).

Rajan et al. (2000) provide both the theoretical model and empirical test of company-wide investment allocation efficiency. They measure allocation efficiency (called "the relative value added by allocation." in their paper) as:

$$\text{Allocation Efficiency} = \frac{\sum_{j=1}^{n} BA_j(q_j - \overline{q})\left(\frac{I_j}{BA_j} - \frac{I_j^{ss}}{BA_j^{ss}} - \sum_{k=1}^{n} w_k\left(\frac{I_k}{BA_k} - \frac{I_k^{ss}}{BA_k^{ss}}\right)\right)}{BA} \tag{1}$$

where I_j refers to capital expenditures of division j, BA_j to its assets, w_j to its asset weight, and q_j to its growth opportunities (measured by the

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median ratio of market-to-book value of assets of all the single-segment firms operating in the same industry as division *j*). Term $\overline{q}$ denotes average of segment *q*'s for the company, and the ratio I_j^{ss}/BA_j^{ss} refers to the median capital expenditures-to-assets ratio for all the single-segment firms operating in the same industry as division *j*. Term *BA* stands for company's total book value of assets. Ultimately, Investment Allocation efficiency increases (and more relative value is added) if segments with better growth opportunities receive more capital and vice versa. Rajan et al. (2000) show that Allocation Efficiency is negatively affected by the segment diversity of divisional growth opportunities, measured as the ratio of the firm's standard deviation of segment asset-weighted *q*'s to the equally weighted average *q* of firm's segments:

$$\text{Segment Diversity} = \sqrt{\sum_{j=1}^{n} \frac{(w_j q_j - \overline{wq})^2}{n-1}} \Big/ \left(\frac{1}{n}\sum_{j=1}^{n} q_j\right) \tag{2}$$

Finally, Rajan et al. (2000) document that the allocation efficiency and diversity measures have value implication for diversified firms – higher Allocation Efficiency (Segment Diversity) leads to diversification premiums (discounts) in multidivisional companies.

Testable Hypotheses for the Impact of RI Plan Adoptions on Internal Capital Markets

RI plans allow adopters to create unique division-specific profit targets reflecting the riskiness of each particular division, while making each divisional manager primarily responsible for the performance of his/her division. The ultimate effect of plan adoption may be positive as the adoption likely forces divisions with less growth opportunities to refuse extra capital, in order not to increase their profit targets. Similarly, high growth segments should attract extra investment funds in order to utilize their greater profit potential. However, adopters may also face extra costs and losses. RI plan adoption may force managers to be too narrowly focused on the performance of their own division, disregard company-wide value-enhancing projects, and engage in campaigning to pass off

shared costs and assets. Therefore, the ultimate impact of plan adoption is an empirical question:

H1 [H1a]. *RI plan adoptions lead to performance improvement [deterioration] for diversified firms.*

If plan adoption improves performance of diversified firms, then one should observe more efficient allocation decisions made on divisional levels. Because overinvestment has been identified as one of the sources of value losses in multidivisional firms, we expect plan adopters to decrease their capital spending. Also, we anticipate increase in the sensitivity of segment investment to segment growth opportunities (measured by segment *q*), since Ozbas and Scharfstein (2010) show such increase is associated with improvements in investment efficiency. Thus:

H2 [H2a]. *If RI plan adoption is value-enhancing [value-reducing], then divisional investment efficiency improves [worsens] after plan adoption by a diversified firm. Adopters lower [do not lower] their divisional capital expenditures, and sensitivity of segment investment to segment q rises [does not rise].*

Improvements in investment efficiency on segment level should lead to the overall increase in company-wide Allocation Efficiency. In addition, if RI plans mitigate divisional inefficiencies, we also anticipate that the negative effect of dispersion of segment growth opportunities on Allocation Efficiency (Rajan et al., 2000) should diminish after the adoption. The opposite should be expected if plan implementation does not lead to improvements in investment efficiency. Consequently:

H3 [H3a]. *If RI plan adoption is value-enhancing [value-reducing] for diversified firms, then the company's Allocation Efficiency improves [does not improve] after plan adoption. The negative impact of Segment Dispersion on Allocation Efficiency of adopters should [should not] be significantly smaller in absolute value after the adoption, compared to the pre-adoption period.*

Ultimately, more efficient decisions should diminish the diversification discount of plan adopters. In addition, if plans mitigate divisional inefficiencies, the negative effect of dispersion of segment growth opportunities on diversification discount (Rajan et al., 2000) should be smaller during the post-adoption period. We should expect the opposite if plan adoption does not improve investment decisions:

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H4 [H4a]. *If RI plan adoption is value-enhancing [value-reducing] for diversified firms, adopters should [should not] be valued at a smaller diversification discount during the post-adoption period compared to similarly diversified firms. The diversification discount reduction should [should not] be positively related to the improvements in Allocation Efficiency achieved by the adopters. The negative impact of Segment Dispersion on diversification discount of adopters should [should not] be significantly smaller in absolute value after the adoption, compared to the pre-adoption period.*

DATA

Our sample of diversified RI plan adopters was constructed from two sources: First, we ran a full text search on 2002, 1999, and 1996 electronic Thomson Research collections of firm proxy statements, and searched for the following keywords: "Residual Income," "Economic Value Added," "Economic Profit," and "Market Value Added." We manually checked all filings and retained only firms where the keyword appeared in the section discussing executive compensation methods, and signaled that the RI plan was indeed used as a primary method of measuring managerial performance.[6] We then searched for the earliest proxy statement mentioning the keyword, and retained the firm in our sample if this earliest proxy was dated after 1992 (the first year the Securities and Exchange Commission (SEC) consistently collected electronic proxy statements). Second, to append our sample with firms adopting RI plans before 1993, we added adopters identified by Hogan and Lewis (2005) who utilize a keyword search similar to ours in proxy statements on LEXIS/NEXIS database during the 1983–1996 period. Finally, the sample adopters had to report more than one industry segment on *Compustat Segment File* in the year of plan adoption.

Each of our sample adopters was assigned a matching non-adopting firm based on (a) diversification status (matching firms had to report more than one industry segment on *Compustat Segment File* in the year of plan adoption), (b) sales-based Herfindahl Index (an inverse measure of diversification equal to the sum of squared divisional proportions of firm's sales), and (c) asset size. First, we looked for a matching firm with the closest sales-based Herfindahl Index, with the same 2-digit SIC and asset size within 50% and 200% of that of the sample firm. If we could

not find any candidates, we searched for companies based on 1-digit SIC and asset size within 50% and 200% of that of the sample firm. If a matching firm still could not be found, we looked for the closest Herfindahl Index match among firms based on 1-digit SIC and no asset restrictions.[7] We chose this matching system because we wanted to preserve the interpretation of our results as the difference between plan adopters and *similarly diversified* non-adopters. However, to control for possible endogeneity of plan adoptions, we perform our subsequent analysis of segment investment, allocation efficiency, and diversification discounts not only for the full sample, but also for the subsample of "expected adopters" versus "unexpected non-adopters." The expectations are based on the Probit analysis of RI plan adoptions that utilized variables such as profitability, growth opportunities, or investment. Similar version of "propensity-based" matching has also been used by Hogan and Lewis (2005).[8]

Table 1 provides the description of our final sample of 89 companies that adopted RI plans from 1990 to 2001 (we did not find any diversified adopters with available data prior to 1990 or in 2002). Panel A shows the number of adoptions peaked at 15 in 1994, followed by a decline until 2001. Balachandran (2006) also documents a similar fall in RI plan adoptions. The adopter distribution by 1-digit SIC codes presented in Panel B documents the majority of adopters are manufacturing firms (SIC = 3). Panel C shows that the most frequent adopters are in the following 2-digit SIC code industries: Industrial, Commercial Machinery and Computers (SIC = 35), and in Electrical Equipment (SIC = 36).

We also find (not reported in Table 1) that the plan adoptions, as well as any potential subsequent corporate policy changes, were unlikely to be performed due to perceived takeover threat, since none of the sample adopters were targeted for acquisition during the three years preceding the RI plan adoption.

RESULTS

In this section, we present the results of our empirical analysis. First, we analyze the investment and divestiture changes surrounding RI plan adoption for diversified firms. Second, we study the segment performance (investment and profitability) of adopters. Third, we present the

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Table 1. Sample Description.

Panel A: RI Plan Adoptions by Years

Adoption year	Diversified adopters
1990	2
1991	2
1992	3
1993	6
1994	15
1995	12
1996	10
1997	9
1998	10
1999	8
2000	6
2001	6
Total	*89*

Panel B: RI Plan Adoptions by SIC codes

SIC range	Diversified adopters
0100–0999	1
1000–1999	3
2000–2999	21
3000–3999	42
4000–4999	5
5000–5999	8
6000–6999	2
7000–7999	5
8000–8999	2
9000–9999	0
Total	*89*

Panel C: Most Frequent SIC Codes of RI Plan Adopters

Most frequent 2-digit SIC codes	Diversified adopters
	35 (10 times): Industrial, Commercial Machinery, and Computers 36 (10 times): Electrical Equipment 28 (8 times): Chemical and Allied Products 20 (5 times): Food and Kindred Products 38 (5 times): Photo Goods and Watches

analysis of the investment efficiency of multisegment firms that adopted RI plans – both on the segment level and in terms of company-wide Investment Efficiency. Fourth, we examine the impact of plan adoptions on diversification discount changes. Fifth, we compare the value gains achieved by diversified and focused adopters. Last, we analyze the determinants of plan eliminations.

Investment and Divestiture Changes Surrounding Adoptions of RI Plans by Diversified Firms

Table 2 presents the univariate analysis of size, capital spending, and acquisition or divestiture changes for four years surrounding plan adoption. Expecting a fading impact of RI plans on performance in years more distant from adoption, we examine the significance of differences for (−2 years; +2 years) and (-2 years; +3 years) event windows. Years −1 and +1 are skipped to avoid possible mismatches of calendar versus fiscal years of plan adoptions and to correctly capture the changes from "before" to "after" the adoption. Both adopters and matching firms have very similar assets and sales (not surprisingly, as the matching was done based on assets). More importantly, RI plan adopters do not significantly change their firm-level capital expenditures, or acquisition and divestiture policies, both over time and when compared to the policies of matching firms. Consequently, the corporate performance improvements (in terms of returns on assets, diversification discounts, and Tobin's Q), documented in subsequent sections, are unlikely to be achieved due to "excessive" capital spending cuts or divestitures. Instead, any potential performance changes will be consistent with the improved allocation efficiency. Last, sample firms do not lower their level of diversification following the RI plan adoption. They have, on average, three segments and their median Herfindahl Index values stay close to 0.50 for all sample period years. The difference in diversification changes between the subsamples is significant at 10% level primarily due to slight diversification decrease for matching companies.

In the rest of the paper, we will focus on the analysis of gains due to RI plan adoption, as well as the possible sources of such gains. We will study how RI plans affect investment efficiency – both on the segment and firm levels – and how the potentially better investment decisions impact the firm's diversification discount.

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Table 2. Firm Characteristics around RI Plan Adoptions by Diversified Firms.

Reldif	*N*	Assets	Sales	Capx/A	Disp/A	Acq/A	Herfind.	Nseg
Adopters								
−4	85	1,470	1,976	0.0689	0.0018	0.0000	0.5251	3 (2.6)
−3	85	1,494	2,032	0.0556	0.0014	0.0000	0.5139	3 (2.6)
−2	**88**	**1,529**	**2,083**	**0.0531**	**0.0022**	**0.0004**	**0.5098**	**2.5 (2.6)**
−1	88	1,741	2,054	0.0502	0.0020	0.0012	0.5061	3 (2.7)
0	89	1,861	2,091	0.0526	0.0027	0.0000	0.5011	3 (2.9)
1	88	1,895	2,133	0.0570	0.0024	0.0004	0.5046	3 (2.8)
2	**84**	**1,899**	**2,303**	**0.0521**	**0.0023**	**0.0047**	**0.5023**	**3 (2.9)**
3	**74**	**1,917**	**2,091**	**0.0475**	**0.0011**	**0.0023**	**0.5006**	**3* (2.9*)**
4	69	1,830	2,218	0.0457	0.0035	0.0061	0.4755	3 (3.1)
Matching firms								
−4	79	1,202	1,541	0.0572	0.0006	0.0006	0.5521	3 (2.9)
−3	81	1,242	1,654	0.0534	0.0005	0.0003	0.5827	2 (2.6)
−2	**85**	**1,399**	**1,585**	**0.0560**	**0.0007**	**0.0009**	**0.5014**	**3 (2.8)**
−1	86	1,442	1,691	0.0521	0.0016	0.0000	0.5541	3 (2.8)
0	89	1,571	1,771	0.0512	0.0010	0.0040	0.5077	3 (3.0)
1	85	1,756	1,841	0.0543	0.0011	0.0001	0.5493	3 (2.9)
2	**80**	**1,742**	**1,838**	**0.0433**	**0.0010**	**0.0036**	**0.5462^{oo}**	**3 (2.7)**
3	**72**	**1,825**	**1,909**	**0.0351**	**0.0001**	**0.0016**	**0.5461^{o}**	**2^{o} (2.8^{o})**
4	63	1,990	1,883	0.0369	0.0009	0.0047	0.5480	3 (2.9)

***, **, *: Difference w.r.t. the value of year −2 significant at 1%, 5%, and 10% levels.
^{ooo}, ^{oo}, ^{o}: Change w.r.t. the value of year −2 greater for RI plan adopters than for matching firms at 1%, 5%, and 10% levels.
Median levels presented. Assets, Sales in constant 2002 dollars. Reldif provides the relative difference in years with respect to RI plan adoption. Capx/A, Disp/A, and Acq/A denote Capital Expenditures, Dispositions, and Acquisitions normalized by Total Assets. "Herfind." denotes sales-based Herfindahl Index (the sum of squared divisional sales weights). Nseg represents the number of company's industrial segments. The numbers in parentheses indicate the mean number of segments.

Diversified Adopters' Segment Investment and Profitability

We show the primary segment-levels statistics in Table 3. The results suggest that diversified RI plan adopters are associated with significant performance improvements. The median segment Return on Assets (ROA) (Operating Earnings/Assets) significantly improves from 11.03% in year −2 to 13.25% in year +2, and to 13.16% in year +3. Segments of matching firms display no similar improvements, despite having no significantly

Table 3. Segment Statistics around RI Plan Adoptions by Multidivisional Firms.

Reldif	ROA	Invest/A	I-Invest/A	Cash/A	Sales	Assets	Nobs
Adopters							
−4	0.1196	0.0583	0.0123	0.1800	574	398	225
−3	0.1101	0.0588	0.0117	0.1662	566	403	219
−2	**0.1103**	**0.0531**	**0.0090**	**0.1629**	**593**	**381**	**230**
−1	0.1206	0.0528	0.0058	0.1728	527	336	238
0	0.1295	0.0540	0.0077	0.1829	525	355	262
1	0.1337	0.0506	0.0077	0.1884	566	471	241
2	**0.1325****	**0.0507**	**0.0072**	**0.1799***	**578**	**459**	**233**
3	**0.1316****	**0.0478****	**0.0058****	**0.1851****	**514**	**360**	**222**
4	0.1252	0.0508	0.0084	0.1728	585	491	196
Matching firms							
−4	0.1251	0.0578	0.0156	0.1753	435	329	237
−3	0.1182	0.0524	0.0127	0.1799	440	317	212
−2	**0.1202**	**0.0563**	**0.0119**	**0.1753**	**436**	**329**	**237**
−1	0.1123	0.0552	0.0142	0.1681	375	288	239
0	0.1108	0.0531	0.0090	0.1776	363	303	265
1	0.1215	0.0563	0.0117	0.1751	368	314	234
2	**0.1175**	**0.0488**^{**,oo}**	**0.0057**^{**,o}**	**0.1712**	**434**	**386**	**207**
3	**0.1201**^{o}**	**0.0452****	**0.0050****	**0.1672**^{o}**	**416**	**353**	**191**
4	0.1144	0.0483	0.0099	0.1707	431	387	165

***,**,*: Difference w.r.t. the value of year −2 significant at 1%, 5%, and 10% levels.
^{ooo}, ^{oo}, ^{o}: Change w.r.t. the value of year −2 greater for RI plan adopters than for matching firms at 1%, 5%, and 10% levels.
Median levels presented. Assets, Sales in constant 2002 dollars. Reldif provides the relative difference in years with respect to RI plan adoption. ROA equals Segment Operating Earnings divided by Segment Assets. Invest/A, I-Invest/A, and Cash/A indicate Segment Investment, Industry-adjusted Segment Investment, and Cash Flows normalized by Segment Assets. Industry-adjusted Segment Investment is computed as the difference between Segment Investment and the median Segment Investment of all single-segment firms operating in the same industry. Cash Flows equal Segment Operating Earnings plus Depreciation.

different returns from adopting firms' segments prior to plan adoption. The analysis of Cash Flows (Operating Earnings + Depreciation) generated by segments demonstrates a similar trend. Median Cash Flows/Assets ratio rises from 16.29% in year −2 to 17.99% in year +2 and 18.56% in year +3 for adopting companies' segments. The segments of matching firms are not associated with similar improvements, despite having comparable pre-adoption performance. Previous research (e.g.,

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Berger & Ofek, 1995) has identified overinvestment as one of the sources of value losses in diversified firms. The results in Table 3 indicate, however, that performance improvements of plan adopting segments cannot be fully explained by overinvestment reduction. Our results show that diversified firms adopting RI plans tend to reduce their investment. Segment Investment/Assets (industry-adjusted Investment/Assets) drops from 5.31% (0.90%) in year −2 to 5.07% (0.72%) in year +2 and to 4.78% (0.58%) in year +3.[9] The change over the window (−2 years; +3 years) is statistically significant at 5% level. However, Table 3 also shows that matching firms' segments experience similar investment reduction, albeit without performance gains.

RI plan adopters could achieve performance improvements without segment investment reductions if they divert capital expenditures toward segments with better-than-average growth opportunities (compared to the other firm's segments). The analysis of segment investment efficiency in Table 4 suggests that firms implementing RI plans indeed allocate capital relatively more efficiently. We measure segment growth opportunities by the median Tobin's Q (defined as (Market Value of Equity + Total Assets − Book Value of Equity) divided by Total Assets) of all single-segment firms in the same industry during a particular year. Our results in Panel A show that plan adopters significantly reduce their industry-adjusted investments in segments with growth opportunities below the firm's average growth opportunities from median of 1.18% in year −2 to 0.20% in year +3. Panel B shows that over the same event window, adopters increase (albeit statistically insignificantly) their industry-adjusted investment in segments with above-average growth opportunities from median of 0.24% in year −2 to 0.90% in year +3. Interestingly, matching firms seem to follow the opposite investment pattern. The overall segment investment reduction by those firms documented in Table 3 appears to be primarily due to reduction of investment in segments with above-average growth opportunities. Median industry-adjusted investment in such segments drops significantly from 1.49% in year −2 to 0.44% in year +2 and to 0.15% in year +3. At the same time, the industry-adjusted investment in below-average growth opportunity segments by matching firms increases, although statistically insignificantly.

Overall, our results in Tables 3 and 4 support H1 and are consistent with the previous research implying that RI plan adoptions may be value-creating. Segment ROA and Cash Flows/Assets improve significantly, while matching companies' segments do not show similar trends. Both adopters and their matching companies reduce segment-level investment.

Table 4. Segment Investment and Performance around RI Plan Adoptions by Multidivisional Firms.

Reldif	Adopters:			Matching Firms:				
	Invest/A	I-Invest/A	Cash/A	Indust. *q*	Invest/A	I-Invest/A	Cash/A	Indust. *q*
Panel A: Segment's industry q below firm's weighted q								
−4	0.0527	0.0101	0.1887	1.15	0.0557	0.0109	0.1665	1.17
−3	0.0516	0.0115	0.1677	1.20	0.0491	0.0069	0.1874	1.17
−2	**0.0504**	**0.0118**	**0.1619**	**1.25**	**0.0514**	**0.0082**	**0.1738**	**1.23**
−1	0.0503	0.0076	0.1671	1.26	0.0547	0.0133	0.1579	1.28
0	0.0521	0.0072	0.1891	1.33	0.0493	0.0084	0.1763	1.29
1	0.0553	0.0103	0.1960	1.33	0.0556	0.0078	0.1798	1.28
2	**0.0565**	**0.0071**	**0.1736**	**1.26**	**0.0485^{oo}**	**0.0104^{oo}**	**0.1802***	**1.24**
3	**0.0495**	**0.0020****	**0.1862***	**1.26**	**0.0509**	**0.0110**	**0.1845**	**1.28**
4	0.0480	0.0071	0.1801	1.19	0.0474	0.0093	0.1792	1.19
Panel B: Segment's industry q above firm's weighted q								
−4	0.0629	0.0131	0.1722	1.48	0.0672	0.0172	0.1974	1.44
−3	0.0615	0.0136	0.1633	1.51	0.0605	0.0141	0.1755	1.54
−2	**0.0559**	**0.0024**	**0.1655**	**1.63**	**0.0651**	**0.0149**	**0.1767**	**1.53**
−1	0.0550	0.0025	0.1913	1.72	0.0570	0.0148	0.1729	1.73
0	0.0568	0.0108	0.1802	1.79	0.0575	0.0108	0.1780	1.70
1	0.0481	0.0058	0.1707	1.76	0.0588	0.0177	0.1730	1.67
2	**0.0477**	**0.0072**	**0.1917***	**1.70**	**0.0488**,^{o}**	**0.0044*****	**0.1667**	**1.77**
3	**0.0516**	**0.0091**	**0.1861***	**1.72**	**0.0452*****	**0.0015*****	**0.1603**	**1.59**
4	0.0595	0.0116	0.1718	1.58	0.0518	0.0105	0.1798	1.64

***,**,*: Difference w.r.t. the value of year −2 significant at 1%, 5%, and 10% levels.
^{ooo}, ^{oo}, ^{o}: Change w.r.t. the value of year −2 greater for adopters than for matching firms at 1%, 5%, and 10% levels.
Median levels presented. Reldif provides the relative difference in years with respect to RI plan adoption. Segment's industry *q* is equal to the median Tobin's Q of all single-segment firms in the same industry. Invest/A, I-Invest/A, and Cash/A indicate Segment Investment, Industry-adjusted Segment Investment, and Cash Flows normalized by Segment Assets. Industry-adjusted Segment Investment is computed as the difference between Segment Investment and the median Segment Investment of all single-segment firms operating in the same industry. Cash Flows equal Segment Operating Earnings plus Depreciation. "Indust. *q*" denotes industry *q* of the segment.

However, while matching companies reduce primarily investment in segments with better (above firm-average) growth opportunities, firms implementing RI plans tend to cut capital spending of segments with poorer growth prospects. Such investment patterns are consistent with H2 suggesting investment efficiency improvements for diversified adopters.

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Nevertheless, conclusive inferences likely cannot be drawn from bivariate analysis in previous tables. First, the magnitude of differences could be questioned, since RI plan adoption is an endogenous event. Firms likely tend to adopt plans when they find them beneficial. The endogeneity of RI plan implementation will be discussed in the next subsection. Second, Shin and Stulz (1998) show that besides own growth opportunities, segment's investment is affected by segment's cash flows, as well as firm's cash flows and growth opportunities. To properly examine segment allocation efficiency of plan adopters, we will perform multivariate analysis in subsection "Multivariate analysis of segment investment by diversified RI plan adopters."

Determinants of RI Plan Adoptions

Firms will likely adopt RI plans only when the managers find them more advantageous than any of the alternatives. Consequently, it is difficult to determine whether firms that performed well did so because they adopted such plans, especially if adoption and prior performance are linked. In order to test the impact of plan implementation, we should examine subsamples of firms that expectedly adopted the plans against those that were expected to, but did not adopt. In this subsection, we present Probit analysis of plan adoption determinants that will enable us to identify subsamples of "expected adopters" and "unexpected non-adopters." These subsamples will then be used in the subsections titled "Multivariate analysis of segment investment by diversified RI plan adopters," "Investment Efficiency changes following RI plan adoptions," and "Diversification discount changes following RI plan adoptions" to provide robustness tests of investment allocation efficiency and value gains associated with plan implementation.

The Probit analysis of determinants of RI plan adoptions is presented in Table 5. Since we want to study how the level of industrial diversification affects adoption decisions, we append our sample of diversified adopters with 81 single-segment firms that implemented RI plans during the period 1987–2002 (these firms will be further analyzed in subsection "Performance changes following RI plan adoptions by diversified versus focused firms").[10] The single-segment adopters were identified by the methodology described in section titled "Data" (i.e., the keyword search in proxy statements plus extra adopters from Hogan & Lewis, 2005, sample).

Table 5. Probit Analysis of RI Plan Adoptions.

Explanatory Variables:	1	2	3	4	5	6	7	8	9
Log (Total Assets)	0.1025	0.1087	0.1085	0.1083	0.1012	−0.0622	−0.0663	−0.0984	0.0148
	*8.70***	*9.00***	*8.94***	*8.94***	*8.12***	*−3.00***	*−3.09***	*−4.24***	*0.57*
Weighted segment ROA	1.0292	1.1465	1.1521	1.1534	1.2251	0.5908	0.7922	0.8965	1.2211
	*6.06***	*6.23***	*6.16***	*6.16***	*5.88***	*2.59***	*3.09***	*3.06***	*3.35***
Herfindahl Index	**−0.3190**	**−0.3536**	**−0.3530**	**−0.3265**	**−0.2752**	**−0.3587**	**−0.3243**	**−0.2297**	**−0.3022**
	*−3.27****	*−3.60****	*−3.59****	*−2.99****	*−2.49***	*−3.12****	*−2.51***	*−1.78**	*−2.08***
Ind.-adj. Investment/Assets		−0.8483	−0.8514	−0.8487	−1.0816		−1.3880	−1.6532	−0.9962
		*−1.84**	*−1.85**	*−1.84**	*−2.28***		*−2.28***	*−2.66****	*−1.18*
Industry Growth Opportunities			−0.0071	−0.0135	0.0340		−0.1283	−0.0186	0.0091
			0.20	*0.35*	*0.82*		*−2.52***	*−0.36*	*0.14*
Segment Diversity				0.0969	0.0289		0.1131	−0.0140	0.1282
				0.55	*0.17*		*0.54*	*0.10*	*0.62*
Investment Efficiency				1.2632	1.5433		1.6276	2.2600	0.8353
				0.41	*0.49*		*0.39*	*0.52*	*0.20*
Total Cash/Total Assets					−1.6229			−1.8728	−1.3035
					*−5.15****			*−5.04****	*−2.77****
Total Debt/Total Assets					−0.5122			0.0210	−0.1167
					*−3.77****			*0.10*	*−0.56*
CEO Bonus/Total Compensation						0.1241	0.0756	0.0823	
						0.71	*0.42*	*0.45*	
CEO Share Ownership						−1.1437	−1.0688	−0.9347	
						*−2.16***	*−2.02***	*−1.73**	
G-Index									0.0293
									*2.21***
Correctly predicted	68%	69%	69%	69%	70%	68%	66%	64%	60%
Pseudo R^2	0.11	0.12	0.12	0.12	0.14	0.30	0.31	0.33	0.08

***, **, * denotes statistical significance at 1%, 5%, and 10% levels, respectively.

The table presents the Probit analysis of RI plan adoption decisions. Models 1–5 are based on 114,074 firm-year observations, Models 6–8 are based on 16,463 firm-year observations with available CEO compensation data, and Model 9 is based on 16,903 firm-year observations with available governance-quality (G-Index) data. The dependent variable is a dummy variable equal to one if a firm adopted RI plan in a given year. Industry-adjusted Investment is computed as the weighted average of segment investments adjusted for the median investment ratio in the segment's industry. Industry Growth Opportunities measured as the weighted average of industry *q*'s of all company's segments. Segment Diversity is the ratio of the firm's standard deviation of segment asset-weighted *q*'s to the equally weighted average *q* of firm's segments, as defined by Rajan et al. (2000). Investment Efficiency is the correlation between segment growth opportunities measured by *q*'s and industry-adjusted segment investment, called "the relative value added by allocation" by Rajan et al. (2000). CEO bonus compensation and CEO (percentage) share ownership are gathered from *Execucomp* database. G-Index is the Gompers et al. (2003) index gathered from the *Risk Metrics* database. *T*-statistics are in italics below the coefficient estimates.

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Factors expected to influence firm decisions to adopt RI plans include (anticipated sign in parentheses):

Firm size measured by Log of Total Assets (+): We expect larger firms to more likely adopt RI plans due to an easier absorption of transaction costs associated with such plans.

Profitability measured by Weighted Segment ROA (?): Managers of more profitable firms may be more willing to adopt compensation plans rewarding better performance. However, worse-performing companies may be in a greater need to adopt RI plans.

Diversification measured by Sales-based Herfindahl Index (?): Since this index is an inverse measure of diversification, a negative coefficient would support our H1 that plan implementation benefits diversified firms. A negative coefficient would support alternative H1a.

Investment level measured by Industry-adjusted Investment/Assets (?): RI plans provide a charge for invested capital. Managers may try to avoid it, but shareholders may be in favor of such a plan.

Industry Growth Opportunities measured by the weighted average of industry q's of all company's segments (−): Garvey and Milbourn (2000) claim that computation of economic profits is difficult for fast growing firms, which lowers the likelihood of adoption of such plans.

Segment Diversity defined in Eq. (2) (?): RI plan adopters with very diverse divisions likely face the greatest implementation challenges (division of shared costs and assets, acceptance of distinct profit targets by all divisions). At the same time, the adoptions also bring the highest benefits – the ability to assess true divisional value creation by considering different business risk.

Investment Efficiency defined in Eq. (1) (?): Managers of firms that invest efficiently may be more willing to accept compensation plans rewarding efficiency. However, inefficient firms may benefit more by adopting RI plans.

Financial slack measured by Total Cash reserves/Total Assets (?): Firms with ample cash reserves may benefit the most from the investment discipline gained through plan adoption. Managers of such firms, however, may be less likely to adopt such plans, as it is difficult for cash to beat the cost of capital targets.

Leverage measured by Total Debt/Total Assets (−): Leverage is considered a monitoring mechanism (e.g., Agrawal & Knoeber, 1996), so it can provide an alternative to RI plan adoption.

Existing CEO bonus compensation measured by CEO Bonus Compensation/Total Compensation (−): Firms that already pay greater proportions of incentive compensation are likely subject to lower agency costs, lowering the likelihood of RI plan implementation.

CEO share ownership measured by CEO Shares Owned/Shares Outstanding (−): Firms with larger CEO stakes are likely subject to lower agency costs, lowering the likelihood of plan adoption.

Governance quality measured by *G-Index* developed by Gompers, Ishii, and Metrick (2003) (?)[11]: Companies with worse quality of governance may be in a greater need to adopt RI plans. However, managers of those companies may be entrenched, and thus unwilling to approve such plans.

Our empirical results in Table 5 suggest that the likelihood of RI plan adoption is increasing with the level of firm industrial diversification. Herfindahl Index is a significantly negative predictor of plan adoption in our basic Model 1, as well as when we control for the level of investment (Model 2), growth opportunities (Model 3), segment diversity and investment efficiency (Model 4), financial slack and leverage (Model 5), availability of alternative CEO bonus compensation and CEO ownership (Models 6−8), and the quality of governance (Model 9). In most of the models, the magnitude of Herfindahl Index coefficients ranges from −0.32 to −0.36. These values imply that, when other control variables are held at their medians, there is between 71% and 86% greater chance of plan implementation by a firm with a Herfindahl Index of 0.50 (close to the sample median of our adopters) compared to the probability of adoption by a focused company.

Our results suggest that firms face significant costs associated with RI plan implementation. The significantly positive Firm size coefficient in Models 1−5 implies that typical adopters are large firms, consistent with the existence of fixed adoption costs.[12] Similarly to Hogan and Lewis (2005), plans are primarily implemented by more profitable firms with lower investment levels and lower financial slack. Managers appear to accept these plans if they benefit due to high profits, but do not suffer due to high profit charges caused by high investment and/or cash levels. We do not find adoption decisions to be related to either Segment Diversity or company-wide Investment Efficiency. Any potential gains in allocation

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efficiency and/or value due to RI plan adoption are thus unlikely due to potential momentum reversals by previously underperforming adopters with high Segment Diversity. We further document that firms with higher levels of CEO ownership likely find adoption of plans based on economic profits less necessary, but we do not find a significant relation between plan adoption and the existing CEO bonus compensation. The positive coefficient on G-Index in Model 9 suggests that RI plans are more likely to be adopted by companies with lower quality of governance, and thus in need of better incentives.

In our subsequent analysis, we will use the results of Model 8 (with the best pseudo-R^2 score) to establish the subsamples of "Expected Adopters" and "Unexpected Non-adopters" of RI plans. These subsamples will be used to test the impact of endogeneity of plan adoption decisions on investment and profitability of firms.[13]

Multivariate Analysis of Segment Investment by Diversified RI Plan Adopters

Table 6 presents the results of multivariate analysis of divisional investment by diversified firms that implemented RI plans. Our regression model design is similar to that of Shin and Stulz (1998) who show that cash flows are re-distributed in diversified firms, since the investment of a particular division depends on cash flows generated by the other divisions of the company. (Shin & Stulz, 1998, claim the cash flow transfers do not create value, because the investment sensitivity to the cash flows is independent of segment growth opportunities.) Investment/Assets ratio of a particular segment is regressed on measures of own and other segments' growth opportunities, own and other segments' cash flows, and variables designed to examine the impact of plan adoption (Post-adoption × Adopter dummy variable, equal to one for years following adoption by RI plan adopting firms), and post-adoption time trend (Post-adoption dummy variable, equal to one for years following plan adoption for both the adopter and the matching firm). We also include firm- and calendar-year fixed effects to control for the panel-structure of our data (these coefficients are not reported in Table 6). In order to minimize the accounting mismatches between the year of plan adoption and the firm's fiscal year-end, we exclude years −1, 0, and +1 from our Table 6 analysis (as well as from multivariate analyses in the following tables).

Table 6. Segment Investment Analysis (2-Way Fixed Effects).

Model	1	2	3	4
Sample	Full	Full	Expected adopters and unexpected non-adopters	Full
Explanatory Variables:				
Segment's Growth Opportunities	0.0021	−0.0014	−0.0019	−0.0014
	0.96	−0.71	−0.58	−0.51
Segment's Growth Opportunities × Adopter × Post-adoption		**0.0094**	**0.0098**	**0.0097**
		2.37**	**2.37****	**2.05****
Other Segments' Growth Opportunities	−0.0011	−0.0011	−0.0032	−0.0011
	−0.36	−0.39	−0.98	−0.37
Segment's Cash Flows/Assets	0.0180	0.0201	0.0343	0.0190
	2.83***	3.19***	5.05***	2.99***
Other Segments' Cash Flows/Assets	0.0002	0.0001	0.0002	0.0001
	6.34***	4.99***	5.94***	4.99***
Other Segments' Cash Flows/Assets × Adopter × Post-adoption		**0.0011**	**0.0009**	**0.0009**
		6.93***	**4.18*****	**4.59*****
Post-Adoption		−0.0024	0.0025	−0.0025
		−0.32	0.30	−0.33
Adopter × Post-adoption		**−0.0188**	**−0.0199**	**−0.0196**
		−2.36**	**−2.35****	**−2.10****
Segment's Growth Opportunities × CEO Turnover × Post-adoption				−0.0005
				0.10
Other Segments' Cash Flows/Assets × CEO Turnover × Adopter × Post-adoption				0.0005
				1.69*
CEO turnover × Post-adoption				0.0019
				0.14

***,**,* denotes statistical significance at 1%, 5%, and 10% levels, respectively.

Dependent variable is the Segment Investment normalized by segment assets. "Segment Growth Opportunities" are measured by the median Tobin's Q of all focused firms in segment's industry. "Post-adoption" is a dummy variable equal to one for years following RI plan adoption both for the adopter and its matching firm. "Adopter" is a dummy variable equal to one for RI plan adopters. "Other Segments' Growth Opportunities" are equal to the weighted average of other segments' industry q's. "Segment's Cash Flows" are measured as the sum of Segment's Operating Earnings and Segment Depreciation. "Other Segments' Cash Flows" is the sum of Cash Flows generated by other segments. "CEO turnover" is a dummy variable equal to one if the adopter appoints a new CEO within one year window around the plan implementation. T-statistics below the coefficient estimates. Firm and annual fixed effects not reported.

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Model 1 shows that segment's investment of both adopters and their matching firms depends significantly on its own, and on other segments' cash flows. It appears capital expenditures of a particular company's division rise (fall), as the other divisions generate more (less) profits. This result implies redistribution of investment funds in a diversified firm (without redistribution, segment's investment should depend only on its own cash flows), and it is consistent with Shin and Stulz (1998) showing similar investment patterns for a large sample of all listed U.S. firms. Importantly, segment investment of firms in our sample is insensitive to segment's growth opportunities. This inability to secure extra investment funds by segments with superior growth opportunities is generally considered a sign of investment inefficiencies in diversified firms (Ozbas & Scharfstein, 2010).

In Model 2, we examine the impact of RI plan adoption on segment investment policies. We uncover three major results. First, and most importantly, segment investment of adopters becomes significantly related to segment's growth opportunities after the profit plans are implemented (the change in segment growth opportunities from 10th to 90th percentile of sample distribution leads to 1.4% increase in investment). Second, the dependence of segment's investment on other segment's cash flows increases by roughly 10 times during the post-adoption period for the adopters, suggesting that RI plans broaden, rather than diminish, functioning of internal capital markets. Third, we find that when controlling for other determinants, adopters actually significantly lower their post-adopting investment by 1.88% of segment assets. Overall, these results support our H2. RI plan implementation appears to be associated with investment reduction and increase in investment efficiency on the segment levels.

The specification of Model 3 is identical to that of Model 2. However, we restrict our analysis to subsamples of "Expected Adopters" and "Unexpected Non-adopters" identified by Probit analysis of RI plan choices. We expect the segment investment changes uncovered by the analysis of these subsamples to be primarily due to plan implementation. The results of Model 3 are nearly identical to those of Model 2 (though the coefficients for investment reduction and for sensitivity to segment's growth opportunities slightly increased in magnitude). Once again, our findings support H2.

In Model 4, we utilize the sample and specification of Model 2, but add variables controlling for the impact of CEO turnover on the investment policies of our adopters. The consideration of 35 CEO replacements in the three-year window surrounding implementation of profit plans among the

89 diversified adopters helps us analyze the possibility that significant changes in segment investment policies attributed to plan adoption may be just the consequence of CEO replacement followed by a decision to adopt a RI plan.[14] Our results show that all three adoption-related segment investment changes (greater sensitivity to segment's growth opportunities; greater impact of other segments' cash flows; investment reduction) remain unaffected by inclusion of CEO turnover variables. Also, except for marginally significant increase in the post-turnover impact of other segments' cash flows, none of CEO turnover variables affect segment investment policies.[15] Consequently, the segment efficiency improvements documented in Models 2 and 3 are likely the direct consequences of plan adoptions.

Investment Efficiency Changes Following RI Plan Adoptions

Rajan et al. (2000) introduce the measure of company-wide Investment Efficiency, defined in Eq. (1). They show that (a) Investment Efficiency of diversified firms worsens as Segment Diversity, defined in Eq. (2), increases and (b) diversification discount decreases for firms with greater Investment Efficiency. Our results in the previous subsection suggest firms pursue more efficient segment investments following the adoption of RI plans. This subsection will study changes in company's overall Investment Efficiency surrounding plan implementation. Valuation impact of Investment Efficiency changes will be examined in the next subsection.

Table 7 presents the analysis of Investment Efficiency. To obtain coefficients with larger absolute values, we multiply Investment Efficiency defined in Eq. (2) by a factor of 100. The explanatory variables – Segment Diversity, the inverse of segment q's average, firm size, and firm and calendar-year fixed effects (unreported in Table 7) – are analogous to those used by Rajan et al. (2000). We also include Post-adoption and Adopter dummy variables, as well as interactive coefficients of those dummy variables with Segment Diversity. The results of Model 1 suggest that RI plan implementation is associated with significant improvements in post-adoption Investment Efficiency. The size of the change (0.2457) exceeds the inter-quartile range of Investment Efficiency distribution, and its economic implication will be examined in the next subsection. Similarly to Rajan et al. (2000), we find Segment Diversity negatively affects Investment Efficiency. Our results also show post-adoption time trend (measured by post-adoption dummy) is not associated with significant Investment Efficiency changes. Model 2 examines the impact of plan

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Table 7. Investment Efficiency Analysis (2-Way Fixed Effects).

Model:	1	2	3	4	5	6	7	8	9	10
Sample		Full sample		Expected adopters and unexpected non-adopters				Full sample		
Log (Sales)	−0.2372	−0.2375	−0.2336	−0.2600	−0.2372	−0.2545	−0.2372	−0.2366	−0.2328	−0.2362
	−2.96***	−2.97***	−2.91***	−2.91***	−2.70***	−2.86***	−2.96***	−2.95***	−2.90***	−2.94***
1/Equally weighted average of seg. q's	−0.2695	−0.3199	−0.2618	−0.5307	−0.6217	−0.4949	−0.2693	−0.3232	−0.2639	−0.2727
	−0.83	−0.98	−0.81	−1.38	−1.64	−1.30	−0.82	−1.00	−0.81	−0.84
Segment Diversity	−1.6766	−1.4434	−2.0883	−1.7703	−1.0287	−2.2756	−1.6770	−1.4325	−2.0877	−1.6760
	−3.58***	−2.39**	−4.21***	−3.36***	−1.62	−4.08***	−3.58***	−2.37**	−4.21***	−3.58***
Segment Diversity × Post-adoption		−1.5120			−3.9969			−1.5358		
		−1.86*			−3.97***			−1.89*		
Segment Diversity × Post-adoption × Adopter		**2.2670**	**1.5881**		**4.0109**	**1.9940**		**2.0952**	**1.4280**	
		3.23* **	**2.64*** **		**4.93*** **	**3.10*** **		**2.80*** **	**2.17** **	
Segment Diversity × Post-adoption × CEO Turnover								0.7619	0.6687	
								0.67	0.59	
Post-adoption	−0.0973	0.0296	−0.0729	−0.1479	0.1281	−0.1559	−0.0973	0.0315	−0.0726	−0.0983
	−0.55	0.17	−0.42	−0.74	0.63	−0.81	−0.56	0.17	−0.42	−0.56
Post-adoption × Adopter	**0.2457**			**0.2638**			**0.2472**			**0.2487**
	2.31 **			**2.18** **			**2.19** **			**2.33** **
Post-adoption × Adopter × Related Segments										−0.1960
										0.32
Post-adoption × CEO Turnover							−0.0072			
							−0.10			
N	877	877	877	642	642	642	877	877	877	877

***, **, * denotes statistical significance at 1%, 5%, and 10% levels, respectively.

Dependent variable, Investment Efficiency, is the correlation between segment growth opportunities measured by *q*'s and industry-adjusted segment investment, called "the relative value added by allocation" by Rajan et al. (2000), multiplied by 100 in order to obtain regression coefficients with larger absolute values. Segment Diversity is the ratio of the firm's standard deviation of segment asset-weighted *q*'s to the equally weighted average *q* of firm's segments, as defined by Rajan et al. (2000). "Post-adoption" is a dummy variable equal to one for years following RI plan adoption both for the adopter and its matching firm. "Adopter" is a dummy variable equal to one for RI plan adopters. "Related Segments" is a dummy variable equal to one if all firm's segments share the same 3-digit SIC code. "CEO turnover" is a dummy variable equal to one if the adopter appoints a new CEO within one year window around the plan implementation. *T*-statistics below the coefficient estimates. Firm and annual fixed effects not reported.

adoption on the strength of the negative relationship between Segment Diversity and Investment Efficiency. If implementation of RI plans improves internal capital markets, then the diversity in segment growth opportunities should have a less negative impact on Investment Efficiency. We find that Segment Diversity is associated with a significantly negative coefficient (−1.44) and that the marginal effect of Segment Diversity in post-adoption years is also negative (−1.51). However, the marginal post-adoption effect of Segment Diversity for adopters is significantly positive (+2.27). The post-adoption impact of Segment Diversity is still negative for firms implementing RI plans (−0.68 = −1.44 − 1.51 + 2.27), but indeed significantly less so than that for matching firms (−2.95 = −1.44 − 1.51). Model 3 shows that the post-adoption marginal impact of Segment Diversity on Investment Efficiency stays significantly positive for adopters even when we do not consider the impact of post-adoption trend on the relation between Segment Diversity and Investment Efficiency.

Models 4−6 utilize the same specification as Models 1−3, but the sample analyzed includes only "Expected Adopters" and "Unexpected Non-adopters" of RI plans. The statistical significance of all coefficients reflecting positive impact of plan adoption on Investment Efficiency remains unchanged when we analyze those two subsamples where the differences − as we argued above − arise more likely primarily due to plan adoption. The magnitudes of the plan-related coefficients actually slightly increase. In Models 7−9, we use the sample and specifications of Models 1−3, but we add variables related to the CEO turnover in adopters. We find that CEO turnover does not significantly affect our results suggesting beneficial impact of plan adoption on functioning of internal capital markets and on Investment Efficiency. In addition, none of the CEO turnover-related variables seems to be a significant predictor of Investment Efficiency levels. In Model 10, we test the impact of plan adoption on Investment Efficiency separately for diversified firms with related (9 sample adopters with all segments sharing the same 3-digit SIC codes), and unrelated segments (remaining 80 sample adopters). We expect RI plan implementation to be less beneficial for the firms with divisions operating in the same industry, as one of the perceived plan advantages is creation of unique, industry risk-specific profit targets. Even though the marginal impact of plan adoption for firms with related segments is negative, as anticipated, the coefficient is statistically insignificant. Overall, the results in Table 7 support H3 predicting Investment Efficiency improvements after the adoption.

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Diversification Discount Changes Following RI Plan Adoptions

Previous studies (e.g., Berger & Ofek, 1995; Hoechle et al., 2012; Rajan et al., 2000) have documented that diversified firms sell with negative excess values – that is, at a "diversification discount" – with respect to the value of divisional assets as self-standing units. Rajan et al. (2000) further show that excess value is a negative (positive) function of Segment Diversity (Investment Efficiency). So far, we showed that RI plan adoption is associated with Investment Efficiency improvements, as well as with lower efficiency-reducing effect of Segment Diversity. In this section, we will examine whether these two consequences of plan implementation have an impact on the value of adopters – that is, whether the post-adoption diversification discount decreases for firms implementing RI plans.

The results of the diversification discount analysis are presented in Table 8. Following Berger and Ofek (1995), we define Excess Value (i.e., "diversification discount/premium" if negative/positive) as *ln[Market Value of Assets/Imputed Value]*. Market Value of Assets is computed as Market Value of Equity + Total Assets – Book Value of Equity. The Imputed Value of a firm is calculated as a sum of segments' imputed values. To compute imputed value of a segment, we multiply its Assets by the Assets Multiple (equal to median "Market Value of Assets"-to-Assets ratio of all single-divisional firms in the segment's industry).[16] Table 8 contains results of our analysis of the determinants of diversification discount. To control for the endogeneity of diversification decisions (e.g., Campa & Kedia, 2002), we also include firm and calendar-year fixed effects (coefficients not reported in Table 8).

Consistent with previous research, we find less diversified companies are associated with a smaller diversification discount, since Herfindahl Index is a positive determinant of Excess Value in all Table 8 models. More importantly, Model 1 shows that compared to their matching firms, RI plans adopters trade at a diversification premium of 6.8% following plan implementation.[17] In Model 2, the significantly positive coefficient for Investment Efficiency is consistent with the findings of Rajan et al. (2000). Model 1 in Table 7 shows that adopters improve their Investment Efficiency on average by 0.25. This Investment Efficiency improvement implies firms implementing RI plans trade at a post-adoption premium of $0.1866 \times 0.25 = 4.7\%$. The premium is attributable to improved investment efficiency of adopters. In Model 3, we show RI plan adopter diversification premium remains significant even after controlling for the negative impact of Segment Diversity documented by Rajan et al. (2000). Model 4 results

Table 8. Diversification Discount Analysis (2-Way Fixed Effects).

Model	1	2	3	4	5	6	7	8	9	10
Sample	Full sample				Expected adopters and unexpected non-adopters				Full sample	
Log (Assets)	−0.1257	−0.1228	−0.1631	−0.1612	−0.1207	−0.1279	−0.1537	−0.1541	−0.1253	−0.1274
	(−6.00)***	(−5.77)***	(−7.66)***	(−7.67)***	(−4.81)***	(−5.06)***	(−5.85)***	(−5.91)***	(−5.93)***	(−5.98)***
Herfindahl Index	0.2608	0.2608			0.1561	0.1326			0.2616	0.2560
	(4.63)***	(4.54)***			(2.27)**	(1.92)*			(4.62)***	(4.46)***
Post-adoption	−0.0246		−0.0035		−0.0160		0.0114		−0.0246	−0.0246
	(−0.50)		(−0.10)		(−0.26)		(0.20)		(−0.50)	(−0.50)
Post-adoption × Adopter	**0.0680**		**0.0579**		**0.1108**		**0.0983**		**0.0659**	**0.0739**
	(2.25)**		**(1.99)****		**(3.05)*****		**(2.84)*****		**(1.98)****	**(2.23)****
Post-adoption × Adopter × Related Segments										−0.0205
										(−0.44)
Segment Diversity			−1.1484	−1.3348			−1.0622	−1.2352		
			(−10.41)***	(−11.31)***			(−8.12)***	(−8.72)***		
Segment Diversity × Post-adoption × Adopter				**0.6452**				**0.5888**		
				(4.03)***				**(3.29)*****		
Investment Efficiency		0.1866				0.1881				
		(3.52)***				(2.97)***				
Post-adoption × CEO Turnover									0.0062	
									(0.14)	
N	877	877	877	877	642	642	642	642	877	877

***,**,* denotes statistical significance at 1%, 5%, and 10% levels, respectively.

Dependent Variable is Excess Value = ln(Market Value of Assets/Imputed Value). Market Value of Assets is computed as Market Value of Equity + Total Assets − Book Value of Equity. The Imputed Value of a firm is calculated as a sum of imputed values of its segments. To compute imputed value of a segment, we multiply its Sales (Assets) by the Sales (Assets) Multiple (median "Market Value of Assets"-to-Sales (Assets) ratio of all single-divisional firms in the segment's industry). Herfindahl Index is equal to the sum of squared divisional proportions of company's sales. "Post-adoption" is a dummy variable equal to one for years following RI plan adoption both for the adopter and its matching firm. "Adopter" is a dummy variable equal to one for RI plan adopters. "Related Segments" is a dummy variable equal to one if all firm's segments share the same 3-digit SIC code. Segment Diversity is the ratio of the firm's standard deviation of segment asset-weighted q's to the equally weighted average q of firm's segments, as defined by Rajan et al. (2000). Investment Efficiency equals to the correlation between segment growth opportunities measured by q's and industry-adjusted segment investment, called "the relative value added by allocation" by Rajan et al. (2000), multiplied by a factor of 100. "CEO turnover" is a dummy variable equal to one if the RI plan adopter appoints a new CEO within one year window around the plan implementation. T-statistics below the coefficient estimates. Firm and annual fixed effects not reported.

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show Segment Diversity has a less adverse impact on post-adoption Excess Value of adopters. Since mean Segment Diversity for RI plan adopters in our sample is 0.097 (with very little variation from before to after the adoption). Model 4 implies (based on the coefficient value for Segment Diversity × Post-adoption × Adopter) a diversification premium of the magnitude of $0.65 \times 0.097 = 6.3\%$. This premium can be attributed to a diminished negative effect of Segment Diversity following plan implementation, consistent with improvements in efficiency of internal capital markets.

Models 5–8 utilize the same specification as Models 1–4, but we analyze the subsamples where significance of results is more likely due to plan adoption – "Expected Adopters" versus "Unexpected Non-adopters." Our results show that the statistical significance of all plan-related variables remains unchanged. The magnitudes of estimated diversification premiums actually increase from 6.8% to 11.1%. Model 9 employs the same sample and specification as Model 1, but we add a dummy variable measuring the post-adoption impact of CEO turnover on diversification discount. Similarly to results presented in previous tables, we find that CEO changes do not significantly affect Excess Value of plan adopters. These findings are consistent with Li (2004) who finds replacement of a CEO is not significantly related to investment efficiency improvements or value gains in diversified firms. Model 10 tests the benefits of plan implementation separately for adopters with related versus unrelated divisions. Similarly to Table 7, we find weak evidence that adoption benefits more firms with segments that operate in distinctly different industries. Overall, the results in Table 8 support our H4 expecting post-adoption diversification discount reduction for firms implementing RI plans.

Performance Changes Following RI Plan Adoptions by Diversified versus Focused Firms

So far, we have documented internal capital market improvements, and corresponding performance gains following plan adoptions by diversified firms. As a robustness check, we now provide the comparison of performance changes following plan implementation based on whether the adopter is a diversified, or a focused company. Unlike multidivisional entities, single-segment firms generally do not have to consider the impact of different riskiness associated with projects adopted by different divisions and/or the relative limited contribution of a single-divisional manager toward firm value (Keating, 1997). RI plans should thus be just one of several

alternative criteria (alongside variables based on stock price and company-wide accounting profitability) available for single-segment firms to assess managerial and firm performance. Consequently, we expect the impact of plan adoption on the performance of focused firms to be less significant when compared to the performance of matching firms.

Table 9 provides evidence on the overall valuation impact of plan adoption conditional on adopter diversification status. We analyze determinants of company's Tobin's Q for adopters and their matching companies. Single-segment adopters are assigned matching firms using the algorithm described in section titled "Data." (We preserve the diversification status, and the matching companies are consequently focused.) Our variables measuring the impact of plan adoption include post-adoption dummy variable and Post-adoption × Adopter dummy variable. Besides size (equal to the log of Sales), we also control for profitability (measured by weighted average of segments' ROA) and firm's growth opportunities (equal to the weighted average of median industry Tobin's Q's of company's segments). We expect both of those variables to have a positive impact on firm's

Table 9. Tobin's Q Changes, Diversification, and RI Plan Adoptions (2-Way Fixed Effects).

Explanatory Variables	Diversified Adopters		Single-Segment Adopters	
	1	2	3	4
Log (Sales)	−0.0253	−0.0293	−0.3099	−0.2899
	(−0.79)	(−0.91)	(−5.35***)	(−4.86***)
Industry growth opportunities	0.1230	0.1239	0.2156	0.2100
	(3.38***)	(3.45***)	(3.49***)	(3.39***)
Herfindahl Index	0.2989	0.3505		0.3219
	(3.05***)	(3.69***)		(1.42)
Weighted segment ROA		1.7506	2.5359	2.5194
		(10.35***)	(7.21***)	(7.16***)
Post-adoption	0.0502	0.0202	−0.0397	−0.0408
	(0.58)	(0.24)	(−0.20)	(−0.20)
Post-adoption × Adopter	**0.1082**	**0.1127**	**−0.0109**	**−0.0162**
	(2.07)**	**(2.20**)**	**(−0.10)**	**(−0.14)**

***,**,* denotes statistical significance at 1%, 5%, and 10% levels, respectively.
Dependent variable is Tobin's Q. *T*-statistics below coefficient estimates. Industry growth opportunities measured as the weighted average of industry *q*'s of all company's segments. Herfindahl Index is equal to the sum of squared divisional proportions of company's sales. Post-adoption is a dummy variable equal to one for years following plan adoption both for the adopter and its matching firm. "Adopter" is a dummy variable equal to one for RI plan adopters. *T*-statistics below the coefficient estimates. Firm and annual fixed effects not reported.

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Tobin's Q. In addition, we control for the level of firm's diversification measured by the sales-based Herfindahl Index. We expect Herfindahl Index (an inverse measure of diversification) to be positively related to Tobin's Q, in accordance with research suggesting diversification has a negative impact on value. Our control variables also include firm- and calendar-year fixed effects to control for the panel-structure of our data (coefficients not reported in Table 9).

Models 1 and 2 in Table 9 analyze the impact of RI plans adoptions for diversified firms. Similarly to Table 8, our results suggest that multidivisional firms adopting RI plans increase in value. During post-adoption years, Tobin's Q of such firms increases (statistically significantly) by 0.11. As expected, industry growth opportunities and profitability have a positive effect on Tobin's Q. The positive coefficient for the Herfindahl Index suggests that the level of diversification affects Tobin's Q negatively. The insignificant coefficient for post-adoption dummy is consistent with no persistent inter-temporal trend in Tobin's Q levels for both adopters and matching firms.

In contrast, no significant effect of plan implementation is detected for single-segment firms based on the results of Models 3–4 in Table 9. The Post-adoption × Adopter dummy is in fact very close to zero in both models.[18] Overall, Table 9 results imply that the value gains are restricted to multidivisional adopters. This finding suggests that RI plans can be particularly useful for diversified adopters, while focused firms may have a greater range of alternative mechanisms motivating managers (based on company-wide accounting and stock performance variables).

Determinants of RI Plan Eliminations

If RI plans are costly, it may be expected that companies will not use those plans permanently. In fact, from the adoption year until 2009, 40 out of 89 (45%) of our sample multisegment adopters had eliminated the plans. In this section, we examine the factors leading previous adopters to eliminate the plans. Principally, there can be three reasons for these actions. First, our analysis in section "Determinants of RI plan adoptions" suggests that plan approvals are likely "manager-driven." Companies adopt RI plans if they have the potential to immediately benefit the managers (the adopters are primarily profitable firms with lower investment levels and lower financial slack). If the plan eliminations are similarly "manager-motivated," we expect that firms would decide to drop the plans if their profitability is low,

investment levels and/or cash reserves are high, and if the managers are paid low bonuses. Second, if, on the other hand, RI plans are efficiently eliminated after improvement in the functioning of internal capital markets and are no longer necessary, then the plans should be dropped if the firm profitability is high. Third, eliminations can be considered as actions that correct previously suboptimal adoptions, especially in cases when the companies are not substantially diversified and do not have significant investment activities (and thus RI plans were not needed to help with the functioning of the internal capital markets).

For the examination of eliminations, we restrict the sample to the 89 diversified adopters. The dependent variable is equal to 1 if the adopter no longer uses the plan during the particular year (starting from the year after adoption until 2009). The set of explanatory variables is similar to that we used in section "Determinants of RI plan adoptions" (in Table 5) to explain plan adoptions. That is, we consider the firm-specific variables such as size (Log of Total Assets), profitability (ROA), diversification (Herfindahl Index), capital expenditures (Capex/Assets), cash reserves (Total Cash/Assets), and leverage (Total Debt/Assets). In addition, we control for the CEO share ownership, CEO bonuses (Bonus/Total Compensation), and the quality of firm governance (G-Index). The significance of our results was nearly identical when the decision not to use the RI plan was determined by the independent variables lagged by one year.

The Probit analysis of RI plan eliminations is presented in Table 10. Our results show that the plans tend to be eliminated by large, less profitable companies, as well as by firms where managers do not earn high bonuses (the coefficients for both ROA and Bonus/Total Compensation are significantly negative). In addition, eliminations are positively – albeit insignificantly – related to higher cash reserves. Consequently, these findings suggest that eliminations can be indeed management-driven – firms drop these plans when they likely generate negative RI, and thus may penalize managers. We also find that firms drop plans when they are less diversified and when they invest less (the coefficient for Herfindahl Index is significantly positive, while the coefficient for Capex/Assets is significantly negative). Since low diversification and low investment are indicators of *less* relevant internal capital markets, it appears that firms may drop RI plans when they have lower potential to help functioning of internal capital markets. Regarding other determinants, eliminations appear to be unaffected by managerial turnover, CEO share ownership, or growth opportunities, but are more likely for less-levered adopters. Overall, Table 10 results imply that the decisions not to continue utilizing RI plans may

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Table 10. Probit Analysis of RI Plan Eliminations.

Explanatory Variables:	1	2	3	4
Log (Total Assets)	0.1389	0.1409	0.1403	0.1010
	*3.46***	*3.50***	*3.46***	*2.28***
ROA	−3.3238	−3.3333	−2.8372	−3.9883
	*−3.83***	*−3.84***	*−3.21***	*−3.94***
Herfindahl Index	1.0539	1.0435	1.0577	0.9905
	*5.06***	*4.99***	*5.04***	*4.47***
Capex/Assets	−6.3487	−6.4121	−6.6519	−5.8843
	*−4.08***	*−4.12***	*−4.25***	*−3.72***
M/B of Assets	0.0014	0.0014	0.0006	0.0142
	0.10	*0.10*	*0.00*	*1.03*
Total Cash/Total Assets	1.0382	1.0271	0.9392	1.2351
	1.41	*1.40*	*1.26*	*1.56*
Total Debt/Total Assets	−1.4046	−1.4110	−1.4038	−1.3807
	*−3.36***	*−3.37***	*−3.35***	*−2.97***
New CEO		0.1780	0.1699	
		0.89	*0.84*	
CEO Bonus/Total Compensation			−1.0059	
			*−2.91***	
CEO Share Ownership			0.0015	
			0.00	
G-Index				−0.0078
				−0.33
Pseudo R^2	0.08	0.09	0.10	0.08
N	840	840	840	753

***,**,* denotes statistical significance at 1%, 5%, and 10% levels, respectively.
The table presents the Probit analysis of RI plan elimination decisions. The dependent variable is a dummy variable equal to one if a previous adopter did not use RI plan during the particular year (starting from the year after adoption until 2009). ROA is measured as EBIT/Assets. Herfindahl Index is the sum of squared divisional sales weights. M/B of Assets is measured as (MV of Equity + Total Assets − BV of Equity)/Total Assets. New CEO is a dummy if the CEO if the company was different from the one who was with the company during the adoption year. CEO bonus compensation and CEO (percentage) share ownership are gathered from *Execucomp* database. G-Index is the Gompers et al. (2003) index gathered from the *Risk Metrics* database. *T*-statistics are in italics below the coefficient estimates.

correct some previously suboptimal adoptions. In addition, we also show that despite their advantages, plans tend to be dropped once they no longer generate positive RI, and thus likely lead to lower managerial bonuses.

In unreported analysis, we also studied the effect of RI plan eliminations on functioning of internal capital markets. That is, we replicated the analysis of Investment Efficiency (Table 7) and of Diversification Discount

(Table 8) during the four years surrounding plan eliminations. Our results showed that post-elimination, the investment efficiency of past adopters slightly worsened, and the diversification discount slightly increased – both consistent with an adverse effect of plan eliminations on functioning of internal capital markets. However, none of those effects were significant.

CONCLUSION

Recent research has identified deficiencies associated with the functioning of internal capital markets in diversified firms. Multidivisional companies have been shown to allocate capital inefficiently across divisions. Less efficient segments tend to receive extra investment funds at the expense of divisions with superior growth opportunities. Ultimately, diversified firms tend to sell at "diversification discounts," reflecting value losses due to problems in internal capital markets. In this paper, we examine how the functioning of internal capital markets is affected by the use of RI plans.

Our study presents four major results. First, RI plans are associated with significant value gains in diversified – but not in single-segment – firms. Second, diversified firms follow more efficient segment-level investment policies after the adoption of the plans. Segment-level investment becomes positively dependent on the growth opportunities, while the overall investment levels decline. Third, company-wide Investment Efficiency significantly improves and becomes less negatively dependent on overall dispersion of segments' growth opportunities for multidivisional firms that implement the plans. Fourth, the diversification discount becomes significantly smaller after the adoption of RI plans. All our findings are robust to considerations of endogeneity of adoption decisions, and to the impact of CEO turnovers or the threat of takeovers.

We also document that firms implementing the plans likely face significant costs, leading to the relatively low adoption rate among U.S. firms. We find that adopters tend to be primarily large diversified firms with managers likely to immediately benefit from the plans due to larger pre-adoption profits, lower investment, and small financial slack. Similarly, RI plans tend to be eliminated if the company profitability declines and managers receive lower bonuses. Consequently, despite the advantages, plan adoptions/eliminations appear to be often motivated by managerial benefits.

Yet, overall, our results suggest that adoptions of RI plans mitigate problems of internal capital markets. Those plans are associated with net

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benefits for diversified firms, consistent with their ability to penalize excessive use of capital.

NOTES

1. On the other hand, there is considerable work on the effectiveness of compensation incentives for firm-wide performance (e.g., Core, Holthausen, & Larcker, 1999; Mehran, 1995; Jensen & Murphy, 1990).

2. See Arya and Mittendorf (2011), Gopalan and Xie (2011), Beneish, Jansen, Lewis, and Stuart (2008), Borghesi, Houston, and Naranjo (2007), Fluck and Lynch (1999), Stein (1997), and Gertner, Scharfstein, and Stein (1994) for discussion of the benefits of internal capital markets, diversification, and cross-subsidization.

3. In addition, Ahn, Denis, and Denis (2006) show that diversified companies cannot rely on the monitoring role of debt due to managerial discretion to suboptimally allocate debt across divisions. Berry, Bizjak, Lemmon, and Naveen (2006) imply that CEOs of multisegment firms are less likely to be replaced following poor performance.

4. The costs may include not only direct fees paid to consulting companies typically hired to assist with plan adoption, but also the opportunity costs associated with actual implementation, setting the parameters affecting RI plan values, training of managers to understand plan consequences and implications, etc. Consulting company Stern Stewart & Co. (that implements RI plans under the name "Economic Value Added") claims it uses approximately 160 adjustments for converting accounting profit into economic profit in order to implement RI plans. O'Byrne and Young (2009) point to this complexity as the reason why RI plans are not more common.

5. Diversification discounts were also documented by Hoechle et al. (2012) and Servaes (1996) for U.S. firms, by Schmid and Walter (2009) for financial institutions, and by Dos Santos et al. (2008), Fauver, Houston, and Naranjo (2003), and Lins and Servaes (1999) for international firms. The magnitude of diversification discounts was challenged by, for example, Villalonga (2004), Campa and Kedia (2002), and Graham, Lemmon, and Wolf (2002) whose studies utilize econometric techniques that take into consideration endogenous choice of firm diversification. However, Hoechle et al. (2012), Ahn and Denis (2004), and Rajan et al. (2000) show that the diversification discount is positively related to the magnitude of investment distortions even after the econometric techniques recognizing endogeneity of diversification choices are applied. Diversification discounts thus can still measure cross-sectional value differences among diversified firms.

6. We were able to identify another set of 91 diversified firms where some RI plan keyword was mentioned, but the plan was likely not truly implemented. Typically, the keyword occurred near the end of a long list of factors (based on accounting and stock variables, as well as subjective measures) that the company may use to measure managerial performance. In an unreported analysis, we found these "secondary" adopters were not associated with any significant changes in investment allocation efficiency, value (Tobin's Q), or diversification discount

following the year of the first occurrence of the keyword in the proxy statement. These results suggest that market does not revalue companies after mere mentioning of a RI keyword in their financial statements. Meaningful implementation of a RI plan is likely necessary for efficiency and valuation gains to materialize.

7. Out of 89 sample firms, we were able to identify matches based on 2-digit SIC code in 88 cases. The remaining one adopter obtained its match based on 1-digit SIC code without any asset size restriction.

8. To further control for possible endogeneity of plan adoptions, in an unreported analysis we also performed 2-stage Heckman regressions for our full sample. The significances of the second-stage results (for segment investment, allocation efficiency, and diversification discounts) were nearly identical to those reported in the paper. In addition, the insignificance of Heckman correction coefficient "λ" suggests low likelihood of a selection bias in our sample.

9. We define segment's industry in a particular year based on the most refined SIC code (4-, 3-, or 2-digit), which contains (in the same year) at least five single-segment firms with SIC codes equal to that of the segment.

10. The majority of our adopters (89 out of 170) are diversified firms, despite multisegment firms being out-numbered approximately 2:1 by focused companies in the overall population of U.S. firms. This suggests that RI plans may indeed be an ideal performance measurement criterion for diversified corporations.

11. Gompers et al. (2003) count the frequency of any of 24 firm charter or bylaws provisions restricting shareholder rights through antitakeover barriers or limitations of voting power, and aggregate the final score to form the G-Index. Consequently, firms with higher levels of G-Index are likely to be associated with worse governance.

12. We further find that median asset size of all adopters, $912 million, exceeds the size of non-adopting *Compustat* firms more than nine times. Incidentally, the negative sign for Size in Models 6–8 is not counterintuitive, because our analysis there is restricted to large companies with compensation data available on Execucomp.

13. Model 8 successfully predicts 64% of all observations: 73% of sample adopters, and 42% of matching companies. The smaller incidence of correct identification of matching firms is not surprising. Since matching companies are diversified, they were expected to be adopters based on our Probit models.

14. The 39% CEO turnover within the three-year period does not appear to be excessive given the average CEO tenure of less than 7 years between 1992 and 2005 (Kaplan & Minton, 2006).

15. In unreported analysis, we also find that CEO turnover variables remain insignificant in the model specification where we omit the plan-related variables. We find the same insignificant impact of CEO turnover in models with omitted plan-related variables in the later analysis of Investment Efficiency (Table 7) and of diversification discount (Table 8) determinants. While Lehn and Makhija (1997) show that company's RI plan levels are superior predictors of managerial turnover, our findings are consistent with Li (2004) and suggest that managerial turnover per se is not sufficient for performance improvements in diversified firms.

16. In unreported analysis, we alternatively measured diversification discounts utilizing imputed values based on segment Sales. That is, to compute imputed value

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of a segment, we multiply its Sales by the Sales Multiple (equal to median "Market Value of Assets"-to-Sales ratio of all single-divisional firms in the segment's industry). In terms of statistical significance, the results were virtually identical to those presented in Table 8.

17. More precisely, since Excess Value of adopters is measured compared to similarly diversified matching firms, any observed diversification premiums can be considered *diversification discount reductions* with respect to the typical discount associated with matching firm values.

18. In an unreported analysis, we find that the ROE and M/B of equity also do not significantly change for focused adopters around the time of the plan adoption – both over time and when compared to matching companies.

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OWNERSHIP MATTERS: THE CAPITAL STRUCTURE OF PRIVATE FIRMS

William R. McCumber

ABSTRACT

This paper investigates the capital structure of a large sample of U.S. private firms from 2004 to 2013. There is a considerable heterogeneity in private firm capital structure not only in terms of the level of leverage but also with regard to the issuance of specific debt instruments. Leverage, debt type usage, and debt specialization are dynamic and strongly related to observable firm characteristics largely in support of contract theory. Unobservable firm and industry characteristics are strong determinants of leverage levels and debt specialization. Macro credit conditions are not related to private firm leverage but are strong determinants of the degree to which firms diversify their debt capital structures.

Keywords: Private firms; capital structure; debt structure

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Of the 27 million firms registered in the United States only 6,200 of these trade on public exchanges. Although private firms account for approximately 50% of gross domestic product and 65% of new job creation[1] we know relatively little about them from an empirical perspective. To my knowledge, despite a vast literature on firm capital structure, all studies rely upon public firm data with the exception of a smaller literature investigating the capital structure of public and private U.K. firms (Brav, 2009) and leveraged buyouts (Axelson, Jenkinson, Stromberg, & Weisbach, 2013).[2] This paper is the first to rigorously examine the capital structure of U.S. private firms.

This study utilizes a large dataset culled from Standard and Poor's Capital IQ database, the source of public firm data distributed to academic institutions as the CompuStat and Execucomp databases. The resultant data consist of non-financial and non-utility private firms with financial data available, inclusive of capital structure data. For example, the largest firm in the sample in 2010 is Liberty Interactive Corporation, headquartered in Colorado. The firm reported $1.6 trillion in assets and $8.9 billion in revenues as of December 31, 2010. Through various subsidiaries the firm markets and sells consumer products via websites, including QVC.com, and television, including sports gear, nutritional supplements, travel services, party supplies, and perishable goods. One of the smallest firms in the 2010 sample is Nine Mile Software, with $97,000 in assets, headquartered in Bountiful, Utah. The firm develops software for use by Registered Investment Advisors (RIAs) including trading and customer resource management (CRM) programs. In 2011 it was acquired by SaveDaily.com, Inc. in a reverse merger transaction.

Given the considerable heterogeneity within the sample with regard to size, industry, and capital structure it is the goal of this study to expand the discussion of capital structure beyond that of large, public companies and the pricing of leveraged buyouts. With private firms, it matters how leverage is defined. It is possible for a firm to be highly levered, even to the point of a negative net worth, when considering the debt to assets ratio, while the same firm may be modestly levered when considering the firm's ability to service the debt via cash flow. Like individuals and households it is possible for private firms to have negative equity and still meet all debt obligations and thus remain a going concern outside a state of bankruptcy or default.

I find that firm leverage is dynamic and strongly correlated with observable firm characteristics in support of contract theory. There is a negative

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association between firm opacity and leverage; firms with a long-term credit rating and firms with more tangible assets have higher leverage. Firms that are implicitly or explicitly backed by a parent firm issue more debt while firms with multiple segments or international revenues are less levered. Importantly, unobservable firm and industry characteristics are strong determinants of leverage in high-dimensional fixed effects models (Gormley & Matsa, 2014), while macroeconomic conditions are at best weakly deterministic.

With regard to heterogeneity within the debt capital structure I am able to distinguish different debt instruments on the balance sheets of 4,537 unique firms, a sample larger than in both Rauh and Sufi (2010) and Colla, Ippolito, and Li (2013). This study is the first to consider debt heterogeneity and specialization in private firms. I find that there is considerable heterogeneity within private firms' debt capital structure, even as these are more opaque than public firms. Firms with greater access to the capital markets, that is, larger, more transparent firms, and firms with higher and multiple sources of revenue, have more diverse debt capital structures. I also find that macroeconomic conditions strongly determine the degree to which firms concentrate their debt capital structure into fewer instruments. Debt heterogeneity, like leverage itself, is dynamic rather than time-invariant. Firms retire and issue debt of different types given market conditions and the firms' ability and willingness to issue different types of debt.

This paper contributes to the broad capital structure literature as well as to recent studies of debt specialization (Colla et al., 2013; Rauh & Sufi, 2010). This study also contributes to the nascent but growing literature utilizing private firm data to explore various topics in corporate finance, including mergers and acquisitions (Bargeron, Schlingemann, Stulz, & Zutter, 2008; Maksimovic, Phillips, & Yang, 2013), leverage ratios (Axelson et al., 2013; Brav, 2009), investment behavior (Asker, Farre-Mensa, & Ljungqvist, 2013), financial reporting (Allee & Yohn, 2009; Burgstahler, Hail, & Leuz, 2006; Cassar, Cavalluzzo, & Ittner, 2015; Minnis, 2011), cash holdings (Gao, Harford, & Li, 2013), and dividend policies (Michaely & Roberts, 2012). Finally, this paper contributes to the LBO literature in that the evidence herein suggests that LBO pricing, which often uses a multiple of debt to revenues or cash flow as a pricing mechanism, is not representative of the leverage of private companies per se.[3]

THE SAMPLE

The sample consists of U.S. non-financial and non-utility private firms with non-missing debt capital structure data in the Capital IQ database.[4] Capital IQ collects financial data on private firms from third party vendors and data feeds, such as Dun & Bradstreet, company websites, annual reports, press releases, required disclosures for firms with public bonds or greater than 500 shareholders,[5] key developments and market transactions processing, and from private equity profiling and validation processes.[6] Data are less plentiful prior to 2003, thus the sample spans 2004 to 2013.[7] Since Capital IQ does not rely upon firms themselves to provide data this reduces selection concerns. The sample consists of firms with capital structure data available, and thus there is a data-driven bias akin to the reliance upon public firm data in most studies. It is unwise to generalize any findings to firms beyond the sample.

Table 1. Number of Unique Firms by Sample Year.

Year	Unique Firms
2004	1,438
2005	1,521
2006	1,368
2007	1,227
2008	1,226
2009	1,298
2010	1,082
2011	1,056
2012	808
2013	404
ALL	4,537

Table 1 reports the number of unique firms by sample year. There are 4,537 unique firms and 11,464 firm-year observations in the final sample. There is a marked drop in the number of firms present in the 2012 and 2013 samples. There are many potential reasons for this, including lags in updates to private firm data, departures from the sample via acquisition by a public firm, an initial public offering of equity, or in some cases, bankruptcy or default.

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Table 2. Firm Exits from the Sample and Firms in Default or Bankruptcy.

Exits or Defaults	No.	% of Firms
IPO: Exchange	847	18.67
IPO: OTC	1,353	29.82
Acquired	593	13.07
Default	74	1.63
Bankruptcy	286	6.30

Table 2 reports the number of firms that leave the sample via acquisition or IPO. A total of 593 firms are acquired by public entities and leave the sample as they are no longer private firms. If a firm is acquired by a private firm it remains in the sample as long as the acquiring firm also has non-missing capital structure data available in Capital IQ. Almost half of the firms leave the sample via IPO, though interestingly the majority offer shares to the public via an over the counter registration as opposed to listing on a major exchange. Table 2 also reports that approximately 8% of sample firms declare bankruptcy or default on their debt obligations, though these firms do not necessarily leave the sample because of bankruptcy or default.

The *indicator* panel of Table 3 reports summary statistics of sample firm descriptives. Almost all (98%) firms have audited financial statements, likely a prerequisite for increased access to capital markets as most private firms are under no obligation to disclose financial or other information to a regulatory body (Minnis, 2011). Interestingly, however, only 18% of sample firms obtained a long-term credit rating while nearly all that did are rated investment grade. Most firms are incorporated in Delaware and Nevada, at 60% and 20% of observations, respectively, due to corporate-friendly legal and disclosure environments in those states.[8]

Seventeen percent and 18% of firms are diversified in that they declare more than one business segment or international operations, respectively. Thirty-nine percent of firm-year observations are subsidiaries, though in practice this distinction may or may not be meaningful. For example, Cinemark USA, Inc. had $2 billion of outstanding debt and reported $2 billion in revenue in 2013. It is a private operating subsidiary of Cinemark Holdings, Inc. (NYSE:CNK), a public firm. Although a private subsidiary, Cinemark USA, Inc. has its own capital structure and has issued public debt; it is reasonable for investors to assume that the private operating subsidiary has at least the implicit backing of the public parent firm and by

extension the cash flows of other subsidiaries of the parent firm. Contrastingly, Universal Hospital Services, Inc. is a private company with $304 million of debt in 2004 and is a subsidiary of UHS Holdco, Inc., a private company with no assets of its own.

Table 3. Summary Statistics of Sample Firms.

Firm Descriptives	Mean	SD	5th	25th	50th	75th	95th	Obs
Indicators								
Investment grade	0.17	0.37	0	0	0	0	1	11,461
Long-term credit rating	0.18	0.38	0	0	0	0	1	11,461
Audited financial statements	0.98	0.15	1	1	1	1	1	11,461
Delaware	0.60	0.49	0	0	1	1	1	11,464
Nevada	0.20	0.40	0	0	0	0	1	11,464
Subsidiary	0.39	0.49	0	0	0	1	1	11,464
Diversified – segments	0.17	0.38	0	0	0	0	1	11,464
Diversified – geographic	0.18	0.38	0	0	0	0	1	11,464
Continuous								
Age	23.33	31.87	1	5	10	26	96	9,003
Employees	5,441	14,350	2	40	680	3,854	26,460	5,354
Revenue	1,385.13	5,237.61	0.08	8.58	121.50	862.50	6,313.00	9,573
Profitability (ROA)	0.11	0.21	0	0.01	0.04	0.11	0.38	4,990
Revenue to assets	1.79	20.00	0.07	0.43	0.87	1.60	3.92	9,558
Cash flow to assets	0.24	2.91	0.02	0.08	0.12	0.18	0.40	6,697

The *continuous* panel of Table 3 reports summary statistics of firm age, the number of employees, and profitability metrics. Although all firms in the sample have debt capital structure data, other data are less frequently available.[9] At the mean, a representative firm is over 23 years old, has well over 5,000 employees, and earns $1.4 billion in revenue. The data are highly skewed, however, as the median firm is 10 years old, has 680 employees, and earns $122 million in revenue. Profitability, as measured by net income to total assets, is 11% at the mean and 4% at the median.

CAPITAL STRUCTURE AND LEVERAGE

Studies of capital structure theory rely upon market values for public firms. Of course these are unavailable for private firms and thus I use book values

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herein.[10] Empirical research typically uses a total debt to total assets ratio (or similar) to proxy for firm leverage. The debt to equity ratio is also commonly used, though for private firms this is problematic. The equity of private firms is concentrated, illiquid, and measured as book value. The book value of equity is simply a net worth figure, and can be negative (see Table 4) for private firms as with households or individuals. Leverage ratios based upon a debt to equity ratio are not meaningful in these circumstances, even assuming that equity is properly measured. Axelson et al. (2013) claim that private equity funds are attentive to capital structure in leveraged buyouts and price the buyout as a multiple of debt to EBTIDA. As creditors are primarily concerned with borrowers' ability to repay I assume that measuring debt relative to revenues is a viable measure of leverage in private firms. Therefore I proxy for leverage in three ways, calculating firm total debt (inclusive of debt in current liabilities) to total assets, to revenue, and to cash flow (EBITDA).

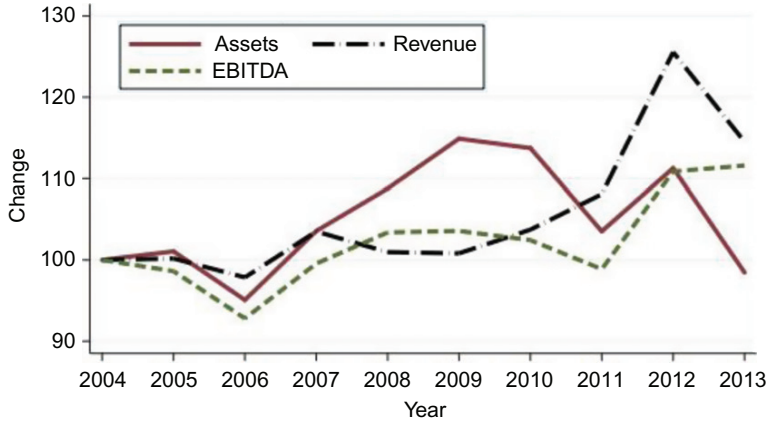

Fig. 1. Change in Leverage. *Note*: 2004 base is 100. Leverage is measured as total debt as a fraction (multiple) of total assets, revenues, or cash flow (EBITDA).

Fig. 1 illustrates that leverage ratios, in addition to firm levels of debt, are dynamic. It is difficult to distinguish, however, whether firms are managing to an optimal capital structure target or reacting to macro conditions. It is possible that firms are adjusting debt levels to a target, though the cost of adjustments are possibly greater than for more transparent public firms (Leary & Roberts, 2005). It is possible that firms are reacting to the U.S. financial crisis and tepid recovery; mean leverage ratios drop immediately

prior to the crisis period, increase during the crisis, and only in the case of the debt to assets ratio recover to 2004 levels in 2013. Finally, it is possible that, since ratios are relative, debt *levels* are not changing as dramatically as assets, revenues, or cash flow.

Summary Statistics

Table 4 reports summary statistics of firm capital structures. At the median, the typical firm has $58.5 million in assets, $14.5 million in debt, and $4.4 million in equity. Mean values are considerably larger, of course, as the data are skewed by the largest firms. Subcategories are scaled by category, such that "cash" is the cash to assets ratio while "revolving lines" is total drawn lines of credit to total debt outstanding. Cash holdings are larger at both the mean and median than in Gao et al. (2013), since their sample of private firms is matched to public firms and are therefore generally larger than in this sample. Higher levels of cash in the sample is consistent with previous literature that smaller, riskier, and high growth firms have both a precautionary need for greater liquidity and face greater costs in raising external funds (Brav, 2009; Gao et al., 2013; Miller & Orr, 1966; Opler, Pinkowitz, Stulz, & Williamson, 1999; Saunders & Steffen, 2011). As Gao et al. (2013) amply treat cash holdings of private firms I preclude further discussion here.

Table 4. Capital Structure Summary Statistics.

	Mean	SD	5th	25th	50th	75th	95th	Obs.
Assets	1,676.63	7,056.48	0.01	2.47	58.50	760.10	7,601.80	11,464
Cash	0.17	0.26	0.00	0.02	0.06	0.19	0.89	10,773
Current assets	0.46	0.32	0.04	0.17	0.39	0.75	1.00	11,222
Fixed assets	0.54	0.32	0.00	0.25	0.61	0.83	0.96	11,222
Tangibility	0.29	0.27	0.01	0.07	0.20	0.46	0.86	10,095
Debt	777.05	3,151.23	0.03	0.77	14.50	398.80	3,310.50	11,464
Commercial paper	0.00	0.02	0.00	0.00	0.00	0.00	0.00	11,464
Revolving lines	0.10	0.25	0.00	0.00	0.00	0.04	0.81	11,464
Term loans	0.28	0.38	0.00	0.00	0.00	0.57	1.00	11,464
Senior bonds and notes	0.30	0.39	0.00	0.00	0.00	0.64	1.00	11,464
Subbonds and notes	0.06	0.17	0.00	0.00	0.00	0.00	0.47	11,464
Capital leases	0.04	0.16	0.00	0.00	0.00	0.00	0.17	11,464
Other	0.06	0.22	0.00	0.00	0.00	0.00	0.64	11,464
Equity	371.25	3,434.96	−165.80	−0.49	4.36	102.00	1,509.20	11,449

Subcategories are scaled by total, that is, cash is reported as a percentage of total assets, term loans as a percentage of total debt.

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At the means, senior bonds and notes comprise 30% of firm debt while term loans represent 28% of out-standing debt. Debt capital structure is discussed in the section "Debt Capital Structure," below, though I point out here only that there is considerable heterogeneity in the types of debt firms issue. With regard to the book value of equity, at the 25th percentile firms have a negative net worth, though interestingly this does not preclude firms from servicing current debt nor issuing new debt; presumably as long as cash flows from operations are adequate to cover interest and principal payments creditors are willing to lend to some firms.

Table 5. Summary Statistics of Firm Leverage Metrics.

Leverage	Mean	SD	5th	25th	50th	75th	95th	Obs.
All observations								
Debt to assets	4.32	49.98	0.02	0.24	0.50	0.85	6.78	11,283
Debt to cash flow (EBITDA)	8.45	21.69	0.14	1.81	4.34	6.93	21.04	6,696
Debt to revenues	8.59	184.20	0.02	0.19	0.55	1.36	8.33	9,521
No outliers								
Debt to assets	0.69	0.89	0.02	0.22	0.48	0.76	2.31	10,718
debt to cash flow (EBITDA)	4.65	3.82	0.13	1.68	4.07	6.45	12.20	6,361
Debt to revenues	0.95	1.29	0.02	0.17	0.50	1.15	3.61	9,043

The top (bottom) panel is inclusive (exclusive) of outliers. The truncated sample retains over 95% of all observations.

Table 5 reports summary statistics of the three measures of leverage. The upper panel includes all observations while the lower panel reports summary statistics calculated after removing outliers. There are numerous outliers and scaling issues in the data, from likely errors of recording, since data are not necessarily reported to the SEC, to scaling issues arising from near zero values for assets or revenues. I truncate values separately for each leverage variable after careful observation of the data. This process removes approximately 5% of the observations, slightly less than was necessary in Brav's (2009) study of U.K. private firms. For the truncated sample, debt is 0.48 (0.69) of assets and half (0.95) of revenue at the median (mean). Debt is 4.1 (4.65) times annual cash flow, as measured by EBITDA, at the median (mean) compared to Axelson et al.'s (2013) 5.2 (5.6) debt to EBITDA multiple for LBO transactions.

Table 6. Correlation Matrix of Three Measures of Leverage.

Leverage Ratio	(1)	(2)	(3)
Assets (1)	1		
Revenue (2)	0.3915	1	
EBITDA (3)	0.4838	0.5131	1

Leverage is measured as total debt, inclusive of debt in current liabilities, relative to total assets, annual revenue, and cash flow (EBITDA).

Table 6 illustrates the importance of using more than one proxy for leverage. The highest correlation between the three measures is 0.51 between debt to revenue and debt to cash flow, suggesting that a firm could be highly levered using one measure and modestly levered by another metric.

Determinants of Leverage

If firm characteristics drive capital structure then differences in firm characteristics should be correlated with differences in leverage. It is noted, however, that all studies of capital structure are fraught with endogeneity concerns. Thus, the following is suggestive rather than causal.[11]

Table 7. Means and *t*-Tests for Differences in Leverage for Subsamples.

		Debt to Assets		Debt to Revenue		Debt to EBITDA	
		Obs.	Mean	Obs.	Mean	Obs.	Mean
Rated	No	8,657	0.713	7,038	0.914	4,486	4.32
	Yes	2,058	0.597	2,002	1.08	1,872	5.428
			0.116***		−0.166***		−1.108***
Investment grade	No	8,793	0.714	7,164	0.923	4,604	4.405
	Yes	1,922	0.586	1,876	1.057	1,754	5.279
			0.128***		−0.134***		−0.874***
Subsidiary	No	6,481	0.703	5,268	0.93	3,358	4.388
	Yes	4,237	0.672	3,775	0.981	3,003	4.935
			0.032*		−0.051*		−0.547***
Diversified (segments)	No	8,784	0.725	7,171	0.986	4,711	4.465
	Yes	1,934	0.535	1,872	0.816	1,650	5.165
			0.190***		0.171***		−0.701***
International sales	No	8,716	0.729	7,119	1.000	4,825	4.522
	Yes	2,002	0.523	1,924	0.769	1,536	5.038
			0.207***		0.231***		−0.517***

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Table 7. (*Continued*)

		Debt to Assets		Debt to Revenue		Debt to EBITDA	
		Obs.	Mean	Obs.	Mean	Obs.	Mean
Delaware	No	3,997	0.799	3,082	0.929	1,880	3.737
incorporation	Yes	6,721	0.626	5,961	0.962	4,481	5.028
			0.173***		−0.033		−1.292***
Public debt	No	8,780	0.705	7,192	0.895	4,661	4.294
issuer	Yes	1,938	0.626	1,851	1.168	1,700	5.612
			0.079***		−0.273***		−1.318***
Size (assets)	1st	2,265	1.372	1,190	1.340	236	2.974
	4th	2,821	0.539	2,714	1.104	2,547	5.396
			0.833***		0.235***		−2.422***
Size (revenue)	1st	2,213	0.935	1,948	1.483	403	3.319
	4th	2,381	0.528	2,378	0.792	2,247	5.059
			0.407***		0.692***		−1.741***

Mean leverage ratios for samples divided by firm characteristics.
10%, 5%, and 1% statistical significance for differences in means, reported under subsample means, designated by *, **, and ***, respectively.

Table 7 reports means and *t*-statistics for differences in leverage for subsamples of firm characteristics. The majority of differences in means are highly significant on a univariate basis, suggesting that firm characteristics matter. It is again important how leverage is measured, however, as rated firms are less levered with regard to assets but have more debt to revenue and EBITDA relative to unrated firms. A multivariate environment will better control for mitigating factors.

In constructing multivariate tests I carefully consider variables such that the model balances concerns of collinearity, data availability, and parsimony while retaining as many observations as possible. Table 8 reports correlations between the model regressors.[12] The base model is a pooled regression,

$$\begin{aligned}\text{Leverage}_{i,t} = {} & \text{Size}_{i,t} + \text{Revenue}_{i,t} + \text{Liquidity}_{i,t} + \text{Tangibility}_{i,t} + \text{Rated}_{i,t} \\ & + \text{Diversified}_{i,t} + \text{International}_{i,t} + \text{Subsidiary}_{i,t} + \text{Other}_{i,t}\end{aligned} \quad (1)$$

where Size is the natural log of total firm assets for firm i at time t. Revenue, Liquidity, and Tangibility are revenues, cash, and net property plant and equipment, respectively, scaled by total assets.[13] Rated, Diversified, International, and Subsidiary are indicator variables equal to one if the firm has a long-term debt credit rating, more than one operating

business segment, international sales, or is a subsidiary, respectively. Errors in Eq. (1) are Huber-White robust against arbitrary heteroscedasticity.

Table 8. Correlation Matrix of Independent Variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Size (1)	1							
Revenue (2)	−0.0841	1						
Liquidity (3)	−0.5349	0.0473	1					
Tangibility (4)	0.0362	−0.0274	−0.2528	1				
Rated (5)	0.4624	−0.0216	−0.2155	0.0527	1			
Diversified (6)	0.3172	−0.0151	−0.1556	−0.0514	0.3477	1		
International (7)	0.2906	−0.0173	−0.0934	−0.1351	0.2901	0.4342	1	
Subsidiary (8)	0.2463	0.0035	−0.1223	0.0065	0.0919	−0.0537	−0.0792	1

Firm size is measured as the natural log of total assets. Revenue, liquidity, and tangibility *are* revenues, cash, and net property plant and equipment, respectively, scaled by total assets. Remaining variables are indicators taking the value of one if the firm has a long-term credit rating, has foreign revenues, more than one business segment, or is a subsidiary.

As Axelson et al. (2013) find that buyout leverage is unrelated to cross sectional factors but determined primarily by macroeconomic conditions I include *Spread* to represent the credit environment at time *t*. *Spread* is the one year change in the spread between high yield and AAA-rated U.S. corporate debt.[14] Therefore if *Spread* is positive macro credit conditions are worsening (tightening) for non-investment grade borrowers. If macro conditions determine private firm leverage then I expect *Spread* to be significant.

Table 9. Determinants of Leverage: Debt to Assets.

Debt to Assets	1	2	3	4
Size	−0.082	−0.083	−0.088	−0.327
	(15.57)***	(26.59)***	(27.43)***	(23.92)***
Revenue	0.001	0.001	0.001	0.000
	(1.91)*	(1.34)	(1.64)	(0.34)
Liquidity	−0.466	−0.479	−0.487	−0.637
	(7.81)***	(10.03)***	(9.82)***	(9.10)***
Tangibility	0.034	0.030	0.083	0.495
	(1.20)	(1.04)	(2.38)**	(6.35)***
1.Rated	0.244	0.240	0.242	
	(15.80)***	(11.69)***	(11.75)***	
1.Diversified	−0.000	−0.004	0.012	
	(0.00)	(0.20)	(0.56)	

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Table 9. (*Continued*)

Debt to Assets	1	2	3	4
1.International	−0.014	−0.021	−0.014	
	(0.83)	(1.03)	(0.69)	
1.Subsidiary	0.115	0.118	0.102	
	(7.33)***	(7.56)***	(6.54)***	
Spread	0.004			
	(1.06)			
Obs.	8,806	8,806	8,806	8,809
Adj. R^2	0.08	0.08	0.11	0.67
F-stat, FE		2.37	6.83	5.33
Year FE	No	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes
Firm FE	No	No	No	Yes

High Dimensional Fixed Effects: 10 years, 43 FF Industries, 3,421 firms.
The dependent variable is leverage defined as the firm debt to assets ratio. Firm size is measured as the natural log of total assets. Operations, liquidity, and tangibility *are* revenues, cash, and net property plant and equipment, respectively, scaled by total assets.
1.*Variables* are indicators taking the value of one if the firm has a long-term credit rating, has foreign revenues, more than one business segment, or is a subsidiary. *Spread* is the one year change in the spread between high yield and AAA corporate debt.
*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Table 9 reports results of the first of three leverage studies. The dependent variable is the debt to assets ratio, and model (1) reports coefficients and significance of the base model, Eq. (1). In the pooled regression, firm characteristics are significant whereas macro credit conditions are not. Larger firms and firms with more cash have less leverage. Larger firms may have greater access to the debt markets and therefore do not have a precautionary motive to increase borrowed capital. A similar argument can be made for firms with more cash on the balance sheet; there is a lesser need for borrowed capital when firms are more liquid. Subsidiaries and firms with a long-term credit rating have higher leverage, again in support of most findings in empirical capital structure literature on public firms. The latter is clearly endogenous, however, as firms that wish to increase leverage will acquire a credit rating to enable the firm to borrow more at a lower cost than unrated firms. To the extent that *Subsidiary* is measured with error, that is, it is not the legal status but the backing of a parent firm that is important, the measurement error would bias against finding significance.[15] The estimates on firm characteristics are economically large and

statistically significant at better than the one percent level. The adjusted-R^2 is low, at 0.08, however.

A critical issue in empirical studies of finance is omitted variable bias and unobserved group heterogeneity, especially as there may be several sources of unobserved heterogeneity. Groups defined upon the basis of time, industry and firm may all display within-group heterogeneity that may severely bias estimates if unobserved group effects are correlated with the (observable) variables of interest. Given the strong possibility that unobserved factors are correlated with firm and macro variables I test and control for group effects using high-dimensional fixed effect estimation per Gormley and Matsa (2014).[16] In models (2)–(4) I adjust base Eq. (1) for fixed effects wherein the highest order effect is absorbed while lower order effects are controlled by separate intercepts. Model (2) considers year fixed effects. I test for the presence of year, essentially macro, effects and these are weakly significant per the *F*-statistic for the significance of the highest order fixed effect (*F*-stat, FE) at the bottom of the table. Interestingly, though year fixed effects are only weakly significant, *spread* drops from the model due to collinearity with the year fixed effects, suggesting that *spread* appropriately captures relevant macro conditions. Controlling for year effects also has the result, in most cases, of increasing the magnitude and statistical significance of firm characteristics on leverage, though the adjusted-R^2 is unchanged.

Model (3) tests for industry effects and controls for both industry, utilizing the Fama French 48 industry classification, and year effects. There are 43 of the 48 industries present in the sample. The *F*-statistic for industry effects is highly significant; it is no surprise that industry characteristics partially determine firm leverage. Firm characteristics remain highly significant. The adjusted-R^2 increases to 0.11, suggesting that the model is indeed improved (albeit marginally) with the inclusion of industry effects. There are 3,421 unique firms in the debt to assets leverage sample. Model (4) controls for firm effects in addition to year and industry effects. The results are telling. The F-statistic for firm effects is highly significant, and the indicator variables are dropped as they are highly collinear with unobserved firm factors. Further, the magnitude of the coefficient estimates for the remaining firm variables, namely size, revenue, liquidity, and tangibility, increase dramatically, strongly suggesting that the absence of firm effects results in a severe attenuation bias. The adjusted-R^2 jumps to 0.67, further confirmation that firm characteristics, both observed and unobserved, drive firm leverage.

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Table 10. Determinants of Leverage: Debt to Revenue.

Debt to Revenue	1	2	3	4
Size	−0.014	−0.016	−0.012	0.016
	(1.89)*	(2.69)***	(2.08)**	(0.75)
Revenue	−0.004	−0.004	−0.003	−0.005
	(2.40)**	(4.44)***	(3.37)***	(6.42)***
Liquidity	−0.157	−0.184	−0.483	−0.129
	(1.36)	(1.99)**	(5.16)***	(1.11)
Tangibility	0.556	0.551	0.462	−0.067
	(8.55)***	(10.31)***	(7.25)***	(0.53)
1.Rated	0.254	0.247	0.230	
	(7.49)***	(6.65)***	(6.29)***	
1.Diversified	−0.106	−0.116	−0.063	
	(3.50)***	(3.11)***	(1.72)*	
1.International	−0.179	−0.193	−0.172	
	(5.87)***	(5.25)***	(4.63)***	
1.Subsidiary	0.028	0.035	0.001	
	(0.97)	(1.24)	(0.05)	
Spread	0.002			
	(0.27)			
Obs.	8,502	8,502	8,502	8,505
Adj. R^2	0.03	0.03	0.10	0.74
F-stat, FE		3.52	15.57	7.25
Year FE	No	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes
Firm FE	No	No	No	Yes

High Dimensional Fixed Effects: 10 years, 43 FF Industries, 3,299 firms.
The dependent variable is leverage defined as the firm debt to revenue ratio. Firm size is measured as the natural log of total assets. Operations, liquidity, and tangibility *are* revenues, cash, and net property plant and equipment, respectively, scaled by total assets.
1.*Variables* are indicators taking the value of one if the firm has a long-term credit rating, has foreign revenues, more than one business segment, or is a subsidiary. *Spread* is the one year change in the spread between high yield and AAA corporate debt.
*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

I repeat this procedure for tests of leverage as defined as multiples of revenues and cash flow, in essence comparing firms' debt levels to firms' ability to service the debt. Because there are fewer observations for income statement data than for balance sheet data in the sample there are 3,299 unique firms in the debt to revenue specifications and 2,322 unique firms in the debt to EBITDA specifications. The number of industries is unchanged. Tables 10 and 11 report results of the four model specifications as above for

leverage defined as debt to revenues and to EBITDA, respectively. Results are very similar to those for debt to assets. When controlling for firm, industry, and year effects firm size is unrelated to leverage, however, a finding that intuitively makes sense when assets are not a part of the leverage equation given the correlations between leverage measures reported above.

Table 11. Determinants of Leverage: Debt to Cash Flow.

Debt to Cash Flow	1	2	3	4
Size	0.286	0.284	0.268	0.171
	(10.39)***	(11.44)***	(10.53)***	(1.27)
Revenue	−0.006	−0.006	−0.006	−0.566
	(1.27)	(1.44)	(1.39)	(7.70)***
Liquidity	−6.629	−6.735	−6.740	−4.811
	(14.64)***	(13.65)***	(13.55)***	(5.60)***
Tangibility	−0.825	−0.850	−0.926	0.566
	(3.96)***	(4.48)***	(3.85)***	(0.79)
1.Rated	0.222	0.210	0.239	
	(1.96)*	(1.78)*	(2.01)**	
1.Diversified	0.105	0.097	0.138	
	(0.86)	(0.79)	(1.10)	
1.International	−0.043	−0.062	−0.016	
	(0.35)	(0.48)	(0.12)	
1.Subsidiary	0.165	0.166	0.120	
	(1.65)*	(1.67)*	(1.21)	
Spread	0.031			
	(1.33)			
Obs.	6,073	6,073	6,073	6,076
Adj. R^2	0.09	0.09	0.13	0.61
F-stat, FE		1.63	6.48	4.14
Year FE	No	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes
Firm FE	No	No	No	Yes

High-Dimensional Fixed Effects: 10 years, 43 FF Industries, 2,232 firms.
The dependent variable is leverage defined as the firm debt to EBITDA ratio. Firm size is measured as the natural log of total assets. Operations, liquidity, and tangibility *are* revenues, cash, and net property plant and equipment, respectively, scaled by total assets.
1.Variables are indicators taking the value of one if the firm has a long-term credit rating, has foreign revenues, more than one business segment, or is a subsidiary. *Spread* is the one year change in the spread between high yield and AAA corporate debt.
*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

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Spread is never significant, but year fixed effects in Table 10 are significant suggesting that macro effects play a role when measuring leverage relative to revenues. Interestingly, however, when measuring debt relative to cash flow (EBITDA), as per pricing in leveraged buyouts (Axelson et al., 2013), neither *spread* nor year fixed effects is significant (*F*-stat of 1.63), while firm characteristics remain highly significant. This presents evidence that the pricing of LBOs is not representative of the leverage of private firms that are not targets of leveraged buyouts. Further, indirect support is thus given to Axelson et al. (2013) that credit conditions are determinants of buyout pricing; when credit is cheap relative to firm risk private equity firms overpay for acquisitions.

I conclude that regardless of how leverage is measured firm characteristics are strongly correlated with leverage. Industry effects are strong determinants of firm leverage, while macro credit conditions at best are weak determinants.

DEBT CAPITAL STRUCTURE

Recent literature has discussed the importance of expanding the discussion of capital structure beyond the *level* of debt to include heterogeneity within the capital structure of debt (Colla et al., 2013; Rauh & Sufi, 2010). Financing frictions, information asymmetry, and macro conditions may well drive firms' ability to issue and/or decision to utilize different debt instruments.

Debt Heterogeneity

Table 12 reports the number of firms utilizing different debt instruments. The most common are term loans and senior bonds and notes, with 54% and 53% of firms issuing these instruments, respectively. Only 15% of firms issue subordinated debt, and less than 1% of firms issue commercial paper or asset backed securities.

Eight percent of firms have issued public debt, but public debt is included in senior and subordinated bonds and notes and therefore not a "type" unto itself.

Table 12. Firms and Debt Heterogeneity.

Firms Utilizing	No.	%
Revolving lines	1,689	37.23
Term loans	2,461	54.24
Senior bonds and notes	2,414	53.21
Subbonds and notes	702	15.47
Capital leases	1,226	27.02
Other	1,081	23.83
Commercial paper	27	0.60
Asset securitization	39	0.86
Public debt	379	8.35

The number and percentage of sample firms utilizing different types of debt.

Going forward I concentrate on the six most common debt instruments in the sample, namely drawn credit lines (RevCr), senior bonds and notes (SenBN), capital leases (Lease), term loans (Term), subordinated debt (Sub), and other (Other), a catch-all for non-standard debt types.

Debt capital structure, like leverage, is dynamic. Fig. 2 illustrates the change in the usage of each debt type within the sample from 2004 to 2013. The pattern intuitively supports macro, industry, and firm theories as to why the usage of different debt types changes over time. For example, as capital leases are tied to specific equipment it is unlikely to vary dramatically over time, though even here there is some variation. There is a marked change in the propensity to utilize some debt types from 2007 to the present, the period of the U.S. financial crisis and ongoing tepid recovery. Firms that were able to draw on credit lines seemed to have done so from 2007 to 2009; drawn lines were 20% more common in 2009 than in 2007. Similarly, the use of term loans is 40% higher in 2010 and 2011 than in 2004, whereas only 75% of the firms issuing subordinated debt in 2004 did so by the end of 2012.

Even more striking is the change in composition of firm debt. Fig. 3 illustrates the change in the proportion of total debt represented by each debt instrument from 2004 to 2013. Senior bonds and notes remain almost unchanged over the decade, perhaps due to their creditor-friendly protections and relative safety.

The percentage of firm debt comprised of term loans is 50% higher in 2013 than prior to the financial crisis, while subordinated and "other" debt (i.e., non-standard financing) are sharply lower at less than half of their proportions in 2004. Thus, both the propensity, that is, both the ability and

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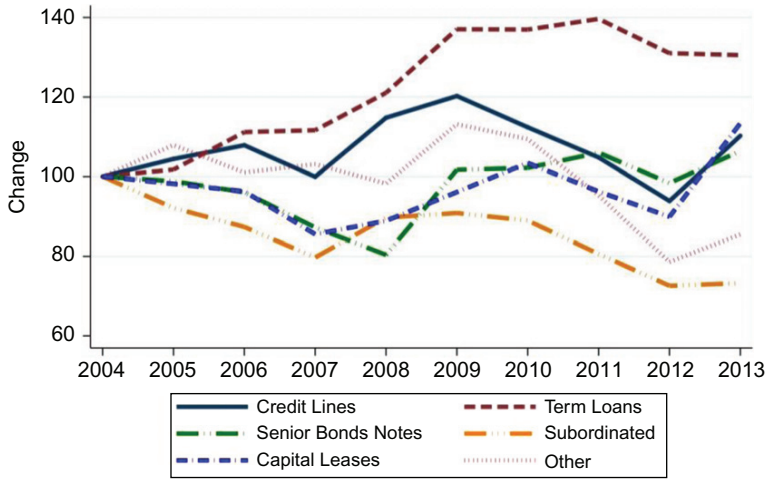

Fig. 2. Change in the Propensity to Utilize Each Debt Type. *Note*: 2004 base is 100. For example, in 2010 sample firms were almost 40% more likely to utilize term loans and 20% less likely to have subordinated debt on the balance sheet.

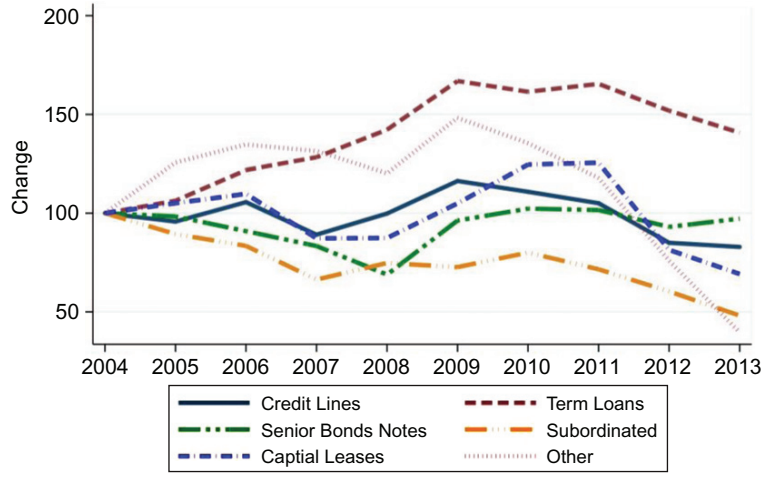

Fig. 3. Change in Each Debt Type as a Percentage of Total Debt. *Note*: 2004 base is 100. For example, as a percentage of total firm debt term loans comprised 50% more in 2010 than in 2004. Similarly, subordinated debt was 25% less in 2010 than in 2004.

willingness, to issue different debt instruments changed as well as the proportion of firm debt represented by each instrument.

Table 13 reports means and *t*-tests for differences in means for subsamples formed upon the basis of firm characteristics as to the percentage of firms issuing each of the most common debt instruments. For example, there are 9,536 non-investment grade firm-year observations and 1,925 observations wherein the firm's long-term debt has received a rating above BBB (investment grade). One-third of investment grade issuers issued subordinated debt, whereas only 13.1% of non-investment grade issuers issued subordinated debt. The difference is highly statistically significant, suggesting that firms with an investment grade debt rating are less opaque and/or financially stronger than firms without such a rating, and are therefore able to issue subordinated debt. The fact that firms issued subordinated debt would also suggest that contracting terms concerning the issue were acceptable to the issuing firm (i.e., the firm was both able and willing to issue), otherwise there would be no observation.

Table 13 illustrates that on a univariate basis, larger firms (by assets and revenues), firms that are less opaque (rated and investment grade), implicitly or explicitly backed by a parent firm (subsidiary), or are diversified (segments and/or international revenues) issue *all* types of debt more frequently than firms that are not. It would stand to reason, therefore, that on a multivariate basis such firms will be more likely to have a diverse debt capital structure. Debt specialization is discussed in section "Debt Specialization".

Table 14 reports means and *t*-tests for differences in means in the percentage of total debt represented by each debt instrument. On a univariate basis, smaller, more opaque and independent (i.e., not backed by a parent firm) firms rely more upon revolving lines of credit, term loans, capital leases, and non-standard borrowings than their counterparts. This makes intuitive sense from an agency perspective, as credit lines and term loans typically have close and frequent monitoring by creditors while capital leases are tied to operating assets. The difference in mean other borrowings is statistically but not necessarily economically meaningful, but still may represent the greater necessity of obtaining creative financing for small, opaque firms. Again supportive of contract theory, large, rated, diversified, and SEC registered (having issued public debt) firms have more diverse debt capital structures; senior bonds and notes and subordinated debt comprise a greater proportion of total debt for such firms.

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Table 13. Means and *t*-Tests for Differences in Means in the Propensity to Utilize Debt Types by Firm Characteristics.

		RevCr	Term	SenBN	Sub	Lease	Other	Obs.
Rated	No	0.284	0.472	0.451	0.126	0.233	0.176	9,400
	Yes	0.446	0.585	0.685	0.345	0.392	0.307	2,061
	Diff	−0.162***	−0.113***	−0.234***	−0.220***	−0.159***	−0.131***	
	No	0.287	0.473	0.455	0.131	0.236	0.177	9,536
Investment grade	Yes	0.444	0.587	0.681	0.333	0.386	0.307	1,925
	Diff	−0.157***	−0.114***	−0.226***	−0.202***	−0.150***	−0.130***	
	No	0.289	0.494	0.456	0.129	0.231	0.184	7,008
Subsidiary	Yes	0.351	0.489	0.551	0.222	0.309	0.224	4,456
	Diff	−0.062***	0.006	−0.095***	−0.093***	−0.077***	−0.040***	
	No	0.286	0.466	0.464	0.14	0.242	0.178	9,520
Diversified (segments)	Yes	0.445	0.62	0.637	0.289	0.355	0.301	1,944
	Diff	−0.159***	−0.154***	−0.174***	−0.149***	−0.113***	−0.123***	
	No	0.292	0.466	0.472	0.142	0.232	0.179	9,451
Diversified (geography)	Yes	0.411	0.614	0.592	0.276	0.401	0.295	2,013
	Diff	−0.118***	−0.147***	−0.120***	−0.134***	−0.170***	−0.116***	
	No	0.24	0.435	0.435	0.075	0.169	0.173	4,544
Delaware incorporation	Yes	0.361	0.529	0.531	0.225	0.322	0.217	6,920
	Diff	−0.121***	−0.094***	−0.097***	−0.150***	−0.154***	−0.044***	
	No	0.292	0.483	0.447	0.134	0.23	0.177	9,518
Public debt issuer	Yes	0.417	0.539	0.719	0.32	0.414	0.306	1,946
	Diff	−0.125***	−0.056***	−0.272***	−0.186***	−0.184***	−0.128***	
	1st	0.124	0.371	0.445	0.017	0.077	0.153	2,820
Size (assets)	4th	0.417	0.588	0.732	0.326	0.385	0.34	2,821
	Diff	−0.292***	−0.216***	−0.288***	−0.310***	−0.308***	−0.187***	
	1st	0.17	0.42	0.455	0.041	0.157	0.14	2,379
Size (revenues)	4th	0.436	0.587	0.752	0.325	0.41	0.369	2,381
	Diff	−0.265***	−0.166***	−0.297***	−0.284***	−0.254***	−0.229***	

RevCr is revolving credit lines, SenBN is senior bonds and notes, Lease is capital leases, Term is term loans, Sub is subordinated bonds and notes, and Other is all other debt.

*, **, and *** designate statistical significance of differences in means at the 10%, 5%, and 1% levels, respectively.

Table 14. Means and *t*-Tests for Differences in Means in the Percentage of Debt Type by Firm Characteristics.

		RevCr	Term	SenBN	Sub	Lease	Other	Obs.
Rated	No	0.109	0.290	0.287	0.047	0.042	0.067	9,400
	Yes	0.085	0.261	0.352	0.127	0.024	0.054	2,061
	Diff	0.024***	0.028***	−0.065***	−0.081***	0.018***	0.012**	
Investment grade	No	0.108	0.289	0.287	0.049	0.042	0.067	9,536
	Yes	0.087	0.266	0.353	0.121	0.024	0.053	1,925
	Diff	0.021***	0.023**	−0.065***	−0.072***	0.018***	0.013**	
Subsidiary	No	0.108	0.304	0.281	0.049	0.043	0.064	7,008
	Yes	0.099	0.255	0.326	0.08	0.032	0.065	4,456
	Diff	0.008*	0.049***	−0.045***	−0.031***	0.011***	−0.001	
Diversified (segments)	No	0.103	0.280	0.296	0.054	0.04	0.068	9,520
	Yes	0.113	0.306	0.309	0.098	0.032	0.048	1,944
	Diff	−0.010*	−0.026***	−0.012	−0.044***	0.009**	0.020***	
Diversified (geography)	No	0.103	0.280	0.298	0.055	0.035	0.066	9,451
	Yes	0.112	0.308	0.299	0.091	0.060	0.055	2,013
	Diff	−0.009	−0.028***	−0.001	−0.037***	−0.025***	0.011**	
Delaware incorporation	No	0.092	0.280	0.298	0.023	0.026	0.076	4,544
	Yes	0.113	0.288	0.299	0.086	0.048	0.057	6,920
	Diff	−0.020***	−0.008	−0.001	−0.063***	−0.022***	0.020***	
Public debt issuer	No	0.111	0.296	0.276	0.052	0.043	0.065	9,518
	Yes	0.072	0.227	0.410	0.106	0.018	0.059	1,946
	Diff	0.039***	0.069***	−0.134***	−0.054***	0.025***	0.006	
Size (assets)	1st	0.053	0.260	0.351	0.007	0.019	0.093	2,820
	4th	0.071	0.27	0.379	0.099	0.022	0.061	2,821
	Diff	−0.018***	−0.011	−0.028***	−0.093***	−0.003	0.032***	
Size (revenues)	1st	0.071	0.274	0.328	0.019	0.045	0.069	2,379
	4th	0.072	0.256	0.395	0.097	0.026	0.053	2,381
	Diff	−0.001	0.018*	−0.067***	−0.079***	0.019***	0.016***	

RevCr is revolving credit lines, SenBN is senior bonds and notes, Lease is capital leases, Term is term loans, Sub is subordinated bonds and notes, and Other is all other debt.

*, **, and *** designate statistical significance of differences in means at the 10%, 5%, and 1% levels, respectively.

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Cluster Analysis

Another method to illustrate debt capital structure heterogeneity is via cluster analysis, an inductive approach meant to identify patterns in unstructured data.[17] Clustering divides the observations into a distinct number of non-overlapping groups. I utilize a partitioning algorithm that assigns each observation to a group according to the means of the variables of interest, in this case the percentage of total debt represented by the six most common debt instruments discussed above. For example, the researcher (somewhat arbitrarily) decides that 10 distinct clusters are appropriate. Ten observations are chosen at random to form (seed) the initial groups. Observations whose six variables are closest to the seeded groups are placed in those groups, then group means of those variables are recalculated. Observations are reassigned iteratively as the means of each group are recalculated until no observation switches groups. The algorithm minimizes the variance within and maximizes the variance between clusters in terms of Euclidean distance from the center of the cluster.

As I have no reason to believe that there are 3, or 5, or 11 clusters I allow the clustering algorithm to run 20 times, that is, partition the data so that there are one, then two, then three, then four distinct clusters up to 20. In order to evaluate which of the 20 solutions creates the most distinction between clusters I calculate the Calinski-Harabasz (1974) pseudo-F index. According to the index there are 16 distinct clusters in the data (pseudo-F of 14,567). In a similar study, Colla et al. (2013) find six clusters in their sample of public firm debt capital structure. Private firms may have greater heterogeneity in debt capital structure than public firms, perhaps due to the (relative to private firms) homogeneity of public firms and their ability to raise capital via equity offerings.

It is difficult to report debt groupings satisfactorily. Summary statistics of clusters are not especially meaningful as there is no theory driving the analysis. Visual representation of debt structure heterogeneity may be instructive, however. Fig. 4 presents each cluster as a spoke on a radar plot. Drawn onto each spoke is the percentage of debt represented by each of the six common debt instruments. The center is zero percent, and four lines each representing 25% radiate from the center. For example, cluster 14 exclusively uses revolving credit lines while cluster 1 only issues senior bonds and notes. Cluster 10 issues approximately 50% term loans and 50% subordinated debt, while cluster 9 issues approximately 50% term loans and 50% senior bonds and notes. While cluster analysis does not answer *why* some firms issue a 50%−50% split between term loans and senior

bonds while other firms only utilize revolving lines, it does allow us to visually comprehend debt capital structure heterogeneity.

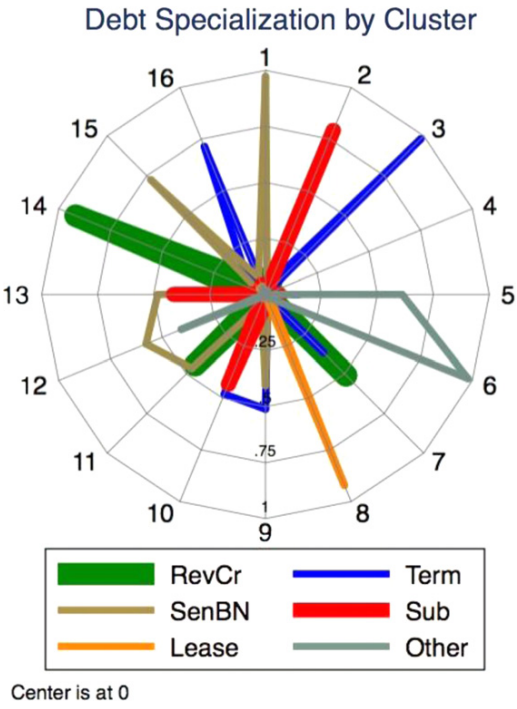

Fig. 4. Debt Type Usage by Cluster. *Note*: Each of six primary debt types is measured as a percentage of total firm debt. RevCr is revolving credit lines, SenBN is senior bonds and notes, Lease is capital leases, Term is term loans, Sub is subordinated bonds and notes, and Other is all other debt.

Debt Specialization

The flip side to debt heterogeneity is debt specialization, of course. Colla et al. (2013) find that for a large sample of public firms there is a positive relationship between the degree of debt specialization and firm opacity and creditor incentives to monitor. Private firms are generally thought to be more opaque than public firms, ceteris paribus, and by definition private firms only issue concentrated securities. Thus all creditors have increased

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incentives to monitor as their positions are concentrated relative to public bond and equity holders. In order to investigate whether Colla et al.'s (2013) findings generalize to private firms I follow the authors in calculating a normalized Herfindahl-Hirschman Index of debt specialization.

$$\begin{aligned}\text{SumSqu}_{i,t} = &\left(\frac{\text{RevCr}_{i,t}}{\text{TD}_{i,t}}\right)^2 + \left(\frac{\text{SenBN}_{i,t}}{\text{TD}_{i,t}}\right)^2 + \left(\frac{\text{Lease}_{i,t}}{\text{TD}_{i,t}}\right)^2 \\ &+ \left(\frac{\text{Term}_{i,t}}{\text{TD}_{i,t}}\right)^2 + \left(\frac{\text{Sub}_{i,t}}{\text{TD}_{i,t}}\right)^2 + \left(\frac{\text{Other}_{i,t}}{\text{TD}_{i,t}}\right)^2\end{aligned} \tag{2}$$

Eq. (2) calculates the sum of squares (SumSq) of the percentage of each of the six primary debt types relative to total firm debt (TD) as defined above. Normalizing, I calculate

$$\text{HHI}_{i,t} = \frac{\text{SumSqu}_{i,t} - 1/6}{1 - 1/6} \tag{3}$$

where HHI is the normalized Herfindahl-Hirschman Index of debt specialization. If a firm perfectly diversifies its debt capital structure across all six debt instruments its HHI equals zero, while a firm only issuing one type of debt has an HHI of one.

Table 15. Summary Statistics of Debt Concentration.

	Mean	SD	5th	25th	50th	75th	95th	Obs.
Specialized debt (HHI)	0.58	0.43	0.12	0.33	0.64	1.00	1.00	11,464
Specialized debt (90%)	0.43	0.50	0.00	0.00	0.00	1.00	1.00	11,464

HHI is the Herfindahl-Hirschman index and 90% is an indicator variable with a value of one if 90% or more of firm debt is of one type.

Table 15 reports summary statistics of *HHI* as well as an alternative measure of debt concentration, *specialized debt* (90%), an indicator taking the value of one if the firm has greater than 90% of its debt in one type. At the mean, HHI is 0.58, while 43% of firm-year observations have 90% or more of their debt in one type of issue. Both are lower than in Colla's (2013) sample of rated and unrated public firms, again suggesting that private firms' debt capital structure is more diverse than for public firms despite the fact that private firms are more opaque.

To examine whether firm, industry, and macro effects drive debt specialization as well as firm leverage I revisit the leverage methodology above. I alter Eq. (1) such that the dependent variable is the Herfindahl-Hirschman Index of debt specialization. I also add leverage, as defined by the debt to assets ratio, to the analysis.[18]

Table 16. Determinants of Debt Specialization.

Debt Specialization (HHI)	1	2	3	4
Size	−0.011	−0.011	−0.012	−0.041
	(5.23)***	(5.96)***	(6.15)***	(4.67)***
Revenue	−0.000	−0.000	−0.000	−0.000
	(1.91)*	(1.63)	(1.18)	(1.61)
Liquidity	0.444	0.422	0.361	0.181
	(15.21)***	(15.31)***	(12.61)***	(4.16)***
Tangibility	0.108	0.103	0.069	−0.100
	(6.29)***	(6.21)***	(3.44)***	(2.07)**
Leverage	−0.039	−0.040	−0.043	−0.029
	(5.66)***	(6.60)***	(7.07)***	(3.38)***
1.Rated	−0.030	−0.033	−0.040	
	(2.76)***	(2.74)***	(3.32)***	
1.Diversified	−0.020	−0.022	−0.013	
	(1.74)*	(1.90)*	(1.13)	
1.International	0.018	0.011	0.023	
	(1.69)*	(0.98)	(1.89)*	
1.Subsidiary	−0.030	−0.024	−0.024	
	(3.34)***	(2.70)***	(2.68)***	
Spread	−0.001			
	(0.79)			
Obs.	8,806	8,806	8,806	8,806
Adj. R^2	0.06	0.08	0.11	0.62
F-stat, FE		27.75	6.49	4.33
Year FE	No	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes
Firm FE	No	No	No	Yes

High-Dimensional Fixed Effects: 10 years, 43 FF Industries, 3,421 firms.
The dependent variable is the Herfindahl-Hirschman index of debt concentration; a firm with only one type of debt has an HHI of one. Firm size is measured as the natural log of total assets. Revenue, liquidity, tangibility, and leverage are revenues, cash, net property plant and equipment, and total debt, respectively, scaled by total assets.
1.Variables are indicators taking the value of one if the firm has a long-term credit rating, has foreign revenues, more than one business segment, or is a subsidiary. *Spread* is the one year change in the spread between high yield and AAA corporate debt.
*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

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Table 16 reports results. Model (1) is the base model, and reports that larger, rated firms have more diverse debt capital structures, a finding in support of Colla et al. (2013). Firms with greater leverage also have more diverse capital structures; firms able to borrow more are also likely to be able to issue different debt instruments. Subsidiaries are more likely to have a diverse debt capital structure, perhaps due to the explicit or implicit backing of a sound parent firm granting them the ability to tap different capital markets. Firms with greater liquidity issue fewer types of debt, perhaps because they have a lesser need to tap multiple markets for capital.

Model (2) explores whether macro effects, proxied by year fixed effects, partially determine the degree of debt specialization for private firms. Unlike with the regression of leverage, where macro (year) effects were at best only weak determinants, with regard to the degree of debt specialization macro conditions are a first order effect. The *F*-statistic for year fixed effects is 27.75, strongly suggesting that debt concentration is dynamic and determined by economy-wide conditions.

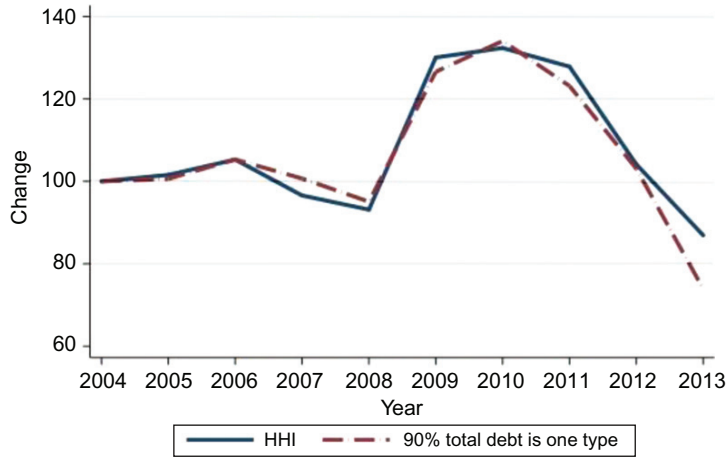

Fig. 5. Change in Firm Debt Concentration. *Note*: Base year is 2004 and set to 100. HHI is the Herfindahl-Hirschman Index of debt specialization and "90% total debt is one type" refers to Spec90, an indicator variable equal to one if the firm's debt capital structure is 90% or more comprised of one debt instrument, that is, term loans or revolving credit lines.

Fig. 5 illustrates the change in measures of firm debt concentration showing a sharp change in the composition of private firm debt capital

structure during the U.S. financial crisis. There is a marked contraction in the ability of firms to issue diverse debt instruments from 2008 to 2009, and only in 2012 did this contraction ease to 2004 levels. I am implicitly assuming that this is a supply driven rather than a demand driven effect; creditors are more likely unwilling to lend during the crisis as opposed to firms preferring not to issue diverse instruments. Returning to Table 16, models (3) and (4) control for industry and firm fixed effects in addition to year effects; in all there are 43 industry groups and 3,421 unique firms in the analysis. Industry and firm effects are also found to be highly significant determinants of firm debt specialization. After correcting for all effects (and attenuation bias), I find that larger, tangible, more levered firms display greater diversity in their debt capital structures as these have greater access to debt capital markets and various instruments. Finally, firms with higher cash reserves are more likely to concentrate their issuance of debt to fewer types.

CONCLUSION

This paper is the first empirical study of capital structure of U.S. private firms. Using a large and heterogeneous sample of private firms with regard to size, industry, and capital structure I find that the level, construction, and concentration of firm debt are dynamic. Leverage is primarily determined by observable firm characteristics in support of contract theory. Specifically, larger, more profitable, more liquid firms are less levered, while more tangible and transparent firms issue more debt. High-dimensional fixed effects methodologies reveal that unobservable firm and industry characteristics are strong determinants of private firm leverage.

With regard to debt heterogeneity, private firms that are smaller and more opaque have more concentrated debt capital structures, likely due to decreased access to diverse capital markets at contracting terms that are acceptable to both borrowers and creditors. Both observable and unobservable firm and industry characteristics again partially determine the degree of debt specialization.

Macroeconomic conditions are at best weakly affecting private firm leverage levels, while strongly determining the degree to which firms are able and/or willing to issue different debt instruments.

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NOTES

1. According to Sageworks, an information company specializing in private firm financial data collection. See www.sageworks.com

2. See, for example, Graham and Leary (2011) for a recent survey of empirical capital structure literature.

3. There is considerable evidence that acquisition pricing, whether via cash and equity (Maksimovic et al., 2013) or debt (Axelson et al., 2013) is determined to a greater extent by macro and credit conditions than by target firm characteristics.

4. Recent literature has utilized both the Capital IQ and Sageworks databases to study private firms. There are advantages and disadvantages to each, of course. Capital IQ has fewer observations but richer data, while Sageworks has many more observations but limited data (companies are anonymous) apart from financial statements.

5. The SEC requires greater disclosure, including 10-K and 10-Q reports, of firms that have $10 million in assets and over 500 shareholders. It also requires disclosures of firms offering public securities, including bonds.

6. According to Capital IQ, "The private company initialization and update process follows a multi-stage, consecutive work flow such that reviewing an entity, writing company profiles, and assigning industry classification … is governed by a meticulous set of data collection guidelines and polices that are themselves reinforced with ample quality control." Moreover, S&P Capital IQ's profiles are subjected to strict internal quality processes that ensure a high level of quality standards in the final product.

7. Data for 2003 are collected and used in robustness tests to allow a "lag" year in regression analyses; 2003 data are not reported in summary statistics.

8. There is considerable debate amongst advisors to small and medium size entities concerning the efficacy of incorporating in either state as the costs of doing so, assuming the firm's physical headquarters are elsewhere, usually outweigh benefits unless firms are suitably large and complex.

9. Therefore the number of observations for univariate and multivariate tests will be lower for some variables of interest.

10. Brav (2009) and other studies (Fama & French, 2002; Leary & Roberts, 2005; Rajan & Zingales, 1995) suggest that reliance upon book values is not a limitation to capital structure research.

11. In robustness tests I rerun all regressions using lagged independent variables, and while such a procedure partially alleviates endogeneity concerns it is not sufficient. Firm characteristics are often time-invariant, even for smaller, private firms. A small firm in year 0 was also likely a small firm in year $t-2$. Similarly, a firm incorporated in Delaware and/or with an investment grade debt rating will likely remain thus in a year or two. Utilizing several lags may further reduce endogeneity concerns after correcting for serial correlation, but then firms are dropped from the analysis when they do not have the requisite number of annual observations, biasing any findings to only those firms with the greatest longevity.

12. In most cases correlations amongst regressors are low. However, larger firms are more likely to seek a credit rating, firms with more than one business segment

are also more likely to be diversified internationally, etc. Though modern statistical packages are well able to estimate coefficients even in the presence of significant multicollinearity I use different model specifications to triage the competing desirable qualities of the models, namely independence amongst regressors, maximizing observations, and parsimony.

13. I also proxy for firm size with the natural log of revenues and the number of employees. Results are unaffected. In robustness I also substitute profitability, as net income to total assets (ROA), and cash flow (EBITDA), for revenues. Results are unaffected.

14. The yield premium utilizes data from the Bank of America Merrill Lynch U. S. High Yield Master II Option Adjusted Spread and the U.S. Corporate AAA Option Adjusted Spread (from same), each of which are the market cap weighted option adjusted yield over the spot Treasury curve. In robustness tests I also control for macro conditions using the level, as opposed to the change, in the hi-yield to AAA spread, as well as the Federal Reserve's "Net Percentage of Domestic Banks Tightening Standards for Commercial and Industrial Loans to Large and Middle Market Firms." Macro conditions as proxied by spread metrics and "tightening" are not significant and results are unaffected by macro condition proxies. See below. Data for spread and tightening calculations can be found at the Federal Reserve Bank of St. Louis website, http://research.stlouisfed.org

15. Given that subsidiaries comprise roughly 40% of the sample a potential concern is that subsidiaries are driving results. Even though subsidiaries may or may be part of a presumably financially stronger parent firm, as discussed above, it still may be that those firms that are, as in the case of Cinemark USA, Inc., are driving or strongly biasing the findings. I therefore exclude subsidiaries from the analysis and rerun all regressions. For example, for regressions of firm leverage as defined by the debt to assets ratio the exclusion of subsidiary firms reduces the sample to 2,127 firms and 5,209 observations. Results are unaffected, and in some cases are stronger than with the inclusion of subsidiaries. I conclude that subsidiaries are not driving results.

16. Another method typically used to correct for intraclass correlations is to employ fixed effects for, say, year and industry while clustering standard errors by firm. Clustering in this manner is likely sufficient but is a weaker form of correction than employing a high-dimensional fixed effects routine. With clustered standard errors the denominator degrees of freedom are adjusted by the number of observations, not the number of clusters. Because of the additional adjustment when using high-dimensional fixed effects the point estimates of regressors will be different than when clustering on one of the dimensions. See http://statistics.ats.ucla.edu/stat/stata/library/cpsu.htm for a thorough discussion on the differences between multilevel modeling and clustering routines.

17. Cluster analysis is inductive in that instead of deductive theory, that is, opaque firms have access to fewer debt types and have higher spreads due to information asymmetry between borrowers and lenders, a geometric or other approach is used to identify patterns in the data, absent of theory.

18. In robustness I also define leverage using the debt to revenue and debt to EBITDA ratios. Results are unaffected.

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INVESTOR PROTECTIONS, CAPITAL MARKETS, AND ECONOMIC GROWTH: THE AFRICAN EXPERIENCE

Bill B. Francis, Iftekhar Hasan and Eric Ofori

ABSTRACT

This paper investigates the impact of the development of capital markets on economic growth in Africa and reports a significant increase in real GDP per capita after stock exchanges are established. This paper also reveals that there are significant improvements in the level of private investments in the post stock market launch era. The results also indicate that stock markets play a complementary role to the banking sector by contributing to the availability of private credit. Although African capital markets are relatively less advanced when compared to capital markets on other continents (particularly in terms of technology, structure, and liquidity), we find that their establishment

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has been crucial in helping African countries catch up with the rest of the world.

Keywords: Africa; capital markets; trading volume; economic growth; private investment

JEL classifications: G10; G15; G18; O16; O40

> Many people wonder why a poor country like Malawi should have a stock exchange in the first place. But the reason for having it here is the same as in London or Frankfurt: enabling the private sector to raise capital. (Rob Stangroom, CEO of Malawi Stockbrokers Ltd.)[1]

INTRODUCTION

Only 11 African countries had stock exchanges in 1990, but by 2005 there were stock exchanges operating in 22 African countries, including a regional exchange in Cote d'Ivoire that serves eight countries.[2] The primary purpose of establishing these stock markets is to mobilize savings and improve the allocation of capital, thereby promoting economic growth. Though in theory this premise cannot be disputed, several scholars have argued that it is premature for African countries to establish stock markets, given their current state of development. The standard argument holds that African economies are not well developed and that they lack the requisite institutions necessary for financial development. For example, Stiglitz (1989, p. 61), in commenting on financial market development in poor countries, states: "If investors are inadequately protected by strong securities and fraud laws, and a judiciary which can fairly and effectively enforce such laws, there is a high likelihood of abuses; the resulting loss of investor confidence may have repercussions well beyond the securities directly affected." Mkandawire (1999, p. 327) similarly notes: "[The] volatility of stock markets in the developing countries renders them a singularly unreliable guarantor of efficient allocation of scarce resources for development purposes. … They are unlikely to make much of a difference in mobilizing and allocating savings." These sentiments are in sharp contrast with the findings of Atje and Jovanovic (1993, p. 636), who report upon a relationship between stock market trading volume and economic growth: "We

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have found a large effect of stock markets on subsequent development. We have failed to find a similar effect of bank lending. That this differential effect should exist is in itself surprising. But if it is true, then it is even more surprising that more countries are not developing their stock markets as quickly as they can as a means of speeding up their economic development." In light of these contrasting viewpoints, the research question this paper addresses is simple: Do stock markets add value to Africa's economies?

We are motivated to look at this issue as a result of the welfare implications. Countries in Africa are fraught with malnutrition, high rates of unemployment, widespread corruption, political instability, poor roads, and widespread poverty. Thirty-eight of the 48 countries in sub-Saharan Africa are classified as low income, with only five able to reach upper middle income status (World Development Report, 2004).[3] Eighteen of the 20 slowest growing countries in the world over the period 1960−2000 are in Africa, with 38 African countries recording an abysmal mean growth rate of 0.6% per year over this period (Barro & Sala-i-Martin, 2004). Even worse, less than one in five households in Africa have access to any formal banking service (Beck, Fuchs & Marilou, 2009; Fang & van Lalyveld, 2014). Africa is the continent which historically has the highest percentage of its citizens living on less than $1 a day. Having a proper financial system to spur the effective allocation of capital is therefore clearly a necessity if Africa is to escape these circumstances. According to Aghion, Howitt, and Mayer-Foulkes (2005), when it comes to factors explaining non-convergence of growth rates between countries, "financial development is among the most powerful of these forces." In their analysis, low levels of financial development makes convergence between countries less likely.

Another argument that can be made for establishing and maintaining African stock markets is that the existence of stock markets will help facilitate globalization of African markets by enhancing the connections between domestic and foreign investors. Alfaro, Chanda, Kalemli-Ozcan, and Sayek (2004, 2009) argue that countries with well-developed financial markets benefit substantially from FDI inflows through total factor improvements as compared to those with weaker financial markets; well-functioning stock markets are thus even more important for Africa. Furthermore, stock exchanges can assist African governments in their privatization programs through public offerings. As an example, the Nigerian Stock Exchange is known to have played an active role in a privatization program to restructure the country's economy (Africa Recovery, 2000).

Another research question this study addresses is as follows: Do African countries with business environments that are characterized primarily by small firms necessitate financial systems that are centered on both banks and stock markets? Or is the establishment of stock markets likely to take business away from banks due to competition and as a consequence weaken economic growth in the long run? The answers to these questions are not trivial. Boyd and Smith (1998) report that banks are necessary at the more basic levels of economic development, but as an economy develops it becomes useful for the financial system to become increasingly market-based. Tadesse (2002) also provide some answers; in his study of industry level data from 36 countries, he argues that "market-oriented systems retard economic growth" in countries dominated by smaller firms. Claessens and Laeven (2005) also address this issue by examining the impact of banking sector competition on economic growth. They report that greater competition in a country's banking system leads to improved bank performance and improvements in a borrower firm's product quality, as well as increases in banking innovation. Much work remains in order to acquire firm conclusions. Proponents of the bank-based financial system argue that this system is superior to a market-based system, as bank monitoring helps resolves the agency problem between management and outside investors.[4] Moreover, in weak institutional settings such as those in Africa, banks can more effectively force firms to reveal information and repay their debts (Chakraborty & Ray, 2006; Levine, 2002). The argument against the establishment of these markets is that the economies in these countries are not well developed, and therefore the limited resources should be applied to the development of their fragile banking systems. This raises the question as to the nature of the interplay between stock market development, banking activity, and economic growth.

Though this paper is not the first to examine the impact of stock markets on economic growth, the research agenda is different from current research. In addition, this paper updates and extends previous work by examining these issues in the context of developing countries. The purpose here is to evaluate Africa's readiness for stock markets, as well as to highlight how African financial system can develop. The study has significant policy implications, as we provide potential redresses for the extensive poverty in Africa. Scholars and policy makers alike have been puzzled by Africa's abysmal growth performance. According to Easterly (2001), the decline in growth rates for most developing countries took off in 1980, with a median per capita income growth of 0% over the period from 1980 to 1998, compared to a median of 2.5% from 1960 to 1979. While there is likely no one

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particular cause for the poor growth of Africa, several arguments have been developed for Africa's growth failure.[5] These possibilities include, among others: Africa's poor level of democracy; the continent's poorly developed financial systems; lack of trade openness; environmental factors such as the natural resource "curse" (Sachs & Warner, 2001), including a decline in rainfall pattern since the 1960s (Barrios, Bertinelli, & Eric, 2010); ethno linguistic fractionalization (Barr & Oduro, 2002; Easterly & Levine, 1997); and corruption (Vicente, 2010). Two of the eight Millennium Development Goals set forth by the United Nations is for Africa to halve the proportion of its population living in abject poverty and hunger by 2015 and also for African countries to enhance access to their financial markets. This study is therefore not only imperative but also timely.

The results of this paper's empirical analyses indicate that the establishment of stock markets helps improve living standards. In other words, stock markets in African countries are not a misuse of resources but instead have a positive impact on the economy. This study also documents that African countries with stock markets maintain a superior growth profile as compared to African countries without stock markets. The results are consistent with Levine and Zervos (1998) and Tadesse (2002). However, these results run counter to Rioja and Valev (2004), who find no connection between finance and growth for low-income countries. This paper also finds that the availability of credit from banks to the private sector improves after a stock market development is launched, indicating that stock markets play a complementary role to the banking system; establishing stock markets augments the development of financial intermediaries. Overall, our conclusions are in support of the argument that most African countries are ready for stock market development.

The rest of the paper proceeds as follows. In the section "Literature Review on the Finance Growth Nexus" we present a literature review on the finance growth nexus. The data are presented in the section "Data." The empirical results are presented in the section "Empirical Results." The section "Summary and Conclusions" concludes.

LITERATURE REVIEW ON THE FINANCE GROWTH NEXUS

The finance growth literature has experienced a revival over the last several years, partly due to the classic work of King and Levine (1993),[6] who

employ data on 80 countries over the period from 1960 to 1989 and report that financial development is positively associated with economic growth, physical capital accumulation, and economic efficiency improvements. Based on their regression results they argue that an increase in liquid liabilities can eliminate a "substantial" portion of the differences between fast and slow growing countries.

In their study on the same subject, Levine and Zervos (1998) report even stronger findings; they introduce measures of stock market development: liquidity, size, volatility, and integration with world capital markets. They find that only stock market liquidity is a predictor of real per capita GDP growth, after controlling for initial income, initial investment in education, political stability, fiscal policy, openness to trade, macroeconomic stability, and the forward looking nature of stock prices. They offer arguments that suggest that though both banking development and stock market liquidity both predict long-run economic growth, banks provide different services from stock markets; they report a correlation of 0.65 between bank credit and stock market capitalization.

Ang and McKibbin (2007) utilize a country study on the Malaysian economy and suggest through principal component analysis that though finance seems to be a "facilitator" of economic growth, it is not a "deep" determinant of economic growth. They conclude therefore that finance follows economic growth, which is in agreement with Robinson's view that "where growth leads enterprise follows."

Minier (2009) examines the growth impact of stock exchange establishment for a sample of 40 countries between 1960 and 1998 and finds the stock exchanges to have spurred growth in the short run. She finds that countries that established stock markets grew faster over the next five years after the exchange opening compared to similar countries without a stock market. Her results of rapid economic growth in the short run seem to disappear in the long run, however.

Henry (2000a) looks at the impact of financial liberalization on equity prices in 12 emerging economies and reports that the liberalizing countries experience abnormal returns of 3.3% per month in an eight month window leading up to the liberalization date.[7] His findings indicate that financial liberalization leads to a reduction in the host country's cost of capital. Our paper provides additional insights by focusing on the macroeconomic impact of initial stock exchange establishment for a larger cross-section of developing countries.

Rioja and Valev (2004) examine the linkage between finance and growth by grouping countries into three income groups: low income,

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middle income, and high income. They report that the link between finance and growth is not "uniformly positive." The association between finance and growth depends on a country's level of financial development. They emphasize that while the impact of finance on growth cannot be established for low levels of economic development, the effect is negative beyond a threshold for high levels of economic development, and the link between finance and growth is strong only for middle income countries. This result to some extent overlaps with the findings of Shan, Morris, and Sun (2001), who analyze this issue based on a sample of nine OECD countries and China, and who find "little support" that finance leads growth.

In their theoretical analyses assessing the merits of the bank-based and market-based systems, Chakraborty and Ray (2006) report that income inequality is lower and investment and per capita income are higher under a bank-based system. For Africa, however, the issue is more subtle, as firms without ties to powerful state-owned banks can be stymied by their competitors through credit deprivation, which impedes the overall effectiveness of capital allocation in the economy. La Porta, Lopez-de-Silanes, and Shleifer (2002) analyze the impact of government ownership of banks on economic performance and report that higher government ownership of banks impedes financial development and slows economic growth. In addition, a financial system that is established with the aim of channeling credit to parastatals will be poor at evaluating managers and will fall short when it comes to allocating credit to the private sector (King & Levine, 1993).

The primary objectives for the establishment of stock markets are to mobilize savings and advance the allocation of capital. Arguments in favor of the market-based system usually highlights the deficiencies in the bank-based system and argue that: (1) stock markets help induce innovation by making it easier for a venture capitalist to exit investment by going public through an IPO (Rousseau & Wachtel, 2000; Wachtel, 2003); (2) stock markets help alleviate the problems associated with excessively powerful banks by providing an alternate source of financing; (3) the existence of stock markets makes valuation of a company easier as quick signals are transmitted to investors about firm value, and such information can be beneficial to banks as well.

Rajan and Zingales (2003), in comparing market-based and bank-based systems, explain that bank-based systems perform well in an environment with small markets and institutions, weak legal protections, and little or no transparency. By contrast, market-based systems perform well when firms

are bigger and properly organized, and when the country has better legal institutions with respect for the rule of law.

Clayton, Jorgensen, and Kenneth (2006) study factors that predict the presence of a financial exchange in a country. They report that countries with greater economic freedom are more likely to have an exchange, and some of the other determinants of exchange development are size of the economy, trade policy, foreign investment, development of the banking sector, and legal system. Yartey and Adjasi (2007) pursue a research agenda that is similar to the one pursued by this study. They document that in Ghana the stock market accounted for about 12% of total asset growth of listed companies over the period 1995–2005. They also noted that in Zimbabwe equity financing contributed to 8% of the funds raised by public companies over the period from 1990 to 1999. So whereas stock markets have contributed to the long-term financing of corporate growth in some sub-Saharan African countries, their results are inconclusive on the overall impact of stock markets in Africa. The only stock market indicator that contributes to economic growth in their empirical analyses is the ratio of value of shares traded to GDP. They do not find the ratio of market capitalization to GDP and stock market turnover to have any impact on economic growth. More analysis is therefore warranted.

Rajan and Zingales (1998) examine this issue for a sample of 41 countries of varying income groups and find that financial market development helps especially those industries that are more dependent on external finance for fast growth. Their argument is that financial deepening not only affects a firm's investment opportunity set, but also impacts a firm's general operations via working capital. Beck and Levine (2004), working with a panel of 40 countries over the period from 1976 to 1998, provide empirical evidence rejecting the hypothesis that "overall financial development is unimportant or harmful for economic growth." They also report that stock markets and banks produce services different from each other; they are complements, rather than substitutes.

Based on the above review it is evident that the relationship between stock market development and banking sector development is not well understood. In addition, the long-run impact of the financial system on economic growth is still not well understood, though the consensus by most scholars is that the development of financial systems reduces the cost of external finance and information cost for firms, thereby influencing the rate of economic growth. The finance growth literature has been mostly silent about the economic impact on a less developed country opening a

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stock exchange, and as the topic is incomplete without a study of developing countries, this paper fills a void.

DATA

The appendix provides additional details on the data and sources for our empirical analyses. Most of our variables are from the World Bank collection of development indicators (www.worldbank.org), which is undoubtedly the most comprehensive database of country level data, and which dates back to 1960. We also obtain data from Andrei Shleifer's homepage.[8] The key explanatory variable in our empirical analyses is *stkmktp* which takes a value of 1 if a stock market is present in a year for a particular country and zero when no stock market is present. It is assigned a value of 1 in the year of the stock market establishment.

We control for standard factors that are known to impact economic growth: for example, birth rate (the number of births per woman); government expenditure (govexp); trade openness; real GDP per capita in 1960 (GDPpercap60) and political and civil unrests (War).

We also include additional controls which are more pronounced for Africa: ethno linguistic fractionalization (*Ethnofract*); country distance from the equator (latitude); and the degree of corruption (Corruption). The variable *Ethnofract* is the probability that two persons chosen at random are from two different ethnic groups. It runs from 0 to 1. A low value indicates a homogeneous society and a high value indicates a very diverse society.

Table 1 shows the 25 countries used in our empirical analyses. Not all stock exchanges in Africa are included in our analyses due to lack of data on relevant macroeconomic variables. Older stock exchanges in South Africa, Egypt, Nigeria, Kenya, and Morocco are excluded in most of our analyses (except when the entire pool of African countries is analyzed in Table 9). The oldest stock exchange in the sample is Tunisia's, which was founded in 1969. The youngest stock exchange is Libya's, which was founded in 2007. Though a regional stock exchange was established in Abidjan in 1998, Cote d'Ivoire already had a stock exchange that had been in existence since 1976, and so this is the reference year used in the before and after analyses.

The South African and Egyptian stock exchanges are comparable to the international standards. Uganda's stock exchange opened for trading in

1998 with no securities listed, while the Tanzanian stock exchange opened for trading with four listings, with trading lasting for two hours per week (Minier, 2009).

Table 1. Stock Markets and Year of Establishment in Africa.

Algeria [1997]	Tanzania [1998]
Botswana [1989]	Uganda [1997]
Cameroon [2001]	Zambia [1994]
Ghana [1990]	Zimbabwe [1993]
Libya [2007]	*Cote d'Ivoire [1976]*
Malawi [1995]	*Togo [1998]*
Mauritius [1988]	*Benin [1998]*
Mozambique [1999]	*Burkina Faso [1998]*
Namibia [1992]	*Guinea-Bissau [1998]*
Rwanda [2005]	*Mali [1998]*
Sudan [1995]	*Niger [1998]*
Swaziland [1990]	*Senegal [1998]*
Tunisia [1969]	
Egypt [1883]	**South Africa [1887]**
Kenya [1954]	**Morocco [1929]**
Nigeria [1960]	

The table represents the 25 countries used in our empirical analyses, except for Table 12, where the entire pool of African countries are considered. The eight countries italicized are all part of the regional stock exchange in Cote d'Ivoire. Countries in bold print are omitted in our before and after analyses due to data limitation. For each country the year of stock exchange establishment is in brackets.

Descriptive Statistics

Summary statistics for the variables used in our before and after analyses are shown in Table 2. These are based on data recorded over 10 years for each variable, if available. Even though the countries in our sample are mostly "poor" there is a wide variation across the sample; real GDP per capita ranges from $403 in Mozambique to $15,361 in Libya (as of 2009). A standard measure of the extent of banking development in the finance growth literature is the amount of credit available to the private sector. By this measure, Cote d'Ivoire has the most developed banking system, and the least developed banks are in Sudan and Ghana, with a private credit to GDP ratio of 0.02 recorded in both countries. The caveat, however, is that while Sudan experienced this value after the establishment of a stock market, in Ghana this value was recorded before the country had a stock market.

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Africa is known to have some of the most corrupt nations. Six of the 10 most corrupt countries in the world are in Africa.[9] Government corruption as defined by Shleifer and Vishny (1993) is "the sale by government officials of government property for personal gain." The least corrupt country in our sample is Namibia, with a corruption index of 7.22, and the most corrupt country is Mali, with a score of 2.78. The lower the index value, the more corrupt the country is. In terms of ethnic diversity (ethno linguistic fractionalization), the most homogeneous country in our sample is Swaziland and the most heterogeneous is Tanzania.

Table 2. Summary Statistics on 25 African Countries with Stock Markets over a 10-Year Period.

	Mean	Median	Std. dev.	Min	Max	*N*
GDP per capita, PPP	2362.54	1086.59	2898.78	403.29	15361.16	219
Private credit (ratio to GDP)	0.11	0.09	0.08	0.02	0.40	211
Liquid liabilities (ratio to GDP)	0.23	0.21	0.11	0.05	0.65	209
Legalorigin	0.36	0.00	0.48	0.00	1.00	250
Trade openness (% of GDP)	63.88	55.79	32.08	11.09	171.00	247
War	0.20	0.00	0.40	0.00	1.00	246
Private investment (% of GDP)	11.32	11.79	5.09	0.70	23.98	240
Birth rate	5.65	5.82	1.34	1.99	7.94	249
Ethno linguistic fractionalization	0.60	0.71	0.28	0.00	0.89	250
Latitude	0.19	0.17	0.13	0.01	0.67	250
Corruption	4.95	5.12	1.25	2.78	7.22	210

Data definitions and sources are in the appendix. *N* is the number of observations.

Correlations

The correlation results displayed in Table 3 are in line with the literature on economic growth: GDP per capita has a negative and statistically significant correlation with birth rate, political unrest (War), and ethno linguistic fractionalization (Ethnofract).[10] Corruption maintains a statistical significance with all of our variables except *Latitude*. Less corrupt countries have higher real GDP per capita, better developed banking sectors, and more investments in the private sector, and these countries also trade more with other countries.[11] We can also infer from Table 3 that political unrest (War) impedes output per person.

Table 3. Correlation Table.

	1	2	3	4	5	6	7	8	9
1. GDPpercap, PPP	1								
2. Privcredit	0.274***	1							
3. LiquidLiab.	0.540***	0.572***	1						
4. Trade openness	0.512***	0.530***	0.579***	1					
5. War	−0.071	−0.241***	−0.071	−0.345***	1				
6. Private Invest.	0.105	0.385***	0.347***	0.194***	0.077	1			
7. Birth rate	−0.747***	−0.129*	−0.626***	−0.400***	0.046	−0.280***	1		
8. Ethnofract	−0.512***	0.006	−0.214***	−0.191***	0.021	−0.009	0.290***	1	
9. Latitude	0.353***	0.005	0.125*	0.164***	−0.119*	0.195***	−0.333***	−0.209***	1
10. Corruption	0.264***	0.128*	0.189**	0.374***	−0.249***	0.145**	−0.155**	−0.225***	0.113

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

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EMPIRICAL RESULTS

Our empirical analyses take a two-step approach. We first perform a before and after analysis to gauge the impact of a stock exchange on a nation's economy for all 25 countries in our sample, resulting in a total of 250 country-year observations. Next, we perform a difference-in-difference analysis to examine if indeed stock exchanges have been beneficial to African countries. We use the full sample of 53 countries to mitigate the issue of the possibility of policy makers timing the formation of a stock exchange based on the country's growth profile.

Effect of Stock Markets on Output

In Table 4 we estimate the effect of stock markets on living standards using OLS. Models (1) and (2) indicate that having a stock market has a positive effect on living standards. However, the significance disappears when we introduce a battery of controls in model (3). One has to be cautious with these estimates since OLS assumes homoscedasticity of error terms.

Further tests are therefore warranted. We therefore perform further analyses but use the method of generalized least squares. This is shown in Table 5. We focus on the economic impact of having a stock exchange two years before the exchange establishment and two years after the stock exchange has been set up. In all of the regression specifications in Table 5, having a stock market clearly boosts economic output. *Ethnofract* is the only control variable that comes across as statistically significant. It is not clear, however, why the magnitude of our coefficients is smaller in models (1) and (2) compared to models (3) through (6).

Table 6 estimates a before and after analysis for 25 African countries with stock markets. The dependent variable is the natural logarithm of real GDP per capita. The purpose of this table is to basically explain how African countries perform upon establishing a stock market. The regressions are run in a panel as random effects using the method of generalized least squares.[12] Since our key explanatory variable is constant over time, random effects is considered appropriate as this is generally more efficient than a pooled OLS. All the regressions include time dummies to account for time specific effects. From the table, the coefficient of stkmktp has a positive sign in all our specifications and is also statistically significant in all of them. The standard errors of our coefficient estimates clustered by

Table 4. Effect of Stock Market on Output – OLS Results.

	(1)	(2)	(3)
stkmktp	0.094***	0.090**	0.122
	(0.024)	(0.035)	(0.160)
Legalorigin		0.035	−0.011
		(0.336)	(0.314)
stmktkp*Legalorigin		0.011	0.102
		(0.067)	(0.120)
Ethnofract		−1.659**	
		(0.793)	
War			0.009
			(0.315)
Latitude			3.17
			(1.849)
Time dummies	Yes	Yes	Yes
Constant	7.284***	8.285***	6.590***
	(0.199)	(0.596)	(0.365)
Number of observations	219	219	215
R^2	0.40%	24.00%	22.70%
Adj. R^2	< 0%	19.50%	17.70%

This table estimates a before and after analyses for 25 African countries with stock markets. The dependent variable is the natural logarithm of GDP per capita, PPP adjusted. 10 years of data are collected for each country: 5 years before the stock exchange establishment and 5 years after the exchange establishment. The regressions are run using OLS. The variable *stkmktp* presence is a dummy variable that equals 1 when the country has a stock exchange in that year and 0 if no exchange has been established in that year. The variable *Liquid Liabilities* is the ratio of liquid liabilities to GDP, that is, M3/GDP. The variable *Legalorigin* is the country's legal origin which is 1 when the country follows an English common law system and 0 for French civil law. The variable *War* is a dummy equal to 1 if a civil war, civil violence, or ethnic violence or any combination of all three happened in a particular year; it is 0 otherwise. *Ethnofrac*t is a variable running from 0 to 1 that represents a country's level of ethno linguistic fractionalization, that is, the probability that two randomly chosen persons are in different ethnic groups, that is, 0 is a homogeneous ethnic society and 1 is a heterogeneous ethnic nation. Latitude is a country's distance from the equator; it is scaled to take values from 0 to 1.
, * denote the level of significance at the 5% and 1% levels, respectively. Standard errors clustered by country are in parentheses.

country are in parentheses. We want to exploit the effect of legal origin (Legalorigin) in our analyses, and so we interact this variable with our stock market dummy in regressions (3) through (6). Overall, the results of Table 4 are robust to a battery of controls and demonstrate a strong positive association between a stock exchange establishment and living standards. These findings are in line with the findings of Levine and Zervos (1998).

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Table 5. Effect of Stock Market on Output Two Years before and after a Stock Market Establishment.

	(1)	(2)	(3)	(4)	(5)	(6)
Stkmktp	0.071***	0.038*	8.436***	6.447***	6.758***	6.555***
	(0.024)	(0.020)	(0.621)	(0.596)	(0.377)	(0.616)
Liquid liabilities		−0.845				
		(0.583)				
Legalorigin			0.026	−0.14	0.0522	−0.146
			(0.340)	(0.442)	(0.326)	(0.447)
stmktkp* Legalorigin			0.001	0.031	0.001	0.031
			(0.043)	(0.048)	(0.039)	(0.041)
Ethnofract			−1.785**			
			(0.843)			
Corruption				0.179		0.167
				(0.149)		(0.153)
War					−0.168	−0.169
					(0.130)	(0.110)
Latitude					3.28	
					(2.011)	
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Number of countries	22	21	22	18	22	18
Number of observations	88	79	88	72	88	72
R^2 within	0.00%	45.51%	19.67%	12.41%	38.27%	37.36%
R^2 between	0.00%	49.49%	26.62%	6.88%	21.84%	5.48%
R^2 overall	0.08%	39.70%	26.59%	6.90%	21.91%	5.60%

This table estimates a before and after analyses for 25 African countries with stock markets. The dependent variable is the natural logarithm of GDP per capita, PPP adjusted. Four years of data are collected for each country: 2 years before the stock exchange establishment and 2 years after the exchange establishment. The regressions are run as a generalized least squares random effects model. The variable *stkmktp* presence is a dummy variable that equals 1 when the country has a stock exchange in that year and 0 if no exchange has been established in that year. The variable *Liquid Liabilities* is the ratio of liquid liabilities to GDP, that is, M3/GDP. The variable *Legalorigin* is the country's legal origin which is 1 when the country follows an English common law system and 0 for French civil law. The variable *War* is a dummy equal to 1 if a civil war, civil violence, or ethnic violence or any combination of all three happened in a particular year; it is 0 otherwise. *Ethnofrac*t is a variable running from 0 to 1 that represents a country's level of ethno linguistic fractionalization, that is, the probability that two randomly chosen persons are in different ethnic groups, that is, 0 is a homogeneous ethnic society and 1 is a heterogeneous ethnic nation. Latitude is a country's distance from the equator; it is scaled to take values from 0 to 1. Corruption is an index that runs from 0 to 10 with low values indicating a highly corrupt environment.

*, **, *** denote the level of significance at the 10%, 5%, and 1% levels, respectively.

Standard errors clustered by country are in parentheses.

Table 6. Effect of Stock Markets on Standard of Living.

	(1)	(2)	(3)	(4)	(5)	(6)
stkmktp	0.190***	0.068***	0.197***	0.123***	0.175***	0.072*
	(0.039)	(0.025)	(0.044)	(0.041)	(0.053)	(0.041)
Liquid liabilities		−0.212				
		(0.398)				
Legalorigin			−0.028	−0.162	−0.004	−0.171
			(0.332)	(0.409)	(0.313)	(0.409)
stmktkp*Legalorigin			−0.019	0.027	−0.008	0.039
			(0.060)	(0.062)	(0.066)	(0.070)
Ethnofract			−1.610**			
			(0.812)			
Corruption				0.188		0.185
				(0.144)		(0.143)
War					0.000	−0.018
					(0.058)	(0.055)
Latitude					3.090*	
					(1.870)	
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	219	200	219	179	215	176
Number of countries	23	22	23	19	23	19
R^2 within	44.78%	45.55%	44.98%	35.77%	45.84%	37.69%
R^2 between	0.00%	27.76%	23.03%	7.84%	20.88%	8.12%
R^2 overall	0.25%	2.62%	23.73%	6.99%	22.47%	6.06%

This table estimates a before and after analyses for 25 African countries with stock markets. The dependent variable is the natural logarithm of GDP per capita, PPP adjusted. 10 years of data are collected for each country: 5 years before the stock exchange establishment and 5 years after the Exchange establishment. The regressions are run as a generalized least squares random effects model. The variable *stkmktp* presence is a dummy variable that equals 1 when the country has a stock exchange in that year and 0 if no exchange has been established in that year. The variable *Liquid Liabilities* is the ratio of liquid liabilities to GDP, that is, M3/GDP. The variable *Legalorigin* is the country's legal origin which is 1 when the country follows an English common law system and 0 for French civil law. The variable *War* is a dummy equal to 1 if a civil war, civil violence, or ethnic violence or any combination of all three happened in a particular year; it is 0 otherwise. *Ethnofrac*t is a variable running from 0 to 1 that represents a country's level of ethno linguistic fractionalization, that is, the probability that two randomly chosen persons are in different ethnic groups, that is, 0 is a homogeneous ethnic society and 1 is a heterogeneous ethnic nation. Latitude is a country's distance from the equator; it is scaled to take values from 0 to 1. Corruption is an index that runs from 0 to 10 with low values indicating a highly corrupt environment.

*, **, *** denote the level of significance at the 10%, 5%, and 1% levels, respectively.

Standard errors clustered by country are in parentheses.

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Growth theory posits that past levels of output can influence the current value. This fact cannot be ignored. Using lags introduces serially correlated errors which can lead to our estimates being inconsistent. To address this issue and to control for simultaneity and omitted variables, we employ a generalized method of moments (GMM) estimation developed for dynamic panels (see Arellano & Bond, 1991; Blundell & Bond, 1998). This approach allows us to control for unobserved time- and country-specific effects and to extract the exogenous component of stock markets on growth. Table 5 reports our results using a one-step difference GMM.[13] Table 5 has reduced standard errors across regression specifications as compared to Table 4. It indicates that establishing a stock exchange increases output per person by about 6%. In our Sargan test the higher the *p*-value of the test statistics, the better our regression specification. In this regard, specification (6) with *War* as a control provides the best estimate.

Table 7. Dynamic Panel-Data Estimation (One-Step Difference GMM) on the Effect of Stock Markets on Standard of Living.

	(1)	(2)	(3)	(4)	(5)	(6)
Stkmktp	0.061**	0.060**	0.061**	0.052**	0.062**	0.064**
	(0.028)	(0.028)	(0.028)	(0.024)	(0.028)	(0.029)
LOGGDPpercapPPP$_{-1}$	0.637***	0.527***	0.537***	0.477**	0.405**	0.590***
	(0.138)	(0.174)	(0.173)	(0.190)	(0.202)	(0.090)
LOGGDPpercapPPP$_{-2}$		0.121*	0.120*	0.042	0.092	
		(0.073)	(0.072)	(0.106)	(0.080)	
Trade openness			0.00			
			(0.001)			
Liquid liabilities				−0.264		
				(0.246)		
Birth rate					0.004	
					(0.069)	
War						−0.002
						(0.024)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sargan test[a] (*p*-value)	0.302	0.389	0.270	0.112	0.274	0.517
Serial correlation test[b] (*p*-value)	0.091	0.173	0.089	0.108	0.109	0.16
Wald test for joint significance (*p*-value)	0.000	0.000	0.000	0.000	0.000	0.000

Table 7. (*Continued*)

	(1)	(2)	(3)	(4)	(5)	(6)
Number of observations	129	129	128	115	106	129
Number of countries	22	22	22	21	18	22

This table is a dynamic panel estimate: the dependent variable is the natural logarithm of GDP per capita, PPP adjusted. 10 years of data are collected for each country: 5 years before the stock exchange establishment and 5 years after the exchange establishment. The regressions are run as a generalized least squares random effects model. The variable *stkmktp* presence is a dummy variable that equals 1 when the country has a stock exchange in that year and 0 if no exchange has been established in that year. The variables LOGGDPpercapPPP$_{-1}$ and LOGGDPpercapPPP$_{-2}$ are the one-year and two-year lags of log of GDP per capita, PPP adjusted, respectively. The variable *Trade openness* is the sum of exports and imports as a percentage of GDP. *Birth rate* is the expected number of births per woman during her lifetime. The variable *Liquid Liabilities* is the ratio of liquid liabilities to GDP, that is, M3/GDP. The variable *War* is a dummy equal to 1 if a civil war, civil violence, or ethnic violence or any combination of all three happened in a particular year; it is 0 otherwise.
Standard errors are in parentheses.
[a]The null hypothesis here is that the instruments used are not correlated with the residuals.
[b]The null hypothesis here is that the errors in the first-difference regression indicate no second-order serial correlation.
*, **, *** denote the level of significance at the 10%, 5%, and 1% levels, respectively.

Table 6 shows the results of our system estimation. The system GMM comprises the original equation in levels used to generate Table 4 and the equation in differences. This system generates efficiency in our estimation. The *p*-values of our Sargan tests strongly reject the null hypothesis of over identifying restrictions. The coefficient of our explanatory variable is statistically and economically significant in all of our regression specifications (Table 8).

Table 8. Dynamic Panel-Data Estimation (Two-Step System GMM) on the Effect of Stock Markets on Standard of Living.

	(1)	(2)	(3)	(4)	(5)	(6)
stkmktp	0.048***	0.045***	0.042**	0.030*	0.040***	0.042***
	(0.011)	(0.014)	(0.016)	(0.016)	(0.015)	(0.015)
LOGGDPpercapPPP$_{-1}$	1.001***	1.011***	1.008***	1.105***	0.852***	0.999***
	(0.002)	(0.016)	(0.057)	(0.101)	(0.105)	(0.003)
LOGGDPpercapPPP$_{-2}$		−0.010	−0.012	−0.090	0.109	
		(0.016)	(0.057)	(0.099)	(0.093)	
Trade openness			0.000			
			(0.000)			

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Table 8. (*Continued*)

	(1)	(2)	(3)	(4)	(5)	(6)
Liquid liabilities				−0.129 (0.088)		
Birth rate					−0.030* (0.016)	
War						−0.035* (0.02)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Sargan test[a] (*p*-value)	0.494	0.404	0.446	0.486	0.374	0.58
Wald test for joint significance (*p*-value)	0.00	0.00	0.00	0.00	0.00	0.00
Number of observations	151	151	150	136	151	151
Number of countries	22	22	22	21	22	22

This table is a dynamic panel estimate: the dependent variable is the natural logarithm of GDP per capita, PPP adjusted. 10 years of data are collected for each country: 5 years before the stock exchange establishment and 5 years after the exchange establishment. The regressions are run as a generalized least squares random effects model. The variable *stkmktp* presence is a dummy variable that equals 1 when the country has a stock exchange in that year and 0 if no exchange has been established in that year. The variables $\text{LOGGDPpercapPPP}_{-1}$ and $\text{LOGGDPpercapPPP}_{-2}$ are the one-year and two-year lags of log of GDP per capita, PPP adjusted, respectively. The variable *Trade openness* is the sum of exports and imports as a percentage of GDP. *Birth rate* is the expected number of births per woman during her lifetime. The variable *Liquid Liabilities* is the ratio of liquid liabilities to GDP, that is, M3/GDP. The variable *War* is a dummy equal to 1 if a civil war, civil violence, or ethnic violence or any combination of all three happened in a particular year; it is 0 otherwise.
Standard errors are in parentheses.
[a]The null hypothesis here is that the instruments used are not correlated with the residuals.
*, **, *** denote the level of significance at the 10%, 5%, and 1% levels, respectively.

Effect of Stock Market on Private Investment

Establishing a stock exchange provides an additional conduit of borrowing for firms. A project which in the absence of a stock exchange had a negative NPV thus has a positive NPV due to a reduction in the cost of borrowing. Therefore, we should expect an improvement in the level of private investment upon a stock exchange establishment; stock exchanges provide additional financing choices, which lead to more investment opportunities. The results in Table 7 clearly support this hypothesis: establishing a stock market leads to an increase in the level of private investment (Table 9).

Table 9. Effect of Stock Market on Private Investment.

	(1) LogPrivInv	(2) LogPrivInv	(3) LogPrivInv
stkmktp	0.240*	0.249**	0.240*
	(0.132)	(0.113)	(0.132)
War	0.105	0.11	0.105
	(0.155)	(0.143)	(0.156)
Legalorigin		−0.015	
		(0.239)	
stmktp*Legalorigin		−0.0249	
		(0.198)	
Ethnofract			0.0917
			(0.42)
Time dummies	Yes	Yes	Yes
Constant	2.097***	2.101***	2.042***
	(0.166)	(0.189)	(0.296)
Number of observations	236	236	236
Number of countries	25	25	25
R^2 within	6.53%	6.55%	6.53%
R^2 between	1.82%	1.93%	1.96%
R^2 overall	2.76%	2.97%	2.54%

This table estimates a before and after analyses on the impact of stock markets on private investments for 25 African countries. 10 years of data are collected for each observation, data permitting; 5 years before a stock exchange establishment and 5 years after establishment. The regression is run as a generalized least squares random effects model and the dependent variable is the natural log of gross fixed capital formation to the private sector, that is, private investment (LogPrivInv) as a percentage of GDP. The variable *stkmktp* presence is a dummy variable that equals 1 when the country has a stock exchange and 0 in each of the five years with no stock exchange; in the year of the stock exchange establishment the variable is coded as 1. The variable *Legalorigin* is the country's legal origin which is 1 when the country follows an English common law system and 0 for French civil law. The variable *War* is a dummy equal to 1 if a civil war, civil violence, or ethnic violence or any combination of all three happened in a year; *Ethnofrac*t is a variable running from 0 to 1 that represents a country's level of ethno linguistic fractionalization, that is, the probability that two randomly chosen persons are in different ethnic groups, that is, 0 is a homogeneous ethnic nation and 1 is a heterogeneous ethnic nation.

Standard errors adjusted for country clusters are in parentheses.

*, **, *** denotes the level of significance at the 10%, 5%, and 1% levels, respectively.

Effect of Stock Market on Banking

Next, we examine the effect of stock markets on the banking system. This is important, since some scholars argue that stock markets can compete with banks for customers, thereby taking business away from the banking

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sector. Deidda and Fattouh (2008) argue that the development of equity markets can lead to "disintermediation." Their argument is not centered on competition for customers between equity markets and banks, but is premised on the fact that since stock markets subject firms to disclosure requirements, firms can be screened by investors, thereby reducing information asymmetry; investors can ascertain the value of the firm from price signals and from the disclosures, and as a consequence firms would have less need for banks. Since the cost of acquiring information about the firm is reduced, the pool of potential investors increases, implying less need for bank borrowing. Boyd and Smith (1998), Demirguc-Kunt and Maksimovic (1996), and Sylla (1998), on the other hand, argue that stock markets and banks are complements, not substitutes. If the argument that stock markets take business away from banks or stock markets can lead to disintermediation is true, then we expect to see a negative sign on our stock market dummy in a regression with a measure of banking development as our dependent variable.

We follow the empirical literature on finance and growth and measure banking development as the ratio of private credit to real GDP. The results are displayed in Table 10. The regressions are run as random effects generalized least squares. Standard errors clustered by country are in parentheses. In model (1), the effect of establishing a stock market on banks is positive and statistically significant, but the overall *R*-squared is low, indicating the likely effect of omitted variables. In models (2) to (4) we introduce several control variables: legal origin, ethno linguistic fractionalization, corruption, political instability (War). All the regressions control for year effects. In model (2) the result indicates that though stock markets are beneficial to African countries on average, the effect of stock markets on banking is higher for French civil law countries. If we assume the LLSV doctrine holds for African countries, then these results mean that since French civil law countries have lower investor protection and are thus less financially developed, these countries have more to gain than their English common law counterparts when a stock exchange is created.

The overall results from Table 10 indicate that stock markets do not take business away from banks, but rather, play a complementary role. By helping to improve investment opportunities for firms, stock markets create additional demand for bank credit. That is, the establishment of stock markets creates an improvement in African countries' fragile banking systems. The results are consistent with Sylla (1998), Boyd and Smith (1998), Onder and Ozyildirum (2013), and Demirguc-Kunt and Maksimovic (1996).

Table 10. Effect of Stock Markets on Banking.

	(1)	(2)	(3)	(4)
stkmktp	0.021***	0.029***	0.026**	0.020***
	(0.008)	(0.010)	(0.011)	(0.007)
Legalorigin		−0.064***	−0.054**	−0.063***
		(0.024)	(0.022)	(0.021)
stmktkp*Legalorigin		−0.025*	−0.020	−0.026*
		(0.015)	(0.017)	(0.015)
Ethnofract		0.020		
		(0.046)		
Corruption			0.006	
			(0.009)	
War				0.010
				(0.013)
Time dummies	Yes	Yes	Yes	Yes
Constant	0.0980***	0.106***	0.0797*	0.116***
	(0.016)	(0.021)	(0.041)	(0.020)
Number of observations	211	211	175	211
Number of countries	22	22	18	22
R^2 within	14.32%	18.28%	18.94%	19.06%
R^2 between	0.04%	24.48%	24.61%	21.48%
R^2 overall	1.97%	23.72%	23.66%	21.40%

The dependent variable in this table is the ratio of private credit to GDP. The estimates are a before-and-after analyses on the impact of stock markets on the banking sector for 25 African countries. 10 years of data are collected for each observation, data permitting; 5 years before a stock exchange establishment and 5 years after establishment. The regressions are run as a generalized least squares random effects model and the dependent variable is the natural log of gross fixed capital formation to the private sector, that is, private investment (LogPrivInv) as a percentage of GDP. The variable *stkmktp* presence is a dummy variable that equals 1 when the country has a stock exchange and 0 in each of the five years with no stock exchange; in the year of the stock exchange establishment the variable is coded as 1. The variable *Legalorigin* is the country's legal origin which is 1 when the country follows an English common law system and 0 for French civil law. Corruption is an index that runs from 0 to 10 with low values indicating a highly corrupt environment. *War* is a dummy equal to 1 if a civil war, civil violence, or ethnic violence or any combination of all three happened in a year; *Ethnofrac*t is a variable running from 0 to 1 that represents a country's level of ethno linguistic fractionalization, that is, the probability that two randomly chosen persons are in different ethnic groups, that is, 0 is a homogeneous ethnic nation and 1 is a heterogeneous ethnic nation.
Standard errors adjusted for country clusters are in parentheses.
*, **, *** denotes the level of significance at the 10%, 5%, and 1% levels, respectively.

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Effect of Stock Markets on the West African Currency Zone

As mentioned above, the regional stock exchange in Africa comprises eight countries: Cote d'Ivoire, Togo, Benin, Mali, Senegal, Burkina Faso, Guinea-Bissau, and Niger. These eight countries are joined in a plan to foster economic integration and form a regional stock exchange. Prior to forming a joint exchange, these countries have also been part of the same currency union, the West African Economic and Monetary Union (WAEMU). The other major monetary union in Africa is the Economic and Monetary Community of Central Africa (CEMAC), whose members are Central African Republic, Chad, Republic of Congo, Equatorial Guinea, and Gabon. Our sample consists of only one country in CEMAC, hence we focus on WAEMU. Both monetary unions have two different central banks that are independent of one other and have a common currency, the CFA (Communaute Financiere Africaine), which was formerly pegged to the French franc but is now pegged to the euro. The results in Table 11 indicate that stock markets have been most beneficial to African countries which have no WAEMU membership.

Table 11. Effect of Stock Markets on Output: Interactions Involving WAEMU Countries.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
stkmktp	0.190***	0.221***	0.103***	0.273***	0.102**	0.228***	0.165***
	(0.039)	(0.046)	(0.032)	(0.047)	(0.043)	(0.041)	(0.046)
WAEMU	−0.567*	−0.515	−0.457	−0.466	−0.882	−0.539	−0.88
	(0.312)	(0.315)	(0.327)	(0.507)	(0.714)	(0.532)	(0.717)
stkmktp*WAEMU		−0.096*	−0.093*	−0.146**	−0.092	−0.151**	−0.104
		(0.056)	(0.051)	(0.058)	(0.067)	(0.063)	(0.075)
Liquid liabilities			−0.14				
			(0.340)				
Legalorigin				−0.327	−0.716	−0.357	−0.727
				(0.542)	(0.755)	(0.572)	(0.757)
stmktkp*Legalorigin				−0.0932	−0.0299	−0.0803	−0.0207
				(0.061)	(0.064)	(0.063)	(0.066)
Ethnofract				−1.158			
				(0.938)			
Corruption					0.124		0.118
					(0.147)		(0.146)
War						−0.033	−0.040
						(0.044)	(0.051)
Latitude						2.137	
						(2.002)	
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 11. (*Continued*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of countries	23	23	22	23	19	23	19
Number of observations	219	219	200	219	179	215	176
R^2 within	44.78%	49.83%	50.20%	53.51%	39.25%	54.60%	41.87%
R^2 between	9.14%	8.76%	4.57%	26.86%	20.73%	26.40%	21.00%
R^2 overall	11.68%	11.62%	7.64%	29.24%	20.92%	29.92%	20.79%

This table estimates a before and after analyses for 25 African countries with stock markets. The dependent variable is the natural logarithm of GDP per capita, PPP adjusted. The variable WAEMU is a dummy variable that is 1 if a country is a member of the West African Economic and Monetary Union (WAEMU) and 0 otherwise. 10 years of data are collected for each country: 5 years before the stock exchange establishment and 5 years after the exchange establishment. The regressions are run as a generalized least squares random effects model The variable *stkmktp* presence is a dummy variable that equals 1 when the country has a stock exchange in that year and 0 if no exchange has been established in that year. The variable *Liquid Liabilities* is the ratio of liquid liabilities to GDP, that is, M3/GDP. The variable *Legalorigin* is the country's legal origin which is 1 when the country follows an English common law system and 0 for French civil law. The variable *War* is a dummy equal to 1 if a civil war, civil violence, or ethnic violence or any combination of all three happened in a particular year; it is 0 otherwise. *Ethnofrac*t is a variable running from 0 to 1 that represents a country's level of ethno linguistic fractionalization, that is, the probability that two randomly chosen persons are in different ethnic groups, that is, 0 is a homogeneous ethnic society and 1 is a heterogeneous ethnic nation. Latitude is a country's distance from the equator; it is scaled to take values from 0 to 1. Corruption is an index that runs from 0 to 10 with low values indicating a highly corrupt environment. Standard errors clustered by country are in parentheses.
*, **, *** denote the level of significance at the 10%, 5%, and 1% levels, respectively.

Difference-in-Difference Regressions

The analyses in Table 9 consist of the full set of 53 countries in Africa. Our cross-sectional regression is in the spirit of Levine, Loayza, and Beck (2000) and is

$$\text{GDPpercapgrowth}_i = \alpha + \beta\ \text{stkmktp}_i + \gamma'[\text{CONDITIONING SET}]_i + \varepsilon_i \quad (1)$$

GDPpercapgrowth_i is the real per capita GDP growth for country i; the variable stkmktp, as before, is a dummy set equal to 1 when the country has a stock exchange (this includes all participants of the West African regional exchange) and 0 otherwise. The conditioning set is essentially our set of controls as in our before and after analyses, except here we introduce GDP in 1960 (logGDP60) to control for convergence.

In the table we find that African countries with stock exchanges outperform those without stock markets, and that the former grow by about

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1.5% annually. We conclude that African countries with stock markets have a superior growth profile than their counterparts without stock markets over the period 1988–2006 (Table 12).

Table 12. Difference-in-Difference Regressions on the Effect of Stock Markets on Economic Growth for the Entire Pool of 53 African Countries.

	(1)	(2)	(3)	(4)
stkmktp	1.339***	1.962***	1.435***	1.204*
	(0.491)	(0.562)	(0.472)	(0.583)
Corruption	0.285	0.177	0.328	0.254
	(0.219)	(0.206)	(0.227)	(0.214)
Ethnofract	−1.536	−2.785**		−0.996
	(0.999)	(0.999)		(1.416)
GDPpercap60		0		−0.001
		(0.001)		(0.001)
Birth rate				−0.736
				(0.443)
Constant	Yes	Yes	Yes	Yes
Number of observations	674	456	674	456
R^2	2.40%	3.60%	2.10%	4.20%
Adj. R^2	2%	2.70%	1.80%	3.20%

This is a difference-in-difference regression for all 53 African countries over the period from 1988 to 2006. The dependent variable is annual GDP per capita growth. The variable *stkmktp* presence is a dummy variable that equals 1 when the country has a stock exchange and 0 when it has no stock exchange in a particular year. *Ethnofrac*t is a variable running from 0 to 1 that represents a country's level of ethno linguistic fractionalization, that is, the probability that two randomly chosen persons are in different ethnic groups, that is, 0 is a homogeneous ethnic society and 1 is a heterogeneous ethnic nation. *Birth rate* is the expected number of births per woman during her lifetime. *GDPpercap60* is the GDP per capita in 1960 in constant year 2000 US $. Corruption is an index that runs from 0 to 10 with low values indicating a highly corrupt environment.
Standard errors are in parentheses.
*, **, *** denotes the level of significance at the 10%, 5%, and 1% levels, respectively.

SUMMARY AND CONCLUSIONS

This paper investigates the impact of stock exchange establishment in Africa. Despite stock markets in Africa not being as developed as the rest of the world's, with the exception of South Africa and Egypt, we do find that they do have a positive impact on economic activity supporting the finance growth nexus where stock markets are complementing banks in

enhancing economic output. This paper takes the position – consistent with several finance growth academics – that African countries can move out of this economic quagmire by having well-functioning financial markets. The development of stock markets can provide an additional source of much needed external financing for firms; firms can undertake more projects and can therefore produce a higher stock of physical capital; and investors can diversify their portfolio with better stock markets.

In a recent survey on financial development in Africa, Beck et al. (2009) report that subsidiaries of foreign banks in Africa have a higher return on assets and a higher return on equity than subsidiaries of the same banks in other regions of the world. Allen, Carletti, Cull, Qian, and Senbet (2010) also report on African stock markets performing impressively over the past several years on a risk-adjusted basis. According to a recent Bloomberg Market (June, 2011) report, it is projected that by 2015, 221 million Africans will advance from "destitution" to "basic-needs" status, meaning these individuals will be in a position to make $1,000–$5,000 a year. Despite these financial and economic improvements, however, much work still needs to be done toward the improvement of banks and the efficient functioning of stock exchanges in this region.

Most of the stock markets on the Continent are illiquid with trading occurring only for a few hours a day. The liquidity problem can be solved if countries can harmonize their trading and disclosure rules. This would make it easier for global investors to avoid multiplicity of rules and codes from one country to another in the region. In addition, for African countries to derive the full benefit of having stock markets there has to be sound and secure property rights, better enforcement of contracts, improved corporate transparency, frequent accounting disclosures, and a regulatory framework that is not too taxing. Future research should focus on knowing more about factors which drive stock market development. A starting point would be to look at the impact of political regimes. As African countries have varying political profiles ranging from unstable (Zimbabwe) to very stable (Botswana); plus several countries on the continent have embraced multi-party democracy recently it will be interesting to see the linkage between democratization and financial development. If more democratization – due to electoral disputes; and a regime switch every four to five years which creates policy discontinuity – reduces the development of financial markets then policy makers should focus on addressing this trade off.

Another avenue for further research, preferably at the firm level, is warranted to gauge the impact of stock exchange establishment on a nation's

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economy. The effect of stock markets on the industrial structure of African countries will deepen our understanding of which types of firms derive the most benefit from stock markets. This is important from a policy standpoint, as policy makers will know where to expend their resources with regards to regulating firms in different industries. This is worthwhile as Allen et al. (2010) suggest that factors responsible for stock market development in other developing countries are different in Africa. In summary, we report that stock market development is indeed an important financial institution that promotes private investment and economic growth. African policy makers should consider extending stock markets the priority that is already offered to the banking sectors.

NOTES

1. As quoted in Minier (2009).
2. The Bourse in Cote d'Ivoire was established in 1998 to serve the following eight countries: Cote d'Ivoire, Mali, Burkina Faso, Senegal, Togo, Benin, Guinea-Bissau, and Guinea.
3. The number of countries in Sub-Saharan Africa is now 49: South Sudan achieved independence from Sudan in 2011. A country is classified by the World Bank (as of 2004) as: a low-income country if its GNI per capita is $735 or less; a lower middle income country if its GNI per capita ranges between $736 and $2,935; an upper middle income country if its GNI per capita ranges between $2,936 and $9,075; and a high income country if its GNI per capita is $9,076 or higher.
4. The caveat here though is that since monitoring is costly, the cost of bank debt is likely to be higher.
5. Collier and Gunning (1999) offer an insightful perspective on Africa's slow growth.
6. The view that financial development correlates with growth is not new. The seminal works in this area are: Gurley and Shaw (1955), Goldsmith (1969), and McKinnon (1973). Levine (2005), Ahrend and Goujard (2014), De Nicolò and Juvenal (2014), Bagella, Becchetti, and Hasan (2004) and Hasan, Koetter, and Wedow (2009), Hasan, Wachtel, and Zhou (2009), and Chan-Lau, Liu, and Schmittmann (2015) provide some extensive literature review that also looks at the advantages and shortcomings of different empirical methodologies.
7. Henry (2000b) also reports a similar finding: stock market liberalization is strongly associated with investment booms. Also, see Korte (2015), Simmer (2015) and McCallum (2015) for related discussions on targeting and returns.
8. www.economics.harvard.edu/faculty/shleifer
9. Bloomberg Markets (June 2011).
10. See Barro (1991).
11. It must be emphasized that one is not inferring causality here. Low standards of living can induce corruption, and corruption can hinder economic growth.

12. To be able to employ a fixed effects methodology, we must assume that the omitted variables vary across African countries and do not change through time, which we cannot do. In addition, we are able to obtain estimates of our time-invariant regressors with a random effects formulation.

13. See Beck and Levine (2004) for discussions on difference estimation and system estimation.

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APPENDIX: VARIABLE DESCRIPTION AND SOURCES

GDPpercap, PPP: This is GDP per capita adjusted for purchasing power parity in 2005 international dollars.
Source: World Development Indicators.

GDP per capita growth: This is the annual percentage growth rate of GDP per capita based on constant local currency.
Source: World Development Indicators – World Bank

stkmktp: This is a dummy variable equal to 1 when a country has a stock exchange and zero otherwise.

GDPpercap60: This variable measures the GDP per capita in 1960 in constant year 2000 US dollars.
Source: World Development Indicators – World Bank.

Legalorigin: This is a dummy variable for the country's legal origin. It identifies a country's company law or commercial code and is set equal to 1 for English common law and 0 for French civil law.
Source: La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1999)

Corruption: This measures the level of corruption in government. The scale is from 0 to 10 with low ratings indicating that illegal payments in the form of bribes are usually demanded from government officials in matters concerning "import and export licenses, exchange controls, tax assessment, policy protection, or loans."
Source: La Porta et al. (1999). Primary Source: Political Risk Services, various years.

Ethnofract: This is the level of ethno linguistic fractionalization. This is the average of five different measures of ethno linguistic fractionalization: "(1) index of ethno linguistic fractionalization in 1960, which measures the probability that two randomly selected people from a given country will not belong to the same ethno linguistic group; (2) [the] probability of two randomly selected individuals speaking different languages; (3) probability of two randomly selected individuals do not speak the same language; (4) percent of the population not speaking the official language; and (5) percent of the population not speaking the most widely used language." The range is from 0 to 1.

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Source: La Porta et al. (1999). Primary Sources: Easterly and Levine (1997), Atlas Narodov Mira (1964), Muller (1964), Roberts (1962), Gunnemark (1992).

Latitude: This is the country distance from the equator. It is the "absolute value of the latitude of the country, scaled to take values between 0 and 1."
Source: La Porta et al. (1998). Primary Source: C.I.A. Factbook (1996).

Liquid liabilities: Ratio of liquid liabilities to GDP, calculated using the following deflation method:

$$\frac{\{(0.5)\times[Ft/P\_et + Ft-1/P\_et-1]\}}{[\mathrm{GDP}t/P\_at]}$$

where F is liquid liabilities, P_e is end-of period CPI, and P_a is average annual CPI.
Source: Beck and Demirgüç-Kunt (2009).

Private credit: Private credit by deposit money banks and other financial institutions to GDP, calculated using the following deflation method:

$$\frac{\{(0.5)\times[Ft/P\_et + Ft-1/P\_et-1]\}}{[\mathrm{GDP}t/P\_at]}$$

where F is credit to the private sector, P_e is end-of period CPI, and P_a is average annual CPI
Source: Beck and Demirgüç-Kunt (2009).

Private investment: This is investments by the private sector as a percentage of GDP, that is, the gross fixed capital formation to GDP.
Source: World Development Indicators.

Birth rate: This measures the female fertility rate. It is the number of lifetime births for the typical female over her expected lifetime.
Source: World Development Indicators.

Trade openness: This is the ratio of the sum of a country's exports and imports expressed as a percentage of GDP.
Source: World Development Indicators.

War: This is a dummy variable that is equal to 1 when a civil war, civil violence or ethnic war is observed for a country; it is zero otherwise.
Source: Polity IV database (Marshall, Jaggers, & Gurr, 2011).

Table A1. African Countries and World Bank (WB) Codes.

Country	WB Code	Country	WB Code
Algeria	DZA	Djibouti	DJI
Egypt	EGY	Eritrea	ERI
Libya	LBY	Ethiopia	ETH
Morocco	MAR	Somalia	SOM
Tunisia	TUN	Mozambique	MOZ
Sudan	SDN	Madagascar	MDG
Benin	BEN	Malawi	MWI
Burkina Faso	BFA	Zambia	ZMB
Cape Verde	CPV	Zimbabwe	ZWE
Cote d'Ivoire	CIV	Comoros	COM
The Gambia	GMB	Mauritius	MUS
Ghana	GHA	Seychelles	SYC
Guinea	GIN	Central African Republic	CAF
Guinea-Bissau	GNB	Chad	TCD
Liberia	LBR	Democratic Rep. of Congo	ZAR
Mali	MLI	Equatorial Guinea	GNQ
Mauritania	MRT	Angola	AGO
Sierra Leone	SLE	Cameroon	CMR
Senegal	SEN	Congo, Republic	COG
Togo	TGO	Gabon	GAB
Niger	NER	Sao Tome and Principe	STP
Nigeria	NGA	Botswana	BWA
Tanzania	TZA	Lesotho	LSO
Kenya	KEN	Namibia	NAM
Uganda	UGA	South Africa	ZAF
Rwanda	RWA	Swaziland	SWZ
Burundi	BDI		

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