**CHAPTER SIX**

**The Development of Modern Microeconomic Theory**

* 1. **The Movement Away from Marshallian Economics**
* Marshall’s engine of analysis, combining supply and demand curves with common sense, could answer certain questions, but others exceeded its scope. Supply-and-demand analysis was partial equilibrium analysis applied to problems of relative prices. But many of the questions economists were trying to answer, such as what determines the distribution of income or what effect certain laws and taxes would have either introduced problems beyond the applicability of partial equilibrium analysis or violated its assumptions. Nonetheless, economists continued to apply partial equilibrium arguments to such issues, assuming that the aggregate market must constitute some as yet unknown combination of all the partial equilibrium markets.
* Most economists were content with this state of affairs for quite a while. After all, Marshallian economics did provide a workable, if not formally tight, theory that was able to answer many real-world questions. It was the middle ground. Marshallian economists were engineers rather than scientists, and engineers are interested not in pondering underlying forces but in building something that works. Marshallian economists were interested in the art of economics, not in positive or normative economics. As Joan Robinson put it, Marshall had the ability to recognize hard problems and hide them in plain sight. Marshallian economics attempted to walk a fine line between a formalist approach and a historically institutional approach. It is not surprising that in doing so it created critics on both sides. In the United States, a group called the institutionalists wanted simply to eliminate the theory, arguing that history and institutions should be emphasized and the inadequate theory dropped. Other critics, whom we will call formalists, went in the opposite direction: they believed that economics should be a science, not an engineering field, and that if economics were to conclude that the market worked well, we needed a theory to show how and why it did so. These formalists agreed with the institutionalists that Marshallian economic theory was inadequate, but their answer was not to eliminate the theory: they wanted to provide a better, more rigorous general equilibrium foundation that could adequately answer more complicated questions.

**6.2 THE FORMALIST REVOLUTION IN MICROECONOMICS**

* In the late 1930s the formalist research program won and the Marshallian approach started to wane. By the 1950s the formalists had reformulated microeconomics into a mathematical structure dependent on Walras, not Marshall. Applications became less important than logical consistency. The formalist revolution reached its apex in 1959 with the publication of the Arrow Debreu model. With the completion of that general equilibrium work, economists turned once again to applied work. But they did not return to Marshall’s engine of analysis approach, which downplayed the use of mathematics and stressed judgment. Instead, they integrated policy prescriptions into the mathematical models. As that happened, the neoclassical era evolved into the modern modeling era. In the modeling approach, mathematics is used to develop simple models that ideally capture the essence of the problem. Then econometric techniques are used to test those models. This development and empirical testing of models has become the modern economic method.

**The Battle over Formalist Approaches**

The mathematical approach is rooted in the thought of several nineteenth- and early twentieth-century figures discussed in our earlier chapters on neoclassical economics. The first of these great pioneers in stating hypotheses in mathematical form was A. Cournot, who published his Researches into the Mathematical Principles of the Theory of Wealth in 1838. Cournot expected that his attempts to bring mathematics into economics would be rejected by most economists, but he adhered to his method nonetheless because he found the literary expression of theory that could be expressed with greater precision by mathematics to be wasteful and irritating. Leon Walras and Vilfredo Pareto, who succeeded Walras as professor of economics at Lausanne, were other early devotees of mathematical economics. Whereas Marshall had focused on partial equilibrium, Walras, using algebraic techniques, focused on general equilibrium. His general equilibrium theory has substantially displaced Marshallian partial equilibrium theory as the basic framework for economic research. Jevons, in his influential Theory of Political Economy (1871), also advocated a more extensive use of mathematics in economics. Jevons was followed by another pioneer in mathematical economics, F. Y. Edgeworth (1845-1926), who pointed out in 1881 that the basic structure of microeconomic theory was simply the repeated application of the principle of maximization. This finding raised the question, Why re-examine the same principles over and over again? By abstracting from the specific institutional context and reducing a problem to its mathematical core, one could quickly capture the essence of the problem and apply that essence to all such micro- economic questions. Following this reasoning, Edgeworth declared that both an understanding of the economy and a basis for the formulation of proper policies were to be found in the consistent use of mathematics. He accused the Marshallian economists of being seduced by the “zigzag windings of the flowery path of literature.” As this extension was occurring, there was a simultaneous attempted extension of mathematics not only into positive economics but also into questions of economic policy. Vilfredo Pareto, whose name is familiar to many students of economics from its use in the phrase Pareto optimal criteria, extended Walras’s general equilibrium analysis in the early 1900s to questions of economic policy. Thus, in the push for formalization little distinction was made between positive economics and the art of economics, John Neville Keynes’s distinction between the two was lost, and the same formal methodology was used for both. Irving Fisher (1867-1947), writing in the last decade of the nineteenth century, was an early American pioneer of formalism who supported and extended Simon Newcomb’s (1835-1909) advocacy of increased use of mathematics in economics. The mathematical approach was not well received in the United States, however, until nearly the middle of the twentieth century. All these pioneers were, therefore, unheeded prophets of the future.

Theory Inattention to their efforts can be attributed partly to the strength of Marshall’s analysis, a judicious blend of theory, history, and institutional knowledge. Unable to compete with the Marshallian approach, early mathematical work in economics was practically ignored by mainstream economists until the 1930s. In the early 1930s, this situation began to change. Expositions of the many geometric tools that now provide the basis for undergraduate microeconomics began to fill the journals. The marginal revenue curve, the short-run marginal cost curve, and models of imperfect competition and income-substitution effects were “discovered” and explored during this period. Though rooted in Marshall, these new tools formalized his analysis, and as they did so they moved farther and farther from the actual institutions they represented. The Marshallian approach to interrelating theory and institutions had been like a teeter-totter: it had worked as long as the two sides balanced. But once the theory side gained a bit, the balance was broken and economics fell hard to the theoretical side, leaving history and institutions suspended in air. History and institutions were abandoned because the new mathematical tools required stating precisely what was being assumed and what was changing, and stating it in such a way that the techniques could handle the entire analysis. History and particular institutions no longer fit in. One could no longer argue, as in the earlier Marshallian economics, that “a reasonable businessman” would act in a certain way, appealing to the reader’s sensibility to know what “reasonable” meant. Instead, “reasonableness” was transformed into a precise concept— “rational”—that was defined as making choices in conformance with certain established axioms. Similarly, the competitive economy was defined as one in which all individuals are “price takers.” Developing one’s models mathematically required non-contextual argumentation, abstracted from any actual setting, in which assumptions are spelled out. Though the use of geometry as a tool in Marshallian analysis was a relatively small step, it was the beginning of the end for Marshallian economics. When geometry disclosed numerous logical problems with Marshallian economics, the new Marshallians responded with further formalization. Thus, by 1935 economics was ripe for change. Paul Samuelson summed up the situation: “To a person of analytic ability, perceptive enough to realize that mathematical equipment was a powerful sword in economics, the world of economics was his or her oyster in 1935. The terrain was strewn with beautiful theorems waiting to be picked up and arranged in unified order.”2 Because many economists had by this time acquired the requisite analytic equipment, the late 1930s and early 1940s witnessed a revolution in micro- economic theory, which formalism won. Cournot, Walras, Pareto, and Edge- worth gained more respect, and Marshallian economics was relegated primarily to a role in undergraduate education.

The first step in the mathematization of microeconomic theory was to extend the marginal analysis of the household, firm, and markets and to make it more internally consistent. As economists shifted to higher-level mathematical techniques, they were able to go beyond partial equilibrium to general equilibrium, because the mathematics provided a method by which to keep track more precisely of items they had formerly kept somewhat loosely in the back of their heads. The second step was to reformulate the questions in a manner consistent with the tools and techniques available for dealing with them. The third step was to add new techniques to clarify unanswered questions. This process is continuing today. These steps did not follow a single path. One path had strong European roots; it included generalizing and formalizing general equilibrium theory. An early pioneer on this path was Gustav Cassel (1866-1945), who simplified the presentation of Walras’s general equilibrium theory in his Theory of Social Economy (1918; English versions 1924, 1932), making it more accessible. In the 1930s, two mathematicians, Abraham Wald (1902-1950) and John von Neumann (1903-1957), turned their attention to the study of equilibrium conditions in both static and dynamic models. They quickly raised the technical sophistication of economic analysis, exposing the inadequacy of much of previous economists’ policy and theoretical analysis. Their work was noted by economists such as Kenneth Arrow (1921- ) and Gerard Debreu (1921- ), who extended it and applied it to Walras’s theory to produce a more precise formulation of his general equilibrium theory. Following Wald’s lead, Arrow and Debreu then rediscovered the earlier writings of Edgeworth. So impressed were they by these writers that they declared Edgeworth, not Marshall, to be the rightful forefather of modern microeconomics. The work of these theorists, in turn, has continued a highly formalistic tradition of general equilibrium theorists. Some of the questions that general equilibrium analysis has addressed are Adam Smith’s questions: Will the unfettered use of markets lead to the common good, and if so, in what sense? Will the invisible hand of the market promote the social good? What types of markets are necessary for that to be the case? Because they involve the entire system, these are essentially general equilibrium questions, not questions of partial equilibrium. They could not, therefore, be answered within the Marshallian framework, although they could be discussed in relatively loose terms, as indeed they were before formal general equilibrium analysis developed. General equilibrium theorists have found the answer to the question “Does the invisible hand work?” to be yes, as long as certain conditions hold true. Their proof, for which Arrow and Debreu received Nobel prizes, was a milestone in economics because it answered the conjecture Adam Smith had made to begin the classical tradition in economics. Much subsequent work has been done in general equilibrium theory to articulate the invisiblehand theorem more elegantly and to modify its assumptions, but by first proving it, Arrow and Debreu earned a place in the history of economic thought.

**6.3 MILTON FRIEDMAN AND THE CHICAGO APPROACH TO MICROECONOMICS**

* The modern modeling approach that has come to dominate the profession has some grounding, too, in the Chicago approach to economics, which ran counter to the formalist approach from the 1950s through the 1970s. The Chicago approach was characterized, first, by a belief that markets work better than the alternatives as a means of organizing society and, second, by its connection to the Marshallian informal approach to modeling. Milton Friedman (1912- ) was a counterweight to Paul Samuelson throughout the modern period of economics. Friedman summarized his Chicago approach as follows:
* In discussions of economic policy, “Chicago” stands for belief in the efficiency of the free market as a means of organizing resources, for skepticism about government affairs, and for emphasis on the quantity of money as a key factor in producing inflation. In discussions of economic science, “Chicago” stands for an approach that takes seriously the use of economic theory as a tool for analyzing a startlingly wide range of concrete problems, rather than as an abstract mathematical structure of great beauty but little power; for an approach that insists on the empirical testing of theoretical generalizations and that rejects alike.
* Friedman’s approach to economics was Marshallian rather than Walrasian. He saw economics as an engine of analysis for addressing real problems and as something that should not be allowed to become an abstract mathematical consideration devoid of institutional context and direct relation to real world problems. In his consideration of policy issues, he combined strong beliefs in individual rights and liberty and in the effectiveness of the market in protecting those rights (see Capitalism and Freedom, 1962). His political orientation was basically pro-market and anti-government. He advocated many policy proposals that at first were seen as radical but later became more acceptable: financing education with vouchers, eliminating licensing in professions, and legalizing drugs. Around 1950, Friedman produced a number of provocative papers on methodology and also a paper on the Marshallian demand curve and the marginal utility of money. In the late 1950s, he made contributions to macroeconomics in his Studies in the Quantity Theory of Money (1956). His column in Newsweek was read by many, and a TV series titled “Free to Choose” gave him greater notoriety than most theorists. He won the Nobel Prize in economics in 1976. Even as Friedman was becoming well known, his Marshallian approach was dying. In part, this was because it was seen by many as ideologically or normatively tainted, causing researchers to revert to formalism to avoid ideological bias. An example of what some economists considered to be the normative bias in the Chicago approach to economics can be seen in the Coase theorem, named for Ronald Coase (1910- ), another influential Chicago economist whose work led to the recent field of law and economics. The Coase theorem was a response to the Pigouvian approach, which saw the existence of externalities as a reason for government intervention. In “The Problem of Social Cost,” Coase argued that in theory, externalities were not a reason for government intervention, because any party helped or hurt by an action was free to negotiate with others to eliminate the externality. Thus, if there were too much smoke from a factory, the neighbors hurt by the smoke could pay the factory to reduce it. The Coase theorem has been much discussed in the literature. The general conclusion is that in and of itself the theorem is no more ideological than is the theory of externalities that predisposes one toward government intervention. Issues involving government intervention are complicated, and there is no answer that follows from theory; in modern economics, a theory of government failure exists side by side with a theory of market failure. Which is more appropriate depends upon the relative costs and benefits, issues upon which individuals may disagree.
* The Chicago approach has stimulated many new ideas, and it, rather than the more formalist approach, may sow the seeds for major developments in microeconomics in the future. Among those new ideas that have been stimulated has been Armen Alchian’s (1914- ) and Harold Demsetz’s (1930- ) work on property rights as underlying markets. Since the Chicago view is that it is best to assume that markets work efficiently, much of the discussion of inefficiency in markets (such as might be produced by monopolistic competition) is misplaced. But markets depend upon property rights; thus, the study of property rights is of paramount importance to economics. What are the underlying property rights? How do they develop? How do they change? The most important follower of Friedman was Gary Becker (1930- ), who won the Nobel Prize in economics in 1992. He has used microeconomic models to study decisions about crime, courtship, marriage, and childbearing. Becker has shown that the simplemaximization microeconomic model based on the assumption of rational individuals has potentially infinite applications, and recent years have seen it used in widely diverse areas. These incursions of economic theory into other disciplines have sometimes been treated facetiously by those who claim that the economic approach is too simple. In one sense, they are right. The ideas and policy conclusions of the “economics of everything” are often simple. But mere simplicity does not make them wrong. Market incentives make a difference in people’s behavior, and noneconomic specialists have often not included a sufficient consideration of these incentives in their analyses. But analyses can go astray when only economic incentives are considered and insufficient attention is paid to institutional and social incentives. Unfortunately, given modern economists’ training in non-contextual modeling, this is often what occurs.
* With the retirement of Milton Friedman and his colleague George Stigler and with Gary Becker’s impending retirement, Chicago economics changed, becoming more mathematical and less intuitive. Not stopping at simple models, it generalized models along the lines suggested by Varian. Clearly, Chicago has entered the modern school of economics, and the modern school of economics has become quite homogeneous. What one learns in graduate programs at Harvard, Chicago, MIT, Stanford, or any top graduate school, is essentially the same thing.