

## 05 How Economics Lost the Complexity Vision

Once the complexity of reality is carefully considered, the argument that applied policy concerns can be reduced to economics becomes so unreasonable that only an academic would dare consider it.

J.N Keynes

In *The Worldly Philosophers* Robert Heilbroner tells a story of a dinner John Maynard Keynes had with Max Planck, the physicist who was responsible for the development of quantum mechanics. Planck turned to Keynes and told him that he had once considered going into economics himself, but he decided against it--it was too hard. Keynes repeated this story with relish to a friend back at Cambridge. "Why, that's odd," said the friend, "Bertrand Russell was telling me just the other day that he'd also thought about going into economics. But he decided it was too easy." That story captures two typical reactions that people often have to economics. For some it is too easy; for others it is too hard.

Both these reactions are reasonable, depending on what economic story one is trying to explain. If you are a natural scientist and are trying to understand the standard models that economists use, and you accept that theirs is the appropriate model, economics is really easy. To non-mathematicians economist's math may look hard, but most of it is easy for a mathematician. However, if you are trying to understand the economy, and you think about all the possible models one could have, and try to match the model to the complex social reality in a scientific way, economics is really hard.

The reason it is so hard is twofold. First, there are lots of interactions and layers of interconnected decisions, all of which feed back onto each other in non-trivial ways. And second, the way in which science harnesses complexity—data analysis and controlled experiments—is much more difficult in social science than in natural science, since there is both less data and the quality of that data is poor.

Some have argued that because of these problems economics, just as the other social sciences, cannot be a science. We don't agree with that assessment, but we are willing to say that many of social science's findings are not scientifically proven to the level that they qualify as scientific fact. In our view that is not a condemnation of social scientists; it is just a reflection that social scientists have to deal with very difficult problems in a reasonable fashion. Our argument is that they could do it better if they add some complexity tools to their analytic arsenal, and would be more careful about being precise about what they know scientifically and what they don't.

In this chapter and the next we tell the story of how in economist's struggle to develop a model that captures the essential aspects of the economy, the way in which policy is framed to the general public got screwed up. What do we mean—screwed up? We mean the way the general public is led to believe that when an economist supports a certain policy, that support is based on their scientific knowledge and theory. This becomes a problem since economists often come to diametrically opposing policy views; some support market fundamentalism and others support government intervention. If their arguments come directly from the same scientific theory, both can't be right. The answer to this puzzle is that economist's policy views don't come from scientific theory—they come from different interpretations and assumptions of the same scientific theory.

That means that neither policy based on market fundamentalism nor government intervention comes from economic science. For example, consider import tariffs—should we have them or not?

Most of the public believes that economic theory tells us that we should not have tariffs. It doesn't. It tells us that under certain conditions, which are seldom met, tariffs will reduce a particular measure of welfare that may relate to social welfare under a variety of assumptions. The policy result depends on the fit of the particular model's assumption to reality, not on the theory itself.

Good economists knew this, but didn't emphasize it in their textbooks and popular writings. Over time economics became known for being narrow-minded supporters of the market, who believed in a world of ultra rational individuals and whose sole focus was material welfare. Some economists actually fit that mold, but most didn't; most used a "control" model where government intervention was needed to correct the failings of the market through top-down government policy. Both supported their beliefs with high-level technical models that most non-economists couldn't understand. Those models were narrow and focused on economic incentives almost exclusively; they provided no scientific support for either position.

### **Classical Economist's "Complexity" Social Science Vision**

Economists weren't always narrow-minded—i.e. focused on economic incentives to the exclusion of all else—as they tend to be today. Up until about 70 years ago, most economists were much more like the other social scientists are today. Early economists, now called Classical economists, knew the limitation of scientific modeling, and in their writing carefully avoided claiming too much for economic science. Instead of arriving at definitive policy conclusions, they arrived at a very general policy prescription, which came to be known as *laissez-faire*—a term that, we will argue, is quite misunderstood, and is consistent with policies supported by both market fundamentalists and government control advocates. The decision of which policy position to adopt is not based on economic science, but rather on broader philosophical issues that are not part of economic science. These are issues upon which reasonable people may disagree.

Classical economists were not highly mathematical; instead they used logical, simple models and heuristic arguments to make their points. If you read Classical economists such as Adam Smith, John Stuart Mill, or even many early "neo" Classical economists such as Alfred Marshall, you will be reading English, not math, and the policy discussions they present will include multiple dimensions, many only tangentially related to what we now consider economics. The general view of policy that they advocated was *laissez-faire* policy—but that policy has been quite misinterpreted. *Laissez-faire* did not mean to them that the state should "do nothing". It meant that the state should think very carefully before entering into the complexities of the economy, because those complexities were likely to make the results quite different than initially intended.

The term *laissez-faire* developed in France. From 1665 to 1683, Jean Baptiste Colbert was what today would be called the Minister of Finance and Economics, under the rule of the Sun King, Louis XIV. His career started with the observation that of the taxes collected from the people, only half ever reached the King. He proceeded to impose a very strong central control by the state, ruthlessly pursuing the greatest corruption. He taxed the nobility for the first time and tightly managed state enterprises. On taxation he stated, "the art of taxation consists in so plucking the goose as to obtain the largest amount of feathers with the least possible amount of hissing". In reaction to this "dirigiste" or top-down approach to public policy, in a meeting in 1680, Mr Legendre - a merchant - answered Colbert's question as to how the state could serve the interests of business, with "*Laissez-nous faire*" (Leave us to act by ourselves). The contrast between Colbert's "dirigisme" and the requested "*laissez-faire*" was to become the central polarity of the market versus the state in 20<sup>th</sup> century economics. It became perhaps more grounded in economic theory, but both Legendre and Colbert already had a pretty good understanding of what the issues were.

## Smith and Mill's Classical Liberal Economics

Adam Smith and John Stuart Mill are two of the mainstays of Classical economics. While they are generally called economists today, they are better seen as social scientists—their writing had sociological, political, cultural, and moral philosophy, as well as economic dimensions. This isn't surprising since social science was not divided up into separate fields then, as it is today. It was an integrated whole that went under the name of political economy. So when Classical economists talked about policy, they were talking about social policy, not just economic policy.

Both Smith and Mill were part of the Classical liberal tradition that argued for liberal values emphasizing the rights of the individual as a foundational social value. They saw the best society as one in which individuals were given the greatest degree of freedom consistent with other people's freedom. Although Smith and Mill are often presented in texts as pro-market laissez-faire economists, and they did favor laissez-faire policy, they were not laissez-faire economists in the way that people today think of laissez-faire economists. They fully admitted the need for government to play a role in the economy, and to solve problems that the market did not solve. They fully agreed that greed was not good, and that the goal of society was not necessarily to produce as much “stuff” as possible.

Adam Smith wrote *The Theory of Moral Sentiments* before he wrote *The Wealth of Nations*, and by many accounts he considered his moral sentiments book the more important work. To understand his argument in *The Wealth of Nations*, one has to understand the context for the argument that *The Theory of Moral Sentiments* provided. In it he argued that an important element of a successful society was what he called sympathy among individuals. By sympathy he meant that a person's conscience arises from social relationships, and that humans could develop moral judgments that guide their actions, even though they also have a proclivity toward self-interest.

In Smith's view a complete person would not be a greedy person, but would be a socially caring person who follows a moral code and a set of norms. Smith's policy recommendations were based on that conception, and included considerations of morals, norms, social conventions, and normal proclivities of humans as he saw them. He didn't formally model any of these issues—there is not a single equation in the entire *Wealth of Nations*—but he could talk heuristically about them, and the book is full of such discussions. If you read it, it is a book of good sense, by someone who didn't trust government—which in his day was far from democratic—on how to do good in society. His idea of the importance of “sympathy amongst individuals” is akin to trust, which plays such an important role in the complexity view of how an economy works. Complexity models suggest that trust is an essential enabler of the kind of replicator dynamics we discussed in the previous chapter, which organize social systems. Without trust, the connections are not made that allow the dynamics to take off. Sympathy or trust is the oil that greases the wheels of the economy.

The arguments in Smith's *The Wealth of Nations* are best seen as an addendum to his *Moral Sentiments* argument. It concentrates on a sub area of interrelationships—economic relationships—dealing with material welfare. For this subset of interests, he felt that society could benefit from letting people follow their self-interest as long as there was sufficient competition to rein that self-interest in. This did not mean that he supported business unconditionally—indeed, one of his well known comments was the “People of the same trade seldom meet together, even for merriment and diversions, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices”. Consistent with this view, Smith found numerous areas when he felt government interventions were needed. It is not without cause that libertarian economist, Murray Rothbard, calls Adam Smith a socialist.

John Stuart Mill falls into the same boat as does Smith. Mill was a giant of economics and a most precocious child, reading Plato in Greek at the age of six, Euclid at 10 and Aristotle at 12. By the age of 13, his father started tutoring him in economics, starting with Adam Smith, and in moral philosophy. In his teenage years, he was editing Jeremy Bentham's papers and attempting to integrate Bentham's rational utilitarianism into his understanding of economics and the world.

Trying to make rationality, utilitarianism, and economics all fit together proved too much even for a young brilliant mind. The result was a nervous breakdown, from which he only escaped by discovering the Romantic poets—Keats, Longfellow, and Coleridge. From them he learned that there is more to understanding the economy than rationality, and that one cannot think of policy without a sense of humanity. The result was a more complete policy economist—one who was equally comfortable with the highest-level analytics, but who also had a good understanding of its limitations. When talking about policy Mill struggled, as one must inevitably do, with how to integrate the various approaches. As Mill did so, he was as undogmatic as possible, and was renowned for giving serious considerations to all arguments against his position. While skilled at rhetoric, he avoided abusing it just to win arguments.

Mill carried the Classical liberal argument further than any previous writer, and he constantly struggled with finding the correct balance between the role of the government and the role of the market. He argued that there are no general principles that can tell us where that balance should be; models provided, at best, half-truths, and one must blend intuition and a broader sensibility with economic models to arrive at policy conclusions.

Whether you can call Smith and Mill's Classical visions "complexity visions" is debatable. At a minimum, Classical economists such as Mill captured the spirit and sensibility that goes along with adopting a complexity vision. Ultimately, complexity tells us that there are limits to predictability, that the whole is not just the sum of the parts, that morals and ethics matter - and it gives us the frame within which to start analyzing the economy in its full complexity. Complexity science is the scientific (rational) struggle to expand our comprehension of the as yet incomprehensible, but it has only taken a few baby steps. Humanists—poets, romantics, spiritualists, artists—have long understood that there is more out there than we can grasp analytically and have beautifully conveyed their insights in rationally incomprehensible ways through their art. The part of complexity economics that Classical economists "got" was that economic policy did not belong in economic science. Economic policy was an art, not a science.

Of course we don't mean that there is nothing in economic science to base policy on, but those things are really basic. For example any policy maker should know that if a government prints a lot of money, the currency will lose value— or that if the state gives out lots of guarantees to underpin savings or rights to health care, you'll need to collect lots of taxes to pay for them. Although these insights are really basic and obvious, there are plenty of policies that flout those rules. Thus, it is useful for society to keep some standard economists around to remind society of these fundamental rules. But it hardly justifies an entire scientific discipline, which should aim at a more comprehensive understanding. The application of basic economic rules involves engineering and common sense much more than it involves science. The Classical economists understood most of these principles of practical policy, and modern economists have added very little to Classical economist's practical policy insights. In fact, they have lost much of Classical economist's policy nuance.

Understanding the limits of models and theory didn't prevent Classical economists from talking about policy; it simply meant that they didn't do it in their role as economic scientists. They argued for wide ranging policy. But rather than supporting their arguments by appealing to their scientific foundation, they argued for them on equal footing with others. Consider Mill's conception of the

future of humankind--which he called the stationary state. It was a conception of a future in which the material welfare was a minor concern of society and people were concerned with what he considered higher, and more meaningful, activities. Economic analysis didn't lead him there, but educated common sense did. Thus, as with Smith, it is not without cause that conservative economist Milton Friedman called Mill a socialist.

We are not arguing that all Classical economists were socialists—we find such classifications unhelpful at best. Nor are we arguing that all Classical economists agreed with Smith's and Mill's view of policy. They didn't. We could have provided examples of classical economists who strongly disagreed with Smith and Mill, who made strong arguments against government intervention, and interpreted laissez-faire as involving far less government involvement than did Mill or Smith. Similarly, we could have given examples of classical economists who believed that more intervention by the state was necessary—all within a framework of laissez-faire. The reality is that some Classical economists were more interventionist and some were less interventionist. Our point is simply that they were all Classical economists, and that they all accepted the laissez-faire philosophy, which warned to be careful about advocating policies requiring government intervention.

What we are saying is that the concept laissez-faire to them did not mean what laissez-faire now means. It did not mean: “let the market rather than the government do it”. It meant: “let the market do it unless the market doesn't do a good job”. When does the market not do a good job? That was debatable—economic theory doesn't tell us, which is why the Classical argument for the market was not rooted in scientific theory, but instead was based on common sense and a study of history; here is what has worked in the past; here is what hasn't worked. Even if one fully understood all Classical economic theory, if one did not understand history, and institutions, one could not determine whether government should intervene or not. Theory says nothing definitive about policy based on a formal scientific model. The complexity approach arrives at the same conclusion, but through a more formal route.

In summary, there are two key aspects of the above description of Classical economic method that we want to highlight. The first is that economic models do not provide policy results. They are just tools that Classical economists specifically recognized as being relevant to a subarea of total welfare—economic welfare. That's why they used the material welfare definition of economics that they did. Critically, both Smith and Mill considered the context beyond material welfare to be a critical part of their policy concerns. The second aspect is that while they supported laissez-faire as a gut reaction in thinking about policy, it was not a dogmatic support of the market. They saw laissez-faire as a precautionary rule to encourage long and hard thinking, prior to giving policy advice that included a government role to be implemented.

Our complexity policy approach is modeled after this Classical policy approach. Like, Classical economists it sees policy as an art that is largely non-economic in nature. It recognizes the importance of analytical models, and of empirical work, and pushes that scientific work as far as possible (which is much farther today than it was in their time). But it takes care to not push it further than the state of the art allows.

### **Falling in Love with Theory**

Classical economist's reasonable approach to policy does not reflect economist's approach today. Their humility has too often been replaced by certainties, ignoring our ignorance we have about policy. The dual narratives of the standard frame became commonly represented as much more certain than is remotely justifiable. Somehow, the policy sensibility found in the top Classical

economists, was smothered from the 1930s to the 1960s. How that happened is the story that we tell in the remainder of this chapter and the next.

The sensibility of Classical economics was initially carried through into what is called the neoclassical period in economics by the work of a Cambridge economist by the name of Alfred Marshall. His *Principles of Economics*<sup>1</sup>, first published in 1890, became the template for English language economics texts up until 1950, and percolated through to the public's understanding of economics. Marshall saw little use for math or formal theory in economics. He wrote the following about math:

(1) Use mathematics as shorthand language, rather than as an engine of inquiry. (2) Keep to them till you have done. (3) Translate into English. (4) Then illustrate by examples that are important in real life. (5) Burn the mathematics. (6) If you can't succeed in 4, burn 3. This I do often.

Consistent with this view of mathematics, Marshall saw economic analysis as an engine of discovery—a set of tools that involved method, not models. He approached policy problems with a “one thing at a time” approach, and was always noting the limitations of the analysis in his writings. He carefully did not come to policy conclusions on the basis of economic models. He advocated a type of theory that was, in essence, a sub-branch of the art of economics. Marshall justified his position by arguing that economics does not avail itself to long deductive chains of reasoning, and thus had to concern itself with shedding light on practical issues. For Marshall economic reasoning was an input into a broader policy analysis, and economic theory was an input into economic reasoning that is designed for the policy problem at hand.

Up until the 1930s the Marshallian approach to policy, which was an extension of the Classical approach discussed above, ruled the English-speaking economic world. When he retired his student and colleague, A.C Pigou, replaced him at Cambridge and carried on his policy tradition through a book entitled *The Economics of Welfare*<sup>2</sup>. Even as he extended Marshall's analysis to wider areas of the economy, Pigou was much clearer than Marshall about the method he was following, and he specifically states that he was not doing pure theory, but was instead doing what he called *realistic theory*. He writes: “Hence it must be the realistic, not the pure, type of science that constitutes the object of our search.” To make this point even clearer, Pigou distinguishes between fruit-bearing theory and light-bearing theory. Fruit-bearing theory—realistic theory—is a branch of the art of economics; it is theory that is designed to solve particular policy problems. Light-bearing theory is pure theory—Pigou didn't do that type of theory.

In terms of our lamppost joke in the first chapter, Marshall and Pigou had no patience for searching under the lamppost or for doing pure science. They wanted to light little matches out in the dark and search on the basis of the light shown by the match. Marshall called it a partial equilibrium, one step at a time approach. For Pigou, a policy that in theory would increase society's consumption, would not necessarily be the best policy; any connection between economic welfare and general welfare had to be argued, and Pigou devoted many pages of his *The Economics of Welfare* to explaining why, as a general precept, one could tentatively use the social dividend—a modern forerunner of the GDP — as a rough guide to general welfare for certain policy changes.

Pigou also included two significant interrelated normative judgments in his consideration. First, he held that, in general, income going to rich people had less positive impact on society's welfare than income going to poor people. Based on this assumption, he argued for policies supporting redistribution from rich to poor if that transfer did not decrease the social dividend. He argued that such transfers

“enable more intense wants to be satisfied at the expense of less intense wants.” Second, he argued that it was inappropriate to differentiate individuals’ ability to generate pleasure, thus specifically excluding the argument that the rich needed more money to fulfill their more refined tastes. Tastes, he argued, were changeable, and if the poor were given more income, they would develop more refined tastes.

Pigou did not deny that these aspects of his welfare economics involved normative judgments. He fully agreed that they did. But, for him, they were reasonable judgments, shared with a large part of the population. Such normative judgments had to be made if the tools of economics were to be relevant for applied policy, and he felt these were defensible.

While both Marshall and Pigou followed a classical policy methodology, they were pushing the boundaries of it in their implicit assumption that government could usefully implement policies to achieve these desired ends. In doing so they were in tune with the times. In the 1930s, socialism and increasing government involvement in the economy was in the air, and the presumption of government action as a last resort was fading. The reasons varied. One was the improvement in government—democratic governments had more of a chance to do good than the autocratic governments of Colbert’s time. Another was the sustained slump that had hit England and the U.S. If markets were so wonderful, why were so many people unemployed and going hungry? Thus, the economic realities were undermining the general public’s and economist’s acceptance of laissez-faire policy. As a result, they were more open to government solutions.

### **Burn the Prose**

Pigou’s work was, in many ways, the end of the Classical methodological approach. In the 1930s, the nature of economics changed. It moved away from his *fruit bearing* realistic science that blended theory and policy in the art of economics, and started focusing much more on *light bearing* pure science. As it did so, the field of economics became much more mathematical and much more concerned with mathematical models than with nuances of interpretation. As that happened, Marshall’s advice to “burn the mathematics” itself was burned, and was replaced with “burn the prose” advice.

As the black and white of mathematics replaced the grey of prose, the discussion of economic policy lost the nuance and qualifications that were central to the Classical/Marshallian policy approach. As mathematical economists started to work with Marshallian tools, they easily saw the severe limitations of these tools. Using higher-level mathematics, they could point out serious problems with the policy rules of thumb derived from Marshallian tools; they could also point out analytic solutions to conundrums that Marshall had shied away from.

As these improvements occurred, economist’s view of theory changed. Instead of seeing theory as something to keep in the back of their mind when dealing with real world problems, economists began to see economic theory as a central tool to be used by policy makers. Instead of using little matches in the dark to guide policy, economists now saw theory as a gigantic analytic streetlight, illuminating policy issues for the entire economy. As that happened Marshall’s humble one thing at a time approach was dumped and replaced with a more theoretical and mathematical approach called general equilibrium theory that had been pioneered by a 19<sup>th</sup> century French economist by the name of Léon Walras.

Walras was the opposite of Marshall. Unlike Marshall who saw pure theory as almost useless for policy, Walras saw pure economic theory as providing a unified model of the entire economy upon which one could build policy. He built a mathematical model of the entire economy, and it acquired the name Walrasian general equilibrium model. In the 1930s economists started studying

the model in earnest. We won't give a full explanation of this general equilibrium model but it briefly amounts to this: Imagine you have a whole bunch of people whose desires are fully determined, and a given set of resources and technology that can translate those resources into goods that people want. General equilibrium theory explores under what conditions a market will allocate the resources efficiently, and concludes that given all these assumptions and a market with an invisible auctioneer who can ferret out everyone's desires and set prices at their equilibrium level before anyone trades, then the market will efficiently allocate resources.

General equilibrium analysis is highly mathematical but more to the point, it involves making enormous assumptions. It shows that if you make enough assumptions, you can prove that an uncoordinated market economy can work. Logically, there's nothing wrong with this model. It is perfectly reasonable to make big assumptions when tackling a new problem in science, and formalizing economic insights was certainly a new problem in Walras' day. The question is whether those assumptions are close enough to reality for the outcome to be useful for guiding policy. Marshall made a judgment that it wasn't and placed his discussion of general equilibrium in a footnote—something to keep in the back of the mind, but not something to spend a lot of time on. Starting in the 1930s, economists began embracing Walras' approach, turning Marshall's footnote into the main story, while relegating Marshall's common sense to the footnotes.<sup>3</sup>

### **The Rise of Policy Activism: Abba Lerner's Economics of Control**

The language of mathematics did not really take full hold of the economics profession until the 1980s, 50 years later. But in the 1930s, the movement toward mathematics was beginning, and cutting edge economists were thinking about the economy in a general equilibrium mathematical framework. As they did so, it began to influence their thinking about policy, and by the 1960s the Classical framework had almost totally disappeared. It was replaced with the two-part framework that characterizes standard economics today—an *optimal control framework* in which one frames economic policy as designing the best control options for government, and a market fundamentalist frame, in which the government cannot do better than the market. In the control framework, the role of government is to get people to do what the model has determined is best for them. Thus, government intervenes to correct for market failures, which occur whenever the assumptions of the model don't fit reality. In the market fundamentalist framework the market arrives at the best results without government. Contrary to the way the story is generally told, however, it was the optimal control model that came first. The formal market fundamentalist framework was a reaction to that optimal control framework.

Probably the best way to tell the story of how the control framework came to dominate the profession is through the story of Abba Lerner who played a key role in its development. He was a brilliant economist, born in 1903 in a Bessarabian (today Moldovan) Jewish family that emigrated to England. Probably no economist better captures the changes that were going on in the 1930s both in economics and in British society than does Lerner. Lerner was not your typical economist of the times. Before he entered graduate school, he had been a haberdasher. In earlier times, Lerner would never have gone to university, but the social concerns of the times had led to the development of new worker school programs. Lerner had attended them, and had excelled. Based on his brilliance shown in the worker school program, Lerner won a scholarship to the London School of Economics (LSE), where he was taught by patrician laissez-faire economists such as Lionel Robbins. Robbins was the epitome of a Classical academic laissez-faire economist, a book collector, with refined tastes and widely read. Robbins strongly maintained a nuanced Classical methodological approach even as others were being seduced by mathematics. He argued that Pigou was losing the nuances of Classical thought in his welfare economics.



If Pigou was losing nuance with his “fruit bearing” practical theories, Lerner was going off the deep end and discarding it totally. Still, Robbins recognized Lerner’s analytical brilliance and he attempted to guide Lerner toward nuance, mostly to no avail. For Lerner, things were either black or white. If a model arrived at a conclusion, then that was the policy conclusion. If Lerner had actually been designing policy, that lack of nuance would have been a weakness. But for designing textbook models that would be used to teach ideas, Lerner’s “black or white” approach was superb; it allowed him to develop simple models that beautifully captured the essence of ideas. Thus, it is not surprising that it was Lerner’s framework developed in *The Economics of Control*<sup>4</sup> that formed the basis of the standard state control economic policy framework that replaced the Classical laissez-faire policy framework.

Lerner was not only analytically brilliant; he was also a strong debater, and when he first came into the LSE he was an avid socialist, arguing for socialist ideas. But Lerner was soon intrigued by the market, and his nimble mind began to put the two together. He asked himself: Why couldn’t you have the best of both—the market and socialism? He soon began arguing for what came to be called market socialism, which was to be the best of both. Essentially, he argued that if economists could figure out what the market result would be, then they could provide directives to socialist managers, essentially telling them—do what the market would do. Having done that, bingo, society could have the best of both.

To achieve this “best of all worlds” in the optimal control model, economists had to figure out what the market would do, which meant calculating how the economy would work after all the interactions among sectors would take place. That meant that Marshall’s partial equilibrium approach wouldn’t work, and that instead Walras’s general equilibrium approach would have to be used for thinking about policy. In Lerner’s approach, society gets economists to calculate the optimal policy using general equilibrium theory, and then government implements the policy economists have deduced.

Lerner published his views in a book, *The Economics of Control*. That book summarized the results of the general equilibrium theory for policy, and translated the results into a set of simple policy rules. Lerner’s book was a hit, and it provided the framework within which standard economics discussed policy. As that framework became the standard economic framework, the role of economic theory changed from a tool to help think about complicated policy issues, to a set of rules that theoretically showed what the “correct” policy was.

The adoption of Lerner’s control framework as the sole policy frame of economics marked a major change in the way economists thought about their role in policy. As opposed to seeing themselves developing tools for policy analysts, who would in turn develop policy precepts, as Marshall and Pigou did, Lerner saw himself developing specific rules of policy from pure theory. He saw himself as identifying precisely what government should do to maximize social welfare.

Lerner’s rules, because of their simplicity and clearness, became the template for the textbook presentation of both policy discussions. While the policy rules were based on a belief that the competitive market result was the preferable result, they were highly activist rules, totally outside the Classical laissez-faire framework. Lerner’s framework held that under the right conditions, the market would achieve desirable ends. But those right conditions were never met, which meant that in order to achieve desirable ends, government must intervene and make corrections. Lerner’s economics of control approach was a highly activist government policy designed to bring the benefits of the market as demonstrated in the general equilibrium model to society.

Lerner articulated the conditions under which competitive markets will be at an optimum in the Walrasian general equilibrium system. He argued that once government knew those rules, the market wouldn't be necessary, since government can make the rules the basis for the directives that the government assigns to economic managers. If one didn't favor market socialism, one could design a welfare capitalist system in which the government could leave most decisions to a regulated market, where the regulations were designed to correct for market failures.

In this Lernerian framework, as opposed to being a last resort, as government intervention was in the Classical laissez-faire policy framework, it became a first resort. As the basis for policy, students were presented the blueprints that governments should follow--if government wanted to work in the social interest. Economic science came to policy conclusions, and all discussions of economic policy became framed within this general equilibrium model. Any discussion of policy and any argument for or against the market that did not fit into the Walrasian general equilibrium model, such as the Classical concern about government interventions for philosophical and practical reasons that underlay its laissez-faire policy, were eliminated from economist's policy discussion. Nuance disappeared. The market worked but only if government intervened to correct for failures pointed out by scientific economic theory. Government intervention had received a scientific foundation.

The development of this Lernerian framework for policy led to a major change in the teaching of economics; before the adoption of Lerner's framework, principles of economics books were discursive. They taught general precepts, not theory or models. Robert Solow points this out when he writes "In the 1940s, whole semesters could go by without anyone talking about building or testing a model. Today, if you ask a mainstream economist a question about almost any aspect of economic life, the response will be: suppose we model that situation and see what happens."<sup>5</sup>

The idea that you can forecast what is going to happen is where the standard policy frame and the complexity policy frame part ways. In a complex system, there are simply too many variables interacting, too much influence of random events being magnified, for anyone to predict the future. So Lerner's policy framework (and indeed Walras') was in its essence banishing complexity, and with it the policy nuance of Classical economics.

### **The Reaction: The Rise of Market Fundamentalism**

Most Classical laissez-faire economists—both activist and pro market--were strong opponents of the economics of control model. They argued that that model did not capture the issues under debate, and that it was essentially pseudoscience. The market was an information processor and the market process generated the results—without the market process, the model results were meaningless. The problem with the economics of control general equilibrium model was that it assumed away market process—to model that process would have involved modeling the dynamic interactions of individuals, and those dynamics were far too complex to formally model. The economics of control model simply assumed away the processes that were fundamental to the way an economy actually worked.

In the 1950s and 1960s such complaints were disregarded by the economics profession, and economists who articulated them were seen as outside the mainstream of economic thinking. There was a strong push for all economists to accept the Walrasian general equilibrium model, and most economists did. But that did not mean that they had to accept the policy results that government intervention would improve upon the market. Two economists at the University of Chicago, Milton Friedman and George Stigler, led the fight against these policy conclusions. Both were brilliant and opposed to government interventionism by nature; they saw the movement toward collectivism and state intervention with great concern. They both had superb rhetorical skills, and, basing their

argument on work by Ronald Coase, they combined to lead a counterrevolution in economic policy away from the control model conclusions that government intervention was necessary, and toward a market fundamentalist policy position in which government intervention only made things worse.

Milton Friedman and George Stigler revived the Classical view that government intervention often reflected less than ideal motives, and thus should be considered carefully, but they did it in a quite different way than was done by earlier Classical economists. Instead of basing the arguments for laissez-faire on practical and historical case study arguments, and seeing laissez-faire as a broad tent philosophy that admitted the benefits of government intervention, but questioned the ability of government to achieve them, they developed an informal “market fundamentalist” general equilibrium model in which the market solved all problems based on ideas of Ronald Coase. They did this by assuming that the market would correct any flaw in economy that might cause it to deviate from its equilibrium. Government wasn’t needed to solve externality problems; the market would do it on its own.

Say, for example, that a factory was emitting smoke. They argued that the individuals bothered by the smoke could pay the factory to stop emitting the smoke if they were concerned by it. The factory could also pay the individuals bothered by the smoke, to put up with the smoke. Either solution would achieve the same end as a government intervention would have. As long as there were no transactions costs markets could develop that would solve all the problems once property rights were established. The issue was property rights, not the market vs. the government. Stigler said that the market result will always be best and not require any government intervention. He admitted that there were significant practical problems with such a “market” solution. But he pointed out that there were also all types of practical problems with the economics of control solution that advocated government intervention. The market fundamentalist model was no more flawed than the control model, and often it fit better with people’s intuitive instincts.

With the development of this market fundamentalist alternative to the control model of Lerner, there were now two standard scientific economic models for thinking about policy. Those favoring government intervention gravitated toward the economics of control model. Those opposed to government intervention gravitated toward the market fundamentalist model. Thus, standard economics ended up with two scientific models of the economy, each with diametrically opposed policy implications.

### **What Got Pushed Out**

Making these two models the basis for thinking about policy fundamentally changed the nature of the economic policy debate. The broader philosophical and practical argument for laissez-faire, which the Classical economists focused on, gave way to the debate on which model was best. Any policy debate that did not fit into the model was essentially ruled out of forgotten. The market fundamentalist response added back support for laissez-faire but not in the nuanced way that the Classical economists considered it—rather in a sledgehammer way that seemed to argue that the market will solve everything, and that those who favored government intervention were always wrong. An economist had to be either in favor of government intervention or against it. The activist Classical liberal position—the policy position of Mill and Smith—got squeezed out. You couldn’t be in favor of laissez-faire and still support government intervention. The policy nuance that was the hallmark of the Classical liberal position was lost.

The problem with the polarized structure of the policy debate is not that either side was wrong, but rather what was left out of the standard economic discussion of policy:

- Neither side questioned the role of norms in policy. Instead both sides of the argument accepted that norms were not part of the debate. As we pointed out, this is where the contribution of the other social sciences is sorely missed.
- Neither side questioned how the activities that individuals undertook could feed back on what the people wanted and shape them as a person. Both sides assumed that people had well-formed tastes and that the tastes are not affected by what they do or their context. That just isn't true—what we want is influenced by the system, and any policy advice would have to take into account the degree to which that occurs. This opens up a whole range of policy actions that are generally not considered.
- Neither side questioned the assumption of perfect rationality, and how policy might deal with irrationality, or at least more bounded rationality than assumed by the standard model.
- Neither side questioned the problems with material welfare as a measure of welfare—problems that were much on the minds of Mill, Marshall and Pigou. Whereas before economists separated economic welfare and social welfare, after the acceptance of these two models, they no longer did. Economist's discussion of policy started talking as if material welfare were everything.
- Neither side questioned how morality fit into the policy discussion. Discussions of morality and of the ethical goals of society and how they related to economic policy became removed from the standard economic discussion of policy.
- Neither side dealt with policy issues when there were non-linear dynamics, path dependency, nested systems, multiple speed variables, sensitive dependence on initial conditions, and other non-linear dynamical properties. As we will see when we introduce complexity in more detail, models including such issues come to quite different policy results than do the standard models.
- Neither side of the debate dealt with the problem of structure of existing institutions; both assumed them as given. The idea that the very structure of government, or of private institutions, can be a problem was not part of the frame of this polarized debate.

## **Two Feuding Camps**

We could go on, but we will stop there. The story we have told is one in which Classical economists fought it out in an open brawl--no gloves, no ring—and came to laissez-faire policy conclusion, where a laissez-faire policy was based on a humility about what direct government control policy can achieve. Then in the 1960's neoclassical economists together got into a tight boxing ring whose perimeter is defined by perfect rationality, unique equilibrium, simple dynamics etc. Then they gradually found themselves polarized at either side of the ring, in two feuding camps. One side implicitly assumed that we had enough knowledge about how the system works for government to intervene correctly. The other side saw it as obvious that no government intervention was justifiable. This defined the policy debate ring; all the brawling outside the ring was disallowed.

Our goal with this book is to return the policy debate back to the open brawl that accepts that all policy issues are on the table. Complexity science is important because it brings the broader policy issues, which were pushed out by the standard economic framework, back into play in the policy discussion. It will help us re-introduce questions such as: What if norms can be changed, thereby achieving “preferable outcomes? Should they be? What if achieving efficient outcomes reduced the resilience of the system? Should we no longer aim for efficient outcomes? What if a change in institutional structure could bring about bottom up social entrepreneurship? Should we encourage

such changes? These, and hundreds of other such questions, are being ignored by economists because of their focus on the two standard models.

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Chapter 5

**1** Memorials of Alfred Marshall, edited by A. C. Pigou. One edition is: New York, A. M. Kelley, 1966, HB103 .M3 1966, pages 427-428.

**2** A.C.Pigou, *The Economics of Welfare* (Macmillan, 1920).

**3** There is an irony here. Marshall, who had excelled and specialized in math in his studies, avoided the math. Walras, who had twice failed the exam for the prestigious Ecole Polytechnique, and settled for studying engineering at the Ecole des Mines, embraced it.

**4** A.P. Lerner, *The Economics of Control: Principles of Welfare Economics* (Macmillan, 1944).

<sup>5</sup> Solow, R. M. (2005). How Did Economics Get That Way & What Way Did It Get? *Daedalus*, 134(4), 87–100