

Muddling Through and Policy Analysis*

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*In a variety of books and articles, both published and in process, I've been out pushing the idea of the "economics of muddling through" as the description of the approach to policy that will become standard in economics over the next 20 or 30 years. The argument is both prescriptive - I argue muddling through is what should be done - and descriptive - I argue that muddling through is what is currently being done, although, like Monsieur Jourdain speaking prose in Molière's *Le Bourgeois Gentilhomme*, many economists don't recognize that that's what they are doing.¹*

If we've been muddlers for so long, why should we be willing to admit it now? I think there are three reasons.

- *First, there is a change occurring in formal theorizing in which the holy trinity - rationality, greed, and equilibrium - is being abandoned as required aspects of any model, and being replaced by a slightly broader trinity-purposeful behavior, enlightened self-interest, and sustainability.²*
- *Second, the work in the formal general equilibrium model built upon the foundation of the holy trinity has been thoroughly explored; all the low hanging fruit has been picked, and young theoretical researchers are naturally gravitating to less explored*

*Parts of this paper come from early drafts of a book I am currently working on with William Brock entitled *The Economics of Muddling Through* (Colander and Brock, forthcoming). At this point only I am responsible for the arguments presented here. In the book we discuss the history of the term muddling through. Here, let me just point out that Charles Lindblom (1959) uses the term somewhat differently than we do.

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¹ Actually, though, I suspect most economists do know that we're muddlers; we are just rather hesitant to admit it. In fact, it may be because we know deep down that we are muddlers that we spend so much time structuring our analysis so that it looks as if we are not muddling. I should also say that the focus of this article is on academic and textbook approaches to economic policy. Economists in actual line positions in government, business, and policy institutes generally recognize that policy involves muddling through.

² For a discussion of this distinction and of where the economics profession is today, see Solow (1997) and Kreps (1997).

areas.

- *Third, today's muddling through is not your father's muddling through; it involves the use of a whole range of applied mathematics that is difficult to use unless we admit we are muddling. Today's muddling is technically impressive muddling and is a far cry from the armchair heuristics that characterized early muddling.*

The paper is organized as follows: First I consider the history of welfare economics, providing a narrative of how we got to where we are. Second, I briefly outline some important changes that are currently occurring in economics. Third, I expand on my reasons for believing that we are now ready to accept a "muddling through" characterization of applied policy, something we have not previously been willing to embrace.

1. A Brief History of Welfare Economics

Welfare economics is the study of the policy implications that can formally be drawn from economic theory. It asks the question: What is the relevance of theory for applied policy? The "muddling through" answer to this question is that theory serves as a guide for reasoned judgment, and thus is an input into policy, but that no policy implications follow from theory. The degree to which economists have been willing to accept that answer has varied over time, and thus their willingness to accept that applied policy work is essentially muddling through has varied.

Today, looking at the principles and intermediate texts, which (since welfare economics is no longer actively taught in undergraduate or graduate school) are as close to welfare theory as most economists get today, one gets no inkling that applied policy is muddling through. Instead, the texts convey the impression that policy is guided by what might be called an "economics of control" framework. In that economics of control framework, applied policy is the direct application of economic theory. It is designed to equate marginal social costs with marginal social benefits, eliminate externalities, and undertake other policies to achieve economic efficiency.

Welfare Economics in Micro

To understand how the economics of control approach came to be the textbook model of policy, it is helpful to consider briefly the history of welfare theory that began with A. C. Pigou's attempt to derive policy results from the theoretical model. Before Pigou, policy was generally not presented in specific models, but was part of a broader philosophical and political set of arguments associated with the economics of Adam Smith and John Stuart Mill, which sometimes went under the name "Grand Tradition." For both of these writers, applied policy was sophisticated muddling through; they blended philosophical, psychological, and economic arguments to arrive at reasoned

pronouncements about economic policy. They were broad social scientists rather than narrow technical economists.

Around the turn of the 19th century J.N. Keynes (1896) tried to codify the rules of applied policy. In his *Scope and Method of Economics* he classified the applied policy branch of economics as an art, which was separate from both positive and normative economics. Positive economics - economic theory - focused on how the economy functioned; normative economics focused on what the goals of economic policy should be, and the art of economics provided a bridge between the two. The art of economics was the branch of economics that considered how to achieve the goals determined in normative economics, given the insights developed in positive economics, about the way the economy functioned that were.

Keynes argued that the art of economics involved venturing outside the realm of economics itself, and that economists, in their role as economists, were best advised to stay out of the business of giving policy advice. They should stick to the study of economic theory - to positive economics - and focus their analysis on how the economy operated, and they should not draw policy advice from that theory. The reason for this was that for Keynes, policy was inevitably a muddle necessarily involving rules of thumb, pragmatism, and good sense. It required a quite different, and looser, methodology than was appropriate for positive economics. To emphasize this point Keynes specifically distinguished economic theorems - implications drawn from economic models - from economic precepts - general rules of applied policy drawn from economic reasoning. While in practice Keynes' methodological approach was not closely followed, it was accepted as being the best prescriptive statement of the correct approach to applied policy. So at the turn of the 19th century the stated approach to applied policy was a muddling through approach.

A first step away from muddling through occurred when Pigou, in his *Economics of Welfare* (1932), tried to avoid the art of economics and incorporate applied economics into positive economic science. He attempted to make a seamless flow from theory to policy precepts. However, Pigou's policy precepts were not the laissez faire precepts of the earlier Classical tradition, but instead were a set of activist precepts that involved internalizing externalities and subsidizing increasing cost industries in order to equate marginal social benefits with marginal social costs. It was only a first step for two reasons. First, Pigou saw a limited domain for welfare economics; it was only an input into the policy decision-making process, not the entire policy process.³ Thus, he

³ Pigou's presentation of welfare economics was actually an extension of Marshall's applied policy analysis, although, as was often the case, Marshall had tried to maintain a firm foot in both positions, and thus it was hard to pin down precisely what his position was regarding the relation between theory and policy. Pigou's presentation was much clearer. Because it was he exposed the introspection upon which the material welfare approach to theory that he used, was based, and thereby opened the analysis up to serious criticisms.

defined welfare economics as “that part of social welfare which can be brought, directly or indirectly, into relation with the measuring-rod of money.” Second, he accepted a material welfare concept of utility in which interpersonal comparisons of welfare were possible. This material welfare approach integrated general elements of popular thinking into the goals of the analysis, especially as that analysis related to income distribution. That’s why Pigou could support a progressive income tax on the basis of theory.

Lionel Robbins attacked Pigou’s material welfare approach. In his “Nature and Significance of Economic Science” (1935), Robbins strongly reiterated J.N. Keynes’ argument that “scientific” economists must wear two hats, one as a policy advisor, the other as a theoretician, and that there could be no seamless connection between the two. In making that argument, however, he shifted ground, and interpreted utility within an ordinalist, rather than a material welfare, framework.

The difference between the material welfare and ordinalist approaches can be seen by considering Pareto’s distinction between utility and ophelimity.⁴ For Pareto, *utility* referred to usefulness, was determinable by introspection, and was comparable across averages of individuals. Marshall and Pigou accepted that interpretation of utility and used it as the basis of their welfare economics. For them, the foundation of the application of theory to policy was introspection. Thus, generally accepted normative views about comparability of welfare were built into applied policy. This view of utility, which is not well known today, was distinguished by Pareto from ophelimity, which referred to satisfaction of desire; it was not determinable, and was not comparable among individuals. Marshall and Pigou took the Pareto-utility approach: for them utility was a rough and ready guide for policy that embodied generally accepted welfare judgments of the society. Ordinalists, such as Robbins, took the Pareto-ophelimity approach: it was a precise statement about individuals’ welfare and did not allow introspection.

Robbins criticized the material welfare aspect of Pigou’s work for the interpersonal welfare judgments that it required, and argued that welfare theory must pull out policy precepts from theory without the introspection inherent in the material welfare approach. He argued that there was no scientific basis for making interpersonal welfare judgments. To avoid including such judgments as part of welfare economics, he defined economics as “the allocation of scarce resources among alternative ends,” which fit nicely into a utility optimizing framework. This definition became the standard textbook definition of economics, replacing Marshall’s “study of mankind in the normal pursuit of business” definition, which was broader and had suggested an empirical, introspective, rather than a logical-deductive, approach. Robbins’ definition built into economics the ophelimity interpretation of utility.

⁴ See Cooter and Rappaport (1984) for a discussion of the distinction between these two approaches.

Robbins' arguments won the day and in so doing both expanded and contracted the domain of positive economics. They expanded that domain because economics now included all activities and goods, and made no distinction between luxuries and necessities. The materialist welfare approach made a distinction and was applicable only for broad categories - it was a tool of muddling through, a rough and ready concept to use in talking about policy as it relates to classes of people, not a precise tool to use to talk about individual welfare. But Robbins simultaneously contracted the domain of economics by limiting the amount of interpersonal comparability that was allowed, since that comparability had no scientific basis.

The result of this change from a materialist welfare to ordinalist interpretation of utility involved a change in the way welfare economics was conceived. Whereas Marshall's and Pigou's welfare economics was a rough guide for economists who were doing actual policy work, and involved making generally accepted interpersonal welfare comparisons, under Robbins' approach welfare economics became a highly esoteric topic, which asked under what conditions policies theoretically can definitely improve the welfare of society. Welfare economics became a deductive scientific analysis, not a societal tool of muddling through. By the 1950s this ordinalist view came to dominate the profession and set the stage for the modern textbook theory of applied policy that stands today.⁵

The next step in the evolution of modern welfare economics occurred when one of Robbins' students, Abba Lerner, as part of his discussion of the socialist calculation debate, spelled out the welfare conditions necessary to achieve social efficiency in his *Economics of Control*. Lerner argued that planned market economies could achieve all the benefits of the market by following the rules of welfare economics. Lerner's economics of control provided the architectural plans for maximizing social welfare of an economy, and if planners were in possession of those plans, the planners could maximize the welfare of an economy as well as the market could.⁶ For Lerner applied policy economics was the application of a scientific set of rules determined by economic theory to be followed by policy makers and by agents in the economy. These rules for both agents and policy makers form the foundation for the current textbook presentation of economic theory.

The economics of control was the final step away from the muddling through approach that was inherent in J.N. Keynes' and earlier Classical economists' applied

⁵ Robbins' view was not that policy did not belong in positive economics, but rather that, following J.N. Keynes, it belonged in a separate field, which Robbins (1981) called "political economy" and which Keynes (1896) called the art of economics.

⁶ Lerner attempted to include the distribution of income in the analysis with his assumptions about uncertainty and utility maximization, but that was soon dropped, as the scientific foundation for any interpersonal utility judgments, even those based upon uncertainty, were questioned.

policy approach. It made economic theory the guiding factor in policy analysis. There was no place for Keynes' art of economics in the economics of control; it was unnecessary because policy was a precise science.⁷

In the economics of control, economic analysis became *the* decision criterion, not an input into a broader decision process, and the results that came out of welfare economics were what "should" be done, not some general results to help economists determine appropriate policy. This, of course, violated Hume's Dictum that you cannot derive a "should" from an "is," but that problem was pushed under the rug by narrowing the goals of economics to a single criterion - ironically called Pareto optimality - that had broad support.⁸ Textbook economic theory became the analysis of under what conditions a market economy will lead to policies that improve the welfare of at least one individual, while reducing the welfare of no individual.

The welfare economics associated with Pareto optimality was called the new welfare economics. In the new welfare economics any position that achieved a result in which no one could be made better off without making someone else worse off was an efficient position, and the new welfare economics came to focus on efficiency to the exclusion of other goals. Accepting the Pareto Criterion as the central focus of policy allowed economic models to reach formally clear conclusions about policy, but it severely limited the applicability of new welfare economics to any real-world problems.⁹

This connection between theory and policy on the basis of efficiency significantly influenced the direction of research in economics. Specifically, it led theoretical economists to focus on abstract models rather than concrete problems, and to a separation of applied work from purely theoretical work. The work associated with Arrow/Debreu is the best example of the focus of this formal theoretical work, which was quite separate from what applied economists did or were interested in.

Applied microeconomics followed a different path. It focused on empirical testing; it did not rely on formal theoretical models tied to theoretical welfare economic foundations, but instead on what might be called an educated common sense -

⁷ This meant that when Milton Friedman wrote his famous essay on methodology (Friedman 1953), although he cited Keynes' tripartite division he immediately forgot the art branch, and discussed economics as if it involved only positive and normative economics. While there were multiple discussions of Friedman's essay, no one objected that the art category was missing.

⁸ This, of course, does not solve the problem. As Sen (1970) pointed out, Pareto optimality cannot be made free of normative judgments.

⁹ See, for example, Graaff (1967), who argues that welfare economics has little applicability, and that economists should stay out of policy discussions and concentrate on describing how the economy works. The new new welfare economics, which adds back value judgments and interpersonal comparability with a social welfare function framework, did not add significant applicability to welfare theory, because it was kept abstract. But it did open up the door to much formal esoteric analysis.

exploring the effect of incentives and determining how much they matter. Not much formal theory was needed for such work - the only theory much of this work needs is that incentives matter. It also led to welfare economics no longer being taught. Why teach welfare economics, if it simply came to the conclusion that one cannot apply theory to policy questions?

Welfare Economics in Macro

The welfare economics of macroeconomics followed a quite different path. The goal of macro policy was assumed to be full employment and zero inflation, without any connection of those goals to individual welfare. Macro models assumed agent actions that were not necessarily consistent with optimization, but were assumed stable and empirically determinable. In Keynesian macro models economists could use the steering wheel of monetary and fiscal policy to control the economy and direct the economy to the desired goals. Output too high - use contractionary monetary and fiscal policy; output too low - use expansionary policy. This mechanistic approach was also developed by Lerner in the second half of his *Economics of Control*. He called it functional finance, and it was presented with as much certainty and firmness as were his rules of microeconomics for the socialist planner developed in the first half of his *Economics of Control*. The 1960s were a time of fine-tuning in macroeconomics.

Lerner's welfare approach to macroeconomics did not last because it involved an inconsistency with the assumptions of microeconomics. As the microeconomic foundations of macroeconomics were explored, and the two approaches integrated, neoKeynesian policy analysis, which was based on Lerner's functional finance welfare approach, was attacked by New Classical economists on consistency grounds. New Classical economists argued that if policy makers had full information, rational individuals should also be assumed to have full information available to them. They further argued that if agents had that information, then much of the benefit of Keynesian policies is eliminated; in fact, most of the Keynesian problems of stabilization and equilibrium at undesirable unemployment levels would not exist.¹⁰ In New Classical models fluctuations in output are simply reflections of shifts in intertemporal choices, or irreducible noise in the stochastic system, and unemployment is simply the result of intertemporal inconsistencies combined with institutional rigidities.

This lack of consistency between agent and economic policy maker assumptions played an important role in the demise of Keynesian economics and the development of the currently popular dynamic stochastic intertemporal equilibrium approach to macro. Model consistency between agents' information sets and policy makers'

¹⁰ An example of the implications of the New Classical approach for policy can be seen in Robert Lucas' recent Presidential address (2003) in which he argued that stabilization has little welfare gain, and that the policy focus of macro should be on growth.

information sets seems logically desirable; if policy makers have access to that information, then why shouldn't the agents in the model also have access to it, at least at a cost? So modern intertemporal equilibrium macro is defensible on these consistency grounds. It is simply the extension of the economics of control micro framework to macro. Thus, I see this movement toward New Classical economics as an important step in the development of economic thinking because it brings both micro and macro onto the same footing, and helps clarify the issues. It shows the full implications of taking an economics of control approach to policy.

2. The Changing Nature of Modern Economics

Now that I have completed my brief history of welfare economics, let me turn to what I see as the most important changes occurring in modern economics - the movement away from the holy trinity assumptions that I discussed at the beginning of the paper. In my view, modern economics is slowly moving away from the holy trinity toward a broader foundation of economic theory of purposeful behavior, enlightened self-interest, and sustainability. The changes that are occurring can be seen in a variety of theoretical work, such as work in behavioral economics, evolutionary game theory, agent based modeling, experimental economics, and new institutional economics - the list could be extended significantly.¹¹ Indeed, as I have argued elsewhere (Colander, Holt and Rosser, forthcoming), much of the work that is considered cutting edge theoretical work falls into the category of moving away from the holy trinity.

One can see the change in the allocation of recent awards in economics. For example, Daniel Kahneman and Vernon Smith in 2002 won a Nobel Prize for their work in behavioral and experimental economics, and Mat Rabin won the John Bates Clark medal for work on behavioral economics. Because of these changes, today one would no longer describe modern economics as neoclassical economics (Colander 2000a).

I do not want to overstate the degree of change that is currently taking place in the profession; one sees only slight change in the work of most existing economists. But I see these small changes as an indicator of much larger future changes. The reason is that the acceptance of behavioral rather than axiomatic foundations to agents' actions involves a major change in the underlying vision of what economists study, and how

¹¹ That is close to happening in behavioral economics in certain fields such as finance. As Richard Thaler has said, once, people asked what was behavioral finance; now people ask what other type of finance is there? A leading indicator of the changes that are occurring is the hiring priorities of top schools, and the needs their hiring departments see. In the early 2000s behavioral economics is seen as a hiring priority; experimental economics is not yet a totally accepted hiring priority, and agent based modeling is as yet hardly on the horizon.

they study it. Specifically, I see the changes leading from a vision of economics *as the study of infinitely bright agents in rich information environments* to a vision of economics *as the study of reasonably bright individuals in information poor environments*. It is this switch that is central to my thesis that economics is moving away from an economics of control framework - *a framework within which infinitely bright economists with full knowledge of the system approach policy* - to an economics of muddling through framework - *a framework within which reasonably bright economists with limited knowledge of the system approach policy*.

Another way of describing my thesis is that the vision of the economy will evolve from its previous vision of a highly complex “simple system” to a highly complex “complex system.”¹² Simple systems, no matter how complex, are reducible to a low dimensional set of equations, making it possible to model the system analytically and to conceive of controlling it. A complex system is not, and must be represented in another fashion—through simulation, or through insights gained with replicator dynamics. One never has a full analysis of the entire complex system, and it cannot be controlled.

Simple and complex systems differ from each other in their micro foundations. Simple systems can be studied from micro foundations alone. Complex systems involve emergent properties, and cannot be understood from an analysis of the elements of the components of that system. There can still be micro foundations, but the micro foundations of complex systems are contextual, and can only be understood in reference to the existing system. Such complex systems are built up in path dependent stages, making individual optimization within such systems history and institution specific. This means that a system’s actual institutional structure is central to understanding that complex systems, and that any assumed rationality must involve some boundedness.¹³

The acceptance of this complexity vision of the economy involves a shift in economics far more fundamental than anything associated with the movements away from the holy trinity that the profession has made so far. But by moving away from the holy trinity economics is making the first step toward such a new vision.¹⁴

¹² For a discussion of what is meant my complex system see Auyang (1998).

¹³ These ideas are developed in *The Economy as an Evolving Complex System I and II* (Anderson, Philip W., Kenneth J. Arrow, and David Pines, eds., (1988) and Arthur, W. Brian, Steven N. Durlauf, and David A. Lane (1997)). See also Colander (2000c).

¹⁴ Of course the simplicity view has not always been the view of economics and thus the movement toward complexity will be a movement back to earlier writers, including Smith, Marshall, and Hayek. See Colander (2000b) for a discussion of the complexity in the history of economic thought.

3. Understanding the Nature of the Change

Jokes about the economics profession are often revealing of the vision that the profession has of itself, and one joke that is often told to make fun of economists' deductive and non-practical tendencies is the can opener joke. In it a physicist and a chemist offer practical solutions to a problem of opening a can on a desert island, while the economist offers a useless solution - to assume a can opener.¹⁵ That joke is not very complimentary about economists and it provoked a less well-known joke that portrays economics in a better light. The joke is:

A physicist, an engineer, and an economist are given a stopwatch, a string, and a ball, and told that the person who can best measure the height of a building will get into a Scientific Hall of Fame. The physicist ties the ball to the string, hangs it down from the roof, and, using the stopwatch, calculates the length of time it takes the pendulum to swing from side to side. From that information he estimates the height of the building. The engineer takes the ball and drops it off the top. He then uses the stopwatch to determine how long the ball takes to fall, and estimates the height of the building accordingly. The economist, however, wins the place in the Scientific Hall of Fame by taking the stopwatch, trading it with a guard in the building for the building plans, and simply reading the height of the building from the blueprints.

This joke, obviously made up by an economist, shows both the benefits of trade and the importance of economic theory. That theory provides a blueprint of how the economy operates, and thus, once found, is to be guarded at all costs. It also shows the economists' assumption that the economy is a complex "simple" system, because those are the only systems for which one can find a complete set of blueprints.

The problems with this story from a complexity point of view are the assumptions that a set of blueprints exists, and that the building of the economy actually followed that set of blueprints if they did exist. The complexity vision sees the economy as emergent from a set of simple decisions in a way that no one previously pictured. Thus the complexity addendum to this story, which Robert Bassman suggested to me in private discussions, is that when the building took place, the builders made adjustments to the plans, which they never marked down on the blueprints. The economist reading from the blueprints got the wrong answer.

Each of the changes currently occurring in the holy trinity can be seen as a movement away from a search for the blueprints of the economic system, and toward a search for understanding a system in which the blueprints are missing, nonexistent, or

¹⁵ The joke is so well known that I do not repeat it in full here, but those who do not know it can find a version of it at www.acaweb.org/RFE/Neat/JokJokAboEco.html.

so far beyond our analytic capabilities that we might as well forget about them. Consider rationality. In order to achieve a blueprint of the economy strong rationality must be assumed, where individuals have information about all others' actions, and can determine what they will do given that information. The models one derives given these strong assumptions are justifiable because they provide the blueprint for the economy - once we have that blueprint we can proceed to discussions of practical issues. Behavioral economics is a direct challenge to that belief - it involves a different sense of theory and of rationality. A behavioral economist looks at what people do, and builds those observations into his or her assumptions about behavior in his or her models. Behavioral economics is designed for economists operating without blueprints.

The "simple" approach relies on theory, uses empirical observation to test the theory, and then builds policy issues around that "empirically tested" theory. The "complexity" approach relies on empirical observation, builds theory around those observations, and then builds policy around the resultant "empirically-determined" theory. The type of rationality assumed is a key difference in the two approaches. Both assume rationality - all models of economics must assume some type of rationality - but there is a difference in the type of rationality and the level of information assumed.

4. Why Now?

Let me now turn to the reasons why I believe the profession is open to a change to muddling through now, and was not previously. One is the developments in macroeconomics. New Classical economics logically follows from assumptions of fully rational agents operating in an information-rich environment. But for many economists - Keynesian, monetarist, and eclectic - the results of the analysis do not meet the "aha" factor; they do not make intuitive sense, and the models do not fit the empirical evidence. If the New Classical logic is correct, that means that it is the assumptions that have to be wrong. Thus these economists are now open to behavioral explanations whereas earlier they were not.

You can get a sense of the difference between the behavioral approach and the rational approach by playing what is called the 2/3rds game. In this game you are to estimate a number that is 2/3rds of the average number guessed by a large group of individuals. Thus if people guessed 75, 50, and 25, the average guess would be 50 and you would win if you guessed 33 and 1/3rd. Rationality does not provide a solution to this game. It drives the answer toward zero. But, of course, guessing zero, which is what some game theorists actually do guess, has no chance of winning.

To win the game you have to go beyond rationality and into minds of individuals. You have to have a sense of what people will do when faced with problems that have no unique rational solution. That knowledge comes from introspection, experience, and

empirical evidence. The study of such issues is the essence of behavioral economics.¹⁶ J.M. Keynes considered these problems of rationality, as is evidenced in his famous beauty pageant analogy, but the Keynesian economics that developed from his work avoided them and stuck with the holy trinity. By pushing the economics of control framework to its logical conclusion, New Classical economics led many economists to reconsider the foundations of theory, and to be willing to abandon the holy trinity.

Accepting that behaviorist view has implications for the way economists picture their role in policy. These implications can be seen by placing the New Classical argument for consistency in reverse. The consistency argument for assuming rational expectations on agents' parts lies in the simple argument that agents can hire economists. If one assumes that economists know the correct model, which might be a stochastic one, then to maintain model consistency one must also assume that agents also can know the correct model, at least at some cost. Combining the two arguments led to the rational expectations revolution.

Muddling through achieves consistency the other way around. Rather than achieve the consistency between agent and policy maker by assuming both individuals and policy makers have full rationality and rich information sets, the economics of muddling through approach is to start from the other direction - to assume both policy makers and agents are operating within an information-poor environment, and, while bright, are not infinitely bright. Neither agents nor economists know for sure, even stochastically, what is going to happen.

I sometimes picture the difference in the standard and the muddling approach approaches to theory and policy in reference to the building of medieval cathedrals. These cathedrals were built following a muddling through approach. They did not rely on scientific laws to guide the building, but instead on accumulated rules of thumb of what worked and what didn't. The building proceeded by trial and error. Different methods of construction would be pushed to the limit until a cathedral caved in somewhere, and then the rules of thumb would change. As the stored knowledge increased, the cathedrals became more grandiose, even without a specific understanding of the laws underlying them. That came much later.

Muddling through policy follows that same approach. It is conducting policy without a full knowledge of the general laws of the economy, if there are any. What you can find, at best, are general rules of thumb for how things have worked in the past, and possibly some exploitable patterns. Economics of control welfare economics follows a different approach to policy; it is basing policy on the underlying architectural plans of the economy.

¹⁶ While there is no "correct" solution, some guesses are better than others, although the guesses depend on the group and the framing of the question. With the question framed as I have framed it to groups of economists "11" has often been close to the best guess.

A second reason that I believe the economics profession is ripe to accept a muddling through approach to policy is the technological change that has occurred in the analytic and computing methods available to economists. Developments in non-linear dynamics, chaos theory, and computing technology eliminate the need to make such restrictive assumptions as we did before. Consider the choice from a graduate student's perspective. Would he or she rather write a dissertation pushing the rationality assumption one degree further, or would he or she rather explore one of the infinite number of new behavioral assumptions that one can make based on findings in psychology? The low hanging fruit has already been picked from the first approach, but there is a lot of low hanging fruit just waiting to be picked in the behavioral approach. Moreover, the study of those behavioral foundations can now be technically impressive. Whereas before, muddling through was primarily heuristic analysis, and difficult to publish, modern muddling through is technically impressive and increasingly publishable.¹⁷ To achieve an analytic solution the full rationality models had to be kept analytically simple. The models used in muddling through do not, because all they are meant to do is to provide guidance, not analytic solutions. This leaves them free to rely on empirical measurements and experiments to provide choices among assumptions, and simulations to provide estimates of solutions to problems that are analytically intractable.

Schumpeter (1954) made the assumption of a unique equilibrium a necessary component of a science of economics. With the higher level of mathematics being taught in graduate school, and with the greater mathematical sophistication of those entering the profession, that restriction is no longer necessary, which is why these more complicated issues are being explored. As students are freed from the requirement of achieving a full analytic solution based on the holy trinity, they can use new tools to study path dependency, non-linear dynamic systems, and many similar complicating features that could well characterize real-world processes. By understanding the processes that guide the economy in its evolution one can gain insight into the economy and into the future direction of the economy, even if one does not know what its ultimate equilibrium will be.

As soon as one moves to these more complicated mathematical approaches, neat analytic solutions are far less likely to be forthcoming. Previously, that meant

¹⁷ I do not want to overstate how these changes are currently affecting economists. Most economists do variations of what they were taught to do, and so have not changed what they do. "Same economist" research changes only slightly. But the economics profession is not a static group, and so the research is also changed by the change in the composition of economists, with younger, newly trained economists coming in, and older economists going out. Thus the evolutionary hiring and retirement process affects research. As time passes, and younger, differently trained, economists replace older economists, the average image of what economics is and of how one does economics changes.

abandoning the approach; today it simply means that one moves from analytics to simulations. Thus, the strongest reason for my belief that the future will involve muddling through is that advances in computing power involve a fundamental change in technology that is reducing the value of deductive theory. If one can gain insight through simulation, one has far less need to gain insight through deductive analytic theory. As long as computing power continues to double every 18 months, eventually a whole new way of doing economics will become the norm: agent-based simulations.

In agent-based models the researcher “grows” an economy, letting simple algorithms describing agent behavior (algorithms developed from work in behavioral work) compete with one another, and see which one wins out.¹⁸ Agent-based simulations are fundamentally different than simulations designed to solve equations. In agent-based modeling one analyzes the system without any equations describing the aggregate movement of the economy; one simply defines the range and decision processes of the individual actors. Through multiple simulation runs one can gain insight into the likelihood of certain outcomes, and of the self-organized patterns that emerge from the model. As computing power becomes cheaper and cheaper, such modeling will likely take over the profession. Ultimately, I see virtual economies being created in which policies are tested to determine their effectiveness in the same way that virtual designs are currently tested.

Is such agent-based modeling still economics? I believe it is; it keeps much of standard economics - it sees individuals as purposeful, although the precise nature of purposeful behavior is derived from the model rather than assumed. It assumes individuals interact and trade, and that successful individuals continue; unsuccessful individuals do not.

5. What Does Muddling Through Tell Us about Policy?

In the muddling through approach that I advocate, one begins with a problem to be solved, not a theory. Given that problem, economic reasoning begins with what Tom Schelling has called the “vicarious problem solving” approach (Schelling 2003). In it one informally models the situation, assuming agents “operate in a purposeful manner, aware of their values and alert to their opportunities.” Using this approach the researcher figures out what an agent might do by imagining him or herself in the person’s position, as best the researcher understands that position, and decides what that person will likely do given that person’s aims, values, objectives, and constraints. It is a type of armchair theorizing that most economists do, and that some, such as Ronald Coase, Gordon Tullock, or the late Mancur Olson, are masters of. Thus, in

¹⁸ For a discussion of agent-based modeling see Robert Axtell and Josh Epstein (1996) and Robert Axelrod (1997).

many ways muddling through is advocating that all economists use such an armchair theorizing approach. But there are two differences. In the muddling through approach that I am advocating such armchair theorizing is only the beginning of the analysis.¹⁹ It is the exploratory work that then will be supplemented by highly technical work, which will provide a foundation for the workable solution to the problem one works out. This work might include field studies, agent-based modeling, statistical data analysis, or a variety of other analytic, statistical, or simulation techniques that might shed light on the issue. The second difference is that the assumptions about the agents will reflect how actual agents operate, and not any predetermined sense of rationality that is separate from introspection. Thus, the agents being modeled will be characterized by introspection - one's understanding of oneself, and insights from psychology.

Initially, the changes in policy analysis associated with muddling through will come slowly and will be appended to existing thinking. Thus, the first set of policy proposal changes that are coming from behavioral economics involve slight addenda to standard economic results. These changes are acquiring the name benign paternalism (Benjamin and Laibson forthcoming) or libertarian paternalism (Sunnstein and Thaler, forthcoming). In this policy work one uses the insights coming from behavioral work in economics to modify the way in which policy is implemented. For example, one of the insights of behavioral work is that preferences are often ill-formed. This fact means that small, seemingly innocuous, differences in the institutional environment, such as in how a choice is presented to an individual, play important roles in outcomes of policies. Libertarian paternalism involves structuring choices in a way that lead to results that the policy maker believes is best for the individual.

An example that advocates of this policy use is the structure of savings plans in which individuals must choose whether or not they want to automatically save.²⁰ If the policy maker structures the program with the default option being that the agent saves, approximately 70% choose saving; if he or she structures the default option as one in which the agent does not save only 30% choose to save. (Sunnstein and Thaler forthcoming) If the paternalistic policy maker believes saving is good, he or she structures the program so that the default option is saving. In doing so the individual's consumer sovereignty is not being violated, because he or she is choosing whether he or she wants to save, and may change at will. But by taking advantage of insights from

¹⁹ I suspect that many armchair theorists would agree. For example, Ronald Coase (1994) writes: "My remarks have sometimes been interpreted as implying that I am hostile to the mathematization of economic theory. This is untrue. Indeed, once we begin to uncover the real factors affecting the performance of the economic system, the complicated interrelations among them will clearly necessitate a mathematical treatment, as in the natural sciences, and economists like myself, who write in prose, will take their bow. May this period soon come." (p.14)

²⁰ In the U.S. these are called 401k plans.

psychology and structuring saving as the default option, the policy maker is guiding that choice to the one that the policy maker believes is best for the person.

6. The Slippery Slope

Libertarian paternalism may seem as though it involves only a small change in policy implications, and that it can be added as an addendum to standard welfare arguments of economics. In my view, that is not the case, because accepting the psychological assumptions upon which it is based undermines standard welfare theory, and thus cannot be appended to it. Instead, the implications for future change in policy analysis of accepting the implications of psychological insights are substantial. The reason is that there is no reason for the policy maker to stop at libertarian policies. Accepting psychology's insight and giving up the rationality and greed foundation for policy means accepting that people's actions do not necessarily reflect what they would "really" want.

Psychological research shows that individuals' choices are influenced by a variety of factors and can be directed in many ways, an insight that has not gone unnoticed by many real-world firms. Thus, based on standard economic theory without the rationality pillar, there is no reason to stop at libertarian policies. If one accepts that policy makers have some insight into what is good for individuals separate from what individuals actually choose, a premise that is the basis of libertarian paternalism, there is nothing in existing standard economic theory to state that one should not go further. For example, why not design policies that take into account individuals' tendency to exhibit hyperbolic discounting, and implement policies to restrict immediate choice, by guiding individuals toward precommitment against immediate gratification? Such policies would likely get significant support among liberal economists.

One can easily go further. Once one accepts that people's actions do not necessarily reflect what they really want, there is no theoretical reason within the economics of control framework to restrict individual behavior to get people to do what is good for them. For example, Robert Frank (1999) argues that a set of goods, which could be called relational goods, are primarily desired because others have them, which means that individuals' welfare from a variety of luxury goods is determined by what one has relative to others. In that case, a policy of taxing luxuries can bring in revenue to the government and actually improve social welfare. Extending this line of reasoning, and assuming that advances in neuropsychology give us a much better sense of individual psychology, from a society's point of view there may well be a determinable optimal set of tastes, and policy can be devoted to achieving that optimal set of tastes in order to optimize social welfare.

Economists as a group, even liberal ones, would, I suspect, be very much against such paternalistic policies. It is in fundamental opposition to the grand liberal tradition

of economics. The public, however, would probably be far less concerned since economists are usually much more hesitant about paternalistic policies than is the general public. My point is not that economists should support paternalist policies; my point is that, in principle, given that one accepts a behavioral foundation of economics, that hesitancy to accept paternalistic policies that follow from it is not based upon deductive theory, since the underlying model that grounded that view has been eliminated when one gave up rationality. Within the new model of endogenous tastes, agents may be made better off, even in their own minds, by government paternalistic actions, because agents' actions do not necessarily reveal their true desires. Thus, the end result of giving up the holy trinity and adopting a behavioral foundation for economics is a much more complicated set of policy arguments, where right and wrong policy will be harder to characterize, and alternative explanations of economists' fear of paternalism will become part of the policy analysis.²¹ Policy analysis will require muddling through as best one can using the technical tools available.

7. Conclusion

If the economy is a complex system, which I believe it is, the best we can do in policy analysis is to muddle through. The only question is whether we will do it openly, or pretend to be doing something more than that. If we do it openly, we will, I believe, do a much better job of policy analysis; we will more likely recognize what is, and is not, important. We will recognize that technical work is extremely important in arriving at answers to policy questions, but that it is only a step in the chain of reasoning; it is not the entire reasoning process.

Muddling through is primarily a state of mind. It is an approach that sees both theory and empirical work as useful in providing insights and structuring thoughts, but not as providing the final answers on policy issues. Those answers will have to be arrived at through a sophisticated blend of philosophical, psychological, and economic arguments.²² Adam Smith excelled in the nuances of that blended reasoning, and thus, in many ways the recent developments in economics are bringing the profession back to where it began.

²¹ In the muddling through approach that I have been advocating (Brock and Colander (2000)), we argue that an important limitation on policy is policy makers' ability to understand the effects of any policy in a complex system. This limitation, more so than inefficiency, lies at the heart of economists' distrust of paternalism.

²² Amartya Sen's work (eg. Sen, 1999) is an example of such a blend.

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