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The Scope and Method of Applied Policy Economics

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Abstract

Much has been written about the methodology of economic science. Little has been written about the methodology of applied economics, and most applied economists think of applied economics as subject to a scientific methodology. But, as Classical economists recognized long ago, that cannot be correct as the methodology of science is designed to minimize the integration of values, while applied policy analysis requires the integration of values into the analysis, ideally in as transparent ways as possible. This article suggests that applied policy economics should consciously follow an engineering, not a scientific, methodology because engineering methodology allows for the conscious blending of philosophical methodology, used to arrive at consensus on values, with scientific methodology used to arrive at consensus on scientific facts and understanding.

***JEL Classifications*:** B40, B41, A12, A13

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methodology, values, applied policy, engineering, normative

Most economists do what they do with little explicit concern for methodology. In many ways, this lack of concern about methodology is for the best; discussions of methodology quickly become esoteric and lost in epistemological mumbo jumbo designed for philosophers, not economists. But in other ways, it is problematic; methodology is fundamental to what economists do, how they go about their work, and how they think about the role they play in society. If, as J. M. Keynes put it, "economics is a method rather than a doctrine, an apparatus of the mind, a technique of thinking, which helps its possessor to draw correct conclusions," then economics *is* its methodology.

A likely reason why economists do not think much about methodology is that economics is institutionally successful. Other social science fields have identity crises; economics does not. Most economists are quite self-satisfied with their technique of thinking and their implicit methodology. They see economics as the legitimate queen of the social sciences. Compared with other social scientists, economists see themselves as more precise in terms of their modeling, more empirically sophisticated, and, overall, more scientific, which they regard as good. Put simply, in most economists' view, economics' scientific methodology is better than the methodology of the other social sciences.

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In this article, I challenge that self-satisfaction as it relates to applied policy. I argue that economists' current applied policy methodology

- significantly limits the scope of economists' policy focus, putting shackles on economists' consideration of a wide variety of policies in an untenable attempt to let scientific methodology guide. What I call formation policy issues—policy issues that go beyond issues of allocative efficiency—do not get the consideration they deserve;
- leads economists to not integrate normative values and sensibilities into policy debates in the most effective way. The result is that their policy advice is often unbalanced—scientifically sophisticated, but philosophically naive.
- leads to serious problems in teaching economics, leaving students unprepared to debate policy issues in the nuanced way that one would expect from an economically educated person.

Separating Applied Policy Methodology From Scientific Methodology

My argument is only about the methodology of applied policy economics, and not of scientific economics. To most economists, this limitation will seem a bit strange as they do not distinguish between the two methodologies. A key element of my argument is that they should, because the methodology appropriate for science is not the methodology appropriate for applied policy. Many of the problems with current applied policy result from the lack of separation.[1] Combining the two has discouraged explicit consideration of economists' applied policy methodology. Since, as I stated above, economists do not spend a lot of time discussing methodology—either scientific or applied—the result is that applied policy methodology is an almost totally unexplored field.

Thinking Like an Economist

Generally, to the degree economists bother, they think of their methodology for both science and applied work as the methodology of positive economics. In the back of their minds, they most probably have some loose remembrances of Milton Friedman's (1953/1966) methodological essay on positive economics. If they actually followed a positivist methodology in their science or in their applied work that would be problematic, as numerous methodologists have pointed out (Davis, 2013; Putnam, 2002). I do not see it as a problem because in their actual work, whether scientific or applied, there is little attempt to follow a strict logical positivist methodological approach of creating theories and empirically testing those theories. Modern economists are far from logical positivists in either their science or their applied policy. Instead, I think most applied policy economists would be comfortable as being described as pragmatic scientists who follow reasonable scientific guidelines adapted to the problem at hand. Those guidelines would go something like this:

- Use the best science possible. Let scientific methodology guide your work. For example, wherever possible, do double-blind randomized control experiments and use scientific evidenced-based policy.
- Be precise in your models. Specify them mathematically so that the assumptions being made in the model are visible to others—Solow's Dictum Rules: Precision first; relevance second.
- If it cannot be quantified, it is not science. Stay away from qualitative and discursive methods.

- Use the best statistical methods to pull as much information from the data as possible. For example, use the latest developments in identification and differences in differences statistical procedures. Use scientific empirical evidence to resolve debates.
- Incorporate scientific experiments—natural, field, laboratory, and computer—into your work whenever possible.
- Avoid the fuzzier aspects of social science such as culture, morals, value judgments, and humanistic concerns that cannot be quantified or integrated into a semiformal mathematical model. This is not to say that such issues are not important, it is just to say that they cannot be dealt with scientifically.
- To get at fuzzy issues, be creative; construct quantitative proxies. If you are sufficiently creative, you can construct proxy quantitative measures for just about anything. Integrate those proxies into your formal policy analysis.

Nobel Prize winner Jean Tirole's (2017) recent book, *Economics for the Common Good*, is an excellent explanation and justification for the lay reader of economists' current methodology as outlined above. It conveys the way I believe sophisticated economists think about their method. It is thoughtful and introspective. It admits to limitations and discusses economics with the sophisticated sense that one would hope to see from a policy economist. But it also conveys the tinge of unwarranted self-satisfaction that economists feel about their method. It is a satisfaction that Tirole defends as deriving from economics' scientific nature.[2] He writes,

> The field of economics is scientific in the following sense. Its hypotheses are explicit, meaning they are open to criticism, and its conclusions and their scope follow from logical reasoning, the applications of the deductive method. These conclusions can be tested using the tools of statistics. (p. 90)

Economists' self-satisfaction with their methodology can also be seen in their pedagogical philosophy that sees a central pedagogical goal of the principles of economics course as getting students to "think like an economist." Thinking like an economist does not mean supporting any specific policy, rather it means using economist's implicit methodology to consider issues.[3]

I am in partial, and in some ways even substantial, agreement with Tirole's and economics' advocates' support for economics. I am after all an economist. For the science of economics, I think their self-satisfaction is defensible. For applied policy, it is not.

Integrating Values Into Applied Policy Analysis

The problem is that policy analysis necessarily involves values and sensibilities that cannot usefully be quantified and fit into formal scientific models; the more important the policy issue, the more values play a central role. The scientific method is not designed to deal with values, and many of its methodological rules derive from science's explicit attempt to be value free.[4] Applied policy analysis requires a different methodology than science because applied policy analysis cannot be value free—it must deal with the value laden questions such as follows: Whose values do we use in the analysis? How do our values shape our analysis? and How do we determine the appropriate values? Following Hume's Dictum that a *should* can only be derived from another *should*, such questions cannot be answered by a value free science; they are questions of moral philosophy.

It follows that applied policy—how to best achieve a set of goals—requires a blending of science and moral philosophy and hence requires a blending of their respective methodologies. This is important because moral philosophy's methodology is quite different from scientific methodology. It is often discursive and fuzzy, not mathematical and precise. Many arguments in moral philosophy cannot be resolved by empirical evidence, or even by logic—they can only be

resolved through what might be called argumentation for the sake of heaven—a method of argumentation in which the goal is to understand the other person's view in a deep way and, through discourse, to come to a shared agreement about the best way forward.[5] The goal of moral philosophy is not to arrive at a scientific truth, but instead to arrive at a philosophical truth—a proposition that, when it is revealed and explained, most people in society will see as acceptable and therefore as useful in applied policy analysis. Good policy is based on a blend of scientific truths and philosophical truths.[6]

It is this blending of methodologies that has been lost by economists in their applied policy work. This is apparent in Tirole's book, which, while it has a good recognition of the moral dimensions underlying economics, has almost no discussion of how to integrate moral philosophical dimensions of policy into economists' scientific work. Thus, while he begins his book by appealing to John Rawls's veil of ignorance (Rawls, 1971), a standard method in moral philosophy, he has no discussion how that method, or Adam Smith's related impartial spectator method, can be used to resolve differences. Instead, Tirole emphasizes that economists' first method of resolving differences is empirical evidence. If empirical evidence does not provide resolution, he explains that economists turn to theoretical models, which he argues "are the main game in town" (p. 107). He has no discussion of trying to arrive at understanding through structured discourse and careful examination of one's values and moral views, in spirited friendly debates with others who do not share the researcher's values and worldview. The philosophical methodological toolkit is absent from even sophisticated economists' methodological toolkit. It should not be.

Adopting an Engineering Methodology

My call in this article is for economists to integrate the philosophical method into their applied policy analysis. They can do this in a relatively unobtrusive way to both their self vision and their current methodology by explicitly seeing the appropriate applied policy methodology as an engineering, rather than a scientific, methodology.[7] That simple change, I argue, will better capture the methodology that the best applied policy economists currently use, and lead to significant improvements in economists' applied policy methodology.[8]

So what is an engineering methodology? The engineer who has written most about engineering methodology, Billy Vaughn Koen (2003) defines it as "the strategy for causing the best change in a poorly understood or uncertain situation within the available resources" (p. 7). Koen argues that this definition is operationally equivalent to a second definition—*use the best available engineering heuristics to solve problems.* Another way to understand engineering methodology is to picture it as a scientifically oriented methodology for situations where science methodology does not fit.[9] Engineering methodology does not attempt to be value free; instead it attempts to be value transparent. Whereas science methodology eschews philosophical methodology, engineering methodology incorporates it as the best way to integrate values into the analysis.

Compared with scientific methodology, engineering methodology is much less constrained, and loose. It is an educated common sense methodology in which "anything goes" as long as that anything is useful in arriving at a useful solution to a problem. It is a creative methodology that is not afraid to be utopian, and also is not afraid to be scientific. Context, not fixed rules, determines method.[10]

Engineering methodology is specifically designed to solve problems, not to find truth, as scientific methodology is designed to do. As problems differ, the appropriate engineering economic methodology will be designed to fit the particular problem being addressed. It is a methodology that continually evolves over time as economists learn what works and what does not, and as analytical and computational technologies change. The appropriate engineering methodology will not be determined by outside methodologists, but instead will be determined from the

bottom up, by the researchers and policy makers using educated common sense. The institutional setting within which the problem exists, the data and other information available, the analytic methods available, and the computational methods available, will all play a role in the choice of methodology.[11]

To highlight the ad hoc nature of their method, engineers emphasize that for an engineer, everything is a heuristic. Koen notes that a heuristic does not guarantee a solution, may contradict other heuristics, reduces the search time in solving a problem. He also notes that its acceptance depends on the immediate context instead of on an absolute standard. Seeing one's framework as a heuristic, not the truth, creates an appropriate modesty for one's claims and keeps one appropriately open to criticism and other approaches. Koen (2003) makes this clear. He writes:

> Everything the engineer does in his role as an engineer is under the control of a heuristic. Engineering has no hint of the absolute, the deterministic, the guaranteed, and the true. Instead it fairly reeks of the uncertain, the provisional and the doubtful. The engineer instinctively recognized this and calls his ad hoc method: doing the best you can with what you've got, "finding a seat of the pants solution," or just muddling through. (Koen, *Definition of Engineering Method*, http://files.eric.ed.gov/fulltext/ED276572.pdf)

A useful heuristic can be quite unscientific. It is anything that helps one come to a solution to a particular problem. Heuristics not only include the type of models that economist think of as models but also include anything else that helps one arrive at a solution—case studies, back of the envelope calculations, thought experiments, insights from bull sessions, sensibilities, and intuitions. Currently, for an economist having your work described as ad hoc is a strong putdown. For an engineer, ad hoc is not a criticism; all heuristics are ad hoc. A criticism would be that it is a poor heuristic for the question being addressed.

The specific heuristics used are to be decided by the researchers working on the problem; Koen argues that an evolving "state of the art" heuristic will develop. Thus, while abstract methodology is not much discussed by engineers, practical methodology is constantly discussed. Methodology is an important part of engineering, but it is a narrow applied micro methodology of best practices for particular areas, with a very loose and unrestrictive general methodology that can probably best be described as an educated common sense methodology.

An example of a nonscientific heuristic might be the observation that it is much harder to take something away from someone than to never give it to them to begin with. This observation suggests that policy design should be very careful to avoid, whenever possible, giving individuals a sense that something belongs to them if one is worried about distributional issues. It would make more sense to focus distribution policy on rules that push toward equality rather than on *re*distribution policy that involves taking something away from somebody after they believe that they have an entitlement to it.[12]

In almost perfectly understood situations, the engineering and scientific methods may asymptotically approach each other, and the better the situation is understood, the closer the two methods are likely to be. The less understood, and more uncertain, the situation, the more likely the methods will differ. When dealing with poorly understood and uncertain issues, engineers do not care a lot about the fine points of scientific methodology; the marginal contribution to a better understanding of a fine point of scientific methodology is unlikely to have a high payoff in the situations that are dealing with.[13] Because values play a central role in designing policy, engineers integrate values into their analysis right from the beginning using a tool such as Smith's impartial spectator to arrive at the values the researcher uses.

A Return to Classical Liberal Methodology

My call for economists to use an engineering methodology to guide applied policy research is not original to me; it has a long tradition in Classical economics, and in many ways, my suggestion

in this article is for the profession to return the Classical methodological roots, as I have discussed in a number of papers and books (Colander & Freedman, 2019; Colander & Su, 2013, 2018). Classical economists separated out applied economics as having a separate methodology from scientific economics. They argued that applied policy methodology should be much looser and freeform than scientific economic methodology. Nassau Senior, the first Classical economist to write seriously about methodology, explicitly notes that policy does not to follow from science. He writes,

> (An economist's) conclusions, whatever be their generality and their truth, do not authorize him in adding a single syllable of advice. That privilege belongs to the writer or statesman who has considered all the causes which may promote or impede the general welfare of those whom he addresses, not to the theorist who has considered only one, though among the most important of those causes. The business of a Political Economist is neither to recommend nor to dissuade, but to state general principles, which it is fatal to neglect, but neither advisable, nor perhaps practicable, to use as the sole, or even the principle, guides in the actual conduct of affairs. (Senior, 1836/1951, pp. 2-3)

J. N. Keynes's (1891) famous summary of Classical methodology also made this separation of applied policy from economic science a key part of his methodological discussion. He carefully specified that there were three branches of economics—positive economics—governed by scientific methodology, normative economics governed by moral philosophy methodology, and the art of economics or applied policy which required blending the two methodologies together.[14] While he spent little time discussing the methodology appropriate for applied policy, he was clear that it was not a scientific methodology. He writes,

> [F]ew practical problems admit of complete solution on economic grounds alone . . . [W]hen we pass, for instance, to problems of taxation, or to problems that concern the relations of the State with trade and industry, or to the general discussion of communistic and socialistic schemes—it is far from being the case that economic considerations hold the field exclusively. Account must also be taken of ethical, social, and political considerations that lie outside the sphere of political economy regarded as a science. (Keynes, 1891, p. 34)

> We are, accordingly, led to the conclusion . . . that a definitive art of political economy, which attempts to lay down absolute rules for the regulation of human conduct, will have vaguely defined limits, and be largely non-economic in character. (Keynes, 1891, p. 83)

Lionel Robbins similarly argued that there should be a separate branch of economics that deals with applied policy economics, and that applied policy work should not see itself as following a scientific methodology. He writes,

> My suggestion here, as in the Introduction to my *Political Economy: Past and Present*, is that its (political economy) use should be revived as now covering that part of our sphere of interest which essentially involves judgments of value. Political Economy, thus conceived, is quite unashamedly concerned with the assumptions of policy and the results flowing from them. I may say that this is not (*repeat not*) a recent habit of mine. In the Preface to my *Economic Planning and International Order*, published in 1937, I describe it as "essentially an essay in what may be called Political Economy as distinct from Economics in the stricter sense of the word. It depends upon the technical apparatus of analytical Economics; but it applies this apparatus to the examination of schemes for the realization of aims whose formulation lies outside Economics; and it does not abstain from appeal to the probabilities of political practice when such an appeal has seemed relevant."

> It should be clear then that Political Economy in this sense involves all the models of analysis and explicit or implicit judgments of value that are usually involved when economists discuss assessments of benefits and the reverse or recommendations for policy. (Robbins, 1981, p. 8)[15]

Alternative Utilitarian Foundations for Policy

The moral philosophical foundation of Classical applied policy economics was utilitarianism which reached its apex in the work of J. S. Mill (1848, 1863). Classical utilitarianism was not part of the Classical science of economics. It was a set of values embodied in the then radical moral philosophy which held that the goal of public policy should be to provide "the greatest good for the greatest number." Mill recognized that this was a vague and self-contradictory goal, but that did not matter because it was not meant to be formalized in a scientific way. It was meant to serve as a reference point for policy discussions undertaken in economists' applied policy work. That discussion of what was meant by "greatest good for the greatest number" in the specific case that one was designing policy for was an integral part of their applied policy analysis; that discussion was the way in which actual values to be used were determined. Without those discussions, the analysis could not appropriately add values and sensibilities into the policy analysis. It is the discussion that made applied policy economics a method rather than a doctrine.

Classical utilitarianism was not open to all value analysis; it was a consequentialist approach to policy, in which policies were to be judged by their predicted consequences, not by their inherent rightness or wrongness.[16] This consequentialist aspect made the philosophical discussions fit better with the scientific branch of economics as both were concerned with actual results, not with metaphysical concepts.

What was meant by "good" for the question at hand was not expected to be fully defined or known beforehand. It was to emerge from the normative discussion. For some policy debates, material welfare might be the relevant goal and what was meant by good could be defined relative to standard economic measures. For other debates, "good" could mean freedom of choice and have little concern about material welfare. "Greatest good for the greatest number" was a malleable concept that would be defined by the context of the policy question, not by any fixed definition. Strictly scientific economic models could not capture the many dimensions of "good," which was why their scientific models did not lead to any policy implications on their own.

All these value issues were embedded in the ambiguous concept of utility, and what was meant by utility could change with the problem being considered. For using the utility concept in science, this was a serious problem; for using utility in moral philosophy, it was an advantage. It facilitated the value policy discussion.

The Neoclassical Sham Social Welfare Function Solution

This Classical methodology that separated science and policy methodology did not last. Instead, the economics profession tried to integrate applied policy into the science. This new scientific approach to applied policy economics developed in the early 20th century with the development of the Walrasian branch of neoclassical economics and welfare economics.

Initially, welfare economics tried to draw policy conclusions directly from economists' formal models with no mention of the role of values for policy analysis. This allowed policy analysis to be framed within a Walrasian general equilibrium system of equations and a general policy model to be developed in which the goal of policy was to maximize aggregate utility.

As that happened, economists' policy thinking started gravitating toward a specific model, and its policy advice became centered on a particular set of allocation problems highlighted by that model. Policy problems were seen as externalities, and policy issues that did not nicely fit that characterization received little focus; those issues that did not fit the externality framework began to be seen as outside the scope of economics. For example, policy solutions based on models involving semi-endogenous tastes or relativity conceptions of welfare were simply not discussed despite their obvious potential importance for policy. While, as I discussed above, Classical economists did not assume that they could quantify utility in a general context—the concept was simply meant as a framework for policy discussion—neoclassical economists tried

to do so.[17] Thus, in their policy models, they started to talk about policy as if its goal was to maximize an aggregate utility function, which was thought of as the sum of all individual's utility functions.

This quantification of aggregate utility stripped economic policy analysis of its nuanced philosophical dimensions of values. It also assumed utilities to be measurable and comparable. Scientifically, there was no way of doing this, nor was it clear philosophically that reducing the goal of policy to a one-dimensional measure was useful. As these problems were pointed out, economists modified their analysis to superficially deal with them. Specifically, they added a social welfare function to their applied policy models, so that the goal of applied policy became seen not as maximizing the sum of utilities but instead as maximizing a social welfare function, which was not only composed of individual's utilities but which also included society's moral judgments.

Because the social welfare function was designed to embody society's moral views, which were to be determined by philosophers outside the model, it avoided falling prey to Hume's Dictum. The social welfare function was to be essentially subcontracted out, and given to applied policy economists by policy makers when they asked for economists' advice. This left economists to handle the technical issues of maximizing appropriately social weighted utilities, without dealing the values and normative issues of how those values were arrived at.[18] Armed with the social welfare function, economists could use their scientific model while agreeing that values needed to be included in the analysis.

The social welfare function provided an elegant theoretical solution to the problem of integrating values into neoclassical economists' analysis and their scientific approach to policy. As a practical solution, it was a sham. There are two reasons why. First, as I argued above, understanding of the values only emerges from within the discussions of policy. If that is the case, values cannot be known independently of the analysis. Second, even if those values could have been determined independently, as a practical matter, values were far too complex to integrate in any meaningful way into a formally specified social welfare function.[19]

Despite these problems, the social welfare function approach was adopted wholeheartedly by the profession and any serious considerations of values by economists as part of their applied policy analysis was removed from economists' applied policy analysis. This allowed them to remain scientific in their applied work. The cost of "being scientific" to applied work was significant. All manner of questions got pushed out of the analysis: What if people believed that putting prices on goods lessoned the value of the good? What if people are concerned with other's welfare, not in an altruistic way, but in a selfish way, so that utility functions are intertwined? What if people did not care all that much about material goods, but cared about having a fair society? What if the process of allocating goods is part of the value individuals assign to goods? All such questions are simply avoided by economist's applied policy social welfare function approach.

The Craft of Applied Policy Economics

Once applied policy is recognized as a blend of moral philosophy and science, it will also be recognized that applied economists will have to have a foot in both fields. This would require a change in economists' training so that applied policy economic training is differentiated from a scientific economic training, just as an engineer's training is differentiated from a scientist's training. Applied policy training would be relatively more focused on problems of applying the models, and less on learning the technical aspects of the models. There would be training in the philosophical reasoning process, and in ways to determine and integrate society's normative sensibilities and values into policy. Thus, the impartial spectator approach would likely be taught and applied to various issues; discussion of fairness of policies will be significantly increased.

This change in training is likely to lead to a change in attitude of applied policy economists. They will see themselves as craftsmen who practice the craft of economics, not as value free scientists. They will see their policies as implementing values, and they will spend significant effort on arriving at reasonable social values inherent in those policies. In their research, they will be attuned to noneconomists' concerns about the implicit values in economic policy analysis, and to concerns about economists' methodological shortcuts. Applied policy models would be presented not as deep theories but as reasonable heuristics. Discursive methods will no longer be automatically put down.

These discursive methods will allow and even encourage challenges to many of the simple goals that applied economists build into their policy analysis, not because those goals are ad hoc but because they that not as useful as other ad hoc goals that moral philosophers have explored. For example, most people do not want more material goods just to have more material goods; they want "a life well lived." To achieve that, people have social goals, spiritual goals, and private material goals. Engineering economic policy methodology will be designed to take all such complicated goals into account.

An example of the type change that will likely occur can be seen by considering economist's goal of efficiency. Currently, as a shorthand, economists often discuss policy in reference to efficiency, as if efficiency were a goal unto itself. As engineering applied economics will have multiple goals, that shorthand will be far less used, and when it is used, it will be explicitly justified. Efficiency will be seen as a description of how goals are met, not as a goal unto itself. Applied economists' main tool, cost/benefit analysis, will likewise be seen as a shorthand, with both costs and benefits having values inherent in their specification.

When discussions of policy goals are not focused on abstract specifications of efficiency, much current discussion of applied economic policy focuses on a goal of maximizing a measurable output—for example, maximize GDP. As society has grown richer, the concern about material welfare—the welfare measured by GDP—has been reduced, making the GDP simplifications problematic. In many ways, for developed Western economies, the economic problem embodied in biological needs, as earlier economists thought of it—providing material goods to people—has been solved. The policy problems we face now are more involved with meeting people's psychological needs. A GDP goal does not capture those needs well.

An example of an alternative to a GDP goal is Amartya Sen's (2007) capabilities approach, which focuses the goal of policy on people having the freedom to achieve well-being. That well-being can be proxied by people's real opportunities, or their capabilities to undertake them. Those proxies could provide a general capabilities index as a policy goal. If adopted, it would lead to a quite different set of policies than we currently follow.

To deal with policy in an economy in which these psychological issues drive welfare, we will need new models that deal with how tastes are formed, and how relative income, not absolute income, drives individuals' choices. Behavioral economics is beginning to explore such issues scientifically, but its models have been slow in coming, because, by design, science moves slowly. Engineering, which sees models and theories as heuristics, moves much more quickly to explore the implications of alternative models; whether a model is the currently accepted scientific model is of little concern. This heuristic approach to theory allows applied policy economists to explore solutions to the emerging policy questions long before the science that underlines the model is accepted, or even develops.

A philosophically rich policy would be judged relative to goals such as Ralph Waldo Emerson's goal, in which "the purpose of life is not to be happy. It is to be useful, to be honorable, to be compassionate, to have it make some difference that you have lived and lived well." When we develop a social welfare function that can capture such goals, then we will have a social welfare function that is useful in applied policy. Until then we will have to rely on discursive measures to judge welfare. But even without being captured in a functional form, it seems clear that the "life

well lived" policy goal would change views of what is useful policy. The role of economic policy would not be to get as much stuff to people as possible, but rather to design an economy in which individuals can feel useful, be honorable, and be compassionate.[20]

Dealing With Poorly Defined and Differing Values

Explicitly dealing with how policy meets people's poorly defined values and goals for life will require different methods of analysis. Introspection will play a key role; focus groups will likely become part of an applied policy economist's standard research tools, so that people's likely reactions to proposed solutions can be explored and modified, to better fit those reactions.

Recognizing that policy needs to deal explicitly with values will lead to a change in the composition of economic research groups. Currently, applied research work is generally done by groups with similar policy views. Researcher with strongly partisan views on different sides seldom work together to address their differences as part of their research. Instead, partisan research groups communicate with other groups through journal articles. This significantly slows the discussions of values and the resolution of those differences. Often the debate is never resolved—for example, the same debates about minimum wage laws are going on today that went on 50 years ago. Designing research groups so that they are composed with researchers with strongly opposing values will likely speed up that discussion of values and sensibilities and lead to a creative policy that both sides can accept.

Integrating values into the policy analysis discussion will change the level of precision of the models. It makes little sense to carry out part of the analysis to a high degree of precision when other aspects of the analysis are only rough guesses. Any more precise analysis than the precision of the weakest link of the chain of reasoning serves little purpose.

As many policy problems faced by applied economists have highly uncertain elements, scientific precision in any part of the analysis is usually not appropriate for the relevant heuristic. It is just wasted effort. To deal with the imprecision, engineers use rules of thumb with large fudge factors, which become precise only for those problems where precision is easily achievable and needed. This is *not* what applied economists currently do when they follow an applied scientific methodology. Their scientific methodology puts science and precision first. It directs economic thinking toward first solving abstract problems, and then relating that abstract solution to real-world problems; the engineering methodology puts applied work first. It directs economists toward first solving imprecise real-world problems, and only secondarily relating that solution to abstract models.

Institutional Design and Formation Policy

Policy can be implemented at many different levels. It can be based on existing institutional structures, or can be designed to change institutional structures at various levels as institutions are nested within each other. Real-world policy advice inevitably involves decisions about what institutional structures to leave in place, and which to change. Standard applied economics policy analysis gives short shrift to this problem of level of change because it provides little consideration of the institutional context within which the policy will be implemented.

What this has meant in practice is that an entire branch of policy analysis—which I call formation policy—has received little focus. Formation policy explicitly considers levels of institutional change, and involves a redesign of the institutions and systems within which individuals act. It is focused on institutional choice and design, and the incentives that will exist within institutions. Fairness is central to that analysis; if the institutions are seen as unfair, then the allocation of resources within those institutions will be seen as unfair, even if they involve mutually beneficial trades, which is the issue that much current allocation policy focuses on.[21] Formation policy deals

with questions such as: What should property rights be? How should property rights change over time? What norms does the policy we are advocating establish? How will a particular institution change those norms? Will another policy lead to preferable norms, and how do we determine whether they do?

An important reason why formation policy and institutional design have received less focus is that their analysis requires a much greater integration of values and sensibilities into the analysis than the scientific method allows, making it almost impossible for economists to follow an applied policy scientific methodology to analyze them. In formation policy, perceived fairness is a central issue. Modern applied policy economists have essentially stopped analyzing issues of fairness, and have limited economic policy analysis to allocation issues given an institutional structure.

Starting with Adam Smith (1759) and up until the 1930s, top Classical economists struggled with formation and fairness questions, which for Classical economists were considered very much within the scope of economics. For example, John Stuart Mill (1848), when comparing capitalism and socialism, wrote,

> The laws of property have never yet conformed to the principles on which the justification of private property rests. They have made property of things which never ought to be property, and absolute property where only a qualified property ought to exist. They have not held the balance fairly between human beings, but have heaped impediments upon some, to give advantage to others; they have purposely fostered inequalities, and prevented all from starting fair in the race. That all should indeed start on perfectly equal terms is inconsistent with any law of private property: but if as much pains as has been taken to aggravate the inequality of chances arising from the natural working of the principle, had been taken to temper that inequality by every means not subversive of the principle itself; if the tendency of legislation had been to favour the diffusion, instead of the concentration of wealth—to encourage the subdivision of the large masses, instead of striving to keep them together; the principle of individual property would have been found to have no necessary connexion with the physical and social evils which almost all Socialist writers assume to be inseparable from it. (p. 209)

Economists have not followed up Mill's concern about the workings of the existing property rights assignment structures because it was difficult to approach such questions scientifically.

No general analysis of how the economy might operate under different property rights structure developed. For example, what if property rights in land had been given out for 75 to 100 years, rather than in perpetuity, so that more of the long-term rents from land accrue to government, or to a social trust? Property rights of 100 years (as opposed to perpetuity) would likely have had indistinguishable incentive effects, but over the long run would likely have had a significant difference in terms of government revenue.

Changing property rights in land would be difficult now, but other property rights structures are constantly changing as technology changes, and economists have not provided much guidance in policy affecting that evolution. For example, patents are given out for 20 years, when a much shorter time would often provide almost the same incentive to produce. Copyrights are given out for 70+ years, even when the positive incentive effects of the longer copyrights seems to be limited.

Another policy issue that economists would likely focus on in formation policy concerns the creation of private institutions that encourage people to advance their pro-social goals rather than to advance their private goals, as current corporations do. Government's role as a moral guide for individuals will be seen as a powerful weapon in allowing solutions to social problems to be dealt with from the bottom up, rather than from the top down. For example, social for-benefit, rather than for-profit, corporations could be developed in which people with pro-social goals can work together to achieve their social goals. Mohammed Yunus's (2010) idea of social business could serve as an example. Once one gives up the attempt to shoehorn economics to fit a scientific

methodology, economists will be more likely to again address these broad formation questions and thereby reinsert considerations of fairness into economists' applied policy analysis.

Conclusion

Let me conclude by noting that the expansion in scope and method that goes along with accepting the engineering methodology is very much within the tradition of J. R. Commons for whom this lecture is named. In his applied work, Commons went far beyond science. He integrated sensibilities, power relationships, and distributional considerations with the goal of developing a "reasonable" framework of institutional rules. In doing so, he blended issues of efficiency, ethics, justice, and fairness into policy design.

Commons and his students played a central role in developing the current institutional foundation for our economy and society. That institutional framework served us well for 75 years, but it is now getting a bit frayed. Given the problems facing society, it is time to think about redesigning those institutions. My hope is that this lecture encourages other economists to follow Commons's footsteps.

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Notes

1. As I will discuss below, Classical economists separated economic science from applied economics. It was only in the early 20th century that the methodologies of scientific economics and applied economics were combined.
2. It is not only economists who exhibit this smugness; most Science, Technology, Engineering and Mathematics (STEM) academics exhibit it as well. So economists are simply bringing that scientific smugness into the social sciences.
3. Economic textbooks often explicitly state that their pedagogical goal is to teach students to think like an economist. My sense is that they do this because they believe that the way economists think is the right way to think, and that it should be the way all social scientists think.
4. While it cannot be totally value free, it can be relatively value free compared with other approaches.
5. While there are many different views of what philosophical methodology is, in all expositions it is much more discursive than scientific methodology. It usually involves an inherent skepticism—doubting everything, offering potential solutions, and then discussion of those solutions with others to arrive at a joint resolution (Capelen, Gendler, & Hawthorne, 2016).
6. Philosophical truths are embedded not in scientific understanding, but in phronesis, the Greek philosopher's name for practical wisdom that is gained through the process of joint reflection and reasoned argument.
7. I use engineering here in a way that does not assume that policy makers can almost mechanically control the economy. I fully agree that, at best, policy might be able to influence its evolution (Colander, 2014). Hayek preferred to describe the type of economic engineering I am suggesting as gardening (Hayek, 1944) not engineering. I have no problem with that description, which emphasizes the pragmatic, bottom up approach that guides the craft. Applied policy need not include trying to control; its goal can be to create a bottom up friendly environment that allows individuals to develop to their full capacity.
8. Some economists already specifically note that their methodology is an engineering methodology. An example of this approach can be seen in Al Roth's work on matching algorithms (Roth, 2002; Roth &

Peranson, 1999; Roth, Sönmez, & Ünver, 2004). Roth, who explicitly notes that he uses an engineering methodology, lets fairness consideration play a key rule in guiding the development of his policy recommendations.

9. Elsewhere I have spelled out what the acceptance of an engineering methodology would mean for applied economic policy and have reduced it to some simple changes. They were as follows:

   - Policy economists should use any heuristic that moves you toward a solution
   - Policy economists should see themselves as Problem Solvers, not Truth Seekers
   - Policy economists should emphasize the ad hoc nature of their models and other heuristics
   - Policy economists should add a fudge factor to their policy recommendations
   - Policy economists should attempt to be more creative in their thinking about policy.

10. The problem of determining the correct methodology for applied policy is not only a problem for economic science, but it is also a problem for all science. It is less of a problem for the hard sciences. A likely reason is because the hard sciences have a separate engineering branch of the science which deals with applied policy. Engineering is the applied policy branch of science. If economics had created another branch of economics, economic engineering, much of the current problem with methodology would be solved. These economic engineers would receive different training, and would follow a different methodology than does economic science. When the hard sciences become directly involved with policy, they too have problems. For example, the hard sciences are having a hard time distinguishing scientific questions such as: Is the climate warming and a central cause of that warming carbon emissions? from policy questions such as: What should society's response be to it? The first is a scientific judgment, in which values play a minimal role. The second is a policy decision in which values play a central issues. Climate scientists have not done a good job separating the two, just as economists have not done a good job separating out applied policy issues from scientific issues in economics.
11. Let me emphasize that my discussion is of applied policy economics. The consideration of the methodology best designed for the discovery of scientific knowledge, which involves extending our understanding of the economy by discovering economic truths, is outside the scope of this article. I leave such issues to philosophers of science. Thus, for example, DSGE (Dynamic Stochastic General Equilibrium) macro might be better science than neoclassical synthesis macro; my argument is that even if it is better science, it is not necessarily better applied policy macro.
12. This makes history an important element of values, making it impossible to make moral judgments on income inequality without a knowledge of the history within which the income was distributed.
13. To see the difference in sensibility, consider Robert Lucas's (2001) comment that "mathematical analysis is not one of many ways of doing economic theory: It is the only way. Economic theory is mathematical analysis. Everything else is just pictures and talk" (p. 9). This sentiment would be foreign to an engineer. For an engineer, pictures and written discourse can be appropriate if they move you toward a solution to a problem. In the initial stages of design formulation, loose discourse is often the most cost effective method.
14. Paradoxically, Friedman cites Keynes's division of economics into three separate branched, positive economic science, applied policy economics, which Keynes called the art of economics, and normative economics as the source of his methodological views. But then he goes on to discuss methodology as if applied policy economics was identical to positive economics, concluding that advances in positive economics will resolve policy disputes (Colander, 1992).
15. Robbins's suggestion was not followed and, paradoxically, his methodological argument was seriously misunderstood, and it had the opposite effect of what he wanted it to have. It was interpreted as implying that value judgments and interpersonal utility comparisons had no place in economics. His argument was not that. It was that value judgments and interpersonal utility comparisons have no place in the *science of economics*. He saw values as having a central role in applied policy economics.
16. In judging a policy, one did not oppose a policy because one believed it was inherently wrong, but rather because one believed that it would lead to results that do not benefit society.
17. For example, Francis Edgeworth hypothesized a hedonometer that would measure utility (Colander, 2007).

18. Interestingly, Abram Bergson (1938, 1954) who developed the social welfare function approach distinguished a "social" welfare function from an "economic" welfare function. He pointed out that his analysis was limited to economic welfare analysis only. This left an alternative path through which values could reenter the analysis—as the economic welfare analysis was integrated into a broader social welfare analysis. That distinction was forgotten, and in Paul Samuelson's version of social welfare analysis, there was no distinction between the economic and the social welfare function.
19. About the only "value" that is ever added in to the social welfare function is the social value that poor individual's incomes are to be given greater weight than richer individual's income. While most people would agree with that general judgment, there would be enormous debate about the particulars, and there would be general agreement that many more issues need to be taken into account before most people would be willing to agree to that way of using values in policy analysis. (For example: In what way has the person earned the money? And: What needs does the person have?) As moral philosopher Harry Frankfurt (2015) argues, a strong case can be made for the view that it is fairness that most people care about, not equality per se. The social welfare function approach misses many of the dimensions of fairness that most people hold.
20. Economists have long called for such a change in goals of policy. J. M. Keynes (1930) put it this way:

> When the accumulation of wealth is no longer of high social importance, there will be great changes in the code of morals. We shall be able to rid ourselves of many of the pseudo-moral principles which have hag-ridden us for two hundred years, by which we have exalted some of the most distasteful of human qualities into the position of the highest virtues. We shall be able to afford to dare to assess the money-motive at its true value. The love of money as a possession —as distinguished from the love of money as a means to the enjoyments and realities of life —will be recognized for what it is, a somewhat disgusting morbidity, one of those semi criminal, semi-pathological propensities which one hands over with a shudder to the specialists in mental disease.

21. An exception to this failure to consider fairness in applied policy is the applied game theoretical mechanism design work done by Al Roth. As Roth presents himself as an economic engineer rather than a scientist, this is consistent with my argument that seeing oneself as an engineer will lead one to focus more on institutional design.

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