Economists Should Stop Doing it with Models (and start doing it with Heuristics)

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Economist's penchant for models is well known. Robert Solow captures it well in his summary of what modern economics is: "Today, if you ask a mainstream economist about almost any aspect of economic life, the response will be: suppose we model that situation and see what happens." (Solow, 1997, 90) Put another way, whatever it is that economists do, they do it with models.[1]

Economists' fetish for models is, in my view, a problem. The problem is not that economists have a relationship with models. A model is simply a heuristic—a simplification of reality. Using a model is a natural way of trying to understand an issue. So having a relationship with models is healthy. Having a fetish for a certain type of model is not. The problem is that economists interpret models narrowly—what they mean by models are semi-formal models, such as a supply/demand, trade, or principle agent model that has precise assumptions and conclusions. The models they like best can be captured in a two, or possibly three, dimensional graphs, or in a solvable set of equations. Such models are seen by economists as scientific and objective; they give gravitas and concreteness to economist's policy recommendations.

Economists' fixation on this particular subset of semi-formal models has stopped them from doing whatever it is that they do with other sorts of models—intuitive models, agent based models, analog models, back of the envelop models, or moral models to name just a few. In fact, just about any aid in arriving a conclusion can be classified as a model. Such a broad classification of model makes the term so inclusive that it serves little purpose. A better name for this more inclusive concept of models is heuristics which are defined as mental shortcuts that ease the cognitive load of making a decision. The thesis of this article is that economists should do it with heuristics, not with models.

Economists' focus on semi-formal models leads them to become fixated on a particular model and draw policy conclusions from models that don't fit the policy problems they are talking about. [2] It causes them to lose objectivity, and get tied into policy positions that cannot be supported by a common sense reasoned approach. Dani Rodrik (https://www.project-syndicate.org/commentary/trump-win-economists-responsible-by-dani-rodrik-2016-11) nicely captured the problem in discussing economists' policy positions on free trade. He notes that economist's standard trade models correctly point out that, given the assumptions of those models, free trade is good social policy. But in drawing out policy implications from their trade models, we economists often tend to forget, or at least significantly downplay, the assumptions of the model that lead to the policy results. Roderick writes:

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[1] The penchant of economists for models has been humorously captured by Jodi Beggs who has created a business and web site entitled "Economists Do it with Models." (https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=economists%20do%20it%20with%20models)

[2] This tendency to draw definitive policy conclusions from models whose assumptions don't match the real world situation is often called the Ricardian Vice, because David Ricardo had a tendency to make that mistake.

> It has long been an unspoken rule of public engagement for economists that they should champion trade and not dwell too much on the fine print. This has produced a curious situation. The standard models of trade with which economists work typically yield sharp distributional effects: income losses by certain groups of producers or worker categories are the flip side of the "gains from trade." And economists have long known that market failures – including poorly functioning labor markets, credit market imperfections, knowledge or environmental externalities, and monopolies – can interfere with reaping those gains.
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> They have also known that the economic benefits of trade agreements that reach beyond borders to shape domestic regulations – as with the tightening of patent rules or the harmonization of health and safety requirements – are fundamentally ambiguous.
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> Nonetheless, economists can be counted on to parrot the wonders of comparative advantage and free trade whenever trade agreements come up. …They have endorsed the propaganda portraying today's trade deals as "free trade agreements," even though Adam Smith and David Ricardo would turn over in their graves if they read the Trans-Pacific Partnership.
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> This reluctance to be honest about trade has cost economists their credibility with the public. Worse still, it has fed their opponents' narrative. Economists' failure to provide the full picture on trade, with all of the necessary distinctions and caveats, has made it easier to tar trade, often wrongly, with all sorts of ill effects.

I could give numerous other examples where economists forget, or at least significantly downplay, the qualifications that need to be considered when relating results of models to policy advice.[3] The problem is not the models per se, but economists' tendency to focus on the results of models without sufficient emphasis on the limitations of the models. As Rodrik notes, that penchant for models has undermined economist's credibility.

Economists should do it with Heuristics, Not with Models

I wouldn't be writing about this problem, if I didn't have, or at least think I have, a solution. My solution is simple: policy economists should stop thinking of themselves as applied scientists and start thinking of themselves as engineers.[4] The reason why is that engineers don't do it with models; they do it with heuristics. As I discussed above, a heuristic is "anything that provides a plausible aid or direction in the solution of a problem but is in the final analysis unjustified, incapable of justification, and fallible." Heuristics includes the semi-formal models that economists tend to think of as models, but they also include highly informal models, intuition, and anything else that might lead to an answer to the question one is trying to answer. The very name, "heuristic" emphasizes the limitations of the models and thus makes it less likely that economists will fall prey to the Ricardian Vice.

[3] Paul Romer (2017) gives examples of the problem in his discussion of modern macro.

[4] Billy Vaughn Koen (Koen, 2003), who has written what appears to be the current standard methodological treatise for engineering defines the engineering method as *"the strategy for causing the best change in a poorly understood or uncertain situation within the available resources."*

I discovered the importance of heuristics as I explored engineering methodology and how much it emphasizes heuristics. Billy Vaughn Koen, one of the few engineers who has written about engineering methodology, makes the importance of heuristics 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, 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 notes four signatures of a heuristic—

- it does not guarantee a solution;
- it may contradict other heuristics;
- it reduces the search time in solving a problem;
- its acceptance depends on the immediate context instead of on an absolute standard.

Unlike economists, who tend to see themselves as applied scientists, engineers see themselves as problem solvers; they are not limited by scientific methodology. Instead, they see themselves using "state-of-the-art" (SOTA) heuristics. These SOTA heuristics are recognized as field-specific and ad hoc. They are constantly changing, as engineers learn by doing. So whereas scientific methodology tends to be rigid and similar across subfields of science, engineering methodology is loser, evolving, and in a constant state of flux. The term, heuristic, explicitly recognizes and highlights the ad hoc nature of their models and other heuristics. Because it does, engineers are more likely to avoid putting too heavy reliance on a particular model in policy thinking. Doing it with heuristics, not models, will encourage economists to use their educated common sense in applying models to policy.

How Doing it with Heuristics will Change what Economists Do

Below are five ways in which doing it with heuristics rather than doing it with models (or put another way, if economists saw themselves as engineers rather than as applied scientists) would change the way applied economics is done.

1. Policy economists would use any heuristic that moves you toward a solution

Engineers use many heuristics and they may well blend a highly formal model with a back of the envelope word model. An engineer does whatever is necessary to arrive at a solution in the time available. Arriving at an answer to a question might involve back of the envelop calculations, input from other specialties, guestimates, and individual judgment—whatever is needed to arrive at a recommendation. In deciding how to allocate scarce research time for thinking about the problem, engineering follows the weakest link principle—it allocates research resources to that part of the problem that seems to be the weakest link. At times, that might be science, but at other times, it might be philosophical questions having to do with goals, sensibility questions having to do with whose judgment to use, or institutional questions having to do with implementation, or historical questions having to do with how similar problems occurred in the past. Whereas a scientist is a specialist, an engineer is a generalist, who brings many different skills to bear on a question. So the research focus of an engineer and a scientist differ.

2. Policy economists would see themselves as Problem Solvers, not Truth Seekers

Since engineering is focused on problem solving, not truth finding, it addresses all aspects of the problem relevant to arriving at a solution, whether that aspect is amenable to scientific treatment or not. Let's relate that to economics. To talk about economic policy, we need to know the goals of individuals and society is. What policy is presented as best depends heavily on how we specify those goals. Koen writes "A fundamental characteristic of an engineering solution is that it is the best available from the point of view of a specific engineer... Theoretically, then, best for an engineer is the result of manipulating a model of society's perceived reality, including additional subjective considerations known only to the engineer constructing the model. In essence, the engineer creates what he thinks an informed society should want based on his knowledge of what an uninformed society thinks it wants." This makes engineering include coming to a consensus decision on normative issues—something that economics has tried to avoid.

3. Policy economists would emphasize the ad hoc nature of their models and other heuristics

Because the ad hoc nature of heuristics is emphasized within the definition of the term itself, policy implications of heuristics are more likely to be presented with their limitations than are the semi-formal models that economists use. Heuristics do not arrive at definitive policy conclusion; they simply aid in judgment. In engineering, the subjective and ad hoc nature of the method is recognized and any model used is not thought of as representing the correct model. This means that the engineer presents his or her recommendation with no more certainty than he or she has in the weakest link of the chain of arguments needed to arrive at the proposed solution.

4. Policy economists would add a fudge factor to their policy recommendations

Because allowance needs to be made for the imperfection of the knowledge in any heuristic, any recommendation in engineering is accompanied by an adjustment for unknowns, often called fudge factors. These safety adjustments are determined through experience, not through scientific calculation. History is an important part of engineering, but not of science. You know what worked in the past, and you know what hasn't even though you thought it should have worked according to the then SOTA model. Based on that history or failure you add appropriate fudge factors to your recommendations for new policies.

5. Policy economists would attempt to be more creative in their thinking about policy.

A final difference that doing it with heuristics would bring about involves creativity. Creative design is an important part of engineering methodology. This creative part of engineering has little to do with science, it is best thought of as an art, requiring a sensibility, a sense of esthetics, not analytic knowledge. Good engineering training involves much more than technical training; it requires on-the job experience, and a broad set of capabilities. In the planning stage of a policy solution, an engineer will design alternative theoretical solution to problems, and that design will feed back on his research—thus, in engineering the research strategy can only be determined *after* the proposed solution is conceptualized. Different designs will require different research. This means that engineering economists will be much more likely to use models to arrive at creative solutions, and then work backwards to see if those creative solutions might work in practice.

Conclusion

My argument has, for rhetorical purposes, been a bit strong. The methodological precept I have been arguing for: Use whatever heuristic that best fits the problem being addressed is itself a heuristic, just as the scientific method is a heuristic. My argument that economists should do it with heuristics, not models, should be treated as a heuristic, not as a rigid guide. It is a heuristic for applied policy work in economics, not for scientific work, where the goal of research it to find the truth, not find a workable policy solutions. I make no claims that my proposed heuristic has anything to do with the methodology for scientific economics, often called positive economics.

The reason the engineering heuristic differs from the scientific heuristic is that the goal of engineering and the goal of science differ. The goal of science is to discover the truth, and the scientific method is the SOTA method that economists have developed to find that truth. My point is that science methodology doesn't carry over to policy methodology. The goal of engineering, and of economics policy analysis, is not to find the truth; it is to find workable solutions to problems. My claim is that the scientific method may not be the best way to do that—it often focuses too much or precision and formality, and not on creativity and nuanced ambiguity, and thus it does not allow sufficient exploration of alternative approaches. [5] Doing it with heuristics, not models would tend to correct that problem.

References:

Koen, Billy Vaughn. 2003 *Discussion of the Method*, Oxford University Press.

Roderik, Dani.

Romer, Paul. 2017 "The Trouble with Macro" *The American Economist*,

[5] This is not to say that they are not related. Engineering often leads science. It finds ways that work in practice, without regard for whether they work in the existing scientific theory. So a part of a good scientific methodology is to listen to the engineers, and see what things work, and then explore why the existing scientific theory didn't have them working.