How Economic Theory Can Be Useful to Policy Students

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August 2017

What this is about

Aspiring economists whose hearts are set on applied, policy-relevant work can still benefit from studying micro-economic theory deeply. How exactly this is so may not be immediately obvious—so, to suggest how theory might be useful to someone who is not writing theory papers all day, I have developed the following practical example.

A practical example

Suppose you study education policy, and you’re working with a municipality on an evaluation of capital expenditure in schools on teacher performance. This project is intended to be your contribution to the “do school inputs matter” literature.² The municipality plans to provide money for equipment that teachers use to prepare their lessons on a daily basis (like copy machines and paper cutters). Previously teachers had to share these resources, which resulted in wasted time and delays. In order to study the effectiveness of these inputs, the municipality has decided to provide funds to only a random set of schools; the others will remain as “controls.”

How should you design your study so that it is as informative as possible?

The most straightforward approach would be to compare the learning outcomes in treatment schools with learning outcomes in control schools. The estimated treatment effect would give you a sense of what to expect if you were to implement the same program under similar circumstances again.

But these caveats are very restrictive. Circumstances hardly ever remain the same. Not only are circumstances likely to be different across municipalities, but they may change within the same municipality as well. Moreover, political authorities usually do not take too well to take-it-or-leave-it policy proposals. They’ll want to tweak the original plan to suit their economic, political, and social constraints.

¹ Thanks to Katie Cunningham and Blake Heller for helpful comments and suggestions. Any remaining errors are my own.

² This literature is in fact one of those cases where theory helped clear up some earlier confusion generated by empirical work; see the Card and Krueger (1996) response to Heckman et al (1996), which in itself was a critique of the theory-less Card and Kreuger (1992); if you are interested in this topic in general, some more recent entrants in the literature include Jackson, Johnson, and Perisco (2016) and John Klopfer’s job market paper.
All of these considerations call for extrapolation from the original study. All extrapolation is fraught with error, but there are better and worse ways of doing so. Theory will hopefully help provide a better way.

There are two contributions that theory will make here. First, it will provide a framework for abstracting, i.e. understanding this intervention as a specific instance of a general class of similar interventions. This will help us address the take-it-or-leave-it problem: it allows us to suggest other interventions that are likely to have the same effect because they work in the same way.

The second contribution of theory is to decompose the total effect into policy-relevant components. This will help us address the changing circumstances problem: we’ll get a better mapping of the channels through which the effect operates, which will make clearer what background circumstances are necessary to support the success of the intervention.

In concrete terms, here is what that means. We will suppose that the main effect of the intervention is to cut the amount of time teachers have to spend preparing lessons.

Microeconomic theory gives us the following abstract understanding of the same intervention. Suppose that we focus on teachers’ time allocation. That is, they have a 24 hour time budget constraint, which they “spend” on various activities. The price of an activity is the amount of time they have to spend to accomplish one task. Put in these terms, the capital expenditure intervention is equivalent to reducing the price of preparing lessons.

The value of abstraction

Note the mileage that we gain from this abstraction already. Here, the capital expenditure intervention is just a specific instance of any intervention that reduces the cost of preparing lessons. Now when you discuss policy proposals, you can consider a much wider array of options than just buying copy machines. This could include parent volunteers who help with copying, or installing projectors in classrooms which circumvents the need to make copies in the first place. Political authorities will appreciate this flexibility.

Of course, the extent to which these alternative interventions are good substitutes to your own depends on how well-fitting the abstraction is. How do you know that your intervention is not better described by another model? The good news is that models usually have testable predictions, and models are usually defined by the differences in their testable predictions. Understanding how models differ in their testable predictions is one of the main goals of studying theory. (The bad news is that we only find out how well the data fits the model after we have run the study. Having a deep, qualitative understanding of the setting that you are studying helps minimize the risk that your model will be ill-fitting).

In this example, I have supposed that we knew the effects of the intervention, and then abstracted. In practice, often all the effects of a particular intervention will not be obvious upfront. In that case, it is easier to see the intervention as a member of the abstract class first, and then use that link to predict the likely effects in the specific case. That is, once you have been trained in understanding the ‘price change template,’ it will be easier for you to think through the
likely consequences of a price change, rather than anticipating specific reactions to copy machines. These abstractions help researchers be sure that they are collecting all the outcome variables that may change as a result of the intervention. The last thing you would want is to miss out on a first-order treatment effect!

Using theory to understand mechanisms

Theory also helps us mine our studies for more information than there may appear to be at the surface. One of the key concepts that you will learn this semester is that every price change can be decomposed into a substitution effect and an income effect. Without going into details now, the substitution effect tells us how teachers reallocate their time now that lesson preparation is cheaper; and the income effect tells us how they reallocate their time because they now have more available time in the day.

Separating the income and substitution effects help us address the changing circumstances problem. Suppose we find that the effects on test scores are driven by an income effect-based reallocation of time away towards other important tasks that were being left undone. In that case, the success of the intervention in other contexts is likely to depend on those teachers also having other work left undone. On the other hand, if the effect is driven by teachers simply making more lesson materials because it is easier to do so, then this would suggest that the intervention is likely to be successful in places where there is latent demand for producing more lesson material.

Note that the income effect is also interesting in itself: it tells us how teachers choose to spend extra time when they have it. Do they allocate it towards teaching, or being at home? Demonstrating that teachers allocate the additional time to teaching would provide evidence that teachers aren’t able to get as much work done as they would like to at school, which may help related interest groups (like the teacher’s unions) build political support for investing more in schools.

The income and substitution effects cannot be directly decomposed from the basic treatment effects. We would need a second axis of variation (one that increases or decreases the amount of available time teachers have in general) and some assumptions on teachers’ preferences. The value of thinking through the theory is that it makes us aware of this possibility, so that we know how to set up the design if we want to be able to do this decomposition at the analysis stage.

What have we gained?

Look how far we have come. We started with a study that just told us what would happen if we implemented a fixed program in a fixed context. Using theory we have been able to draw links to other interventions that should work in the same way, and we were able to provide reasonable guesses of which other contexts are likely to yield similar results. Our study is now more useful to a much wider range of people, and other researchers will find it easier to link their own work to this project.
Unfortunately, this extra mileage does not come for free. It is built on assumptions, which our audience may or may not believe, and which may or may not be correct. The more assumptions we include, the more we can extrapolate. In the extreme, we can build a full structural model and simulate any possible counterfactual. On the other extreme, we can stay rooted to our basic treatment effects, and refuse to say anything outside of them. The optimal solution is likely to lie somewhere in between. As you learn theory, it will be useful to think about what assumptions you are willing to adopt in your own work.

Further reading

If you are interested in thinking more about the craft of economic modeling, there is a great literature on this subject. I recommend starting with Dani Rodrik’s Economic Rules. This book critically examines economic modeling with eloquence and humility, and will help you gain a better sense of what theory does well and what it does not.

If you’re interested in learning more about the pipeline from specific studies to policy recommendations in other contexts, Mary Ann Bates and Rachel Glennester have an excellent article in the Stanford Social Innovation Review on how they think of the problem.

References


3 Of course it doesn’t. There are no free lunches.

4 Banerjee, Chassang, and Snowberg (2017) provides a framework for thinking about the optimal level of assumptions. They model study design as a strategy played by a researcher in a game against an adversarial audience. Their paper focuses specifically on the design choice of whether to randomize subjects into treatment and control groups, but the principles from their framework can be applied to more general questions of whether or not to impose assumptions (with full randomization being the assumption-free benchmark).