Nemmers Prize Dinner Talk

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"The method of econometric research aims, essentially, at a conjunction of economic theory and actual measurements, using the theory and technique of statistical inference as a bridge pier."

From: T. Haavelmo, in his 120 page Nobel Prize winning treatise, "The Probability Approach to Econometrics", Econometrica, 1944.

I am going to try and give the non-economists in the audience a sense of what we do in empirical Industrial Organization, where we have gotten to, and what remains to be done.

Industrial organization analyzes market responses to environmental and/or policy change.

It recognizes that very few, if any, markets are either monopolies (one firm supplying a product that does not have competitors) or perfectly competitive (where firms have no ability to influence price). Virtually all markets are imperfectly competitive; markets where each firm knows its actions affect the payoffs, and hence the

actions, of its competitors.

In the 1980's theorists took up the challenge of analyzing responses to environmental and policy changes in markets where each firms' actions affected all firms outcomes, and this lead to a revolution in the way markets were analyzed. The work was based on notions of Nash equilibria (1956); or "rest points" where each agent (say firm or regulator) was doing the best it could given the actions of the other agents.

At an equilibrium no agent has an incentive to change its behavior and in markets not in equilibrium at least one agent does have an incentive to change. So it was natural to analyze changes in terms of the equilibria they could generate.

The applied theory that followed focused on simple models where different assumptions were used to generate an understanding of what could happen in imperfectly competitive markets. Though insightful, the different assumptions (on functional forms, the timing of decisions, ...) led to different conclusions, and it was not

clear which assumptions were appropriate for any given situation.

Enter empirical Industrial Organization. Our goal was to built frameworks that let the data tie down the needed assumptions; following a tradition that dated at least to Haavelmo's Nobel Prize winning 120 page Econometrica article.

Our progress was enabled by the advance in our computational abilities, the data that emanated from that, and advances by our theory and econometric colleagues. The Northwestern department, with its traditional strengths in Theory, Econometrics and Industrial Organization was deeply involved in this endeavor.

Our goals included helping policy by providing a deeper understanding of how markets worked. The empirical alternatives that were (and continue to be) available to influence policy were focused on measuring outcomes from observed policy changes without explicitly modeling behavior. This had the advantage of providing a single number that policy makers and politicians found easy to assess.

The disadvantage of this way or proceeding is that it could not credibly predict the outcomes from different policies or from the same policy in alternative environments. The strength of our approach is that, once we condition on the theory and have estimates of the primitives (demand and production functions, ...), we can construct outcomes from counterfactual policies, that is from policies that were being evaluated but not yet introduced, and from similar policies applied to different situations.

Of course we recognize that our models are not "correct" in any absolute sense of the word; the world is far too complicated a place for that. Our goal is only to provide the best possible guidance to policy makers; recognizing that a decision will be made with or without our input.

As better data, methodologies, and knowledge of institutional structures becomes available, they are (slowly) incorporated into our work leading to more accurate predictions.

We have been differentially successful in our attempts to mimic likely outcomes from policy and environmental changes. Our models for the impacts of choices on near term outcomes, say the prices that would emanate from a merger, a new regulation or tax, or a change in bidding rules in procurement auctions, have been used extensively. Not only in Industrial Organization but also in various related fields, by regulatory institutions, and to some extent by firms and statistical agencies.

We have done less well in modeling choices designed to impact the longer term evolution of markets; investments of various forms, including research and development activity. Here application of the simplest extensions of Nash-like assumptions to decisions of firms that understand that their actions affect their competitors actions leads to policy functions that are extremely complex.

The complexity generates cognitive demands on decision makers that are so far beyond the abilities of firms that it is hard to believe that there is not a better approximation to firm behavior. At the

same time the complexity also makes it difficult for researchers to use the models without greatly simplifying the assumptions used.

Relatedly, we are just beginning to analyze adjustment processes. That is none of us believe that firms instantaneously shift to a new equilibrium after an environmental change. Moreover in situations involving strategic interactions, where the decisions of one firm impact the profits of its competitors there might be more than one outcome that satisfies our equilibrium conditions, and a deeper knowledge of the adjustment process would guide us to the most likely ones.

These are a few of the topics that my colleagues and I are still working on.

I would like to conclude by thanking the Nemmers family and the prize committee, not only for the award to me, but also for the focus of past awards on the fundamental developments that underlie many of the advances in economics over time.

And of course, thanks to my wife and children, who put up with me while I was focused on all this.