Models and Economists: A Methodological Note

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Ever since the discipline of economics began, its practitioners have tried to infer laws, tendencies, causal relationships, associations, etc about the real world. The mode of reasoning used was predominantly verbal. In the successive periods, economics witnessed an increase in the use of diagrams, statistics and mathematics for purposes of reasoning. Today, we know that mathematical economics and econometrics form an essential part of the economists' toolkit. Irrespective of the mode of reasoning, economists make claims about certain mechanisms in the real world. These claims are made through the construction of models – mathematical, statistical, verbal or a mix of all three. This note examines the nature of this claim. Specifically, this note asks how claims about the real world can be made from models. This problem of inference is illustrated by examining the nature of the models that are employed in the Eleventh Five Year Plan of India.

In India, model building has been a central part of the plan formulation since the First Five Year Plan. Models such as Harrod-Domar and Feldman-Mahalanobis were used to determine the growth rates that could be achieved in the plan period. It is interesting to know that, the Planning Commission during the Eleventh Plan relied not only on their in-house model but also on models built by various research institutions within the country. These institutions include National Council for Applied Economic Research (NCAER), Indira

Gandhi Institute of Development Research (IGIDR) and Indian Statistical Institute (ISI), Bangalore. (see Planning Commission 2009, 11-12) The models developed check whether the Plan projections of sectoral growth rates and overall growth rates can be met, what the impacts of the global slowdown are on the overall growth rate, the effects of oil price shocks and how stimulus measures affect the GDP growth rate. These explorations are known as "conceptual explorations". They investigate "the internal properties of models, without considering the relationship between the world of the model and the real world" (Sugden 2000, p 8). These models assume that their explorations and projections hold true in the real world too.

It is pointed out that, an increase of public investment in services by 1% of GDP can increase the GDP of 2009-10 by 1.1 percentage points. Whereas, a 10% fall in exports volume will lower the GDP of 2009-10 by 1.5 percentage points. From such similar exercises, the Planning Commission felt that the government could mitigate the impact of the global slowdown. However, in a note, it is written that these projections are "From a general equilibrium model in which it is assumed that the adjustments to the new equilibrium are completed in one year. Thus, the impacts may be overstated as in reality this may not be the case" (Planning Commission 2009, 25). And, one paragraph later, it is written that "Nonetheless the models provide deeper understanding on the working of the economy and the possible impacts of policy measures" (*Ibid*). Thus, these models not only make inferences about the real world mechanisms, but they also compute how these mechanisms are affected by various policy measures. In this manner, these models perform the function of laboratories (Maki 2005, 308). They do so by initially *constructing* these models and then, *examining* these models by carrying out interventions (policy stimulus and shocks in this case).

From the above paragraph, the crucial role played by modelling in Indian policy formulation is clear. Models, we know, are representations of reality. There are two issues to reckon with here. The first issue is to what extent the model represents reality. And the second issue is, how does one make statements about the entire economy based on a model. This issue is a long-standing problem in philosophy. It is a problem of induction – suppose A is a white swan, B is a white swan, etc; from these individual observations how do we infer that all swans are white.

The models developed for the Eleventh Plan are based on different theoretical approaches. The approaches include Walrasian, Keynesian and structuralist. The equations used in each of these models reflect the world-view of the underlying approach in addition to the value of the parameters which pertain to the Indian economy. The Walrasian approach does not have money as a store of value. The implication of such an assumption is that, bank deposits, post office savings deposits, money invested in stocks and bonds, etc do not exist in a Walrasian economy. And most of these approaches divide the entire economy into the fiscal sector, monetary sector and external sector. The value of the parameters are estimated from the time series data of the relevant variables. None of these models seem to represent the distinguishing characteristics of the Indian economy. For one, there is no explicit recognition of the presence of the large informal sector. This informal sector has significant effects on the arenas of production, exchange and on the monetary sector. Also, no indication is provided of the rural-urban gap which is very visible in India. The relationships are mainly among the macroeconomic aggregates such as GDP, gross fiscal deficit, exports, gross investment, real effective exchange rates and so on. All of them are accounting identities, which have obvious

and trivial relationships with each other. To achieve inclusive growth, one needs to look at the structure of economic growth – the proportion of labour employed in agriculture, the degree of urbanisation, the increase in informalisation of employment, how much of employment is created by GDP growth, the nature of the employment generated, etc.

The second issue is that of inference, which asks how an "inductive leap" is made from a model to the real world. The question to be asked is: how credible are these models? That is, how do we trust the inferences made from these models? It is clear that "if we are to make inductive inferences from the world of a model to the real world, we must recognize some significant similarity between those two worlds" (Sugden 2000, p 23). According to Nancy Cartwright, a philosopher of science, a credible world "is a world that contains features that occur in the real world in arrangements consistent with constraints of certain real-world institutional structures, behaving in ways dictated by principles that are at least sometimes true in those structures" (Cartwright 2009, p 46). Once we go over the details of the models, it becomes clear that there are not very "credible". And, the outcomes depend crucially on the value of the "not so credible" parameters and equations.

To sum up, it is clear that when economists model the real world, they not only make quite unrealistic assumptions about the real world, but they also make an "inductive leap". In India, as seen earlier, macro-modelling occupies a very significant role in policy making. The methodological issues however have not received much attention. Owing to the limitations associated with modelling, it is very pertinent that economists adopt more caution when employing these models to intervene in the Indian economy.

References

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