

Book Reviews

Price Shocks and Energy Models

Macroeconomic Impacts of Energy Shocks. By B G Hickman, H G Huntington, and J L Sweeney (eds) Leiden and New York North-Holland Publishing Company, 1987, 331 pp, \$73 25

Reviewed by John M. Reilly

The book provides a reasonable introduction to the major macroeconomic models and analyzes similarities and differences among model responses to a set of macroeconomic shocks as well as potential policy responses to these shocks. It represents the working group report of model comparisons conducted by the Energy Modeling Forum (EMF) over an 18-month period in 1982 and 1983. The macroeconomic working group (EMF-7) follows a tradition of energy model comparisons dating to the results of EMF-1, published in 1977. EMF-7 includes the well-known, large US macroeconomic models with limited detail on energy (Wharton, Chase, DRI, Bureau of Economic Analysis, Michigan Annual Econometric, and MIT-PENN-SSRC). These models do not disaggregate by energy fuel. Therefore, substitution among fuels is not explicitly addressed. The number of models was expanded by the inclusion of several that have slightly different focuses: International macroeconomic linkages (LINK and the FRB Multi-Country Model), world oil markets and US economic growth (Mork Energy-Macroeconomic and Hubbard-Fry), small monetarist models (Claremont and St. Louis FRB), long-term macroeconomic growth (Hickman-Coen), and a Canadian model (MACE) that contrasts energy impacts in a small open economy.

The value to model users of controlled experiments across models is indisputable, but the process is difficult, time-consuming, and uninteresting to all but the narrowest of audiences. With impetus from the Energy Information Administration of the U.S. Department of Energy, requiring strict standards for model validation, support from the Electric Power Research Institute, and the careful, continuing efforts of the Energy Modeling Forum, the energy modeling community has taken

the lead in validating and comparing economic models. In this sense the workshop report provides a contribution to economic analysis and is justifiably a part of the North-Holland Series with the title *Contributions to Economic Analysis*. The book's lasting contribution is its documentation of the results of EMF's attempt to compare models and as an introduction to that process. Economic modelers in areas other than energy would do the profession a favor by imitating the EMF process.

The book is essential reading for the business and policy community that uses the large macroeconomic forecasting services. To their credit, the editors do much more than edit, providing a careful framework for comparing results and model structures without serving as proponents for or antagonists of particular approaches. The obvious audiences are those involved in energy policy-making and modeling. For them the book provides insights into how the economy responds to an oil or natural gas price shock and how monetary and fiscal policy may be used to limit inflationary or employment impacts.

The group pursued two broad goals. "First, we sought to understand the models themselves by identifying important commonalities as well as structural differences. Second, we sought to use the models to sharpen our understanding of energy shocks and of the related policy issues" (p. vi). It is difficult to compare model structures and simultaneously provide convincing policy guidance. The editors make it clear that they are aware of the difficulty. The reader, however, never gets a satisfactory answer to the question: Are we comparing models or understanding the economy? The reader is, therefore, unsure if the results indicate weaknesses of the models or provide fundamental insights into the behavior of the economy.

A simplified, reduced-form econometric model attempting to directly estimate responses to past oil shocks might have provided a benchmark comparison with the summary elasticities derived from the model experiments. Such an exercise would have provided a direct comparison with actual economy performance. The difficulty the reader faces is illustrated by the discussion of

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four questions for which energy economists have sought answers for at least the past 15 years

First, are the impacts of a drop in oil prices simply the opposite of a price increase? According to the editors, "the model results suggest that when the economy is experiencing significant unemployment, the economic gains from a modest oil price reduction of \$7 per barrel or less are equal but opposite to the losses induced by a price increase of comparable size" (p 4) The workshop participants did not consider other base employment conditions or other price drop magnitudes, they hesitated to extend their results to the more severe 1986 price drop I suspect model results under other conditions would suggest roughly equal, but opposite, impacts because the underlying production and energy demand relations do not capture structural features that could produce unequal effects¹ Thus, the finding is more indicative of the model structures than it is a finding about how the economy actually operates

Second, does an oil price shock permanently affect economic growth? According to the editors, "the more slowly adjusting models would presumably eventually recover to long-run equilibrium were the simulation horizon extended beyond four years" (p 173) Although growth effects are somewhat afield of the EMF-7 primary objective of shortrun impacts, more could have been made of any differences in predictions between the longrun growth models and the shortrun macroeconomic models Three simple characterizations of the impacts of energy shocks on growth are possible One possible impact is that the oil price shock results only in the unemployment of resources with no change in investment Thus, potential Gross National Product (GNP) grows undisturbed Once full employment is restored, the economy is back on track A second type of impact would include a temporary effect on investment With time to adjust, investment would regain its preshock level as would economic growth However, the economy would not make up for the investment it lost during the shock/recovery phase, making potential GNP less than if the shock had not occurred A third possibility is that the oil price shock would affect relative prices over time as well as across commodities, thereby affecting longrun savings and investment decisions and altering the growth rate of the economy If potential GNP is unaffected as in the first case, a focus on short-term macroeconomic effects provides an accurate picture of the full impact of the energy shock If either potential GNP or the growth rate of the economy is affected, short-term impacts may be swamped by growth effects

Third, how has the experience of the past 15 years changed the economywide response to an oil shock?

¹ See, for example, Paul C Stern (ed.), *Improving Energy Demand Analysis* (Washington, DC National Academy Press), 1984

Most of the models were estimated with 1960-80 data, with the data for a few models extending back further There is considerable evidence that the private sector increased its ability to respond to an oil shock (for example, penetration of dual-fuel capabilities) Attention to structural elements that might explain time-varying price responses could shed some light on whether these macro models tend to overestimate shock impacts, given the experience gained as a result of two major oil shocks

Fourth, how certain are we about the responses of the economy to an oil shock? According to the editors, "there was wide-spread agreement that a 50-percent oil price shock would severely reduce US real output and international purchasing power" (p 111), but there were substantial differences in the estimated magnitude of the response of the economy of Federal policy to alleviate the negative effects of the shock As macroeconomists, the model developers had strong and diverse views on macroeconomic policy These differing views translate into substantial predicted differences in the economy's response to the Government's fiscal and monetary policy The model developers were not energy economists, and they generally adopted similar and relatively simple representations of energy use and production The participants disagreed in the area in which they were relatively expert and agreed in the area in which they were relatively inexpert

These issues are not faults of the book, which provides a background against which the issues can be raised If the book is flawed in this area, it is because the editors did not raise the issues as directly as they might have and because they were overly cautious in bringing the simulation results to bear on the issues

A particularly useful result of the study is the clarity with which the editors remind us that GNP is a limited measure of economic impacts in an open economy, particularly with a foreign oil shock, because GNP fails to account for the terms of trade effects These effects represent a real loss of the Nation's purchasing power abroad not measured in unemployment and lower GNP The editors also show that a foreign oil shock would affect even an energy-independent United States The macroeconomic models clearly demonstrate that these energy shocks are transmitted indirectly to the United States through international trade Such effects are likely to be missed in models limited to the energy sector that deal only with energy trade

The book's 125 pages of overview are meant to be accessible to a broad audience, whereas the remainder of the book offers greater detail The overview is long and, although the terms used are relatively well de-

finer, it will be tough going for the reader lacking graduate training in economics or familiarity with large-scale macroeconomic models. The chapters offering greater detail do not offer that much more detail, conveying a sense of redundancy.

The major disappointment of the book is that, although the discussion of the models highlighted the value of having a diversity of types of models (long-term growth, quarterly macroeconomic, energy detail, and the Canadian model), the comparison of the results never took

advantage of that diversity. To what extent do some models have comparative advantages for certain uses because of the original focus of the modelers? Did the participants feel that the long-term models gave a better picture of recovery from the shock? Are there features of the long-term models that might improve the quarterly models? Should we put more faith in the models with an energy focus because we are dealing with an energy issue? Where do the rational expectations models fit, particularly in terms of the money supply policies explored?

More P's and Q's

Plutology (Gr *πλοῦτος*, *wealth*) This term was used by Courcelle-Seneuil to describe that part of his treatise on political economy which dealt with what is described by some more modern writers as 'pure theory', that scientific study of the results of the action of economic motives on men and societies to which the terms 'economics' and 'economic science' have been applied in the effort to escape the confusions which arose from embracing under the general title 'political economy', both these more abstract investigations and the application of the knowledge thus gained, with that derived from other sources, to problems of practical statesmanship. To this second part of the subject the eminent French economist applied the term *Ergonomy*. The Australian W. E. Hearn adopted the title for his work, *Plutology, or the Theory of the Efforts to Satisfy Human Wants*.

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A. W. Flux
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(See review on p. 34)
