

BUSINESS REVIEW

Federal Reserve Bank of Philadelphia

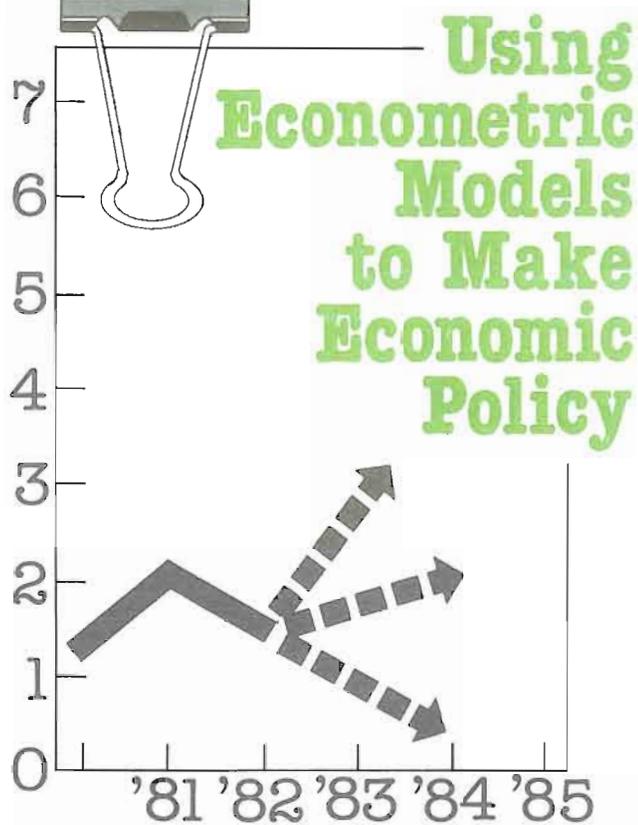
ISSN 0007-7011

JANUARY • FEBRUARY 1983

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DEREGULATION:
A New Future for Thrifts

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**USING ECONOMETRIC MODELS
TO MAKE ECONOMIC POLICY:
A CONTINUING CONTROVERSY**

Richard W. Lang

... Economists are sharply divided over the question of whether econometric models can be used to analyze policy—even if the correct type of model is employed.

**DEREGULATION:
A NEW FUTURE FOR THRIFTS**

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... The road to financial deregulation can be a rocky one, but there may be no other choice if thrift institutions are to survive the 80s.

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REVIEW**

Federal Reserve Bank of Philadelphia
100 North Sixth Street
Philadelphia, Pennsylvania 19106

The BUSINESS REVIEW is published by the Department of Research every other month. This issue was partially edited by John Mulhern. Future issues will be edited by Judith Farnbach. Artwork is directed by Ronald B. Williams. The REVIEW is available without charge.

Please send subscription orders and changes of address to the Department of Research at the above address or telephone (215) 574-6428. Editorial communications also should be sent to the Department of Research or telephone (215) 574-6448. Requests for additional copies should be sent to the Department of Public Services.

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Using Econometric Models To Make Economic Policy: A Continuing Controversy

by Richard W. Lang*

Economic forecasting frequently has been called an art, not a science. Yet this art often is crucial to the formulation of public policy. Policymakers—such as the officials of the Federal Reserve System—rely on forecasts of economic activity when they develop policies. For example, in January of each year, the Federal Reserve decides on tentative target ranges of monetary growth for the coming year. In order to choose the appropriate

target, the Fed would like to know how the economy will respond to various monetary policies. The Fed would like to have accurate forecasts of economic activity *conditional* on alternative rates of money growth in the economy.

How can the Fed obtain forecasts that will help it make policy decisions? It must use some sort of forecasting model. But the choice of a forecasting model (and associated statistical techniques) depends upon how the forecast will be used. In particular, not all forecasting models are designed to evaluate alternative economic policies.

Economists and policymakers, including those within the Federal Reserve System,

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frequently use econometric models to forecast the effects of choosing one policy or another.¹ But over the past few years, serious questions have been raised about the use—and usefulness—of econometric models in evaluating and choosing among alternative economic policies. The resulting debate among economists has addressed the current state of economic theory as well as the state of econometric practice. Resolving these issues will require substantial efforts on the part of theoretical economists as well as econometricians and statisticians. In the meantime, the controversy about the use of econometric models for policy evaluation has generated some heated debates.

POLICY ANALYSIS HAS SPECIAL REQUIREMENTS

The choice of a forecasting model depends upon how the forecast is to be used. For example, suppose your firm's sales have been highly correlated historically with national output (Gross National Product, or GNP). To plan production schedules for 1983, you want an accurate prediction of 1983 GNP. What model should you choose? Whatever works! You can use any of a number of approaches: a large econometric model, a small model, a statistical procedure based only on GNP's past history, or a purely judgmental approach. In fact, you could "pool" several models' predictions of GNP, taking either a simple average or a weighted average based on past predictive accuracy. The point is that to obtain a GNP prediction to be used to plan production schedules,

whatever works—whatever has minimized the prediction error—can be used.

You do not have to be an economist or use a forecasting model based on economic theory to predict economic variables.² *Economic predictions* attempt to estimate future values of economic variables, such as GNP, unemployment, and inflation. These forecasts may be based on a model grounded in economic theory, but they need not be, and often they are tied only loosely to theory. If we know A and B are highly correlated, and we know A earlier than B, we have a good chance of inferring the future value of B. If one finds that the unemployment rate always rises one-tenth of one percent when Aunt Matilda has a cold, Aunt Matilda's health can be used to forecast. To predict, one doesn't necessarily need to know what is cause and what is effect; a high degree of correlation is all that is required.

Economic theory, in contrast, attempts to spell out cause-and-effect relationships in economic behavior, starting from the premise that individuals desire to maximize their own welfare and businesses attempt to maximize their profits. For example, economic theory tries to explain how the demand for a commodity changes as its price changes; or what forces affect the level of interest rates over time; or what factors change unemployment.

If you use predictions of economic activity in making your business decisions, you want predictions that turn out to be close to the actual values. If the predictions miss the mark, your profits could be affected adver-

¹The term 'econometric' simply refers to measurement and empirical estimation of economic relationships using statistical techniques. An econometric model is a set of equations representing, or describing, economic relationships that can be statistically estimated. For a further discussion of econometrics, see Michael D. Intriligator, *Econometric Models, Techniques, and Applications* (Englewood Cliffs; Prentice-Hall, Inc., 1978), especially Chapters 1 and 2.

²The term 'economic variable' refers to measures of economic activity—such as GNP, consumption, the unemployment rate—as well as to prices and interest rates associated with economic activity. That these measures are referred to as variables simply reflects that they take on different values depending on the circumstances. For example, the unemployment rate was 9 percent in March 1982 but was 8.5 percent in January 1982.

sely. To provide an accurate prediction you might use a model grounded in economic theory. But this approach might be more expensive than some other approach that does at least as well. Or you might find that there are some variables for which economic theory provides little guidance in generating a forecasting model. In any case, as long as you care only about the accuracy of your predictions, not about *how* they are obtained, economic theory need not play a major role in your forecasting procedure.

In contrast, if you are trying to estimate the effects on the economy of alternative economic policies, you need more information than if you are only interested in predicted values with small errors. You need to know the links between policy actions and the behavior of the economy. Policymakers are clearly in this position, and economic theory can provide guidance to them in building models of these links. Although the theoretical relationships between policy instruments and all other economic variables need not be spelled out completely, policy evaluation does require more information about the structure of the economy than would be necessary if one were making predictions alone.

Because different types of forecasting models require the collection of different amounts of information, the choice of a model depends on how the forecast is to be used. Business forecasters may well prefer to use one type of model, while an economic policymaker would find that same model of little use in evaluating alternative policies. Different forecasting purposes generally are accommodated by one of three types of econometric models: autoregressive models, reduced-form models, and large-scale structural models.³

³For a more detailed description of these models than what follows, see Intriligator, especially Chapters 2 and 15.

WHAT DIFFERENT MODELS CAN DO

Econometric models consist of a set of equations that are supposed to represent the relationships between economic variables. Econometric models of the national economy come in various sizes, from just a single equation to hundreds of equations. The three different types of econometric models are distinguished not only by size, but also by the information they require and the kinds of analysis for which they can be used.

Autoregressive Models. Estimating an autoregressive model involves a statistical procedure which relates the current value of an economic variable to the past values of the same variable—its own past history. A single equation which relates current values of GNP to past values of GNP, for example, would be a simple autoregressive model of overall economic activity. To generate a prediction of next year's GNP, the current and past values of GNP are plugged into the autoregressive model's equation.

Although such predictions do not rely on any information other than the variable's own past history, these models at times have been more accurate than other types of models. But lack of reliance on any other information is exactly why autoregressive models are not helpful to policymakers in evaluating alternative economic policies. The Fed, for example, may ask the question, "How fast will GNP grow next year if money grows at X percent instead of Y percent?" Since money growth does not enter into the autoregressive GNP model's forecasting procedure, the model cannot answer this question. A model that can answer the Fed's question must include a variable representing money growth in addition to just GNP's past history. One way to capture this additional information is to use a reduced-form model.

Reduced-Form Models. Reduced-form models seek to explain the relationship between policy variables and economic variables such as GNP. A reduced-form model does not attempt to capture each of the steps

in the process by which a change in economic policy affects the economy. Instead, a reduced-form model seeks to explain the overall net effect. Such a model need contain only a few equations, so it is relatively cheap to build.

Although reduced-form models of GNP do not explicitly take account of the interrelationships of GNP with all other economic variables, they do capture a quantitative relationship between GNP and policy variables. Thus, these models are used to answer such questions as, "How fast will GNP grow if money grows at X percent instead of Y percent?" Reduced-form models often are used to evaluate the effect of fiscal or monetary policy on economic activity. Monetary policy usually is represented by the rate of growth of some measure of the money stock. Fiscal policy is measured by aggregate federal spending, aggregate taxes, or the budget deficit. The historical relationship of these policy variables to GNP can be statistically estimated in this reduced-form context, and then this estimated relationship is used to forecast next year's GNP, assuming a particular setting for the policy variables. By plugging different values of policy measures into the model's equations, policymakers might make judgments about the relative attractiveness of different policies. The effect on GNP of alternative choices of next year's policy variables might be evaluated in this context.

These small reduced-form models are usually used to evaluate the effects of broad economic policies—such as total government spending, total tax revenues, or growth of the money supply—on aggregate economic activity such as GNP, inflation, or unemployment. They are not typically used for evaluating the effects of the narrow instruments of monetary and fiscal policy. For example, the effects of changes in tax rates or in depreciation rules, or the impact of changes in reserve requirements or in the discount rate, cannot be readily examined in

reduced-form models. To study these effects, a model that includes more detail about the economy is required. The model must attempt to lay out the relationships among an expanded number of economic variables, and therefore it must be larger in scope. Larger models (or parts or sectors of them) frequently are employed to study the impact of changes in policy instruments because they provide details about economic relations that small models lack.

Large-Scale Structural Models. Large-scale structural models are used for all types of policy evaluations. The term 'structural' means that the model attempts to capture the structure of the economy—the interrelationship of all relevant economic variables. These models are built by analyzing the individual sectors of the economy.

For example, a large-scale structural model could have equations explaining the supply and demand for various products such as autos, steel, and consumer installment credit. But steel is a significant input in the production of autos, and consumers often purchase autos on installment credit, so the large model's equations would tie these sectors together. Large-scale structural models can be large indeed; they typically are composed of several hundred equations.

Variables representing monetary and fiscal policies also are included in structural models. Indeed, these large models typically attempt to specify in detailed fashion the channels through which policy actions affect the economy. By assuming particular values for the settings of policy variables, they might be used to forecast next year's GNP under alternative economic policies—for example, how next year's GNP will change if money grows at different rates. In addition, these large models are used to answer questions about how particular industries—housing, autos, agriculture—will behave as economic policies change.

The equations that comprise large-scale structural models are, in principle, based on

economic theory. Because of their foundation in economic theory and their attempt to capture the detailed structure of the economy, these models have a wider range of uses than either autoregressive or reduced-form models. Large models are used to predict and to evaluate alternative economic policies as well as to evaluate economic theories. But these models have been subject to serious criticisms in regard to their usefulness in evaluating alternative economic policies, and even in regard to their ability to provide reliable estimates of the structure of the economy.

CAN MODELS CAPTURE ECONOMIC REALITY?

Building an econometric model that captures the structure of the economy is a tall order. Despite their size, large-scale structural models are still very simple compared to the complexity of a nation's economy. Do these models reflect reality—or at least are they close enough approximations that they do not substantially misrepresent reality? Economists have hotly debated this subject in recent years.

Specifying the Model. One problem in formulating a model to represent reality involves whether the model's equations adequately specify the relationships among the economic variables being examined.⁴ Economic theories do not necessarily make clear which variables can be safely omitted when building models of economic relationships. For this reason, different model-builders include different sets of economic variables in their models' equations in order to improve their models' predictive ability. Consequently, there are a number of *different* structural models of the U.S. economy. Estimates of the relation between two variables—such as between GNP and money—differ across

these models because the “other factors” that are included in the models' equations vary from one model to another. Some economists have argued that too often a researcher chooses a particular specification of the equations in a model because it tends to support his preconceived idea of what the relationship should be.⁵

This multiplicity of specifications arises, in part, because the field of economics is not amenable to experimental examination involving replications of the same events. Unlike experiments in physics or chemistry which can allow one thing to change while all others are kept the same, empirical studies of economic theories are done by examining a system—the economy—in which almost everything is changing at the same time. Statistical techniques that estimate economic relations can take account of changes in the variables that alter the economic environment, but only if data on these variables are included in the econometric model. Yet data and time limitations prevent the inclusion of all variables that could be remotely related to the variables of interest to policymakers.⁶

⁵For example, in a recent *American Economic Review*, Cooley and Leroy investigate alternative specifications for a money demand function—which is a cornerstone of monetary theory and policy—and find widely varying results. Specification problems are crucial since policymakers use estimated equations to decide among alternative policies. See Thomas F. Cooley and Stephen F. Leroy, “Identification and Estimation of Money Demand,” *American Economic Review* 71 (December 1981), pp. 825-844.

⁶Another problem in specifying an econometric model is that, in general, economic theory does not provide sufficient information to write down the precise form of the relationship between two variables—whether their relation is linear or nonlinear. In a linear relation, the separate effects of several variables can be added together to obtain the total effect on the variable being explained in the model. In a nonlinear relation, however, the effects of several variables cannot be simply added together since their effects on the variable being explained are multiplicative.

⁴For a general discussion of specification problems in economic models, see Intriligator, Chapter 2.

Choosing a "best" specification of a model of the economy has proved difficult because no one model has proved consistently superior to others in its forecasting ability or in its ability to agree with economic theory. But if important variables are inadvertently omitted from one of these models, the model is *misspecified*. And a misspecified model is likely to give erroneous estimates of the effects of different policy options on economic activity.

Identification Problems. Another problem that affects large structural models of the economy is the difficulty of identifying the source of a change in an economic variable. For example, consider a situation in which a researcher observes that the price of oil is changing. Oil prices can change because either the supply of oil is changing or the demand for oil is changing, or because both are changing. In general, the researcher would like to identify which factors are changing the price of oil. To do so, the analyst must specify those factors that affect demand for oil but not supply, as well as those factors that affect supply but not demand. By doing so he ensures that his model is *identified*—that he can determine why the price of oil is changing.⁷

In a large-scale structural model of the economy, this process of identifying the model's equations for each market or sector is a large undertaking. That is, the sector explaining the price and quantity of oil must be identified, the sector explaining the price and quantity of labor must be identified, and so on—and then these separately identified sectors are tied together into the large model. Is the large model as a *whole* then identified? Many argue it is not. The reason is that this market-by-market identification process often ignores common factors among markets and sectors which become apparent once

these markets and sectors are aggregated into a large model.⁸

If a model's equations are not appropriately identified, a change in one variable (such as GNP) could be incorrectly attributed to a change in another variable. The true relationship between the variables could be obscured. Estimates of the model's behavior would not adequately represent the way the economy actually behaves.

Policymakers hope that a model's identification problems do not significantly obscure the effect of policy variables on economic activity. Some economists believe that this hope is well-founded.⁹ But the general problem of identification in economic models is likely to continue to call into question the reliability of large-scale models.¹⁰

While specification and identification problems call into question the reliability of large-scale structural models in representing reality, there is another criticism of the use of all econometric models—structural, reduced-form, and autoregressive—in the evaluation

⁸Sims, in a recent article in *Econometrica*, calls the current identification procedure of large models "incredible identification." He argues that "the style in which large-scale macroeconomic model-builders construct claims for a connection between these models and reality—the style in which identification is achieved for these models—is inappropriate, to the point at which claims for identification in these models cannot be taken seriously." Malinvaud, in a 1981 *Econometrica* article, agrees with Sims on this point, although he disagrees with Sims on many others. See Christopher Sims, "Macroeconomics and Reality," *Econometrica* 48 (January 1980), pp. 1-48, and E. Malinvaud, "Econometrics Faced with the Needs of Macroeconomic Policy," *Econometrica* 49 (November 1981), pp. 1363-1375.

⁹Sims argues that large-scale models still are useful for forecasting and policy analysis. He says, "For forecasting and policy analysis, structural identification is not ordinarily needed, and false restrictions may not hurt, may even help a model to function in these capacities." See Sims, *Econometrica* 48 (January 1980), p. 11.

¹⁰Malinvaud discusses the question of reliability in more detail; see *Econometrica* 49 (November 1981).

⁷See Intriligator, Chapter 2, for a general discussion of the identification problem.

of alternative economic policies. This criticism—called the Lucas critique—has become the subject of much debate among economists and policymakers.

THE LUCAS CRITIQUE: DO POLICY CHANGES INVALIDATE MODELS?

In 1976, Robert Lucas wrote an article in which he argued that “any change in policy will systematically alter the structure of econometric models.”¹¹ His argument basically goes as follows.

The structure of an econometric model embodies and reflects the behavior of economic agents (consumers and producers). The decisions of consumers and producers, however, depend on their perceptions of the rules being followed by economic policymakers. If policymakers change their policies (the economic rules of the game), producers and consumers might change their actions and decisions as well, and hence change the structure of the economy.

Lucas viewed this conclusion as a fundamental criticism of the use of econometric models for policy evaluation. In his view, “comparisons of the effects of alternative policy rules using current macroeconomic models are *invalid* regardless of the performance of these models over the sample period or in *ex ante* short-term forecasting.”¹² Since policymakers want to evaluate the effects of different policy actions, the Lucas critique is important.

How severe is Lucas's criticism? Its severity is still an open issue (see Appendix). Some argue that the Lucas critique is not crucial if the policy alternatives in question in-

volve simply varying the value of a policy instrument (without changing the way in which policy is executed).¹³ For example, consider a situation in which there has been an excise tax on liquor for many years and the government has changed the tax a number of times. Using this historical experience, researchers can estimate the effect of a *change* in the excise tax on the amount of liquor sold. Such estimates then can be used to address the question of what effect a new change in the excise tax of 10 percent will have on liquor sales, compared to a change in the tax of 5 percent.

The situation is much different, however, when the excise tax is first introduced. Since there is no historical experience to measure the past impact on liquor sales of changes in such a tax, the researcher must obtain more specific information on both the supply and demand for liquor before being able to evaluate the impact of the new tax. In this case the Lucas critique certainly applies.

Similar situations could exist for more general fiscal and monetary policies. That is, if the Federal Reserve has been setting monetary growth targets for many years and has changed them over time, researchers can estimate past effects of changes in money growth on economic activity. This suggests that the Fed can get a reasonable answer to the question of “what happens to the economy if money increases at X percent in 1983 rather than Y percent.” But this is the case only if the model used to make these comparisons was estimated over a period when there were no changes in the way monetary policy was conducted. If the Fed switches the way it tries to control the economy, then the Lucas critique becomes a more serious problem.

¹¹Robert Lucas, “Econometric Policy Evaluation: A Critique,” *The Phillips Curve and Labor Markets*, supplement to the *Journal of Monetary Economics*, ed. by Karl Brunner and Allan Meltzer (1976), p. 41.

¹²On the other hand, Lucas viewed this critique as “of only occasional significance” for the issues involved in using just the short-term predictions of econometric models. Lucas, p. 41.

¹³For example, see Sims, *Econometrica* 48 (January 1980); or Christopher A. Sims, “Policy Analysis with Econometric Models,” *Brookings Papers on Economic Activity* (1: 1982), pp. 107-152.

In a recent article, Christopher Sims argues that the types of policy changes that are subject to the Lucas critique rarely occur.¹⁴ According to Sims, policymakers do not often make radical changes in monetary or fiscal policy. Instead, changes in economic policies are made slowly over time, so that any resulting change in the structure of the economy would occur slowly over time as well. Sims concludes from this line of reasoning that econometric models can be used to evaluate alternative policies, although he has suggestions about the type of model to be used. In particular, he argues in favor of an expanded version of the reduced-form approach that involves elements of autoregressive models as well.¹⁵

The debate about the significance of the Lucas critique is of particular concern to the Federal Reserve. Prior to October 1979 the Fed attempted to influence money growth mainly by changing short-term interest rates. Since then the Fed has focused principally on manipulating the growth of reserves to control money growth. Whether this change in the conduct of policy is subject to the Lucas critique and, if so, how sensitive the structure of the economy is to such a change in policy, are questions still being worked on by many researchers today.

SUMMARY

The debate about the validity of using econometric models to analyze economic

policies probably seems arcane to most people. But since econometric models and forecasts based on those models are used by policymakers in making their decisions, the general public is affected by the outcome of these debates. Robert Solow cryptically pointed out the relevance of such debates to the public in terms of monetary policy at a 1978 conference:

I would like to assure the practical people in this room and also the ones out in the streets of Edgartown [where the conference was held] that although the battles that are fought in conferences like this appear to be fought with anti-que pop guns, the bullets are real and they may soon be fired at you by the Federal Reserve.¹⁶

The possibility that an econometric model misrepresents reality—because of specification or identification problems, or because of the Lucas critique—does pose risks to economic policymaking. Resolving some of these issues will require a lot of work. Economic theory must be pushed to provide better specification and identification of the relationships among variables. Econometricians and statisticians will have to put more emphasis on testing specifications in econometric models and on testing the sensitivity of the models' structures to policy changes. When these problems are better resolved by the economics profession, economic forecasting and the formulation of economic policies will be able to be more a science, and less an art.

¹⁴See Sims, *Brookings Papers on Economic Activity* (1: 1982).

¹⁵Sims's approach is called vector autoregression. For more about this type of model, see Thomas J. Sargent, "Estimating Vector Autoregressions Using Methods Not Based on Explicit Economic Theories," *Quarterly Review*, Federal Reserve Bank of Minneapolis (Summer 1979), pp. 8-15.

¹⁶Robert M. Solow, "Summary and Evaluation," *After the Phillips Curve: Persistence of High Inflation and High Unemployment*, Federal Reserve Bank of Boston, Conference Series No. 19 (June 1978), p. 203.

APPENDIX . . .

ECONOMISTS SHARPLY DIVIDED OVER ECONOMETRIC MODELS

In the 1970s, the issues of identification, specification, and the Lucas critique were raised in attacking the usefulness of standard econometric models. Robert Lucas and Thomas Sargent expressed strong views on this subject at a June 1978 conference:

First, and most important, existing Keynesian macroeconomic models are incapable of providing reliable guidance in formulating monetary, fiscal and other types of policy. This conclusion is based in part on the spectacular recent failures of these models and in part on their lack of a sound theoretical or econometric basis. Second, on the latter ground, there is no hope that minor or even major modification of these models will lead to significant improvement in their reliability.*

These criticisms were not left unanswered, however, by the proponents and users of the standard macromodels. Not everyone agrees with the Lucas-Sargent views that these models do not and cannot capture reality. At the same conference, Franco Modigliani commented that the problem was not that econometric models fail to capture the real world, but that the real world is difficult for policymakers to control:

To a large extent the sweeping indictment of the Lucas and Sargent paper confuses two kinds of crises. One is the crisis of whether these models have captured the world itself. The second crisis, which I believe is the real problem, is that the world we capture is extremely hard to tame, to cure from inflationary shocks, the new disease of '73-'74 and thereafter. So the crisis is right there in the structure of the world, not in our ability to capture that structure.†

*Robert E. Lucas and Thomas J. Sargent, "After Keynesian Macroeconomics," *After the Phillips Curve: Persistence of High Inflation and High Unemployment*, Federal Reserve Bank of Boston Conference Series No. 19 (June 1978), p. 89.

†Franco Modigliani, "Discussion," *After the Phillips Curve: Persistence of High Inflation and High Unemployment*, Federal Reserve Bank of Boston, Conference Series No. 19 (June 1978), p. 195. This position is also supported by Richard G. Lipsey, "The Understanding and Control of Inflation: Is There a Crisis in Macroeconomics?" *Canadian Journal of Economics* (November 1981), pp. 544-576.

Both Benjamin Friedman and Robert Solow commented that Lucas and Sargent had overstated the problems that standard econometric models have had in representing and forecasting economic activity. Friedman criticized Lucas and Sargent's claim that Keynesian models have fundamental methodological problems that are not shared by alternative models proposed by them.[‡] And both Friedman and Solow complained about the strong terms in which Lucas and Sargent condemned the standard models:

[Lucas and Sargent] describe what happened in the 1970s in a very strong way with a polemical vocabulary reminiscent of Spiro Agnew. . . . I share Franco Modigliani's view that the alarmism, the very strong language that I read to you, simply doesn't square with what in fact actually happened. If you give grades to all the standard models, some will get a B and some a B minus on occasion, especially for wage equations, but I don't see anything in that record that suggests suicide.§

For policymakers' use of econometric models to evaluate alternative economic policies, the Lucas critique—that changes in policy will alter the structure of the economy—is most important. Lucas had made this point at an earlier conference:

Given that the structure of an econometric model consists of optimal decision rules of economic agents, and that optimal decision rules vary systematically with changes in the structure of series relevant to the decision maker, it follows that any change in policy will systematically alter the structure of econometric models.

For the question of the short-term forecasting or tracking ability of econometric models, we have seen that this conclusion is of only occasional significance. For issues involving policy evaluation, in contrast, it is fundamental; for it implies that comparisons of the effects of alternative policy rules using current macroeconomic models are invalid regardless of the performance of these models over the sample period or in *ex ante* short-term forecasting.||

Not all economists agree on the severity of the Lucas critique. Lucas's conference paper was criticized by Robert Gordon, who was less pessimistic about the usefulness of econometric models in evaluating alternative policies:

While Lucas' critique effectively demonstrates an important weakness of econometric simulations, his paper overstates the impossibility of remedy; and hence its implications are likely to be misunderstood by policymakers. . . .

My conclusion from Lucas' analysis is much less pessimistic. While I am pre-

[‡]Benjamin M. Friedman, "Discussion," *After the Phillips Curve: Persistence of High Inflation and High Unemployment*, Federal Reserve Bank of Boston, Conference Series No. 19 (June 1978), pp. 73-80.

[§]Robert M. Solow, "Summary and Evaluation," *After the Phillips Curve: Persistence of High Inflation and High Unemployment*, Federal Reserve Bank of Boston, Conference Series No. 19 (June 1978), pp. 203-204.

^{||}Robert E. Lucas, Jr., "Econometric Policy Evaluation: A Critique," *The Phillips Curve and Labor Markets*, Carnegie-Rochester Conferences on Public Policy, supplement to the *Journal of Monetary Economics*, ed. by Karl Brunner and Allan H. Meltzer (1976), p. 41.

pared to grant the validity of the proposition that the mechanical extrapolation of a model with fixed parameters cannot provide useful information on the effects of all policy changes, on the other hand the effects of some policy changes can be determined if parameter shifts are allowed and are either (a) estimated from the response of parameters to policy changes within the sample period or (b) are deduced from *a priori* theoretical considerations. #

After examining several different cases of different types of policy changes, Gordon concluded that Lucas's argument was overstated and that some types of policy changes could be evaluated in econometric models.**

The extent to which the Lucas critique applies is still being debated, but it seems clear that econometric models should be used with special care when analyzing large changes in economic policies. William Poole described the range of policy changes that could be considered in evaluating the relevance of the Lucas critique:

First of all, there is no model builder in this room who would expect his model to hold up if we were to consider an experiment, let's say, of 100 percent rate of money growth in the next 12 months. No model builder expects his model to stand up in that kind of an experiment. Clearly the institutional structure in the model, the lag structure, and so forth, simply would fall apart. Now, what about 50 percent money growth? Or 25 percent money growth? As we go down to ranges that are closer to those that we are familiar with, and we have more confidence that we are within the ballpark of the historical range of observation, then we are more confident that the models can tell us something. But that is not the end of the story. . . we can mention a long list of apparently minor changes. . . They don't involve major changes in the institutional structure, and it's hard to see how they make much difference.

But that is not the point, it seems to me. The point is. . . whether the changes in institutional structure in response to policy changes are large compared to the changes in forecasts of economic variables in response to policy adjustments within a fixed institutional structure. After all, none of us expects very big effects from policy experiments that involve a change in the annual rate of growth of money of 1 percent for six months. If we talk about 2 percentage points for six months, or 3 or 4, as we raise the policy dose, we expect larger policy effects. But, of course, we also expect larger changes in institutional structure.††

In Poole's view, most economists agree in principle with the Lucas critique about policy evaluation. But the practical implications of this criticism are still under study. As Poole points out, the Lucas critique has given model builders further impetus to refine and improve econometric models.

Robert J. Gordon, "Can Econometric Policy Evaluations Be Salvaged?—A Comment," *The Phillips Curve and Labor Markets*, Carnegie-Rochester Conferences on Public Policy, supplement to the *Journal of Monetary Economics*, ed. by Karl Brunner and Allan H. Meltzer (1976), p. 47.

**Gordon, p. 57.

††William Poole, "Summary and Evaluation," *After the Phillips Curve: Persistence of High Inflation and High Unemployment*, Federal Reserve Bank of Boston, Conference Series No. 19 (June 1978), pp. 212-213.



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