

ance of the economy is to be interpreted in terms of the behavior of both of the airplanes.

The point of the example is to illustrate the fact that in games against intelligent agents there are important strategic aspects which are absent from games against nature. Actions taken today by government policy-makers will affect people's expectations about how policy-makers will behave tomorrow. In turn, this will affect how people behave today. This is why it is helpful for private decision-making for the government to follow a widely understood and predictable rule. A pilot whose actions are erratic and are apparently determined largely by current conditions is not the kind of pilot to encounter in crowded airspace a few hundred feet above ground level.

Perhaps not surprisingly, macroeconomic models which are consistent with this more sophisticated view of the design of government policy are still in the early stages of their development. As a result, no formal basis yet exists for giving policymakers quantitative advice about how to design economic policy. Nevertheless, as we have already discussed, the rational expectations view does imply that predictability of government policy is important for private decision-makers. But even greater appeal follows once it is recognized that the "game" being played is not one between two similar players, as was the case in our airplane example. Rather, the policy game is one between a highly visible and dominant player, the government, and a very large number of private firms and households. Thus the private economy cannot assume a leadership role, because by its very nature it consists of a huge number of independent decision-makers who cannot act in a coordinated way.

On the other hand, the government, by virtue of its size, can be a dominant player. It has, therefore, a special responsibility to act clearly, predictably and consistently. The conclusion that may be drawn is that once expectational issues are taken seriously, it becomes necessary for government policy to be accurately and easily predictable. This is best achieved by government following well-understood policy rules.

To sum up, the recent burst of interest in the investigation of rational expectations models has provided important new insights into the behavior of the American economy.

Even if some of the assumptions that are employed in rigorously formulated economic models are regarded as being too extreme, this is not to say that the new issues that have been identified are not of relevance. The fact that people do look forward in making their decisions requires nothing less than a major revision of the way economists think about macroeconomic phenomena, and of the way policy-makers think of and attempt to design suitable macroeconomic policy.

JEC, Dec. 1981, Expectations and the team

STATEMENT OF ALFRED S. EICHNER*

EXPECTATIONS IN ECONOMICS

The recently revived emphasis on expectations is hardly a comforting development—for it threatens to reduce even further the credibility of economics as a discipline.

No one would deny that individuals form expectations of the future, and that these expectations exert an important influence on the economy. Every economist, especially since Keynes, has been aware of this fact. The controversy arises over how a variable like expectations—which, being entirely in the minds of individuals, is not directly measurable—should be incorporated into economic analysis.

The practice generally followed by economists is to focus on the directly observable variables which are thought to shape expectations, such as current sales or employment, and then ascertain what is the relationship between those directly observable variables and the types of behavior thought to be affected by expectations, for example, business investment or consumer spending. In effect, though expectations may be considered to be the intervening variable linking changes in sales and employment to changes in business investment and consumer spending, this factor is omitted from the analysis because, not being directly observable, its actual effect cannot be determined. Any hypothesis based on such a variable would be untestable, and therefore of no value to those interested only in explaining the dynamics of the economy.

In the late 1950's and early 1960's when economists began for the first time to undertake empirical research on a significant scale, efforts were made to take expectations into account more explicitly in explaining both investment and consumption behavior. In the case of investment, stock market prices were used to gauge expectations about further business profitability and, in the case of consumption, the findings from the Michigan Survey Research Center were used to approximate expectations about the future levels of household income. In both cases, the effort to incorporate expectations into the analysis explicitly led to little or no improvement in the ability to model the behavior of business firms and households, and the effort was gradually abandoned. What distinguishes the recently revived interest in the role played by expectations is not the development of better direct measures of the psychological factors at work but rather the willingness to throw any methodological caution to the wind.

Actually, there are two quite distinct, and only loosely connected, lines of argument behind this latest emphasis on expectational factors. One is the line of argument associated with the misnamed "rational expectations" models; the other is the line of argument associated with certain "supply-side" policies.

*Professor of economics, Rutgers University, and director, Center for Economic and Anthropogenic Research (CEAR).

There are, as a further distinction, two separate types of "rational expectations" models, one concerned with the set of relative prices that can be expected to prevail in the long run when, as Keynes noted, we are all dead and the other concerned with the change in the aggregate price level that is likely to occur in the more immediate run. Since the first type of rational expectations model is of no policy relevance—it is intended only to enable theorists to solve the problem of uncertainty by assuming it away—we shall focus on the second. It is this version of the same basic line of argument which gives rise to the claim that attempts to manipulate the economy through monetary policy are likely to prove futile.

The argument goes as follows: individuals have in their minds a correct model of the inflationary process and that, in this model, the factors responsible for inflation are monetary ones—it being generally understood that the price level is directly tied to the growth of the money supply. Thus, when the monetary authorities act to increase the money supply, this in a misguided effort to stimulate employment and real output, they only succeed in persuading businessmen and others active in the various markets that prices will subsequently rise. These individuals will insist on higher rates of compensation in order to offset the higher prices they expect to have to pay in the future, and it is in this way that the inflationary expectations created by the monetary authorities when they act to increase the money supply become self-fulfilling. The point is that, because businessmen and others can be expected to correctly anticipate what will be the effect of the Federal Reserve Board's actions—their expectations and subsequent behavior are, in this sense, "rational"—the Fed cannot use monetary policy to achieve a higher growth of employment and real output than would otherwise occur.

The question here is not whether individuals form expectations about the future trend of prices, or even whether those expectations are based on a correct model of the inflationary process (though this last assumption seems a questionable one, in light of the widespread disagreement over the causes of inflation). The question, rather, is whether the correct model of inflation is one which places the primary emphasis on monetary factors. The role played by expectations, "rational" or otherwise, is really beside the point. Either the rise in prices can be explained by the growth of the money supply, in which case the arguments involving rational expectations merely reinforce the main point, or, alternatively, the rise in prices is to be explained by other factors—in which case the arguments about rational expectations are either irrelevant or need to be reformulated. In other words, as developed so far, the "rational expectations" models are simply frosting on the monetarist cake.

If the rational expectations theorists could suggest some means by which inflationary expectations could actually be measured directly, then the models they have developed might indeed represent an important advance. Instead, the change in expectations is merely identified with the change in the money supply, thereby avoiding the need to model or in any other way approximate empirically the change in expectations. The role of expectations is

brought into the argument only to show it makes no difference to the basic monetarist argument. The whole exercise is simply an intellectual sleight-of-hand—the equivalent of the well-known trick in which an individual is asked to think of a number and then, after being told to carry out a string of mathematical calculations, is correctly told the sum he is left with because, at some point along the way, the number he was originally asked to think of was factored out. If the basic monetarist argument is correct, it is correct for other reasons, and not because any "rational expectations" frosting has been added to it.

Of course, I should hasten to add, there is very little empirical evidence to support the basic monetarist argument. The statistical correlation observed between the growth of certain monetary aggregates and the price level is simply a combination of the common trend factor affecting both variables and the reverse of the generally assumed casual relationship. There is a growing body of evidence, based on the work of post-Keynesian economists, suggesting that the money supply is to a significant degree endogenously determined and depends on the growth of prices, rather than the reverse. In any case, the monetary aggregates with which the price level is statistically associated are not variables over which the Fed has any real control.

It is probably the policies based on the so-called "supply-side" models rather than the implications of the rational expectations models which are the principal reason for the interest now being shown by policy-makers in the role played by expectations. According to the supply side models, a reduction in taxes will lead, because of the effect on "expectations," to increased work effort, investment, productivity and growth—a line of argument which neatly fits the current political mood. As a contribution to our understanding of the economy, however, the supply-side models leave a great deal to be desired.

The first point that needs to be stressed is that the models are largely outside the public domain—in sharp contrast to what is usually true of scientific research findings. The models have been developed almost exclusively by private consulting groups and investment counseling services, for sale to clients (including the government). The models have not yet appeared in any of the economic journals or in books where, being in the public domain, the evidence in support of the models can be evaluated by those with the necessary technical training. This development, by itself, represents a major step backwards in economics. The point is made all the more poignant by the fact that the results claimed from the models are in sharp contrast to the findings of other investigators, those whose work has been published and therefore subject to scrutiny by knowledgeable critics. At the very least, then, the supply-side models need to be placed in the public domain, and the empirical evidence underlying the models evaluated, before serious thought is given to using the models as the basis for public policy.

Second, there is strong reason to question the statistical methods by which the supply-side models have been constructed. It would appear, on the basis of the limited information available on the models, that at least some of them are a) improperly specified, and b) statistically naive. This is certainly true of the one supply-side

model I have been able to examine in some detail, the "prototype wedge" model developed by Wainwright & Co. under the direction of Professor Arthur Laffer. In that model, various factors—such as the amount of defense spending and "tax progressivity," the latter measured by the ratio of the overall marginal tax rate to the overall average tax rate—are simply regressed against the growth of real GNP per capita each year over a 38-year period (including World War II). The other factors affecting the growth of real GNP per capita, along with the structural relationships by which the growth of real GNP per capita is influenced by the variables taken into account, are simply ignored. It is in this sense that the model is misspecified and the results of questionable value. Moreover, little thought seems to have been given to the likelihood that at least some of the observed relationships are due primarily to a common trend factor. After all, defense spending has increased throughout the period covered, along with real GNP per capita, with particularly large increases during World War II. It is in this sense that the model seems statistically naive. From what has been reported about some of the other supply-side models, it would appear that the prototype wedge model is not unique in its shortcomings as an exercise in econometrics. Only after all the supply-side models have been placed in the public domain will the extent of their statistical deficiencies be fully known.

Third, from the response to critics by some of those responsible for building the supply-side models, as reported in the press, it would appear that, at least in one or two cases, the effects claimed from a reduction in taxes are based, not on any available evidence, but rather have simply been built into the models by assumption. This represents a further step backwards in economics, and indeed is but another form of intellectual sleight-of-hand. If policy is to be based on the results which are built into a model by assumption, then any policy will be equally defensible, it merely being a matter of building a different model based on the assumption that gives the desired result. Indeed, there is little reason to worry about what the available evidence shows since that evidence counts for naught in this type of exercise as a scientific activity.

One can, of course, have sympathy for the argument that the economics journals and the other means of placing research findings in the public domain are not always open to unorthodox viewpoints, such as those represented by the supply-side models. It is too easy for anonymous referees to reject the work as invalid when the real objection is that the work violates some prejudice of the referee. Certainly this has been the experience of post-Keynesians economists like myself who have similarly attempted to build "supply-side models"—though of a radically different sort—only to find that the established journals, as well as the established sources of funding, are closed to them. Still, there are several important differences between the two types of supply-side models in this and in other regards. First, in a post-Keynesian type of supply-side model, little emphasis, reflecting the available empirical evidence, is placed on the effect that taxes are likely to have on production. Instead, the supply-side of the picture is the effect that costs rather than demand will have on price levels. It is for this reason that post-Keynesian supply-side models suggest the futility

of attempting to control inflation by reducing aggregate demand, this on the unfounded belief that there is actually a Phillips curve. The level of production, however, does depend in this type of model on aggregate demand, and it is the level of aggregate demand, as determined by governmental and other types of discretionary spending, which is far more important than any tax rates in explaining the level of production. Productivity is yet another matter that needs to be accounted for on the supply side, it being explained in a post-Keynesian model largely by the rate of business investment.

Second, although expectations play a crucial role in a post-Keynesian supply-side model, they neither are used to negate the significance of uncertainty nor are they built into the model simply by assumption. They are instead reflected both in the structural relationships that constitute the model and in the size of the coefficients for the variables in the structural equations. For example, when the model indicates that a 1 percent increase in aggregate output above its trend value leads to a 1.9 percent increase in corporate plant and equipment expenditures above the trend growth rate, this does not mean that the cyclical increase in aggregate output forces corporations to increase investment disproportionately. It means instead that the cyclical increase in aggregate output causes corporate executives to revise their expectations as to the future growth rate of industry sales and to step up their companies' capital outlays accordingly.

The behavior captured by the model reflects a range over which a change in expectations will have little or no effect on how the economy operates. In this way, the current state of expectations becomes a parameter of the model, indicating when the model does or does not apply. The institutions which are explicitly taken into account in the model—money, financial intermediaries, large oligopolistic business enterprises and industrial trade unions—can be regarded as social mechanisms which have evolved for coping with the uncertainty (unforeseeable future) which is inherent in economic activity. Even so, it is recognized that their behavior, in acting as one would normally expect these institutions to act, may be destabilizing for the system as a whole, either in terms of real output and employment or in terms of prices. Moreover, it is recognized that these institutions may, at times, even behave in ways other than expected, thereby contributing in historically unique ways to the instability of the system. It is at those points in time that it can be said that expectations, as a parameter of overall economic activity, have changed. Expectations, then, are important in defining the normal behavior of economic institutions within a post-Keynesian model, the only behavior which can be captured in an econometric model. When these expectations change, and the behavior of the institutions being modeled is no longer normal, the model itself no longer applies.

Third, although it has not been easy to gain funding for and publish the results from the post-Keynesian types of supply-side models, those models are nonetheless in the public domain. More importantly, it is not the authors of those models who have been reluctant to make the results available to critics for whatever reason. In this way and in the greater scrupulousness with which

the available empirical evidence is taken into account, the post-Keynesian type of supply-side model represents a more promising alternative to the conventional demand-side models, both orthodox Keynesian and monetarist, than the better publicized supply-side models which naively suggest that production can be increased and inflation controlled simply by lowering taxes.

STATEMENT OF LEONARD FORMAN*

The way in which economic agents make decisions when confronted by imperfect information and uncertainty has always been a major unsolved problem for economists. Indeed, there are some schools of thought which hold that the nature of the problem makes it insolvable—that because of uncertainty the proper paradigm for economics is one in which disequilibrium is the normal state of affairs. Unfortunately, much of the discussion with regard to expectations, particularly the current intellectual fashion—rational expectations—takes place within the timeless framework of equilibrium analysis in which social and cultural mores and attitudes are absent. Such discussions are deeply flawed.

The Walrasian general equilibrium framework, which provides the microeconomic foundation for conventional macromodels, eliminates any possibility of an endogenous cyclical process. Equilibrium, not disequilibrium, is the pervading metaphor.

There is, however, an alternative vision of the economy's macro-dynamics which seems to be more easily reconciled with the institutional characteristics of a modern industrial society. Cycles are viewed as an endogenous process in a decentralized market economy where the future is uncertain, production takes time, and the financial system, which supports the production and spending activities of society, is fragile and periodically subject to speculative excesses. Random shocks exacerbate the cyclical problems but they are not necessarily, in this view, the fundamental cause of cycles.

Indeed, changes in economic activity in the short period are viewed as being the result of changes in discretionary expenditures by households, government and the business sector. The decision to increase or decrease such expenditures depends on one's view of the future. Because of uncertainty—the unpredictability of future events—expectations are continuously revised on the basis of new information. More importantly, such expectations or anticipations are often wrong. It is the deviation between our expectations of future economic activity and the actual unfolding of that future which causes a continuous revision in discretionary expenditures. The cyclical turbulence we observe in the economy is therefore often the result of disappointed expectations. When one extends the concept of uncertainty from imperfect information about the future to imperfect market information about the present, one understands why cycles are an inherent part of the economic process.

In modern industrial decentralized economies, markets are uncoordinated. The institutional characteristics of such economies do not lend themselves easily to the instantaneous elimination of market imbalances either within markets or between markets. Imperfect information and adjustment costs in the purchase, hiring and firing of factor inputs forces firms to respond slowly to supply-

*Director of planning and chief economist, New York Times.