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1 Rational Expectations, Business Cycles, and Government Behavior

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Government and Business Cycles

Irregular fluctuations in economic activity, as measured by aggregate production and employment, are a persistent characteristic of market economies. What is the relation between these business cycles and the government's monetary and fiscal policies, by which we mean its regulation of the quantity of money and its total spending and taxation? From an historical perspective, have governmental monetary and fiscal actions exacerbated or mitigated business cycles? With regard to prospects for the future, what are the possibilities for prescribing monetary and fiscal policies that can improve the cyclical performance of the economy?

A decade or so ago, the belief was widespread that economists knew the answers to questions such as these, or at least knew how to find the answers. This belief is now severely shaken. The previous optimism derived mainly from the reasonably satisfactory completion of the research program associated with the Keynesian revolution. This program involved the resolution of long-standing theoretical and empirical

This paper provides an introduction to the subject of the conference on rational expectations and economic policy and a selective summary. In preparing this paper, my intent has been to identify critical theoretical and empirical questions, to review the state of knowledge about these questions, and to give a balanced view of the main issues of contention. I have not attempted to survey the literature. The selected references are not exhaustive and are intended only to supplement my summary of difficult points.

Stanley Fischer, the organizer of the conference, gave me considerable advice on the preparation of this paper. Robert King and many other people gave me helpful comments on preliminary drafts. The National Science Foundation provided support for the conference as well as for my research relating to the subject of the conference.

issues concerned with the role of various factors, including monetary and fiscal actions, in the determination of aggregate demand for output and labor services. It seems clear, however, that this work has not resulted in mastery of the business cycle.

Two sets of events have contributed to the loss of confidence in the power and beneficence of economic knowledge and expertise. First, the actual ability of models of the economy to predict business cycle developments has failed to meet the expectations of the builders and users of these models. Second, the government has failed grossly to deliver on official assurances regarding its ability to mitigate the business cycle. The optimism prevalent in the mid-sixties, associated most vividly with the idea of fine tuning the macroeconomy, has soured in the face of recession and inflation in the seventies.

These disappointing developments, in conjunction with basic innovations in economic analysis, have prompted a fundamental reconsideration of accepted ideas about the economic behavior that is responsible for business cycles and have cast doubts on previously established ways of viewing the effects of government behavior on the economy. Specifically, we can identify three distinct but complementary changes in thinking about the relation between government and business cycles. These changes are (1) the development and general acceptance of "the natural rate hypothesis," which relates cyclical fluctuations in aggregate employment to inaccuracy in inflationary expectations, (2) the widespread questioning of the ability of the political process to produce good economic policies, and (3) the fundamentally innovative idea of "rational expectations." Before discussing at some length the meaning and significance of rational expectations, it will be useful to consider briefly the other two developments.

The Natural Rate Hypothesis

Prior to the formulation of the natural rate hypothesis, conventional wisdom about the relation between inflation and economic aggregates, such as output, employment, and unemployment accepted the hypothesis of a stable Phillips curve. This hypothesis associated lower levels of unemployment with higher rates of inflation and implicitly assumed the terms of this supposed trade-off to be independent of both past and current monetary and fiscal actions. Accordingly, government could use monetary and fiscal policies to keep output and employment as high as it desired if it were willing to accept the given rate of inflation associated with these chosen levels of output and employment.

The natural rate hypothesis contradicted this conventional wisdom by asserting that a fixed relation exists, not between economic aggregates and the rate of inflation, but between these aggregates and the difference

between the actual rate of inflation and expectations about the rate of inflation. More specifically, the natural rate hypothesis asserts that, given the microeconomic structure of the economy, the behavior of private economic agents—businessmen, workers, and consumers—that is based on correct expectations about the rate of inflation generates unique levels of aggregate output, employment, and unemployment, denoted for obscure historical reasons as "natural" levels. Levels of aggregate output and employment above, equal to, or below their natural levels are associated with rates of inflation higher than, equal to, or less than inflation rates that have already come to be generally expected.

The natural rate hypothesis does not imply that monetary and fiscal actions do not affect the level of aggregate demand for output and labor service, nor does it deny that aggregate demand affects the actual levels of output and employment. It does, however, imply limitations on what government policy can accomplish. Many factors, including fiscal policy actions such as changes in income tax rates and unemployment benefits, can cause the natural levels to change over time. But the natural rate hypothesis implies that monetary and fiscal policies have to affect the difference between actual and expected inflation rates to make actual levels of output and employment change relative to their natural levels. Moreover, if, as seems reasonable, the experience of actual rates of inflation higher or lower than expected tends to increase or decrease inflationary expectations, the natural levels of output and employment are the only levels consistent with a constant rate of inflation. Levels of output and employment above the natural level involve steady increases in both the expected and actual inflation rates, and, as the converse proposition, reductions in the expected and actual inflation rates require a period of recession, with levels of output and employment below their natural levels. Thus, the natural rate hypothesis implies that no tenable monetary or fiscal policy can permanently keep output above and unemployment below their natural levels.

The natural rate hypothesis and its implications are robust propositions, for they can be derived under a variety of assumptions about the determination of economic aggregates. Specifically, some models that imply the natural rate hypothesis assume that market-clearing conditions are satisfied—that is, actual quantities realize all perceived or predicted gains from trade. These models relate differences between the actual and natural levels of the aggregates to differences between actual inflation and expectations of actual inflation (Phelps 1967, Friedman 1968). An alternative model of output and employment that also implies the natural rate hypothesis allows that wage or price stickiness or both can cause markets to fail to clear. This model relates differences between the actual and natural levels of the aggregates to differ-

ences between actual inflation and expectations of what the rate of inflation would be if markets were to clear (Barro and Grossman 1976, chap. 5). These examples indicate that the natural rate hypothesis and its implications do not depend on particular assumptions about market clearing. These assumptions become critical when we consider the idea of rational expectations.

The Limited Capability of the Political Process

Prior to the current decade, discussions of the government's role in the economy typically accepted, at least implicitly, the notion of achieving "the public interest." To make this notion operational, economists commonly portrayed the political process as operating as would a rational being facing a maximization problem that is well defined and has a consistent solution. But both recent and distant history suggest that this view does not provide a good basis for understanding the government's monetary and fiscal policies.

This observation does not imply that government behavior is unpredictable. In principle, appropriate positive models of the political process could account for actual monetary and fiscal actions, including both stochastic and nonstochastic components. Yet these models presumably would not be based on the idea of the government's maximizing an unambiguous objective function subject to realistic constraints.

One consideration that would be important in a realistic model of government behavior is the failure of economists, despite their devoting considerable resources to the task, to produce firm enough knowledge about the structure of the economy to support confident adoption of any specific "stabilization policy." Other relevant considerations concern the responsiveness of representative democracy to the electorate and the specific possibility of duplicity on the part of politicians and bureaucrats.

The most basic problem, however, seems to be the inherent weakness of politics as a process for making economic decisions. Experience suggests that the political process has limited ability to specify consistent goals, establish priorities, and choose between competing objectives about economic matters, especially when these decisions require comprehension of complex technical issues and constant processing of complex information. The difficulty of reaching a political consensus about complicated economic issues would seem to be sufficient, even if we had reliable models of the economy and all officials were public spirited, to preclude the adoption of consistent objectives and the explicit acknowledgment of relevant constraints, both of which are prerequisite to using a maximization calculus to prescribe actual policies.

For example, while economists investigate the dynamic relation between unemployment and inflation and argue specifically about whether a tradeoff between unemployment and inflation is possible, the political process has had difficulty accepting even that such a trade-off might be necessary.

Actual government behavior seems to alternate, almost mindlessly, between giving priority to reducing unemployment and giving priority to reducing inflation. It is noteworthy that the alleged independence of the Federal Reserve system has not avoided this situation. In the present context, the main implication of a realistic view of government behavior and the political process would seem to be that, even assuming that the derivation of optimal feedback control rules for monetary and fiscal policies, using economic models and mathematical optimization techniques, were technically feasible, the practical applicability of such an approach is questionable.

Rational Expectations, Neutrality, and Nonneutrality

The idea of rational expectations is distinct from, but complementary to, these other changes in thinking about the relation between government behavior and business cycles. The natural rate hypothesis associates variations in economic aggregates relative to their natural levels with expectational errors involving differences between actual and expected rates of inflation. The idea of rational expectations takes this line of thought one fundamental step further by proposing a general theoretical approach to the study of expectations. The resulting analysis suggests that monetary and fiscal policies may not be able to produce systematic expectational errors, and this implies that the ability of the government to improve the aggregate performance of the economy is even more limited than we inferred either from the natural rate hypothesis or from a realistic view of the political process. Specifically, the idea of rational expectations suggests that it may not be feasible to design monetary and fiscal policies that can actively stabilize aggregate output and employment relative to their natural levels. More generally, the idea of rational expectations suggests a new set of questions about the causes of business cycles and their relation to government behavior.

Models that incorporate rational expectations have three main components. One component, which provides a framework for working out the implications of rational expectations, involves assumptions about the structure of the economy. These assumptions specify the relevance of expectations and perceptions for the market activities of private agents, the relation between the perceptions of government officials and their monetary and fiscal actions, and the interaction of the behavior of the private agents and government to determine the aggregate

variables—output, employment, and unemployment—and the rate of inflation.

Full development of these structural assumptions is a large undertaking and would be necessary for a complete understanding of business cycles, but only a couple of assumptions are critical for deriving the implications of the idea of rational expectations. One of these assumptions is that the information that is potentially relevant for private agents includes both knowledge of the specification of the structure of the economy itself and knowledge of the past and current data that this structure identifies as consequential. A second critical assumption is applicability of the natural rate hypothesis.

The second important component, which is also the primary distinguishing feature of rational expectations models, is the general principle (we can call it "the rational expectations postulate") that private economic agents gather and use information efficiently. This postulate treats informational activities the same as any other activity that economic man undertakes. In this context, efficiency means that the amount of resources private agents devote to gathering and using information is such that the marginal alternative cost of these resources equals the marginal benefit from the information.

Acceptance of both the natural rate hypothesis and the rational expectations postulate leads directly to the idea that problems of obtaining and utilizing information are critical factors in the generation of business cycles. Thus, the third component of these models, the relevance of which follows directly from the other components, involves specification of the availability and usability of information. The development of this component has led to a research program that focuses on the relations between various information problems, monetary and fiscal policies, and the nature of business cycles. The carrying out of this program in the last few years has involved considerable ingenuity.

A central theoretical result of this effort has been the formulation of a set of assumptions about information sufficient for the apparently paradoxical juxtaposition of the two propositions about government behavior and business cycles that have become associated with the idea of rational expectations. One proposition, which we can denote the neutrality hypothesis, is that the time pattern of differences between actual and natural levels of aggregate output and employment, which forms the main component of business cycles, is independent of monetary and fiscal actions that involve systematic responses to business cycle developments (Sargent and Wallace 1975, 1976). According to this proposition, systematic monetary actions affect only nominal variables, such as the level of prices and the rate of inflation. The other proposition, which we can denote the nonneutrality hypothesis, is that the pattern of business cycles nevertheless depends in a significant way on an important

subset of monetary and fiscal actions (Lucas 1972, 1975*b*, 1977; Barro 1976).

The precise nature of these propositions should be clarified. First, the neutrality hypothesis does not say that systematic government behavior in general cannot affect aggregate output and employment. Rather, the hypothesis is that systematic government behavior affects economic aggregates only to the extent that it alters the microeconomic structure of the economy and changes the natural levels of these aggregates. For example, according to the neutrality hypothesis, if, as economic theory suggests, these natural levels are largely independent of monetary phenomena, systematic monetary actions can have little effect on the actual levels of these aggregates. A corollary of this proposition is that the analytical exercise of calculating optimal feedback control rules for monetary policy is not efficacious (Sargent and Wallace 1975, 1976; Lucas 1976).

Second, the neutrality and nonneutrality hypotheses are not contradictory. Specifically, the neutrality hypothesis does not say that historically monetary and fiscal policies have not been important, perhaps the most important, factors in generating real macroeconomic fluctuations. Rather, the neutrality hypothesis implies only that the systematic part of monetary actions has not been consequential in this respect. A separate question is whether the neutrality and nonneutrality hypotheses are consistent in the sense of being joint implications of a plausible model.

Third, neither the neutrality hypothesis nor the nonneutrality hypothesis follows directly from the natural rate hypothesis and the rational expectations postulate alone. The set of additional assumptions about information is crucial. The most important assumptions in this set seem to be the following:

First, private agents know enough about the structure of the economy to foresee correctly on average the effects of monetary and fiscal actions, if they either perceive or predict these policies accurately. This assumption means that the subjective probabilities that private agents attach to the possible effects of perceived or predicted monetary and fiscal actions are equal to the true probabilities associated with these effects.

Second, private agents readily adjust their behavior in accord with these perceptions or expectations. This assumption means that actual quantities realize all perceived or predicted gains from trade. In other words, aggregate output and employment satisfy market-clearing conditions, a situation that, as mentioned above, some derivations of the natural rate hypothesis already subsume.

These first two assumptions imply that private behavior involving incorrect expectations about the rate of inflation cannot result from correctly perceivable or predictable monetary and fiscal actions. Given

the natural rate hypothesis, this implication means that perceivable or predictable monetary and fiscal actions on average do not affect the time pattern of differences between actual and natural levels of output and employment.

Third, if monetary and fiscal policies involve systematic responses to business cycle developments, which would include the case of a feedback control rule, even if the government does not announce its behavioral pattern, private agents will figure it out. This assumption means that systematic monetary and fiscal actions are accurately predictable, and this, together with the prior two assumptions and the natural rate hypothesis, implies the neutrality hypothesis.

Fourth, many monetary and fiscal actions are neither readily predictable, that is, systematic, nor readily perceivable. These actions generate private behavior that is based on incomplete information and possibly incorrect expectations about the rate of inflation. For example, an unperceived monetary contraction can cause private agents to reduce employment and output because they perceive decreased demand for productive services that they supply to be at least in part symptomatic of a worsening of the real terms at which they can indirectly exchange their services for goods that they consume, rather than to be merely symptomatic of a general deflation in the nominal values of the goods they buy as well as the services they sell. This assumption about incomplete information generates the nonneutrality hypothesis and permits the model that implies the neutrality hypothesis to allow as well for the apparent empirical relation between monetary and fiscal actions and business cycles.

A fifth assumption, which extends the theory beyond the neutrality and nonneutrality hypotheses, is that the degree of inaccuracy in beliefs about the state of the economy that results from a given unpredictable and unperceivable monetary or fiscal action depends inversely on the magnitude and frequency of such actions, that is, on the variance of monetary or fiscal policies. This assumption, like the first and third assumptions, is essentially a reflection of a more general and basic assumption that private agents who behave according to the rational expectations postulate do not make systematic mistakes.

This fifth assumption implies the proposition, which we can denote as the variance hypothesis, that the larger the variance of monetary and fiscal behavior, the smaller the effects of given unpredictable and unperceivable monetary and fiscal actions on aggregate output and employment (Lucas 1973, Barro 1976). The variance hypothesis represents an elaboration of the nonneutrality hypothesis. A corollary of the variance hypothesis is the proposition, which we can denote as the misallocation hypothesis, that the larger the variance of monetary and fiscal behavior, the more likely are private agents to misinterpret other

economic disturbances and to fail to make the adjustments in resource allocation that these other disturbances would otherwise call for (Barro 1976).

Are the Neutrality and Nonneutrality Hypotheses Consistent?

Critical evaluation of this model that combines rational expectations and incomplete information has involved both considerable discussion of the a priori plausibility of the assumptions of the model and tentative attempts at direct econometric testing of its implications. On a priori grounds, the assumption about incomplete information, which says specifically that a significant part of monetary and fiscal actions are neither systematic nor perceivable, seems to me to be the most troublesome. The problem is that, although it seems reasonable to suppose that much government action is not systematic, the identification of specific and significant monetary and fiscal actions that are not perceivable is not immediately obvious. After all, both published data that measure values of monetary and fiscal variables and price indexes, which indicate the aggregate state of the economy, are readily available. Consequently, this assumption about incomplete information seems to require that either the noise or the reporting lag involved in these measurements is operationally significant. The one empirical study that directly addresses this issue suggests, however, that imperfections in the published data do not play a significant role in determining the behavior of economic aggregates (Barro and Hercowitz 1978).

Such results, if supported by further empirical research, would make it hard to accept the juxtaposition of the neutrality and nonneutrality hypotheses. Specifically, without this assumption about incomplete information, the other assumptions listed above would imply the neutrality hypothesis but would not imply the nonneutrality hypothesis. In this case, acceptance of the proposition that systematic monetary and fiscal policies cannot affect the course of business cycles would seem to imply that no monetary and fiscal actions affect business cycles. This implication is not only implausible but would leave us without a convincing theory of why economic aggregates fluctuate at all. Alternatively, preservation of the nonneutrality hypothesis would require rejection of other assumptions, which seem to be necessary for the neutrality hypothesis.

Pursuing this line of thought, what can we say about the plausibility and significance of the other assumptions? As suggested above, the assumptions that concern knowledge about the structure of the economy and the systematic behavior of government seem in spirit to be simple extensions of the rational expectations postulate, which in turn is an application of the concept of economic man. Thus, it would seem hard

to reject these assumptions without rejecting the presuppositions of neoclassical economic theory (Lucas 1975*a*, McCallum 1979).

A more contentious aspect of the derivation of the neutrality hypothesis is the assumption, which concerns the utilization of information, that aggregate output and employment satisfy market-clearing conditions. Of particular interest in this context are recent variations on the so-called non-market-clearing approach, which is both the primary paradigmatic rationalization for Keynesian models of business cycles and the principal alternative to the incomplete information approach to explaining the causal relation between monetary and fiscal actions and economic aggregates. The traditional attraction of the non-market-clearing approach has been that it explicitly takes into account alleged evidence of the chronic failure of markets to clear, such as layoffs and other apparent symptoms of nonwage rationing of employment.

Recent non-market-clearing models incorporate the natural rate hypothesis, the rational expectations postulate, and the assumptions that private agents understand the structure of the economy and the systematic behavior of government; however, these models also assume that long-term contracts fix wages or prices and prevent the realization of advantageous transactions that were unpredictable when these contracts were being made but are perceived or become predictable during the term of the contracts (Fischer 1977, Phelps and Taylor 1977, Taylor 1979). This non-market-clearing assumption implies that monetary and fiscal actions that are perceivable, though not predictable sufficiently in advance, can affect the course of business cycles. In these models assumptions about incomplete information are redundant. Moreover, an additional assumption that the government can react to business cycle developments faster than private agents revise their contractually fixed wages and prices implies that the neutrality hypothesis does not hold and that systematic monetary and fiscal policies are efficacious.

Although these non-market-clearing models are superficially appealing, they are also problematic. For one thing, the argument that contractual rigidity is real is not conclusive. Recent theoretical work based on the idea that labor market transactions involve arrangements for shifting risk from workers to employers suggests that the allegation that actual markets chronically fail to clear may reflect an incorrect interpretation of the facts. These risk-shifting models provide a rationale for observed stickiness of wage rates and explain alleged symptoms of employment rationing, such as layoffs, while allowing markets to clear and private agents to realize all perceived gains from trade (Grossman 1979).

Non-market-clearing models are also subject to the basic a priori objection that contractual arrangements restricting perceived and mutually advantageous transactions would not be viable in competitive

markets unless there were costs involved in taking advantage of information about potential gains from trade (Barro 1977*b*). But the existing literature has not identified any convincing costs of this type. Thus, these models of contractual rigidity do not explain the failure of markets to clear.

Another problem with the incomplete-information model that implies both the neutrality and nonneutrality hypotheses is sometimes alleged: even if some monetary and fiscal actions are not currently perceivable, it is not plausible that such misperceptions would persist over time. This argument leads to the claim that this model is not consistent with observed persistence in the effects of monetary and fiscal actions on aggregate output and employment. Various extensions of the model show, however, that an absence of serial correlation in misperceptions does not preclude serial correlation in the effects of these misperceptions resulting from gradual adjustment in, for example, demands for labor services, inventories, or physical capital (Blinder and Fischer 1978, Lucas and Sargent 1978, McCallum 1979). In addition, careful empirical analysis suggests that the amount of persistence in employment and unemployment is much less than one might infer from casual inspection of the data (King 1978).

Formal econometric analysis of models incorporating rational expectations has involved experimentation with a variety of approaches. One interesting example is the development of operational statistical distinctions between predictable and unpredictable changes in the stock of money (Barro 1977*a*, 1978), and another is the testing of the variance hypotheses as applied to monetary disturbances (Lucas 1973, Hanson 1978), but none of the econometric studies have yielded a clear-cut test of the key neutrality hypothesis (Lucas 1977*b*, Barro and Hercowitz 1978, McCallum 1979). Moreover, some of the results of such studies seem to be weak in the face of small changes of specification (Small 1979).

In sum, the present state of the theory of the business cycle and the role of monetary and fiscal policy is unsatisfactory. The research program associated with the natural rate hypothesis and the rational expectations postulate has raised basic questions but so far has provided fewer answers. The ingenious incomplete information model that implies both the neutrality and nonneutrality hypotheses is not wholly convincing, but a sound basis for preferring any other existing model of the business cycle is still wanting.

Significance of Rational Expectations

The neutrality hypothesis implies that attempts to design optimal systematic monetary and fiscal policies are pointless except to the extent

that such policies affect the natural level of output. Whether or not we accept this hypothesis and its radical implication, however, the rational expectations postulate has had profound effects on our way of thinking about government behavior. For example, within the recent vintage of non-market-clearing models, analysis of the determination of the degree of contractual rigidity as a balancing of adjustment costs and benefits would seem to imply a version of the variance hypothesis. Specifically, the larger the effort government makes to use systematic monetary and fiscal policies to manage economic aggregates, the larger the incentive private agents have to modify the form of their contracts to mitigate these effects (Gray 1978). Thus, even in a model in which the neutrality hypothesis does not hold, acceptance of the rational expectations postulate implies limitations on the potential effects of systematic monetary and fiscal policies on aggregate output, employment, and unemployment.

The importance of the positive analysis associated with rational expectations, moreover, does not depend on whether or not actual monetary behavior results as if from the solution of a postulated social optimization problem. The discussion of the limited capability of the political process suggests that the conventional conception of basing monetary and fiscal policy on a maximization calculus is largely irrelevant and that adoption of a consistent stabilization policy is not a practical possibility. Thus, the implications of rational expectations regarding the potential effects of stabilization policy and the feasibility of the optimal control approach may have little practical relevance. Nonetheless, the hypotheses associated with rational expectations have essential implications for understanding the effects of government behavior, however it is generated.

These hypotheses, in addition, do not imply that government behavior—or, more basically, the institutional framework within which government behavior is determined—is without normative significance, although discussion of the normative implications of these hypotheses requires the additional specification of a relevant normative standard. For example, acceptance of the neutrality hypothesis and the misallocation hypothesis suggests as a standard of optimality the hypothetical outcome that the behavior of economic agents would generate in a world of complete information. This standard implies that the best policy the government can pursue is dissemination of any information it has and minimization of the nonsystematic aspects of its own behavior (Barro 1976). In this context, particular instances of nonsystematic government behavior on average do not improve the performance of the economy, but the possibility of such disturbances tends to mislead private agents about the nature of other economic disturbances, thereby worsening the average performance of the economy.

The idea of rational expectations also has profound implications for research strategy, which reflects our way of looking at the behavior of private economic agents and its relation to government behavior. Most basically, it no longer seems reasonable to analyze the effects of government behavior without taking into account the reactions of private agents behaving in accord with the rational expectations postulate. Acceptance of this view implies, among other things, rejection of the methodology underlying conventional economic forecasting models (Lucas 1976). One might speculate that the fact that the idea of rational expectations threatens to make obsolete a substantial amount of professional capital, which is associated with forecasting models as well as with the methodology of optimal control, helps to explain the amount of heated professional controversy it has provoked.

A final question is whether the implications of rational expectations are good news or bad news for the man in the street. The neutrality hypothesis is surely disturbing to those who view government as an economic doctor attempting to use stabilization policy to treat a periodically ailing private economy. In this view, past failure to mitigate the business cycle has resulted from bad luck or potentially avoidable mistakes.

An alternative view, however, is that monetary and fiscal policy has a sorry historical record that is the inevitable consequence of the political process by which policy is formulated. For those who hold this pathogenic view, the implications of rational expectations are both good and bad. On the one hand, the variance hypothesis implies basic limitations on the potential for systematically misguided government behavior to do harm to the economy. On the other hand, the misallocation hypothesis implies that chronic unpredictability of government behavior worsens the average performance of the economy. From this point of view, the basic structural reform suggested by the idea of rational expectations is the adoption of stable and readily predictable monetary and fiscal behavior.

Summary of Conference

The papers and discussions of the NBER conference touch on most of the issues raised in the preceding sections. The paper by Robert J. Barro and Mark Rush, "Unanticipated Money and Economic Activity," reports extensions of Barro's earlier econometric analysis that focuses on the distinction between predictable and unpredictable growth in the stock of money. The main innovations in the conference paper involve refining the calculations of predictable and unpredictable money growth to take account of the relations between money growth and economic

aggregates and testing of these cross-equation restrictions. Barro and Rush conclude that the new evidence, both annual and quarterly, provides further support for the finding that aggregate output and unemployment respond to unpredictable money growth, but not to predictable money growth. They are less successful, however, in explaining changes in the price level. For example, the pattern of response of the price level to unpredictable money growth does not seem consistent with the pattern of response of aggregate output. Barro and Rush stress that this inconsistency is discomforting for non-market-clearing models as well as for incomplete information models. Another problem is the lack of close correspondence between the pattern of price response for annual data and that for quarterly data. These difficulties reaffirm the need for further development of the theoretical framework underlying the empirical analysis.

In his discussion of the paper by Barro and Rush, Robert Weintraub questions whether the assumption that monetary policy reacts to unemployment implicit in Barro and Rush's calculations of predictable money growth is consistent with the neutrality hypothesis. Weintraub also expresses doubt that the data would contradict other assumptions about monetary policy.

Robert J. Gordon's discussion of the paper by Barro and Rush stresses the difficulty of reconciling the estimated response pattern for prices with the incomplete information model. Moreover, Gordon emphasizes the apparent reality of the non-market-clearing assumption and the apparent falsity of the incomplete information assumption.

The paper by Robert J. Shiller, "Can the Fed Control Real Interest Rates?" sets up a model embodying assumptions that imply both the neutrality and nonneutrality hypotheses and shows that these hypotheses also extend to the rationally expected real interest rate, defined as the difference between the nominal interest rate and the rationally expected rate of inflation. Although prima facie evidence suggests that monetary actions can affect the rationally expected real interest rate, Shiller's analysis implies that such evidence does not contradict the neutrality hypothesis and does not mean that systematic monetary policy can control the time pattern of this interest rate. Shiller discusses various observations that bear on the plausibility of the neutrality hypothesis and stresses doubt about the crucial market-clearing assumption. Shiller's main point, however, is that existing data on seasonal or cyclical time patterns of realized real interest rates do not provide a logical basis for an empirical test of the neutrality hypothesis.

The paper by Olivier Jean Blanchard, "The Monetary Mechanism in the Light of Rational Expectations," presents a non-market-clearing model of the recent vintage that incorporates the idea of rational expectations. Specifically, Blanchard assumes that aggregate demand de-

termines aggregate output, with output prices either rigid or adjusting gradually in response to non-market-clearing situations, but that expectations of future wage income, which affect consumption demand, and expectations of eventual market-clearing prices, which serve as a target for actual price adjustment, are accurate. Blanchard simulates the effects of monetary disturbances on aggregate output, asset prices, and output prices, using some parameter estimates reported in another paper and some made-up parameters. The simulations draw the important distinction between anticipated and unanticipated disturbances, and they suggest in general that assumptions about expectations are quantitatively important for dynamic adjustments in this type of model.

Bennett McCallum's discussion of Blanchard's paper presents a critique of the econometric procedure that produces parameter estimates used in the simulations. This critique brings out the inherent difficulty of drawing confident quantitative conclusions about the structural relations of the macroeconomy, especially when the model of the economy takes expectations and their formation carefully into account. Michael Parkin's discussion stresses the basic objection that the non-market-clearing assumption, which, in Blanchard's model, allows monetary disturbances to affect aggregate output, lacks a firm basis.

Stanley Fischer, in his paper "On Activist Monetary Policy with Rational Expectations," argues that the type of model specified by Blanchard is realistic. Specifically, Fischer asserts that various costs of utilizing information provide a plausible a priori basis for the non-market-clearing assumption. Fischer also explains that Barro's econometric analysis, which suggests that predictable monetary actions do not affect aggregate output, is consistent with the idea of rational expectations but does not provide a test of the neutrality hypothesis. In particular, Barro's evidence does not imply that systematic monetary policy cannot affect the course of business cycles by reacting to new information faster than private agents. Fischer stresses that, if we accept the non-market-clearing assumption and the implied potential for effective systematic monetary policy, the key issue becomes whether the policy-making process is capable of taking good advantage of this potential. Fischer discusses various economic and political considerations that seem relevant to this issue and reaches cautiously optimistic conclusions. Mark Willes's discussion of this paper stresses the point that the idea of rational expectations at the least has shaken confidence in the ability of economists to design effective stabilization policy and has shifted the burden of proof to those who advocate activist policy.

Finn Kydland and Edward C. Prescott investigate the implications of rational expectations for choosing among alternative fiscal policy rules in their paper "A Competitive Theory of Fluctuations and the Feasibility and Desirability of Stabilization Policy." Kydland and Prescott consider

a model in which the neutrality and nonneutrality hypotheses both obtain, and their analysis focuses on the effects of changes in technology and shifts in fiscal policies on aggregate employment. In their model, these effects are persistent, but not permanent. Kydland and Prescott conclude that tax rates should not respond either to fluctuations in economic aggregates or to temporary changes in public expenditures. Robert Hall's discussions of this paper and of Fischer's paper stress both the crucial role that the assumptions about market-clearing and non-market-clearing play in the analysis and the lack of a convincing case either for accepting or for rejecting these assumptions.

In the paper "Rules, Discretion, and the Role of the Economic Advisor," Robert E. Lucas argues that the idea of rational expectations provides a powerful tool for analyzing the consequences of various fixed policy rules but also implies that economic analysis cannot hope to predict the consequences of discretionary policies. Lucas acknowledges that the rational expectations postulate by itself does not imply the neutrality hypothesis and, hence, does not preclude consideration of systematic monetary and fiscal policies.

The paper by Robert M. Solow, "What to Do (Macroeconomically) When OPEC Comes," discusses what monetary and fiscal policies should have been during 1974–75 on the basis of a non-market-clearing model that is not restricted to conformity either to the natural rate hypothesis or to the rational expectations postulate. Solow characterizes actual policy during this period as "mindless."

The paper by William Poole, "Macroeconomic Policy, 1971–75: An Appraisal," reviews the record of monetary and fiscal actions and price controls during that period and concludes that these discretionary policies were a cause of substantial fluctuations in economic aggregates. Poole attributes much of the bad record of macroeconomic policy to political considerations that impinge on all policy makers. He suggests that legislated policy rules would improve the performance of policy.

A summary of the conference also provides a summary of the current state of thinking about the issues relating to rational expectations. Four main observations seem warranted. First, nearly all of the participants accepted the rational expectations postulate, at least as a working assumption. Second, most of the participants expressed a priori reservations about both the incomplete information approach and the non-market-clearing approach to understanding business cycles. They agreed that there do not seem to be firm a priori grounds for either accepting or rejecting the neutrality hypothesis. Third, the participants agreed that at present no solid empirical evidence exists relating to the neutrality hypothesis, and they were not sure about how to produce such evidence. Fourth, the participants expressed the prevailing skepticism about

activist stabilization policy. This attitude seemed to result in part from acceptance of the idea of rational expectations and in part from the disappointing record of actual monetary and fiscal policies.

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