

theories, in their current state of development, haven't provided an account of particular fluctuations or episodes observed in the data. Technology and innovation are harder to measure than spending, for example. But unless technology can be measured, its cyclical implications are hard to gauge.

Some Policy Considerations

Policy issues hinge on theoretical issues whose resolution is unlikely to occur soon, if at all. But, in the meantime, the policy issues cannot be avoided; the show must go on.

Three views can be distinguished about how monetary policy can affect the business cycle and enhance social welfare. First, if the business cycle is due purely to the interaction between nominal and real variables, then some countercyclical policy (such as faster money growth in recessions) can stabilize the economy and ameliorate defects of the free market economy. Of course, the design of such a policy will not be easy in practice. A second view attributes the business cycle entirely to real—not monetary—factors, so that monetary policy is essentially irrelevant. Ironically, then, the real business cycle theories do not offer any basis for rejecting Keynesian monetary policies.

A third view, that the business cycle is caused by a confluence of monetary and real influences, is more popular

among economists. In this view, monetary policy, if well designed, may serve to stabilize the economy. To the extent that a Keynesian mechanism is at work, Keynesian policies will enhance welfare. But to the extent that fluctuations represent the economy's efficient responses to changing real opportunities, successful stabilization will thwart these desirable responses. Just how aggressively policy should pursue stabilization will depend on which mechanism is most important in accounting for the business cycle. Lacking a clear answer, many economists believe that a cautiously countercyclical policy of some type may not be unwise.

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ECONOMIC COMMENTARY

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Monetary Policy Debates Reflect Theoretical Issues

by James G. Hoehn

Can monetary policy act to stabilize the economy? Should policy attempt to do so? These questions have been the subject of considerable controversy during the last few decades. The continuing controversy reflects, in large part, the inability of economists to resolve theoretical issues surrounding the relationship between nominal variables, such as inflation and money growth, and real variables, such as output and employment.

If nominal variables do not significantly influence the movement of real variables over the business cycle, as some theories suggest, then monetary policy is ineffective as a stabilization tool. If, on the other hand, such an influence does exist, the design of monetary policy is an important factor in the business cycle. Although most economists believe monetary policy does influence the course of the business cycle, even this belief may not help settle the policy issues unless we know just how those effects operate and how to exploit them.

This *Economic Commentary* reviews some of the important developments in economic theory that have altered our understanding of the real-nominal interaction, and their implications for monetary policy.

Classical and Early Keynesian Theories

Classical economic theory, which prevailed before 1930, held that economic fluctuations are ultimately determined by technology, by the preferences of individuals, and by the available quantities of capital, labor, and other productive factors. These ultimate determinants are reflected in the supply and demand for commodities, and prices rise or fall (adjust) so that markets clear—that is, so that supply and demand are in balance. But the classical theory held that nominal prices or the overall price level did not influence supplies and demands of individual commodities. Instead, the prices that really matter to people are price ratios, or relative prices, which represent the terms of trade between different goods, and between leisure and consumption. If all nominal (or dollar) prices and wages are doubled, relative prices are unchanged, so that equilibrium quantities and outputs are also unchanged. It would seem to be a consequence that there is no effect of inflation—an overall increase in prices—on economic activity.

The overall price level, in turn, is determined by interaction of money supply and demand. For example, a rise in the supply of money would, given a stable turnover rate (velocity), translate into a higher volume of nominal spending on goods and services. This higher level of overall demand would not, to a reasonable approximation, affect any of the ultimate determinants of the economy's output, so the classical view was that all prices would tend to be bid up

in equal proportion to the money increase. On the other hand, a rise in money demand due to rising output would, for a given money supply, tend to cause prices to fall as people tried to save money, so that the nominal supply would be adequate to carry out transactions. So long as prices adjusted fast enough, money growth and inflation would not appreciably disturb economic activity, and all resources would always be fully employed.

However, a strong positive relationship between inflation and overall activity was observed in the years prior to World War I. Economists began to suspect that markets do not clear rapidly enough for inflation to have no real effects. Finally, the severity of business cycles and the depth of the Great Depression made it appear that supply, particularly of labor, could exceed demand for a considerable time and by a substantial amount. The notion of continual full employment seemed quite implausible.

The Keynesian economists attributed the Depression to insufficient overall demand. They held that wages and prices were too sticky in the short run to fall enough to eliminate excessive unemployment and other gaps between supply and demand. Instead, firms and workers would respond to rising or falling demand largely by increasing or decreasing output and employment in the short run. Consequently, government policies that stimulated spending would raise output as well as prices. At first, Keynesians argued that only direct

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government spending would have much effect. Monetary policy was thought ineffective because interest rates were already very low in the Depression, yet there were no unsatisfied creditworthy borrowers. In the context of the milder postwar recessions, however, they felt that monetary policy could stimulate spending by expanding the money supply and lowering interest rates.

Monetarists had some technical disagreements with Keynesians over the process linking monetary expansion to demand stimulation. Monetarists did not think it depended entirely on a fall in the interest rate. More importantly, while they agreed with Keynesians that sticky prices and wages made for an interaction between nominal and real variables, they cautioned that the uncertain lags between policy actions and their effectiveness made it unlikely that active manipulation of the money supply would be helpful. They blamed economic fluctuations on instability in the money supply.

Problems of the Keynesian Model

After World War II, business cycles did not conform to earlier patterns. The simple, positive relationship that had existed earlier between the rate of inflation and output fluctuations disappeared. During certain periods, most notably the mid-1970s and early 1980s, high inflation and recession coexisted.

This empirical anomaly encouraged Keynesians to make more plausible models that include not only demand-side influences, but also supply-side influences such as productivity, oil prices, and changes in the international terms of trade. These Keynesian models fit historical facts well, but necessarily require the imposition of questionable assumptions. Two kinds of questionable assumptions about relationships are noteworthy: those that exclude variables from relationships,

and those that specify the lags between variables. If everything depends on everything else, as in principle it does, then it is impossible to build a precise model. Acceptable approximations can include the important relationships and exclude others. Likewise, the timing of these relationships has to be approximated because theory does not adequately specify them. These ambiguities are solved in practice by trying various reasonable assumptions out to see what works, in the sense of fitting the data. The result is a detailed hypothesis of how the economy works, but the historical accuracy of the model does not necessarily prove that the underlying theory is correct. The forecasts of the models have not provided a clear basis for claiming success.

A debate over the assumptions underlying the models led to the recognition that the rules of behavior that model equations described were not really structural but would vary depending on the economic and policy environment. For example, the early models assumed, at least implicitly, that persistent inflation of money and aggregate demand would, by raising prices, cause business to respond by increasing output and employment. But, both reason and growing evidence suggested that, when inflation becomes permanent, firms and workers would eventually come to routinely raise prices rather than output. The idea that there is a certain level of economic activity that results when suppliers adjust to inflation has been termed the natural rate hypothesis. This hypothesis was so named because it held that, on average, the unemployment rate would equal a "natural rate" determined by real factors, such as labor force characteristics and the normal process of expansion and contraction of individual firms and industries. The unemployment rate could not be held down permanently by raising the rate of inflation. This hypothesis is no longer controversial.

Economists originally thought that the assumption that expectations adapted to past inflation, termed *adaptive expectations*, would make the models consistent with the natural-rate

hypothesis. And although expectations are not explicitly represented in Keynesian models, they are consistent with the notion that a sustained rate of inflation will have effects on economic activity only in the short run, until suppliers come to anticipate the inflation. This improvement in the models made them a more plausible account of postwar data. (Indeed, in conjunction with the supply factors also incorporated, the models fit the historical data very well.) However, the notion of adaptive expectations was undermined in the 1970s by the seeming inability of accelerating inflation to bring about increased output and, more importantly, by a new recognition that this adaptive expectations notion is not consistent with the natural rate hypothesis after all. If expectations merely adapted to past experience, monetary policy could always keep accelerating inflation, thus keeping output above its natural level, and unemployment artificially low!

The *rational expectation hypothesis* ruled out the possibility that people could be consistently surprised by inflation. Although people do not have complete information on inflation, they use the knowledge they have, including knowledge of how monetary policy reacts to the business cycle. The remarkable conclusion was that, if the influence of money and inflation was due to the way it tricks suppliers and workers into increasing output and employment, then this influence cannot be systematic in any way. In particular, it cannot be systematically related to the state of the economy. If money growth is regularly increased during recessions, this will be expected and will only raise inflation. So monetary policy would be ineffective as a stabilization tool. This would be true, even though unsystematic, hence, unexpected, changes in money growth and inflation would affect output.

The rational expectations hypothesis has proved too difficult to incorporate into the detailed statistical models. But its implication—that only unanticipated money growth and inflation matters for output and employment—has been tested. Unfortunately, the distinction between expected and unexpected inflation and money growth turned out not to be helpful in accounting for the business cycle. Inflation appears not to be systematically related to output in the postwar era—unless, as in Keynesian models, supply-side factors are opportunistically controlled for—regardless of whether inflation is anticipated or not. On the other hand, money growth, whether or not anticipated, does seem to foreshadow output and employment fluctuations by up to several years. These results have in common that the anticipated-unanticipated distinction is unimportant, but differ on whether real and nominal variables are interrelated. The money-output nexus found involved lags too long to be consistent with the expectations explanation: why would it take suppliers several years to adjust to the money supply, when such timely estimates of it are made public?

An answer in the spirit of the earlier Keynesian tradition is that prices and wages are sticky. New versions of sticky-price models are more plausible than earlier ones because they can incorporate rational expectations and the natural-rate hypothesis. For example, wage contracting models assume wages do not adjust fully during the multi-year period that wage bargaining agreements are in effect. These contracts are widely considered an important feature of the real world that may help account for observed lags in the relationship between money and output. The contracting theory still has some serious unresolved theoretical problems, though. Why would employees commit themselves to a predetermined nominal wage and allow the employer to vary employment in whatever way most advantageous to him in light of developments during the

contract? Aren't rational employees interested in bargaining over employment as well as nominal wages? Also, true compensation adjusts during contracts in many ways, ranging from cost-of-living clauses and varying overtime, to longer or shorter coffee breaks and changing work rules and conditions. Although some sticky-price or wage-contracting mechanism may be at work in the business cycle, the earlier debates over rational expectations versus adaptive expectations have inculcated a healthy skepticism among economists regarding models that simply assume some plausible mechanism rather than working out how individual people would rationally behave under different policies. A model or relationship that is not worked out in terms of the underlying incentives of individuals generally breaks down when policy, or any other aspect of the economic environment, changes. Hence, such models or relationships may not provide reliable guides for policy.

Real Business Cycle Theory

The search for explanations of rational individual behavior consistent with the overall economic fluctuations has led, particularly during the 1980s, to a more radical break with the Keynesian tradition by *real business cycle* theories. In these, as in the classical theories, sticky prices and expectational errors play no role. But these theories go beyond the classicals by taking on the difficult task of explaining how employment could fluctuate so much without indicating some kind of market failure.

In a common version of the real business cycle explanation, changes in the productivity of labor and capital initiate fluctuations. Obviously, productivity changes alone could account for output fluctuations, but it would be difficult to use them to explain cycles—persistent fluctuations around the long-run trend. The hypothesis is that productivity shocks induce rational individuals to take actions that generate these cycles. For example, the economy might receive an unexpected windfall as output exceeded expectations when employment and capital

investment decisions were made. A short-run unexpected reduction in the price of oil, or a bumper harvest, would be examples of productivity shocks. Rather than consume the entire windfall immediately, it will surely be preferable to spread out the benefits of this windfall over time, if efficiently possible. The windfall can be used for investment that pays off over a number of years. During that time, employment will also be higher because the investments make labor more productive. Eventually, the higher wealth will be enjoyed partly by more leisure. This up and down employment pattern would constitute a cycle.

Other mechanisms can generate cyclical fluctuations. Permanent advances in technology, such as the recent ones in information processing, may require the movement or retraining of labor, and the movement of other resources from declining industries to advancing or new ones. This may initially create unemployment as labor relocates.

Real business cycle theories can also plausibly account for the leading relationship between money and output. For example, as the economy gears up to exploit favorable productive opportunities, the financing arrangements will partly involve bank loans that increase deposits that are included in the money supply. In this view, the banks' ability to expand and contract credit and the money supply to meet the demands of business allows money growth to vary cyclically and to lead output changes, without necessarily exerting a causal influence.

Real business cycle theories make clear that an economy that is making efficient use of its resources in the face of changing technology will generate cycles in output and employment. Therefore, it is plausible to consider business cycles—at least of the mild, postwar variety—as largely an efficient response to technological forces, as opposed to failures of markets to adjust. However, real business cycle