

Theories of Price Determination

By George A. Kahn

The rising inflation rates of the 1970s and the falling inflation rates of the early 1980s have provided a challenging laboratory for testing and designing theories of price determination. While the laboratory has produced widespread agreement on the long-run determinants of the aggregate price level, disagreement over theories of the short run still persists. These differences have led to a variety of policy prescriptions designed to reduce inflation while maintaining an “acceptable” level of production and employment. Policy differences result, despite a common model of long-run price behavior, because of different assumptions about short-run aggregate supply and demand.

While no theory of price determination can claim to explain recent price behavior completely, Keynesian, monetarist, and new classical theories have emerged as the leading contenders.¹ These theories fall into two categories based on their policy recommendations. Keynesians or, more generally, policy activists recommend that policy respond to current or expected economic conditions. By “leaning against the wind” or accommodating adverse

supply shocks, policy activists believe they can reduce fluctuations in real output. Monetarists and new classical economists, on the other hand, recommend a policy that is invariant to the current state of the economy. By adhering to simple policy rules, monetarists and new classical economists maintain that uncertainty will be reduced and economic performance improved. To understand how these diverse policy prescriptions arise and how they relate to underlying theories of price determination requires a closer examination of the prescribing theories.

This article uses an aggregate supply and demand analysis to illustrate common features of models of price determination and to highlight important differences. The first section

¹ While most readers are probably familiar with the Keynesian and monetarist schools, they may not be familiar with the new classical school. The principal features of the new classical economics are perfectly competitive markets and rational expectations. Other names that have been given to this school of thought include rational expectations, monetarism Mark II, and, in tribute to its main authors, the Lucas-Sargent-Wallace approach. The somewhat stylized distinctions made in this article between theories of price determination are meant to reflect the general views of leading economists. Prominent representatives of the Keynesian school include Franco Modigliani, Paul Samuelson, and James Tobin. Representatives of the monetarist school include Karl Brunner, Milton Friedman, Allan Meltzer, and the staff of the Federal Reserve Bank of St. Louis. Representatives of the new classical school are Robert Lucas, Thomas Sargent, and Neil Wallace.

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presents the supply and demand framework. It describes the generally accepted downward sloping shape of the aggregate demand curve and the vertical shape of the long-run aggregate supply curve. It also establishes the role of price expectations in the derivation of short-run aggregate supply. How quickly prices and price expectations adjust to changes in demand is shown to be an important point of disagreement among theories of price determination. The second section focuses on other factors affecting aggregate supply and demand and discusses the importance placed on each factor by different theories of price determination. It also describes the different policy recommendations associated with proponents of Keynesian, monetarist, and new classical schools of thought.

Prices, price expectations, and output

A useful framework for studying price determination is the aggregate supply and demand model. This model divides the macroeconomy into a demand side and a supply side. The demand side represents the spending of consumers, firms, and the government. The supply side represents the production of goods and services by firms using labor and other inputs. Together, demand and supply determine the level of prices and real output.²

Long-run theory of price determination

In the long run, prices are determined by the interaction of aggregate demand and long-

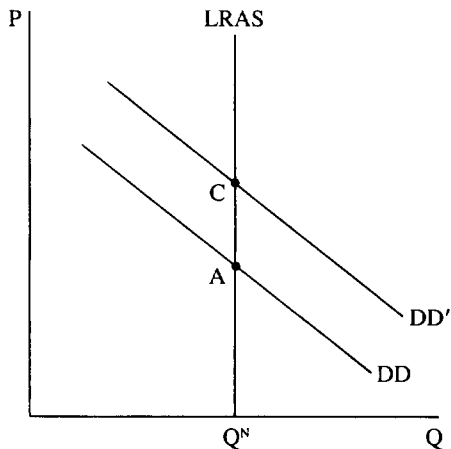
run aggregate supply. Two common features of most theories of price determination are a downward sloping demand curve and a vertical long-run supply curve. Aggregate demand is an inverse relationship between the price level and the level of real output. It represents combinations of prices and real output that clear both the product market and the money market under specific behavioral relationships for private spending and given levels of the money supply and fiscal policy variables. A higher price level, other things equal, requires a higher interest rate to keep the demand⁴ for money equal to the supply of money. The higher interest rate, in turn, reduces interest-sensitive spending and causes real output to decline. Because a higher price level is associated with a lower level of real output, the demand curve slopes downward.

The other common feature of models of price determination is the shape and position of the long-run aggregate supply curve. This curve indicates the amount produced at each price level when all resources are fully employed and price expectations are correct. The level of output determined by the long-run supply curve is called the natural rate. The size of the labor force, the structure of the labor market, the state of technology, and other factors not generally explained in simple macroeconomic models determine the level of real output that corresponds to the natural rate. Because it is generally agreed that this level of output does not depend on the price level, the long-run aggregate supply curve is drawn as a vertical line. In fact, some economists prefer to define the position of the long-run aggregate supply curve as the level of output at which there is no tendency for inflation to rise or fall.³

Figure 1 shows two possible aggregate demand curves, DD and DD', and one possible long-run aggregate supply curve, LRAS.

² While this article analyzes theories of price level determination, many of the results extend to theories of inflation determination. Because inflation can be represented by a continual upward shifting of the supply and demand curves described in this article, growth in the variables that influence the price level can be thought of as determining the inflation rate.

FIGURE 1



The price level, P , is on the vertical axis, and real output, Q , is on the horizontal axis. If DD represents the initial level of aggregate demand, then DD' represents an increase in aggregate demand. At each possible price level, DD' implies greater real output, and at each level of real output, DD' implies a price level higher than DD . The greater aggregate demand thus associated with DD' could be the result of a more stimulative fiscal or monetary policy or greater consumer or business confidence. Figure 1 also shows a long-run aggregate supply curve. Reflecting the natural-rate

³ More technically, the natural rate of output is defined as the amount of real GNP produced when the economy is operating at the natural rate of unemployment. The natural rate of unemployment, in turn, is defined as the unemployment rate consistent with a stable inflation rate and no supply shocks. The natural rate of unemployment is not necessarily the optimal rate of unemployment. Reducing the natural rate requires microeconomic policies that increase the efficiency of labor markets. For a discussion of "structural" unemployment and ways to reduce it, see Stuart Weiner, "Enterprise Zones as a Means of Reducing Structural Unemployment," *Economic Review*, Federal Reserve Bank of Kansas City, March 1984, pp. 3-16.

hypothesis, LRAS is drawn as a vertical line at the natural rate of output, Q^N . The slope of the long-run aggregate supply curve indicates that there is no long-run relationship between the price level and output. Any price level is consistent with the natural rate of output.

The long-run price level is determined by the intersection of DD and LRAS, as in Figure 1. When aggregate demand increases as a result of, say, an increase in the money supply, the demand curve shifts up and to the right to DD' along the fixed LRAS curve. In Figure 1, the economy moves from point A to point C. The long-run result of the increase in aggregate demand is an increase in the price level, with no change in real output. In fact, anything that shifts aggregate demand will affect only prices in the long run. Output will be left equal to its natural rate. It is impossible, therefore, in most modern theories of price determination for government policies affecting aggregate demand to have any lasting effects on real output.⁴

Theories of short-run aggregate supply

The short-run aggregate supply curve shows how firms alter production and employment for given price expectations in response to changes in the price level. Because production and employment decisions depend on the price level and must often be made before the price level is known, expectations about prices play an important role in short-run aggregate supply determination. Any deviation between the actual and expected price level is an unantici-

⁴ Strictly speaking, macroeconomic policies can affect the natural rate by influencing the allocation of income between investment and consumption. If increases in government spending on consumption goods "crowds out" private investment spending, the future capital stock will fall. A reduction in the capital stock will then reduce production possibilities.

pated price change that causes economic agents to reevaluate past decisions. In the long run, as agents gain information about prices and incorporate that information into their decisions, actual and expected prices are the same. Only when expectations turn out to be correct is the economy operating on its long-run aggregate supply curve at the natural rate of output. At any other level of output, actual prices deviate from expected prices, output deviates from its natural rate, and economic agents are led to revise their inaccurate price expectations.

Two explanations are widely given to explain why deviations of the actual price level from its expected value cause the aggregate supply curve to slope upward. One explanation focuses on the product market. If prices turn out to be greater than expected, producers will attribute at least some of the deviation of actual from expected prices to an increase in the relative price of their particular product.⁵ As a result, firms will increase employment and production, and real output will rise. If, on the other hand, prices turn out to be lower than expected, producers will attribute part of the deviation to a decline in the relative price of their product, and real output will fall. Therefore, for given price expectations, a higher price level leads to a higher level of real output.

The other explanation focuses on the labor market. If wages are set before product prices and based on the expected price level, then an unexpectedly high price level will lead to an unexpectedly low real wage rate (the nominal

⁵ Robert Lucas uses the confusion between local and aggregate price shocks to derive an upward sloping supply curve in "Expectations and the Neutrality of Money," *Journal of Economic Theory*, Vol. 4, April 1972, pp. 103-24. For a more accessible version of the same model, see Robert Lucas, "Some International Evidence on Output-Inflation Tradeoffs," *American Economic Review*, Vol. 63, June 1973, pp. 326-34.

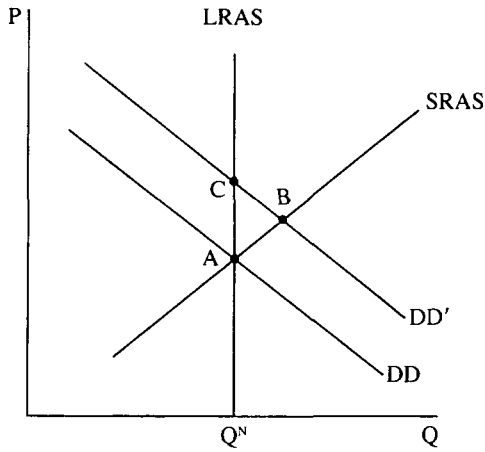
wage rate divided by the price level). Because labor costs are lower, firms will want to hire more labor and increase production.⁶ Similarly, a lower than expected price level leads to a higher than expected real wage and a reduction in employment and real output. Thus, for given price expectations, a higher actual price level is associated with a higher level of real output. The short-run aggregate supply curve slopes upward.

Figure 2 illustrates the effect of an increase in aggregate demand under an upward sloping short-run aggregate supply curve. When DD shifts to DD', the economy moves initially from A to B. Both real output and the price level increase, provided price expectations remain unchanged. In the long run, as prices and expectations adjust to the higher level of aggregate demand, the economy moves back along DD' to point C. In other words, the

⁶ This is not the complete story, however, since workers must be induced to supply the additional labor at a lower real wage rate. Suppose workers evaluate the purchasing power of their nominal wage in terms of expectations about average consumer prices and producers evaluate their real labor costs in terms of the actual price received for products produced. As long as workers' expectations are slow to adjust and lag behind reality, a higher price level can lead to increased employment and production. Workers' expectations may be slow to adjust if workers sample prices only during infrequent shopping trips. Milton Friedman proposed this explanation for the upward sloping short-run aggregate supply curve in "The Role of Monetary Policy," *American Economic Review*, Vol. 58, March 1968, pp. 1-17. He also coined the phrase "natural rate" in that article. About the same time Edmund Phelps also described the natural rate hypothesis in "Phillips Curves, Expectations of Inflation, and the Optimal Unemployment Over Time," *Economica* (NS), Vol. 34, August 1967, pp. 254-81.

Another way to induce workers to supply more labor at a lower real wage would be to have them sign wage contracts at the beginning of the period. These contracts specify the nominal wage rate and require workers to supply whatever labor is demanded by firms. When prices go up, real wages go down. Firms demand and workers supply more labor. For a discussion of why workers and firms would find it mutually advantageous to sign long-term contracts, see Arthur Okun, "Inflation: Its Mechanics and Welfare Costs," *Brookings Papers on Economic Activity*, 1975:2, pp. 351-90.

FIGURE 2



short-run aggregate supply curve shifts up as expectations change. Consequently, there is no long-run output gain associated with the increase in aggregate demand. The economy has a higher price level at the natural rate of output. Old-fashioned aggregate price theories that predicted a long-run price-output tradeoff and a permanent shift from point A to point B as a result of an increase in aggregate demand are no longer credible theories of price determination.⁷ In their place are natural-rate theories that posit only short-run tradeoffs between prices and output.

⁷ The inverse statistical relationship between inflation (rather than the price level) and unemployment (rather than output) is called the Phillips curve. It was first described by Irving Fisher in "A Statistical Relation Between Unemployment and Price Changes," *International Labour Review*, Vol. 13, June 1926, pp. 785-92. A. W. Phillips "discovered" and popularized a similar inverse relationship between wage growth and unemployment in "The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957," *Economica*, Vol. 25, November 1958, pp. 283-99. Note that the supply and demand model derived in the text actually implies a short-run price level-output tradeoff, not a Phillips curve relationship.

Keynesians, monetarists, and new classical economists agree that unanticipated price changes cause changes in real output. They disagree, however, about the speed of adjustment of prices and expectations. Keynesians and monetarists claim that shifts in aggregate demand affect real output for several periods. This is because they believe prices and expectations adjust slowly. Price and wage rigidities introduced by such institutions as labor market contracts and government regulations cause prices to respond gradually to changes in aggregate demand. If, for example, three-year staggered wage contracts are prevalent, as they are in the U.S. economy, the adjustment of wages to price changes can take up to three years. Specifically, if nominal wages are determined by long-term contracts between workers and firms and if workers agree to supply the labor demanded at the contract wage, then price increases are associated with lower real wages and greater output and employment.⁸ The resulting gain in real output will last until all existing contracts have been rewritten to incorporate a higher price level. In the long run, when all contracts have been renegotiated, nominal wages will fully reflect the higher price level. Real wages and real output will return to their initial levels, but prices will remain higher. Thus, the long-run aggregate supply curve is vertical.

New classical models of price determination combine perfect price flexibility with rational expectations to arrive at a strikingly different set of conclusions. In these models, prices and wages are determined by auction markets, and price expectations are based on all available information and an accurate understanding of

⁸ For a labor market-based derivation of an upward sloping short-run aggregate supply curve, see George Kahn, "Wage Behavior in the United States: 1907-80," *Economic Review*, Federal Reserve Bank of Kansas City, April 1983, pp. 16-26.

the economy. The assumed flexibility of prices and wages implies that perceived movements in aggregate demand lead to proportionate, contemporaneous movements in the price level. In terms of Figure 2, a shift in aggregate demand from DD to DD' due to, say, an increase in the money supply, causes a movement along LRAS from A directly to C as long as the increase in demand is fully anticipated. In other words, SRAS shifts upward and to the left at the same time as the shift in DD, so that the economy comes to rest immediately at the long-run equilibrium point C. In effect, the SRAS curve is vertical.

The distinction between anticipated and unanticipated changes in the new classical models of aggregate demand is important. If anticipated, a change in demand will be perceived as economywide and will result in agents immediately adjusting prices and wages so that all relative prices (real wages, for example) remain the same. If unanticipated, agents will think at least part of the increase in demand is unique to their market and will increase production and employment in order to exploit a perceived temporary increase in the relative price of their product.⁹ Once agents figure out that the increase in aggregate demand affected all prices proportionately so that relative prices actually remained the same, they will reduce production to its previous level. Thus, in Figure 2, the effect of an unanticipated increase in aggregate demand is a movement from point A to point B to point C. In contrast to Keynesian and many monetarist models, the associated output gain lasts only one period. This lack of persistence

⁹ The terms "anticipated" and "unanticipated" usually refer to expectations formed in the previous period. Thus in the Keynesian model (and many monetarist models) an increase in aggregate demand that is fully anticipated as of the previous period can have real effects because some agents are locked into contracts signed in even earlier periods.

results from the new classical assumptions of price flexibility, rational expectations, and a one-period information lag.¹⁰

Both rational expectations and perfect price flexibility are crucial to the new classical model. The assumption of rational expectations—that people form expectations on the basis of all information available and an accurate model of the economy—has had wide influence on macroeconomic theory. It is not, however, the only assumption necessary for the new classical result that only unanticipated demand shocks affect real output. Not only must expectations be rational, but prices must be flexible, as they would be in a world where all markets worked like auctions. Because models closely resembling Keynesian theories can be constructed under the assumption of rational expectations,¹¹ the primary issue is not whether expectations are formed rationally but how quickly prices adjust to changes in aggregate demand.

The degree of price and wage flexibility has become an important area of ongoing research, at least among members of the non-

¹⁰ Early models from the new classical economics were criticized for their inability to explain the persistence of output fluctuations (Milton Friedman's 1968 model in which workers are "fooled" about the real wage is also subject to this criticism.) Subsequently, these models have been modified to include lags in the transmission of information and accelerator effects. See, for example, Robert Lucas, "An Equilibrium Model of the Business Cycle," *Journal of Political Economy*, Vol. 83, December 1975, pp. 1113-44.

¹¹ See, for example, Stanley Fischer, "Long-term Contracts, Rational Expectations, and the Optimal Money Supply Rule," *Journal of Political Economy*, Vol. 85, February 1977, pp. 191-206; John Taylor, "Aggregate Dynamics and Staggered Contracts," *Journal of Political Economy*, Vol. 88, February 1980, pp. 1-23; and Edmund Phelps and John Taylor, "Stabilizing Powers of Monetary Policy Under Rational Expectations," *Journal of Political Economy*, Vol. 85, February 1977, pp. 163-90. These theories differ from traditional Keynesian theories in that they imply the optimality of policy rules. They differ from new classical theories in that they assume price stickiness and imply the superiority of rules with feedback over constant growth rate rules.

monetarist, policy activist school. Monetarists have shown surprisingly little interest in research on the short-run dynamics of wage and price behavior. Their lack of interest could reflect the greater weight they place on the long run or their belief that short-run fluctuations cannot be explained. Nevertheless, preliminary evidence on short-run price and wage responsiveness suggests a wide variation of flexibility across time and place.¹² Flexible price models seem appropriate in some instances. In other instances, sticky price models dominate. In the postwar U.S. economy, overlapping three-year wage contracts seem to imply that the sticky price model is more appropriate. Thus, for the United States, it is difficult to accept the price flexibility assumption explicit in the new classical proposition that only unanticipated demand shocks affect real output.

Scope for demand management policies

Proponents of the three major theories of price determination differ considerably on the causes of shifts in aggregate demand and supply. Keynesians or, more generally, policy activists stress the instability of the private sector and the need for countercyclical policy. Monetarists claim that the private sector is basically stable and focus on the destabilizing effects of historical demand management policies. New classical theorists stress the distinction between anticipated and unanticipated policy. While both monetarists and new classical economists recommend nonactivist policies, they do so for somewhat different reasons. An examination of factors thought to

¹² See, for example, George Kahn, "Wage Behavior in the United States: 1907-80," and Jeffrey Sachs, "Wages, Profits, and Macroeconomic Adjustment: A Comparative Study," *Brookings Papers on Economic Activity*, 1979.2, pp. 269-332.

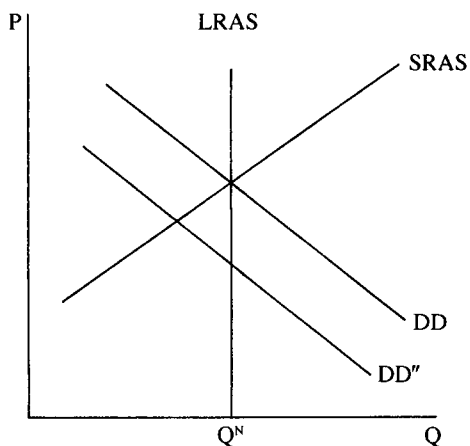
shift aggregate demand and supply highlights the differing assumptions underlying alternative policy recommendations.

Factors shifting aggregate demand and recommended policy responses

Any factor that causes the aggregate demand curve to shift causes prices, and possibly output, to fluctuate. Increases in government spending, the money supply, net exports, or consumer or business confidence, and decreases in taxes or money demand are among the factors that cause the demand curve to shift to the right. Changes in these variables in the opposite direction shift the aggregate demand curve to the left. Keynesians, monetarists, and new classical economists have differing views on the importance of these factors.

Keynesians believe that shifts in aggregate demand result from the inherent instability of the private sector as well as from policy changes. They think, for example, that money demand can shift as a result of factors other than changes in real output and interest rates. If money demand increases and money supply remains unchanged, the aggregate demand curve will shift down and to the left. Figure 3 shows the price and output effects of a decline in aggregate demand from its initial level, DD, to a lower level, DD'. Under the assumption of an upward sloping short-run aggregate supply curve, real output and prices will fall. Policy activists believe that to keep output and prices from falling, the Federal Reserve should accommodate the increase in money demand by increasing the money supply. Increasing the money supply will shift aggregate demand back up and to the right, keeping the price level stable and output equal to its natural rate. In general, Keynesians believe that by manipulating monetary and fis-

FIGURE 3



cal policy, the impact of both inflationary and recessionary shocks to aggregate demand can be at least partially offset. Through the use of these policy tools, output can be kept closer to its natural rate.

Monetarists believe that aggregate demand would be fairly stable but for perverse policy actions. They believe, for instance, that money demand is a stable function of interest rates and real income. Fluctuations in aggregate demand and the associated short-run deviations of real output from the natural rate result largely from changes in the money supply. Consequently, monetarists recommend stable money supply rules, such as a constant growth rate, to minimize fluctuations in prices and real output.

Furthermore, because monetarists believe discretionary policy affects output and prices with long and variable lags, they do not generally believe the Federal Reserve should react to exogenous shocks. The monetarists' focus on the long run gives further support to their reluctance to lean against the wind. They

claim that knowledge of short-run behavior is not sufficient to permit discretionary policy and that knowledge of long-run behavior implies the optimality of fixed money growth rate rules. These results follow even though monetarists believe the short-run supply curve is upward sloping with respect to anticipated demand shifts.

New classical economists, who believe in flexible prices and rational expectations, conclude that any shock to aggregate demand that is fully anticipated will affect only prices and not real output. Unanticipated shocks to aggregate demand will have the same short-run effects in the new classical model as demand shocks in the monetarist or Keynesian models.

The new classical model calls for stable, predictable policy. This recommendation follows from the belief that private agents will "see through" any effort by policymakers to cause real output to deviate systematically from its natural rate. The best policymakers can do is minimize random fluctuations in policy variables so as to minimize unexpected aggregate demand fluctuations. The way to do this, according to the new classical model, is with policy rules. While one rule is as good as another, new classical economists prefer simple rules, such as constant money growth.

An important implication of the anticipated-unanticipated demand shock dichotomy for policymakers is the need for credibility when changing policy. In a move from an inflationary policy to a disinflationary policy, for example, credibility is important if real output is not to be sacrificed. If a policy change is announced and carried out by the Federal Reserve but not believed by private agents, the effect will be the same as an unanticipated demand shock. In a move to disinflationary policy, aggregate demand will shift down and to the left along a short-run supply curve that is upward sloping with respect to the unex-

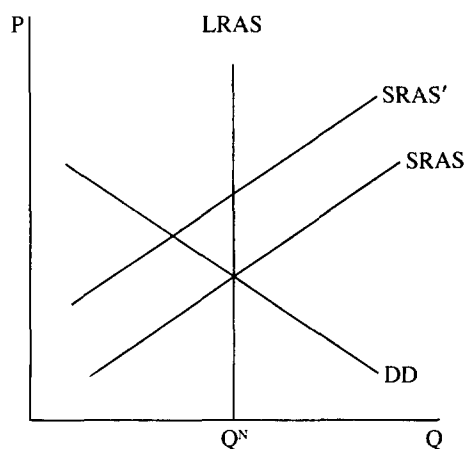
pected shift.¹³ Inflation will decline, but so will real output. As agents come to expect the new disinflationary policy, the short-run supply curve effectively becomes steeper, and further reductions in inflation can be made less costly.

Factors shifting aggregate supply and recommended policy responses

In addition to changes in price expectations, supply shocks shift the aggregate supply curve. A supply shock is any event that changes the output firms are willing to produce at a given price level.¹⁴ Adverse supply shocks shift the short-run aggregate supply curve up and to the left. In Figure 4, this effect is shown as a shift from SRAS to SRAS'. Examples of adverse supply shocks are a sudden large increase in the price of energy such as those imposed by OPEC in 1973-74 and 1979-80, an increase in the price of food resulting from a crop failure, a spontaneous demand by workers for higher wages, and a worsening in the terms of international trade.¹⁵ For a given demand curve, these adverse supply shocks raise prices and lower real output, as in Figure 4. The effect on output can be temporary or permanent, depending on the nature of the supply shock. If the shock permanently reduces production possibilities, the long-run aggregate supply curve shifts to the left.

Keynesians or policy activists are distin-

FIGURE 4



guished not only by their belief that policy should lean against the wind but also by their belief that policy should accommodate adverse supply shocks. If, for example, an oil shock shifts the short-run aggregate supply curve up and to the left, policy activists believe that the money supply should be increased in order to reduce the fluctuation of real output from its natural rate. Increasing the money supply shifts the aggregate demand curve to the right

¹⁵ The terms of trade worsen when, other things constant, the nominal exchange rate increases or the foreign price level increases relative to the domestic price level. If the terms of trade worsen as a result of, say, an increase in the price of imports relative to the price of exports, the short-run aggregate supply curve will shift up and to the left. This assumes that producers face increased costs of production or try to increase profit margins. Given a downward sloping demand curve, output will fall and prices will rise. Under the same worsening in the terms of trade, however, the aggregate demand curve will shift up and to the right if aggregate spending shifts away from foreign goods toward domestic goods. This shift in aggregate demand tends to increase the price level and real output given an upward sloping short-run aggregate supply curve. The net effect of a deterioration in the terms of trade after allowing for shifts in both supply and demand will be an increase in the price level and an ambiguous change in real output.

¹³ Here, the results derived for the price level are assumed to extend to changes in the price level.

¹⁴ See Robert Gordon, *Macroeconomics*, Third Edition, Little-Brown, Boston, 1984, or Glenn H. Miller, Jr., "Inflation and Recession, 1979-82: Supply Shocks and Economic Policy," *Economic Review*, Federal Reserve Bank of Kansas City, June 1983, pp. 8-21, for more extensive, yet accessible discussions of supply shocks and inflation.

and raises the price level above what it would have been without a policy response. An alternative policy response would reduce the money supply to extinguish the tendency for the supply shock to raise prices. In this case, the aggregate demand curve would shift to the left, and output would fall below what it would have been had no policy response been made.

Monetarists and new classical economists agree that policy should not respond to supply shocks, but for different reasons. Monetarists believe that while supply shocks may reduce real output, any policy response is likely to do more harm than good. Long and variable lags in the transmission of policy changes to the economy are likely to influence output at the wrong time and create additional problems. Thus, monetarists believe a constant growth of the money supply should be maintained even in the face of supply shocks. New classical economists, on the other hand, argue that supply shocks affect only relative prices and evoke optimal responses from the free market. Policy intervention, if anticipated, will only exacerbate the price-level effects of supply shocks. Thus new classical economists also argue for an unchanging policy in the face of supply shocks.

Summary and conclusions

Monetarists and Keynesians basically share an underlying model of price determination. They differ, however, regarding the stability of aggregate demand, the emphasis placed on the short run, and the desirability of discretionary policy. Monetarists and new classical theorists share a common philosophy that the economy will operate most efficiently if left on its own under stable, predictable policy rules. They differ, however, regarding predictions about the effects of anticipated policy.

These issues reflect not merely different assumptions about economic behavior but, in fact, different approaches to the study of macroeconomics. While some of these issues are empirical questions, it is doubtful that all the issues can be resolved by data analysis alone.

Selected Readings

Asterisks mark relatively nontechnical readings that are accessible to a wide audience. Other readings represent important contributions to the economics of price or inflation determination. They vary in difficulty.

Arrow, Kenneth J., "Toward a Theory of Price Adjustment," in Moses Abramowitz, *The Allocation of Economic Resources*, Stanford: Stanford University Press, 1959, pp. 41-51.

*Barth, James R., "The Costs of Slowing Inflation: Four Views," *Economic Review*, Federal Reserve Bank of Atlanta, January 1982, pp. 39-49.

Barro, Robert J., "A Theory of Monopolistic Price Adjustment," *Review of Economic Studies*, 39, January 1972, pp. 17-26.

_____, "Rational Expectations and the Role of Monetary Policy," *Journal of Monetary Economics*, 2, January 1976, pp. 1-32.

_____, "Long-Term Contracting, Sticky Prices, and Monetary Policy," *Journal of Monetary Economics*, 3, July 1977, pp. 305-16.

_____, "Second Thoughts on Keynesian Economics," *American Economic Review*, 69, May 1979, pp. 54-9

*Branson, William, *Macroeconomic Theory and Policy*, New York: Harper and Row, 1972.

Bronfenbrenner, Martin, and Frederick D. Holzman, "Survey of Inflation Theory," *American Economic Review*, 53, September 1963, pp. 593-661.

Brunner, Karl, and Allan H. Meltzer, "Institutional Arrangements and the Inflation Problem," *Journal of Monetary Economics*, 3, Supplementary Series, 1976

- _____, eds., *The Problem of Inflation*, Carnegie-Rochester Conference Series on Public Policy, 8, 1978.
- Drazen, Allan, "Recent Developments in Macroeconomic Disequilibrium Theory," *Econometrica*, 48, March 1980, pp. 283-306.
- Eckstein, Otto, ed., *The Econometrics of Price Determination Conference*, Washington: Federal Reserve Board, 1972.
- Fischer, Stanley, "Long-term Contracts, Rational Expectations, and the Optimal Money Supply Rule," *Journal of Political Economy*, 85, February 1977, pp. 191-206.
- Fisher, Irving, "A Statistical Relation Between Unemployment and Price Changes," *International Labour Review*, 13, June 1926, pp. 785-92.
- *Friedman, Milton, *Inflation: Causes and Consequences*, New Delhi: Asia Publishing House, 1963.
- *_____, "Nobel Lecture: Inflation and Unemployment," *Journal of Political Economy*, 85, June 1977, pp. 451-72.
- *_____, "The Role of Monetary Policy," *American Economic Review*, 58, March 1968, pp. 1-17
- Goldfeld, Stephen, "Rules, Discretion, and Reality," *American Economic Review*, 72, May 1982, pp. 361-66.
- Gordon, Robert J., "The Demand for and Supply of Inflation," *Journal of Law and Economics*, 18, December 1975, pp. 807-36.
- *_____, *Macroeconomics*, Third Edition, Boston: Little-Brown, 1984.
- _____, "Output Fluctuations and Gradual Price Adjustment," *Journal of Economic Literature*, 19, June 1981, pp. 493-530.
- _____, "Recent Developments in the Theory of Inflation and Unemployment," *Journal of Monetary Economics*, 22, April 1976, pp. 185-219.
- _____, "The Theory of Domestic Inflation," *American Economic Review*, 67, February 1977, pp. 128-34.
- Hall, Robert E., "The Rigidity of Wages and the Persistence of Unemployment," *Brookings Papers on Economic Activity*, 1975:2, pp. 301-35.
- *Heller, Walter W., "Shadow and Substance in Inflation Policy," *Challenge*, 23, January/February 1981, pp. 5-13.
- *Kahn, George A., "International Differences in Wage Behavior: Real, Nominal, or Exaggerated," *American Economic Review*, May 1984, forthcoming
- *_____, "Wage Behavior in the United States: 1907-80," *Economic Review*, Federal Reserve Bank of Kansas City, April 1983, pp. 16-26
- Keynes, John Maynard, *The General Theory of Employment, Interest, and Money*, New York: Harcourt Brace, 1936.
- Laidler, David, "Monetarism: An Interpretation and an Assessment," *Economic Journal*, 91, March 1981, pp. 1-29.
- _____, and Parkin, Michael, "Inflation: A Survey," *Economic Journal*, 85, December 1975, pp. 741-809.
- Lucas, Robert E., Jr., "An Equilibrium Model of the Business Cycle," *Journal of Political Economy*, 83, December 1975, pp. 1113-44.
- _____, "Expectations and the Neutrality of Money," *Journal of Economic Theory*, 4, April 1972, pp. 103-24.
- _____, "Some International Evidence on Output-Inflation Tradeoffs," *American Economic Review*, 63, June 1973, pp. 326-34
- _____, and Rapping, Leonard A., "Real Wages, Employment, and Inflation," *Journal of Political Economy*, 77, September/October 1969, pp. 721-54. An expanded version appears in Phelps (1970).
- Mayer, Thomas, ed., *The Structure of Monetarism*, New York and London: Norton, 1978.
- McCallum, Bennett T., "Price-Level Stickiness and the Feasibility of Monetary Stabilization Policy with Rational Expectations," *Journal of Political Economy*, 85, June 1977, pp. 627-34.
- _____, "Rational Expectations and Macroeconomic Stabilization Policy: An Overview," *Journal of Money, Credit, and Banking*, 12, November 1980, pp. 716-46.
- *Miller, Glenn H., Jr., "Inflation and Recession, 1979-82: Supply Shocks and Economic Policy," *Economic Review*, Federal Reserve Bank of Kansas City, June 1983, pp. 8-21.
- *_____, "Slowdown in Economic Activity and the Rate of Inflation," *Economic Review*, Federal Reserve Bank of Kansas City, September/October 1981, pp. 18-27
- Muth, John F., "Rational Expectations and the Theory of Price Movements," *Econometrica*, 29, July 1961, pp. 315-35.
- Nordhaus, William D., "Recent Developments in Price Dynamics," in Eckstein, 1972.
- Okun, Arthur M., "Inflation: Its Mechanics and Welfare Costs," *Brookings Papers on Economic Activity*, 1975.2, pp. 351-90.

- * _____, "The Invisible Handshake and the Inflationary Process," *Challenge*, 22, January/February 1980, pp. 5-12.
- * _____, *Prices and Quantities: A Macroeconomic Analysis*, Washington: Brookings, 1981.
- Perry, George L., "Inflation in Theory and Practice," *Brookings Papers on Economic Activity*, 1980:1, pp. 207-41.
- _____, "Slowing the Wage-Price Spiral. The Macroeconomic View," *Brookings Papers on Economic Activity*, 1978.2, pp. 259-91.
- * _____, "Understanding World Inflation," *American Economic Review*, 65, May 1975, pp. 120-24
- Phelps, Edmund S., "Phillips Curves, Expectations of Inflation, and the Optimal Unemployment Over Time," *Economica* (NS), 34, August 1967, pp. 254-81
- _____, et al., *Microeconomic Foundations of Employment and Inflation Theory*, New York: Norton, 1970.
- _____, and Taylor, John, "Stabilizing Powers of Monetary Policy Under Rational Expectations," *Journal of Political Economy*, 85, February 1977, pp. 163-90.
- Phillips, A. W., "The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957," *Economica*, 25, November 1958, pp. 283-99.
- Sachs, Jeffrey, "Wages, Profits, and Macroeconomic Adjustment: A Comparative Study," *Brookings Papers on Economic Activity*, 1979:2, pp. 269-332.
- Sargent, Thomas J., "A Note on the 'Accelerationist' Controversy," *Journal of Money, Credit, and Banking*, 3, August 1971, pp. 721-25.
- _____, and Wallace, Neil, "'Rational' Expectations, the Optimal Monetary Instrument, and the Optimal Money Supply Rule," *Journal of Political Economy*, 83, April 1975, pp. 241-57.
- *Solow, Robert M., "The Intelligent Citizen's Guide to Inflation," *The Public Interest*, Winter 1975, pp. 30-66.
- Stein, Jerome, ed., *Monetarist, Keynesian, and New Classical Economics*, Oxford: Blackwell, 1982.
- Taylor, John, "Aggregate Dynamics and Staggered Contracts," *Journal of Political Economy*, 88, February 1980, pp. 1-23
- Tobin, James, "Are New Classical Models Plausible Enough to Guide Policy?" *Journal of Money, Credit, and Banking*, 12, November 1980, pp. 788-99.
- _____, "Inflation and Unemployment," *American Economic Review*, 52, March 1972, pp. 1-18
- *Weiner, Stuart E., "Enterprise Zones as a Means of Reducing Structural Unemployment," *Economic Review*, Federal Reserve Bank of Kansas City, March 1984, pp. 3-16.