Arthur M. Okun

PRICES & QUANTITIES

A Macroeconomic Analysis

Prices and Quantities: A Macroeconomic Analysis

ARTHUR M. OKUN
The Brookings Institution

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Foreword

IN RECENT YEARS the world economy has been plagued by chronic and worsening inflation that has persisted despite substantial slack in operating rates and high unemployment levels—the condition termed stagflation. In the past, traditional techniques of macroeconomic management owed their success in combating either inflation or unemployment to the responsiveness of wages and prices to changes in aggregate demand. Wage and price increases could be moderated by restraining aggregate demand, or employment could be increased by stimulating it. During the past decade, however, the same policies have not been effective, and the nation has not been able to contain inflation even in periods of economic slack.

It now seems clear that the economists' traditional model, which presupposes short-run price and wage flexibility, is no longer valid for most of the industrial world, and hence inflation responds only weakly to shifts in macroeconomic policy. In this volume, Arthur M. Okun seeks to explain that loss of responsiveness by analyzing how modern labor and product markets work and how their structure leads to the observed macroeconomic behavior. Many, often divergent, models of economic behavior have been advanced during the past decade, based on job search, expectations, and other recent developments in economic theory. Okun examines these models critically, rejecting some and building on the insights of others. His interpretation of microeconomic behavior and macroeconomic performance provides a basis for the design of policies to deal with stagflation.

A central feature of Okun's analysis is implicit contract theory, which recognizes that efficiency-maximizing decisions by business firms reflect long-term considerations as well as short-term changes in markets. The establishment of long-term relations in labor and product markets—by implicit contracts—reduces costs, but such contracts also complicate the task of managing the economy as a whole. The growing importance of implicit contracts has increased the number of markets in which wages and prices are less sensitive to short-run changes in the demand for labor and goods. For that reason, restrictive macroeconomic policies have the

seemingly paradoxical effect of reducing output and increasing unemployment while doing little to slow inflation. Moreover, the adverse effects of external shocks to the economy, such as restrictions on the supply of oil, are magnified by public and private arrangements that have evolved to protect workers and producers from the consequences of inflation.

Okun describes the mechanics of the long-term relations between employers and employees and between customers and suppliers and shows how the resulting practices in price and wage setting affect overall economic management. He characterizes the contracts in career labor markets and in customer product markets as analogous to an *invisible handshake*. Within this framework, Okun shows why traditional monetary and fiscal policies alone are unable to cope with stagflation and how government policies such as indexation, increases in indirect taxes, and excessive regulation exacerbate inflation. He also recommends specific policies to address today's problems. It was Okun's hope that economic policymakers would be encouraged to move in these new directions to prevent even more damage to the economy.

The book was virtually completed before the author's untimely death on March 23, 1980. The manuscript was prepared for publication by his colleagues at Brookings under the supervision of Joseph A. Pechman, director of the Brookings Economic Studies program. Okun had completely revised and edited the first seven chapters in response to comments on the manuscript received at a series of staff seminars in the summer of 1979. The material constituting the seventh (and last) chapter of Okun's original manuscript is here divided, as Okun intended, between chapters 7 and 8. He left chapter 8 not quite finished; only minor editorial changes were made in it to preserve as much as possible of the original language. Okun prepared the bibliographical notes and the figures for the first six chapters. Footnote references were added to the text of chapters 7 and 8, but no attempt was made to prepare bibliographical notes for these chapters. The figures in chapter 8 were prepared by Martin Neil Baily and Barry P. Bosworth.

Handwritten notes on copies of the manuscript in Okun's files indicate that he would have made a number of further revisions had he lived to complete the book himself. Because Okun's skills as an economic analyst and a writer are legend, his colleagues were reluctant to alter the manuscript even in places in which Okun himself had clearly indicated his dissatisfaction. They agreed that it would be better to publish the book as Okun left it rather than attempt to guess at the changes he might have

made. Even without his final revisions, Okun's book stands as a major contribution to macroeconomic analysis.

Many persons were helpful during the preparation of this volume. The author was particularly grateful to his colleagues at Brookings and to William Fellner of the American Enterprise Institute for comments and suggestions at the staff seminars. Individual chapters of the manuscript were carefully reviewed by Henry J. Aaron, Martin Neil Baily, Katharine L. Bradbury, David W. Breneman, Ralph C. Bryant, Andrew S. Carron, Owen J. Evans, Howard K. Gruenspecht, Robert W. Hartman, Lester B. Lave, Robert Z. Lawrence, Thomas M. Lenard, James P. Luckett, George L. Perry, Walter S. Salant, Juliet B. Shor, and Karen A. Swiderski. Nancy J. Delaney and J. Edward Shephard provided research assistance and verified factual content. The manuscript was edited by Karen J. Wirt and typed by Jacquelyn G. Sanks; Florence Robinson prepared the index.

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BRUCE K. MACLAURY
President
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I

The Literature and the Real World

THE DECADE of the seventies was an unhappy time for macroeconomic performance and for macroeconomists. Capitalist industrial countries generated far less growth and suffered far more inflation than in the fifties or the sixties. They experienced persistent inflation, often in the face of excess supply, that defied the standard lessons of economic textbooks. Some industrial nations fared better on price stability at the expense of growth; others that accepted less deterioration of growth displayed inflation records that were generally worse than average; some managed to compile abysmal records on both fronts. So the strategy of policy is everywhere subjected to agonizing reappraisals.

The State of Macroeconomics

What was in the mid-sixties a developing synthesis and an emerging consensus on macroeconomic policy and analysis has crumbled. Just as the consensus was Keynesian (to be sure, post-Keynesian after a generation of refinements and amendments), so the counterreaction has been anti-Keynesian. The monetarists, led by Milton Friedman, expressed their skepticism and pessimism about the future of the "new economics" of the Keynesians when it looked most successful, in about 1965. As economic performance deteriorated, their earlier views seemed prophetic. Some eclectic observers who found events disturbing abandoned the Keynesian paradigm of macroeconomic analysis and naturally turned to the competitive product supplied by the monetarists.

But the monetarist model has not dealt successfully with the phenomenon of chronic inflation, either ex ante by means of prediction or ex post by explanation. It has a mixed record of accounting for speedups and slowdowns in the growth of nominal GNP. It also has failed to account

for the unusual "split"—a bloated inflation component and a shriveled real component—in the growth of nominal GNP in slack economies. Indeed, the monetarists were particularly enthusiastic in predicting prompt disinflationary benefits from slower growth of nominal GNP. As such, they have been especially optimistic, and thus especially wrong, about the consequences of recession and slack for inflation.

The plain fact is that no school of economists has a satisfactory theory of inflation. We all operate, more or less, with a view of lagging and shifting short-run Phillips curves. That model continues to point to a disinflation that does not, in fact, take place. Why, after the 1970 recession, did the U.S. inflation rate become no lower than 3 percent—and then only with the artificial influence of controls and only for a brief respite? Why did the American economy remain at essentially 6 percent inflation after mid-1975, following the most severe recession in nearly forty years? The annals of the National Bureau of Economic Research reveal no comparable inflationary recession. Why did inflation in the United States accelerate so dramatically in 1978 when indicators of resource use for labor and capital were comparable to earlier tranquil periods like 1964 and 1972?

Economists keep chasing the shifting econometrics of the shifting Phillips curve. The lags in response to excess demand have to be short, but those in response to excess supply grow increasingly longer in successive estimates. The estimate of the full-employment (or equilibrium or "natural") utilization rate is progressively revised downward. If the unshakable maintained hypothesis is that inflation is the product of excess demand, the analyst has to find that demand was excessive most of the time to keep the inflation in orbit. Models of expectations proliferate in which people are supposed to look forward by looking backward over a decade. Allegedly, people see the stubbornness of inflation, expect it to keep churning, and turn that into a self-fulfilling prophesy. But where and when did that stubbornness originate?

To be sure, four or five consecutive years of objectively defined excess demand were experienced during the late sixties. Neither the growth record nor the 4 percent inflation record of the Vietnam War period poses a serious puzzle. Indeed, it is entirely consistent with the standard Phillips curve analysis that was at the time a respected element of the post-Keynesian synthesis and that neatly fits the facts of the entire 1954–69 period. To account for that experience, one does not need to strain for evidence of long lags in wage-price responses, of structural deterioration

in labor markets, or of inflationary psychology. The mystery began when the excess demand ended. I argue below that the prolonged, traditional excess-demand inflation of the late sixties compounded the problems of the seventies by dislodging arrangements and institutions that previously stabilized the price level. But that argument has to swim against the tide. It has to recognize that the trade-off deteriorated throughout the industrial world, not merely in the United States, and it has to cope with the fact that the American economy experienced more severe periods of excess-demand inflation in several other wartime eras, which apparently did not produce a derailing.

Something has to be different now. The difference in what exists today must stem from what has happened in the past. The intensity of inflation that is maintained in a weak economy simply must reflect the inflationary history that preceded it. Some insidious ratchet has gone into operation, giving inflation a far greater degree of persistence than it ever had before. But who threw the ratchet into the soup? In searching for the villain, the question arises of whether the fiscal-monetary process or the price-wage process has changed. Yet both these suspects have good alibis; it takes a great deal of ingenuity to write even a plausible indictment against either. Policymakers accepted (more accurately, opted for) more recession and more slack in the seventies than they did after the Second World War or the Korean War. Private decisionmaking shows no evidence of a major increase in monopoly power in either labor or product markets or of anticompetitive structural changes that would account for the resistance of prices and wages to excess supply.

Even more fundamentally, economists cannot explain adequately why and how much inflation matters. Clearly, it matters a great deal to the American public. Even when it was well predicted and not accelerating, 6 percent inflation was highly disturbing to the citizenry. Yet many economic models imply that only the unanticipated component of inflation can cause any significant welfare loss.

Economists sometimes get along remarkably well in the absence of a theoretical framework. A few of them sensed the major inflationary implications of food, fuel, and devaluation in 1973–74, even though they could not produce such results with analytical models. Even those who were surprised by that episode have learned from experience. Everybody now knows enough to disaggregate and to take account of special factors. No professional economist will ever again insist (as some did early in 1974) that a major rise in the price of oil cannot raise the price

level since it merely pushes other prices down. But when they proceed ad hoc without an underlying theoretical framework, the lessons do not get properly generalized. People can learn the truth about the inflationary effect of decisions made by the Organization of Petroleum Exporting Countries and yet fail to realize that the same truth applies to hikes in indirect taxes, farm price supports, or minimum wages.

It is my conviction that the price-wage process is the place to look for an understanding of persistent inflation. The sluggishness in the response of prices and wages to imbalances in supply and demand accentuates fluctuations in output and employment. Because prices do not carry the main burden of adjustments, quantities are obliged to carry the load. The theory of inflation and the theory of fluctuations in the real economy face a single task—to explain the split of nominal GNP growth between the real and the price components.

The domain of this book is what Keynes described as the aggregate supply function. He labeled it, but he never really analyzed it with the same perceptiveness or enthusiasm that he devoted to aggregate demand. For years after the Phillips curve was grafted to the main body of Keynesian thinking about aggregate demand, economists seemed to have a workable set of macroeconomic tools that gave the right answers to the big questions of practical relevance. The macro framework clearly had missing linkages and even glaring inconsistencies with micro analysis. Many economists recognized these defects, and some worked to correct them. But their efforts seemed to be mainly an intellectual venture to improve the logic of economics and reunify the micro-macro compartments, rather than to increase relevancy in explaining the key characteristics of short-run macroeconomic fluctuations. Recent experience has made clear that the building of a sturdy micro-macro bridge is essential not just to link the two sides of economics, but to make the macro side viable once again.

For the short run, the aggregate supply function is concerned basically with how prices and wages behave as functions of GNP (nominal or real). It is intended to explain how a given rise in nominal GNP, determined by aggregate demand, is split between output gain and price increases. Viewed from the income side, the questions are how variations are compounded of changes in factor productivity, factor inputs, and factor prices (mainly wages). I basically ignore the intriguing long-run issues of supply here—the role of technology, capital formation, work incentives, and the like in determining output at full employment. Simi-

larly, I have little to say in this book about the basic building blocks of aggregate demand—the consumption function, the marginal efficiency of capital, and the liquidity preference function. The shapes of these functions and their stability are still controversial and unsettled issues, which are extremely important both for understanding economic fluctuations and making fiscal and monetary policy. But the basic determinants of aggregate demand are not much in dispute. The framework of the demand side is generally acceptable and readily usable. The supply side lacks an equivalent framework to organize our thinking about interactions between prices and quantities.

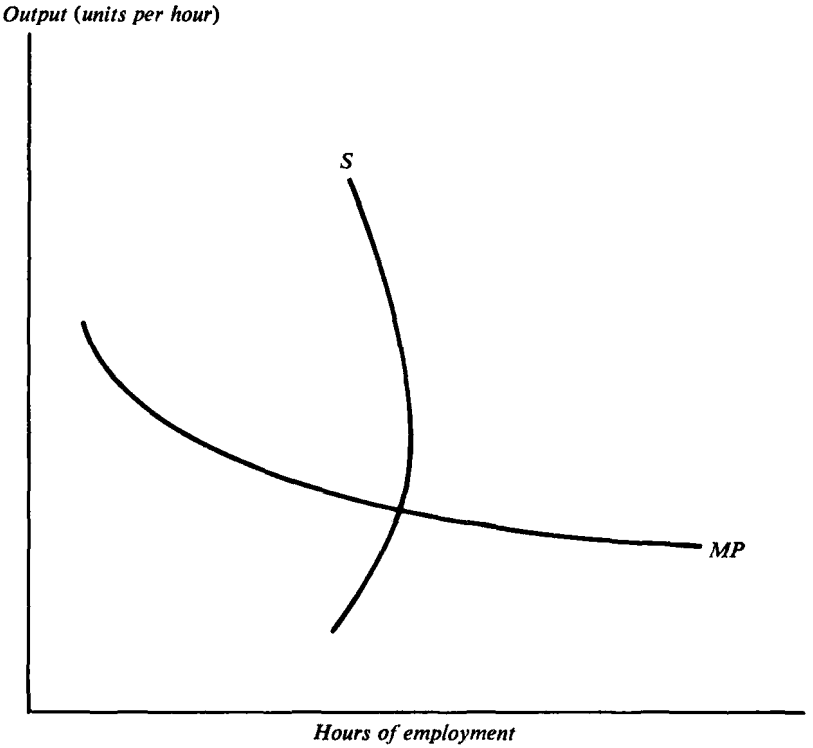
In developing the supply side of the story, I believe I was on the right track in stressing customer product markets and career labor markets in my article, "Inflation: Its Mechanics and Welfare Costs" (*Brookings Papers on Economic Activity, 2:1975*). That piece was an early sketch; this book is an attempt to turn it into a portrait. It is an attempt to generalize and formalize the concepts into a way of thinking about the world. Also, unlike its predecessor, it uses an interrelated and symmetrical framework to analyze fluctuations in real activity and in the inflation rate.

The Heritage of Classical and Keynesian Theory

The observed character of short-run fluctuations in aggregate output is palpably inconsistent with the classical microeconomics of competitive equilibrium. That inconsistency is most clearly evident in a simple model of an economy that produces one commodity, with labor as its only variable input and capital as a fixed factor in the short run. Suppose that homogeneous labor is hired in a perfectly competitive market and produces a given output as determined by a short-run production function. The demand curve for labor, with the wage measured in units of output, is then technologically determined; indeed, it is identical to the marginal product curve of labor, *MP*. Diminishing returns give it a negative slope. So long as the supply curve of labor, *S*, is a function of the real wage, whether positively, vertically, or negatively sloped (provided that it is less negatively sloped than demand), equilibrium in the labor market lies at the intersection of the supply and demand curves. As figure 1-1 below shows, the intersection determines the real wage, the level of labor input (employment), and, in turn, output.

The short-run equilibrium can be disturbed only in two ways. The

Figure 1-1. *Labor Market Equilibrium in a One-Good Competitive Economy*



supply curve of labor may shift, reflecting a change in the labor-leisure preferences of the working-age population, or the demand (marginal product) curve may shift, reflecting a change in technology. Changes in the stock of capital or in the size of the working-age population are ruled out of the short-run analysis as long-run phenomena.

Similarly, supply and demand curves for the commodity determine conditions in the product market. Given perfect competition in that market, the supply curve of output is simply a transformation of the demand curve for labor from a labor input to an output scale. If, for example, the marginal physical product of labor is five units of a good per hour, clearly the real marginal cost of output, MC/W, is one-fifth of an hour of labor. Real marginal cost is therefore the reciprocal of marginal product: $MC/W = 1/MP$. Both demand for labor, D_N, and supply of output, S_G, must be unaffected by equal proportionate changes in wages, W, and

prices, P (that is, both are homogeneous of degree zero in W and P) and can be expressed as functions of the ratio between the two—either the real wage or, as Keynes preferred, the price measured in wage units. Thus, $S_G = S_G\ (W/P)$ and $D_N = D_N\ (W/P)$.

The demand for a good, D_G, is a more elusive animal. It has a relation to the supply of labor, but the two are not necessarily tied together in the way that the demand for labor and the supply of goods are. To the extent that real wages influence the choice of leisure, they must influence the demand for goods in the opposite direction. Because people who decide to work less are presumably deciding to consume less, consumption and leisure are jointly determined in the individual's optimization. Given the supply of work that is forthcoming and the profit generated by the stock of capital and the amount of labor being applied to it, people translate real income into demand for goods whenever they decide either to invest in or to consume a basic commodity. (Think of it as grain, which can be eaten or used as seed.) The demand for goods can differ from the volume of real income only because people can consume and invest, in sum, either more or less than their incomes. If that were not the case, factor supply and demand for goods would be linked closely in trades for the commodity. For anyone to spend on the commodity more or less than income (to save without investing, dissave without disinvesting, or invest without saving) requires the existence of a "financial market" for loans or securities. That market, in turn, creates a third price—the price of loans or the interest rate—to go along with the price of labor (the wage) and the price of goods.

Then, the demand for goods can shift while the supply of labor remains the same, and such a shift necessarily changes the demand for, or the supply of, loans. Presumably a weakened demand for goods, which implies a larger supply of loans, a weaker demand for loans, or both, means a much lower interest rate on loans. That rate in turn bolsters the demand for goods (investment in the commodity and current consumption), thus equilibrating D_G and S_G. Therefore, although the change in the demand for goods can alter the interest rate, it cannot affect overall output, employment, or the real wage in equilibrium.[1] Those are all basically determined in the labor market. Fluctuations in the demand for goods cannot account for cycles in output.

1. This abstracts from the conceivable influence of a lower interest rate in reducing the supply of labor by encouraging people to take leisure now because the return to saving is lower.

In the one-good competitive economy, the IOUs of some well-known economic agents whose promises to pay are viewed as absolutely reliable might circulate as commodity money and might be held, even though they carry a zero interest rate, because of their convenience as a means of exchange. It strains the imagination to try to introduce a money other than a commodity standard into this world. But if the model is to say anything about the price level, it must have a dollar unit and not just a goods unit; and then it must have a supply of money that will obviously influence the dollar price of the good. Once money is held, economic agents can increase their demand for goods by reducing their desired holdings of money (as well as, or instead of, reducing their net supply of loans). That attempted disgorging of money must increase the dollar price of the product. Because the real wage that maintains equilibrium in the labor market is unchanged, the nominal wage rate must rise in parallel with the product price, leaving output and employment unchanged.

Similarly, if an added supply of money is dropped like rain upon the system, people will adjust. In part, they may raise their net supply of loans in the financial market, lowering the interest rate on securities (nonmoney). That in turn raises D_G, encouraging substitution of the good for money and thus raising the price of the good. In part, they may directly raise their demand for goods as a result of the added money, again raising the price of the good. And again, the dollar wage must rise proportionately (unless the labor-leisure margin is altered). Under a broad class of assumptions, the full equilibrium of all markets, following a one-time change of g percent in the supply of money, involves g percent changes in prices and wages, and no change in the interest rate. That is a quantity-theory world. The validity of that quantity-theory condition determines whether a change in the money supply alters the interest rate. Regardless of whether it holds, a change in the money supply cannot alter output and employment in short-run equilibrium.

The model does not guarantee the existence of an equilibrium, or its stability, for any or all three markets. But it does indicate that, if the equilibrium is stable, changes in technology and in the labor-leisure margin are the only explanations for equilibrium fluctuations in output and employment!

The macroeconomic practitioners who relied on the classical model did not try to spin a cyclical theory of laziness or of innovation. Instead, cycles were attributed to disequilibria. One or more of the three market sectors must fail to do its job of adjusting the price to maintain the bal-