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## *Inflation: Its Mechanics and Welfare Costs*

ECONOMISTS CONTINUE to be baffled by the mystery of inflationary recession (or stagflation) that has been experienced by industrialized countries during the 1970s. What causes inflation to churn on and on even after excess demand disappears? This whodunit is the latest in a long series that reflects the inadequacy of current theory in explaining the mechanics of how inflation proceeds once it has begun. In this paper, I shall sketch an interpretation of the persistence of inflation based on an interaction of “customer” or “career” markets, in which prices and wages do not equate supply and demand, with “auction” markets, in which prices do reliably clear markets.

### **Changing Styles in Inflation Theory**

The suggested interpretation developed in this paper builds on past theoretical literature, which I shall briefly review as a foundation for the subsequent analysis.

#### VINTAGE KEYNESIANISM

Vintage Keynesianism of the World War II period offered a comparative-static view of price-level equilibrium, given an “inflationary gap” and a

Note: I am indebted to Nancy Delaney for her assistance in the research, and to Edward Gramlich and several participants in the Brookings panel for constructive criticism.

dynamic view of the approach to that equilibrium.<sup>1</sup> Over a wide range of output from very depressed levels up to full employment, variations in aggregate demand changed output with prices and wages essentially constant. On the other hand, in the inflationary zone above full employment, incremental aggregate demand merely bid up the price level, leaving production unchanged. Thus, the aggregate supply curve relating prices and output had a right angle. And the task of optimum policy was to make aggregate demand intersect supply at the vertex of the right angle—an assignment that could be difficult but that involved no agonizing tradeoff or cruel dilemma.

Given an inflationary gap, equilibrium might be restored at a new higher price level because of a nonaccommodating monetary policy, or the reduced real value of cash and government bonds (the Pigou effect), or automatic stabilizers in the fiscal system. If, however, these equilibrating forces were nonexistent or very weak, hyperinflation might result.

The dynamic determinacy of the price level was attributed to one or both of two basic lags—(1) spending behind income and (2) wages behind prices. In the former, consumers and businessmen formulated dollar budgets for the period ahead, and stuck to them; thus, a sufficient jump in the price level would curb the real volume of spending to the level of full-employment output.<sup>2</sup> The rate of inflation then depended on the size of the inflationary gap and the length of the budgeting lag. In the latter, this period's wage level was set equal to last period's marginal revenue product of labor; real wages thus would be squeezed by inflation and so would real consumer expenditures (even if they did not lag behind income).

Much later, Robert Clower interpreted these lags as imperfections in the process of market recontracting. In the case of the budgeting lag, developments in today's factor markets do not get into today's prices on product markets. In the case of the wage lag, today's developments in product markets cannot get into today's prices on factor markets.<sup>3</sup> These lags pro-

1. John Maynard Keynes, *How to Pay for the War* (Harcourt, Brace, 1940). See also, for example, Carl Shoup, Milton Friedman, and Ruth P. Mack, *Taxing to Prevent Inflation* (Columbia University Press, 1943); Ralph Turvey, "Some Aspects of the Theory of Inflation in a Closed Economy," *Economic Journal*, vol. 61 (September 1951), pp. 531-43; and the references in note 4 below.

2. That would not happen, however, if the private decisionmakers formulated their spending plans as shopping lists rather than dollar budgets.

3. Robert Clower, "The Keynesian Counterrevolution: A Theoretical Appraisal," in F. H. Hahn and F. P. R. Brechling, eds., *The Theory of Interest Rates* (St. Martin's, 1965), pp. 112-13, 121-24. The same kind of mechanism underlies the model in Robert J. Barro and Herschel I. Grossman, "A General Disequilibrium Model of Income and Employment," *American Economic Review*, vol. 61 (March 1971), pp. 82-93.

duce interesting difference-equation models of the inflationary process.<sup>4</sup> Yet they have not been a fruitful basis for quantification. The lengths of the lags were never estimated with any precision; and no link was established between the rate of inflation and the size of the inflationary gap. Indeed, the very existence of a budgeting lag was never empirically demonstrated. And while wages and prices demonstrably chased each other, the evidence did not establish that real wages were depressed by inflation as the vintage Keynesian wage lag insisted.<sup>5</sup>

Gradually, in response to postwar experience, economists rounded the right angle of the aggregate supply curve, converted full employment into a zone, and developed the concept of a tradeoff. But the early fifties gave them no reason to puzzle over the momentum of rising prices because inflation screeched to a halt in 1951—a development that still stands out in retrospect as an intriguing fortuitous mystery. The events of 1956–57 posed another, unpleasant, mystery: why inflation began so soon at aggregate unemployment and operating rates that apparently did not involve generally excessive demand. Charles Schultze analyzed that puzzle with a refined version of the vintage Keynesian inflation model, stressing sectoral imbalances in demand and asymmetric responses to excess supply and excess demand.<sup>6</sup>

#### PHILLIPS APPROACH

The Phillips approach departed fundamentally from vintage Keynesianism by relating a given utilization rate to a given *rate* of inflation rather than an equilibrium *level* of prices, thus positing a continuous tradeoff between inflation and unemployment. As James Tobin put it, “The Phillips curve has been an empirical finding in search of a theory . . .”<sup>7</sup> Tobin’s own

4. For example, see Tjalling Koopmans, “The Dynamics of Inflation,” *Review of Economic Statistics*, vol. 24 (May 1942), pp. 53–65; A. Smithies, “The Behavior of Money National Income under Inflationary Conditions,” *Quarterly Journal of Economics*, vol. 57 (November 1942), pp. 113–28; and Ralph Turvey, “Period Analysis and Inflation,” *Economica*, n.s., vol. 16 (August 1949), pp. 218–27.

5. The frustrations of one young economist with these hypotheses (and his unproductive negative conclusions) are evident in Arthur M. Okun, “The Effects of Open Inflation on Aggregate Consumer Demand” (Ph.D. dissertation, Columbia University, 1956).

6. Charles L. Schultze, *Recent Inflation in the United States*, Study Paper No. 1 of materials prepared in connection with the Study of Employment, Growth, and Price Levels for consideration by the Joint Economic Committee, 86 Cong. 1 sess. (1959), pp. 44–77.

7. James Tobin, “Inflation and Unemployment,” *American Economic Review*, vol. 62 (March 1972), p. 9.

rationale rested on a model of “stochastic macro-equilibrium” in which disequilibria in particular markets could maintain some stable positive inflation rate in the presence of some persistent degree of overall labor-market tightness.

Asymmetries and nonlinearities could account for the puzzle of 1960–63—a continuing rate of inflation of 1 or 2 percent in an excess-supply economy. If some prices and most wages are rigid on the down side and if the response of wages to unemployment is nonlinear, then excess demand in a minority of sectors can produce some upcreep in overall price levels.

Empirically, the Phillips curve looked like a winner for the United States. Annual increases in prices (and wages) relative to unemployment rates for 1954 to 1968 fit a hyperbola like a glove.<sup>8</sup> A few refinements took care of the minor deviations. The persistence of the 1956–57 inflation into 1958 could be explained by some short lags of a vintage Keynesian type; the somewhat better tradeoff performance of the early sixties relative to the fifties could be accounted for by the price-wage guideposts or by “hidden unemployment.”<sup>9</sup>

The stubbornness of wage and price inflation in 1970–71 ended the heyday of the Phillips approach. Perry sought to save the Phillips curve by reinterpreting the measure of labor-market tightness to reflect the shifting demographic composition of unemployment.<sup>10</sup> The Perry shift is now generally accepted as a constructive refinement, but it explains only a small part of the “new” inflation of the 1970s. The expansion of unemployment insurance and welfare benefits was also invoked to account for tighter labor markets at a given unemployment rate.

The other major analytical developments stressed expectations. According to one thesis, the economy became more inflation prone because private decisionmakers perceived increased tolerance for inflation and reduced tolerance for unemployment on the part of government. I would not dis-

8. These gave no reason to suspect that the structure had changed through 1968. In terms of the relationship between prices and the official unemployment rate, the observations for 1966–68 showed, if anything, a slightly more favorable tradeoff than those of 1956–57. See the chart in the *Economic Report of the President together with the Annual Report of the Council of Economic Advisers, January 1969*, p. 95.

9. George L. Perry, “Wages and the Guideposts,” *American Economic Review*, vol. 57 (September 1967), pp. 897–904; N. J. Simler and Alfred Tella, “Labor Reserves and the Phillips Curve,” *Review of Economics and Statistics*, vol. 50 (February 1968), pp. 32–49.

10. George L. Perry, “Changing Labor Markets and Inflation,” *BPEA*, 3:1970, pp. 411–41.

miss this hypothesis.<sup>11</sup> But I doubt that it explains much. For one thing, the hypothesis would predict stronger spending behavior—a movement along the Phillips curve, as well as a shift in it. If consumers and firms detect an expansionary bias in stabilization policy, aggregate private demand should be stronger for *given* settings of fiscal and monetary policies; I see no evidence that this has been the case.

#### ACCELERATIONISM

Accelerationism was the most fundamental transformation of the Phillips approach into an expectational format. It hypothesized that inflation will become increasingly rapid in any maintained situation in which unemployment lies below some critical, or “natural,” rate. Basically, it argued that the very possibility of getting unemployment below the natural rate depends on a process of fooling people—coaxing out higher employment and higher production with higher prices for the things they sell and then surprising them with higher prices than they expected on the things they buy. Through lags in the perception of inflation, these surprises raise output and employment, but as people learn that they are being fooled, the lags shorten.

When Milton Friedman and Edmund Phelps independently set forth this theory, the Phillips-curve approach seemed to be working very well. Basically, accelerationism was a pessimistic forecast rather than an explanation of experience; whatever else one thinks of the theory, the prophetic accuracy of its pessimism has to be admired.<sup>12</sup> Some of the macroeconomic empirical facts of the early seventies fit the accelerationist theory. Even though the unemployment rate exceeded the natural rate (by anybody’s estimate) in 1970–71, people were, according to the accelerationists, still adapting to the inflationary surprises of 1965–69; hence, inflation decelerated very slowly and only after a lag.

11. See Arthur M. Okun, “The Mirage of Steady Inflation,” *BPEA*, 2:1971, pp. 485–98, and other contributions to that symposium: William Fellner, “Phillips-type Approach or Acceleration?” pp. 469–83; and Robert J. Gordon, “Steady Anticipated Inflation: Mirage or Oasis?” pp. 499–510.

12. Milton Friedman, “The Role of Monetary Policy,” *American Economic Review*, vol. 58 (March 1968), pp. 7–11, and Edmund S. Phelps, “Phillips Curves, Expectations of Inflation and Optimal Unemployment Over Time,” *Economica*, n.s., vol. 34 (August 1967), pp. 254–81. Actually, the essential elements of the theory were spelled out much earlier in William Fellner, “Demand Inflation, Cost Inflation, and Collective Bargaining,” in Philip D. Bradley, ed., *The Public Stake in Union Power* (University of Virginia Press, 1959).

More generally, the unemployment-inflation experience of the first half of the 1970s manifestly reveals a far less favorable tradeoff than does that of 1954–68. Clearly, the short-term Phillips curve has shifted upward. In the sense of recognizing that shift, we are all accelerationists now (to reverse Friedman's celebrated concession to Keynes). On the other hand, I believe the inflation-unemployment tradeoff applies to all relevant inflation and unemployment rates and all relevant time horizons. I find particularly incredible the clear (though often ignored) implication of the no-tradeoff view that inflation no longer imposes a cost. If the American public has fully adapted to some anticipated inflation rate like 6 percent, then that inflation cannot do any good in expanding output and employment, but by the same token it cannot do any harm in distorting distribution or allocation. The same public that allegedly adapted to that expected inflation rate still believes that inflation is painful; and so do I.

The microanalytical underpinning of accelerationism is seriously deficient. In part, inflation is supposed to distort temporarily the tradeoff between work and leisure. According to this story, when people observe a rise in money wages, they believe that real wages are rising too. Consequently they take jobs and give up leisure, which they now view as more expensive. Ultimately, however, they find that the cost of living has accelerated too, and the labor supply hence gradually shifts back. But why should people take significantly longer to perceive the movement of the cost of living than that of wages? Even more fundamentally, how can the thesis assume a substantial positive elasticity of the supply of labor with respect to the real wage? While that proposition has been widely accepted (by Keynes, among others), the empirical evidence suggests that the elasticity is close to zero and may not even be positive.<sup>13</sup>

In part, the temporary distortion is supposed to involve the tradeoff between work and search (rather than leisure).<sup>14</sup> According to this variant,

13. See Robert J. Gordon, "The Welfare Cost of Higher Unemployment," *BPEA, 1:1973*, table 2, p. 159, and George F. Break, "The Incidence and Economic Effects of Taxation," in Alan S. Blinder and others, *The Economics of Public Finance* (Brookings Institution, 1974), pp. 180–91. Some demographic groups exhibit a positive response to their own wage, but offsetting that are the negative cross-elasticities of the labor supplied by one family member to the wage of other members.

14. Models of work-leisure-search distortions include Dale T. Mortensen, "Job Search, the Duration of Unemployment, and the Phillips Curve," *American Economic Review*, vol. 60 (December 1970), pp. 847–62; Edmund S. Phelps, "Money-Wage Dynamics and Labor-Market Equilibrium," *Journal of Political Economy*, vol. 76

because the unemployed do not know the universe of job offers, they interpret a good offer in an improving labor market as a high *relative* wage and take it rather than continuing their search. Thus, the average duration of unemployment and hence the number of unemployed decline. But ultimately job seekers recognize that it is worthwhile to take more time to sort the favorable offers of a strong labor market. As a result, the drop in unemployment must be temporary, lasting only so long as people are fooled.

The facts of the real world do not square with the implications of this work-search hypothesis. First, as Perry has shown, changes in the number of spells as well as in the duration of unemployment account importantly for cyclical fluctuations in unemployment. Second, as Tobin has noted, the quit rate does not lag in an improving labor market. Third, rejections of job offers are less frequent than this theory would imply—except in the trivial sense that every unemployed person has rejected an “offer” to become a self-employed garbage picker.<sup>15</sup>

Some accelerationist models are rooted in product rather than labor markets. In their world, output exceeds its equilibrium level temporarily when expected selling prices are especially high in relation to expected buying prices.<sup>16</sup> I know of no empirical evidence of such cyclically systematic errors in firms’ predictions of selling prices relative to buying prices.

Although their explanations are unsatisfactory, I believe that the search of the “search theorists” has not been in vain. They have correctly focused attention on the way wages and employment must adjust through a search process in the absence of a market-clearing mechanism that would adjust wages to keep supply and demand in equilibrium.

The effort to build the analytical base for accelerationism, led by Phelps, has produced constructive research into the “microeconomic foundations” of both employment and inflation theory. The pervasive issue is the relative role of quantity adjustments and of price (wage) adjustments in different types of markets over different time horizons; this tied back into the earlier efforts by Hicks, Tobin, Patinkin, and Leijonhufvud to make sense of the

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(July/August, 1968), pt. 2, pp. 678–711; and Robert E. Lucas, Jr., and Leonard A. Rapping, “Real Wages, Employment, and Inflation,” in Edmund S. Phelps and others, *Microeconomic Foundations of Employment and Inflation Theory* (Norton, 1970).

15. George L. Perry, “Unemployment Flows in the U.S. Labor Market,” *BPEA*, 2:1972, pp. 263–75; Tobin, “Inflation and Unemployment,” p. 7; Gordon, “Welfare Cost of Higher Unemployment.”

16. See Thomas J. Sargent, “Rational Expectations, the Real Rate of Interest, and the Natural Rate of Unemployment,” *BPEA*, 2:1973, pp. 429–72, especially p. 435.

Keynesian theory of involuntary unemployment.<sup>17</sup> And the common theme is that, in markets that lack a clearing mechanism, quantities vary a lot because prices (wages) vary too little and too late. These nonclearing phenomena are the heart of the explanation of both inflationary and recessionary processes.

#### PURPOSE OF THIS PAPER

I shall now sketch a nonclearing argument that makes sense to me, drawing on various strands of the literature. Because of the absence of market-clearing mechanisms, quantity adjustments carry the burden for many types of product and factor markets, leading to the observed sluggishness and persistence of inflation and of excessive unemployment. While many elements (including some monopoly models, transactions costs, uncertainties, and various sunk costs) can explain the absence of market clearing, I shall stress the cost of information, interpreting it broadly (too broadly, some may feel) to include costs of prediction, of establishing reliability, and the like.<sup>18</sup>

In particular, the costs of information lead to implicitly contractual long-term relationships between employees and employers and between customers and suppliers. These relationships create a zone of indeterminacy for wages and prices and a need for “fair” formulas for the sharing of bilateral monopoly surpluses. By putting price and wage making into a longer-term context, they lengthen the lags and weaken the causal connections between changes in demand and changes in prices or wages.

I shall then explore some implications of the resulting lags in the inflationary process. Prices and wages in “customer markets” will lag behind

17. John Hicks, *Capital and Growth* (Oxford University Press, 1965), pp. 74–77; J. R. Hicks, *Value and Capital* (2d ed., London: Oxford University Press, 1946), pp. 245–72; James Tobin, “Money Wage Rates and Employment,” in Seymour E. Harris, ed., *The New Economics* (Knopf, 1947); Don Patinkin, *Money, Interest, and Prices* (2d ed., Harper and Row, 1965), pp. 313–34; Axel Leijonhufvud, *On Keynesian Economics and the Economics of Keynes: A Study in Monetary Theory* (Oxford University Press, 1968), pp. 102–09.

18. I believe my semantics are in the spirit of Kenneth J. Arrow, “Limited Knowledge and Economic Analysis,” *American Economic Review*, vol. 64 (March 1974), pp. 1–10. I do not mean that people are ignorant or generally uninformed; I share Michael Wachter’s concern (expressed in his comments below) that the terminology may be misleading in that respect.



those in “auction markets.” Thus, inflation must affect the allocation of resources and change relative prices. Hence, there can be no uniform “real” interest rate whose constancy might maintain a simple equilibrium of financial markets during inflation.

Customer markets depend heavily on—and in turn enhance—the usefulness of money as a yardstick and as a store of value; that usefulness is impaired in a world of inflation, as are many aspects of buyer-seller relationships that are “efficient” institutions in a complex world. Thus, the welfare costs usually attributed to inflation—haphazard redistributions of income and wealth and socially unproductive economizing of cash balances—should be viewed in a broader context as disturbances to a set of institutions that economize on information, prediction, and transaction costs through continuing buyer-seller relationships. Inflation does fool people, as the accelerationists contend. But it does so, not so much by disappointing their point-estimate expectations as by depriving them of a way of economic life in which they need not depend heavily on the formulation of costly and uncertain point-estimate expectations.

The skeleton I shall sketch below has many missing analytical bones and no empirical flesh. Yet I believe this basic approach has far-reaching implications for both analysis and policy. It reveals weaknesses in proposals for living with inflation by indexation. It explains why most of the American public dislikes inflation so much more intensely than does most of the economics profession. It offers a common approach for product and labor markets, encompassing administered prices and sticky wages. It suggests that the welfare costs of garden-variety, nagging inflation are qualitatively similar to (although far smaller than) the distortions of allocation typically attributed to galloping, acute hyperinflation. It explicitly recognizes the store-of-value function of money and rescues inflation theory from “barter illusion.” This approach advances the line of thinking of my 1973 article on upward mobility, but contrasts with views I expressed as recently as 1970 and with most discussions of inflation in the literature.<sup>19</sup> The out-

19. “Upward Mobility in a High-Pressure Economy,” *BPEA*, 1:1973, pp. 235–52; and Arthur M. Okun, “Inflation: The Problems and Prospects Before Us,” in Arthur M. Okun, Henry H. Fowler, and Milton Gilbert, *Inflation: The Problems It Creates and the Policies It Requires* (New York University Press, 1970), pp. 12–22. The best of the “standard” treatments is Robert M. Solow, “The Intelligent Citizen’s Guide to Inflation,” *Public Interest*, no. 38 (Winter 1975), pp. 39–49.

standing exception is John Hicks, whose recent analysis of the welfare costs of inflation delivers the same principal message as does this paper.<sup>20</sup>

### **Customer Markets**

In traditional short-run market analysis, firms are viewed as price takers and quantity makers. In the Marshallian case, the prototype competitive firm has a given quantity of fresh fish or fresh fruit on hand that it dumps onto an auction market to fetch whatever price it will bring.<sup>21</sup> Manifestly, most sellers of products in the real world are quantity takers and price makers; even those with minuscule market shares put price tags on their commodities. In the short run, they are never surprised by the price, and always subject to surprise about the quantities they sell.

If price making meant nothing more than the absence of auction markets, price tags and price lists would introduce only the tiniest lag in the adjustment of prices and trivial fluctuations in quantities. Any firm (competitive or monopolistic) that experienced a surprising rise in demand would tend to raise its prices promptly, and those unfavorably surprised would tend to reduce them. A few other considerations might lengthen that lag a bit: it costs something and takes some time to make and implement the firm's decisions on prices and then to print and distribute the new price lists. But these elements imply an inertia of prices that should last for days or weeks, not years. And they cannot explain movements in the wrong direction—like rising prices in the summer of 1975.

After a shift in demand, competitive producers could, in principle, reach the new equilibrium price after a few rounds of price changes without an auctioneer. Suppose there are many, fairly similar small hotels in a large city, and that the marginal cost of having an additional room occupied is negligible. With no auction (or organized exchange) mechanism to keep occupancy essentially full and stable by varying the price, a downward shift in demand might produce a short interval of depressed occupancy rates;

20. See the concluding portion of *The Crisis in Keynesian Economics* (Basic Books, 1974). Specifically (p. 79): "Any system of prices [and wages] . . . is bound to work more easily if it is allowed to acquire, to some degree, the sanction of custom. . . . This, I believe, is the true reason why inflation is damaging. . . . In conditions of inflation [arrangements] continually need re-fixing, so that issues which had seemed closed have to be reopened."

21. See Alfred Marshall, *Principles of Economics* (8th ed., London: Macmillan, 1947), pp. 369–79, and Hicks, *Capital and Growth*, pp. 49–57.

but the restoration of equilibrium would not take very long, *if* the hotels were seriously trying to be do-it-yourself auctioneers. No recession would ensue, in which the hotels accept less occupancy and maintain their room charges while expecting occupancy to continue depressed. Nor would prolonged booms emerge.<sup>22</sup>

The absence of the auctioneer has more important effects. First, it confronts the potential customer for the hotel room with a costly search process (like that of the unemployed worker).<sup>23</sup> Even so, if the potential customer sampled a few hotels randomly every time he contemplated a purchase, the lack of an auctioneer would merely reduce the price elasticity of demand, increasing the effective degree of monopoly within the industry and thus the profit-maximizing price. The real reason that the auctioneer is missed so much and that hotels do not try to be do-it-yourself auctioneers is that the optimizing innkeeper will recognize his ability to influence the search behavior of the customer. Today's occupants have indicated that they regarded the hotel's offer (at least *ex ante*) as a satisfactory deal. By pledging continuity of that offer, the innkeeper can encourage customers to return to buy, or at least to sample, using yesterday's experience as a guide to today's offerings. A kind of intertemporal comparison shopping develops by which yesterday's offer influences today's demand, as a result of an implied commitment of the seller to maintain his offer.

The customer who counts on that stability believes he knows the terms of his previous supplier's offer without shopping. But he must shop to determine the offers (price, quality, service) of unfamiliar sellers. It is as though that information is recorded on a card that can be purchased for a non-trivial price. In such a situation, maximizing behavior for the customer may resemble satisficing behavior. The expected value of the information card is low when the status quo is satisfactory. Knowing this, the supplier wants to ensure that the customer will not find it worthwhile to buy the information card. He can assume that, if today's offer is maintained, most of today's customers will return. If he also believes that *any* rise in his price will in-

22. Nor is it conceivable that, despite the shift in demand, each hotel owner believes that the price elasticity of demand at the prevailing price, and hence the profit-maximizing price, is unaffected.

23. See the model presented by Edmund S. Phelps and Sidney G. Winter, Jr., "Optimal Price Policy under Atomistic Competition," in Phelps and others, *Microeconomic Foundations*. I am introducing one new element that is not in their model: relating the customer's search behavior to the supplier's pricing strategy.

crease discretely the proportion of his customers who will buy information cards, he will tend to leave his price unchanged, even when demand rises.

#### THE BUYER-SELLER RELATIONSHIP

An established customer-supplier relationship introduces a bilateral monopoly surplus that can be split between the cooperating buyers and sellers. In the short run, most customers would pay a slightly higher price to their suppliers without shopping, and most suppliers would, if they had to, sell for a shade less to their customers. This interdependence puts a premium on maintaining the relationship and on limiting conflict over the sharing of the surplus to methods that will not impair its total value.

The supplier obviously cannot promise the customer that he will offer the same deal forevermore. In particular, he may have to raise his price if his costs rise. But he can promise to treat the customer "fairly" on all the dimensions of their transactions, thus offering the customer an implicit contract. It remains implicit because of the high cost of spelling out and negotiating the terms of an explicit, formal contract. The implicit contract may apply to a wide variety of unspecified contingencies extending beyond changes in costs. When the supplier and customer agree on certain rules or conventions of fair play, each offers the other an effective incentive to play by those rules (and a credible threat against the one who breaks them).<sup>24</sup> These implicit contracts serve as efficient substitutes for the costly institutions of formal long-term contracts and organized futures markets.<sup>25</sup>

Empirically, the typical standard of fairness involves cost-oriented pricing with a markup. Apparently, in most industries, the criterion is full rather than variable costs. But it is based on some standard or normal output rather than actual output; thus the customer is not asked to pay for the higher overhead per unit and the lower productivity of recessions. The concept is also apparently historical costs, which are obviously subject to more precise calculation than are replacement costs. The recurrence of transac-

24. For a discussion focusing on the labor market that considers a variety of informal methods of dealing with contingencies, see Oliver E. Williamson, Michael L. Wachter, and Jeffrey E. Harris, "Understanding the Employment Relation: The Analysis of Idiosyncratic Exchange," *Bell Journal of Economics*, vol. 6 (Spring 1975), pp. 250-78.

25. For the problems associated with futures markets, see Arrow, "Limited Knowledge."

tions between customers and suppliers makes it possible to base the terms of sale on the facts of the past rather than forecasts of the future. Once such cost-based pricing practices become established, the firm can often count on its competitors to set prices in a similar fashion.<sup>26</sup>

It can justify cost-oriented price increases—a desire evident in the dedicated, if fuzzy, statements that firms issue, insisting that higher costs “force” them to raise prices. No supplier can tell his customers: “As a result of stronger demand, I am now in a position to capture a larger share of the surplus from our relationship.” This attitude influences price-making behavior as well as public-relations releases. In effect, the supplier firm represents itself to its customers as a kind of procurement agency operating under a brokerage arrangement. The markup onto costs becomes a reasonable way to set a “fair” price for the services of the firm.

More generally, the customer-strategy entrepreneur gears prices to costs because his reliance on customers vastly complicates any fine-tuning of prices to demand for purposes of profit maximization. The price elasticity of demand for his product is relatively low in the short run because of his established clientele (and that of his competitors), but much greater in the long run because information diffuses. Hence, the firm presumably “underprices” —or sacrifices—for the near term if it maximizes the discounted future stream of profits (rather than current-period profits). Thus, a price reduction in response to a temporary weakening of demand would often impose an even greater sacrifice of current profits in order to promote future profits. Moreover, the crucial long-run price elasticities of demand are subject to high degrees of risk or uncertainty, or to estimation only through expensive market research (that is, high information costs). A risk-averse firm may be discouraged thereby from changing prices because it sees high variance in the outcome (à la Brainard) or because it is led to “slant” the probabilities (à la Fellner).<sup>27</sup> In addition, risk-averse investors may like the reduced cyclical volatility of profits that results because firms “underprice” least in periods of weak demand and most (thus, investing most for future demand) in particularly good times.

26. Phillip Cagan, *The Hydra-Headed Monster: The Problem of Inflation in the United States* (American Enterprise Institute, 1974), pp. 21–34.

27. William Brainard, “Uncertainty and the Effectiveness of Policy,” *American Economic Review*, vol. 57 (May 1967), pp. 411–25; William Fellner, *Probability and Profit* (Irwin, 1965), pp. 173–80.

## THE SCOPE OF CUSTOMER RELATIONS

Customer relationships have some importance to any firm whose demand curve is higher than it would be if the firm were offering its product for sale for the first time—with no clientele, reputation, or record of performance. Those relationships should be most important for heterogeneous products and least important for homogeneous ones, where the price is uncomplicated by a quality dimension. Nonetheless, heterogeneity has many aspects beyond the physical characteristics of the product, including transportation arrangements, credit terms, speed and reliability of delivery. Thus, department stores facilitate the return of merchandise for full refund by regular customers with charge accounts. Wholesalers who have established the reliability of small retailers for trade credit offer financing arrangements to keep them as customers. Similarly, while customer relationships seem less important for professional buyers than for households, even the former cannot assess the long-term reliability of a new supplier, and hence prefer continuing relationships. Thus, in a weak steel market, imported steel may be priced 10 percent or more below the physically identical domestic product. In a strong market, however, the reliable customer of domestic firms is assured of supplies, in amounts geared to his past purchases, at prices below those of imports.

Big-ticket items that are bought infrequently might appear to be least subject to the customer strategy. Yet, repair services on autos and appliances are used to maintain relationships; and firms work to establish brand-name reliability, in effect counting on reputation (a flow of information from one consumer to the next) to substitute for repetition. Finally, oligopolistic market structures that make price competition self-destructive among firms may encourage uniform and sticky “administered prices” accompanied by differentiation of services.<sup>28</sup>

28. It is thus understandable that Gardiner Means and John Blair have found and stressed a correlation between industrial-concentration ratios and the kinds of pricing patterns that I attribute to customer markets. See National Resources Committee, *The Structure of the American Economy*, A Report Prepared by the Industrial Section under the Direction of Gardiner C. Means (Government Printing Office, 1939), pt. 1, pp. 138–45; Gardiner C. Means, “Simultaneous Inflation and Unemployment: A Challenge to Theory and Policy,” *Challenge*, vol. 18 (September/October 1975), pp. 6–20; and John M. Blair, “Market Power and Inflation: A Short-Run Target Return Model,” *Journal of Economic Issues*, vol. 8 (June 1974), pp. 453–78. I do not, however, believe that sticky cost-based prices are unique to oligopoly or could be eliminated by changing market structure.

In summary, the prototype of pricing in customer markets is a markup over past costs. But cost changes show up with a lag because prices will be altered only when average costs have changed by some threshold amount or only at specified intervals. As Cagan summarizes the result: "Empirical studies have long found that short-run shifts in demand have small and often insignificant effects [on prices], and that, instead, costs play a dominant role."<sup>29</sup> This empirical finding of markup rigidity is inconsistent with the classical theory of price determination, in which the strength of demand should alter the ratio of prices to costs.

#### CYCLICAL PATTERNS

By dampening its cyclical price fluctuations, the customer-strategy firm will magnify its cyclical variations in orders and sales. When the firm encounters an unexpected drop in demand, its inventories of finished goods may increase; its utilization of its work force and capital may decline; it may cut its workweek; it may reduce hiring and begin layoffs; or it may speed up deliveries. And these changes in quantities may not be accompanied by changes in price, for the reasons spelled out above.

When demand strengthens after a slump, the same options are thrown into reverse. The firm presumably optimizes so that it is equally costly to meet favorable sales surprises (including successes in attracting new customers) by dipping into inventories, lengthening its workweek, and drawing on its queue of job applicants. Under typical circumstances, the customer-strategy firm is likely to maintain some reserve of capacity in all three forms. The firm may be in disequilibrium throughout and yet make all the adjustments in quantities. The forces inducing changes in prices can be very weak.<sup>30</sup>

29. Cagan, *Hydra-Headed Monster*, p. 22; also see the detailed review of empirical findings by William D. Nordhaus, "Recent Developments in Price Dynamics," in Otto Eckstein, ed., *The Econometrics of Price Determination*, A Conference sponsored by the Board of Governors of the Federal Reserve System and Social Science Research Center (Board of Governors, 1972), pp. 34-43. Moreover, the analytical discussion of short-run pricing by Nordhaus on pp. 21-27 and 31-34 is particularly perceptive. Another valuable discussion is presented by Otto Eckstein, "A Theory of the Wage-Price Process in Modern Industry," *Review of Economic Studies*, vol. 31 (October 1964), pp. 269-71, 281-82. For an analysis of the rationale of fixed pricing intervals, see Stephen A. Ross and Michael L. Wachter, "Pricing and Timing Decisions in Oligopoly Industries," *Quarterly Journal of Economics*, vol. 89 (February 1975), pp. 115-37.

30. In the customer-strategy model, cost decreases are no less likely to be passed through in lower prices than are cost increases of equal magnitude in higher prices. This

### Career Labor Markets

Customer-supplier relationships in product markets are paralleled by long-term employer-employee attachments in labor markets; in combination, the two models unify the analysis of quantity-adjusting responses to disequilibrium in labor and product markets.

Actually, the labor-market side of this analysis is better known and more widely accepted, and since I have previously explored it in some detail, I shall treat it only briefly here.<sup>31</sup> Many employers adopt policies to promote long-run attachment by workers. They pursue that strategy because the value of an experienced worker exceeds that of an inexperienced one by a margin greater than the corresponding wage differential. Entering workers impose costs on the firm of screening, hiring, training, and on-the-job learning; yet they cannot be made to bear these costs fully through a lowered entering wage. For one thing, many of these “investments” are valuable to the worker only insofar as he remains an employee of that firm; the nontenured recruit will not pay for them. Second, the relevant interest rate to the worker is likely to be far higher than that to the firm. Third, even the “general” training that improves the worker’s marketability to other firms cannot be properly appraised by him, given his information. Finally, the firm will wish to bolster the entering wage in order to ensure a queue of willing applicants that it can sort and screen when it needs to hire new workers.

Thus, the firm really makes an investment in a new worker, spending more to hire, train, and pay him than he is worth in the short run. But it must then amortize that investment by paying wages *below* marginal revenue product to workers who become experienced. Nonetheless, the firm wants to maintain wage rates for experienced workers above those of their next-best opportunity in the labor market in order to hold down quit rates and protect its investment. It will also hold down quit rates by offering its

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result is consistent with Tobin’s view of the empirical evidence: “This [inflationary] bias cannot be attributed to product pricing, which apparently passes on proportionately the changes in labor costs . . . in both directions—down as well as up.” See James Tobin, “The Wage-Price Mechanism: Overview of the Conference,” in Eckstein, ed., *Econometrics of Price Determination*, p. 10.

31. Okun, “Upward Mobility,” pp. 235–44; also, see Stephen A. Ross and Michael L. Wachter, “Wage Determination, Inflation, and the Industrial Structure,” *American Economic Review*, vol. 63 (September 1973), pp. 675–92.



experienced workers regular pay increases and growing seniority privileges in the form of fringe benefits, retirement programs, and provisions for leave and vacation. These arrangements create a bilateral monopoly surplus and a zone of indeterminacy for the wage for an experienced worker. That wage must exceed his perceived best alternative and be less than his current marginal revenue product. Again, because of information costs (and sunk costs), the elasticity with respect to the wage has a time gradient—from low in the short run to high in the long run. These relationships have pervasive empirical consequences—the negative correlation between wage rates and quit rates, the extremely low quit rate of experienced workers in high-paying industries, the countercyclical changes in the size of wage differentials, cyclical patterns of upgrading jobs, the low levels of unfilled vacancies for career jobs even in tight labor markets, and the like.

This long-attachment, or “career,” job market is analogous in many features to the customer-product market. But the roles played by buyers and sellers present a set of interesting contrasts. The price (wage rate) is set by the buyer in labor markets (outside of collective bargaining), but by the seller in product markets. The other party then engages in search (or shopping). A seller in product markets and a buyer in labor markets typically make similar transactions with many people on the other side of the market, and they must be price makers, at least in part, to display equitable treatment of the people with whom they deal. Wage discrimination among similar employees of the same firm or price discrimination among its customers would destroy long-term relationships.

#### CYCLICAL RESPONSES

Career job arrangements desensitize the wage rate to changes in overall tightness of the labor market. First, because experienced workers earn more than their next-best opportunity wage, strengthening the labor market will increase the quit rate only slightly. Second, the normal queue of applicants allows the firm to hire new workers without raising the entering wage. To be sure, the “marginal effective wage” of the firm may increase.<sup>32</sup> A higher rate of inflow of new workers may push up marginal hiring and training costs and force the firm to hire new workers with poorer credentials. Hence, it may be worthwhile to lengthen the workweek, even at the

32. Robert E. Hall, “The Process of Inflation in the Labor Market,” *BPEA*, 2:1974, pp. 347–60.

cost of paying overtime premiums. But the firm has a strong incentive to avoid an unscheduled increase in the entering wage insofar as it would feel obliged to maintain its wage structure by increasing simultaneously the pay of experienced workers.

By making the elasticity of labor supply low in the short run and uncertain in the long run, the nonauction search mechanism creates wage inertia in career labor markets just as it makes prices sticky in customer product markets. Moreover, the quit-rate function may discourage wage changes much as the “information card” decision discourages price changes. That aspect of wage stickiness can be illustrated by the following model. A firm has two classes of workers—experienced and new; their wage differential is fixed by custom or convention. Thus, the firm has a single wage decision; that, in turn, will determine the quit rate of experienced workers, and hence the residual number of them who stick with their jobs. So long as the firm’s optimal employment exceeds that level, it will be hiring some new workers out of its queue of applicants, whose quality (innate skill, education, experience) may be assumed to have a distinct and identifiable gradient. For any given wage, the deeper the firm must dip into the queue, the lower will be the productivity (average and marginal) of new workers. Thus, the quality of new workers will depend positively on the wage and negatively on the level of employment.

By setting a higher wage, the firm gains by reducing the quit rate of experienced workers and by raising the quality of its queue. It pays for that, of course, with a bigger payroll. If the supply of new applicants of given quality and the quit rate of experienced workers were both smooth continuous functions of the wage, the optimum wage would turn out to be a continuous increasing function of the level of employment. But the quit rate of experienced workers is likely to be discontinuous—low and fairly insensitive for wages at or above the level that fulfills the firm’s implicit long-term obligation to be fair, but jumping discretely for wages below that level. If the discontinuity around the “fair” wage is substantial, that wage may be optimal for a wide range of employment levels.

In the event of a sudden deterioration of the labor market, wage reductions may not play much of a role (even for a nonunion employer). A firm that has sought to establish a prospect of rising wages over the career horizon may destroy its investment by cutting wages. To cut wages and yet avoid a long-term worsening of the quit rate, the firm must prove to the experienced worker that it is “forced” to take such action, which may be possible only if the firm is on the brink of bankruptcy or at least of a shut-

down. Otherwise, pay cuts could be interpreted by workers as an “unfair” action by the employer to capture a larger share of the surplus.<sup>33</sup>

When the alternatives are temporary layoffs and wage cuts, the former are likely to be the lesser evil to the firm. To be sure, they are an evil: experienced workers care about steadiness of employment as well as the wage rate, and a laid-off worker may find a better job before he is recalled. In fact, however, wage premiums in many industries are sufficiently large to bring most laid-off workers back when they are recalled.<sup>34</sup> Moreover, as Baily has recently pointed out, layoffs have several partial offsets in the form of transfer income and some value of leisure.<sup>35</sup> Finally, and I believe particularly important, the firm has clean hands in the case of a layoff; since it is not using the worker, it cannot be “taking advantage” of him. All in all, it is easy to understand how the convention that wages are cut only *in extremis* became entrenched in labor markets before unions were significant and before Keynes attached so much weight to the downward rigidity.

For many of the same reasons, a weakening of labor markets may not even substantially reduce the short-run rate of wage increase in career jobs. The big issue in wage setting is a long-run battle over the division of the bilateral monopoly surplus between employers and experienced workers. Each side perceives the short-run elasticity of the other as relatively low, but the long-run elasticity as substantial. Hence, workers do not want to squeeze the firm into gradual extinction; and the firm does not want to press the workers to the point of explosive quit rates. These boundaries, however, may contain a wide area of sharp conflict of interest; and standards of fairness are sought to preserve the surplus available to the two sides combined.

#### CRITERIA IN WAGE DETERMINATION

Various groups of employers and workers may opt for different standards of “fairness”: gearing wages to other wages or to product prices, or to con-

33. Some case studies of the extreme conditions that justify pay cuts are presented by Peter Henle, “Reverse Collective Bargaining? A Look at Some Union Concession Situations,” *Industrial and Labor Relations Review*, vol. 26 (April 1973), pp. 956–68.

34. Harold L. Sheppard and A. Harvey Belitsky, *The Job Hunt* (Johns Hopkins Press, 1966), pp. 35–37.

35. Martin Neil Baily, “Wages and Employment under Uncertain Demand,” *Review of Economic Studies*, vol. 41 (January 1974), pp. 43–47. The psychic cost of unemployment to most breadwinners is an offset to those offsets, however.

sumer prices. Any of these standards will weaken the impact of changing labor-market conditions, and strengthen the momentum of a given rate of wage increase.

*Wage-wage patterns.* One method of achieving “fairness” involves emulating the wages recently set by other firms. The comparability system for compensation of federal employees is the most important example of this practice, but similar methods are used in many private firms. And many smaller industries “pattern” on steel or autos in their collective-bargaining settlements. Such patterning lends inertia to the rate of wage increase in the economy. In particular, overlapping schedules of contracts of long duration may result in a wage settlement that is a moving average of other recent wage settlements that were in turn moving averages of previous moving averages.

*Wage-product price patterns.* Alternatively, long-attachment wages may follow product prices. Recent price hikes by the employer that widened his profit margin can be legitimately viewed by labor as increasing its marginal revenue product and hence warranting a pay advance. On the other hand, recent rises in the firm’s price that merely reflected a passthrough of previous increases in labor or material costs, with an unchanged markup, should make no case for further wage gains.<sup>36</sup>

*Wages and consumer prices.* Finally, consumer prices may influence wages. Presumably, one of the attractions of a career job is the prospect of a reasonably secure and rising standard of living for the long run. If the cost of living increases sharply relative to wages (or if the real-wage outlook merely becomes far more uncertain), the worker may see less value to his job, perhaps enough less to quit, even with no evidence that his wage has deteriorated relative to the (unknown) alternatives. And if the cost of living would affect quit rates at given wages, it will influence wages—in a way that need not depend on a mythical real-wage effect on leisure.

If the risk of a price-wage squeeze imposes a serious disutility on the worker, unions will seek wage adjustments informally geared to past move-

36. Many wage equations in the early sixties included the profit margin as an independent variable. See Richard G. Lipsey and M. D. Steuer, “The Relation between Profits and Wage Rates,” *Economica*, n.s., vol. 28 (May 1961), pp. 137–55; Otto Eckstein and Thomas A. Wilson, “The Determination of Money Wages in American Industry,” *Quarterly Journal of Economics*, vol. 76 (August 1962), pp. 388–401; George L. Perry, *Unemployment, Money Wage Rates, and Inflation* (M.I.T. Press, 1966), pp. 27–29, 48–52. The profit squeeze and wage bulge of subsequent years made the fit deteriorate, so the variable dropped out—but not for analytical reasons. In part, Perry puts it back in his discussion of income shares in the article in this issue.

ments of consumer prices or formal escalator clauses (even though an optimal bargaining strategy would depend on the ability to pay of the employer as well as the ability to consume of the worker).

On reasonable assumptions, the worker should prefer a contract for the next three years that offers certainty about his *real* wage to one with the same expected value that provides a certain nominal wage (and hence an uncertain real wage). On standard assumptions of one-sector inflation models, the employer who must commit himself for three years would also be expected to make the same choice. Surely, the wage escalator should reduce risk for firms in cyclical industries where product demand (and hence the ability to pass increased labor costs into product prices) is typically highly correlated with movements of overall consumer prices. The fact that formal escalators are the exception rather than the rule reveals a defect in the standard theory. Why do employers uniformly resist escalators, even in industry-wide bargaining? In a few conversations I have had with sophisticated businessmen on this issue, their explanations illustrate vividly the importance of certainty about *nominal* future costs in *customer* product markets. Some mention the need to make fixed-price bids or to accept fixed-price orders for production processes of long duration. More generally, they insist on the importance of planning in terms of dollars. They stress vulnerability to interproduct and international competition in a world where escalator clauses are rare. They view their future financial resources as given in nominal, and not constant, dollars. When they have to decide on a purchase of labor-saving machinery, they want to compare its price with some known price for labor over as long a horizon as possible.

Even if, for such reasons, the escalator imposes a net cost on the employer, the firm may recover that cost with an offer of lower expected value if the insurance is worth a lot to the worker. Thus, escalators may be an efficient element in the wage bargain. In fact, they have spread in recent years, although really strong uncapped ones are limited to a few major industries. All in all, consumer prices influence wages through both formal escalators and informal cost-of-living adjustments—ruling out any pure case of a “one-shot” rise in the cost of living.

#### INFLATIONARY BIAS IN WAGES

Of the various features of a career labor market outlined above, only the downward rigidity of the wage level points to an inflationary bias in wages. Because a wage cut is a qualitatively different and abnormal outcome, it

can have sufficiently adverse long-term effects on quit rates to become unprofitable for employers. The qualitative significance of zero as a floor has no parallel for any ceiling. While downward rigidity in this sense can importantly raise the mean wage increase if much of the frequency distribution of wage changes would otherwise lie below zero, it cannot have any influence when the entire frequency distribution lies in the positive range.

Apart from downward rigidity, an inflationary bias might arise from an asymmetry following a regularly scheduled wage increase or a collective-bargaining settlement. The firm still retains the option of "overfulfilling" its pledge, by awarding extra wage increases or Christmas bonuses if labor markets should tighten dramatically. But it cannot underfulfill with negative Christmas bonuses. The resulting phenomenon of upward "wage drift" introduces a long-term bias if any of the temporary bulge becomes permanent (as seems likely, if only because it gets into prices in the interim).

A third possible source of inflationary bias arises because the strike is a recurrent threat that may disrupt any static equilibrium for union wages. Analytical models typically suggest that, while monopoly power of unions may lead to *high* wages, that power, once exercised, should not speed the *rise* of wages over time. But because the strike threat is the enforcement instrument of the union's (bilateral) monopoly power, that standard conclusion is not airtight. In any formal contract, the union makes the concession of disarming itself and burying the strike threat for, say, the three-year duration. When the contract expires, it once again has the opportunity to exercise that threat; *conceivably*, it may seek an additional payment from the firm in return for three more years of disarmament.<sup>37</sup>

In summary, career labor markets make wages less sensitive to labor-market conditions, rigid downward, and subject to a zone of indeterminacy and possibly to an inflationary bias. They also create indeterminacy in the bargaining process, permitting widely varying results in different periods of history and different countries on the extent to which wages follow labor-market tightness, wages, product prices, or consumer prices. Some characteristics of wage behavior are predictable: the rate of wage increase will have momentum; it will ultimately respond to market conditions; it will show downward rigidity. Once adopted, a particular pattern of wage fol-

37. This argument does not imply that the union will capture an ever-larger share of the bilateral surplus in successive rounds of bargaining. For one thing, market conditions do change; for another, firms would ultimately find it worthwhile to resist further wage increases even at the expense of greater risk of a strike.

lowing will persist for some time. But it will change and evolve, and it will defy any general theory with empirical content that is meant to comprehend all labor markets in all countries at all times—as is confirmed by Perry's analysis of worldwide wage experience in this issue.<sup>38</sup>

### **Inflation in the Mixed Customer-Auction Economy**

In the real world, a few products are sold on organized auction markets; a few strictly fit the customer-market model with price tags based on a non-cyclical markup over past costs; many lie between these poles; and some may reflect forces that are neither market clearing nor customer oriented. While no labor is marketed in a pure auction exchange, labor markets cover a spectrum of wage flexibility. In this sense as well as in many others, it is a mixed economy.

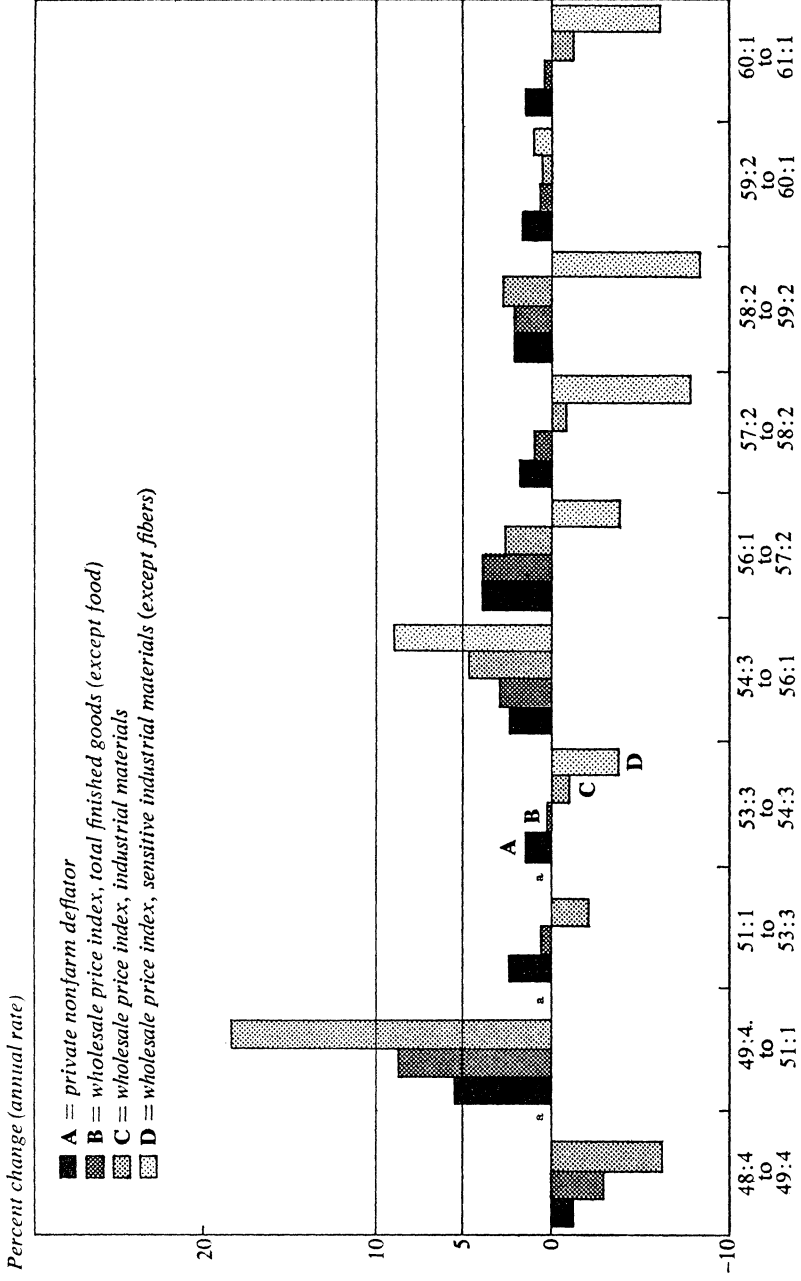
Figure 1 illustrates the mix in product markets, showing the contrasting behavior of four price indexes in selected periods of varying inflationary pressure. The sensitive industrial materials index, bar D, approximates pure auction prices; it is volatile, often declines, and responds promptly to changes in aggregate demand pressure. A broader group of wholesale industrial materials, whose price changes are shown by bar C, is not quite so volatile, less apt to fall, and less prompt to respond. (The unusual relative behavior of bars C and D over the period 1973:4 to 1974:4 stems from the inclusion of petroleum in C, but not in D.) Wholesale prices for finished products (bar B) are less “auction-like” in behavior than either C or D, while the private nonfarm deflator (bar A) is the least auction-like and most dominated by customer prices.

#### **A SIMPLE ALGEBRAIC MODEL**

A simple algebraic model can describe some of the mechanisms of inflation in the mixed economy. For convenience, I shall focus on the auction-

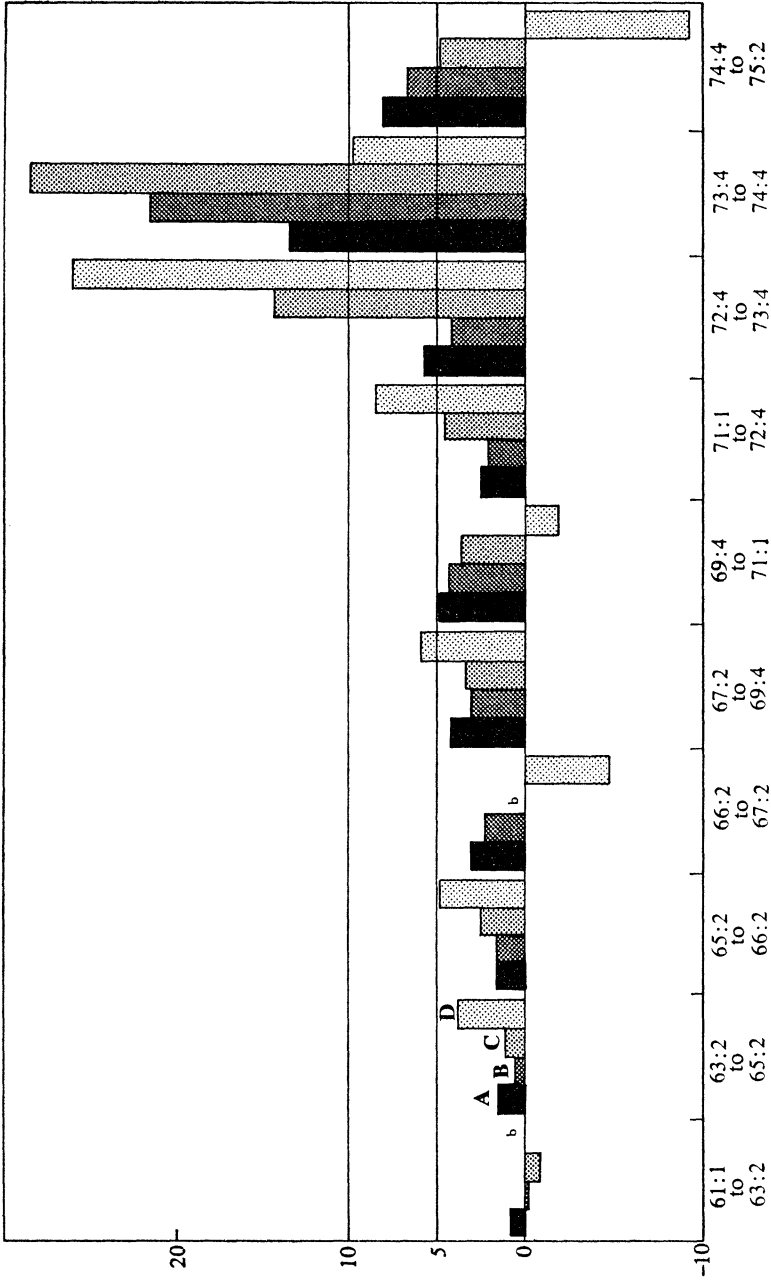
38. Throughout, some of the phenomena that I view as conventional could be conceptualized as expectational. (The indeterminacy is there in either case.) In part, this choice is a matter of analytical taste. For example, I would describe the current salaries of baseball players as based on last year's performance and argue that this convention rests on the long-term attachment that provides an incentive and a payoff for every year (except the final one in each career). Chicago and Minnesota economists would insist that the pay is an expected value where last year's performance provides the best estimate of this year's. As I see it, the analytical principle of Occam's razor supports my preference, but perhaps an even more ancient principle applies: *de gustibus non est disputandum*.

**Figure 1. Inflation Rate, Selected Price Measures, over Varying Intervals, 1948:4 to 1975:2**





Percent change (annual rate)



Sources: A—official U.S. Department of Commerce data, from COMETS data bank; B, C, D—unpublished tabulations of special groupings of U.S. Bureau of Labor Statistics wholesale price indexes, compiled by the Board of Governors of the Federal Reserve System.  
 a. Data for this index are not available for years before 1953.  
 b. This change was negligible.

customer dichotomy in product markets rather than that in labor markets. I shall assume that customer prices are set by a markup over cost with a one-period lag, while auction prices clear markets. I shall also assume that all the costs of customer products (and none of the costs of auction items) are wages. For simplicity, the supply of auction-priced items is taken as completely inelastic over some significant short period, while the output of customer items can be expanded at constant real costs. Moreover, I shall initially ignore any changes in stocks of auction items (treating them all like fresh fish).

Also for simplicity, income and price elasticities of demand are taken as unity for both types of products, so that each captures a fixed share of total expenditures. For the moment, I shall note merely that wages,  $W$ , may depend upon prices,  $P$ , in both sectors, output,  $Q$ , in the customer sector (which reflects the strength of demand), and lagged wages,  $W_{-1}$ . The model can be represented by the following four equations:

$$(1) \quad P_A \bar{Q}_A = a \bar{Y}$$

$$(2) \quad P_C Q_C = (1 - a) \bar{Y}$$

$$(3) \quad P_C = b W_{-1}$$

$$(4) \quad W = f(P_A, P_C, Q_C, W_{-1}),$$

where the  $A$  subscript refers to auction items, and the  $C$  subscript to customer items;  $\bar{Y}$  is nominal income, which (like  $\bar{Q}_A$ ) is taken as exogenous.

Initially, suppose that prices in both sectors are constant and so is income. Now income starts rising persistently at a rate of  $m$  percent, perhaps because of stimulative monetary or fiscal policies. The auction-priced items immediately have an inflation rate of  $m$ . But the inflation rate of customer items initially is zero, while their output expands at the rate of  $m$ .

Developments in subsequent periods depend on the behavior of wages. In the extreme case where wages are absolutely rigid,

$$(4a) \quad W = \text{constant},$$

the inflation in the auction sector and the expansion of output in the customer's sector would both continue at the same rate of  $m$ . The inflation would never spread to the customer sector, and real wage rates would be squeezed although real payrolls would be maintained.

Suppose instead that wages respond promptly but incompletely to output

(and hence employment demand) in the customer sector, but not to prices:

$$(4b) \quad W/W_{-1} = (Q_C/Q_C^*)^s,$$

where  $Q_C$  is the initial “noninflationary level” and  $0 < s < 1$ . In this case,  $P_C$  starts rising after one period and keeps rising at an increasingly rapid rate that ultimately reaches  $m$  and thus matches the rate of increase of  $P_A$ . But the ultimate ratio of  $P_C/P_A$  is below its initial value by  $m/s$ . And the equilibrium value of  $\log(Q_C/Q_C^*)$  is also  $m/s$ . Finally, the equilibrium value of  $P_C/W$  is  $m$  below the initial ratio. Thus, real product wages are up and profit margins on customer items are down. Real wages measured in terms of consumer prices may, however, be up or down depending on the weight of auction items in the cost of living. Thus, the initial inflationary phase in which auction prices rise faster than customer prices (and wages) “permanently” changes relative prices.<sup>39</sup>

Finally, suppose wages respond fully and immediately to the cost of living, but not at all to the state of the labor market:

$$(4c) \quad W/W_0 = (P_A/P_{A_0})^k (P_C/P_{C_0})^{1-k},$$

where  $k$  is the weight of auction items in the cost of living. It is convenient to set  $P_{A_0} = P_{C_0} = bW_0 = 1$ . Remarkably, every single result of this model corresponds to that based on (4b), with the mere substitution of  $k$  for  $s$ . The (4c) variant does make real wages in terms of consumer prices determinately constant, but the other changes in relative prices that emerge from (4b) apply here as well.

With both (4b) and (4c), ending the growth of nominal income does not halt inflation promptly, although auction prices stop inflating at once. Customer prices still register past wage increases, while wages keep rising as a result of tight labor markets—in (4b)—or of continuing advances in customer prices—in (4c). Thus, inflation damps down only gradually.

Interesting further possibilities can be entertained by relaxing some of the restrictive assumptions made above and thus allowing for more complex lags, partial responses of wages to the cost of living, labor inputs in the auction sector, differential price and income elasticities in the two sectors, auction-priced materials that are embodied in final products, variations in the output of the auction sector, changing real costs of producing customer items, and inertia in wage increases.

39. With  $P_{C_0} = P_{A_0} = 1$ , the solution to the first-order difference equation for  $P_C$  is  $\log P_{C_t} = mt - m/s + (m/s)(1 - s)^t$ ; while  $\log P_{A_t} = mt$ .

Several results appear to be robust for a wide class of such models: (1) The rate of inflation can be viewed as depending on (a) the size of the impact on the auction sector, and (b) the speed of transmission (generally through wages) to the customer sector. (2) A rise in the inflation rate changes relative prices, because the auction prices get out in front and the others do not catch up. (3) The more the output of a sector can rise, the less its price tends to go up. (4) Realized markups are squeezed wherever costs are passed through with a lag. (5) Inflation starts slowly but builds up a momentum that keeps it going even after its initiating source is eliminated.<sup>40</sup>

The implied squeeze on the profit margins of customer firms during inflation raises interesting questions. To be sure, so long as their output is rising rapidly in an inflationary boom, their margins in the real world are buoyed up by a cyclical productivity bonus that does not appear in these models. Yet the implied influence of inflation per se—as distinct from expanding output—in squeezing margins may have some verisimilitude. It clearly applies to public utilities and may apply to customer-strategy industries that are self-regulatory in their passthrough of costs. And since customer-strategy firms account for most U.S. equities, this squeeze could even be one of the reasons why the stock market does not perform well during inflationary times.<sup>41</sup>

Because customer prices lag behind costs in these models, real wages measured in terms of those prices are increased by inflation, regardless of how wage rates themselves are determined. The typical empirical result that real wages deflated by total consumer prices have no distinct cyclical pattern may indeed suggest that they are procyclical in terms of customer prices alone. Of course, this result conflicts sharply with the traditional Keynesian view that employment could increase only with declining real wages. But Keynes' belief in that classical proposition rested on the assumption that firms typically operated with diminishing marginal product of labor, a thesis that has long since been exploded by the facts on cyclical productivity.<sup>42</sup>

40. These models closely resemble one constructed by James Duesenberry way back in 1950. See "The Mechanics of Inflation," *Review of Economics and Statistics*, vol. 32 (May 1950), pp. 144–49. Also, compare the models used by Robert J. Gordon to analyze food inflation in "Alternative Responses of Policy to External Supply Shocks," *BPEA*, 1:1975, pp. 185–94.

41. Note, however, that FIFO profits are pulled down only to the extent that the cost-passthrough lag is longer than the inventory lag. Several aspects of cyclical movements in profit margins are explored by Charles Schultze in his paper in this issue.

42. See Okun, "Upward Mobility," pp. 211–13.

## ASSETS AND INTEREST RATES

When inventories of auction items are brought into the analysis, they play a key role, building a bridge to monetary theory. Suppose auction markets are "efficient" in the sense that all worthwhile information is compiled and digested by traders and reflected promptly in market prices. Then the demand for inventories of auction items (like cotton) will be geared to price expectations; cotton (or a futures contract in it) is potentially a portfolio asset for anyone who expects its price to soar. However, for customer items (like dacron), which are extremely illiquid, stock demands are essentially transactions balances of producers, distributors, and ultimate consumers; those stocks are likely to be much less sensitive to inflation and interest rates than are auction stocks. To be sure, cost expectations (for wage rates and the like) can influence sellers, and price expectations can induce intertemporal shifts by buyers (like the bulge in car sales in August 1974), but their scope and magnitude seem sharply limited.

Given an emerging inflation, the responses of asset markets in a mixed world will differ from those of a pure auction world. In the latter (with a sufficient sprinkling of assumptions), a jump in nominal interest rates by the expected rate of inflation will keep portfolios in equilibrium for every asset except non-interest-bearing cash. The induced economizing on money holdings produces the single adverse allocative effect of inflation recognized in standard theory—additional trips to the bank. But those answers cannot apply to the world of two classes of real assets, with the high inflation rate on cotton and the lower (and less relevant) one on dacron. Nominal interest rates cannot rise enough to equilibrate the demand for cotton stocks at the pre-inflationary level without creating an excess supply of loans and dacron stocks.

As a result, the rise in nominal interest rates must leave some expected net return from cotton speculation and thus maintain some additional demand for cotton inventories, limited by the high (and presumably increased) risk of holding these stocks. Sophisticated, wealthy, and risk-neutral (or relatively less risk-averse) investors are handed a windfall by the opportunity for speculation on cotton. Moreover, the buildup of cotton stocks and any possible induced holddown (or buildup) of dacron stocks lengthen the list of real allocative effects of inflation: there are changes in the schedule of trips to lots of suppliers, not just to suppliers of money.

While the expected inflation rate on cotton thus sets an upper limit on the inflation premium in nominal interest rates, I see no compelling reason

why the expected inflation rate on dacron should be a lower limit. Surely, nothing guarantees or even suggests that the premium will correspond to the weights of dacron and cotton in any overall price index, or that any general "real" interest rate, however defined, will remain stable, or that the premium thus will offer reasonable insurance to savers who want to hedge against inflation. It is predictable that the structure of interest rates will be altered, because the financial sector is also a mixed auction-customer world. Because thrift institutions borrow short and lend long, they must pursue a customer "pricing" strategy, passing through the sluggish yields on their portfolios in the form of sluggish interest rates to their depositors. The customer strategy has more fundamental causes than the government ceiling on interest, which is really an effort to preserve its viability. In any case, the interest rate received by depositors does not compensate them at all fully for increased inflation.

The role and importance of money and near-moneys become clear in a mixed world. In a hypothetical world of universal, frictionless auction markets, every product is liquid, and a well-diversified portfolio of commodities should dominate over demand deposits. It is precisely because customer items are illiquid assets with sluggish prices that fixed-dollar assets are so attractive to households who may need to spend for automobiles, appendectomies, college tuition, life-insurance premiums, and property-tax bills at uncertain times in the future.<sup>43</sup>

An inflationary world with greater volatility of overall prices and of relative prices reduces the "real" services provided by liquid assets in ways that do not get recorded on balance sheets. The typical household is offered no reliable escape, even if it correctly anticipates inflation. Commodity markets are too risky; equity markets reflect the problems of customer-product firms; borrowing more to accelerate purchases of customer-priced autos and appliances is generally a losing strategy (1974 provided an exception); only homebuying offers hope for salvation, and then only to a limited number of families in those intervals when mortgages are available. Ample reasons emerge for the empirical fact that consumers save more in response to previously unanticipated inflation.<sup>44</sup> The diminished real wealth from

43. See Leijonhufvud, *On Keynesian Economics*, pp. 80–81; Karl Brunner and Allan H. Meltzer, "The Uses of Money: Money in the Theory of an Exchange Economy," *American Economic Review*, vol. 61 (December 1971), pp. 784–805.

44. George Katona stressed that fact for years to a skeptical profession; see *The Powerful Consumer* (McGraw-Hill, 1960). See also F. Thomas Juster and Paul Wachtel, "Inflation and the Consumer," *BPEA, 1:1972*, pp. 71–114.

nominal assets and the adverse “income effect” associated with greater risk and uncertainty apparently swamp incentives to shift into goods. And households may save particularly in liquid form in order to bolster their dwindling ratio of cash reserves to income and consumption. Thus, in a variety of ways, the new mixed world makes sense of the old story that inflation discriminates against the unsophisticated saver and investor, redistributing wealth from “suckers” to “sharpies.”

Inflation may also stimulate investment in plant and equipment by auction industries and depress it in customer industries. The latter may well be confronted with an increased real interest rate (in terms of their product prices). Even if they are not, they may respond negatively to an equal rise in nominal interest rates and inflation rates. A number of businessmen have told me that their firms initially and tentatively evaluate a proposed new plant by estimating how its output (at some “normal” operating rate) would contribute to profits, assuming that the product will be sold, and all inputs bought, at *current* prices. That initial estimate of profitability will be depressed when lenders are getting some inflation premium in nominal interest rates—unless the firm assumes enough inflation of its product price (relative to that of variable inputs) to recoup this inflation premium. As I heard one businessman express his feelings, “I hate to make an investment that can be bailed out only by inflation.” In effect, even if his best estimate is that he can push up prices fast enough to recoup the inflation premium, he feels greater uncertainty about profitability and hence greater reluctance to invest.

In summary, inflation has far more pervasive influences on portfolio choices than the traditionally hypothesized shift from nominal assets to real assets. It may push them away from nominal assets, customer items, equities of customer firms, and perhaps even physical capital of customer firms into auction commodities and those few other real assets that are reasonably liquid, like real estate.

#### ADAPTATION AND ACCELERATION

The institutions of the customer sector are geared to a basically noninflationary world. And they have to adapt if the world becomes and remains inflationary. Some of these adaptations are taking place today. Customer-strategy firms are trying to widen their markups. They are shortening the intervals at which they pass through cost increases; they change prices more

frequently; they are departing from historical cost calculations and trying to anticipate future cost increases. Many firms have begun to think and price LIFO as well as to report LIFO profits; they are focusing anew on the gap between replacement and original costs of capital in setting prices; some have ended the practice of accepting orders with fixed delivery prices, while others are putting future cost increases into those prices; some firms have instituted wage and pension escalators and have shortened labor contract periods. They are searching for new formulas and yardsticks to supplant the dollar yardstick. More and more investors are learning to participate in commodity markets and real-estate ventures. Lenders who need certainty of capital value are increasingly reluctant to make long-term commitments.

Most of these adaptations shorten the lags and increase the intensity of inflation associated with any given level of real economic activity. Thus, they generate an adverse shift of the short-run Phillips curve that reflects the inflationary experience of the past. That shift accords with the prediction of the accelerationist model, although the mechanism of acceleration is very different from that implied by a natural unemployment rate and a particular expected inflation rate. I believe the United States is currently suffering from an acceleration resulting from such adaptations to past inflation, as well as from the momentum of the more normal long lags in customer and career markets.

The gradualness and the costliness of these adaptations reveal the great dependence of customer institutions on the dollar yardstick. The adaptations require new techniques of management control, new—and perhaps inherently less efficient—kinds of customer and employee relationships, and a new breed of accountants. The innovators find themselves out of step and unable to communicate with their customers, suppliers, lenders, and government tax collectors or regulators. And so the economy adapts to inflation at only a tortoise's pace, even though everyone expects inflation to continue at least at a mule's (if not a hare's) pace.

### **Implications for Welfare and Policy**

Customer markets are valuable institutions to society, because information costs are really high. In comparison with a dominantly auction economy, they cut the cost of shopping, and reduce the resources devoted to



trading in spot and futures transactions and to the negotiation of formal contracts. They lower job turnover and create reasonably predictable career income profiles; they encourage firms to invest in workers and to build career ladders for them. They economize on resources devoted to point-estimate forecasting of the future. They promote reliance on custom and habit. They allow accounting systems and hence orders, capital budgeting, and financing to be guided by reliable historical costs rather than conjectural future costs. They make money and, more generally, fixed-dollar assets valuable and reasonably reliable claims over a wide range of consumer goods and services that may be desired many years in the future.

Prolonged and intense inflation upsets many habits of economic life, confronting consumers with price increases and price dispersions that send them shopping; making them doubt their ability to maintain their living standards, and downgrade the value of their career jobs and long-term savings; and forcing them to compile more information and to try to predict the future—costly and risky activities that they are poorly qualified to execute and bound to view with anxiety. The recognition by the consumer that economic institutions are gravely disturbed by inflation is an appreciation of reality—not money illusion. The illusion—Walrasian-general-equilibrium illusion or barter illusion—lies in the models of an economy in which inflation does not matter, offering automatic protection to savers through the interest premium on nominal assets and leaving intact the relative prices of cotton and dacron and the relative wages of janitors and professors.

The accelerationist is right that, in some respects, people are fooled by inflation. But the fooling lies, not so much in disappointing predictions of precise outcomes as in undermining the foundations of habit and custom that permit one to live without many point-estimate predictions. And the institutions of the system provide no vehicles of “unfooling” to transport the economy to a no-tradeoff situation of “fully anticipated” inflation and a natural unemployment rate.

I do not know, at this point, how to quantify the benefits of a customer economy or how to assess the fraction of those benefits that would be dissipated by the persistence of rapid and erratic inflation. Clearly, the total benefits are large: consider the welfare loss that would be imposed on a person forbidden ever again to engage in any economic transaction with anyone whom he has voluntarily bought from or sold to in the past—his employer, banker, mechanic, tailor, and the like. The percentage “discount”

imposed by intense inflation on these relationships is not enormous, but neither is it trivial, given their dependence on the dollar yardstick. As William Brainard suggested in conversation, estimates of the substantial costs associated with a shift to the metric system may give some clues to the much larger costs of abandoning the dollar yardstick.

However these welfare benefits are evaluated, they must be balanced against the welfare costs of a customer economy—greater volatility of output and employment. In a recessionary world of universal auction markets, price and wage levels would plunge rapidly toward zero, allowing the Keynes effect and the Pigou effect to restore full employment.<sup>45</sup> And rapidly rising prices could similarly halt booms with a brief intense spurt (rather than a long nagging bout) of inflation.

Although I cannot prove that the prevalence of customer markets yields a net benefit, subjectively I think the system is worth saving. The ability of the system to limit the waste of idle resources and to contain the inflationary bias in wages looked pretty good in the fifties and sixties, particularly in contrast to the record of the thirties and the forties. Indeed, in that tranquil period, long-run attachments must have paid off well. Infrequent layoffs, low quit rates, good internal ladders served firms and career workers, while sluggish cost-based prices satisfied customers and suppliers. Those successes may well have gradually encouraged more customer and career strategies; and that, in turn, may contribute to the finding that wages and prices have been less responsive in recent years to given cyclical movements of real activity.<sup>46</sup>

#### STEADY INFLATION

Some proposed policy strategies with respect to inflation seek an alternative yardstick for the dollar. The proponents of steady inflation—rather than low inflation—would set a target of stability in the first derivative of the value of the dollar rather than in its level. The steadily shrinking dollar

45. To do so, they would have to outweigh any negative impact of deflationary expectations on investment demand and have to escape any liquidity trap. Like Robert Hall (in his article in this issue), I would expect a high degree of downward wage and price flexibility to restore full employment. But, unlike him, I would attach a large social cost to wage and price volatility.

46. See Cagan, *Hydra-Headed Monster*, pp. 2–8. Tobin points to the declining agricultural share of employment and GNP in the postwar era as another possible contributor. See his “Inflation and Unemployment,” p. 14.

may be a reasonable yardstick, but it has to be second best—just as a 5 percent annual decline in the length of a “yard” would be inferior to stability.

I can see two possible arguments for the compromise goal of steady inflation, but I find neither persuasive. First, if the key difficulty of stabilization stemmed from the downward rigidity of the *level* of wages, it could be sensible to aim at a normal inflation rate that kept nearly all wage movements in the positive range—so that absolute cuts in wage rates in significant sectors would not be needed to achieve the desired macro-equilibrium. Second, if the economy were fairly well adapted to some particular inflation rate (like 5 percent), it might not be worth the transitional cost to wring that inflation out of the system. As I have argued above, however, the adaptations are limited adjustments to varying and uncertain inflation (which still leave the system heavily dependent on the dollar yardstick), rather than full adjustments to any particular inflation rate.

The main problem of steady inflation as a goal is its lack of credibility. Targeting on a stable first derivative is admitting failure in the effort to stabilize the level. Why should anyone expect any greater success in stabilizing the rate of change of the price level than in stabilizing the price level? Moreover, in the context of the model of this paper, steady inflation requires such a full adaptation that the same expected inflation rate can pertain to dacron and cotton, and to the wages of professors and janitors. Steady inflation strikes me as even more of a mirage than when I first called it that four years ago.<sup>47</sup>

#### INDEXATION

Another proposed strategy for policy would substitute for the dollar yardstick a new cost-of-living unit through indexation of incomes, assets, debts, and taxes. Thus far, explicit cost-of-living adjustments have been enacted for social security and for federal retirement benefits, and both of the formulas written into law involve serious technical defects.<sup>48</sup> Apparently, construction of a substitute yardstick is not a trivial task.

The most far-reaching proposal would promote wage indexation as a general practice. Through indexation, career wages would respond more

47. See “Mirage of Steady Inflation.”

48. The defect in social security is discussed in Barry M. Blechman, Edward M. Gramlich, and Robert W. Hartman, *Setting National Priorities: The 1976 Budget* (Brookings Institution, 1975), pp. 175, 182; that in federal retirement introduces a recurrent and compounded rounding error.

promptly and more fully to changes in the prices of auction products and in flexible wages. As Robert J. Gordon has convincingly argued, that must be socially undesirable when the changes in auction prices result from changes in supply.<sup>49</sup> But when the price changes are demand induced, presumably indexed wages would more nearly approximate the “shadow equilibrium” wages of an auction labor market.

A program of universal wage escalators would represent an effort to breathe life into the textbook auction model (accompanied by a hope that supply shifts would rarely be the culprit). In the indexed world, like the auction world, the price level would be volatile and would respond rapidly to aggregate demand; hence, a nonaccommodating monetary policy would automatically unleash the Keynes and Pigou effects in the early stages of inflation. Moreover, because the decreased inflation resulting from restrictive discretionary policies would emerge with a much shorter lag behind the reduced output and employment, such policies might become politically more feasible. The thesis is that, if inflation “hangs out” sooner, it will be stopped sooner. I find the argument intriguing, but not persuasive.

The equity case for wage indexation seems even less persuasive. To be sure, escalators make the real wage of an indexed worker less dependent upon such arbitrary elements as the timing of his contract or the effectiveness of his union leader. And they may help to resolve conflict by keeping inflation issues out of the wage bargain. At the same time, by increasing the volatility of price movements, they must exacerbate the uncertainty and variability of real incomes for those who have no escalators. If indexing is less than universal, its equity effects must be uncertain.

And if indexing became universal for wages, contracts for future delivery, claims, and taxes, the market-basket unit would become the yardstick and the numeraire of the economy, and the price level would become highly unstable. Clearly, the price system would go haywire if all the sellers of the items in a comprehensive market basket set “real prices” in market-basket units (only by magic would the prices add up to unity). Now suppose they aim collectively at a real price that exceeds unity, but they have to set price tags in dollars. If everybody’s price is geared to full escalation with a short lag, the inconsistency of real aims must result in explosive inflation. The price system can work with gold, peanuts, or dollars as the standard, but it cannot work on an all-inclusive market-basket standard. To put it another

49. “Alternative Responses of Policy,” pp. 201–02.

way, the money equation would be pushed out of the general-equilibrium system, making that system insoluble.

All things considered, I suspect as good (or as bad) a case can be made for a social effort to discourage the responsiveness of career wages to cost-of-living movements as for one to promote it. If the link could be broken entirely, inflation would be more narrowly confined to auction markets and limited by a different kind of automatic stabilizer—a squeeze on consumer demand due to depressed real labor income. Transitory inflationary shocks might then blow themselves out with much less impact on the price level. The political process might even be improved because inflation would squeeze the majority of voters harder.

#### POLICIES FOR THE AUCTION SECTOR

If instead of designing alternative yardsticks, policymakers should be aiming to save the dollar yardstick, then they must recognize the special role of the auction sector. While auction items may not be the source of excess demand, they will be the source of major price increases. Speculation on auction-product inventories in a strong cyclical upswing is not a response to any genuine change of relative scarcities, and serves no social function that I can see. Huge price increases of auction items impose macroeconomic welfare costs by transmitting both inflation and, through restrictive fiscal-monetary policies, underutilization to customer and career markets.<sup>50</sup> For these reasons, public stocks of auction items, measures to ensure adequate and reliable domestic supplies, and government disincentives to cyclically speculative stockbuilding all belong in the kit of economic stabilization instruments.

These realities of the mixed auction-customer world have been flagrantly ignored in U.S. agricultural policies of the seventies. Indeed, it is hard to find mistakes in monetary or fiscal policies that can match the macroeconomic damage wreaked by the policies of export promotion (backed by no public stocks) of farm products. Certain policies on the pricing of oil

50. The macroeconomic externalities can be illustrated by the following arithmetic example. Suppose (1) the price elasticity of U.S. demand for some auction item (say, wheat) is 0.2; (2) in light of the social attitude toward the inflation-unemployment tradeoff, stabilization policy aims at a given *nominal* GNP target. Then the production and domestic sale of one extra bushel, priced at \$4, lowers nominal farm GNP by \$16 and permits a \$16 increase in nominal nonfarm GNP. So the bushel is really worth about \$20!

that essentially ignored their macroeconomic inflationary and recessionary effects rate another high place on the horror list.

The especially heavy weight of auction items in U.S. exports and imports has important implications for exchange-rate policies and for the monetary-fiscal mix. The discouragement to imports from a depreciating currency may sacrifice potential anti-inflationary benefits. Thus, the undervaluation of the dollar on trade account in 1974 and 1975 may be significantly impairing U.S. price performance (given the level of economic activity).

The anti-inflationary benefits of a highly valued currency are also an argument—although not necessarily a decisive one—for less monetary stimulus (offset by more fiscal stimulus). With flexible exchange rates, high interest rates that encourage short-term capital inflows may strengthen the currency and help particularly to moderate inflation. Such a shift in the monetary-fiscal mix would also help if domestic inventory holdings of auction commodities are especially sensitive to interest rates. In general, policy-makers in the mixed customer-auction world should be critically aware of the possibilities for shifting the inflation-output tradeoff with measures that have their impact primarily on either auction-priced or customer-priced items. Many of those options lie in international economic policies, and some would require negotiation and coordination among trading partners to avoid “inflate-thy-neighbor” strategies.

As has been widely suggested, the worldwide character of the 1973 boom and the 1971–73 devaluations of the dollar contributed to the particular severity of recent inflation in raw materials and other traded commodities.<sup>51</sup> The story of 1966 may have been just the reverse: excess demand in the United States was not shared by its trading partners, and the dollar was increasingly overvalued; as a result, imports poured in, dampening down the inflation rate on commodities. Indeed, commodity inflation was unusually moderate in 1966–69; as shown by figure 1, it did not even match that of the middle and late fifties. That stability in the auction sector may have contributed to the initial complacency of U.S. policy. That experience also contributed in 1972–73 to the serious errors of economic forecasters (including me). We were blindsided by commodity inflation while we focused happily on tranquil labor markets, as though they were the only potential source of serious inflation.

51. See, for example, William Nordhaus and John Shoven, “Inflation 1973: The Year of Infamy,” *Challenge*, vol. 17 (May/June 1974), pp. 18–19.

**FISCAL POLICY**

The makers of stabilization policy face a particular problem because customer prices and career wages are lagging indicators. By the time they exhibit a visible acceleration in a cyclical expansion, inflation will have become deeply entrenched. Discretionary policy decisions require the guide of more sensitive indicators that will register excess demand more promptly; quit rates, order backlogs, and the like should be examined carefully for their potential contribution to an early diagnosis.

The reverse problem created by customer and career markets is the need for so much unemployment for so long in order to work off an inflation that has become well entrenched. Under those circumstances, there are overwhelming merits in fiscal devices that would operate directly to hold down prices with less compression of output and employment. The ideal medicine for an economy in which both unemployment and inflation are too high is a value-added subsidy. And the next best is reduction in broad-based excise and sales taxes and payroll taxes. While they would be harmful in excess-demand inflation, these are the only prescriptions that deal directly and efficiently with the disease of stagflation. The one objection I hear again and again in response to my advocacy of such measures concerns their novelty—a disadvantage that would be remedied by their adoption.

**INCOMES POLICY**

Finally, a case for price-wage intervention by the government emerges in the customer-auction world. If most wages are heavily influenced by some criterion of fairness (and do not register some precise optimizing intersection of supply and demand), the government can be constructive by promoting a noninflationary criterion (or “guidepost”). In a world where, for good reasons, people care about the stability of the price level, every price or wage that has a zone of indeterminacy imposes an external macroeconomic cost when it is set at the top of the zone and yields a social benefit when it is set at the bottom. To be sure, there are grave difficulties in publicly influencing these private decisions; and misconceived controls can do even more harm to customer and career relationships than inflation does. But the potential social surplus from recognizing the macroeconomic ex-

ternalities may be large enough to compensate parties that accept some restraints.<sup>52</sup>

The world of mixed customer and auction markets poses serious dilemmas for public policy. It is not the world of costless, fully adjusted inflation or of intractable natural unemployment rates. Its tradeoff problem is genuine and genuinely agonizing. The system needs reasonable price stability to preserve its institutional framework: it cannot thrive with a 14 percent or even a 7 percent rate of inflation. And some loss of output and employment is worthwhile and unavoidable in the cure of an entrenched inflation. But because so many prices and wages respond so little to demand in the short run, holding down output and employment is an extremely slow and excruciatingly painful cure for inflation. The prolonged maintenance of unemployment rates of 7 percent or more, and of shortfalls in annual output of \$100 billion to \$200 billion, is neither a sensible nor a credible strategy. Fortunately, the system offers many opportunities for more efficient policies to dislodge an entrenched inflation. These include measures that counter the destabilizing influence of auction commodities; that use taxes and subsidies to reduce costs without reducing aggregate demand; and that influence wage and price decisions to reflect their macroeconomic externalities.

52. See my 1974 proposal for real wage insurance in Arthur Okun, "Incomes Inflation and the Policy Alternatives," in "The Economists' Conference on Inflation: Report," vol. 1 (1974; processed), pp. 369-71.



## *Comments and Discussion*

**William Fellner:** Arthur Okun's present contribution may be viewed as a companion piece of Hicks' work on similar problems, though with a number of distinctive features. My first comment will relate to the paper's main analytical thesis; my second and third comments will be concerned with alternative policy approaches to the inflation problem, in view of Okun's observations on these.

First, Okun's seller in a customer market is uncertain about the long-run price elasticity of the demand that he individually faces, and he is risk averse. The reasons Okun gives for the uncertainty about elasticity—even about its sign—are presented in a particularly constructive and original section of the paper in which the disruptive effect of price changes on customer relations is stressed.

As for the seller's risk aversion, this is in part the kind that is consistent with the von Neumann-Morgenstern-Savage axioms, but that risk aversion also includes another element. Even if the risk-averse seller acts consistently with the usual probability-utility axioms, he will prefer smaller expected profits predicted with relatively little uncertainty to larger expected profits with undesirable characteristics of the higher moments of a distribution.

But Okun's strong emphasis on custom, and on past practices that have come to be considered usual and fair, strongly suggests to me that, according to him, more is involved here than the risk aversion compatible with the usual probability-utility axioms. One arrives at the same conclusion when reading Hicks. They have their way of describing the additional factor shaping this risk aversion. Let me say a word about my way of looking at it. Basically, the question here is how to interpret the concept of rationality.

One must recognize that it is often too costly, or even literally impossible,

to structure a problem involving probabilities in such a way as to derive probability judgments for the payoffs from the probabilities assigned to clearly specified conditions (and conditions of conditions), and then to add together the weighted conditional probabilities so defined. Many decision problems remain ill-structured in the sense that one has little confidence that all conditions to which probabilities should have been assigned have indeed been accounted for, and this state of affairs does not lend itself to even rough subjective estimates of the variance that is thereby introduced into the final probability judgment. Also, the final probability judgment relating to the payoffs is apt to be more controversial among competent individuals the less well-structured a decision problem is in this sense.

In some of these situations it is very tempting to rely on a rule of thumb biased toward the status quo, in some sense of this term, and I see no reason for postulating that such behavior is generally “unintelligent” or tends toward worse long-run results than reliance on controversial personal probabilities—on hunches. This poses a problem of considerable interest for decision theory, and also for the theory of resource allocation and other branches of economic theory. To my way of thinking, Okun is calling attention to a specific aspect of this general problem. A quantitative appraisal of the problem’s significance for pricing practices will require more empirical research; the models sketched in Okun’s paper are intended to be merely illustrative, and they perform this function effectively. Inflation makes it impossible to follow various customary practices that have been preferred on both sides of a good many markets, though the evaluation of these practices from a general economic point of view raises as yet unresolved questions.

Second, turning to the inflation problem more generally, I will note that both Okun and Hicks are removing from the Keynesian system the justification for inflation that is incorporated in Keynes’ concept of involuntary unemployment (adapted to the growth context by Tobin). There the justification is provided by postulating that rising prices bring real wage rates to their equilibrium level. Okun’s analysis suggests to me that he is rightly skeptical about this hypothesis—certainly about building policy on it. Hicks, too, expressed his doubts about the real-wage equilibrating effect of inflation.

I don’t see any other convincing case for net benefits from a rising general price level. The remaining arguments seem to me clearly too weak to offset the generally shared grave misgivings about the destabilizing effects of in-

flation. One must therefore conclude that from about 1965 on inflation has resulted either from the mistaken *unwillingness* of demand-management policymakers to observe constraints set by price-level objectives, or by the *inability* of a policy aiming for price stability to achieve it and to avoid the unintended result of underutilization of capacity combined with inflation. The data for 1951–65 disclose neither a mistaken unwillingness to be guided by price-stability constraints nor lack of success in this effort. The more recent record is different.

Given the 1965–74 record, the problem, as I see it, is to condition the markets anew to price-level objectives of policymakers, as the only way to avoid disturbances from large unexpected movements of prices. In my appraisal, a gradual return to price *stability* is the appropriate target, and Okun's analysis strengthens this belief. Even the dissenters should agree that demand policies can be successful only if they have *some* credible target for prices. The reason is that price expectations must become grounded at a point lying outside the area of the expectational system itself.

Third, a demand-management policy to which price expectations become conditioned can be employment oriented only within the limits compatible with a price constraint. Such a policy cannot promise the achievement of specified unemployment-rate targets. The policy would have to be supplemented by workable arrangements involving de facto subsistence guarantees, and, to be successful, arrangements of this sort need to satisfy a number of specific conditions. But this is the best chance we have, because the attempt to hit low unemployment rates by means of inflation is doomed to failure and direct price and wage controls would not solve our difficulties. By now the truly controversial question relates less to the dangers of inflation than to attitudes about controls. This, too, is reflected in Okun's paper.

Okun is certainly no believer in comprehensive control programs, but I have strong misgivings also about benign methods of administering limited wage and price controls, including the acceptance of governmental responsibility for specific wage-price decisions in the form of guidepost policy, jawboning, and the like. Okun does not share these misgivings. In my appraisal, direct controls can achieve certain objectives only by reliance on the police power—and then only at the expense of other important objectives. Trying to be “nice” about the administration of such a program makes the regulations largely ineffective and their incidence entirely haphazard. The main result of this ineffectiveness and of the hit-or-miss exercise of governmental powers is demoralization in a no-man's land. Judging

by the policy conclusions Okun derives from his analysis, what he and I see differently is the *magnitude* of this risk, which to me seems very great.

**Michael Wachter:** Okun's paper is very much in the spirit of his earlier paper, "Upward Mobility in a High-Pressure Economy" (*BPEA, 1:1973*), and represents an important extension of the ideas explored there. Here Okun addresses two issues—the mechanics and the welfare costs of inflation—and applies his model to see its implications for these problems. I think that the paper makes considerable progress on both issues, and provides a very useful framework for understanding the institutional economic environment in which inflation takes place. In particular, it is a neoclassical model that does not rely on the job-search imagery. My disagreements with the paper are generally confined to a few of the inferences that Okun draws from his model. In these cases Okun strays from what I believe to be the (deceptively) strong neoclassical conclusions inherent in his model.

The model is based on two sectors: a customer-market sector and an auction-market sector. A particularly strong point is Okun's systematic description of the nature of these polar market types and their likely impact on inflation. First, the existence of customer markets creates long lags between inflation and its determinants. Although Okun uses the terminology "costs of information" to refer to the basis of the lagged response, he differentiates his approach from the job-search school. I would argue, however, that this terminology can be seriously misleading. In the job-search school, "costs of information" refers to the costs workers and employers (buyers and sellers) incur largely in learning about the current distribution of prices, wages, employment opportunities, and so on. Long lags are most unlikely to arise in this situation; indeed, these informational problems may characterize the rapidly responding auction markets of the Okun model. The lags in the customer markets arise in an institutional setting. Buyers and sellers do have informational problems in understanding their current environment, but the real issue is that they are maximizing long-run profits (or wages and so on) in a world of ongoing relationships among the economic actors. Factors such as customer loyalty, specific training of workers and their upgrading along promotion ladders, and the prevalence of contractual obligations (explicit and implicit) suggest that the real problem is that the future—rather than the present—is unknown. The absence of futures markets that would enable economic agents to hedge against most changes in prices and wages and in performance levels of workers and firms is not accidental. Theoretically, of course, it could all be done by

futures markets; empirically, it cannot—the possible future states of the world are too numerous and complicated. In this sense, it is the institutional arrangements of the customer markets and not costs of information that account for the sluggish response of inflation (as well as any number of other variables). My disagreement with Okun here is not merely terminological, but it is only a matter of degree: I would place more weight on the inability to forecast or to hedge against future developments in an economy in which ongoing relationships are prevalent.

Okun's second major point is that inflation has large welfare costs because it impinges on the workings of these long-run relationships in the customer markets. In this argument, I believe that he is directly on target. I wonder whether this new paper implies a shift in Okun's own utility-function tradeoff between inflation and unemployment. In the world of customer markets there is no such thing as a pure inflation. Institutional arrangements can be altered to meet new problems, but the transition can be exceedingly long and difficult. Furthermore, no evidence suggests that there are "inflation-neutral" methods of institutional change. And even if they exist, it is impossible to predict that they will be adopted, given the lack of a theory of institutional change. Of course, the quantitative importance of this problem is not easily measured, so that its impact on the neutrality-of-inflation story cannot be assessed.

An important and valuable aspect of Okun's work has been to divert concern with the problem of institutional lags away from oligopolies and unions and toward broader concepts such as customer markets. In this manner the model focuses on the desire of firms to deal with promotion ladders, quits, and turnover costs, rather than union contracts. This construct suffers from the uncertain definition of its boundaries, and there is a related unresolved problem of endogeneity. Whereas the union and oligopoly sectors are identifiable and there are even some theories about why they arise, the same cannot be said (at least to the same extent) for the customer-market sectors. For example, what industries develop into customer markets and why? And what characteristics are customer markets likely to have—which party bears the risks of rigid price arrangements, the costs of training workers, and the like? This is an important gap in the analysis, although one certainly cannot fault Okun for not solving it all in one paper.

In Okun's model, customer markets are not spread randomly across the economy. Rather, the complicated arrangements of these markets develop as an (internal market) efficiency response to what would be externalities in

the auction market.<sup>1</sup> Clearly, microeconomics and profit-maximizing behavior are relevant in this world. I am reluctant to argue that all institutional arrangements, along the customer-auction continuum, are in equilibrium in the third quarter of 1975; but the role of efficiency makes me cautious about suggesting changes in these arrangements until I know where the inefficiencies are located. It is on this point, for example, that I would criticize Okun's suggestions on the usefulness of wage and price controls. He argues that wages are heavily influenced, and prices somewhat influenced, by some criterion of "fairness" in customer markets. Undoubtedly, he is correct, but one must exercise care in interpreting what fairness means.

"Fair" wage (and price) differentials do not imply differentials that arise largely by chance, play a small allocative role, or respond easily to government manipulation. This problem is made all the more difficult by the cyclical variations of these differentials as a consequence of the different lengths of the planning period of the relevant firms. As a result, the government cannot observe and then enforce equilibrium differentials. Beyond this is the enforcement problem posed by the sheer number of wages and prices to be supervised. Hence, I interpret the Okun customer-auction model as making an incomes policy less rather than more attractive. Wages can always be controlled by the government, but the social and economic costs may be high in the customer markets.

In any case, to the extent that controls are adopted, they need not be economy-wide. As I have argued elsewhere, an analysis of wage differentials makes it clear that cost-push inflation, to the extent that it currently exists, is heavily concentrated in the construction and governmental sectors.<sup>2</sup> The wage differentials in these two sectors have shown a secular rise that far outmatches changes in other sectors over recent years. The wage problems in these sectors, however, do not arise specifically because they are customer markets. Rather, inappropriate government policy seems to be the source of the inflationary bias. Consequently, overall economy-wide controls are not needed; instead, structural changes in these two markets could go far in reducing cost-push factors. Concentrating control efforts in the offending sectors also has the merit of easing the enforcement problem. Unfortunately, such a simple solution seems to be politically unattractive.

1. The efficiency role of internal labor markets is a primary argument in my paper, "Primary and Secondary Labor Markets: A Critique of the Dual Approach," *BPEA*, 3:1974, pp. 637-80.

2. This argument is documented further by Robert Hall's paper in this issue.

I would also argue with Okun's conjecture that customer markets have an inflationary bias. It may very well be that there are significant institutional rigidities to falling wage levels (but much less so to prices), so that customer markets may be prone to wage inflation at very low rates of inflation. On the other hand, I see no reason why customer markets should impart a significant upward drift to inflation rates that are not close to the zero level. In particular, the U.S. economy has had little experience with wage drift (or overfulfillment of contracts), and increasing union-wage premiums have been limited largely to the construction and municipal sectors. I believe that the inflation problem of customer markets is more closely related to the timing of discrete wage and price changes than to a secular upward bias. My guess is that the current price increases in steel and aluminum are examples of just this point.

I found the section on assets and interest rates too brief for such a difficult question. This topic alone could be the subject of a separate paper. In any case, I do not follow Okun's quick jump to the conclusion that the mixed world of customer and auction markets discriminates against the "typical" household—that is, favors the "sharpies" over the "suckers." Empirically, the literature on the redistributive effects of inflation argues strongly against a systematic bias in favor of the wealthy. Okun's discussion of the reaction of businessmen to inflation is more in the spirit of his argument. Institutional rigidities make it difficult for firms to adjust to a change in the rate of inflation even when the new rate is equal to the rate they estimated. Hence, in a mixed world of rapidly and slowly adjusting markets, inflation generates considerable real effects. These effects cannot be anticipated, however, in large part because they depend upon underlying secular changes in relative prices (or product demands) that may be taking place as well as because not all customer markets adjust slowly all of the time. When contracts come due or when new commitments are made, the relevant customer markets adjust rapidly. The result—and this is a central point—is that the real effects of inflation generate a great deal of uncertainty.

A few small points: First, Okun doubts that increasing transfers to the unemployed contribute to an increase in the noninflationary unemployment rate, but he subsequently argues that layoffs from the customer sector are not as painful because of transfer income. Although this is not necessarily a contradiction, I would argue that the (relative) increase in transfer income is likely to have the former as well as the latter effect.

Second, Okun argues that wages essentially follow some combination of prices and other wages, but are largely independent of aggregate demand. Indeed, even the reduced-form relationship between prices and past and current wages is unstable over time and across countries. Although the underlying mechanism is quite different, by adopting this approach Okun is utilizing the Keynes-Weintraub type of model, in which wages are exogenous. This strong exogeneity argument is, in a sense, a natural-rate theory of the rate of wage inflation. It is even more pessimistic than the Lucas-Sargent models in that they hold out the hope that at least the reduced-form, autoregressive structure will be useful for prediction purposes. In a paper on the responsiveness of wages to inflation for the next Brookings panel, I come to a different conclusion about the exogeneity of wage inflation. The type of model that involves a fixed planning period, based on institutional rigidities, modifies the rational-expectations results. Essentially, the institutional rigidities allow the system to appear to be “irrational” for at least the length of the planning period. Hence, the Sargent statistical exogeneity conditions may hold, but they are relevant only over the longer time horizon. For quarterly or even yearly models, the empirical relationships may still be more systematic than a moving-average, autocorrelated structure. Consequently, even if one adopts a rational-expectations framework, plenty of room remains for aggregate unemployment—especially if it can be properly measured—to influence wage inflation.

To summarize, the Okun paper is an important statement of the inflation mechanism and its resulting welfare costs. The major factor is that institutional arrangements that are currently based on zero, or close to zero, inflation have been strained and are being forced to change. In today’s economy, *even if inflation is correctly anticipated*, there remain institutional and contractual rigidities that prevent economic actors from adjusting to inflation and consequently that imply that continuing inflation will impose real effects on the economy.

### General Discussion

William Nordhaus began the critique of “customer markets” by agreeing with the author that many firms and industries adjust to changes in demand primarily by varying quantities rather than prices. That fact needs a theo-



retical explanation; and while Nordhaus felt that he had not seen a convincing one elsewhere, he did not find Okun's persuasive either. Basically, the amendment of the paper to the Phelps-Winter model makes the proportion of customers who go shopping change discretely in response to even an infinitesimal price increase by the supplier. To Nordhaus, that was not an adequate rationale for the stickiness of prices in response to shifts of demand. The main difficulty was that he was not persuaded that the information tickets had sufficient value to consumers to make them a quantitatively significant phenomenon. Richard Cooper pursued the issue of the value of information tickets. On the one hand, he was impressed by the information costs involved in obtaining services from new suppliers when one moved cross-country, for example. That indicated that the bilateral rents shared by cooperating suppliers and customers could be quantitatively important. On the other hand, if those search costs are high and the quasi-rents substantial, Cooper thought that one should expect well-organized markets for consumer information that would attempt, in effect, to supply Okun's information tickets at a lower cost.

William Poole felt that the customer-supplier relationship had to rest on the confidence of the buyer in obtaining the lowest relative price of a product rather than the most stable absolute price. If the buyer has confidence that some discount house consistently charges favorable prices, he will accept rises in their price tags, still feeling that the prices are lower than at competing retailers.

Robert Hall argued that the cyclical constancy of markups could be reconciled with the classical theory of price determination as long as supply is highly elastic, average costs are thus flat, and capital is a mobile factor that earns a rental price. In response to a question from Okun, Hall agreed that the output of any particular firm would be indeterminate under those circumstances. On a related point, Robert J. Gordon remarked that the absence of market-clearing arrangements did not necessarily stem from information costs or customer relationships, but rather might reflect low short-run price elasticities of demand. In effect, the hotel owner may not act as an auctioneer simply because he doubts that he could fill the rooms on some days even at a very low price. The classical theory of derived demand could explain such short-run inelasticity for many kinds of products and services, *without* invoking Okun's particular rationale.

The strength and potentialities of the customer-product model were stressed by some of the discussants. Charles Holt felt that this conceptual

approach would stimulate other researchers to do additional fruitful work. He suggested that economists might learn more about these issues from an extensive body of literature in the marketing field that discussed techniques of developing customer relationships and establishing brand loyalty. Holt saw important alternatives for public policy in attempting to improve the structure of markets or to intervene in the existing structure so as to make it function better. He urged thorough exploration of the possibilities of using taxes and subsidies to discourage excessive wage and price increases, to encourage the expansion of production, and otherwise to elicit microeconomic behavior with favorable macroeconomic effects. R. A. Gordon approved of the introduction of the concept of fair play and similar long-run interpersonal considerations into the analysis of pricing, as recognition of an important kind of rationality that was generally ignored in neoclassical general-equilibrium theory. He also expressed his support for the kinds of novel policy approaches that Okun had espoused. In Walter Salant's judgment, the paper provided the best explanation to date of some important facts about price-quantity interactions that have been empirically well established but have often been analytically ignored or rejected because no theoretical framework was offered to explain them.

In contrast to his reservations about the customer-product market, R. J. Gordon felt that the analysis of career labor markets was on the "right track." He suggested a number of other avenues that might be explored, like the inherent logic of seniority rules and the way they tend to encourage layoffs in preference to wage reductions in a recession. Gordon was encouraged by a growing body of literature developing the concept of implicit contracts in labor markets. Hall, on the other hand, doubted that specific human capital was of sufficient importance to explain very much about wage rigidity. He agreed that the existence of specific human capital created a zone of indeterminacy in wages; hence, wage rates might not respond to changes in labor-market tightness, as long as they remained within the altered zone. However, he parted company with Okun on the empirical significance of specific capital and hence on the size of the zone of indeterminacy. Hall pointed to the extremely high interfirm mobility of certain types of craft workers like lithographers; they must have essentially no firm-specific capital. He also suggested that, if problems of internal wage structure deterred existing firms from taking advantage of a very weak labor market by reducing wages, one would expect the accelerated establishment of new firms.

A number of participants took issue with Okun's rejection of steady

inflation as a target for public policy. Robert Solow contended that, even in a world of customer markets, the major costs of inflation lay in the irregularity and unevenness of the rate of price increase. He saw no compelling reason why the relative irregularity around a positive inflation trend should be greater than that around a horizontal trend. Moreover, the customer need only believe that his preferred seller quotes prices in the right general range, not that they be constant. In short, while smooth inflation is admittedly impossible, so is smooth price stability. R. J. Gordon noted that a cost-benefit calculation was necessary to establish whether, once the inflation rate reached 6 percent, it was better to try to beat the rate back down to zero or to try to maintain the prevailing rate as smoothly as possible thereafter. William Fellner supported the verdict of the paper; in his view, to accept an inflation trend just because it had in fact developed entailed a posture for public policy that lacked credibility. James Pierce, on the other hand, argued that a target of zero or near-zero inflation had a tremendous dispersion in one direction and therefore might create more uncertainty for the public than a target from which deviations were likely to be more symmetrical. Pierce interpreted recent developments in financial markets—such as floating-rate notes and money-market funds—as evidence of greater adaptability to inflation than Okun had suggested.

Michael Lovell commented that the “refixing of arrangements” that inflation necessitated, according to Hicks and Okun, was not necessarily bad. By shaking up conventions that contribute to price rigidity, inflation might contribute to economic efficiency by facilitating the realignment of *relative* prices.

Okun responded to a number of the comments. In response to Nordhaus, he defended the discontinuity in the shopping function, arguing that some change in price is qualitatively different from no change in price, particularly insofar as it could affect the confidence of the customer that today’s price would be maintained tomorrow. Agreeing with Fellner on the need for credible price-level objectives, he contended that price expectations must depend on the government’s policies toward grain exports and energy as well as on monetary and fiscal policy. He reiterated that conventional wage and price controls stood low in his ranking of potential solutions; he shared Holt’s sympathy for techniques that might use the price system to deal with macroeconomic externalities. More generally, Okun urged the need for professional brainstorming to develop socially and politically acceptable mechanisms that could help to dislodge inflation while reducing the required sacrifices of output and employment.