

# FEDERAL RESERVE BANK OF ST. LOUIS

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# REVIEW



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# Inventory Investment in the Recent Recession and Recovery

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**T**HE behavior of inventory investment since the beginning of the 1973-75 recession has been a dominant concern of economic analysts. Initially, this concern was motivated by a recognition that a relationship between inventory investment and changes in total output and employment has been one of the most pronounced regularities of the business cycle. This relationship appears to be such a dominant factor in previous postwar recessions that they have been referred to as "inventory recessions."<sup>1</sup> Consequently, inventory behavior is watched closely as at least a potential indicator of prospective changes in output and employment. More recently, attention has been focused upon the 1976 "pause" in economic growth. One of the principal hypotheses purporting to explain this situation relies heavily upon inventory investment behavior.

The 1973-75 recession was the longest and most severe in postwar experience. Its causes, at least initially, were unique.<sup>2</sup> The behavior of inventory investment during the recession, while deceptively similar to that of prior recessions, was also unique. Inventory investment declined sharply during the recession, but it remained much higher than prior experience would indicate. This deviation from prior experience has had a very significant impact on inven-

tory investment, economic activity, and the views of policy-makers in the first two years of recovery and expansion.

## INVENTORIES AND ECONOMIC ACTIVITY

Inventories consist of raw materials, work-in-progress, and finished goods. There are many reasons for holding items in inventory, such as the cost and availability of goods required in the production process, the length and flexibility of the production period, and the variability of market demand. The basic motives may be summarized as transactions, precautionary, or speculative motives.

Firms tend to hold some inventories simply to be able to meet their expected levels of sales. It is usually cheaper to acquire large lots of raw material and finished goods and hold them than to acquire raw materials as they are used, or to produce goods as they are sold. Moreover, the length of time involved in a production process requires an amount of work-in-progress inventories which is directly related to the production rate. This transaction motive is based upon the requirements of daily activity and the inability to match receipts of intermediate goods and production with sales.

The precautionary motive leads firms to hold buffer stocks of inventory. This motive is based upon the risk of fluctuations in sales. Unexpected increases or decreases in sales may be met by either changing production rates or varying inventory levels. Since the costs of varying production rates can be large, firms often choose to hold a buffer stock.

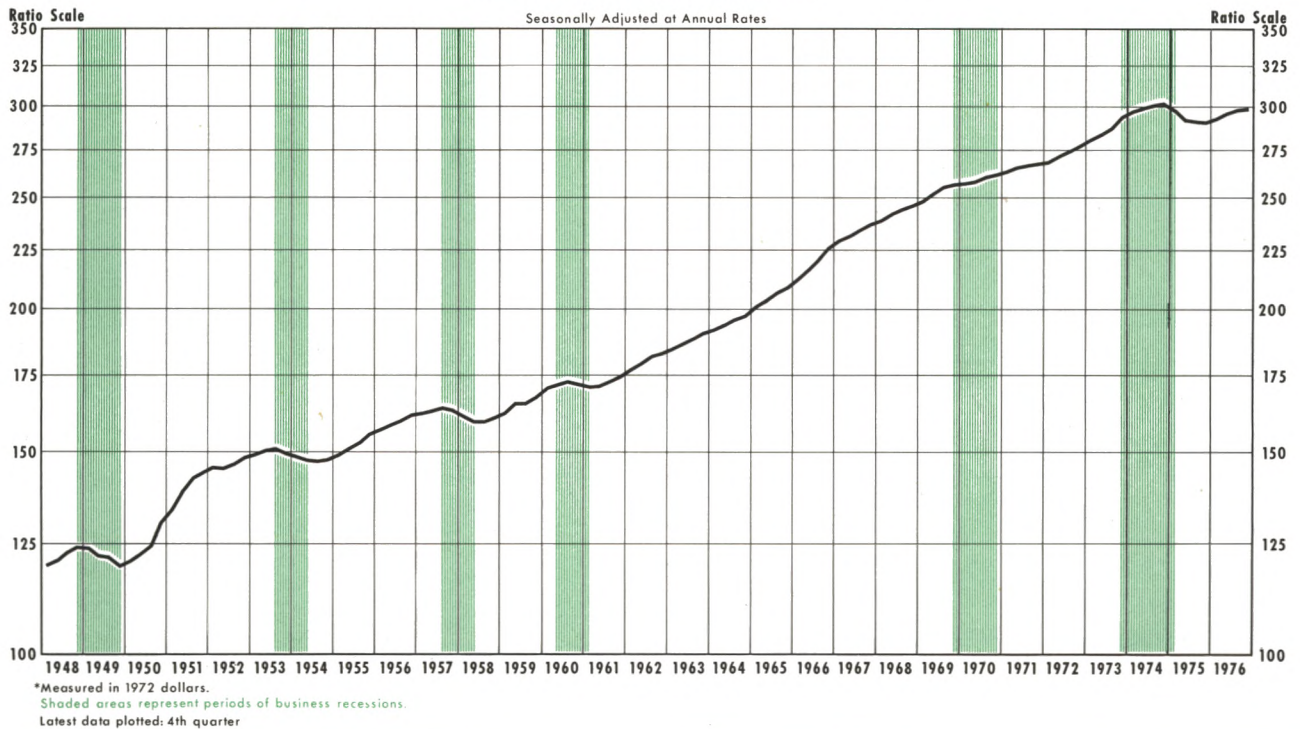
The speculative motive for inventory holding rests upon the possibility of capital gains or future "shortages" of raw materials. Firms may gain by buying raw materials ahead of increases in their prices or holding

<sup>1</sup>See for example, Michael K. Evans, *Macroeconomic Activity: Theory, Forecasting and Control: An Econometric Approach* (New York: Harper & Row, Publishers, 1969), p. 201; Thomas F. Demburg and Duncan M. McDougall, *Macroeconomics: The Measurement, Analysis, and Control of Aggregate Economic Activity*, 4th ed. (New York: McGraw-Hill Book Company, 1972), p. 367; or Paul W. McCracken, "Are the Gray Clouds Clearing?", *Economic Outlook USA* (Spring 1974), p. 1-3.

<sup>2</sup>The causes of the recent recession have been examined by many analysts including Gardner Ackley, "Two-Stage Recession and Inflation, 1973-1975," *Economic Outlook USA* (Winter 1975), pp. 6-7; Denis S. Kamosky, "Another Recession, But Different," this *Review* (December 1974); pp. 15-18; Norman N. Bowsher, "Two Stages to the Current Recession," this *Review* (June 1975), pp. 2-8; and Arthur M. Okun, "A Postmortem of the 1974 Recession," *Brookings Papers on Economic Activity* (1:1975), pp. 207-21.



Chart I  
Stock of Business Inventories\*



their product for future price appreciation. This type of inventory holding does not appear to be different from a precautionary motive, but it remains typical of the literature to distinguish this motive.<sup>3</sup>

It is impossible to identify the proportions of inventory held for each reason, but the motives are suggestive of the economic forces which determine the stock of inventory for the firm or the economy. The single most important factor influencing the demand for a stock of inventory is probably the expected sales rate. A larger rate of sales tends to require a larger stock of inventory. For example, the stock of business inventory in constant (1972) prices, shown in Chart I, has equaled 22 to 25 percent of real GNP since 1948. An increase in expected sales leads firms to engage in positive spending for inventories or inventory investment. If the expected growth of sales slows, firms tend to slow inventory investment. When sales are expected to decline, inventory stocks would tend to become excessive so that negative inventory investment, or disinvestment, may occur.

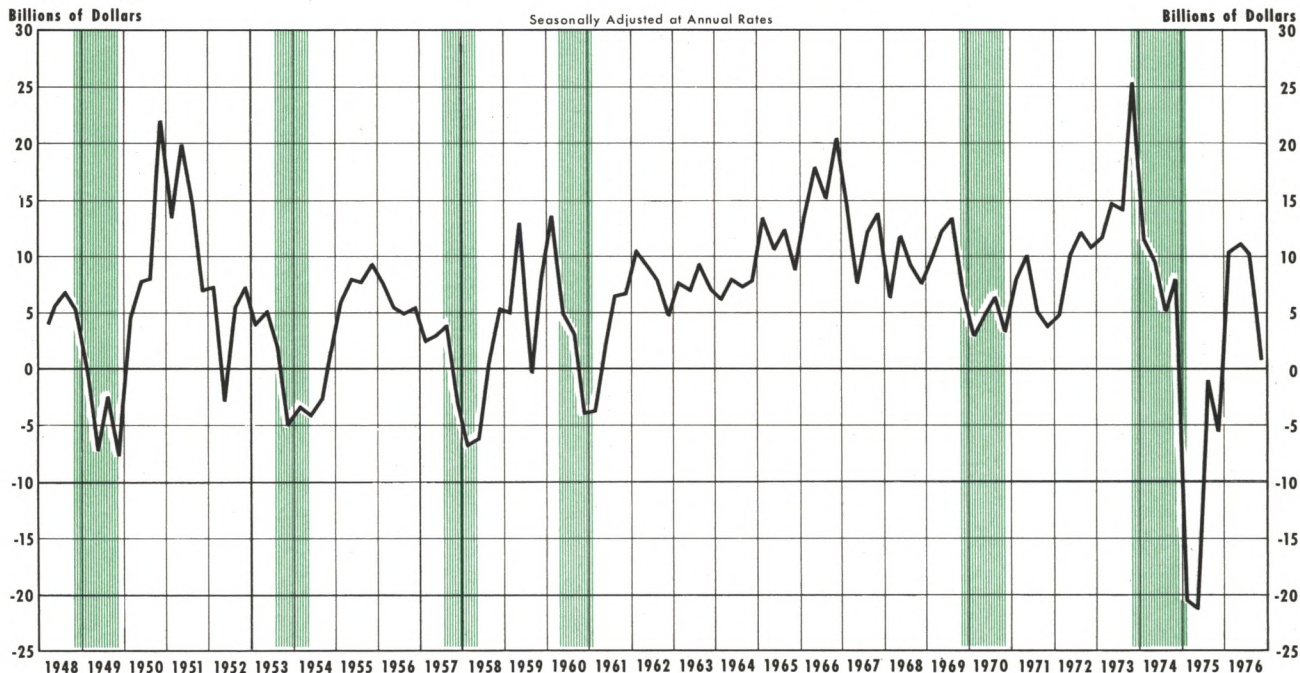
<sup>3</sup>See, for example, Evans, *Macroeconomic Activity*, p. 203. Evans also includes a backlog of demand as a reason for holding larger inventories.

Inventory investment, shown in Chart II, is a small component of production of final goods and services (GNP). For example, the largest postwar rate of inventory investment occurred in the fourth quarter of 1973 when it equaled \$25.4 billion (1972 dollars) at an annual rate, or about 2 percent of real gross national product. However, inventory investment is quite erratic, and changes in the rate of inventory investment can be quite large relative to changes in production rates, especially during recessions.

The sharpest swings in inventory investment and the largest positive or negative rates of investment have occurred since 1973. Quarterly rates of inventory investment over this volatile period (IV/1973 — IV/1976) are presented in Table I. After reaching its largest postwar rate in the first quarter of the recession, inventory investment declined. During the last quarter of the recession (I/1975), inventory investment became negative as firms depleted inventory stocks at an annual rate of \$20.5 billion. Through the first three quarters of the recovery, inventory stocks continued to decline, although at slower annual rates. Inventory investment resumed in 1976 at a fairly steady annual rate of about \$10 billion until the last quarter when it fell to about \$1 billion.



Chart II  
Actual Real Inventory Investment\*



\*Measured in 1972 dollars.  
Shaded areas represent periods of business recessions.  
Latest data plotted: 4th quarter

### THE ROLE OF INVENTORY INVESTMENT IN POSTWAR RECESSIONS

To some extent, the sharp decline in the rate of inventory investment during the recent recession was to be expected. Inventory investment had declined sharply in the five previous postwar recessions. Indeed, a major share of the decline in national output

during these recessions has been reflected in declines in production for inventory stocks. This is a major sense in which postwar recessions are said to be "inventory recessions."

The importance of inventory investment during recessions is reflected in the ratio of changes in inventory investment to changes in real GNP. As shown in Chart III, this ratio is usually quite small. However, there are a few quarters, primarily during recessions, when the change in inventory investment is greater than the total change in production. If output falls during such a quarter, production for inventory stock falls more, and other components—such as consumption, other types of investment, government purchases and net exports— increase. Most of the extremely high levels of the ratio of changes in inventory investment to output fluctuations occurred during recessions.

In Table II the decline in real GNP and real inventory investment, from the peak to the trough quarter, is shown for each of the six postwar recessions. In two postwar recessions the decline in the production rate was greatly exceeded by the drop in inventory investment. In three others, including the most recent

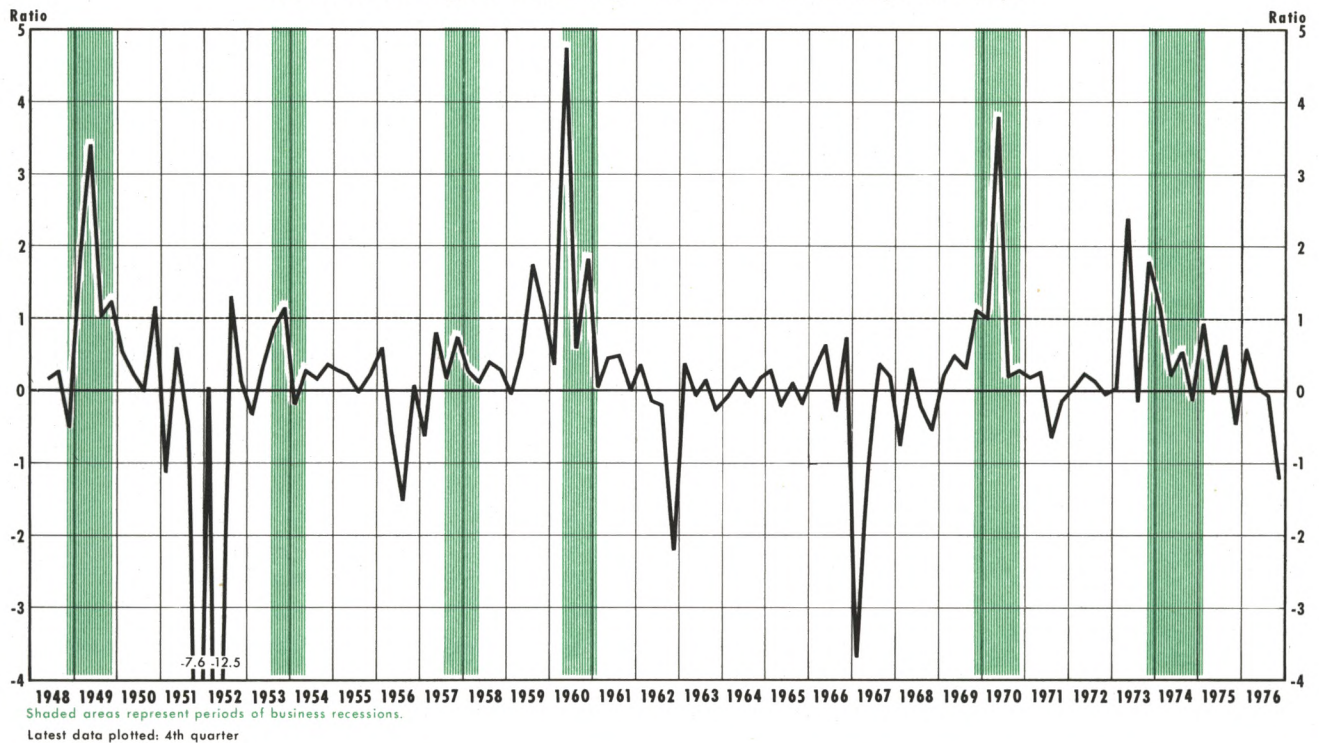
Table I

#### Real Inventory Investment (Constant 1972 Dollars)

Quarters	Inventory Investment
IV/1973	\$25.4
I/1974	11.4
II/1974	9.4
III/1974	5.1
IV/1974	8.0
I/1975	-20.5
II/1975	-21.2
III/1975	- 1.0
IV/1975	- 5.5
I/1976	10.4
II/1976	11.1
III/1976	10.2
IV/1976	0.9



Chart III  
Ratio of Change in Inventory Investment to Change in Output



recession, the decline in the rate of inventory accumulation was about 57 percent of the decline in production. Even in the 1953-54 recession, about 36 percent of the decline in output reflected a decline in the rate of inventory investment.<sup>4</sup>

However, the notion of an inventory recession involves more than the relative size of fluctuations in inventory investment and real GNP. The more general concept of an inventory cycle, of which an inventory recession is only one stage, implies a specific sequence of changes in inventory investment before, during, and after recessions.<sup>5</sup>

<sup>4</sup>These figures may understate the role of inventory investment during recessions. For example, in the first two quarters of the 1953-54 recession, real output declined \$9.8 billion while inventory investment declined \$10.1 billion.

<sup>5</sup>The first major theoretical attempt to explain inventory investment and the inventory cycle in terms of a relationship between desired inventory investment and changes in the level of sales is L. A. Metzler, "The Nature and Stability of Inventory Cycles," *Review of Economic Statistics* (August 1941), pp. 113-29. A simple explanation and numerical illustration of the inventory cycle may be found in many textbooks, including Dernburg and McDougall, *Macroeconomics*, pp. 367-69. A good discussion of the inventory investment models spawned by Metzler's work may be found in Evans, *Macroeconomic Activity*, pp. 201-20.

### The Inventory Cycle Theory

An inventory cycle is a pattern of systematic fluctuations in economic activity associated with inventory adjustments. These adjustments are alleged to arise because the desired level of inventory stocks is related to the expected sales rate. Consequently, changes in expected sales affect inventory investment. Moreover, changes in demand for inventory investment also influence actual and expected sales. In this theory, such changes in investment spending are believed to affect output and employment.

Table II

Peak to Trough Changes in Real Inventory Investment and Real GNP in Postwar Recessions

Recession	Decline in Real Inventory Investment (Billions)	Decline in Real GNP (Billions)	Decline in Investment as a Percent of Decline in GNP
	(1)	(2)	$[(1)/(2) \times 100]$
1948-49	\$-13.0	\$- 4.7	276.60%
1953-54	- 6.0	-16.8	35.7
1957-58	- 9.9	-17.4	56.9
1960-61	- 8.7	- 2.3	378.3
1969-70	- 3.5	- 6.1	57.4
1973-75	-45.9	-81.5	56.3



The following is a scenario of how an inventory cycle might occur. Some unexpected exogenous force increases aggregate spending and stimulates a corresponding change in production and employment. Firms, reacting to their new sales, attempt to change their inventory levels in the same direction through inventory investment. Thus, further changes in total spending, income and employment tend to occur. As inventory approaches its desired level, firms reduce their rate of spending on inventories causing aggregate demand and output growth to slow. The slowing of output growth is reinforced since it leads to a further slowing of inventory investment. The reduction in inventory investment brings sales and income growth to a halt at the cyclical peak. As inventory investment declines further, the economy enters a recession and firms may actually attempt to meet sales by selling off inventory stocks. Inventory stocks fall relative to sales so firms reach a point where inventory replacement is necessary, even to maintain the low recessionary sales rate. Inventory restocking increases demand for goods and services and provides the stimulus for a recovery and the ensuing expansion.

Two basic observations about recessions emerge from an inventory cycle theory. The first is that inventory investment declines before and during the early stages of such a recession, and often becomes negative before beginning to recover. Second, inventory investment tends to recover before the end of a recession. The pattern of inventory investment in the first five postwar recession and recovery periods shown in Chart II conforms to these relationships.<sup>6</sup> In the first four postwar recessions, inventory investment declined before and during the recession, reached a negative rate, and recovered before the end of the recession. In the fifth recession, 1969-70, inventory investment recovered before it reached a negative rate. In this case, the rate of growth of inventory stocks slowed, but firms did not actually reduce inventory stocks as they had in the prior recessions.<sup>7</sup>

<sup>6</sup>This pattern does not demonstrate that these recessions were "inventory recessions." It does lend support to the importance of the link between changes in expected sales and inventory investment. This link and a monetary theory of recessions yield the same pattern of inventory investment in recessions and recoveries as that indicated by the inventory cycle theory.

<sup>7</sup>Barry Bosworth, "Analyzing Inventory Investment," *Brookings Papers on Economic Activity* (2:1970), pp. 207-27, argues that "an inventory cycle is not an adequate frame of reference" for economic developments in the 1969-71 period. Most of the argument rests upon the failure of inventory investment to become negative during the recession although this is not unusual in light of the extent of the decline in real output. A pattern of inventory behavior in the 1969-70 period similar to that in prior recessions may not have been evident from the preliminary data available in 1970.

Table III

## A Simple Inventory Investment Model

$$\text{Model: } I_t = \alpha + \beta (\text{GNP}_t - \text{GNP}_{t-1}) + \varepsilon_t$$

where  $I_t$  = Constant Dollar Inventory Investment in Quarter  $t$

$\text{GNP}_t$  = Constant Dollar Gross National Product in Quarter  $t$

$\varepsilon_t$  = random variable

Sample period: I/1948-III/1973

$$I_t = 3.795 + .374 (\text{GNP}_t - \text{GNP}_{t-1})^*$$

(5.4275) (5.8513)

$$R^2 = .25 \quad \text{D.W.} = .71$$

$$\text{S.E.} = 5.229$$

\*Values in Parentheses are "t" statistics.

In the 1973-75 recession, inventory investment did not follow the pattern of a typical inventory cycle. Inventory investment did decline during the recent recession, but it did not decline *prior* to the onset of the recession. Instead, inventory investment rose sharply to its highest postwar rate during the first quarter of the recession. Moreover, inventory investment did not begin its recovery until the third quarter of 1975, two quarters *after* the recession trough and did not become positive until one year after the recession trough.

### Inventory Investment and Output Changes

Since the notion of an inventory recession follows from a relationship between inventory investment and sales, it is useful to examine the relevance of this relationship in the postwar period. This provides a standard against which we may compare the behavior of recent inventory investment. A simple illustration of the relationship between real inventory investment and *changes* in real output or spending (both at annual rates) is given in Table III for the period from 1948 through the third quarter of 1973.<sup>8</sup> While other important factors which influence inventory investment are omitted, the relationship captures the importance of sales growth inherent in the inventory cycle theory.<sup>9</sup>

<sup>8</sup>Changes in real GNP may not be the appropriate measure of sales, even for such a simple illustration. Several investigators have used different measures of aggregate sales. See, for example, the survey by Victor Zarnowitz, *Orders, Production, and Investment — a Cyclical and Structural Analysis* (New York: National Bureau of Economic Research, 1973), p. 352 and pp. 362-63; or Evans, *Macroeconomic Activity*, p. 217.

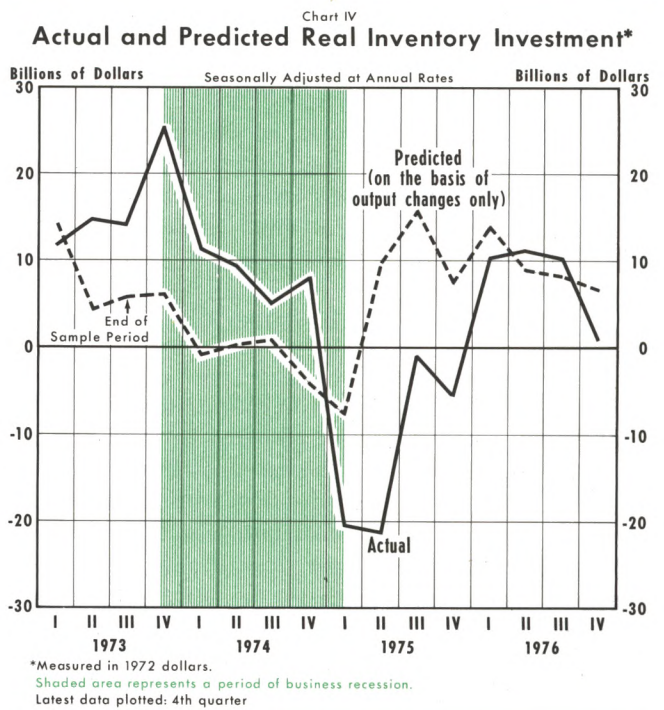
<sup>9</sup>Current changes in real output "explain" only 25 percent of inventory investment. Also, the statistics suggest that other important factors may have been ignored. Adjustment for this potential problem, however, does not alter the conclusions drawn from Chart IV.



The postwar inventory-output relationship in Table III implies the *predicted* inventory investment rates in Chart IV, based on output changes since 1973. The predicted pattern is very similar to the experience of previous recessions. However, the rates implied by this relationship are markedly different from the *actual* inventory investment behavior shown there. During the recession, actual inventory investment exceeded, by extremely large amounts, the rates implied by the postwar relationship. Beginning in the last quarter of the recession (I/1975) and continuing throughout the remainder of 1975, actual inventory investment was much smaller than the rates implied by the postwar relationship.

Other factors which affect inventory investment apparently dampened the severity of the recession by keeping inventory investment high.<sup>10</sup> "Shortages," the termination of price controls in 1973, high rates of inflation, and the fear of new price controls in 1974 probably pushed inventory investment above the levels normally desired on the basis of output growth alone. More importantly, firms apparently did not anticipate the recession, its length, or its severity, and were slow to lower production rates and inventory investment. By the end of the recession, its severity was more obvious and the excess inventory stock became apparent as well. Thus, the forces which dominated inventory investment during the recession also dominated and dampened the recovery so that throughout 1975, actual inventory investment was much lower than the simple investment-output relationship indicates.

The unusually high rates of inventory investment which apparently existed during most of the recession began in the second quarter of 1973. Accumulating the "excess" of actual investment over the amount predicted on the basis of output growth from the second quarter of 1973 yields \$19 billion of "excess" inventory stock by the end of 1974.<sup>11</sup> The large rates at which inventory stocks were depleted in the last quarter of the recession and throughout the remainder



of 1975 eliminated these "excess" inventories. Adding the amount by which actual investment fell short of that implied by the postwar inventory-output relationship yields a runoff of inventory stocks of about \$19 billion.<sup>12</sup> Thus, after the first year of recovery (I/1975 to I/1976) the errors have cancelled out, and the simple postwar relationship appears to hold as well as it did in the earlier period.

The behavior of inventory investment in the recent recession and recovery supports the view that firms accumulated excessive inventories (relative to output) in 1973 and that they continued to invest in excessive inventories until the end of the recession. Beginning in the last quarter of the recession and continuing through the first year of recovery, firms sold off the excess inventories, with aggregate inventory investment being negative throughout 1975.<sup>13</sup> The rates of inventory investment in 1976 were to be expected

<sup>10</sup>Okun, "A Postmortem," pp. 220-21, argues that forecasters would have predicted GNP better for the second half of 1974, if they had accounted for the inventory-output relationship and the inventory cycle. Using seriously erroneous predictions like those indicated in Chart IV for the second half of 1974, they would have lowered their GNP forecasts toward the actual results.

<sup>11</sup>Since the investment figures plotted in Chart IV are at annual rates, the actual addition to stocks in each quarter is one-fourth the indicated amount. Thus, excess inventory accumulation is one-fourth the amount by which each quarter's actual investment exceeds the quarter's estimated investment.

<sup>12</sup>The estimates of the excess and run-off of inventories are intended to illustrate the process which was present in 1973-75 and not the precise extent of the problem. The actual depletion of inventory stock from the fourth quarter of 1973 to the fourth quarter of 1974 was \$12 billion (see Chart I).

<sup>13</sup>This unusual behavior of inventory investment in 1975 is a major factor in explaining the unusual changes in bank asset portfolios during the first year of the recovery. See R. Alton Gilbert, "Bank Financing of the Recovery," this *Review* (July 1976), pp. 2-9.



as they were consistent with the moderate growth of sales experienced during the year.

### THE 1976 "PAUSE"

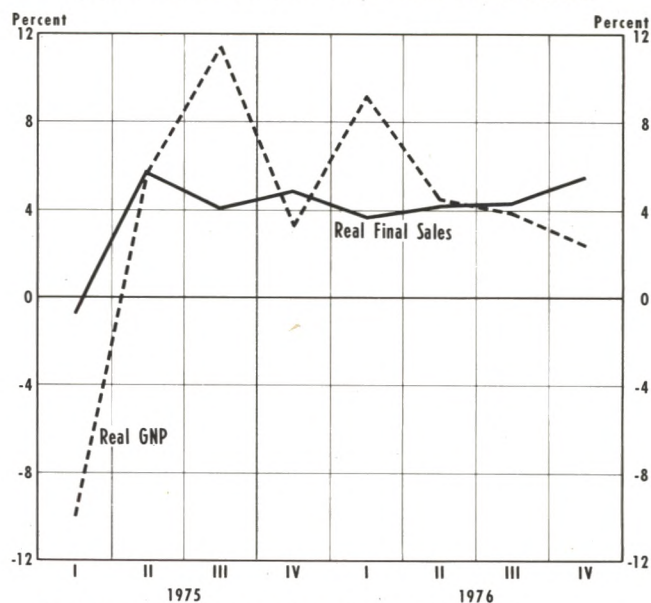
An explanation of a "pause" in a recovery in terms of the inventory cycle is that inventory is rebuilt by rapid production until firms reach a desired level of inventory stocks.<sup>14</sup> As the inventory stock approaches its desired level, production in excess of sales in order to rebuild inventory stocks is no longer necessary so that both production growth and inventory investment slow.

Real GNP growth slowed in 1976, from a 7.3 percent rate in the first year of recovery to a 4.2 percent annual rate during the second and third quarters of 1976. This was the pause which caused increasing concern in the second half of last year. However, inventory investment did not slow during the pause. Instead, it was higher than the negative rates which prevailed throughout 1975. Inventory investment was steadily maintained at its higher rate, hovering around \$10 to \$11 billion (constant dollars) through the first three quarters of 1976. Thus, the data are not consistent with the inventory cycle explanation of a pause.<sup>15</sup>

Nevertheless, there does appear to be a connection between inventory decisions and the slowdown in growth of total output. In two quarters during the first year of the recovery (III/1975 and I/1976), there were large increases in the rate of inventory investment. In each quarter, the increase in inventory investment was matched by a sharp rise in production. In the first case (III/1975), inventory investment rose \$20.2 billion, but remained negative. In the second instance (I/1976), inventory investment rose \$15.9 billion to a \$10.4 billion rate.

The distorting effects of changes in inventory investment on the pattern of the recovery may be seen in Chart V. Growth of real final sales (the difference between output and inventory investment) has been relatively constant since the trough in the first quarter of 1975. The growth rate of real GNP has been more

Chart V  
Growth in Real GNP and Real Final Sales\*



\*Growth refers to quarter-to-quarter compounded annual rates of change.  
Latest data plotted: 4th quarter

erratic. In the two quarters when inventory investment increased rapidly (III/1975 and I/1976), real GNP growth surged upward. These increases in inventory investment reflected the ending of the inventory stock depletion. The same rate of final sales required an increased rate of production, since firms were no longer willing to meet sales by depleting stocks.

The apparent slowdown in the rate of output growth after a year of recovery was the result of unusually high output growth in two quarters before the pause. These two surges in output growth were not due to changes in sustained forces affecting output growth. Instead, they were associated with once-and-for-all production changes required by the ending of the inventory adjustment. The rate of output growth during the period of the pause reflected the very steady moderate rate of growth of sales which has existed since the beginning of the recovery.

### CONCLUSION

The behavior of inventories in the recent recession and recovery reflects the fact that businesses, like many economists, under-anticipated the severity and length of the decline in output. While the inventory investment rate declined throughout the recession, it remained positive and large, by historical standards, up to the last quarter of the recession. After the recession

<sup>14</sup>The nature of the 1976 economic slowdown is discussed more fully by Neil A. Stevens and James E. Turley, "Economic Pause - Some Perspective and Interpretation," this *Review* (December 1976), pp. 2-7.

<sup>15</sup>It may be noted in Chart IV that the predicted inventory investment rate based upon the earlier postwar relationship in Table III follows the pattern described by the inventory cycle explanation of the pause. Following the relatively high rates of predicted inventory investment in 1975 and the first quarter of 1976, predicted investment declines from the first through the third quarter of 1976.



came to an end in early 1975, businesses continued to adjust to the "excessive" levels of inventory which they had accumulated. A net inventory run-off existed in all four quarters of 1975. To the extent that inventory adjustments cause production changes, it must be said that inventory investment played a role of moderating the decline in production and employment during the recession and moderating the first three quarters of the recovery.

As the inventory adjustment came to an end, large increases in production rates were necessary to meet moderately expanding sales. The aftermath of these

one-time adjustments in production rates in late 1975 and early 1976 was the apparent "pause" of 1976. During the first quarter of 1976, positive inventory investment was restored and continued at a steady rate consistent with the moderate real output growth experienced throughout most of 1976. Production growth and inventory investment slowed markedly in the fourth quarter of 1976 and, apparently, in the first quarter of this year. If the faster growth in final sales experienced in the fourth quarter of 1976 persists, as many observers expect, inventory investment is likely to be higher in the remainder of 1977 than it was in 1976.





# The Effects of Changes in Inflationary Expectations

RACHEL BALBACH

*The following paper was prepared while Rachel Balbach was a visiting scholar at the Federal Reserve Bank of St. Louis.*

**O**VER the past twenty years, abundant attention has been given, both in professional journals and in the popular press, to the wealth redistribution which occurs as a result of unanticipated inflation. Less widely known but equally detailed work has been done on the characteristics and allocative effects of perfectly anticipated inflation. There have been, however, few examinations of the effects of revisions in inflationary expectations and the adjustments which accompany them. It may be that this is due to the belief that such revisions take place extremely gradually, as was indicated by most empirical studies based on adaptive expectations hypotheses, so that their effects would be negligible in magnitude. More recent work suggests that this may not be the case. In particular, the theory of rational expectations implies that changes in inflationary anticipations occur much more rapidly in response to policy changes than was previously thought. If there is any validity in this view, it is worthwhile to investigate in detail the nature of the ensuing adjustments and their effects. If those effects are deemed to be undesirable, we can add yet another argument to those which have already been advanced against a monetary policy characterized by frequent changes in the rate of money growth.

Whether inflation itself redistributes wealth among net monetary debtors and creditors depends strictly upon whether it was correctly or incorrectly anticipated. The phenomenon is by its nature *ex post*, with any wealth effects which occur the result of *past* infla-

tion. This paper, addressing a very different question, argues that a change in inflationary expectations has its own wealth transfer effect. That redistribution occurs immediately as a result of a change in the expected rate of *future* inflation. Furthermore, it is of no consequence whether the new expected rate of price level increase turns out to have been right or wrong.

The adjustment to revised inflationary anticipations causes shifts in both the nominal rate of interest and the rate of return on existing real assets, affecting the relative prices of claims to fixed amounts of money and of nonmonetary assets according to their respective terms-to-maturity<sup>1</sup> and productive life expectancies. For example, an upward revision in the expected future rate of inflation will lead to a rise in the nominal rate and a decline in the real rate. This occurrence does in general accomplish a transfer of wealth from monetary creditors to their debtors, an

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<sup>1</sup>In the case of a bond which provides interest payments over the interval prior to maturity, there is a difference between its "duration" and term-to-maturity. It is the bond's duration which is the direct determinant of the effect of a change in the nominal interest rate on its present value. For this analysis, see Michael H. Hopewell and George G. Kaufman, "Bond Price Volatility and Term to Maturity: A Generalized Respecification," *American Economic Review* (September 1973), pp. 749-53, and Frederick R. Macauley, *Some Theoretical Problems Suggested by the Movements of Interest Rates, Bond Yields and Stock Prices in the United States Since 1856* (New York: National Bureau of Economic Research, 1938). In this paper, I use the two terms synonymously, implicitly assuming that all bonds are paid interest only at maturity.



effect superficially resembling that of unanticipated inflation. Unlike that situation, however, it is not necessary in this case that net monetary debtors (creditors) will gain (lose). What happens to the individual unit's wealth position depends on the time-dimension characteristics of the particular assets and liabilities on its balance sheet.

### Wealth Transfer Under Unanticipated Inflation

The term *inflation* refers to a fall in the value of money, or equivalently, a rise in the level of prices of real goods and services. Little, if any, consideration is given to the relative price changes which may be associated; usually, it is assumed that the prices of all such goods increase proportionately.<sup>2</sup> The only assets which do not share in this price rise are claims to fixed amounts of money, either immediately or in the future; these are termed monetary assets. Thus, when an unanticipated inflation occurs, those who have only real assets and liabilities, or whose money-fixed claims on others are just offset by monetary liabilities, are unaffected, since by definition their nominal wealth has changed in the same proportion as the price level. Since the inflation had not been expected, no provision had been made for the lowered exchange-value of the dollar, thus net monetary creditors, those whose monetary assets exceed monetary liabilities, have less wealth than they would in the absence of inflation. Their loss is reflected in the gains of net monetary debtors, whose nominal equity rises more than the price level.

The loss to creditors (and the gain to debtors) is the same whether the claims they hold are in the form of cash, 30-day notes or 30-year mortgages, since by definition an unanticipated inflation has not been adjusted for by a change in interest rates. Thus, if we

<sup>2</sup>Frequently, we encounter an insistence upon distinguishing between a "once-and-for-all" increase in the price level as opposed to a "continuous" or sustained rise, with the term inflation generally reserved for the latter. For the issues addressed here, that distinction is irrelevant; it is unnecessary to speak of continuous rates of inflation although we typically do so, perhaps as a convenient way of dealing with our ignorance of past or expected future time-paths of price change.

In the case of unanticipated inflation, the predicted wealth effects do not at all depend upon the time-path of the rise from one price level to another. Rather, they are a function of the fall in the value of money and of claims to fixed amounts of money in terms of real goods and services; no systematic, predictable changes in the relative prices of those goods are implied. Implicitly, the same assumption of constant relative prices is made in discussions of anticipated inflation. For this reason again, predicted wealth effects are due only to the higher cost of holding money.

should observe that, overnight or over the course of the past year, the price level *has* doubled, just as we find that the \$100 under the mattress still adds up to \$100, so does the bond of whatever maturity which had a market price of \$100 still maintain its nominal value, and the real wealth reduction associated with holding either comes strictly from the fact that its purchasing power has been halved. This is the case so long as we confine the analysis to that realized, unexpected inflation alone, without confounding its certain effect on wealth with any effect that observations of past changes in the price level may have on expectations for the future and so on interest rates. Nor does the age of the debt affect the size of the creditor's or debtor's wealth change. Rather, the gain or loss is strictly a matter of how long over the period of rising prices he holds monetary assets or owes monetary liabilities of whatever vintage.

### Wealth Transfer Due to Changes in Inflationary Expectations

An upward revision in expectations as to the *future* rate of inflation leads to a quite different set of events. Interest rates adjust, the makeup of portfolios is altered, and changes in the *relative prices* of assets in these portfolios cause wealth transfer. The process of adjustment involves a complex set of revisions which occur simultaneously. For the sake of clarity of exposition, however, we can assume that they take place in consecutive steps.

We can begin with the commonly cited Fisher effect which has been the basis for numerous estimates of inflationary expectations.<sup>3</sup> When the expected rate of price level change is zero, market forces insure that the nominal rate of interest on money-fixed obligations is equal to the rate of return on real investment, with appropriate adjustment for risk. If the expectation of price change is raised to some positive number, the expected real value of money-fixed future payments falls; that decline will be capitalized in the form of lower present values of existing claims. That is, the nominal rate of interest will rise to a level which is higher than the real rate by the amount of the expected rate of price increase, and is the relevant interest rate for old and new loans alike.

If we assume the rate of return on real assets to be unchanged, the lower market price of existing bonds

<sup>3</sup>Irving Fisher, *The Rate of Interest* (New York: The Macmillan Company, 1907), pp. 77-86 and 356-73.



makes the expected real yield to their holders equivalent to the real rate. The loss to bondholders and the gain to their debtors is realized immediately, and no further redistribution is envisioned. And the present loss (gain) is greater the longer the term-to-maturity of the obligation.<sup>4</sup>

But this is not the whole adjustment; in particular, the assumption of a constant rate of return on real assets is not justified. The perceived cost of holding money balances is now higher, since their real value is expected to decline with rising prices. In view of this, people will attempt to reduce money balances by shifting into other assets and, as a result, the prices of those assets will rise. It is important at this point to specify just what sort of asset substitution will take place and which prices will rise as a consequence. Traditionally, treatments of this phenomenon refer to a one-shot price level surge as people attempt to shift out of money and monetary assets into real assets.<sup>5</sup> The easy inference, and one which apparently is commonly drawn, is that there occurs an indiscriminate increase in the demand for real goods and services which simply raises all prices proportionately. But this is not the implication of the portfolio adjustments made as people try to acquire assets whose value will be protected from inflation. They will not, for example, be willing to pay more now for current services or highly perishable goods because they expect their prices to be higher a year hence; that is to say, the demand for avocado trees will rise more than the demand for avocados. Nor is there anything in economic theory which implies that this behavior is equivalent to an increase in consumption.<sup>6</sup>

The decline in the demand to hold money balances is an increase in the demand for those real assets

<sup>4</sup>This assumes that the expected inflation rate is constant through the time-horizon of the longest-term existing bond. If this is not the case — if, for example, the anticipation is of a higher near-term rate of inflation which will then be dampened — the relative loss associated with longer term bonds will be smaller.

<sup>5</sup>On this point, see Reuben A. Kessel and Armen A. Alchian, "Effects of Inflation," *Journal of Political Economy* (December 1962), pp. 521-37, upon which I have drawn heavily in this article. Also see Martin J. Bailey, "The Welfare Cost of Inflationary Finance," *Journal of Political Economy* (April 1956), pp. 93-110, and much of the literature which developed from that work, surveyed in John A. Tatom, "The Welfare Cost of Inflation," this *Review* (November 1976), pp. 9-22.

<sup>6</sup>Joseph Bisignano, in his article, "The Effect of Inflation on Savings Behavior," Federal Reserve Bank of San Francisco *Economic Review* (December 1975), pp. 21-26, apparently followed this line of reasoning to conclude that there is an inverse relationship between the anticipated rate of inflation and the savings rate.

whose nominal prices and income streams are expected to change with the price level and for bonds, whose expected returns are equivalent, given their now depressed market values. This raises the prices of both forms of wealth, so that the nominal rate of interest falls from its elevated level and the rate of return on real assets also falls below its initial equilibrium, with the difference between the two rates continuing to reflect the expected rate of inflation. The measured price level will, of course, shift upward, but this is the result of a systematic, predictable change in relative prices.<sup>7</sup> Just as the higher nominal rate of interest means that the present value of a bond falls by more the more distant its maturity, so does the lower real rate imply that nonmonetary, or real, assets will rise more in price the longer their life expectancy.<sup>8</sup>

### The Two Phenomena Compared

In sum, a rise in the anticipated future rate of inflation causes (1) a rise in the nominal rate of interest and a fall in the real rate, which changes the relative prices of monetary and nonmonetary assets, and (2) a rise in the measured price level of real goods and services, which lowers real money balances for a given level of nominal balances. This set of adjustments can result in a transfer of wealth from net monetary creditors to net monetary debtors, so that if we observe that such a wealth transfer has taken place during a period in which prices have been rising, we cannot safely take this as evidence that the inflation was inadequately anticipated over that interval. But the redistribution due to changed *expectations* is very different in nature from that which occurs as a result of *realized*, unanticipated inflation. As has been noted above, the latter imposes losses on holders of all fixed money obligations equally, whatever the form of those obligations, because their nominal values remain constant while those of real goods rise together. Net monetary creditors must lose; net monetary debtors must gain.

<sup>7</sup>It is this shift which accomplishes the reduction in real money balances, insofar as the nonbank public cannot affect the stock of money in existence.

<sup>8</sup>It may be argued that, given the definition of inflation presented in the previous section with its emphasis on constant relative prices, this particular price level increase should be given a different name. It really does not matter. The significant distinction lies in the fact that these price changes have different implications for wealth transfer than does unanticipated inflation with its assumed constant relative prices (see the following section) and that they occur as a result of changed expectations which themselves take no account of relative price changes.



On the other hand, when the cause of the transfer is expectation-induced changes in rates of return, the size of gain or loss, and even its incidence, is determined by the longevity or terms to maturity of the assets and liabilities of the individual economic unit. For example, the smallest loss associated with holding monetary assets is the one to cash balances, since their nominal value remains constant. A greater loss to bondholders must occur insofar as those debts are existing obligations the terms of which cannot be renegotiated on demand. Because of this, even a net monetary creditor may gain (or a debtor lose).

Consider only one example. Suppose we construct a simple balance sheet for a net monetary creditor, again defined as one whose claims to fixed amounts of money exceed his money-fixed liabilities. His net monetary assets of \$100 comprise the difference between monetary assets held in the form of cash (\$1100), and his monetary liability, which is a note promising to pay \$1100 in one year. Assuming that no change in the price level is anticipated and that the market rate of interest is ten percent, the present value of the note is \$1000. His balance sheet is presented below:<sup>9</sup>

Assets		Liabilities	
Cash	1100	Note	1000
Goods	100	Equity	200

Suppose there occurs an unanticipated increase in the price level, but that the new level is expected to persist. The market rate of interest will not be affected; hence, only the nominal value of his real assets will change, rising in proportion with the price level, and his total real wealth (the constant-dollar value of equity) must fall.<sup>10</sup> Thus, if the price level has doubled, the only entries on his balance sheet to be affected are "goods," the nominal value of which becomes \$200, and his equity, which consequently rises to \$300. Adjusted for the price level change, this equity is \$150, representing a fall in his real wealth of 25 percent.

<sup>9</sup>This balance sheet and those presented below differ from the typical accounting balance sheet in that they record the present values of both assets and liabilities, in order to reflect their current market values and thus the actual present wealth of the individual. The usual balance sheet, which values assets at their historical costs and liabilities at maturity (the note, for example, would be recorded at \$1100), fails to do this.

<sup>10</sup>For numerical illustrations of the wealth effects of unanticipated inflation on net monetary creditors and debtors, see Nancy A. Jianakoplos, "Are You Protected from Inflation?", this *Review* (January 1977), pp. 2-8.

Consider now a different story. There arises a new expectation of future inflation. The portfolio adjustments which ensue cause a rise in the nominal rate of interest, say, of five percentage points, and a fall in the real rate which in turn raises the measured price level by three percent.<sup>11</sup> The new balance sheet reflecting these changes is

Assets		Liabilities	
Cash	1100	Note	957
Goods	103	Equity	246

His real assets, assumed to comprise a representative basket of goods, rise in nominal value with the price level; the present value of his future liability, now discounted at a 15 percent rate, immediately falls to \$957. The nominal value of his equity is \$246, his real wealth — that is, the value of his equity deflated by the rise in the price level — has increased to \$239, and the net monetary creditor has gained.

One small change in his original balance sheet will alter considerably the effects of the same events. Let his net monetary position remain constant, but suppose that instead of holding all his monetary assets in the form of cash, he lends out \$1000 at the original ten percent rate to be repaid at the end of two years; compounded annually, his future claim is to \$1210. Given the same change in expectations with its consequent adjustments, his new balance sheet is as follows:

Assets		Liabilities	
Cash	100	Note	957
Loan	915	Equity	161
Goods	103		

His nominal equity, or wealth, has fallen by \$39; when his equity is expressed in constant-dollar terms, the decline in real wealth is \$44.

A similar exercise could be gone through for debtors or considering real assets of different life expectancies whose nominal values rise more or less than the price level with consequent varying wealth effects. It would serve merely to further point up the fact that the phenomenon we are examining is more basically one of relative price changes rather than price level changes.

<sup>11</sup>This price level rise implies neither that the rate of return on real assets has fallen by 3 percent nor that the expected inflation rate is 8 percent. The change in the average of all prices due to a given change in the real rate depends upon the distribution in terms of the productive durability of existing goods and services.



## Conclusion

If the adjustments consequent to a revision in inflationary expectations turn out to have reflected a correct prediction, no further wealth transfers will occur. But the accuracy of price level anticipations is a whole separate issue; the change in expectations itself, right or wrong, has behavioral, price and wealth effects which should be acknowledged and identified. This paper has dealt only with expectations of accelerated inflation; a downward revision in inflationary anticipations will have symmetrical and opposite redistributive effects. That is, if the members of the economy decide that the future rate of inflation will be lower than they had before expected, the nominal rate of interest will fall, the real rate will rise, and corresponding changes in the values of monetary and nonmonetary assets and liabilities will occur.

It follows from the foregoing discussion that a monetary policy which is characterized by frequent changes in the rate of money growth and thus instability in the rate of price change over time cannot

avoid wealth transfers even if each rate change is correctly anticipated before it occurs — even, indeed, if it is announced in advance. It would be difficult to characterize these transfers as anything but unintended in terms of any generally accepted goals. The deleterious effects on the economy of the increased uncertainty engendered by such a policy have been pointed out often. More recently, the proponents of rational expectations have suggested that a countercyclical monetary policy is ineffective in achieving desired goals. In addition to these criticisms, the apparent inevitability of unplanned wealth transfers, whether as a result of incorrect anticipations or revisions in them, provides a persuasive argument against such a policy and in favor of stable money growth.<sup>12</sup>

<sup>12</sup>If the market's expectations are of *successful* countercyclical policy, such that the long-term anticipation is of a stable price level (or a stable trend rate of inflation), it may be that the wealth transfers will be negligible in size. The valuation of long term assets then might be affected insignificantly, while the impact on short-term assets in any case is small. Presumably, in such a case, uncertainty also would not be increased. It is by no means clear, however, that expectations are indeed characterized by such confidence.





# Food: Outlook Favorable for Consumers

NEIL A. STEVENS

**T**HE 1977 outlook for food is generally favorable for consumers. Despite damage to certain fruit and vegetable crops last winter, large supplies and relatively stable prices are in prospect for most foods.<sup>1</sup> This was the forecast of the U.S. Department of Agriculture at its annual outlook conference and in recent releases.

The generally favorable outlook for food this year is in contrast to the years 1973-75 when sharply reduced supplies and unexpectedly large increases in export demand resulted in sharp increases in domestic food prices. The developments in those years led to a decline in per capita food consumption and an increase in the proportion of disposable income spent for food — both of which were opposite to long-established trends. With two years of large crop harvests as well as an expansion in supplies of livestock foods beginning in late 1975, consumers are again enjoying a resumption of the long-run movement toward greater per capita food consumption, and a declining proportion of their income spent on food.

## *Agriculture Adjusts to Shocks of Early 1970s*

The agricultural sector of the U.S. economy was subjected to a number of disturbances in the early 1970's which affected the demand for and supply of food. These events included adverse weather conditions both at home and abroad, major realignment of international currencies, embargoes on grain shipments, price and wage controls, and the oil embargo and subsequent large increases in the price of energy. As a consequence smaller quantities of food were produced for domestic consumption, and large increases occurred in food prices.

In the past two years, the food sector has been untangling itself from these destabilizing events. Agricultural production was largely freed from Govern-

ment production controls in 1973, and thus has been able to adjust fairly rapidly to the changing market conditions. The environment for adjustments in the food industry has been enhanced by the absence of further severe shocks in the past two years. Export demand has stabilized, domestic wage and price controls have been removed, and embargoes have not been used extensively.

Adjustments have occurred in both crop and livestock production. Disappearance of the major crop inventories in 1972 and 1973, despite relatively high crop production in these years, was followed by considerably higher grain crop prices. Farmers responded to the higher prices by increasing the acreage planted to crops. The total acreage devoted to crops increased over 10 percent from 1972 to 1976, but overall crop production rose only about 8 percent. The failure of crop production to rise as rapidly as the acreage devoted to crops reflects both somewhat less favorable growing conditions in 1976, and the fact that new land brought into production was generally less productive than land previously in cultivation. Crop production in the past two years, however, has been considerably above the production in the drought-stricken year of 1974.

Major adjustments in the livestock sector have also occurred. Substantially higher feed prices in 1972 led to an interruption in the upward trend in livestock production. Such production declined in 1973, increased somewhat in 1974, but fell again in 1975 as the effects of the 1974 crop failure worked itself through the livestock industry. Feeding operations were cut back and animals were fed and marketed at lighter weights for shorter periods of time. In 1976 total livestock production rebounded as production was stimulated by higher livestock prices and lower feed grain prices, as well as herd liquidation.

## *Food Demand Will Be Moderately Strong in 1977 . . .*

Demand for food is expected to increase in 1977. One important source of fluctuation in growth of de-

<sup>1</sup>See U.S. Congress, Senate, Committee on Agriculture and Forestry, *1977 U.S. Agricultural Outlook*, (Papers Presented at the National Agricultural Outlook Conference Sponsored by the U.S. Department of Agriculture, Washington, D.C., November 15-18, 1976, National Food Situation, U.S. Department of Agriculture (March 1977) and Agricultural Outlook, U.S. Department of Agriculture (March 1977).



mand for food is the rate of gain in disposable income. Incomes grew somewhat less rapidly in 1976 than many analysts had hoped, but overall, the pace of the recovery and disposable personal income gains have been similar to those of other postwar recoveries.<sup>2</sup> Expansion of disposable personal income is generally expected to continue through 1977 as monetary and fiscal policies have been generally consistent with further economic expansion. Despite the cold weather and natural gas shortages which hampered production in the first quarter, real economic growth is expected to average around 5 percent in 1977.<sup>3</sup> Thus the demand for domestic food is expected to expand again this year.

Exports are also an important source of demand which greatly influence the domestic food picture, with farm exports now accounting for about 25 percent of U.S. crop production. Export demand has been rising rapidly in recent years as a result of several factors including the realignment of international currencies, some crop failures abroad, growing world population, increased per capita incomes, and the decision of the U.S.S.R. to increase livestock production by importing grain from Western countries in bad harvest years.

Growth of export demand is likely to be slowed somewhat this year by a 10 percent increase in grain production outside the United States. While the value of U.S. agricultural exports is expected to edge above the \$22.8 billion in fiscal 1976, the volume of exports is forecast to drop to 99.4 million metric tons from the 107 million metric tons in fiscal 1976.

### *... But Food Supplies Will Also Expand*

The dominant feature of the food outlook is the supply of livestock and crop foods which has already been produced or now is in the production process. The general outlook is for the production of most foods in 1977 to equal or exceed 1976 levels. This outlook, of course, is subject to the vagaries of weather influences which could substantially alter crop output and animal production patterns.

### *Crop Foods*

Crop food supplies for the first half of 1977 have been largely determined by 1976 harvests and stocks

carried over into the new marketing year. Total crop production of food used for human and animal consumption was the same in 1976 as in 1975. With substantially larger stocks carried over from the large 1975 harvest, total crop supplies available for consumption this year were boosted above last year's level.

Cereals such as wheat and rice are among the most plentiful crops. Wheat production in 1976 was about the same as the record crop in 1975 and almost 20 percent above 1974. With larger stocks carried over from the previous year, total wheat supplies for the 1976/77 year are almost 10 percent above 1975/76. Hence, wheat supplies are adequate despite the unfavorable crop conditions over much of the winter wheat growing areas during the fall and winter. Rice acreage and production was down last year, but a five-fold increase in carry-in from the previous year has resulted in a 14 percent increase in available supplies in 1976/77. Farmers are planning to reduce rice acreage this spring, but even with smaller production, this season's large inventories will keep supplies adequate throughout the year.

Prospects are for a significant increase in supplies of world sugar in 1976/77. The world sugar crop was about 96 million short-tons, up 6 percent from a year earlier. Consumption of sugar is expected to increase less than the increase in production; hence, carryover stocks at the close of the year is likely to be higher and is expected to represent about one-fourth of world consumption. However, the tariff on imported sugar was increased from 62.5 cents per cwt. to \$1.87 per cwt. last fall and the price of raw sugar is not likely to change much from current levels.

Oil crop supplies are dominated by soybeans. Last year's 18 percent reduction in soybean production has reduced oil supplies for much of 1977. However, increasing lard and cottonseed oil production will partially offset the decline in soybean oil. Currently, favorable soybean prices are expected to boost acreage this spring and with favorable weather conditions, soybean supplies should be somewhat more plentiful by late this year.

Coffee supplies have been sharply reduced as a result of a severe frost in Brazil in 1975 and coffee prices have been rising ever since. The world crop in 1976-77 is estimated at 62 million bags, down from 73 million bags a year ago. Furthermore, coffee production is expected to be hampered for at least another two years as trees recover from the severe freeze and new trees reach maturity.

<sup>2</sup>See Neil A. Stevens and James E. Turley "Economic Pause — Some Perspective and Interpretation," this *Review*, December 1976, pp. 2-7.

<sup>3</sup>Agricultural Outlook, U.S. Department of Agriculture, January-February 1977, p. 4.



Supplies of fresh vegetables were sharply reduced by the severe weather conditions of this past winter as well as reduced acreage of some crops. Florida crops such as tomatoes, peppers, snap beans, cucumbers, and eggplant were severely damaged by a freeze while some other crops such as cabbage, celery, lettuce, escarole, radishes and sweet corn escaped much of the damage. In addition, Texas vegetable crops such as cabbage and carrots were reduced due to cold and wet weather conditions as well as planned acreage reductions. As a result of the smaller supplies of fresh vegetables, the fresh vegetable component of the food price index in the first quarter was approximately 20 percent above a year earlier, which translates into approximately a 1 percent increase in grocery store food prices.

Replanted vegetable crops scheduled to be marketed this spring are expected to lead to sharply falling fresh vegetable prices. However, the vegetable situation, both fresh and processed, could be further complicated this summer by lack of irrigation water in some parts of the western states. The impact of the western drought, however, may not be too severe. Current water supplies in the southern California producing areas generally are adequate, while conservation of water supplies and smaller acreages of less valuable crop such as rice, alfalfa and other field crops in other areas will allow the scarce water supplies to be applied to the more valuable vegetable and fruit crops.

Supplies of processed vegetables, measured by stocks of canned and frozen vegetables early this year, are below the relatively high levels of a year ago, but potato supplies are quite large as the fall crop was at a record 300 million cwt. The 1976 dry bean crop was slightly below a year ago but availability of other relatively cheap animal proteins has resulted in the sluggish demand for this crop.

Prospective supplies of fresh and processed fruits are mixed. Citrus crops were expected to be at a record level this year, about 17 percent above last year's record crop. Substantial freeze damage has reduced the Florida citrus production to around 183 million boxes, just slightly above last year's crop. However, the juice yield will be down so that the amount of frozen orange juice from the Florida crop may be 6 to 9 percent below last season. Total citrus production from all producing areas was slightly above the previous season's production.

## *Livestock Foods*

Production decisions made last year and early this year have insured relatively large supplies of livestock products for the first half of 1977. Supplies of red meats, particularly pork, are expected to remain relatively large in the first half of 1977, despite unfavorable profit margins for cattle and hog producers last year. Beef production in the first half of the year is expected to be slightly below a year ago, but pork production will likely be one-fifth above year earlier levels and will more than offset the decline in beef output. Broiler production is expected to increase further during the year although less favorable profit margins should slow the rate of gain. Overall livestock production in the first half of the year will likely exceed that of a year ago.

Milk production is expected to remain somewhat above year-earlier levels in the first half of this year. But as was recently pointed out by the Federal Reserve Bank of Chicago, the consumer is not likely to enjoy any gains, in terms of lower milk prices, from the expanding output.

Higher dairy support prices became effective today (April 1, 1977) in line with the recent announcement by the Administration. The increase boosts the support price for manufacturing milk to \$9 per hundred-weight, up from the \$8.26 level that had prevailed for the past six months and \$8.13 imposed one year ago. The rise in the support price comes in the face of increasing production, stagnating consumption, and mounting government stocks—trends that will no doubt be reinforced by the higher support prices.<sup>4</sup>

Prospects for livestock production for the second half of 1977 are for increases in pork production to slow as lower hog prices than a year ago will tend to discourage farmers from rapidly increasing farrowings this spring. By the fourth quarter of 1977 pork production may be 4 to 6 percent above the relatively high fourth quarter of 1976. Beef output is expected to taper off later this year to about 6 to 8 percent below a year ago. Beef output will be constrained by a reduced inventory which early this year stood 6.8 percent below the level of two years ago. Broiler and egg production is expected to make only moderate gains in the second half of the year. On balance, livestock production in the second half of the year is expected by the U.S.D.A. to fall somewhat below year ago, however, production for the entire year will likely average slightly above last year.

<sup>4</sup>See Gary L. Benjamin, Federal Reserve Bank of Chicago *Agricultural Letter* (April 1, 1977).



### Food Prices May Rise Only Moderately

Rising food prices were of great national concern in 1973 and 1974 as these prices rose more rapidly than prices of other goods and service. Retail food prices increased over 14 percent in both 1973 and 1974, while retail prices of items other than food increased 3.9 and 9.9 percent, respectively. This situation has reversed in the past two years with more abundant food supplies and a slower growth in export demand. Retail food prices increased 8.5 percent in 1975, slightly less than the 9.3 percent increase for items other than food. In 1976 food prices increased only 3 percent over 1975, about one-half the rate of increase of other retail prices. Domestically produced foods purchased at grocery stores rose only about 1¼ percent in 1976. Imported foods and food eaten away from home contributed the remainder of the higher cost of food last year.

Food prices will likely rise less rapidly than other prices this year. Although winter damage to vegetable crops, along with greater than seasonal increases in prices of coffee, eggs, and fish has increased the food costs early this year, large supplies for most foods will keep food price increases at a moderate level. Some of the large increases in food prices early this year, particularly fresh vegetables, should prove temporary, as these prices are expected to decline sharply with

Table I

#### PER CAPITA FOOD CONSUMPTION (1967 = 100)

Year	Animal Products	Crops	Total Food
1967	100.0	100.0	100.0
1968	101.5	101.1	101.2
1969	101.2	102.0	101.5
1970	102.5	103.1	102.8
1971	103.8	102.8	103.3
1972	103.6	104.1	103.8
1973	99.1	105.3	101.9
1974	101.9	103.8	102.8
1975	99.9	104.9	102.2
1976	103.7	106.8	105.1

Source: *Agricultural Outlook*, U.S. Department of Agriculture (March 1977), p. 28.

the harvesting of spring vegetables. The U.S. Department of Agriculture projects that retail food prices at grocery stores for all of 1977 will average 3 to 5 percent higher than in 1976. Also, contributing to an increase in overall retail food prices will be price increases for food eaten away from home. Such prices may rise somewhat more than grocery store prices, possibly around 6 percent. Increased prices of coffee, fishery products, and other imported foods are expected to account for approximately one-half of the rise in retail food prices this year. The remainder will be associated with higher marketing margins as average farm prices will likely remain unchanged from a year ago.

This range for food prices reflects varying assumptions of weather conditions. The 5 percent estimate takes into account some possible underestimation of the impact on prices from the bad weather this winter as well as problems which could result from continued drought conditions in the West. Drought in livestock producing areas could alter the pattern of livestock prices as forced liquidation of herds would lower prices around mid-year followed by higher prices later this year. On the other hand, the 3 percent projection assumes more favorable weather conditions during this year's growing season resulting in large crop harvests both in the U.S. and abroad.

As a result of the favorable price and supply conditions for food last year, per capita consumption of food rebounded sharply from 1975. U.S. per capita consumption of all foods increased almost 3 percent in 1976 with the strongest gain coming from animal products. But per capita consumption of crop food also made gains (Table I). Per capita consumption of

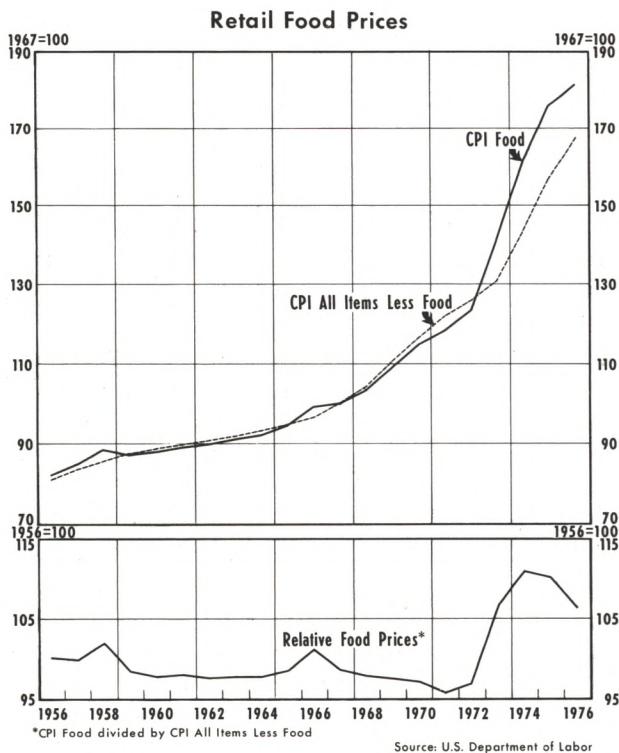




Table II  
Percent of Disposable Personal Income Spent on Food

	Food for Use at Home	Food Away from Home	Total Food Expenditures
1960	16.1%	4.1%	20.2%
1965	14.2	4.0	18.2
1970	13.4	3.9	17.3
1971	12.7	3.7	16.4
1972	12.5	3.8	16.3
1973	12.5	3.8	16.3
1974	13.1	3.9	17.0
1975	13.0	4.1	17.1
1976	12.7	4.1	16.8

Source: *Agricultural Outlook*, U.S. Department of Agriculture (March 1977), p. 9.

food is likely to make some further gains this year although the increase will likely be less than in 1976.

Not only did U.S. consumers buy more food, but they spent a smaller percent of their disposable income on food in 1976 than a year earlier. Table II shows that U.S. consumers from 1960 through 1972 spent less and less of their income on food. Consumers spent 16.8 percent of their income on food last year, down from 17.1 percent in 1975, but still higher than

the 16.3 percent in 1972. The percent of total disposable income spent on food this year will probably be slightly less than last year.

### Summary

Food prices in 1976 rose less rapidly than the overall inflation rate in contrast to the 1973-75 period. Consumers found that they spent a smaller percentage of their income on food while buying increased quantities. This favorable situation resulted from increased supplies as normal weather conditions, relatively free pricing, removal of production controls, and lack of other shocks to the agricultural economy led to significant gains in production.

The reasonably good crop harvest in 1976, and livestock production already in progress assures fairly large supplies of food, at least in the first half of 1977. The staple foods such as cereal crops, livestock foods, potatoes, and sugar are in plentiful supply. On the other hand, several fruit and vegetable items, fishery products, and coffee are in short supply. However, supplies of most vegetables are expected to return to normal this spring. On balance, relatively large supplies of food are expected to limit increases in grocery store food prices to around 3 to 5 percent during 1977.

