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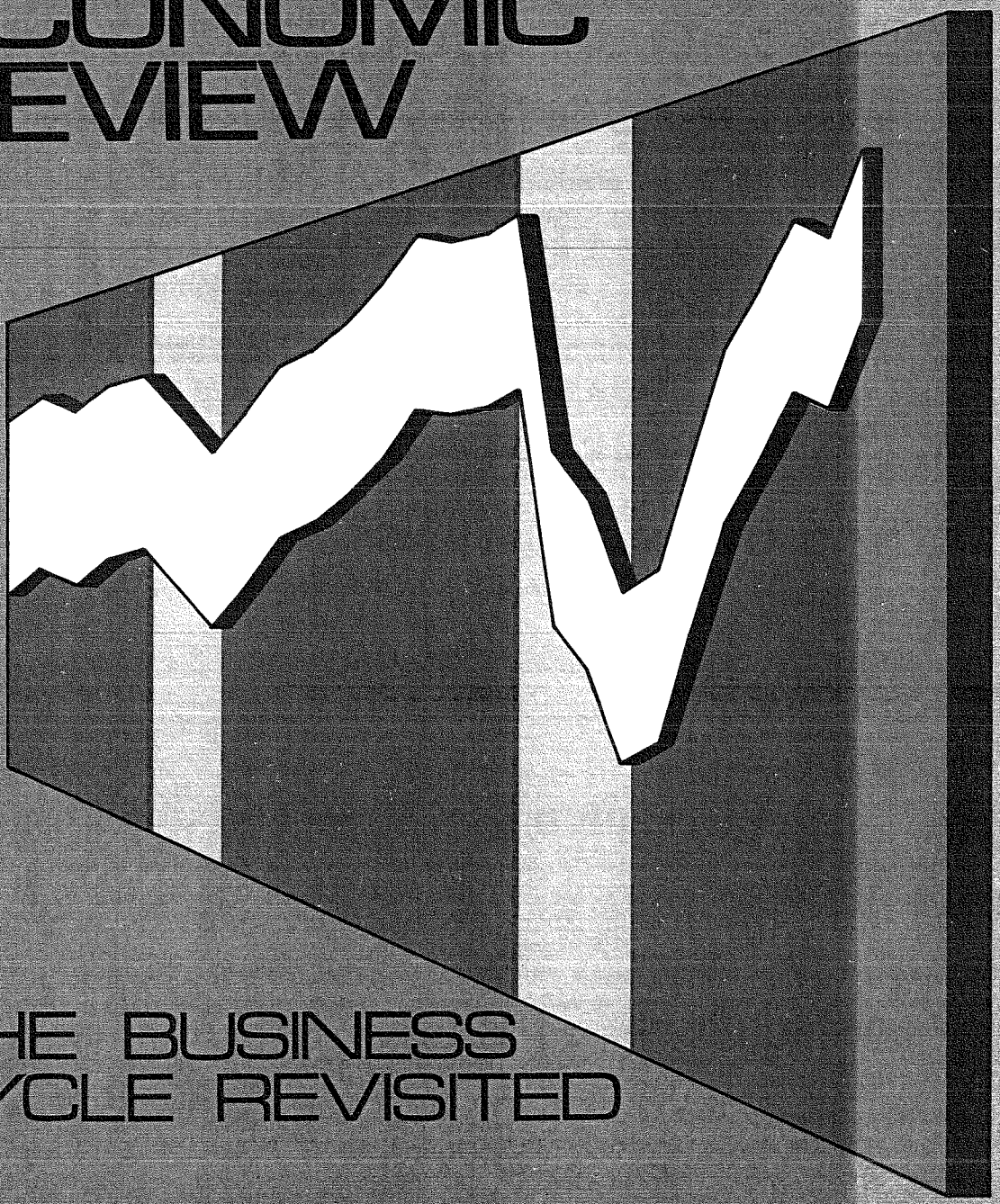

THE BUSINESS CYCLE REVISITED

SPRING 1977

The Outlook for Inflation Based on Cost-Push and Capacity Factors

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Cost-push influences frequently have been cited as the cause of short-term increases in the overall price level. But there is general agreement among economists that, over the long run, inflation is a demand-related rather than a supply-related phenomenon. Neither strong unions nor oligopolistic manufacturing firms, through their market power, can independently generate a sustained upward movement in prices. Unless wage increases are validated or supported by increased demand for labor, rising unemployment eventually will halt the wage-push. Similarly, the efforts of sellers to widen their profit margins, without regard to the strength of demand, eventually will be frustrated by heavy discounting from list prices.

The monetarists go a step further and argue that inflation is always a purely monetary phenomenon, that apparent cost-push influences (even in the short run) are lagged reactions to past excesses in monetary growth. But even the monetarists agree that a short-run acceleration in the rate of money growth initially stimulates the demand not only for goods and services but also for factor inputs. It is in this sense, with regard to their role in transmitting inflation, that it is useful to study the underlying "cost-push" elements at work in the inflationary process.

This article attempts to study the role of costs and capacity-utilization rates in the industrial pricing process, and to formulate an inflation forecast for 1977 based on a consideration of those factors as well as the expected behavior of farm and food prices. The first section describes the cost-plus pricing methods most manufacturing firms follow in setting their prices, and the variables that affect the various elements of cost. The second and third sections compare the behavior of the various cost elements during the current recovery in U.S. economic activity with that of previous post-war economic recoveries. The fourth section examines the behavior of costs and prices during 1976 in more detail, as a prelude toward developing an inflation forecast. Finally, in the last section we analyze what all these considerations imply for the overall rate of inflation in 1977.

I. Cost-Price Determination Process

Most manufacturing firms in the United States operate in imperfectly competitive markets, where individual producers have some control over the price of their output in the short-run. They do not passively accept as a "given" the price established by the freely operating forces of supply and demand. Rather, empirical studies have shown that most firms set their product prices in accordance with some version of the cost-plus principle. The central tenet of this doctrine—also known as mark-up pricing—is that prices per unit of output are set primarily on the basis of average costs of production (for labor, materials, energy and capital) plus a margin of profit based on some predetermined target rate of return on investment.[1] Prices per unit therefore change primarily in response to changes in unit costs, or profit margins, rather than in response to short-term shifts in the demand for goods. Of course, demand influences may be felt through variations in the profit margin, since firms frequently increase their markups during booms and shade their list prices during recessions and other periods of demand-supply imbalance.

Unit labor costs, the largest cost factor, de-

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pend upon the hourly compensation paid workers and their productivity, i.e., output per hour. Wage-rate changes in turn depend primarily upon the unemployment rate and the past rate of inflation in consumer prices.[2] Under the traditional Phillips Curve concept, the rate of increase in wages bears an inverse relationship to the rate of unemployment, which serves as a measure of tightness in labor markets.[3] For the recovery stage of the business cycle, with unemployment declining, the Phillips analysis thus implies an accelerated rate of increase in compensation.

Past inflation influences wages in two ways: 1) automatically, through the operation of cost-of-living adjustment (COLA) clauses in labor contracts and 2) through the collective-bargaining process, as organized workers seek also to increase their real wages. Because labor contracts normally extend over several years' time, wages are affected not only by past price behavior but also by the expected behavior of prices during the term of new contracts.

The second major determinant of unit labor costs is productivity.[4] Changes in labor productivity reflect two distinct forces: 1) the long-term trend in technology as reflected in the capital/output ratio and 2) short-term cyclical fluctuations in output and the capacity-utilization rate.[5]

Other direct costs of production include the costs of materials and energy. The costs of industrial raw materials—such as cotton, hides, natural rubber, and metal scrap—depend largely upon prices determined in highly competitive markets, where changes in demand lead to quick adjustments. Consequently, their prices tend to show a higher degree of cyclical volatility than prices for products at later stages of the production process. Highly processed materials, such as steel and aluminum, in contrast are priced in oligopolistic markets in accordance with the cost-plus principles outlined here. Higher prices for these products affect the costs incurred by manufacturers of finished products such as automobiles and appliances, encouraging them to raise their product prices. The costs of energy, which have risen sharply (both absolutely and relatively) in recent years, are determined primarily by OPEC cartel's actions in setting the world price of oil and by the Federal Power Commission's actions in regulating interstate natural-gas prices.

II. Cost Behavior During Previous Recoveries

How do these cost elements behave during the recovery phase of the typical business cycle? A review of five cyclical recoveries (prior to the 1973-75 period) shows that hourly-compensation growth typically increases gradually as the recovery progresses, presumably in response to both a decline in the rate of unemployment and a speed-up in the rate of inflation (Chart 1-A). Output per labor-hour typically rises sharply during the early stages of the recovery, when capital and labor are both underutilized and output can be expanded without commensurate growth in aggregate hours by fuller resource utilization (Chart 1-B).[6] In contrast, output per labor-hour normally slows during the more advanced stages of the business recovery, as plant capacity becomes more fully utilized and output expansion becomes difficult even with increased inputs of labor.

The rapid rise of productivity early in the expansion, combined with a relatively moderate rate of increase in compensation, typically causes unit labor costs to stabilize or even decline (Chart 1-C). Later in the recovery, with slowing productivity and accelerating compensation, unit labor costs tend to rise at a more rapid rate.

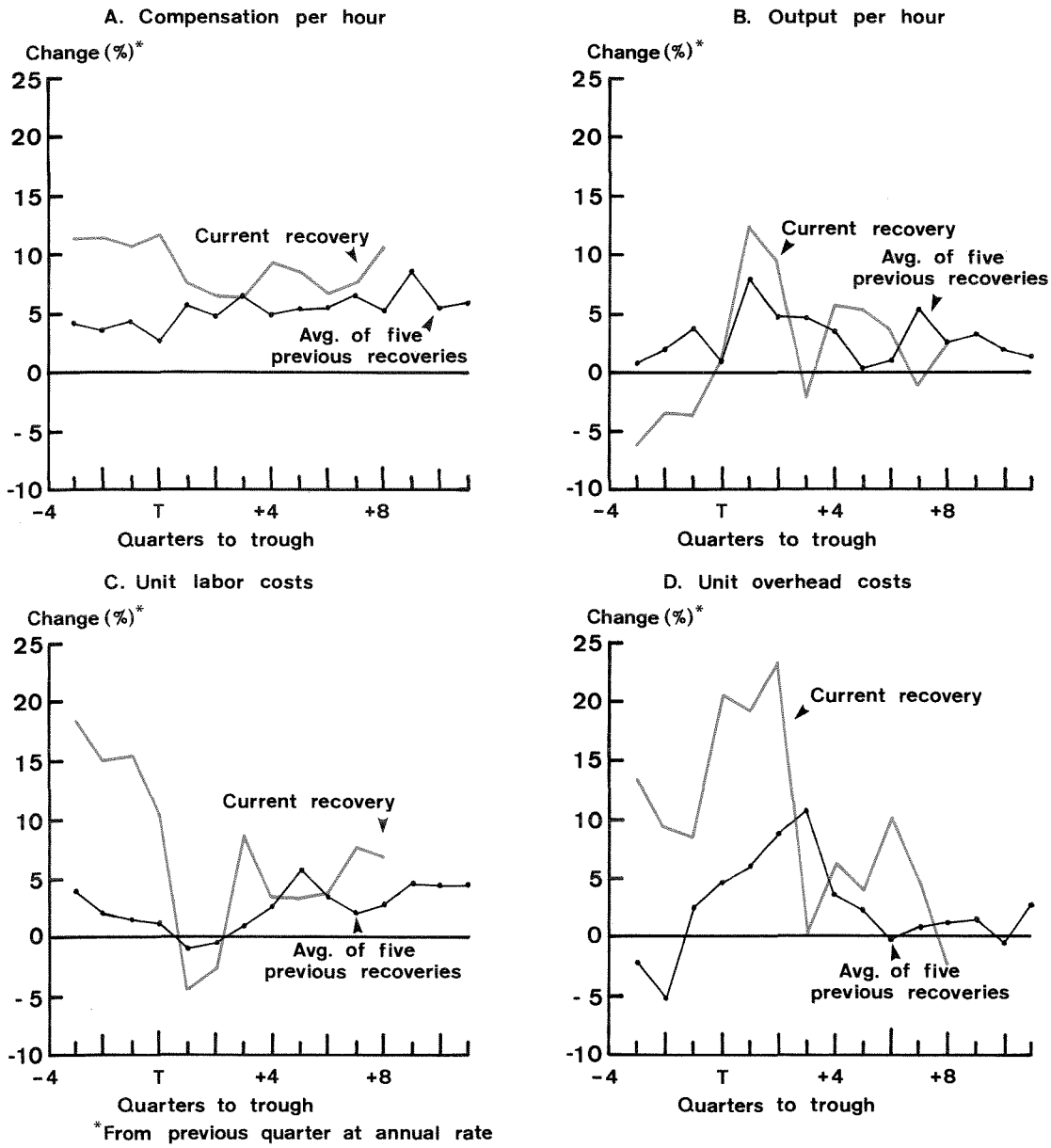
On the raw material side, industrial raw-material prices typically begin to turn upward about a quarter before the cyclical low in general business activity, as manufacturers begin to rebuild their materials inventories in preparation for increased production. These prices tend to rise slowly, then more rapidly, and then more slowly again in response to a slower growth of production and inventory accumulation. Finally, late in the expansion period, the rate of increase in prices begins to accelerate again as buyers begin to react to expectations of shortages (Chart 2-A).[7] Reflecting these price movements, raw material costs per unit of output tend to fluctuate in the same manner over the course of each cyclical expansion. Energy prices (and

energy unit costs) in contrast remain relatively stable until the later stages of the typical recovery (Chart 2-B)—although not of course in the most recent recovery.

Those manufacturing industries producing industrial materials—particularly highly-processed materials such as steel, aluminum, and paper—tend to be the first to experience capacity bottlenecks as the recovery matures. Demand for these materials is bolstered not only by increased consumption but also by inventory accumulation (as a hedge against possible shortages and

Chart 1

CYCLICAL BEHAVIOR OF LABOR AND OVERHEAD COSTS



*From previous quarter at annual rate

higher prices), so that their output typically tends to rise faster than the production of finished products such as automobiles. Thus, at any given stage of the expansion, the capacity-utilization rate in the basic material (primary processing) industries tends to be higher than for the manufacturing sector as a whole (Chart 3).[8]

This survey of pre-1973 business cycles indicates that total costs per unit of production generally rise at a relatively slow rate early in the recovery, when output is rising relatively rapidly, and at a faster rate as the recovery matures. But at that advanced stage of the expansion, excess demand pressures relative to available supply cause widespread capacity bottlenecks in the basic material industries, exerting strong upward pressure on industrial prices.

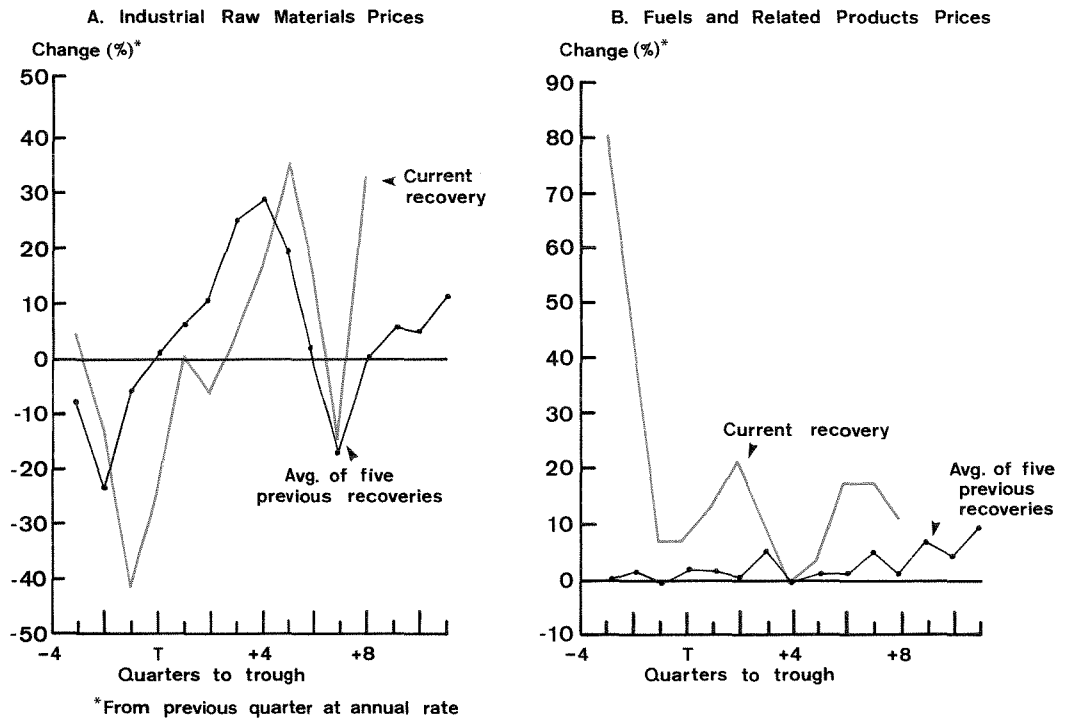
III. Cost Behavior During the Current Recovery

Unit labor costs, the dominant cost element, have followed the typical pattern during the recovery from the severe 1973-75 recession (Chart 1-A). During the first two quarters of the recovery, unit labor costs in the nonfarm business sector actually declined sharply, and thus offset much of the increase in costs that has since occurred. Meanwhile, the rate of increase in hourly compensation slowed during the first two quarters of the recovery, accelerated in early 1976 and then settled back again. This suggests that the rising unemployment rate during the first half of 1975 and the latter half of 1976 acted to moderate the rate of increase in wages during those periods.

Productivity also has followed the expected cyclical pattern (Chart 1-B), growing fastest during the early stages of the recovery and then

Chart 2

CYCLICAL BEHAVIOR OF RAW MATERIAL AND ENERGY COSTS



*From previous quarter at annual rate

rising at a more moderate rate. But throughout most of the current recovery, the growth of productivity has been above average for comparable stages of the business cycle, due to the comparatively low capacity-utilization rates prevailing during this business upswing. Gains in productivity thus have provided a larger than normal offset to rises in compensation, moderating the upward pressure on industrial prices stemming from rising unit labor costs. In fact, the exceptional growth of productivity during the first two quarters of the recovery actually acted, along with the deceleration in the growth of hourly compensation, to reduce unit labor costs.

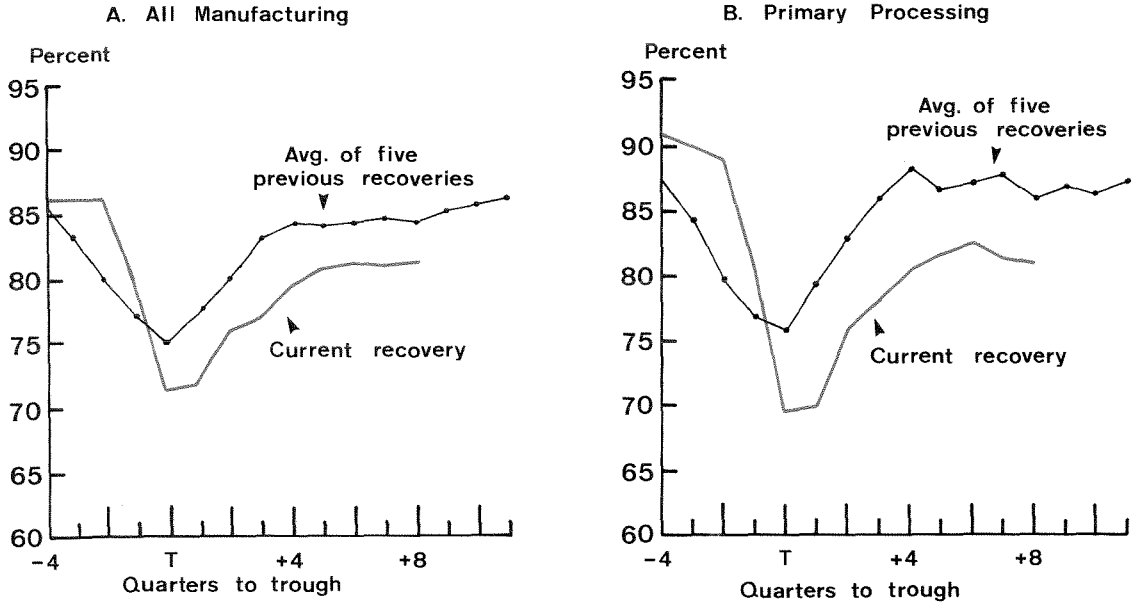
Raw material prices also have tended to follow the expected pattern—rising relatively slowly and then more rapidly until the "pause" of mid-1976, which reduced the demand for industrial raw materials and moderated their prices (Chart 2-A). Energy prices, on the other hand, failed to follow the typical pattern, since OPEC actions caused a greater rate of increase during the recession than during the recovery (Chart 2-B). This rise in energy prices undoubtedly acted to offset some of the benefits of the early-recovery decline in unit labor costs.

Total unit costs consequently rose at a relatively modest rate during the early stages of the recovery, when labor costs were declining. Total costs then followed roughly the same pattern during the first half of 1976, before accelerating because of rapidly rising labor and energy costs. Despite this gradual acceleration, costs still rose far less on an annual basis in 1976 than in 1975, due to the very large increase recorded during the late-recession period of early 1975.

Industrial prices have generally paralleled the cyclical movements in costs during this recovery, but the overall increase in prices has been greater than the rise in unit labor costs (Charts 1-C and 4). This pattern suggests that manufacturing firms have been attempting to restore their profit margins to more acceptable levels after seeing those margins narrow during the preceding recession.

Chart 3

CYCLICAL BEHAVIOR OF CAPACITY UTILIZATION RATE

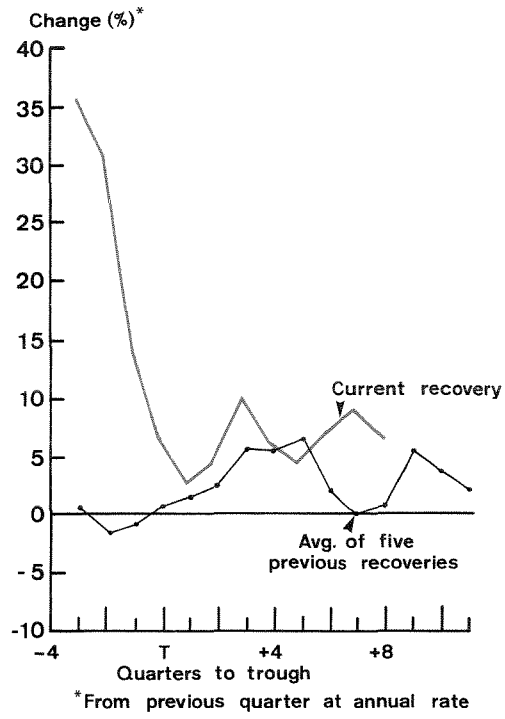


Prices rose at a slower pace in 1976 than at any time since 1972, when wage and price controls hid the actual cost pressures underlying the economy. The GNP deflator, the broadest measure of price change, rose at an average annual rate of 5.1 percent—about one-half the rate reached during the peak inflationary period of 1974 (Table 1). Actually, the inflation rate accelerated during the course of the year, but the late-year increase was at least partly due to the impact of a Federal pay increase.

Food and energy were largely responsible for the 1976 price improvement, but prices for manufactured products also rose at a more moderate pace. The food component of the consumer price index rose by only 3.3 percent—the smallest gain since 1971. Energy prices at first declined as a result of a legislated rollback of domestic oil prices, but they later accelerated again; still, the 7.1-percent annual increase in household energy prices was only a fraction of the 1974 peak figure.

Chart 4

CYCLICAL BEHAVIOR OF INDUSTRIAL PRICES



The wholesale price index also decelerated in 1976 (Table 1). The farm and processed-food component actually declined slightly, acting to moderate the upward pressure on retail food prices. Industrial commodities, which account for more than three-fourths of the total index, rose 6.3 percent for the year—again, only a fraction of the earlier peak rate. Slower rates of increase were widespread among most major categories, including not only fuels but also metals, chemicals, and paper. Inflation speeded up again in late 1976, but slack demand conditions, especially for highly processed basic materials, led to widespread discounting from published list prices. Thus, the acceleration in realized prices was less than for the posted prices which make up the industrial price index.

Moderate labor pressures

Reductions in labor cost pressures helped account for the deceleration in industrial prices. In 1976, unit labor costs in the private nonfarm business sector rose by only 3.6 percent—again only a fraction of the earlier peak (Table 2). When 1976 opened, it was expected that hourly compensation would rise by at least 10 percent, or slightly more than in 1975, as organized labor sought to compensate for the prior decline in its real wages attributable to sharply rising living costs. Most of the contracts expiring had been negotiated in 1973, when wage and price controls were still in effect.

Although the settlements in the automobile, electrical equipment, trucking and rubber industries turned out to be relatively high, the average first-year increase in compensation amounted to a relatively low 8.3 percent for all new major contracts with COLA provisions. Moreover, the wages of nonunion workers rose at an even slower rate, so that the increase in hourly compensation for all workers in the nonfarm business sector (including cost-of-living adjustments) averaged 7.4 percent.

Even more important in moderating labor cost pressures was the solid growth in productivity. Output per labor-hour increased in the nonfarm business sector by a healthy 3.7 percent after declining in 1974 and rising only slowly in 1975,

Table 1
Behavior of Major Price Indices, 1970-77
(Percent change, at seasonally adjusted annual rates)

	GNP Deflator	Consumer Price Index	Wholesale Price Index		
		All Items	All Items	Farm Products & Processed Foods	Industrial Commodities
1970	5.4	5.9	3.7	3.4	3.8
1971	5.1	4.3	3.2	2.0	3.6
1972	4.3	3.3	4.6	7.6	3.4
1973	5.8	6.2	13.1	30.0	6.8
1974	10.0	11.0	18.9	11.5	22.2
1975	9.3	9.1	9.2	3.8	11.5
1976	5.1	5.8	4.6	-0.6	6.3
1975					
I	8.5	8.3	-2.1	-19.3	5.8
II	4.3	6.2	3.3	7.6	1.7
III	7.0	8.3	7.9	14.1	5.3
IV	7.1	6.5	9.2	3.9	11.5
1976					
I	3.2	4.7	-0.7	-16.2	4.9
II	5.2	4.5	4.5	11.6	3.3
III	4.4	3.6	3.6	-7.7	7.5
IV	5.8	4.4	7.6	-0.7	10.2
1977					
I	5.8	8.6	8.5	16.5	6.6

Source: GNP deflator: U.S. Department of Commerce, Bureau of Economic Analysis; consumer and wholesale price indexes: U.S. Department of Labor, Bureau of Labor Statistics.

Table 2
Changes in Productivity, Labor Costs and Industrial Prices, 1974-77
(Percent change, at seasonally adjusted annual rate)

	Compensation per hour*	Output per hour*	Unit Labor costs*	Industrial Prices**
1974	9.3	-3.5	13.2	22.2
1975	9.5	1.6	7.7	11.5
1976	7.4	3.7	3.6	6.3
1975				
I	11.6	1.1	10.4	5.8
II	7.1	11.8	-4.2	1.7
III	6.4	8.9	-2.3	5.3
IV	5.8	-2.8	8.9	11.5
1976				
I	9.0	5.4	3.4	4.9
II	7.7	4.4	3.2	3.3
III	7.1	2.7	4.3	7.5
IV	7.0	-1.2	8.3	10.2
1977				
I	10.2	2.6	7.3	6.6

*Private nonfarm business sector.
**Industrial commodity component, wholesale price index.
Source: U.S. Department of Labor, Bureau of Labor Statistics.

and thus helped account for the modest 3.6-percent increase in unit labor costs. Productivity growth weakened as the recovery progressed in 1976, and actually declined slightly during the final quarter, but that sluggishness was attributable not to capacity restraint but to a temporary slowdown in industrial production.

In retrospect, it is clear that wage increases in 1976 were moderated by the 1975 slowdown in inflation, which held down newly negotiated wage demands—and by the further price slowdown that occurred in 1976, which held down the increases granted all workers under contracts with COLA provisions. Slower wage increases, in combination with above-average productivity gains, then helped dampen the increase in unit labor costs in a way that helped cool the inflation rate even more. Similarly, the slower rate of increase in energy prices and unit energy costs helped to moderate the increase in industrial prices.

Moderate capacity pressures

Capacity restraints posed little threat to the overall price level in 1976. According to newly revised Federal Reserve statistics, the rate of capacity utilization in manufacturing reached 81 percent by the final quarter of 1976. This figure, although substantially above the cyclical low of 71 percent, was still about 7 percentage points below the 1973 peak, when shortages and production delays generated intense upward price measures.[9] In the materials industries, where shortages had been most intense, the 80-percent operating rate of late 1976 was a full 13 percentage points below the 1973 peak. Only the chemical, energy and paper industries—with capacity utilization rates ranging from 83 to 88 percent—were operating at above-average rates.

In raising prices last year, manufacturers attempted not only to recover increased costs but also to achieve the higher rate of return required to finance necessary expansion in plant and

Table 3
Profits Per Dollar of Sales, by Industry, 1974-76
(Cents)

	1974	1975	1976	1976 I	1976 II	1976 III	1976 IV
				(After taxes)			
All Manufacturing Corporations	5.5	4.6	5.3	5.2	5.9	5.3	5.0
Durable Manufacturing Corporations	4.7	4.1	5.2	4.8	5.8	5.0	5.0
Basic Material Industries	5.5	4.2	4.4	3.4	5.2	4.7	3.9
Primary metal industries	6.6	4.3	3.9	3.5	4.8	3.9	3.5
Iron & steel	6.4	5.0	4.1	3.8	4.8	3.9	3.8
Nonferrous metals	7.0	3.1	3.6	3.1	4.7	3.7	2.9
Fabricated metal products	4.6	4.2	4.8	4.8	5.3	4.9	4.1
Stone, clay & glass products	4.5	3.7	5.0	2.3	6.2	6.2	4.6
Other Durable Manufacturing	4.3	4.1	5.5	5.2	6.1	5.1	5.5
Nondurable Manufacturing Corporations	6.4	5.1	5.5	5.6	5.9	5.6	5.0
Petroleum & Coal Products	12.8	7.7	8.5	8.7	9.0	8.3	8.0
Basic Material Industries	5.9	4.2	5.0	5.6	5.7	4.7	4.1
Industrial chemicals	8.4	6.9	6.9	7.8	7.6	6.7	5.5
Textile mill products	2.5	1.5	2.4	3.0	2.9	2.0	1.6
Paper & allied products	7.0	5.6	5.8	6.1	6.7	5.7	4.7
Rubber & plastic products	5.0	3.1	3.8	3.9	4.5	2.8	4.0
Other Nondurable Manufacturing	4.1	4.4	4.5	3.9	4.8	5.2	4.1

Source: Federal Trade Commission, "Quarterly Financial Report for Manufacturing, Mining and Trade Corporations."

equipment. Many firms were still trying to overcome financial problems generated by the recession. Metals and other basic materials industries had been especially hard hit, because the demand for their products was adversely affected not only by the consumption slowdown but also by the inventory liquidation which continued to depress orders even after consuming industries had begun to recover. For example, steel-mill product shipments dropped 28 percent during 1975, and nonferrous metals experienced similar declines.

These industries thus were unable to pass on all of their higher costs in 1975, and as a result, profit margins and rates of return on investment dropped sharply. For some, the slippage even continued into 1976 (Tables 3 and 4). During the first quarter of 1976, after-tax profits per dollar of sales in the primary metals industries amounted to only 3.5 cents—less than one-half the mid-1974 level and less than the 5.2-percent average return earned currently by all manufacturing firms. Similarly, their return on stockholders' equity was only 7.1 percent—about one-third of the mid-1974 figure and far below the 13.3-percent average return earned currently by all manufacturing firms. Their rates of return rose sharply during the second quarter when demand conditions improved, but margins eroded somewhat again during the last half of the year, despite a spate of published price increases, as weak demand conditions reduced sales and undermined list prices.

Table 4
Annual Rates of Return on Stockholders' Equity, by Industry, 1974-76
(Percent)

	1974	1975	1976	1976 I	1976 II	1976 III	1976 IV
				(After taxes)			
All Manufacturing Corporations	14.9	11.6	13.9	13.3	15.7	13.7	13.1
Durable Manufacturing Corporations	12.6	10.3	13.6	12.3	16.0	12.9	13.3
Basic Material Industries	15.2	9.9	11.0	7.1	13.6	11.8	9.5
Primary metal industries	16.5	8.6	8.2	7.1	10.7	8.1	7.1
Iron & steel	17.0	10.9	9.0	8.1	11.3	8.7	7.9
Nonferrous metals	15.7	4.9	6.8	5.3	9.5	7.0	5.5
Fabricated metal products	16.0	13.2	15.3	15.0	17.7	15.8	12.9
Stone, clay & glass products	10.6	8.5	12.0	4.8	15.5	16.1	11.1
Other Durable Manufacturing	11.4	10.5	14.8	13.7	17.1	13.4	14.9
Nondurable Manufacturing Corporations	17.1	12.9	14.2	14.3	15.5	14.4	12.9
Petroleum & Coal Products	21.1	12.5	14.3	14.7	14.8	14.0	13.9
Basic Material Industries	15.0	9.7	12.5	13.7	14.7	11.4	9.0
Industrial chemicals	17.6	11.0	14.2	16.2	16.3	13.5	11.0
Textile mill products	7.9	4.3	8.0	10.0	10.1	6.6	5.3
Paper & allied products	17.7	12.6	13.7	14.5	16.3	13.6	10.9
Rubber & plastic products	14.4	8.0	10.8	10.6	13.4	7.6	11.4
Other Nondurable Manufacturing	15.0	15.2	15.3	14.3	16.4	16.6	13.8

Source: Federal Trade Commission, "Quarterly Financial Report for Manufacturing, Mining and Trade Corporations."

V. Higher Inflation in 1977?

In 1977, as demand conditions improve sufficiently to support higher prices, producers of some basic materials such as steel undoubtedly will raise their posted prices in a further effort to offset rising costs and improve profit margins. The higher cost of these products in turn will lead to higher prices for many manufactured goods in which those materials are utilized. This does not mean, however, that wholesale industrial prices will rise significantly above the 6.3-percent figure registered in 1976. Based on the expected growth of demand, bottleneck pressures are likely to develop in only a few manufacturing industries over the course of the year, while near-term prospects for unit labor costs and energy costs do not appear as worrisome as they did during the weather-caused supply problems of early 1977. Similarly, the prospect of ample supplies of most farm products points to only about a one percentage-point increase in food-price inflation, despite recent problems caused by the Eastern freeze and the Western drought. Altogether, these factors suggest a moderate acceleration in the overall inflation rate in 1977 as a whole.

Moderate increase in labor pressures

Unit labor costs in the private nonfarm business sector may rise about 4 or 5 percent this year, compared to the 3.6-percent increase of 1976. An increase of that magnitude seems likely on the basis of a modest 2-to-3 percent increase in labor productivity, along with a 7-percent rise in hourly compensation. Normally, labor compensation would rise at a faster rate at this stage of a mature expansion, but the increase could be dampened by the improvement in the inflation rate that already occurred in 1976.

This year, as in 1976, the collective bargaining calendar is extremely heavy.[10] Major contracts covering nearly 5 million workers are expiring in a number of important industries—including coal, petroleum refining, steel, aluminum and construction. On the basis of the agreement recently reached in the first of those industries—steel—it seems likely that the overall increase in compensation for all workers in nonfarm business will be close to the 7.4-percent increase recorded in 1976.

The early-1977 price upsurge would suggest upward pressure on wage negotiations from the recent price escalation, but little of this was evident in the steel agreement, which was settled about as expected with an 8.3-percent first-year increase and an average 5-percent annual increase over the life of the contract. Again, the significant improvement in the unemployment rate would suggest further upward pressure on labor compensation—except for the fact that the jobless rate, presently hovering around 7.3 percent, is still abnormally high for this stage of the recovery. In 1977 also, fewer workers will be involved in negotiations who are not already covered by cost-of-living adjustment provisions. In fact, two-thirds of the workers covered by expiring contracts have been protected by COLA provisions, and thus from at least some of the effects of inflation, during the past three years.

Productivity growth in the nonfarm business sector probably will drop below the 1975 figure of 3.7 percent, reflecting the tendency for plant-utilization rates to increase in the later stages of a business recovery. However, productivity growth may remain above normal, because there is still less pressure on capacity-utilization rates than at the same point of previous recoveries. The relatively strong first quarter performance—a 2.6-percent rate of increase in output per labor-hour in the nonfarm business sector—in the face of severe weather problems suggests grounds for optimism in this regard. In any event, if productivity grows by 2 to 3 percent and labor compensation rises at a 7-percent rate, the increase in unit labor costs could be held to 4 or 5 percent.

Shortages posed by capacity restraints do not appear to be a major threat. If industrial production rises (as expected) by 6 percent this year, and if manufacturing capacity increases by 3 percent (in line with past plant-equipment spending trends), the capacity-utilization rate in manufacturing will rise only gradually from 81 to 84 percent—still quite low in comparison with the peak operating rates reached in 1973. Thus the supply situation generally should be quite easy, with only a few exceptions such as paper. In fact, with the continuation of present trends in pro-

duction and capacity growth, bottlenecks would not be likely to hamper production until well into 1978.

Energy and raw material inputs

Energy prices are likely to rise at a somewhat faster rate than had been expected before severe weather conditions abnormally increased the winter demand for heating fuels. Prior to the onset of the freeze, energy experts were predicting a 6- to 7-percent rise in prices of fuels and related products—about the same rate as in 1976.[11] These estimates took into account the OPEC-imposed increase in the price of imported crude oil at the beginning of the year.

These forecasts are now considered to be a little low. To help alleviate the natural-gas shortage in freeze-affected areas, Congress passed legislation calling for the removal of price controls (through July) on emergency sales of natural gas in interstate markets. However, the amount of gas involved in these "emergency" sales is only a small percentage of the total market, so that little additional price pressure should result. Altogether, energy prices may not rise more than 7½ percent this year, assuming some pressure from that source and from the initial implementation of the Administration's energy program. Still, an increase of that magnitude would raise energy costs per unit of output in manufacturing—and the overall rate of inflation—by rather modest amounts.

Industrial raw-material prices accelerated during the first quarter of 1977, reaching a point 15 percent higher than a year earlier. Some increase in prices is normal for this stage of the recovery, but the recent upsurge has been aggravated by this spring's "snap back" in industrial production, which followed the late 1976 pause and subsequent weather-induced slowdown. As production returns to its normal growth trend, industrial raw-material prices should rise at a slower rate, and, as a result, the rise in unit raw-material costs may parallel last year's increase.

Farm and food prices

The overall rate of inflation this year will of course reflect changes in farm and food prices as well as the changes in industrial prices discussed above. Prior to the advent of the recent drought and freeze, food prices were not expected to be a major source of inflationary pressure. Indeed, the U.S. Department of Agriculture early this year was predicting a 3- to 4-percent rise in the food component of the CPI, not much more than in 1976.[12] But the USDA later raised the forecast to the 4- to 6-percent range, as a result of the sharp increase in fruit and vegetables prices caused by California's drought and Florida's freeze.[13] Yet with only few exceptions, the supply prospects for most major products remain quite favorable.

In the case of meat (particularly beef), the supply conditions that led to lower prices last year are unlikely to persist throughout 1977. Favorable ratios of livestock to feed prices in 1975 resulted in large increases in meat production in 1976. The resulting addition to supplies helped depress prices, but the ensuing reduction in cattle numbers then set the stage for higher beef prices in the latter part of this year. But continued large supplies of pork and poultry are expected to dampen the overall increase in retail meat prices.

Most observers predict significantly higher prices for fresh fruits and vegetables—and of course sharply higher prices for coffee. Indeed, most of the acceleration in the inflation in farm and food prices during the first quarter was attributable to these products. But prices for fresh vegetables already have begun to decline, so that the annual increase in fresh fruit and vegetable prices should be less than in the first quarter. Moreover, prices of cereal products should remain relatively stable on an annual basis because of ample supplies of the principal food grains, wheat and rice. Indeed, heavy U.S. output of these crops in 1976 allowed substantial rebuilding of stocks. Similarly, milk production is expected to continue at high levels, creating the possibility of some weakness in prices.

VI. Summary and Conclusions

In this article, we examined the typical cyclical behavior of industrial prices, and presented projections of future price behavior based on cost-push and capacity factors. Industrial commodities not only account for three-quarters of the weight of the wholesale-price index, but their prices are also the major determinant of prices for nonfood items sold at the retail level. To round out the inflation outlook, we also analyzed the expected behavior of farm and food prices at the wholesale and retail levels.

Our analysis suggests that the increase in industrial prices will not be much higher than last year's 6.3-percent figure, judging from the expected behavior of labor, material and energy costs, and the expected level of capacity-utilization rates in manufacturing. Meanwhile, the favorable supply outlook for most agricultural products, in conjunction with the effects of recent weather problems, suggests a one-percentage point greater increase than last year in farm and food prices. Our overall analysis of the expected behavior of manufacturing costs and farm and food prices, together with its implications for the expected behavior of the wholesale and consumer price indexes, suggests that the GNP deflator will increase about 5.5-6.0 percent in 1977, only moderately faster than the 5.1-percent rate recorded last year.

FOOTNOTES

1. Actual costs per unit usually vary greatly with the rate of operation. To overcome this variability in cost, most manufacturing firms use a "standard" rate of operation for estimating unit costs rather than the actual operating rate. The standard rate may be the actual average rate of operation experienced over a period of years, e.g., 75 or 80 percent of plant capacity. The use of a standard operating rate makes for less frequent price changes than would actual unit cost pricing, because it makes prices respond to changes in labor, material and energy prices rather than operating rates (unless the standard rate is changed). Standard unit labor costs typically are calculated on the basis of the trend rate of growth in productivity. Similarly, under target return pricing, profit margins are determined not on the basis of actual operating rates but on an assumed or long-run average rate of plant utilization. In effect, this procedure is designed to prevent short-run changes in volume from unduly affecting prices, with the expectation that the averaging of fluctuations in cost and demand over the business cycle will produce the desired rate of return on investment. Under standard cost procedures, prices at any given time may not necessarily reflect actual unit costs of production, although over longer periods prices must reflect actual unit costs for firms to remain in business.

For a description of the pricing practices of large industrial corporations in the United States, see A.D.H. Caplan, Joel B. Dirlam and Robert F. Lanzillotti, **Pricing in Big Business: A Case Approach** (Washington, D.C.: The Brookings Institution, 1958). An example of the target pricing calculus and its implications also appears in Gardner G. Means, **Pricing Power and the Public Interest** (New York: Harper and Brothers Publishing Company, 1962), pp. 232-248. For an analysis of the properties of various econometric price determination models incorporating these micro-economic pricing practices, see William D. Nordhaus, "Recent Developments in Price Dynamics," **The Econometrics of Price Determination,** Conference sponsored by the Board of Governors of the Federal Reserve System and Social Science Research Council, October 30-31, 1970, Washington, D.C., pp. 16-49.

2. There have been numerous empirical studies utilizing these two variables as determinants of changes in money wages. See for example, Otto Eckstein and Thomas A. Wilson, "The Determination of Money Wages in American Industry," **Quarterly Journal of Economics,** LXXVI, Number 3 (August 1962), pp. 379-414. For a more recent version of that approach, see Otto Eckstein and Roger Brinner, **The Inflation Process in the United States,** Congressional Joint Economic Committee, 92nd Congress, 2nd Session (Washington, D.C.: U.S. Government Printing Office, 1976), pp. 3-46. Also, Paul A. Samuelson and Robert M. Solow, "Analytical Aspects of Anti-Inflation Policy," **American Economic Review, Papers and Proceedings,** L, Number 2 (May 1960), pp. 177-194. This article also contains an excellent discussion of the difficulties of disentangling "demand-pull" and "cost-push" sources of inflation from ex-post statistical data.

3. A.W. Phillips, "The Relation Between Unemployment and the Rate of Change in Money Wage Rates in the United Kingdom, 1951-1957," **Economica,** N.S., XXV, Number 100 (November 1958), pp. 283-299. For an analysis of later modifications in the original Phillips Curve concept, see Thomas M. Humphrey, "Changing Views of the Phillips Curve," **Monthly Review,** Federal Reserve Bank of Richmond, LIX, Number 7 (July 1973), pp. 3-13.

4. Unit labor cost is computed as the ratio of compensation per hour/output per hour. In determining the increase in unit labor costs during any given period, increases in output per hour, i.e., productivity, provide a direct offset to increases in compensation per hour. For example, in 1976, unit labor costs in the private nonfarm business sector rose by 3.6 percent, reflecting a 7.4-percent increase in compensation per hour and a 3.7-percent increase in productivity. For a more complete explanation of the manner in which unit labor cost is measured, as well as the inverse relationship between unit labor cost and productivity, see J. Randolph Norsworthy and Lawrence J. Fulco, "Productivity and Costs in the Third Quarter," **Monthly Labor Review,** XLVI, Number 2 (February 1976), pp. 38-39.

5. See, for example, Thor Hultgren, **Changes in Labor Cost During Cycles in Production and Business,** National Bureau of Economic Research, Occasional Paper No. 74, 1960; Edwin Kuh, "Profits, Profit Markups and Productivity," Study Paper No. 15, Congressional Joint Economic Committee, **Study of Employment, Growth and Price Levels** (Washington, D.C.: U.S. Government Printing Office, 1959). Also, Thomas A. Wilson and Otto Eckstein, "Short-Run Productivity Behavior in U.S. Manufacturing," **Review of Economics and Statistics,** XLVI, Number 1

(February 1964), pp. 41-54.

6. These results, which were developed independently, conform with the findings of the authors mentioned in footnote 5 above.

7. The upsurge in industrial raw material prices during the Korean War period helped to push up this average during the first several quarters after the trough, but this had little effect on the typical cyclical pattern. The Bureau of Economic Analysis, U.S. Department of Commerce, classifies the Bureau of Labor Statistics' spot market price index for 13 industrial raw materials as a leading indicator of cyclical troughs—but not of cyclical peaks, because of its inconsistent behavior near the peak.

8. In June 1976, the Federal Reserve Board introduced a new capacity utilization series for the industrial materials industries as a replacement for the old series for "major materials." The new series is much broader in scope than the old series, since it includes all the materials industries contained in the industrial production index. But unlike the old series, it extends only back to 1967. For the cyclical comparisons used in Chart III-B, it therefore was necessary to use the FRB capacity utilization series for primary-processing industries as a proxy for capacity utilization in the materials industries. The primary-processing index incorporates many of the same manufacturing industries that are represented in the industrial-materials index—including textiles, lumber, paper, industrial chemicals, petroleum refining, rubber and plastics, stone, clay and glass and primary and fabricated metals—and has moved in close correspondence with the materials index during the 1967-76 period. For a discussion of the methodology involved, and of the relationship between the primary-processing and industrial-materials series, see "New Estimates of Capacity Utilization: Manufacturing and Materials," **Federal Reserve Bulletin,** LXII, Number II (November 1976), pp. 892-905.

9. In late 1976, the Federal Reserve Board introduced a major revision in its manufacturing capacity-utilization series dating back to 1946. The revised figures showed that the capacity utilization rate in recent periods tended to be much higher than earlier estimates. The overall capacity-utilization rate in manufacturing during the third quarter of 1976, for example, was estimated to be 80.8 percent, in contrast to the figure of 73.6 percent reported earlier. The differential between current operating rates and the peak rates attained in 1973 thus was considerably smaller than originally calculated—although substantial nonetheless. For a discussion of the methodology, refer to **Ibid.**

10. For a discussion of 1977 labor negotiations and the collective bargaining environment, see Lena W. Bolton, "Bargaining Calendar to be Heavy in 1977," **Monthly Labor Review,** LXLIX, Number 12 (December 1976), pages 14-24. Also, Douglas LeRoy, Schedule Wage Increases and Escalator Provisions in 1977," **Monthly Labor Review,** C, Number 1 (January 1977), pp. 20-26.

11. **Economic Report of the President,** 1977 (Washington, D.C.: U.S. Government Printing Office, January 1977), page 44.

12. U.S. Department of Agriculture, Economic Research Service, **Agricultural Outlook,** AO-16 (Washington, D.C.: U.S. Government Printing Office, November 1976), pp. 1-11. Also, "Food Prices Expected to Rise Little in 1977; Boon to the Economy?" **Wall Street Journal,** December 28, 1976, page 1.

13. _____ **Agricultural Outlook,** AO-19 (Washington, D.C.: U.S. Government Printing Office, March 1977), page 7.