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Chapter 16

Trends and Cycles in Productivity, Unit Costs, and Prices: An International Perspective

Geoffrey H. Moore and John P. Cullity

This chapter examines short-run cyclical changes in productivity, costs, prices, and profits in the United States and other industrialized countries in recent decades, as well as in the current recession. It also analyzes long-term trends in productivity, compensation, costs, and prices for their implications about levels of inflation and real earnings.

Theoretical speculation into the causes of business cycles has often centered on the notion that imbalances among productivity, cost, and price changes are a significant part of the process of cumulative change by which one set of business conditions transforms itself into another set. That these factors were important to an understanding of cyclical changes in market-oriented economies was the subject of discussion as far back as 1913. Many decades elapsed before statistics that securely supported this insight arrived on the scene. In recent years, however, several of the larger industrial countries have begun to publish quarterly data on productivity, costs, prices, and profits. The section on short-run cyclical changes summarizes the salient findings on the relationships among these key variables.

The chapter also considers in more detail the disinflation processes currently affecting U.S. economic activity. Movements in hourly compensation, output per hour, and various measures of costs, prices, and profits during the 1981-1982 recession are compared with the

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average of changes for the six recessions from 1948 to 1980. Recessions start out with an imbalance between costs and prices that grows worse for a time and damages the outlook for profits. However, the recession itself brings about a realignment as business enterprises strive to reduce costs. Once costs are rising less rapidly than prices, the outlook for profitable expansion of sales and output improves, and this sets the stage for recovery. All of this suggests that economic recovery hinges as much on an upturn in price/labor cost ratios as upon the much talked about decline in interest rates.

The section dealing with short-run cyclical changes also reveals a close link between movements in productivity and movements in the leading indicators. One can think of causal links running in both directions. For example, an upswing in new orders, one of the leading indicators, is likely to lead to an improvement in output per hour, because the additional output generated by the orders can often be produced without a commensurate increase in labor input. On the other hand, an improvement in productivity, generated by new capital investment, can reduce costs and prices and thereby stimulate orders. Statistics depicting this linkage are provided for the United States, United Kingdom, West Germany, and Japan.

Productivity gains in the industrial countries were generally slower in the 1970s than in the 1960s or before. Statistics are provided documenting this trend, using 1973 as the dividing line. Data on trends in wages, labor costs, prices, and real earnings are presented for seven countries. It is plain that the international productivity slowdown did not retard the gains in nominal wages in most countries. In five of the seven countries studied, wage gains in manufacturing industries were higher, not lower, after 1973. The exceptions were West Germany and Japan. The consequence, except for those two, was an extraordinary acceleration in labor costs per unit of output. The statistics reveal that countries with the largest increases in unit labor costs generally had the largest increases in prices, especially during 1973-1980. Growth rates in real earnings were lower in the 1973-1980 period in every country except the United Kingdom.

Additional evidence about these long-term relationships is developed by measuring growth rates from one business cycle peak to the next. The data cover the nonfarm business sector in the United States since 1948. In every one of the business cycles, the gains in nominal hourly compensation exceeded the gain in output per hour. The differential diminished in the first three cycles, but increased afterwards, reaching dramatic heights in the last two cycles. This growing disparity showed up, of course, in unit labor costs. A tight relation between inflation in costs and inflation in prices was maintained throughout.

Finally, this chapter examines the long-lasting marriage of real earnings and productivity. Official statistics suggest that in the last two cycles, those since 1973, changes in real compensation were negative, even though productivity increased slightly. This discrepancy, however, may reflect a problem with the consumer price index used to calculate real earnings. When nominal hourly compensation is deflated by three other price indexes that have some claim to relevance, the rates of increase in real compensation match those in productivity growth more closely than when the consumer price index is used. The results cast doubt on the widely accepted view that real earnings have declined in recent years.

Sustained long-term economic growth has been the most striking feature of U.S. business history. Growth in labor and capital resources fueled a substantial part of this growth. Secular improvements in the use of these resources also accounted for a large part. Americans have generally taken these productivity improvements for granted. A cursory examination of the economic record of the 1970s, however, is sufficient to dispel anyone's continuing inclination to complacency on this matter. That decade was the worst since 1901-1910 in terms of the growth in output per hour. Specifically, from 1971 to 1980, labor productivity in the private, nonfarm business sector grew only 9 percent, which was well below its growth in any of the preceding six decades. This development constituted a cruel irony, since in the 1960s some of the nation's ablest economists had thoroughly analyzed the problem of economic growth and put together extensive menus on how to stimulate faster growth. The consequences of the dismal productivity performance made an impression on the growth of output, on the growth of real earnings, and on the behavior of costs and prices. The poor productivity performance was not a problem unique to America. The same ailment afflicted every major industrial economy. In this chapter, we first examine short-run cyclical changes in productivity, costs, prices, and profits in the United States and other industrialized economies in recent decades, as well as in the current recession. We then analyze long-term trends in productivity, compensation, costs, and prices for their implications about levels of inflation.

CYCLICAL MOVEMENTS

Mitchell's Generalizations and Recent U.S. Business Cycles

Theoretical speculation into the etiology of the business cycle has often centered on the notion that imbalances among productivity, cost, and price changes are a significant part of the process of cum-

ulative change by which one set of business conditions transforms itself into another set. Wesley C. Mitchell, for instance, recognized as far back as 1913 that these factors were important to an understanding about cyclical changes in market-oriented economies.¹ His theoretical insights were widely discussed in the United States but many decades elapsed before statistics that securely supported his position arrived on the scene.² In 1972, the U.S. Bureau of Labor Statistics began to publish quarterly data on costs and profits per unit of output for all nonfinancial corporations along with comparable prices received. The BLS series were carried back to 1948 and they now cover seven full business cycles. In each of these cycles, the changes in these variables bear a family resemblance to those which Mitchell described almost seventy years ago.

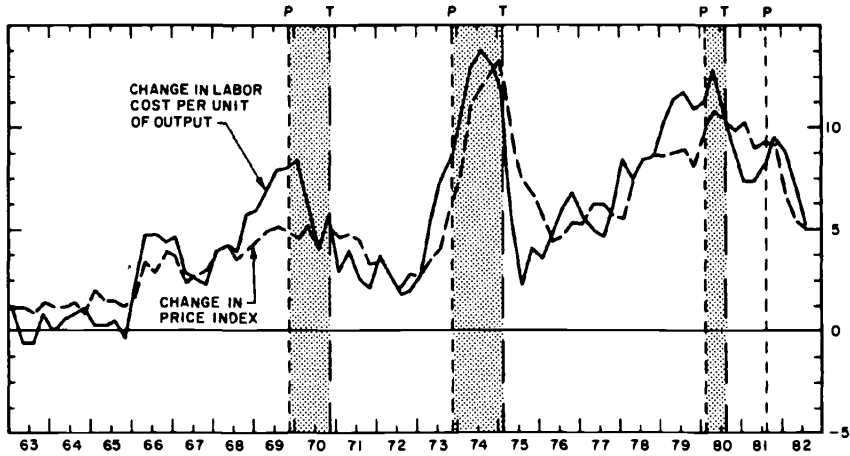
Let us summarize Mitchell's views and then look at what has happened during recent business cycles. Mitchell suggested that in the later stages of economic expansion an encroachment of costs on prices occurred which paved the way for an eventual squeeze on aggregate profits. These developments were crucial to an understanding of the reluctance of business firms to commit themselves to new investment projects. This hesitancy to undertake new investments itself then contributed to the forces responsible for turning expansion into recession. In contrast, a reversal of this occurs during recessions and this helps to brake the cumulative process of contraction and bring about an upturn.

Figure 16-1 offers us a glimpse of the movements of these statistics in recent decades. The salient findings on this subject as they now appear to stand are as follows:

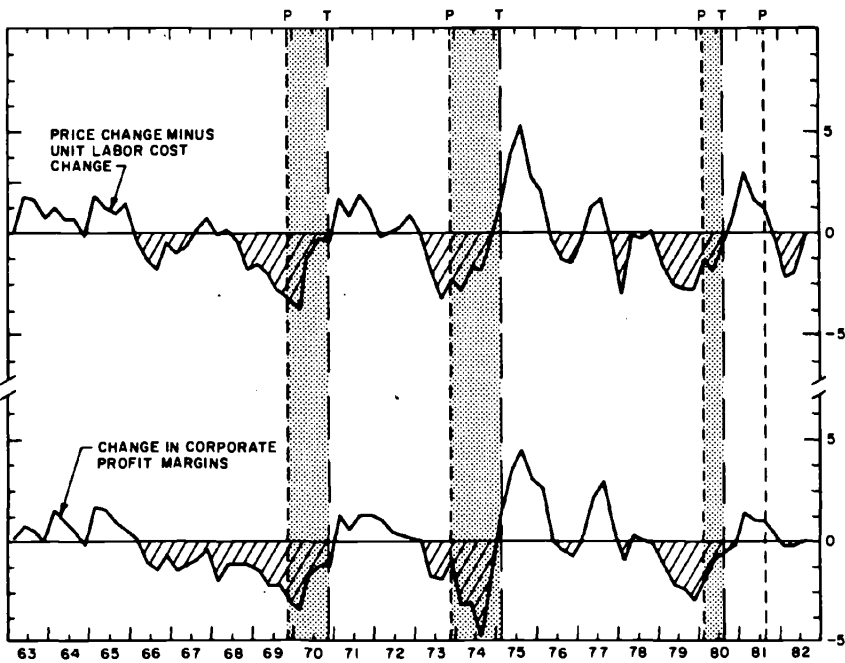
1. For nonfarm businesses as a whole, the rates of increase of unit labor costs and of prices received have generally tracked one another closely. (See Figure 16-1a.)
2. There have been important divergences, however. Shortly before and during each of the recessions (shaded area), unit labor costs rose more rapidly than prices, whereas in the early stages of each of the recoveries, unit labor costs rose more slowly than prices. The arithmetic differences between the growth rates in prices and unit labor costs are shown in Figure 16-1b.
3. The differences between price changes and unit labor cost changes follow a cyclical pattern, which is reflected in corporate profit margins (Figure 16-1b). In general, profit margins tend to fall late in economic expansions and during recessions, as businesses fail to pass through to prices some of the sharp increases they experience in unit labor costs. In contrast, margins tend to recover early in expansions.

Figure 16-1. Growth Rates in Labor Costs, Prices, Profits, and Productivity, Nonfarm Business—United States.

IA. UNIT LABOR COSTS AND PRICES

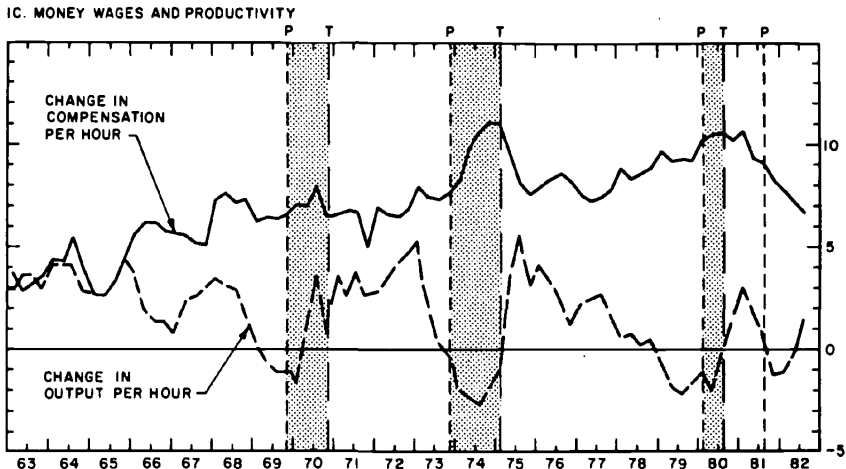


IB. PRICE/COST DIFFERENCES AND PROFITS



(Figure 16-1. continued overleaf)

Figure 16-1. continued



Note: Shaded areas are recessions, from peak (P) to trough (T).

- The reasons for the behavior of unit labor costs can be seen when cost is subdivided into its two components: average hourly compensation and output per hour (Figure 16-1c). During the late states of contraction and the early stages of economic expansions rapid increases in output per hour occur along with a relatively slow rise in hourly compensation. Hence, changes in labor costs per unit of product fall. In contrast, as the economy approaches a peak, changes in output per hour usually decline. (For details, see Table 16-1.) At about that time, hourly compensation generally grows more rapidly. When growth in hourly compensation exceeds the increase in output per hour, changes in unit costs advance.

Mitchell's Generalizations and Growth Cycles In Europe and Japan

Another test of the power of Mitchell's generalizations, which has both scientific value and practical advantages, can be made by compiling relevant statistics in other countries and conducting similar experiments with them. If similar relationships are revealed, the case for the theory would obviously be strengthened. However, finding a similar testing ground for the theory elsewhere is a bit more difficult than it might at first appear. As noted earlier, the U.S. tests were conducted inside the framework of the business or classical cycle.

Table 16-1. Productivity Changes over Business Cycles, United States
(percent).

	<i>Business Cycle Contractions</i>		<i>Business Cycle Expansions</i>	
	<i>1st Half</i>	<i>2nd Half</i>	<i>1st Half</i>	<i>2nd Half</i>
Averages				
1919-1961 (10 cycles)	0.8	2.8	5.3	3.0
1961-1982 (4 cycles)	-1.9	1.4	3.2	0.7
Individual cycles				
1961-1969 (E) ^a			3.6	1.6
1969-1970 (C) ^b	1.2	1.4		
1970-1973 (E)			3.9	1.9
1973-1975 (C)	-2.9	-0.4		
1975-1980 (E)			3.4	-0.1
1980-1980 (C)	-2.8	3.2		
1980-1981 (E)			2.0	-0.2
1981-1982 (C)	-3.2			

^aE = Expansion.

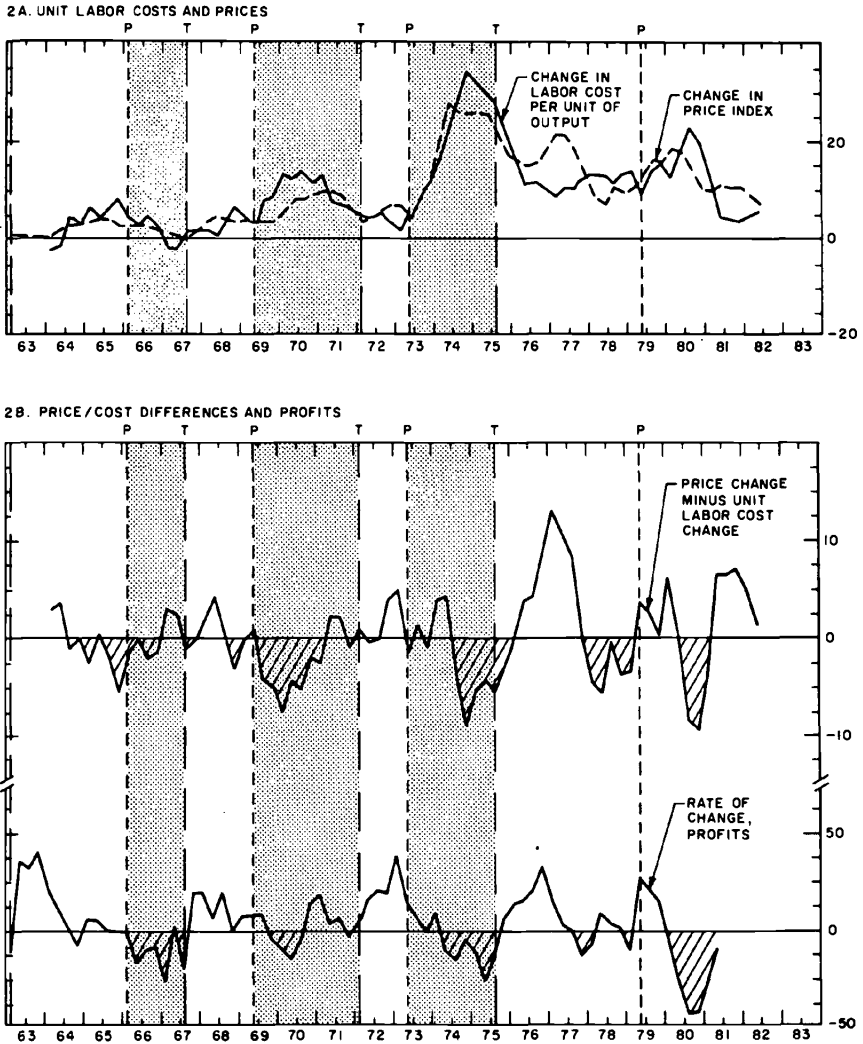
^bC = Contraction.

Source: The data for 1919-1961 relate to the manufacturing sector and are monthly; see Solomon Fabricant, *A Primer on Productivity* (New York: Random House, 1969), p. 91. The data for 1961-1982 are for the nonfarm business sector and are compiled quarterly by the Bureau of Labor Statistics.

This framework involves an absolute rise and fall in aggregate economic activity. In the 1950s and 1960s, however, many countries did not experience actual declines in activity but did experience varying rates of growth. When the work on international economic indicators now being conducted at the Columbia Center for International Business Cycle Research was first launched at the National Bureau of Economic Research in 1973, the task was to learn more about these fluctuations. To examine these growth cycles, therefore, methods of measuring and eliminating long-run trends were developed. From the trend-adjusted data, chronologies of growth cycles were derived in the same manner that had been used in the United States to derive the business cycle chronology. The growth cycle then is simply a trend-adjusted business cycle. The expansion phase is a period when the short-run growth rate of aggregate economic activity is greater than the long-run rate, whereas in the contraction phase the short-run growth rate is less than the long-run rate.

Figures 16-2, 16-3, and 16-4 disclose information about labor costs, productivity, and prices for the United Kingdom, West Germany, and Japan within a growth cycle framework. The peak (*P*) and trough (*T*) dates identify periods of slowdown in economic

Figure 16-2. Growth Rates in Labor Costs, Prices, Profits, and Productivity in Manufacturing—United Kingdom.

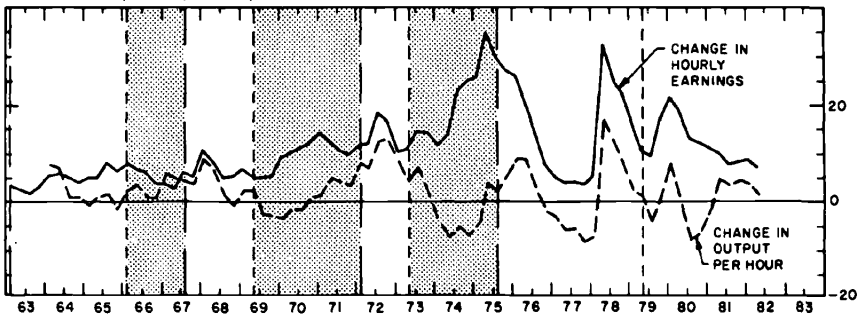


growth in each country, not necessarily periods of recession. The salient findings for the three countries are as follows:

1. Although each country has its own pattern, the close relationship between rates of change in labor cost per unit of product and in prices is as visible in these three countries as in the United States.

Figure 16-2. *continued*

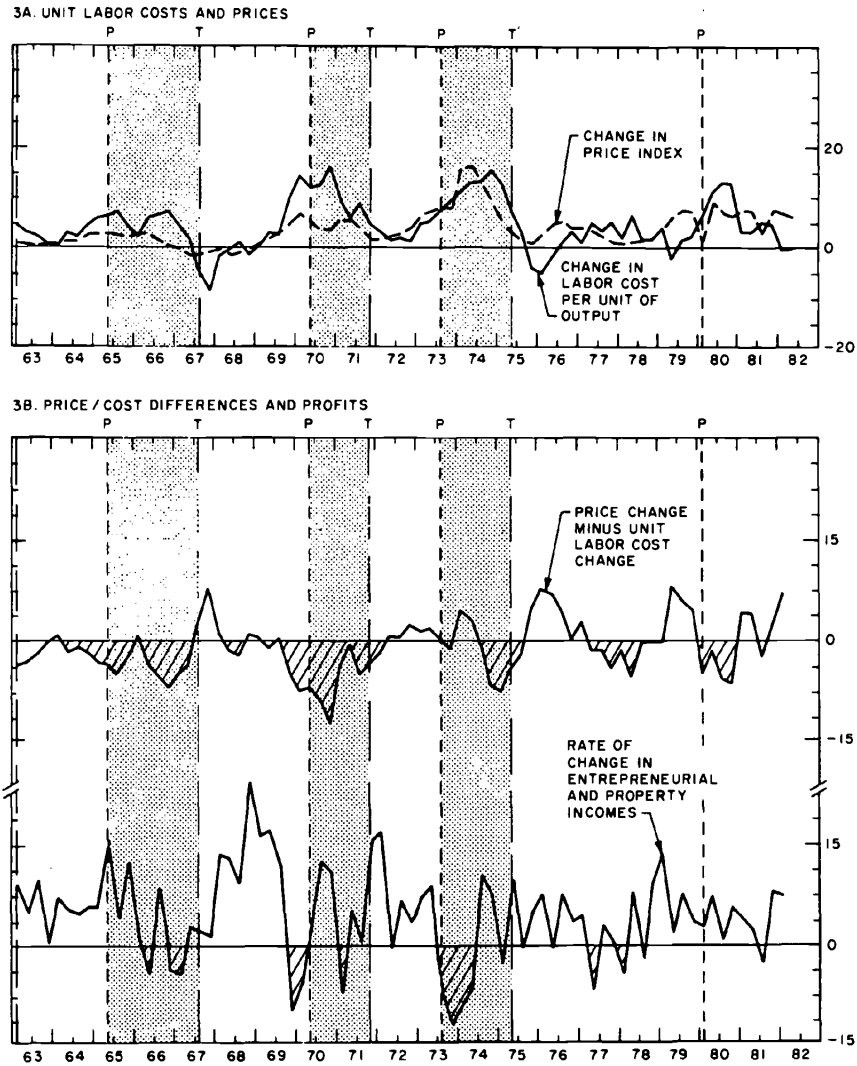
2C. MONEY WAGES AND PRODUCTIVITY



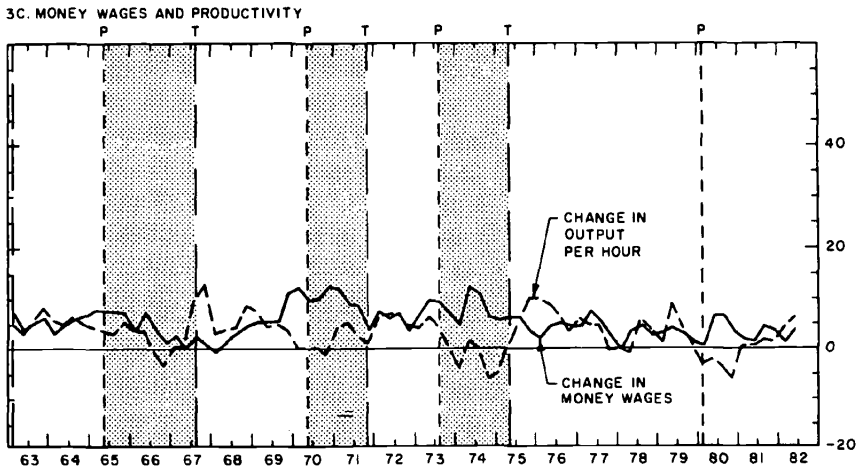
Note: Peak (P) and trough (T) dates identify periods of slowdown in economic growth.

2. For the three countries, unit labor costs rose faster than prices during each of the growth recessions since 1963. The encroachment process, however, started to take hold *before* the growth recessions in only seven of the twelve episodes.³ Although this differs from the universal drop before U.S. business cycles it should be borne in mind that growth cycle peaks typically occur before business cycle peaks.
3. Changes in profit margins in Japanese factories since 1963 moved downward before each of the *growth* cycle peaks and reached negative values—that is, margins were falling—no later than one quarter after the growth cycle peak in any case. Moreover, lows of changes in profit margins preceded each of the growth cycle troughs. For the United Kingdom and West Germany we have unfortunately been unable to locate data on profit margins. As a proxy, we have computed changes in total profits for the United Kingdom and in total entrepreneurial and property income for Germany. In the United Kingdom highs in the rate of change in profits preceded each of the growth cycle peaks, and lows occurred before growth cycle troughs. At about the same time growth cycle lows were reached, total profits were again rising. Corresponding statistics on changes in the West German series are more erratic, and it is difficult to find more than traces of the cyclical pattern that shows up clearly in the price/cost differences.
4. During the early stages of growth cycle expansions, rapid increases in output per hour occur, along with a slowing of the rise in compensation; hence, increases in unit costs fall. In contrast,

Figure 16-3. Growth Rates in Labor Costs, Prices, Profits, and Productivity in Manufacturing—West Germany.



changes in output per hour typically decline as a growth cycle peak is approached, while hourly compensation grows more rapidly. When the growth in hourly compensation exceeds that in output per hour, changes in unit costs advance.

Figure 16-3. *continued*

Note: Peak (P) and trough (T) dates identify periods of slowdown in economic growth.

Summing up these relationships, costs are generally rising more rapidly than prices when a slowdown or recession begins, but their differences diminish during recessions. By the time a recovery begins they are usually in much closer alignment.

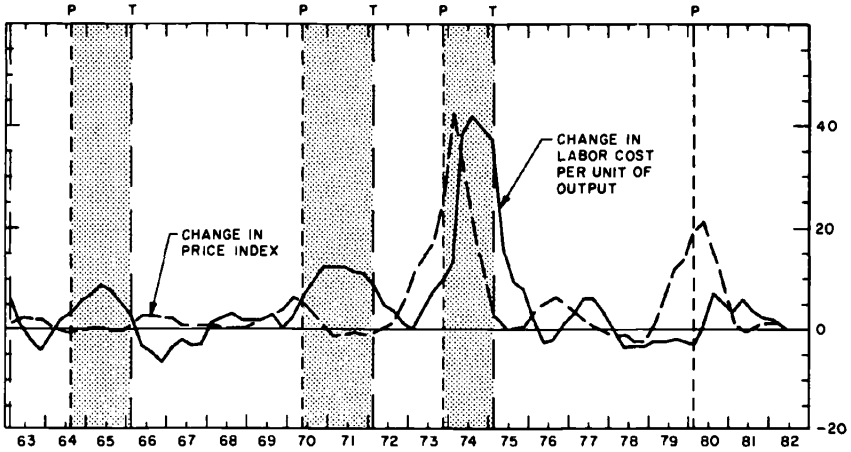
A principal function of economic history, which studies changes under various sets of institutional arrangements, is to test the relevance of economic generalizations and to ask which are the more widely and which are the more narrowly applicable. The historical analysis we have summarized covers a long span of U.S. history and goes far beyond our boundaries to discover new testing grounds in the United Kingdom, West Germany, Japan, and other countries. Few economic generalizations have been accorded as much testing as Mitchell's views on the cyclical behavior of costs and profits. Still fewer have been able to survive tests of this sort for so long a period.

Recession-Recovery Patterns

We now turn to materials that disclose a few of the features of the disinflation processes currently affecting U.S. economic activity. Figure 16-5 depicts the movements of hourly compensation, output per hour, and various measures of costs, prices, and profits for the months before and after the business cycle peak in July 1981. The data are plotted in what is known as a recession-recovery format.⁴

Figure 16-4. Growth Rates in Labor Costs, Prices, Profits, and Productivity in Manufacturing—Japan.

4A. UNIT LABOR COSTS AND PRICES



4B. PRICE / COST DIFFERENCES AND PROFITS

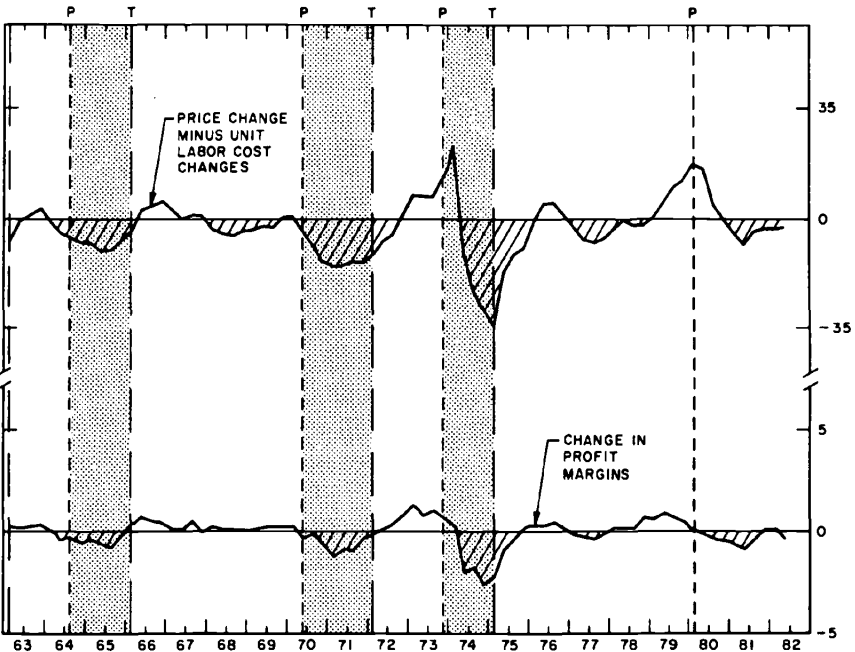
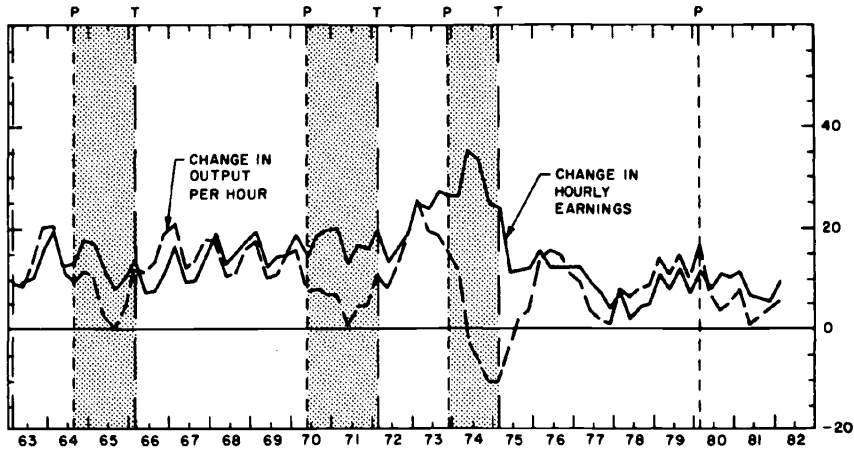


Figure 16-4. *continued*

4C. MONEY WAGES AND PRODUCTIVITY



Note: Peak (P) and trough (T) dates identify periods of slowdown in economic growth.

The growth rates displayed are two-quarter smoothed changes; that is, the growth rate is derived from the ratio of the current quarter's index to the average index for the four preceding quarters. This calculation is designed to smooth out the irregularities in the short-term movements of the various statistics. The railroad track line displays the average pattern of the series during six preceding recessions, 1948-1980. The solid line represents the movements of the respective series during the current recession.

It is plain that the rate of gain in nominal hourly compensation during the 1981-1982 downswing has fallen more sharply than during earlier contractions. Hourly compensation was rising at a 9 percent annual rate at the 1981 peak. A year later, it was increasing at a less than 7 percent rate. The decline to date has been more than twice as large as the average decline in previous recessions.

The slowdown in the growth of hourly pay has helped to slow the growth of labor cost per unit of product. At first, however, unit labor costs rose more rapidly, owing to the sharp decline in productivity growth when the recession got underway. The decline in private nonfarm productivity was much sharper than the typical change that occurs in the early stages of economic contraction. Hence, unit cost accelerated during the first six months of the downswing. Since then, however, unit cost changes have followed a path similar to that during comparable phases of earlier recessions.

Figure 16-5. Recession-Recovery Patterns: Productivity, Costs, Prices and Profits.

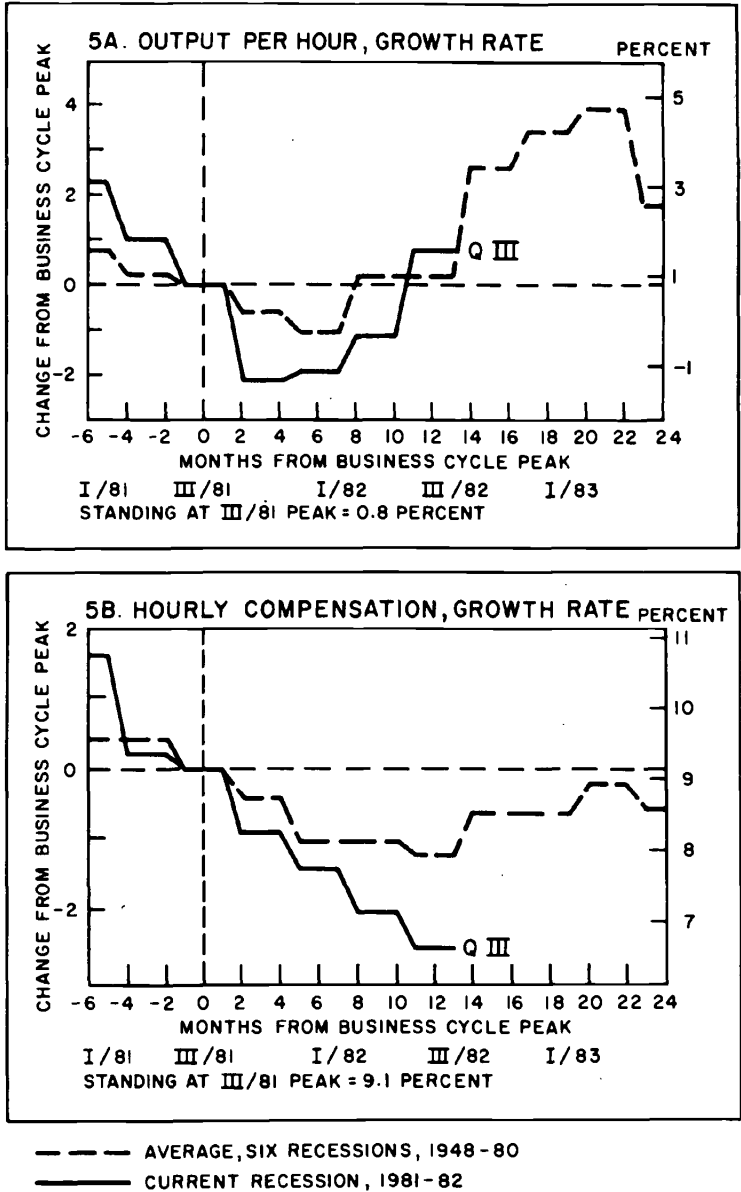
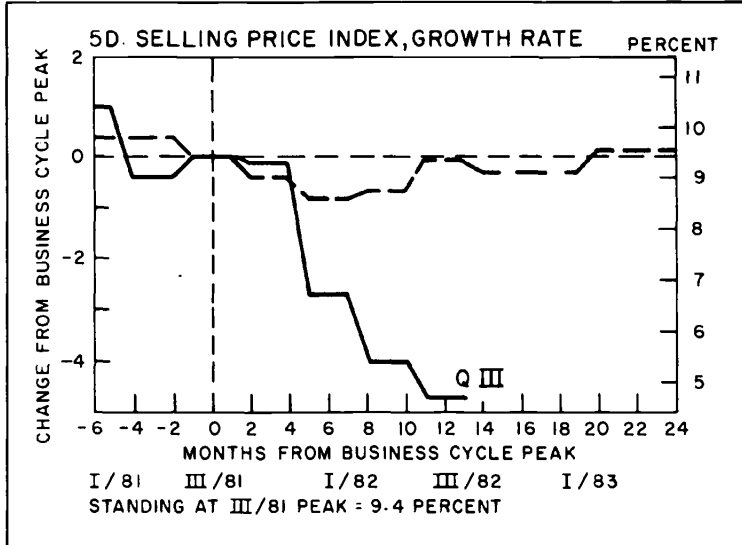
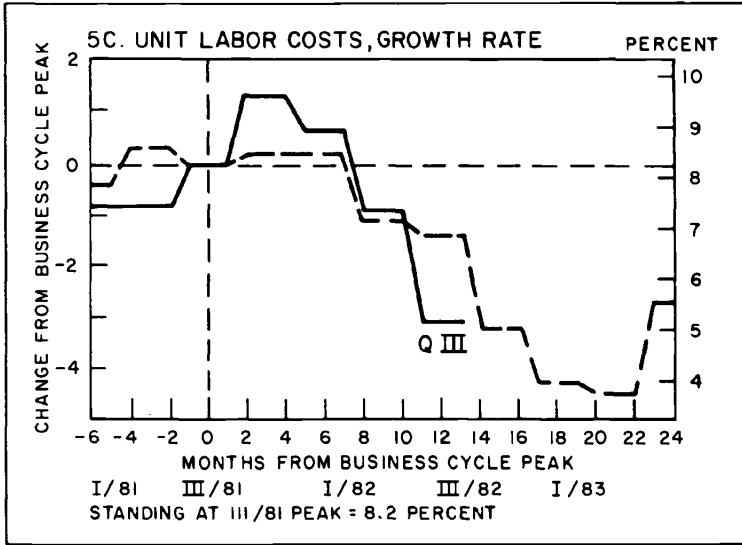
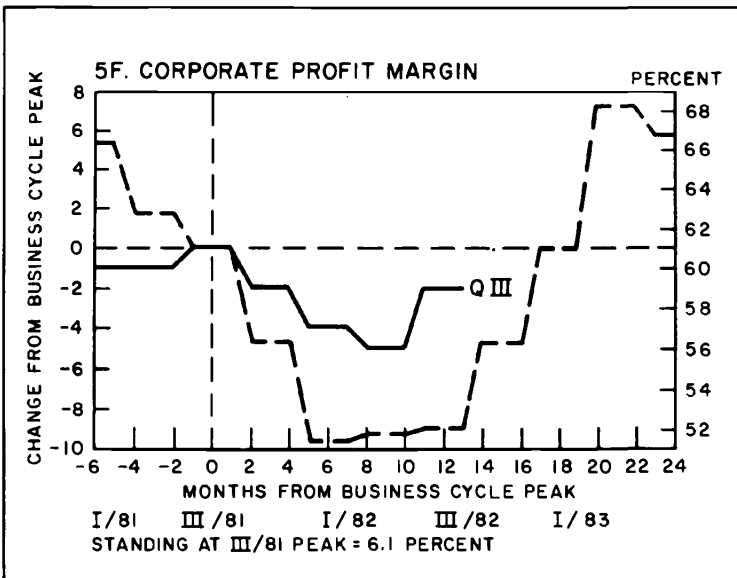
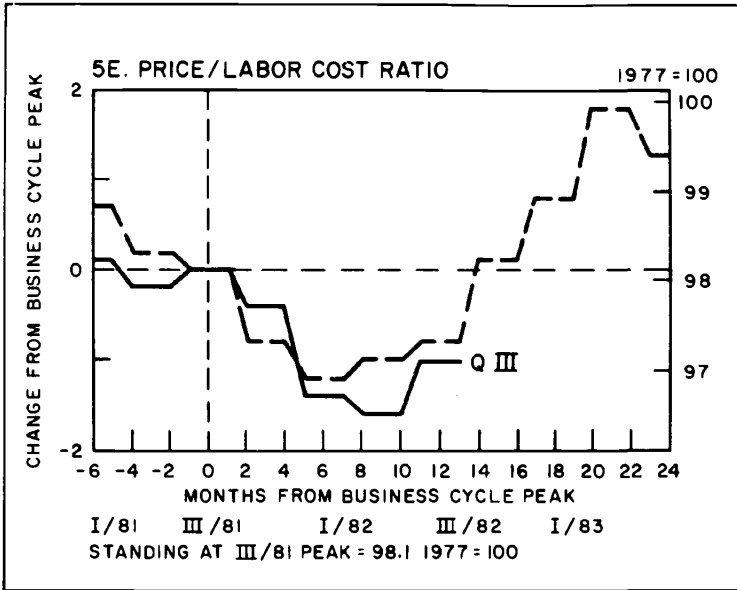


Figure 16-5. continued



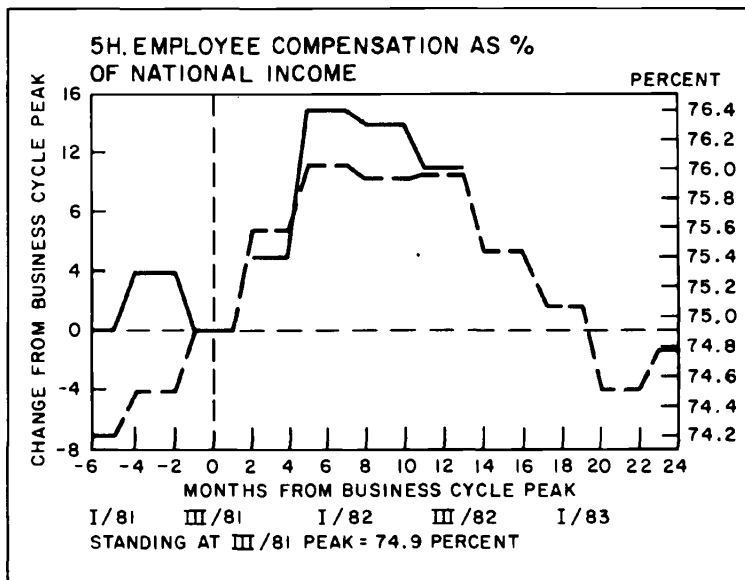
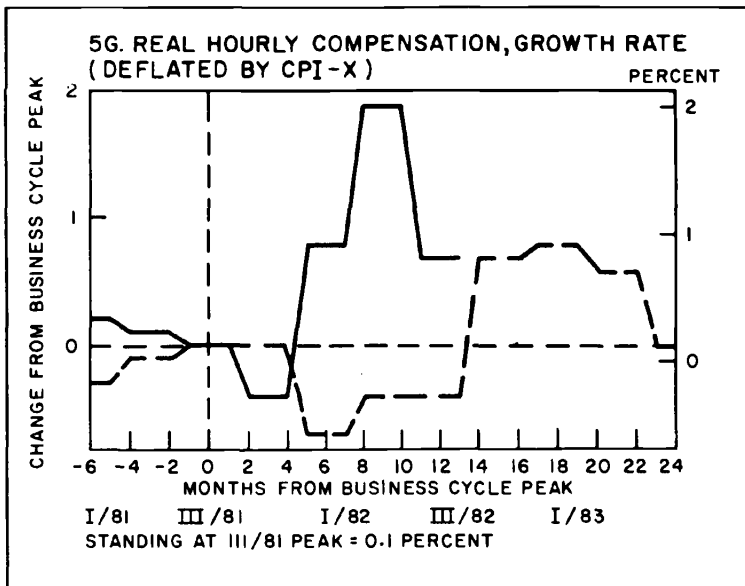
(Figure 16-5. continued overleaf)

Figure 16-5. continued



--- AVERAGE, SIX RECESSIONS, 1948 - 80
 ——— CURRENT RECESSION, 1981 - 82

Figure 16-5. continued



Note: Data pertain to the nonfarm business sector except for f (all nonfinancial corporations) and h (entire employed population).

The charts also reveal the striking changes in prices that occurred early in the economic slide. At that time, the inflation rate fell like a rock. The decline in the growth of prices working in conjunction with the stickiness of the cost changes served to prolong and intensify the encroachment of costs on prices that began, as usual, during the preceding economic upswing. Thus, the price/unit labor cost ratio continued its downward slide through the second quarter of 1982, a big factor in the decline of profit margins. Since then, both the ratio and margins have increased. Another implication of the sharp decline in the rate of price inflation, which affected the economic well-being of the close to 100 million employed persons, is disclosed in the movements of the changes in real hourly earnings. A sharp increase in real hourly compensation occurred about six months after the business cycle peak in the summer of 1981 (see discussion on page 272). Normally, real earnings do not start to increase until about a year after a recession has started. This increase has helped to offset some of the decline in income produced by the drop in employment, since real income has increased for those who remained employed.

Every economist knows that there are only two ways to increase the real earnings of labor. They can be raised by (1) increasing output per hour of work, or (2) enlarging the share of total income that goes to wage and salary workers. The first of these two sources is basic and will be addressed in our discussion of long-term trends. In the short run, however, business firms in the aggregate may not be able to increase their prices as rapidly as hourly rates of pay are rising. Hence, real hourly earnings will increase.

During the 1981-1982 recession, although real hourly compensation fell slightly at the start, there was a rapid quickening of real compensation afterward. In the second quarter, this series rose at a 2 percent annual rate. Not only that, as suggested earlier this is associated with an enlargement of the share of total income that goes to the workers. The latter effect can be seen in the lagging economic indicator, compensation of employees as a percent of national income, which has risen of late (see Figure 16-5h). Indeed, in the first half of 1982, workers' share in the national income, at 76 percent, was higher than in any preceding six-month period save one.

In his masterpiece on business cycles published in 1939, Joseph Schumpeter propounded the remarkable proposition that periods of recession are times when the harvest is gathered after the strenuous efforts of the expansion.⁵ Sympathetic students of his work have usually looked at this proposition with bemusement, as something better overlooked since it would only detract from the respect that his work rightfully deserves. But Schumpeter's formulation is at least

a reminder to us that business cycle recessions are not catastrophes in all respects. The data on changes in real hourly earnings just cited provide some perspective on this matter.

The figures tell still another story that perhaps has not received the attention it deserves. During the past year, the public's attention has been focused on the high level of nominal and real interest rates. There has been enormous speculation about the impact of these rates on the prospects for economic recovery. There is justification for this position. However, scant attention if any is focused on the behavior of unit labor costs and their relation to prices. Judging from past experience, economic recovery hinges as much on an upturn in price/labor cost ratios as upon a decline in interest rates.

The Link between Productivity and the Leading Indicators

We have seen that short-run movements in productivity are closely linked to costs, prices, and profits, which in turn have long been viewed as crucial factors in the generation of business cycles. One might expect, therefore, that productivity movements would show a close affinity to the so-called leading indicators, which for a variety of reasons anticipate business cycle peaks and troughs. One can think of causal relationships running in both directions. For example, an upswing in new orders, one of the leading indicators, is likely to lead to an improvement in output per hour, because the additional output generated by the larger volume of orders can usually be produced without a commensurate increase in labor input. On the other hand, an improvement in productivity generated, say, by new capital equipment, can reduce costs and prices and thereby stimulate orders.

Figure 16-6 supplies a test of the strength of this two-way relationship, comparing growth rates in leading indexes with growth rates in productivity in four countries. In each country there is a general correspondence between the movements of the two series. Thus, faster growth in a country's leading index is likely to be accompanied by faster growth in output per hour. Slower growth or decline in the leading index and in productivity also go together. Both lead general business activity, and by about the same amount of time; that is, the movements of the leading indexes and productivity are roughly coincident with one another. More often than not, in fact, the turns in productivity growth have preceded those in the leading index growth rates by a few months, again attesting to the significant role of productivity in the business cycle.

One of the practical values of this relationship is that the leading indexes can help appraise current movements in productivity. For

Figure 16-6. Growth Rates in Productivity and in the Leading Indexes—Four Countries.

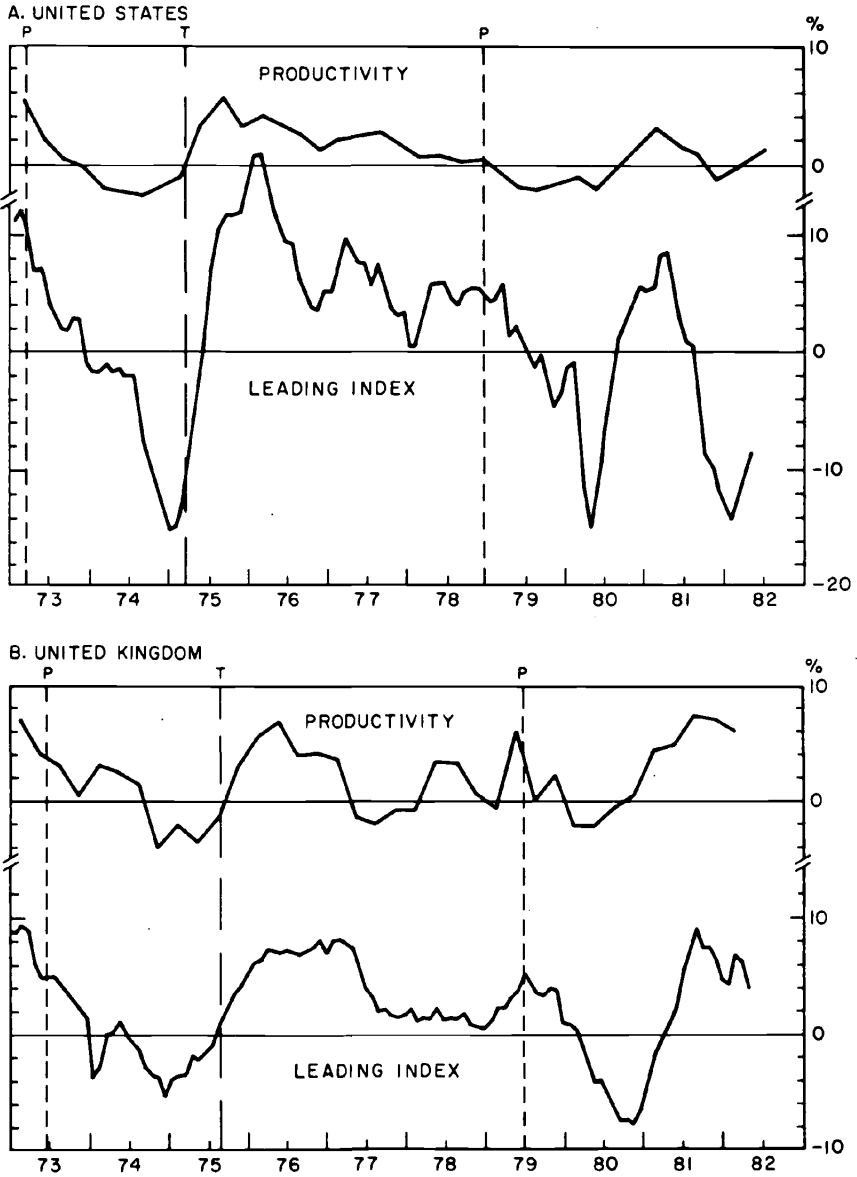
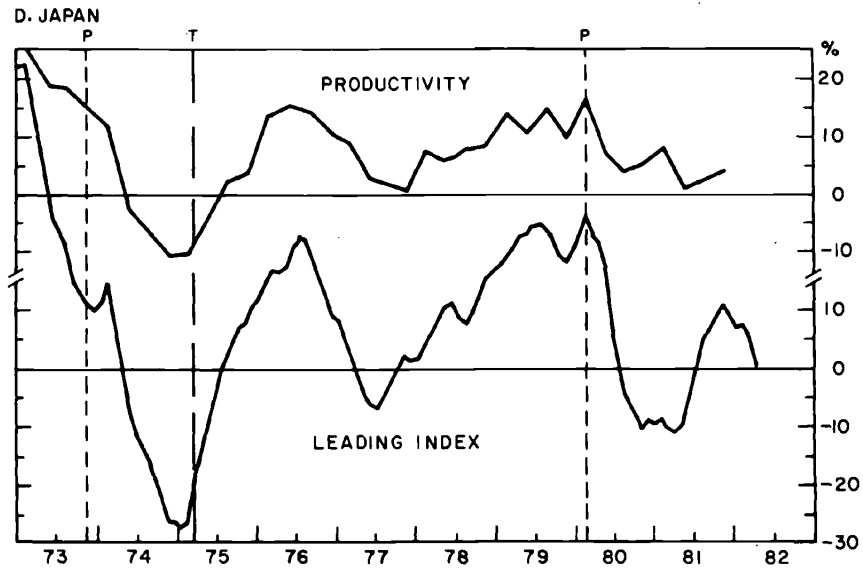
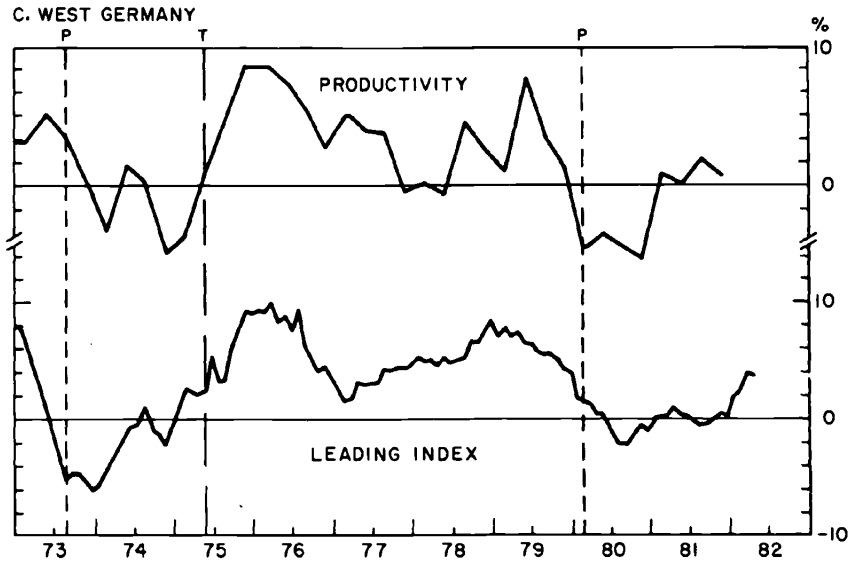


Figure 16-6. continued



Note: Peak (P) and trough (T) dates identify periods of slowdown in economic growth.

example, the striking improvement in productivity growth in the United Kingdom since 1980 seems to be firmly based, since the growth rates in the U.K. leading index have risen substantially from their low at the end of 1980. In most countries, the leading indexes are available several months before productivity data are published, so the former give some advance indications of movements in the latter.

LONG-RUN TRENDS

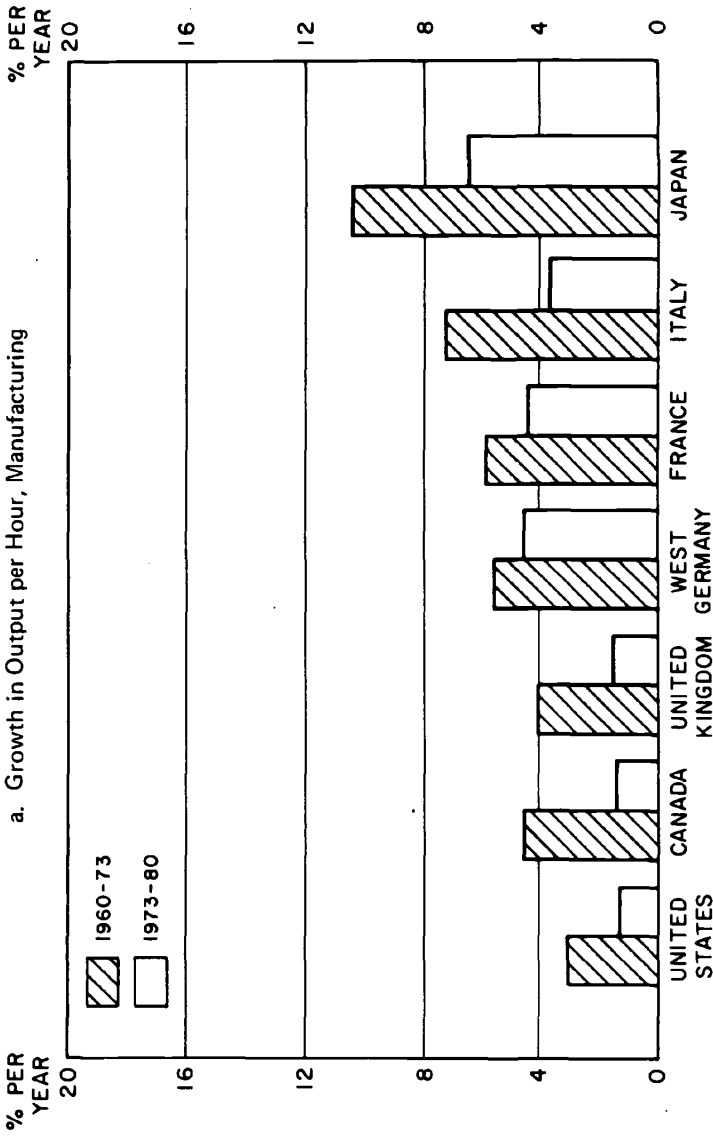
As noted earlier, productivity gains in the industrial countries have been generally slower in the 1970s than in the 1960s or before. Figure 16-7 documents this trend, using 1973 as the dividing line, and displays the concomitant trends in wages, labor costs, prices, and real earnings, along the lines developed in John Kendrick's recent work.⁶ Except for prices, where we use the consumer price index, all the data pertain to the manufacturing sector.

One thing the international productivity slowdown did not do was to retard the gains in nominal wages. In five of the seven countries, wage gains in manufacturing industries were higher, not lower, after 1973. Only in West Germany and Japan did wage gains follow the productivity trend. The consequence, in every country except West Germany and Japan, was an extraordinary acceleration in labor cost per unit of output. A further consequence was a faster rise in prices, because labor costs constitute a big proportion of total costs in most industries. Although reductions in profit margins and other costs can temporarily offset some of the increases in labor costs, in the long run, rising labor costs get passed through to prices.⁷

A comparison of the bars in Figure 16-7c and d reveals that countries with the largest increases in unit labor costs generally had the largest increases in prices, especially during 1973-1980. The United Kingdom and Italy are well above the rest in both cost and price increases. West Germany and Japan share the honors for the smallest increases in both costs and prices. They were the countries whose wage trends during the past eight years came closest to matching their reduced productivity growth.

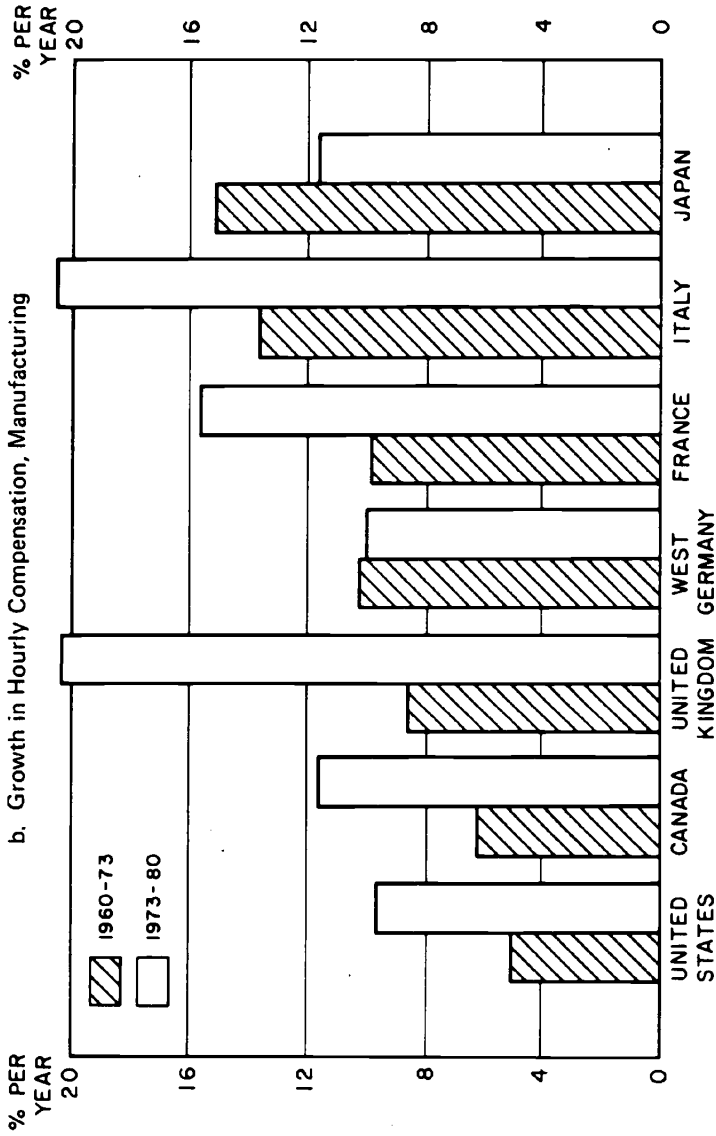
As for real hourly earnings, growth rates were lower in the 1973-1980 period than in the previous period in every country except the United Kingdom (Figure 16-7e). The reduction in real wage gains for the United States and Japan were conspicuously sharp. The enormous acceleration in money wages did not pay off in real terms. As has been established time and again, productivity growth holds the key to growth in real earnings in the long run.

Figure 16-7. International Reactions to the Productivity Slowdown.



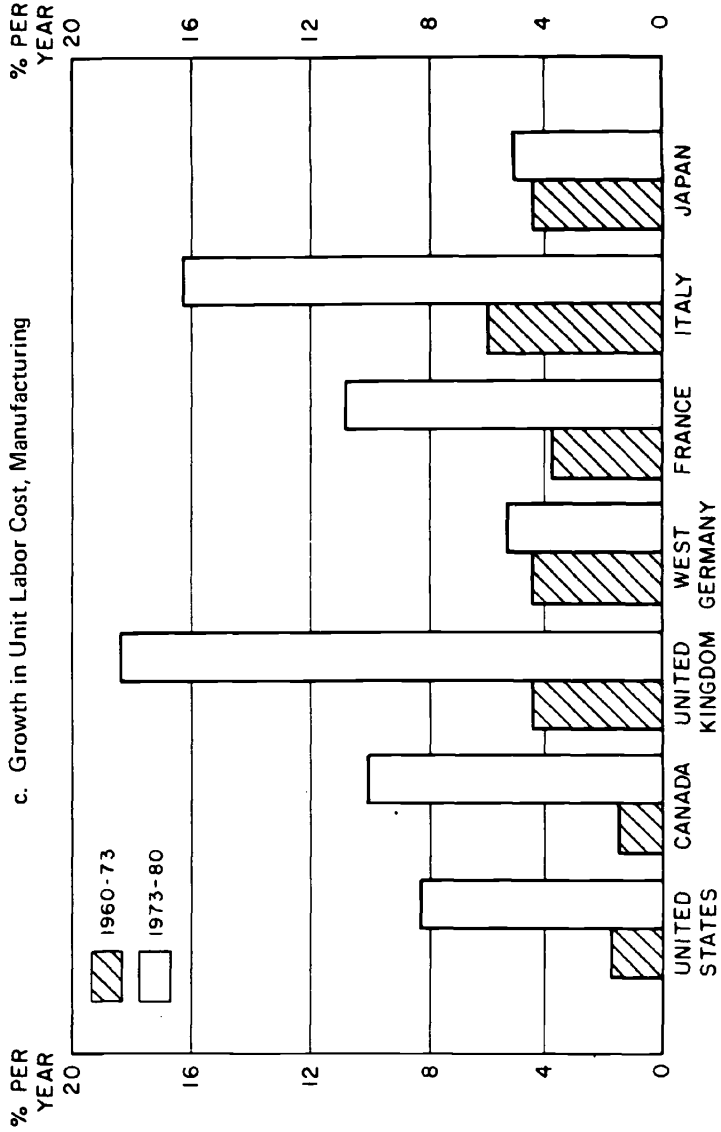
The productivity slowdown has been international in scope . . .

Figure 16-7. continued



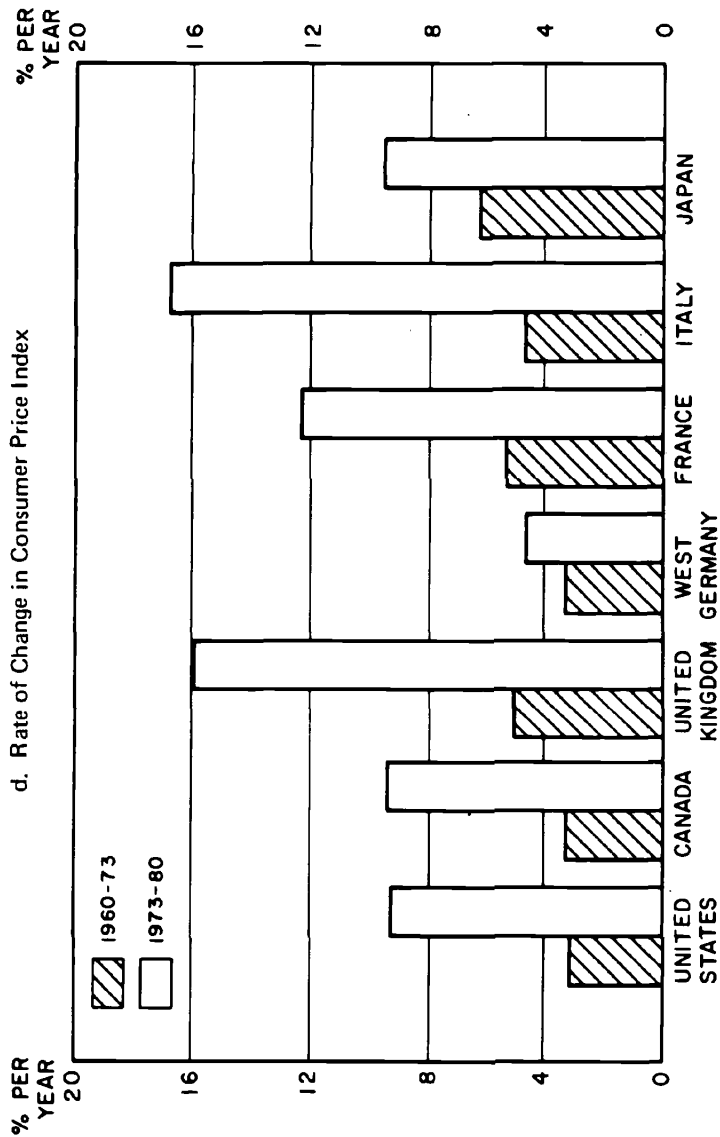
but hourly compensation accelerated everywhere except in Germany and Japan, far exceeding productivity growth.

Figure 16-7. continued



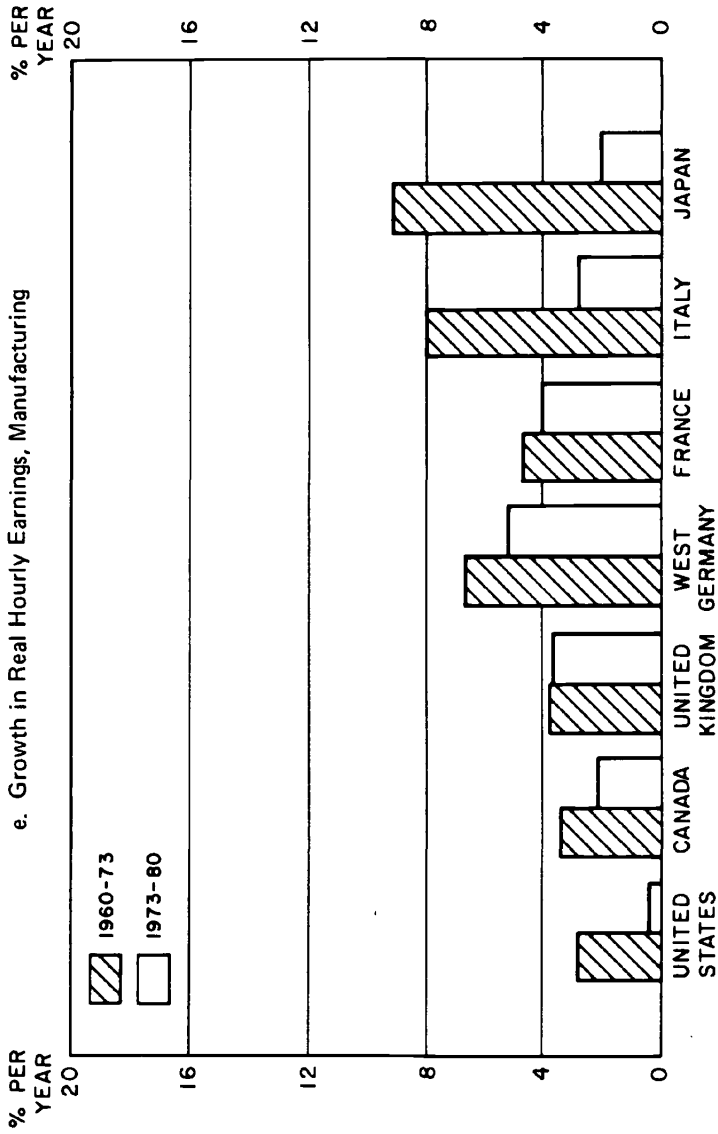
So labor cost per unit of output accelerated, though only a little in Germany and Japan...

Figure 16-7. continued



while prices accelerated also, but least in Germany and Japan...

Figure 16-7. continued



and gains in real hourly earnings slackened, like productivity.

Further evidence buttressing those long-run trend relationships is displayed in Figure 16-8. Here the method of putting to one side the short-run cyclical changes is to measure growth rates from one business cycle to the next. The data cover the nonfarm business sector in the United States since 1948. Hence the industry coverage and time span is wider than in the preceding charts, while the geographic coverage is narrower.

In every one of the seven business cycles, the gains in hourly compensation in nominal terms exceeded the gains in output per hour (Figure 16-8a). In the first three cycles, from 1948 to 1960, the differential diminished. Then it increased, reaching dramatic heights in the last two cycles, 1973-1980 and 1980-1981. Over the entire period the relationship between growth in hourly wages and in productivity was, if anything, inverse. Perhaps "perverse" would be a better word.

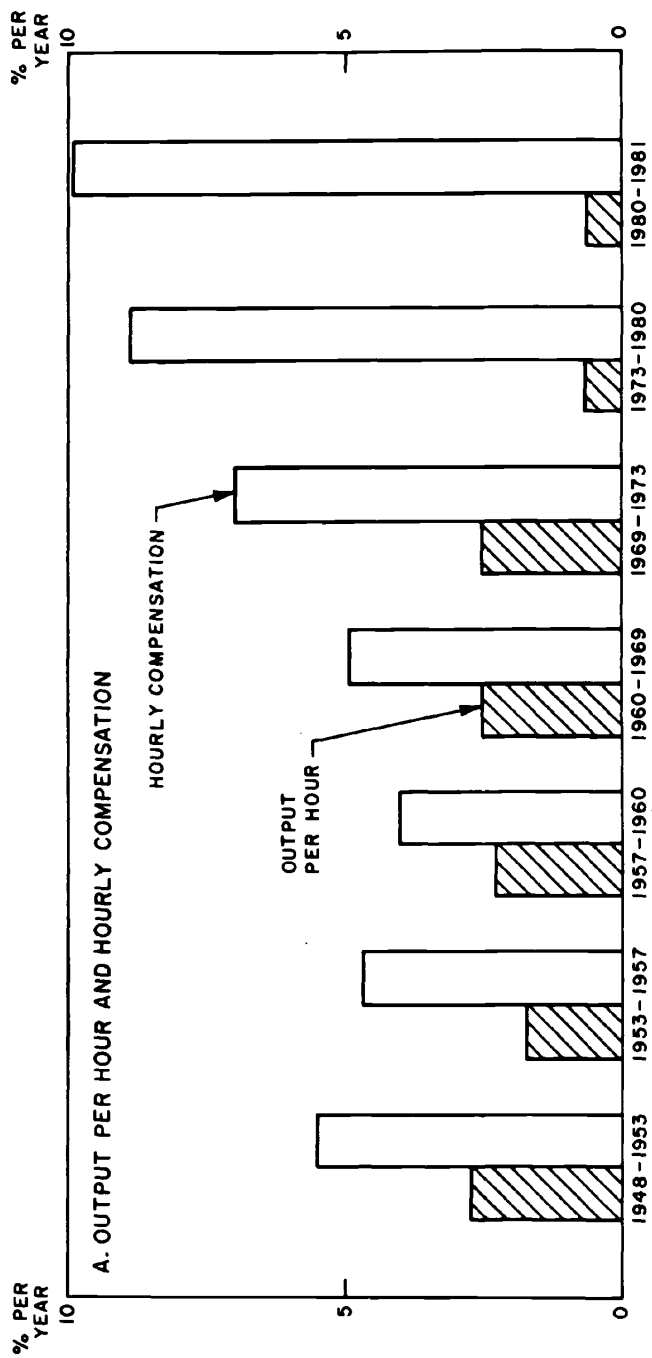
This growing disparity between wages and productivity in the 1960s and 1970s showed up, of course, in unit labor costs (Figure 16-8b). The tight relation between inflation in costs and inflation in prices was maintained throughout. Whatever the ultimate source of inflation, costs and prices go together.

Finally, in Figure 16-8c, we return once again to the long-lasting marriage of real earnings and productivity. As productivity goes, so go real earnings. This time, however, there is a slight twist. In the first two cycles, real earnings growth exceeded productivity growth. In the last five cycles, since 1957, real earnings growth fell short of productivity growth.

The reasons for this twist are worth further exploration. On the face of it, the inflation in nominal wages had a negative payoff. Not only did the gains in real earnings decline as productivity slowed, they did not even keep up with productivity. In fact, in the last two cycles, since 1973, changes in real earnings were negative, even though productivity increased slightly. This decline in real earnings, however, may reflect a problem with the consumer price index, which is used to calculate real earnings. To examine this matter, we have deflated hourly earnings with three other price indexes that have some claim to relevance, with the results shown in Figures 16-8d, e, and f. We find that in all three instances, the rates of increase in real compensation match those in productivity growth more closely than when the consumer price index is used. Moreover, all three of the alternative measures show that real earnings increased since 1973, albeit slowly.

One can argue, of course, about the relative merits of the various price deflators. CPI-X measures housing costs in terms of a rental

Figure 16-8. Growth Trends in Productivity, Compensation, Costs and Prices, Nonfarm Business Sector, United States, 1948-1981.



(Figure 16-8. continued over/leaf)

Figure 16-8. continued

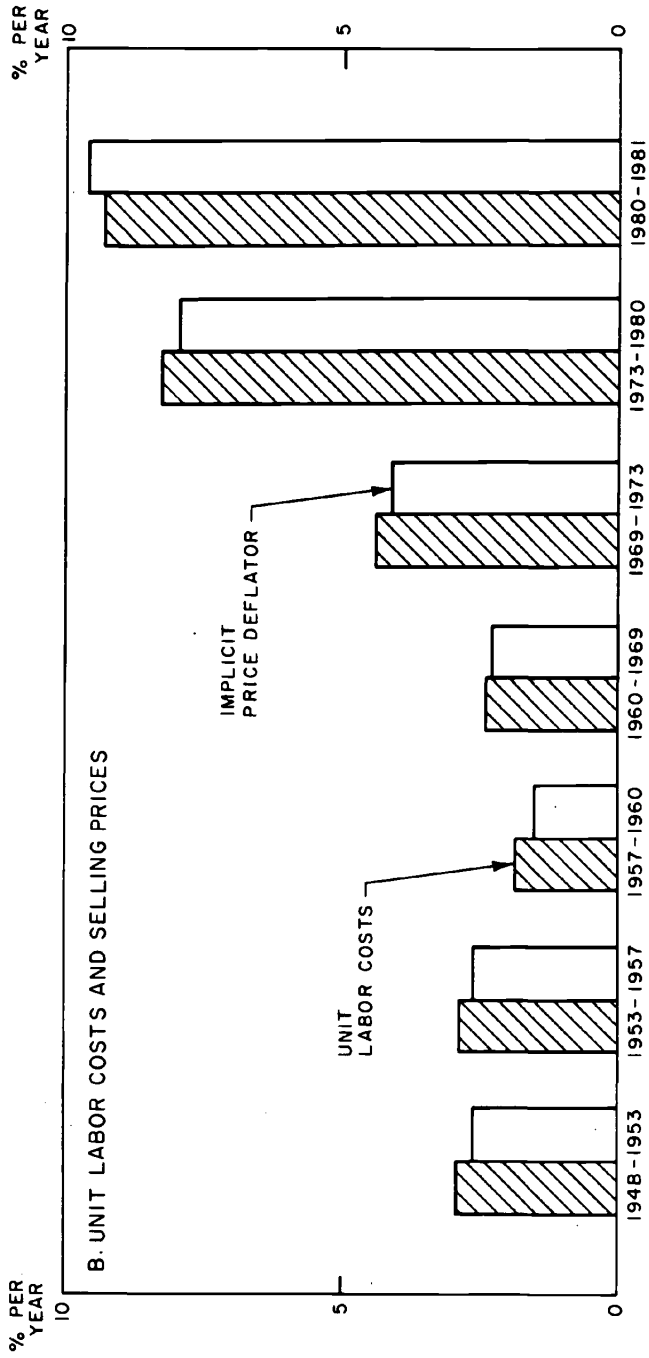
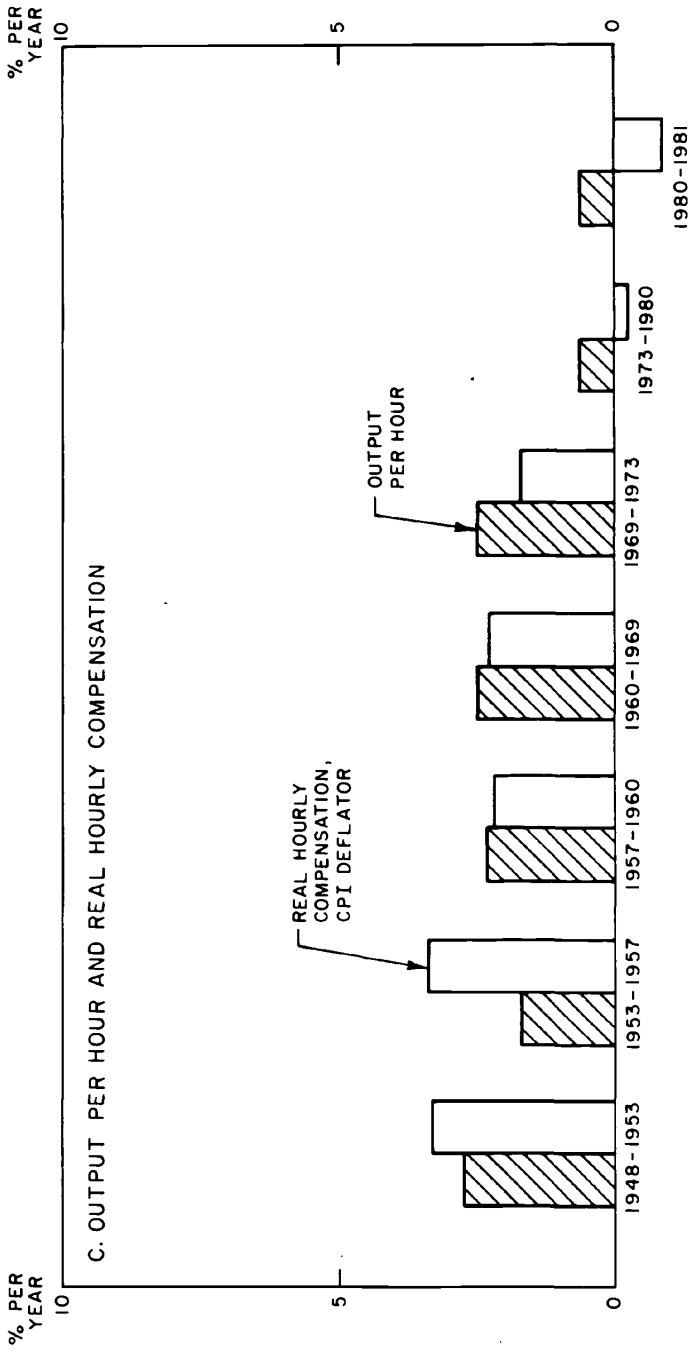


Figure 16-8. continued



(Figure 16-8. continued overleaf)

Figure 16-8. continued

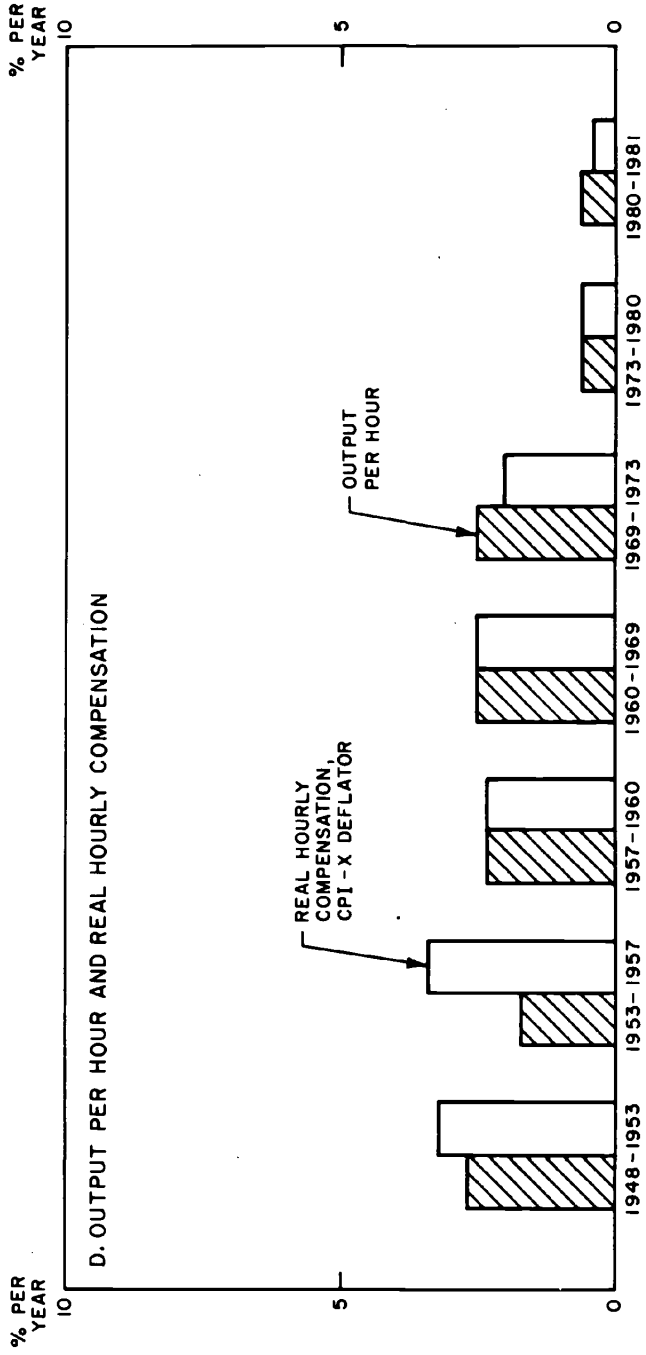
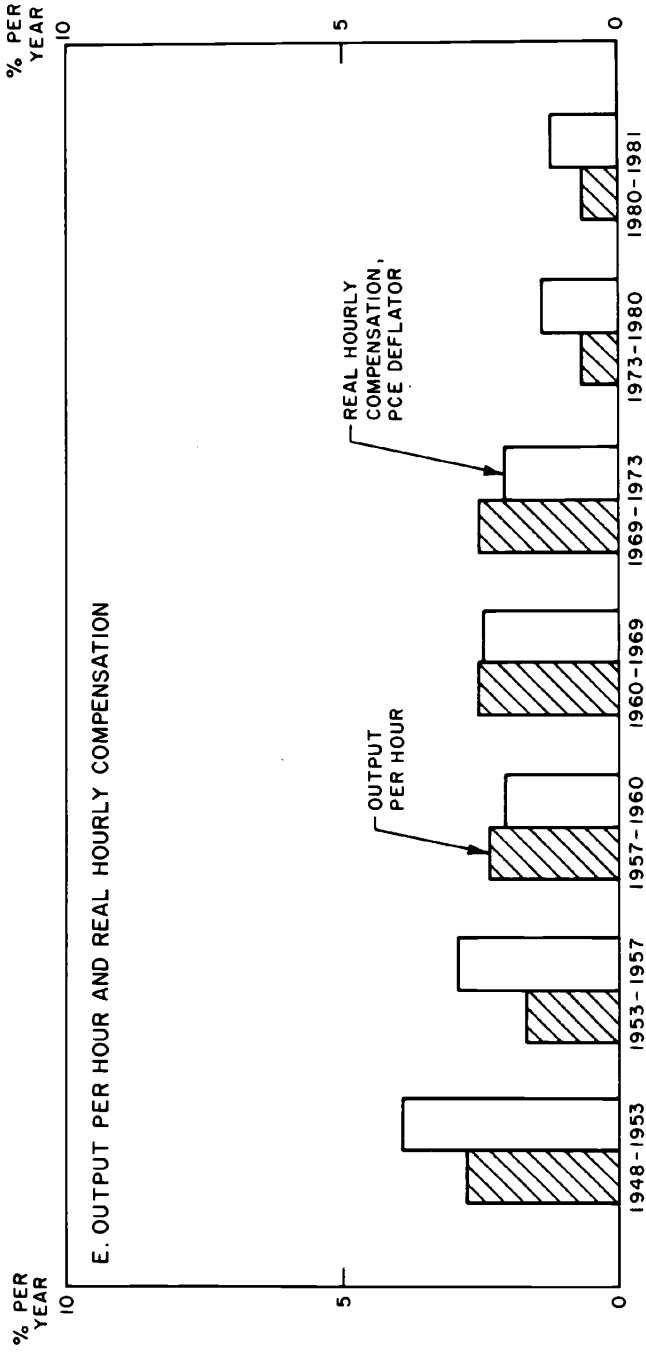
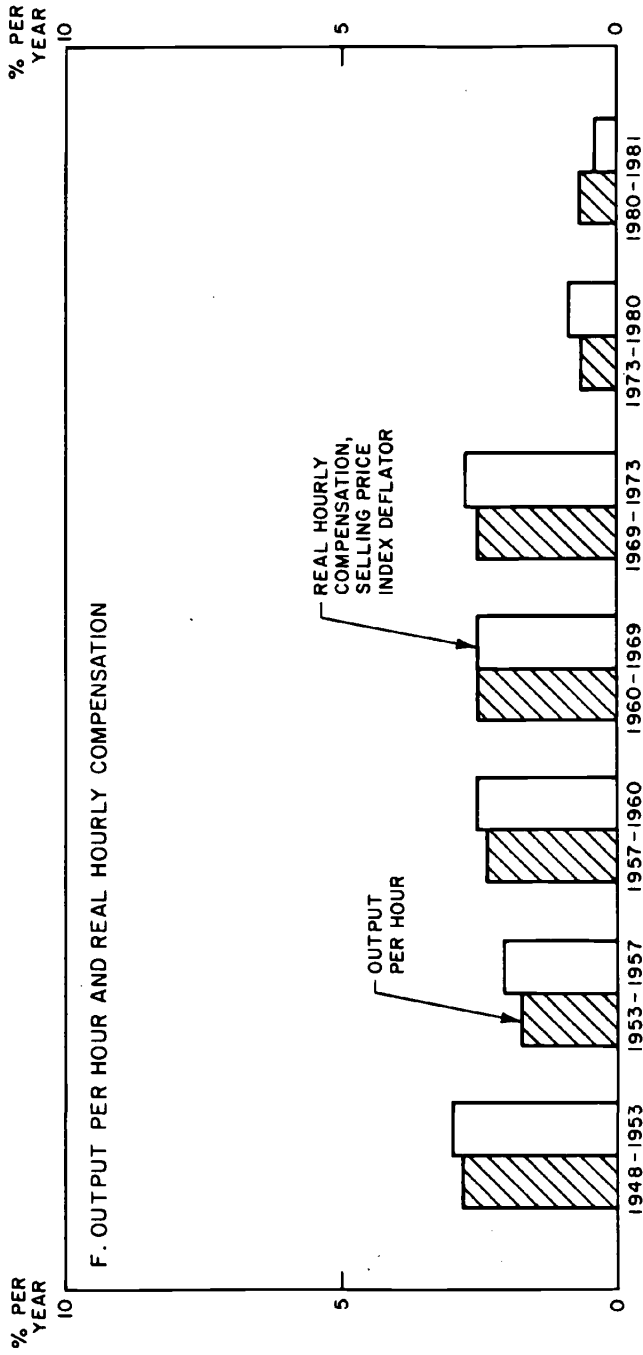


Figure 16-8. continued



(Figure 16-8. continued overleaf)

Figure 16-8. continued



Note: Growth rates are measured between successive business cycle peaks.

equivalent concept, and is to be adopted by the BLS as the official CPI for the urban population after January 1983. The personal consumption expenditures deflator also uses a rental equivalent concept. In addition, it is affected by changes in the composition of consumer spending. The selling price index, which is the implicit price deflator for nonfarm business output, is the same deflator that is used to derive the productivity estimates. These prices are not the prices that wage earners pay, but this measure of real earnings does represent the amount of industry's output that could be purchased with an hour's compensation. All of the alternative price deflators support the conclusion that real earnings have increased in recent years about in line with productivity growth.

NOTES TO CHAPTER 16

1. Wesley C. Mitchell, *Business Cycles and Their Causes*, (Berkeley: University of California Press, 1941).

2. Empirical support for the hypothesis was first developed by Thor Hultgren in "Cyclical Diversities in the Fortunes of Industrial Corporations," *Occasional Paper 32* (New York: National Bureau of Economic Research, 1952). Stronger support was then provided in Thor Hultgren, *Costs, Prices, and Profits: Their Cyclical Relations*, Studies in Business Cycles, no. 14 (New York: 1965). The results of still other tests were disclosed in Geoffrey H. Moore's "Tested Knowledge of Business Cycles," *42nd Annual Report*, (New York: National Bureau of Economic Research, 1962), as well as in Moore's "Productivity, Costs, and Prices: New Light From an Old Hypothesis," *Explorations in Economic Research* 2, no. 1, (Winter 1975). See also Anthony T. Cluff's doctoral dissertation, "Prices, Unit Labor Costs, and Profits—An Examination of Wesley C. Mitchell's Business Cycle Theory for the Period 1947-1969," (George Washington University, June 1970). Findings about the validity of the hypothesis beyond U.S. boundaries are found in Philip A. Klein and Geoffrey H. Moore, "Monitoring Profits During Business Cycles," in Helmut Laumer and Maria Ziegler, eds., *International Research on Business Cycles* (Aldershot: 1981). Gower Publishing.

3. Three of the five exceptions occurred at the start of the 1973-1975 worldwide downturn when the price runups associated with the activities of the OPEC cartel doubtless were a contributing factor to the deviation from the usual sequence.

4. For further information on recession-recovery patterns, see *Recession-Recovery Watch*, a bimonthly publication of the Center for International Business Cycle Research, Rutgers University. See also Gerhard Bry and Charlotte Boschan, *Cyclical Analysis of Time Series: Selected Procedures and Computer Programs*, National Bureau of Economic Research, (New York: Columbia University Press, 1971), pp. 151-199.

5. Joseph A. Schumpeter, *Business Cycles*, vol. 1, (New York: McGraw-Hill, 1939), p. 142.

6. John Kendrick, "International Comparisons of Recent Productivity Trends," in *Contemporary Economic Problems, 1981-1982 Edition*, William Fellner, Project Director, (Washington, D.C.: American Enterprise Institute, 1981), pp. 125-170.

7. Some students of economic policy drew a distinction between demand-pull and cost-push inflation that suggested that the former was a monetary phenomenon while the latter was nonmonetary. In reality, both types of inflation are monetary in the important sense that they require monetary expansion. Either M , the quantity of money, or V , its velocity of circulation, must go up. Demand-pull, as well as cost-push inflations, are phenomena that can be stopped or prevented by monetary restrictions. In modern industrial economies, price and wage policymakers often operate on the basis of an important tacit assumption that monetary policy will accommodate pricing or wage bargains that they arrange. The notion that their actions might be incompatible with moderate rates of expansion in the money supply is not often considered.