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cient resources to research and other activities with large external benefits.

The growing importance of the non-profit sector will probably pose some disturbing questions about how to promote efficiency and equity in such organizations (cf. the problems with Blue Cross). When non-profit operations represent only a minor exception to an essentially private-enterprise economy, the problem is not very serious. But if we ever reach the stage where non-profit operations tend to dominate the economy, we probably will be faced with the need for radically new instruments of regulation and control.

### DEMAND FOR PHYSICAL CAPITAL

There are some portions of the service sector that use large quantities of physical capital. Real estate and the services provided by government roads and highways are notable examples. By and large, however, goods industries tend to be more capital intensive than services. In recent years (1960 through 1963) business expenditures for new plant and equipment in goods industries were approximately three times as great as in profit-seeking service industries; the comparable ratio of output levels in the two groups of industries was only 1.25 to 1.00. Corporate plus non-corporate depreciation charges as a percentage of industry gross product reveal a two-to-one ratio in favor of the goods sector, and balance-sheet data from the *Statistics of Income* also suggest that capital intensity in the goods sector is roughly double that of the service sector.

There are, to be sure, exceptions to the general rule. The hotel and motel industry has a high capital-to-labor ratio, as do self-service laundries and dry-cleaning establishments, bowling alleys and motion-picture theatres. But in many important service industries, the input of physical capital is small. In barber and beauty shops, for example, labor and materials account for between 80 and 90 per cent of total cost. Another point to be noted is that in the largest service industry, retail trade, an important part of the capital input takes the form of inventories rather than the output of the capital goods industries.

In pointing out the relatively lower capital intensity of most service industries, I am not attempting to revive a "stagnation" theory in any form. The maintenance of high levels of employment and a rapid rate of growth is logically consistent with a decline in the relative importance of physical capital in the economy. The important point is to recognize that, if such a decline occurs because of interindustry shifts, it may be a proper and useful adjustment to new circumstances, with important implications for relative profit levels in different industries. While the national rate of savings may be just as high as before, other forms of investment, such as education, that are not customarily included in savings-investment estimates may take on increased importance.

### BUSINESS CYCLES

It is generally believed that the service sector is less sensitive than the goods sector to cyclical fluctuations in production and employment. Daniel Creamer found that the cyclical amplitude of fluctuations of wage and salary payments of commodity-producing industries exceeded that of distributive industries, while the latter were more cyclically sensitive than wage and salary payments in the services.[20] The intersector differences

[20] *Personal Income during Business Cycles* (Princeton, N.J.: Princeton University Press [for the National Bureau of Economic Research], 1956), p. 47. Creamer's distributive group includes trade and transportation.

were greater during the cycles preceding World War II than in the postwar period, but the ranking of sectors in terms of amplitude of fluctuations was unchanged.[21]

In an unpublished NBER study, Geoffrey Moore has compared the fluctuation of employment in a group of nonagricultural commodity-producing industries with that of a group of service industries for four postwar business cycles (1945–61) and has found the amplitude to be much greater for commodities. The average monthly change during contractions was −0.75 per cent for goods and −0.04 per cent for services. The average monthly change during expansions was 0.35 per cent and 0.28 per cent, respectively.

Evidence of the greater stability of services can also be found in unemployment rates of wage and salary workers. Table 11 presents the average rate by sector and industry group annually for 1948–63 and the average for the sixteen years.

[21] *Ibid.*, p. 56.

We see that unemployment in goods has been consistently higher than in the service sector; the average rates over the period were 5.8 and 3.8 per cent, respectively. Much of this differential can be explained by a greater amount of *seasonal* unemployment in goods-producing industries. The Bureau of Labor Statistics estimated that in 1957 the unemployment rates for seasonal reasons alone were as follows: agriculture, 2.7 per cent; construction, 4.2 per cent; manufacturing, 1.5 per cent; and transportation, 0.8 per cent; whereas in trade the rate was 0.6 per cent, and in services only 0.3 per cent.[22] Another possible explanation for the sector differences is that unemploy-

TABLE 11

UNEMPLOYMENT RATES OF WAGE AND SALARY WORKERS, BY SECTOR AND INDUSTRY GROUP 1948–63

| | Average 1948–63 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Goods | 5.8 | 3.9 | 7.3 | 6.1 | 3.4 | 3.0 | 3.0 | 6.7 | 4.9 | 4.6 | 5.4 | 9.2 | 6.7 | 6.8 | 8.3 | 6.4 | 6.4 |
| Service | 3.8 | 3.4 | 4.6 | 4.6 | 2.9 | 2.4 | 2.3 | 3.8 | 3.4 | 3.0 | 3.4 | 4.9 | 4.3 | 4.3 | 5.1 | 4.4 | 4.5 |
| Goods excluding agriculture | 5.7 | 3.8 | 7.4 | 5.9 | 3.4 | 3.0 | 2.9 | 6.6 | 4.8 | 4.5 | 5.3 | 9.2 | 6.6 | 6.7 | 8.2 | 6.3 | 6.2 |
| Service excluding public administration | 4.3 | 3.7 | 5.1 | 5.1 | 3.2 | 2.8 | 2.6 | 4.4 | 3.9 | 3.5 | 3.8 | 5.5 | 4.9 | 4.8 | 5.9 | 5.2 | 5.1 |
| Agriculture | 7.0 | 4.7 | 6.5 | 8.2 | 3.9 | 3.9 | 4.7 | 8.0 | 6.4 | 6.5 | 6.7 | 9.9 | 8.7 | 8.0 | 9.3 | 7.3 | 8.9 |
| Mining, Forestry and Fisheries | 7.6 | 2.9 | 8.5 | 6.6 | 3.8 | 3.4 | 4.9 | 12.3 | 8.2 | 6.4 | 6.3 | 10.6 | 9.7 | 9.5 | 11.6 | 8.6 | 7.5 |
| Construction | 10.1 | 7.6 | 11.9 | 10.7 | 6.0 | 5.5 | 6.1 | 10.5 | 9.2 | 8.3 | 9.8 | 13.7 | 12.0 | 12.2 | 14.1 | 12.0 | 11.9 |
| Manufacturing | 5.3 | 3.5 | 7.2 | 5.6 | 3.3 | 2.8 | 2.5 | 6.1 | 4.2 | 4.2 | 5.0 | 9.2 | 6.0 | 6.2 | 7.7 | 5.8 | 5.7 |
| Durable goods | 5.3 | 3.4 | 7.4 | 5.2 | 2.6 | 2.4 | 2.0 | 6.5 | 4.0 | 4.0 | 4.9 | 10.5 | 6.1 | 6.3 | 8.4 | 5.7 | 5.4 |
| Nondurable goods | 5.3 | 3.6 | 6.9 | 6.0 | 4.0 | 3.3 | 3.1 | 5.7 | 4.4 | 4.4 | 5.3 | 7.6 | 5.9 | 6.0 | 6.7 | 5.9 | 6.0 |
| Transportation and public utilities | 3.7 | 3.0 | 5.2 | 4.1 | 1.9 | 1.9 | 1.8 | 4.8 | 3.5 | 2.4 | 3.1 | 5.6 | 4.2 | 4.3 | 5.1 | 3.9 | 3.9 |
| Wholesale and retail trade | 5.1 | 4.3 | 5.8 | 5.8 | 3.7 | 3.1 | 3.0 | 5.2 | 4.3 | 4.1 | 4.5 | 6.7 | 5.8 | 5.9 | 7.2 | 6.3 | 6.2 |
| Finance, insurance, and real estate | 2.1 | 1.6 | 1.8 | 2.0 | 1.3 | 1.5 | 1.6 | 2.0 | 2.1 | 1.4 | 1.8 | 2.9 | 2.6 | 2.4 | 3.3 | 3.1 | 2.7 |
| Service industries | 3.9 | 3.5 | 5.1 | 5.0 | 3.1 | 2.6 | 2.4 | 4.0 | 3.8 | 3.2 | 3.4 | 4.6 | 4.3 | 4.1 | 4.9 | 4.3 | 4.4 |
| Public administration | 2.1 | 2.0 | 2.9 | 2.8 | 1.6 | 1.1 | 1.2 | 2.0 | 1.8 | 1.6 | 2.0 | 3.0 | 2.3 | 2.6 | 2.7 | 2.2 | 2.5 |

SOURCE: *Manpower Report of the President*, 1964, Table A-11.

NOTE: Industry affiliation is determined by the last job held prior to unemployment.

[22] U.S. Bureau of Labor Statistics, *The Extent and Nature of Frictional Unemployment* (Study Paper No. 6, Study of Employment Growth and Price Levels, Joint Economic Committee, Congress of the United States, November 19, 1959), p. 52. It should be noted in passing that the large sector differential in unemployment implies a subsidy of goods by services via unemployment compensation (see Charles B. Warden, Jr., "Unemployment Insurance, a Statistical Study of Massachusetts Experience" [unpublished Ph.D. dissertation, Harvard University, September, 1963], p. 82).

ment tends to be higher in declining or slow-growing industries than in those with rapid rates of growth of employment.

Of greater interest in the present context than the difference in level is the fact that unemployment in goods is much more sensitive to business conditions, as may be seen in Figure 3. The rate for each sector in each year has been plotted as an index number with the sector's average rate 1948–63 equal to 100. We note that the index for goods fluctuates much more sharply than for services over the business cycle. The variance of the goods index is more than a third larger than that of the service index.

The larger cyclical amplitude of unemployment in goods presumably reflects larger swings in output. One of the reasons for the stability of output in services is the fact that the output cannot be stored. This sector, therefore, is spared the effects of swings in inventory investment, swings which make a major contribution to the cyclical fluctuations of the economy. Similarly, some service industries do not experience cyclical changes in demand comparable to the fluctuations in consumer and producer demand for durable goods. Figure 4 shows that cyclical swings of unemployment in nondurable goods manufacturing industries are less marked than in durable goods manufacturing. They are not as stable, however, as in services, even with government excluded. Greater cyclical instability in the purchases of goods than services is not inconsistent with goods having the same or even lower income elasticity of demand. The latter should refer to the relation between income and

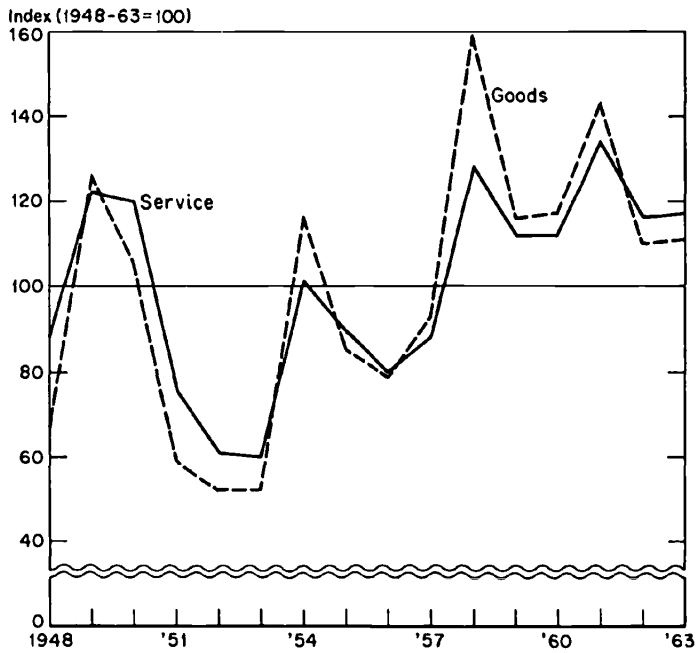


FIG. 3.—Annual indexes of unemployment rates, goods and service sectors, relative to their average rates, 1948–63. See Table 1 for sector definitions.
Source: *Manpower Report of the President*, 1964, Table A-11.

*consumption*, and the consumption of goods is much more stable than purchases over the cycle because of the existence of stocks in the hands of consumers.

It is difficult to obtain accurate data on cyclical swings in service industry output, as distinct from employment, but annual man-hours and real output (gross product in 1954 dollars) in wholesale and retail trade are shown as ratios of their 1947–63 trend values.[23] We see that the amplitude of fluctuation of real output is considerably greater than that of man-hours. The variance of the real-output

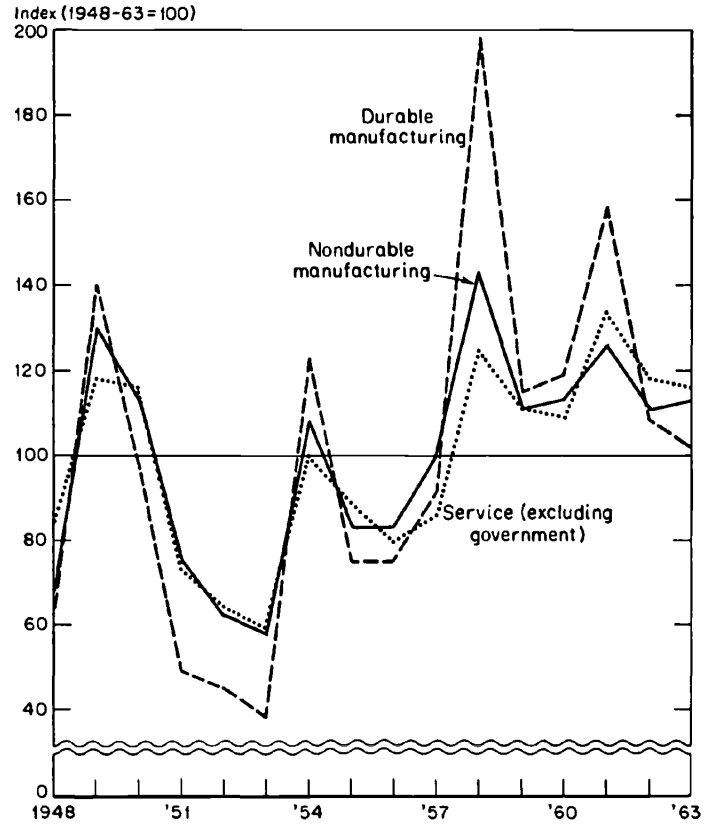


FIG. 4.—Annual indexes of unemployment rates, durable and non-durable manufacturing and service, excluding government, relative to their average rates, 1948–63.
Source: *Manpower Report of the President*, 1964, Table A-11.

in my judgment the amplitude of fluctuation in output is almost certainly greater than that of employment. Thus, inferences about stability, based on employment data, should be tempered in discussing output swings.

Some evidence to support this view is presented in Figure 5 (top portion) where series from the trend line is approximately double the corresponding variance of man-hours.

When a similar comparison is made for manufacturing (Fig. 5, bottom por-

[23] Trend values were calculated by fitting a least-squares regression line of the form $\log X = a + bT$, where $X$ equals man-hours or real output, and $T$ equals time.

tion), we find both man-hours and real output are more cyclically sensitive than in trade, but there is little difference between the variance of man-hours and of real output around their trend lines.

Reasons for the discrepancy between output and man-hours in trade (and other services) can be found in the nature of the labor force. First, there are large numbers of self-employed; their employment is almost completely insensitive to cyclical fluctuations in output. Second, the role of salaried employees, as opposed to hourly workers, is much larger in services than it is in goods. Also, the educational level is higher and the costs of hiring are probably greater. This means that dismissals or layoffs during recessions that are expected to be short-lived will be less frequent. Finally, it should be noted that there is a substantial number of service industry employees classified as "wage and salary workers" who are actually compensated on a "piecework" basis. Their wages in whole or in part are determined by their output, and take the form of commissions, tips, or a share of "profits." Employers

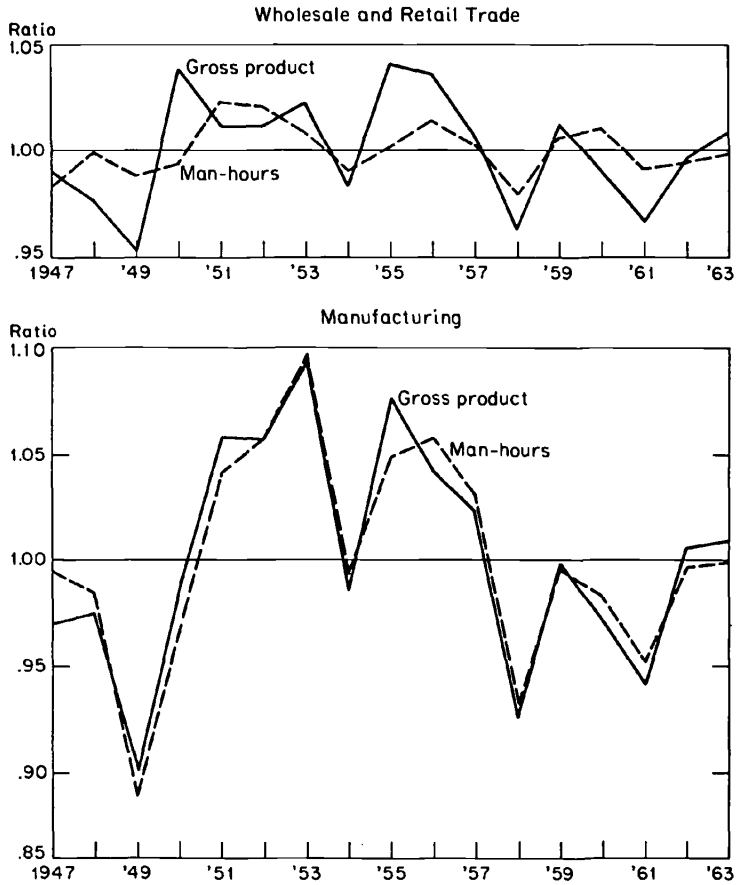


FIG. 5.—Ratios to trend, man-hours, and gross product in constant (1954) dollars, wholesale and retail trade and manufacturing, 1947–63.

Source: U.S. Department of Commerce, Office of Business Economics; U.S. Department of Labor; and *Economic Report of the President.*

have little reason to fire such employees when business falls off. This group includes real estate, insurance, and security brokers, waiters and waitresses, barbers and beauticians, and most salesmen of durable goods. Because their earnings are more sensitive to cyclical fluctuations in spending than are their hours of work, we can think of these workers as having "flexible" wages.[24]

There is some "piecework" employment in manufacturing, as well as in the service sector, but the effect on measured employment is not the same because of differences in the production process. When demand falls in manufacturing, the employer will probably cut back on production, regardless of whether labor is paid on an hourly or piecework basis, and this cutback will usually result in less employment. The effect in services is different because the amount and timing of the output and employment required is not known in advance. In both situations a decrease in demand means a fall in the marginal revenue product of labor. In manufacturing, the wage per hour tends to remain the same, and there is a reduction in man-hours. In the case of waiters, barbers, salesmen, and so on, employment tends to remain unchanged, and the necessary adjustment is achieved through a fall in hourly earnings.

A second interesting point suggested by Figure 5 concerns the timing of cyclical changes in real output and man-hours. Although annual data reveal timing differences imperfectly, in manufacturing the two series tend to move together, while in trade the man-hours series appears to lag behind real output. At most upper turning points, trend-adjusted man-hours reaches a peak one year after the peak in trend-adjusted real output. The reason probably is that output in manufacturing can be planned in advance and the appropriate labor inputs scheduled accordingly. Output in trade is uncertain, and employment plans are often based on output experience of the previous year. It is relevant to note that the OBE measure of real output in trade does not make any allowance for such quality changes as delays in being waited on. It may be that when measured real output in trade rises rapidly, and man-hours do not, there is a decrease in the quality of service and therefore true output does not rise as rapidly as measured output.

To sum up, a comparison of the two sectors suggests that output in services is less sensitive to cyclical fluctuations in total demand and employment is less sensitive to fluctuations in output. Wage rates, on the other hand, are probably not as stable as in goods, because earnings frequently depend upon output. If the service sector continues to grow relative to the rest of the economy, these considerations will probably take on increased importance for questions of economic stability.

## IMPLICATIONS FOR ECONOMIC ANALYSIS

In this section it is argued that the growth of the service sector has important implications for economic analysis. One line of reasoning is by analogy. In retrospect, it is apparent that the change in emphasis from primary to secondary production had considerable influence on economic analysis. Land became less important as an input in production and distribution models, and physical capital became much more important. The need for a theory of imperfect competition became more apparent. Short-run supply curves could no longer be thought of as completely inelastic, and the possibilities

[24] I am grateful to Jacob Mincer for this formulation.