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Chapter Title: Changes in Aggregate Economic Activity during the First Year of Recession

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since 1920 (1923-24, 1926-27, 1948-49, 1953-54) and less than in the three more severe contractions (1920-21, 1929-30, 1937-38).

- b. The intermediate position of the 1957-58 contraction first became apparent in data for the leading indicators for November 1957, i.e., four months after the peak of July 1957. It was confirmed by most indicators of aggregate economic activity when data for February 1958 became available.
- c. In contractions of the severity indicated for the 1957-58 contraction, it would be in line with previous experience if the level of economic activity generally remained below the previous peak level (July 1957) for a period ranging from a year and a half to two and a half years.
- d. One of the outstanding features of the first eight months of the 1957-58 contraction has been the relatively modest decline in personal income. The rise in consumers' prices has been less unusual, since increases occurred during the first eight months of four of the seven business contractions since 1920.

9. The tentative findings reported above need to be tested further.<sup>6</sup> The method could usefully be tested on declines that did not reach business cycle proportions. Comparisons based on a different method of dating downturns—e.g., dating the downturn from the peak in the specific series being compared—should be made, and other ways of measuring the severity of recessions should be explored. The empirical results should be examined in the light of the hypotheses that have been advanced to account for variations in the severity of business cycle contractions. Work along these lines will be facilitated now because electronic computer programs are available to handle the computations.

## 2. CHANGES IN AGGREGATE ECONOMIC ACTIVITY DURING THE FIRST YEAR OF RECESSION

Table 266 shows how a comparison of developments during the first year of mild and severe business contractions works out for one widely used economic indicator, the Federal Reserve index of industrial production. Percentage changes are computed from the peak standing (a three-month average that includes the business cycle peak month, the month preceding and the month following) to one month after the peak, two months after the peak, and so on up to twelve months after the peak. The table covers the seven business cycle contractions since 1920 (excepting the contraction that followed World War II). Note that the peak dates are not necessarily those at which the production index reached its peak, but rather when business activity at large did so. Usually the peak in the production index has not differed by more than a month or two from the business cycle peak.<sup>7</sup> Use of the business cycle peak enables us to examine a wide variety of series on a comparable basis (see below).

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<sup>6</sup> Two important contributions have already been made. Julius Shiskin has constructed and analyzed an extensive set of measures of the scope, magnitude and rate of change in the separate industry components of various economic aggregates such as employment, production, and new orders. He has compared the current contraction with those beginning in 1953, 1948, 1937, and 1929 on a plan similar to that used here, and also on a plan that uses the "specific cycle peak" dates in each aggregate as the point from which to start the comparison. This work has been carried on at the Bureau of the Census for the Council of Economic Advisers.

Pao Lun Cheng, Michigan State University, in a paper on "Statistical Indicators and Cyclical Amplitudes," presented at the annual meeting of the Midwest Economics Association, Des Moines, Iowa, on April 19, 1958, explores the relations between the severity of business cycle contractions and the rates of change in indicators prior to and during the contractions. Part of this work is along lines very similar to those followed here, and yields similar conclusions. In addition, however, Dr. Cheng tests a number of interesting hypotheses that go well beyond our own work.

<sup>7</sup> At one of the peaks the difference was 5 months; at one, 2 months; at three, 1 month; and at two there was no difference. In the current recession the difference is somewhat greater than usual. The peak in the production index, according to revised figures published in March 1958, was reached in December 1956 or February 1957 (146

TABLE 266  
PERCENTAGE CHANGES IN INDUSTRIAL PRODUCTION DURING  
SEVEN BUSINESS CYCLE CONTRACTIONS

Months after Peak	Business Cycle Peak						
	Oct. 1926	July 1953	Nov. 1948	May 1923	Jan. 1920	May 1937	Aug. 1929
	Standing at Peak (1947-49: 100) <sup>a</sup>						
	52.7	136.3	103.7	49.0	42.7	64.7	60.7
Percentage Change from Peak							
1	-1.3	-0.2	-1.6	0	+3.1	-1.0	-1.1
2	-1.3	-2.4	-2.6	-2.0	+0.8	+0.5	-2.7
3	-1.3	-3.2	-4.5	-2.0	-3.9	-1.0	-7.7
4	-1.3	-5.4	-6.4	-4.1	-1.6	-4.1	-11.0
5	+0.6	-7.6	-7.4	-6.1	-1.6	-11.9	-11.0
6	-1.3	-8.3	-8.4	-6.1	-3.9	-19.6	-11.0
7	-1.3	-8.3	-8.4	-8.2	-3.9	-27.3	-12.6
8	-1.3	-9.8	-9.3	-6.1	-6.2	-28.9	-12.6
9	-3.2	-9.8	-7.4	-4.1	-8.6	-30.4	-15.9
10	-3.2	-8.3	-6.4	-6.1	-18.0	-30.4	-17.6
11	-5.1	-9.0	-9.3	-8.2	-22.7	-32.0	-20.9
12	-5.1	-9.8	-7.4	-12.2	-27.3	-33.5	-24.2
Rank of Percentage Change <sup>b</sup>							
1	6	3	7	2	1	4	5
2	3	5	6	4	1	2	7
3	2	4	6	3	5	1	7
4	1	5	6	3	2	4	7
5	1	5	4	3	2	7	6
6	1	4	5	3	2	7	6
7	1	4	5	3	2	7	6
8	1	5	4	2	3	7	6
9	1	5	3	2	4	7	6
10	1	4	3	2	6	7	5
11	1	3	4	2	6	7	5
12	1	3	2	4	6	7	5

<sup>a</sup> Three-month average, centered on the peak month.

<sup>b</sup> A rank of 1 is given to the smallest decline (or largest rise) among the seven contractions, a rank of 7 to the largest decline, etc.

Source: Board of Governors of the Federal Reserve System. Index is adjusted for seasonal variations. The seven business cycle contractions are arrayed from left to right according to their over-all severity (see text).

Table 266 makes it clear that changes in the volume of industrial output in the first month or two of a business recession are typically slight. Declines of only 2 or 3 per cent are the rule. Moreover, the relative severity of the decline manifests itself only irregularly during the first six months or so after the con-

in both months), seven or five months before the business cycle peak in July 1957. Before revision, the index showed December 1956 one point higher than February. The revised index declines to 144 in April and May, rises to 145 in June, July and August, and then declines to date.

traction begins. The mild recessions of 1948 and 1953 began with a relatively sharp decline in industrial production, although after five months the declines were not as great as in the major contractions of 1929 and 1937. It is important to realize that in the first few months of what turns out to be a mild recession the decline in output may be as sharp or sharper than in a severe contraction. Furthermore, a severe contraction like that of 1920-21 can start out with only a moderate decline in production. The ultimate severity of the 1929 contraction in comparison with the 1921 or the 1937 contraction was not evident in terms of the magnitude of the decline in industrial output even after twelve months had elapsed. Nevertheless, these measurements do permit at least a rough classification of contractions according to severity after about six months, and the validity of the classification improves as the span increases. It can be made more dependable by reference to other data, as we shall see.

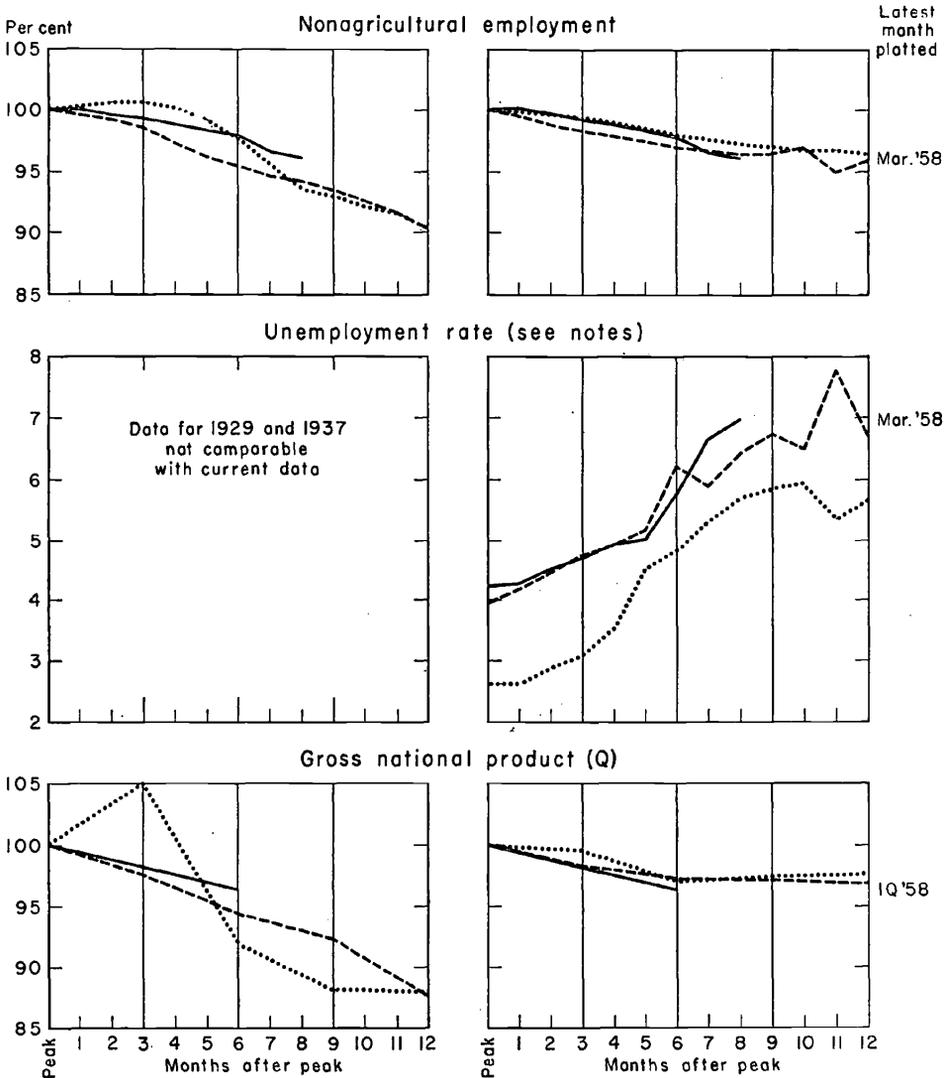
In reading Table 266 and similar tables it is important to recall that all economic series are subject to erratic movements due to such factors as strikes, international incidents, unusual weather, flu epidemics, and the like. These have less influence on broad aggregates, such as the index of production, than on data for narrow sectors, as a rule. Nevertheless, each monthly figure should be scrutinized in relation to the evidence provided by adjacent months, as well as other information. A graphic record, like that provided in Chart 268, will help. In some cases, too, the absolute level of the figures should be considered, as well as the change from the peak level. That is why, for example, the unemployment rate is shown in Chart 268 as an absolute rate, rather than simply in terms of the change in the rate.

Another factor that should be taken into account is the possible error in our dates for the business cycle peaks. For example, recently we revised the 1929 date, shifting it from June to August. July is a close competitor with August in this choice, but both appear definitely superior to June in terms of the data now available. The peak in January 1920 may be too early by a month or two. A similar difficulty exists in the choice between July and August 1957 (see text below). The use of a three-month average centered on the peak month tends to reduce the effect of such uncertainties on our measures of changes. But their more important effect is on the number of months a decline has been under way by a given date. If the peak is dated two months early, the fifth month after the erroneous peak is actually only the third month after the true peak. The relative effects of such errors, however, tend to diminish as the interval from the peak lengthens (see note 14, below).

Tables similar to Table 266 have been compiled for a number of other important aggregative measures of economic activity, and are reproduced in Appendix A. Here we shall consider only the rankings of the percentage changes (Table 273). Since these series figure significantly in our determination of business cycle turning dates, usually their peaks and that of the business cycle closely coincide. At any given turn, however, some may continue to rise for a few months, as the table indicates. On the other hand, some may have begun to decline before the designated peak month, so that in these cases the ranking is based on only that part of the decline that took place after the business cycle peak.

CHART 268. Relative changes after business cycle peaks, selected series.\*

- - - - - Aug. 1929 - Aug. 1930  
 ..... May 1937 - May 1938  
 — July 1957 -  
 - - - - - Nov. 1948 - Nov. 1949  
 ..... July 1953 - July 1954  
 — July 1957 -



\* All series except the unemployment rate are converted to indexes, using the three-month average centered on the business cycle peak months or quarters as the base (=100). The peak months (quarters) are: August (3Q) 1929, May (2Q) 1937, November (4Q) 1948, July (2Q) 1953, and July (3Q) 1957. All series except industrial stock prices and wholesale prices are adjusted for seasonal variations.

CHART 268 (continued)

----- Aug. 1929-Aug. 1930  
 ..... May 1937-May 1938  
 \_\_\_\_\_ July 1957-

----- Nov. 1948-Nov. 1949  
 ..... July 1953-July 1954  
 \_\_\_\_\_ July 1957

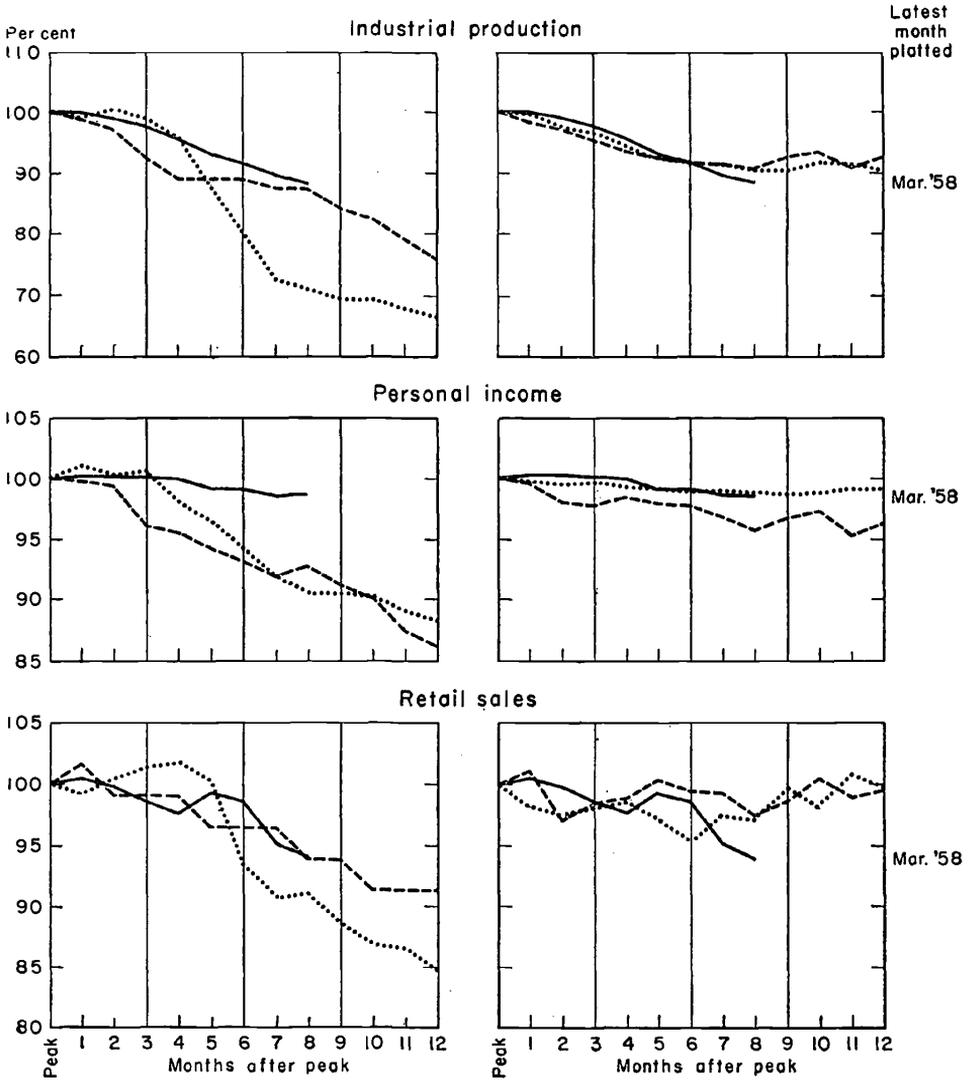


CHART 268 (continued)

----- Aug. 1929 - Aug. 1930  
 ..... May 1937 - May 1938  
 ——— July 1957 -

----- Nov. 1948 - Nov. 1949  
 ..... July 1953 - July 1954  
 ——— July 1957 -

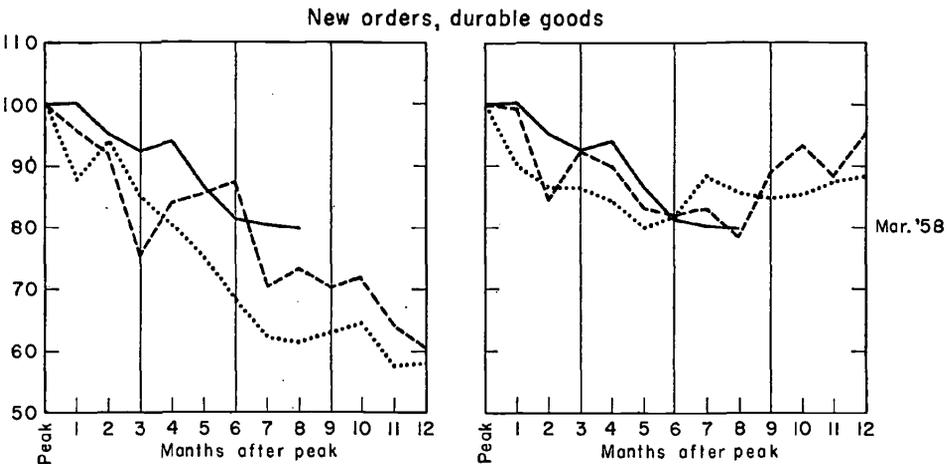
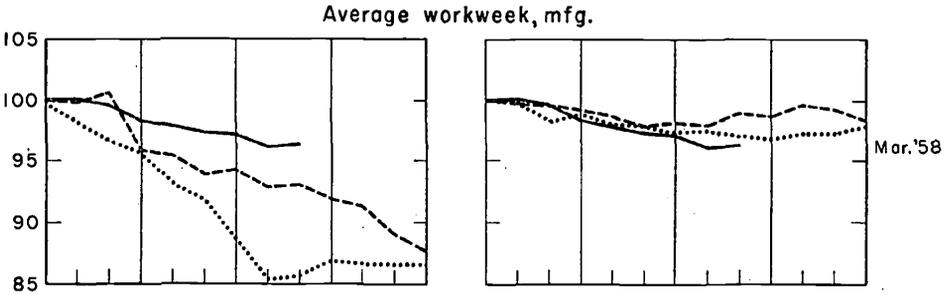
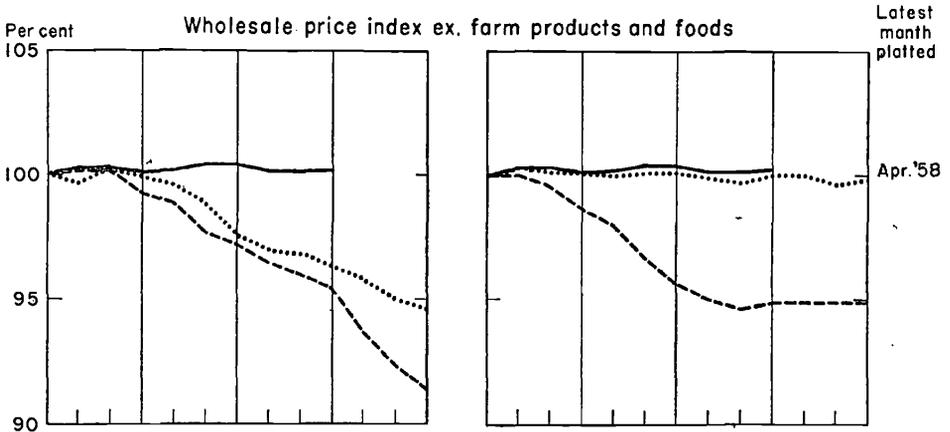


CHART 268 (continued)

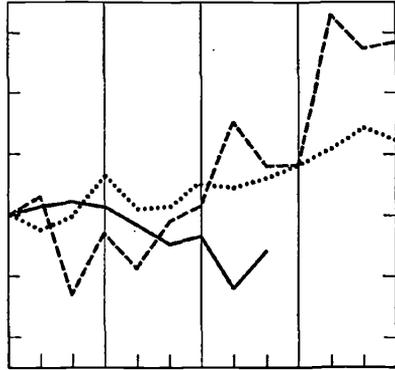
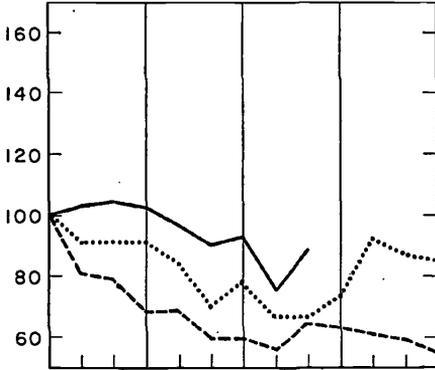
----- Aug. 1929-Aug. 1930  
 ..... May 1937-May 1938  
 ——— July 1957-

----- Nov. 1948-Nov. 1949  
 ..... July 1953 - July 1954  
 ——— July 1957 -

Per cent

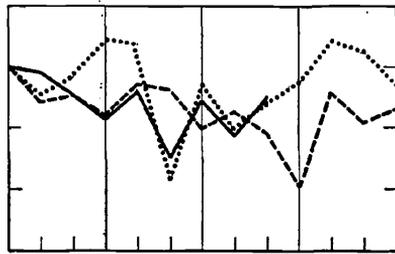
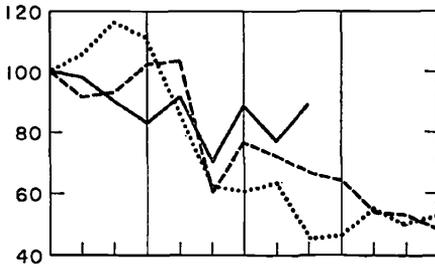
Residential construction contracts, fl. sp.

Latest month plotted



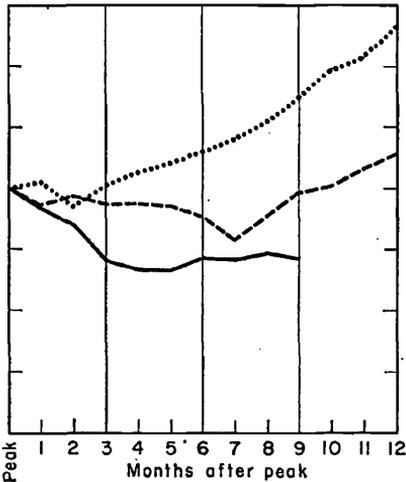
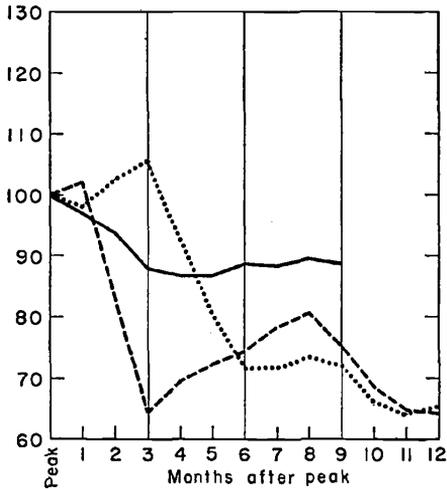
Mar.'58

Commercial and industrial construction contracts, fl. sp.



Mar.'58

Industrial stock prices



Apr.'58

On the whole, Table 273 confirms the showing of Table 266. The initial changes in measures of the general level of economic activity may be quite misleading if regarded as an indication of the severity or mildness of the impending decline. It is not until some six months after the peak that the ultimate severity of the contraction, in relative terms, is reflected even moderately well in most of these series.<sup>8</sup>

It appears that some series are less reliable at a given interval after the peak than others (Table 274). Railroad freight carloadings, retail sales, and the wholesale price index (excluding farm products and foods) show relatively low correlations. In the case of carloadings, the long-run decline in the relative share of the railroads in freight traffic due to the competition of other carriers has tended to increase the severity of the recent declines. For example, in 1920-21 the decline in carloadings was only a third as large as the decline in industrial production during the first eight months; in 1929-30 during the same period the drop in carloadings was two-thirds as great as in industrial production; in 1953-54 the decline in carloadings was one and a half times that in production; in 1957-58, carloadings fell 18 per cent during the first eight months, which again is about one and a half times the drop in industrial production.

The failure of retail sales to correlate well with the severity of business contractions may be due to lack of comparability of the data for earlier cycles. The figures for 1929-30 and earlier recessions are limited to department stores, whereas the later figures cover all types of retail store. However, department store experience was probably more nearly representative of total retail sales in the twenties than it is today. In the case of the wholesale price index it appears that initial declines have been sharper in some of the mild business contractions than in the more severe. Until ten months after the business cycle peak the correlation is inverse, though small.

Some of the erratic factors that may affect results based on a single indicator can be ironed out by averaging several indicators. The six indicators that show the most consistently high correlations in Table 274 (nonagricultural employment, gross national product, industrial production, bank debits outside New York City, personal income, and corporate profits) taken together provide the rankings shown in Table 275. The average ranks are computed only for 3, 6, 9, and 12 months after the peak because two of the series are available only quarterly.

### 3. CHANGES IN "LEADING INDICATORS" DURING THE FIRST YEAR OF RECESSION

The series used in Table 273 are precisely those in terms of which the ultimate severity of a business recession is likely to be judged.<sup>9</sup> In attempting an

<sup>8</sup> The .05 significance level for a Spearman rank correlation coefficient based on seven observations, as most of the coefficients in Table 273 are, is .71 (Sidney Siegel, *Nonparametric Statistics for the Behavioral Sciences*, 1956, p. 284). In appraising the coefficients in Tables 273 through 276, however, one should keep in mind that the coefficients for a given series for different monthly spans are not statistically independent, that the coefficients for different series for the same span are not independent, and that the .05 significance level for coefficients based on the average ranks of groups of series is certainly less than .71, though not as much less as it would be if the series were independent. The coefficients are presented mainly to provide a convenient summary statistic on the degree of relationship between the changes in the indicators and the severity of the contractions.

<sup>9</sup> The number of unemployed or the unemployment rate should of course be considered in any such appraisal. They are omitted from Table 273 because the available monthly data for contractions before World War II are not comparable in magnitude with current data. The unemployment rate is included in Table 278, where only the directions of change are utilized.