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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.[8]

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.[9] In attempting an

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[8] 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.

[9] 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.

TABLE 273

RANKING OF PERCENTAGE CHANGES IN SELECTED INDICATORS OF AGGREGATE ECONOMIC ACTIVITY DURING SEVEN BUSINESS CYCLE CONTRACTIONS

Rank of 3 month change

Indicator	Contraction Beginning							Rank Correlation with Severity of Contraction
	Oct. 1926 (1)	July 1953 (2)	Nov. 1948 (3)	May 1923 (4)	Jan. 1920 (5)	May 1937 (8)	Aug. 1929 (7)	
1. Nonagricultural employment, BLS	—	2	4	3*	—	1*	3	0
2. Gross national product (Q)	2*	4	5	3	—	1*	6	.26
3. Industrial production	2	4	6	3	5	1	7	.29
4. Freight carloadings	1*	4	5	2	6	3	7	.61
5. Bank debits outside N.Y.C.	3*	4	7	6	2*	5	1*	-.32
6. Personal income	5	3	4	2*	—	1*	6	.09
7. Retail sales	4	7	6	2*	1*	3*	5	-.36
8. Corporate profits after taxes (Q)	2	1	4	7	3	5	6	.68
9. Wholesale price index, excl. farm & food	6	2*	5	7	1*	3	4	-.29
Average rank, 6 indicators[a]	2.8	3.0	5.0	4.2	3.3	2.3	4.8	.18
Rank of average rank	2	3	7	5	4	1	6	

Rank of 9 month change

Indicator	Contraction Beginning							Rank Correlation with Severity of Contraction
	Oct. 1926 (1)	July 1953 (2)	Nov. 1948 (3)	May 1923 (4)	Jan. 1920 (5)	May 1937 (8)	Aug. 1929 (7)	
1. Nonagricultural employment, BLS	—	1	2	—	—	4	3	.80
2. Gross national product (Q)	2	3	4	1*	—	6	5	.60
3. Industrial production	1	5	3	2	4	7	6	.71
4. Freight carloadings	3	5	6	2	1	7	4	.07
5. Bank debits outside N.Y.C.	1*	3	5	2*	4	7	6	.79
6. Personal income	2*	3	4	1*	—	6	5	.60
7. Retail sales	2.5	4	5	1*	2.5	7	6	.50
8. Corporate profits after taxes (Q)	4	1	3	2	7	6	5	.61
9. Wholesale price index, excl. farm & food	7	2	5	4	1*	3	6	-.32
Average rank, 6 indicators[a]	2.0	2.7	3.5	1.6	5.0	6.0	5.0	.72
Rank of average rank	2	3	4	1	5.5	7	5.5	

Rank of 6 month change

Indicator	Contraction Beginning							Rank Correlation with Severity of Contraction
	Oct. 1926 (1)	July 1953 (2)	Nov. 1948 (3)	May 1923 (4)	Jan. 1920 (5)	May 1937 (8)	Aug. 1929 (7)	
1. Nonagricultural employment, BLS	—	1	3	—	—	2	4	.80
2. Gross national product (Q)	1*	4	3	2	—	6	5	.71
3. Industrial production	1	4	5	3	2	7	6	.64
4. Freight carloadings	2	6	4	1	3	7	5	.36
5. Bank debits outside N.Y.C.	1*	4	5	3	2*	6	7	.68
6. Personal income	2	3	4	1*	—	5	6	.66
7. Retail sales	4	6	2	3	1*	7	5	.14
8. Corporate profits after taxes (Q)	1	3	2	5	4	7	6	.89
9. Wholesale price index, excl. farm & food	6	2*	5	7	1*	3	4	-.29
Average rank, 6 indicators[a]	1.2	3.2	3.7	2.8	2.7	5.5	5.7	.68
Rank of average rank	1	4	5	3	2	6	7	

Rank of 12 month change

Indicator	Contraction Beginning							Rank Correlation with Severity of Contraction
	Oct. 1926 (1)	July 1953 (2)	Nov. 1948 (3)	May 1923 (4)	Jan. 1920 (5)	May 1937 (8)	Aug. 1929 (7)	
1. Nonagricultural employment, BLS	—	1	2	—	—	4	3	.80
2. Gross national product (Q)	2*	3	4	1*	—	5	6	.66
3. Industrial production	1	3	2	4	6	7	5	.86
4. Freight carloadings	1	4	6	3	2	7	5	.50
5. Bank debits outside N.Y.C.	1*	2	4	3	5	6	7	.96
6. Personal income	1	2	4	3	—	5	6	.94
7. Retail sales	2	3	4	5	1*	7	6	.61
8. Corporate profits after taxes (Q)	2	1	3	4	7	6	5	.82
9. Wholesale price index, excl. farm & food	4	1	2	5	7	6	3	.54
Average rank, 6 indicators[a]	1.4	2.0	3.2	3.0	6.0	5.5	5.3	.82
Rank of average rank	1	2	4	3	7	6	5	

Source: Appendix A. The seven business contractions are arrayed from left to right according to their over-all severity (see text). Changes in a given indicator during each of the seven contractions are ranked according to magnitude. The smallest decline (or largest rise) is assigned a rank of 1, the next smallest a rank of 2, etc. All series except the wholesale price index are adjusted for seasonal variations.

* Increase.

[a] Nonagricultural employment, gross national product, industrial production, bank debits, personal income, corporate profits.

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TABLE 274

RANK CORRELATION COEFFICIENTS: SEVERITY OF BUSINESS CYCLE CONTRACTIONS AND PERCENTAGE CHANGES IN SELECTED INDICATORS

Indicator	No. of Contractions Covered[a]	Months after Peak											
		1	2	3	4	5	6	7	8	9	10	11	12
Indicators of Aggregate Economic Activity													
Nonagricultural employment, BLS	4	.40	0	0	.40	.40	.80	1.00	.80	.80	.80	.80	.80
Gross national product (Q)	6	—	.04	.26	—	—	.71	—	.64	.60	—	—	.66
Industrial production	7	-.25	-.68	.29	.43	.61	.64	.64	.18	.71	.75	.79	.86
Freight carloadings	7	.54	-.29	-.32	-.07	.29	.36	.07	.75	.07	.21	.21	.50
Bank debits outside N.Y.C.	7	.93	0	-.32	.54	.57	.68	.75	.80	.79	.75	.96	.96
Personal income	4,6[b]	-.60	0	.09	1.00	1.00	.66	1.00	.80	.60	1.00	1.00	.94
Retail sales	7	-.29	—	-.36	-.43	0	.14	.29	.29	.50	.50	.46	.61
Corporate profits after taxes (Q)	7	—	—	.68	—	—	.89	—	—	.61	—	—	.82
Wholesale price index, excl. farm & food	7	.04	-.32	-.29	-.29	-.29	-.29	-.29	-.43	-.32	.21	.43	.54
Leading Indicators													
Average workweek, mfg.	6	-.26	-.37	.43	.89	.89	.77	.89	.77	.77	.77	.77	.71
Layoff rate, mfg., *inverted*	7	-.04	-.07	.07	.04	.14	.14	.32	.29	.32	.43	.71	.71
Accession rate, mfg.	7	0	.46	.64	.46	.43	.39	.54	.21	.14	.25	.25	.25
New orders, durable goods	7	.21	-.14	.64	.71	.14	.21	.75	.68	.61	.61	.71	.75
Residential construction contracts	7	.79	.39	.82	.79	.64	.57	.57	.54	.54	.57	.64	.64
Comm. & indus. const. contracts	7	.04	.07	-.11	.21	.79	.82	.71	.82	.46	.79	.82	.86
New incorporations, number	7	.14	-.14	.61	.68	.75	.71	.82	.86	.68	.64	.71	.71
Business failures, liabilities, *inverted*	7	.39	.07	.54	.14	-.32	.14	.61	.25	.50	.61	.57	.50
Basic commodity price index	7	.07	.21	.14	.39	.57	.46	.46	.39	.68	.64	.64	.68
Industrial stock price index	7	0	.39	.39	.93	.96	.93	.89	.89	.89	.93	.96	.96

[a] See Tables 273 and 275.
[b] Entries for 3, 6, 9, and 12 months after peak include the two contractions for which quarterly data are available (1923–24 and 1926–27) as well as the four covered by monthly data.

TABLE 275

RANKING OF SEVEN BUSINESS CYCLE CONTRACTIONS ACCORDING
TO SEVERITY IN SUCCESSIVE MONTHS AFTER PEAKS,
TWO GROUPS OF INDICATORS

Months after Peak	Rank of Average Rank Contraction beginning							Rank Corre-lation with Severity of Contraction
	Oct. 1926 (1)	July 1953 (2)	Nov. 1948 (3)	May 1923 (4)	Jan. 1920 (5)	May 1937 (6)	Aug. 1929 (7)	
Six Indicators of Aggregate Economic Activity[a]								
3	2	3	7	5	4	1	6	.18
6	1	4	5	3	2	6	7	.68
9	2	3	4	1	5.5	7	5.5	.72
12	1	2	4	3	7	6	5	.82
Ten Leading Indicators[b]								
1	1	3.5	6	3.5	5	7	2	.32
2	1	2	7	3	6	5	4	.50
3	1	2	5	3.5	3.5	6	7	.88
4	1	2	3	4	6	5	7	.96
5	1	2	3	4	5	7	6	.96
6	1	3	4	2	5	7	6	.86
7	1	3	4	2	5	7	6	.86
8	1	2.5	4	2.5	6	7	5	.83
9	1	2.5	4	2.5	7	6	5	.79
10	2.5	2.5	1	4	7	6	5	.74
11	1	3	2	4	7	6	5	.82
12	3	1	2	4	7	5.5	5.5	.77

Source: Tables 273 and 276 and Appendix A. The seven business contractions are arrayed from left to right according to their over-all severity (see text). A rank of 1 indicates a small decline, a rank of 7 a large decline.
[a] Nonagricultural employment, gross national product, industrial production, bank debits, personal income, corporate profits (see text).
[b] See Table 276.

early estimate of relative severity, however, other types of series may be more helpful. In the National Bureau's studies of business cycles numerous series have been uncovered that typically turn down some months before the peak in general business. Because of their sensitivity, they may provide an early indication of the severity of contractions. Table 276 contains the rankings of the percentage changes for a group of them, based on the figures provided in Appendix A.

We find that even as early as the third month after the peak the declines in many of the leading series begin to differentiate the more severe from the less severe recessions. Hence something can be gained by watching the early movers. Again, some appear less reliable for the purpose than others. The layoff and accession rates, business failure liabilities, and new orders for durable goods show relatively low or erratic correlation coefficients (Table 274). Because of

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TABLE 276

RANKING OF PERCENTAGE CHANGES IN TEN LEADING INDICATORS DURING SEVEN BUSINESS CYCLE CONTRACTIONS

Rank of 3 month change

Indicator	Contraction Beginning Oct. 1926 (1)	July 1953 (2)	Nov. 1948 (3)	May 1923 (4)	Jan. 1920 (5)	May 1937 (6)	Aug. 1929 (7)	Rank Correlation with Severity of Contraction
1. Average workweek, mfg.	4	3	1	2	—	6	5	.43
2. Layoff rate, mfg., *inverted*	3	5	6	2	1*	7	4	.07
3. Accession rate, mfg.	2	3	1	7	5	4	6	.64
4. New orders, durable goods	1*	5	4	3	2*	6	7	.64
5. Residential construction contracts	2	1*	5	4	3	6	7	.82
6. Comm. & indus. const. contracts	4	2*	5	6	7	1*	3*	–.11
7. New incorporations, number	2	1*	6	3	5	7	4	.61
8. Business failures, liabilities, *inverted*	4	3	2	1*	7	5	6	.54
9. Basic commodity price index	2	3	7	6	1*	5	4	.14
10. Industrial stock price index	3	2*	4	6	5	1*	7	.39
Average rank, 10 indicators	2.7	2.8	4.1	4.0	4.0	4.8	5.3	.88
Rank of average rank	1	2	5	3.5	3.5	6	7	

Rank of 9 month change

Indicator	Contraction Beginning Oct. 1926 (1)	July 1953 (2)	Nov. 1948 (3)	May 1923 (4)	Jan. 1920 (5)	May 1937 (6)	Aug. 1929 (7)	Rank Correlation with Severity of Contraction
1. Average work week, mfg.	2	3	1	4	—	6	5	.77
2. Layoff rate, mfg., *inverted*	1	6	4	2	5	7	3	.32
3. Accession rate, mfg.	3	4	2	7	6	1	5	.14
4. New orders, durable goods	2	4	3	1*	7	6	5	.61
5. Residential construction contracts	4	3*	2*	1*	7	5	6	.54
6. Comm. & indus. const. contracts	3	2	5	1*	7	6	4	.46
7. New incorporations, number	3	1*	2*	5	6	7	4	.68
8. Business failures, liabilities, *inverted*	4	3	2	1*	7	6	5	.50
9. Basic commodity price index	2	1*	5	3	6	7	4	.68
10. Industrial stock price index	2*	1*	4	3*	5	7	6	.89
Average rank, 10 indicators	2.6	2.8	3.0	2.8	6.2	5.8	4.7	.79
Rank of average rank	1	2.5	4	2.5	7	6	5	

Rank of 6 month change

Indicator	Contraction Beginning Oct. 1926 (1)	July 1953 (2)	Nov. 1948 (3)	May 1923 (4)	Jan. 1920 (5)	May 1937 (6)	Aug. 1929 (7)	Rank Correlation with Severity of Contraction
1. Average workweek, mfg.	1	4	2	3	—	6	5	.77
2. Layoff rate, mfg., *inverted*	2	6	5	3	1	7	4	.14
3. Accession rate, mfg.	2	4	3	7	1*	6	5	.39
4. New orders, durable goods	2	6	5	1	3	7	4	.21
5. Residential construction contracts	4	2*	3*	1*	3	5	6	.57
6. Comm. & indus. const. contracts	1*	2	4	3	7	6	5	.82
7. New incorporations, number	1*	4	3	2	7	6	5	.71
8. Business failures, liabilities, *inverted*	6	1*	2*	4	7	5	3	.14
9. Basic commodity price index	3	1*	7	4	4	6	5	.46
10. Industrial stock price index	2*	1*	3	2	5	7	6	.93
Average rank, 10 indicators	2.4	3.1	3.7	3.0	4.7	6.1	4.8	.86
Rank of average rank	1	3	4	2	5	7	6	

Rank of 12 month change

Indicator	Contraction Beginning Oct. 1926 (1)	July 1953 (2)	Nov. 1948 (3)	May 1923 (4)	Jan. 1920 (5)	May 1937 (6)	Aug. 1929 (7)	Rank Correlation with Severity of Contraction
1. Average work week, mfg.	3	2	1	4	—	6	5	.71
2. Layoff rate, mfg., *inverted*	1	2	5	3	6	7	4	.71
3. Accession rate, mfg.	4	3	1	6	7	2	5	.25
4. New orders, durable goods	2	3	1	4	7	6	5	.75
5. Residential construction contracts	4	2*	1*	3*	7	5	6	.64
6. Comm. & indus. const. contracts	3*	1	3	4	7	5	6	.86
7. New incorporations, number	3*	1*	2*	5	7	4	6	.71
8. Business failures, liabilities, *inverted*	4	3*	2*	1*	7	6	5	.50
9. Basic commodity price index	1*	2*	5	3	7	6	4	.68
10. Industrial stock price index	2*	1*	3*	4	5	6	7	.96
Average rank, 10 indicators	2.6	2.0	2.4	3.7	6.7	5.3	5.3	.77
Rank of average rank	3	1	2	4	5	5.5	5.5	

Source: Appendix A. The seven business contractions are arrayed from left to right according to their over-all severity (see text). Changes in a given indicator during each of the seven contractions are ranked according to magnitude. The smallest decline (or largest rise) is assigned a rank of 1, the next smallest a rank of 2, etc. The layoff rate and business failures are treated invertedly, i.e., the smallest increase (or largest decrease) gets a rank of 1, etc. All series except basic commodity prices and industrial stock prices are adjusted for seasonal variation.

* Increase (in layoff rate and business failures, decrease).

the erratic month-to-month changes that many of these series exhibit, it is especially desirable to study all the evidence rather than rely on data for a single month or a single series. The average ranks for all ten leading indicators provide one means for doing this (Table 275), though of course the individual series and their relations to one another and to other series should be studied as well. As a group, the leaders provide a more reliable indication of severity than the aggregates during the first six or possibly nine months of recession.[10]

4. CHANGES IN THE SCOPE OF BUSINESS CYCLE CONTRACTIONS

The measures provided in Appendix A can help, also, to show how widespread the economic contraction is and whether it is spreading further. Table 278 shows how this may be done, using ten indicators of aggregate economic activity and ten leading indicators. The left-hand section of the table indicates, for successive months after the business cycle peak, what proportion of the series were above their level at the cycle peak (that is, a three-month average centered on the peak date). Very few of the aggregates (section A) reached such a favorable position during the first twelve months of the several recessions, although in the milder recessions one or two of the aggregates could be counted in this group in nearly every month. In 1953–54 eighteen months elapsed before half the aggregates regained the levels they had attained at the business cycle peak, and in 1948–49 it took seventeen months to reach a similar position. In the more severe contractions none of the aggregates got back to the peak level in that length of time. Among leading indicators (section B), five of the ten were above the July 1953 peak levels within ten months, or three months before the business upturn in August 1954. In the 1948–49 contraction five of the ten leaders had exceeded the peak level after thirteen months, or two months after the business upturn began. In 1920, 1937, and 1929 none had regained the peak level even after a full year of contraction. In Chart 290 the solid curves depict these developments during the first 24 months of each contraction.

Even though an indicator has not risen sufficiently to exceed the level attained when business activity was at its zenith, it may nevertheless have begun to rise. It is vital to watch for these initial upward movements. The right-hand section of Table 278 (and the dotted curves in Chart 290) shows what propor-

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[10] This implies that the leaders indicate the *subsequent* ranking of the aggregates. The following set of rank correlation coefficients, based on the ranks of the average ranks in Table 275, supports that inference, as well as the observation that the ranks of the leaders stabilize at an earlier date:

	Months after Peak		
	3	6	9
Leaders in specified month vs.			
Aggregates 3 mos. later	.88	.95	.99
Aggregates 6 mos. later	.70	.86	—
Leaders 3 mos. later	.85	.88	.76
Aggregates in specified month vs.			
Aggregates 3 mos. later	.29	.59	.83
Aggregates 6 mos. later	−.14	.39	—