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Volume Title: Measuring Recessions

Volume Author/Editor: Moore, Geoffrey H.

Volume Publisher: UMI

Volume ISBN: 0-87014-375-1

Volume URL: <http://www.nber.org/books/moor58-1>

Publication Date: 1958

Chapter Title: INTRODUCTION AND SUMMARY

Chapter Author: Geoffrey H. Moore

Chapter URL: <http://www.nber.org/chapters/c2591>

Chapter pages in book: (p. 1 - 7)

MEASURING RECESSIONS*

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1. INTRODUCTION AND SUMMARY

THE purpose of this report is to provide a set of measurements of past business cycle recessions with which any current recession can be compared. The contractions in business activity that the American economy has experienced from time to time have, of course, varied widely in severity. Yet even severe depressions have often begun gradually. How soon can a severe decline be detected? How do the relative declines in the various available measures of economic activity compare with one another as a contraction develops? How can one determine whether a contraction that is currently under way is already or is going to be smaller or larger than those that have occurred in the past? How can one judge when it is about to end? The measurements presented here suggest possible ways of providing answers to questions such as these. Although the body of the report deals with measurements for recessions that have already run their full course, we shall, at the end, show how the method has worked out from month to month during the recession that began in 1957.

First, let us glance at the historical record of twenty-four business contractions given in Tables 260 and 261. The peak dates are the months when ex-

* Research along the lines developed in this report began during the recession of 1953-54, when tables comparing the percentage changes in a long list of economic series during the current and preceding recessions were prepared for Arthur F. Burns, then Chairman of the Council of Economic Advisers. In October 1957 R. J. Saulnier, present Chairman of the Council, requested the assistance of the National Bureau in preparing a similar set of tables. Tables covering some seventy monthly and quarterly economic series were promptly prepared. The Council compensated the National Bureau for the costs of this part of the statistical work. The electronic computer program was developed with the aid of a grant from the National Science Foundation. The International Business Machines Corporation generously contributed machine time on the 704 computer. These resources were essential to the pursuit of the study. No less essential were the intellectual and financial resources that have over the years been invested in the National Bureau's studies in business cycles. The present report is, in the truest sense, a product of these contributions, for the data and methods used here are virtually all derived in one way or another from this earlier work.

The statistical tables were prepared by Sophie Sakowitz, Dorothy O'Brien, and Sandra Renaud. Charlotte Boschan prepared and tested the electronic computer program. Alexander Pitts developed the materials necessary for the selection of the 1957 business cycle peak date and reviewed all the other peak dates. The charts were drawn by H. Irving Forman. Mary Phelps edited the manuscript. I am greatly indebted to these individuals as well as to others of the National Bureau staff for their wholehearted efforts to complete the job as speedily as possible. The comments of many who read the manuscript aided in its revision. These included Leo Grebler, Philip Klein, Maurice W. Lee, Ruth P. Mack, Roland I. Robinson, W. Allen Wallis, Donald B. Woodward, and Victor Zarnowitz. I am especially obliged to Arthur F. Burns, Solomon Fabricant, and Julius Shiskin for their sound advice and stimulating comments at all stages of the work.

The paper has been approved for publication as a report of the National Bureau of Economic Research by the director of research and the Board of Directors of the National Bureau, in accordance with the resolution of the board governing National Bureau reports (see the *Annual Report of the National Bureau of Economic Research*). It is to be reprinted as No. 61 in the National Bureau's series of Occasional Papers.

TABLE 260

THE DURATION OF BUSINESS CYCLE EXPANSIONS AND CONTRACTIONS
IN THE UNITED STATES, 1854-1957

Business Cycle			Duration of	
			Expansion	Contraction
Trough	Peak	Trough	(months)	
Dec. 1854	June 1857	Dec. 1858	30	18
Dec. 1858	Oct. 1860	June 1861	22	8
June 1861	Apr. 1865	Dec. 1867	46	32
Dec. 1867	June 1869	Dec. 1870	18	18
Dec. 1870	Oct. 1873	Mar. 1879	34	65
Mar. 1879	Mar. 1882	May 1885	36	38
May 1885	Mar. 1887	Apr. 1888	22	13
Apr. 1888	July 1890	May 1891	27	10
May 1891	Jan. 1893	June 1894	20	17
June 1894	Dec. 1895	June 1897	18	18
June 1897	June 1899	Dec. 1900	24	18
Dec. 1900	Sep. 1902	Aug. 1904	21	23
Aug. 1904	May 1907	June 1908	33	13
June 1908	Jan. 1910	Jan. 1912	19	24
Jan. 1912	Jan. 1913	Dec. 1914	12	23
Dec. 1914	Aug. 1918	Mar. 1919*	44	7
Mar. 1919*	Jan. 1920	July 1921*	10	18
July 1921*	May 1923	July 1924	22	14
July 1924	Oct. 1926	Nov. 1927*	27	13
Nov. 1927*	Aug. 1929*	Mar. 1933	21	43
Mar. 1933	May 1937	June 1938*	50	13
June 1938*	Feb. 1945	Oct. 1945	80	8
Oct. 1945	Nov. 1948	Oct. 1949	37	11
Oct. 1949	July 1953	Aug. 1954	45	13
Aug. 1954	July 1957		35	
Average, 24 cycles, 1854-1954			29.9	19.9

For an explanation of the method used to determine the business cycle peak and trough dates and some tests of their validity, see Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles* (National Bureau of Economic Research, 1946), Ch. 4. A few of these dates (designated by an asterisk) have been revised since the Burns-Mitchell report, and the list has been carried forward to date.

* Revised.

pansion of aggregate economic activity culminated and contraction began, as judged from a variety of statistical records; the trough dates specify when contraction culminated and expansion began. The measures of duration show that five of the eight contractions since 1920 have lasted roughly a year (11 to 14 months). One was somewhat shorter (8 months), one somewhat longer (18 months), and one very much longer (43 months). Before 1920, contractions frequently lasted more than a year—indeed, ten out of sixteen between 1857 and 1919 lasted 18 months or more. The reasons for the apparent reduction in the typical length of contraction are not fully known, and we do not know whether it can be counted on as a permanent shift.¹ The intervening intervals

¹ For some observations suggesting that the durations of business contractions (and expansions) may be subject to long swings associated with the construction cycle and related developments, see the report by Moses Abramovits in the National Bureau's *Thirty-eighth Annual Report* (May 1958).

TABLE 261
MEASURES OF THE DURATION AND AMPLITUDE OF BUSINESS CYCLE CONTRACTIONS
IN THE UNITED STATES, 1920-1954

Business Cycle	Peak	Trough	Mos. from Peak to Trough	Unemployment Rate, Annual			Unemployment Rate, Monthly			Nongri-cultural Employment	Industrial Production	Gross National Product	Personal Income	Bank Debts Outside N.Y.C.	Retail Sales
				At Peak ^a	At Trough ^a	Change in Rate ^a	At Peak ^b	At Trough ^b	Change in Rate ^b						
Jan. 1920	July 1921		18	4.0	11.9	+7.9	—	—	—	-29.0	—	—	-22.5	-4.2	
May 1923	July 1924		14	3.2	5.5	+2.3	—	—	—	-16.3	-2.3 ^c	+0.1 ^c	-3.1	-1.7	
Oct. 1926	Nov. 1927		13	1.9	4.1	+2.2	—	—	—	-5.7	+0.3 ^c	+0.8 ^c	+8.7	0	
Aug. 1929	Mar. 1933		43	3.2	23.6	+20.4	0.58	24.96	+24.4	-50.1	+49.6 ^c	-49.8	-61.9	-43.3	
May 1937	June 1938		13	14.3	19.0	+4.7	11.53	19.77	+8.2	-10.0	-11.9 ^c	-11.2	-16.5	-14.1	
Feb. 1945	Oct. 1945		8	1.2	3.9	+2.7	0.11	0.34	+0.2	-29.4	-10.9 ^c	-4.1	-1.0	+8.7	
Nov. 1948	Oct. 1949		11	3.4	5.5	+2.1	3.96	6.99	+3.0	-7.7	-3.2 ^c	-3.7	-5.3	-0.3	
July 1953	Aug. 1954		13	2.5	5.0	+2.5	2.63	5.93	+3.3	-3.4	-2.0 ^c	-0.2	+0.2	-0.8	
July 1957							4.23			-9.5					

1. Contractions in Chronological Order	
Business Cycle	Severities
Oct. 1926	Nov. 1927
July 1953	Aug. 1954
Nov. 1948	Oct. 1949
May 1923	July 1924
Jan. 1920	July 1921
May 1937	June 1938
Aug. 1929	Mar. 1933

2. Contractions in Order of Severity (excl. February-October 1945)	
Business Cycle	Severities
Oct. 1926	Nov. 1927
July 1953	Aug. 1954
Nov. 1948	Oct. 1949
May 1923	July 1924
Jan. 1920	July 1921
May 1937	June 1938
Aug. 1929	Mar. 1933

All data are adjusted for seasonal variations. For sources, see Appendixes A and B. For a ranking of amplitudes of business cycle expansions and contractions from 1879 to 1933 see Table 150 in Burns and Mitchell, *op. cit.*

^a Based on annual averages for the following business cycle peak and trough years: P, 1920; T, 1921; P, 1923; T, 1924; P, 1926; T, 1927; P, 1929; T, 1932; P, 1937; T, 1938; P, 1944; T, 1946; P, 1948; T, 1949; P, 1954; T, 1957. The annual data are from Stanley Lebergott, "Annual Estimates of Unemployment in the United States, 1900-1954," in *The Measurement and Behavior of Unemployment* (National Bureau of Economic Research, Special Conference Series 8, 1957), pp. 215-16.

^b Based on three-month averages centered on business cycle peak and trough months, except as noted. The peak standings from which the percentage changes are computed are given in Appendix A.

^c Based on changes between the following business cycle peak and trough quarters: P, I 1920; T, III 1921; P, II 1923; T, III 1924; P, III 1926; T, IV 1927; P, III 1929; T, I 1933; P, II 1937; T, II 1938; P, I 1945; T, IV 1949; P, II 1953; T, III 1954; P, III 1957.

of expansion have typically been substantially longer than the contractions, many of them lasting two or three years. This has been just as true since 1920 as it was before.

The durations of the expansions and the contractions are not sufficiently uniform or regular to give one more than a very rough notion about how long an expansion or contraction might be expected to last when it has just begun. After a year or so has elapsed, however, it may be of some help to know how frequently or infrequently phases of given lengths occur. Thus at the end of 1956 one could say this about the expansion that had begun in August 1954:

"If the current expansion were to continue through all of 1957, it will have lasted forty months. In the National Bureau's business cycle chronology covering the past 100 years there are only five expansions (out of twenty-four) that lasted as long as forty months: June 1861–April 1865, forty-six months; December 1914–August 1918, forty-four; March 1933–May 1937, fifty; June 1938–February 1945, eighty; and October 1949–July 1953, forty-five. Four of these expansions encompassed major wars, and one was the recovery from the Great Depression. Clearly, if the present expansion extends through 1957 without a setback it will establish a new precedent."² This bit of information in itself, of course, was not enough to forecast a recession, but it could usefully be considered together with other more direct and more important evidence. It now appears that the expansion came to an end in July 1957, that is, after 35 months (see below).

Table 261 shows the size of the declines between the business cycle peak and trough dates since 1920, as registered by several widely used measures of business activity. Clearly, a contraction that appears more severe than another by one measure may appear less severe by another measure. The 1953–54 contraction was somewhat greater than 1948–49 when measured in terms of the percentage decline in industrial production or the increase in the unemployment rate, but somewhat less than 1948–49 when measured by the percentage decline in gross national product or in nonagricultural employment.³ Nevertheless, one can construct at least a rough ranking of the contractions according to severity.

At the top of the list of recent contractions, obviously, is the contraction that began in 1929—the longest and deepest. The only other that comes close to it in the National Bureau's 100-year chronology is the contraction of 1873 to 1879. Next most severe among those since 1920 are the contractions of 1920–21 and 1937–38. Both were very sharp and fairly short, but that of 1937–38 began when unemployment was still at a very high level, much higher than in 1920. The contraction of 1923–24 was of moderate amplitude, not unlike that of 1948–49. The most recent contraction, 1953–54, was in most respects of slightly lesser magnitude than the contraction of 1948–49, yet greater than that of 1926–27, and certainly more widely recognized. There remains the brief contraction after World War II, February–October 1945, which marked the transition from a wartime to a peacetime economy, and which is the most difficult

² *Thirty-seventh Annual Report*, National Bureau of Economic Research (May 1957), p. 53.

³ Note that the table measures the percentage declines between business cycle peak and trough dates. Somewhat different results would be obtained if the declines were measured from the specific peak in each indicator to its trough. The latter method has some advantages for the purpose of measuring the amplitude of business cycles, and some disadvantages. In practice we have used both methods.

of all to characterize because different measures yield such different results. However, in terms of its impact upon the well-being of the population it must surely be classed among the more modest of those in our list.⁴

In order to have a definite scale we shall use the following ranking of contractions according to severity, excluding the 1945 episode because of its special character. The ranking is based partly on the information in Table 261 (see second section of table) and partly on other information bearing on the depth of these contractions (see note 3 above).

Contraction	Rank
Oct. 1926 Nov. 1927	1 (mildest)
July 1953 Aug. 1954	2
Nov. 1948 Oct. 1949	3
May 1923 July 1924	4
Jan. 1920 July 1921	5
May 1937 June 1938	6
Aug. 1929 Mar. 1933	7 (most severe)

We can then construct, for each of these contractions, measures that show by how much business activity declined from the peak as the contraction continued, and compare such measures with the above ranking. Such measures should tell us at about what stage—that is, how many months after the contraction began—the relative severity of each recession became evident, and how it manifested itself in different aspects of economic activity, such as production, employment, incomes, prices. Similar measures constructed during the course of a current contraction can then be used to appraise its severity and its scope compared with earlier contractions.

One of the prerequisites for such an analysis is that the current contraction is known or is believed to have begun, so that the date from which it starts, i.e., the peak of the business cycle, can be fixed. Of course, such a date may be selected tentatively, when a contraction is only suspected. If the assumption turns out to be an error, the error need not long persist. Experience suggests that the date of the peak can be determined with reasonable accuracy fairly soon after it occurs.⁵

Study of materials developed along these lines and presented later in the report suggests the following tentative conclusions:

⁴ Another period that might be considered a cyclical contraction is 1951–52. Many sectors of the economy suffered setbacks at this time, after the rapid upsurge in 1950 when the Korean War began. Nevertheless, although the rate of growth of aggregate economic activity slackened perceptibly there was no appreciable over-all decline in output, income, or employment, and no rise in unemployment, since the defense industries kept expanding rapidly. Therefore we do not consider it to be a business cycle contraction. For an analytic description of this period see Bert G. Hickman, *The Korean War and United States Economic Activity, 1950–1952* (National Bureau of Economic Research, Occasional Paper 49, 1955). For the definition of business cycles followed in our work, and a discussion of its historical application, see Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles* (National Bureau of Economic Research, 1946), Chapters 1 and 4.

⁵ For a description of some methods for accomplishing this see Arthur F. Burns, *Frontiers of Economic Knowledge* (National Bureau of Economic Research, 1954), especially pp. 107–34, 179–80, and Geoffrey H. Moore, *Statistical Indicators of Cyclical Revivals and Recessions* (National Bureau of Economic Research, Occasional Paper 31, 1950).

1. When a business recession begins, most broad indicators of aggregate economic activity (production, employment, income, trade) show relatively slight declines, and during the first six months of the recession the magnitude of the declines bears little relation to the ultimate severity or depth of the recession.

2. About six months after a recession begins, the percentage declines from the peak month to the current month in most economic aggregates are smaller in mild recessions than in severe recessions, and this ranking is maintained in succeeding months with little change.

3. When such comparisons are made for types of economic data that typically begin declining before a recession starts (for example, new orders, construction contracts, the average workweek, stock prices) the distinction between mild and severe recessions begins to appear as early as three or four months after the recession begins, and is also substantially maintained in succeeding months.

4. Although frequently both mild and sharp business contractions have ended within about a year, the recovery to the previous peak level has been accomplished much more quickly after mild contractions. Hence the period of depressed activity has been much longer when the contraction proceeded at a rapid rate.

5. While the above conclusions suggest that a rough ordering of recessions according to severity can be made within four to six months after the onset, they do not imply that either the ultimate depth or the duration of recessions can be reliably forecast by this means. Many factors not taken into account by the method, such as governmental measures taken to combat depression, have an important bearing on the severity and duration of business contractions. The method appears useful primarily in providing a yardstick against which a current decline in various aspects of economic activity can be gauged, and thereby facilitating a more accurate and enlightened appraisal of what has already taken place. This in itself might facilitate the development of appropriate counter-cyclical programs.

6. Measures of the strength of various counter-cyclical factors (for example, unemployment compensation payments, increased governmental expenditures, easier credit terms, lower taxes) at similar stages of recession might be developed on the same plan as described here, although it is not attempted in this study. Such measures might be of assistance in judging the prospects for further business contraction or for a resumption of economic expansion.

7. Several months before a recession comes to an end and an upturn in aggregate activity occurs, a progressive narrowing of the scope of contraction ordinarily becomes visible. Fewer activities continue to decline, more begin to rise. It appears first in series of the "leading" type. The more extensive and more sustained this reduction in the scope of the contraction is, the more likely that it marks the real end of recession rather than an abortive recovery. Information of this sort may help to identify an upturn in aggregate activity at about the time it occurs or shortly thereafter.

8. When the methods developed in this investigation are applied to the business contraction that began in July 1957, we find that:

- a. After eight months of contraction, i.e., through March 1958, most indicators have declined more than in the corresponding periods of the four milder contractions

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.⁶ 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.⁷ Use of the business cycle peak enables us to examine a wide variety of series on a comparable basis (see below).

⁶ 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.

⁷ 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