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CYCLICAL FLUCTUATION ANALYSIS:
SOURCES AND METHODS

This Appendix describes sources and methods used for obtaining monthly estimates of employment, output, and output per man-hour for the series discussed in Chapter 7.

Employment

Employment is defined as the number of wage and salary workers plus the number of self-employed workers. For wage and salary workers, the Bureau of Labor Statistics monthly employment series based on payroll data was used. This is published in *Employment and Earnings Statistics for the United States, 1909–66,* BLS Bulletin No. 1312-4. For the self-employed, we used unpublished monthly estimates of self-employment by industry, compiled by the Current Population Survey, Bureau of the Census.

The BLS employment series underwent a major revision in 1961 to reflect both the most recent industrial classification scheme and improved estimation procedures. Food store and automotive dealer employment were not revised prior to 1958. The old series for 1947–57 are not comparable with the new ones, as indicated by large discrepancies between the two for the 1958–60 overlap period (compare data in *Employment and Earnings Statistics, 1909–1966* with estimates in monthly issues of *Employment and Earnings* for the years 1958–60). Therefore, for both store types it was assumed that the 1958 ratio of the new series to the old series by month equaled the monthly ratios for each of the eleven previous years.

Self-employment in food, apparel, and automotive stores was estimated by applying the ratios of self-employed workers in each store type to all self-employed retail workers in Census of Business years to the monthly CPS self-employment in retail trade series. Ratios for every year in the period studied were obtained by interpolation between Census of Business years.

Output

With the exception of manufacturing, output is always given by deflated sales. Current dollar sales are compiled by the Bureau of the Census. All sales series used, except wholesale trade, are published in the *Survey of Current Business* of April 1966; *Business Statistics, 1961, 1959, 1957, and 1955;* and the *Survey of Current Business* of June 1957. The wholesale trade series is for merchant wholesalers only. It was assumed that the changes in total wholesale sales conformed to changes in this series. For 1948–55, wholesale sales were obtained from unpublished worksheets of the Bureau of the Census. Figures for 1947 were estimated by extrapolation based on data for service and limited-function wholesalers. (See *Business Statistics, 1951*.) For the remainder of the period; the source is the *Monthly Wholesale Trade Report*. For the years 1956–59, wholesale sales in the *Monthly Wholesale Trade Report* were multiplied by the ratio of annual sales figures in *Business Statistics, 1965* to annual figures in the *Monthly Wholesale Trade Report*. This procedure was employed to take account of the fact that the series was revised in 1961, but sales prior to 1960 were not changed with the exception of annual totals. (Compare data in *Monthly Wholesale Trade Report* with that in *Business Statistics, 1965*.)

Current dollar sales were deflated by price indexes (1957–59 = 100) to obtain constant dollar sales. Table J-1 shows these deflators.

TABLE J–1

Current Dollar Sales Deflators

Industry	Deflator
Retail trade	All-commodities component of the Consumer Price Index.
Food stores	Food component of the CPI.
Apparel stores	Apparel component of the CPI.
Auto dealers	A weighted average of the new automobile, used automobile, and tire components of the CPI. The weights were .5, .4, and .1, respectively.[a]
Wholesale trade	All-commodities component of the Wholesale Price Index.
Manufacturing	Manufacturing component of the WPI.

[a] For 1947–52 a price index for used automobiles was not available. Therefore, it was assumed that the new automobile index adequately reflected price movements of all automobiles in this period. This assumption was strengthened by the fact that few used cars were traded in these years. The tire index is published on a quarterly basis. Monthly figures were obtained by interpolation between quarters. A similar procedure was employed to obtain a new automobile price index between 1947 and 1952.

For manufacturing, output was measured by the manufacturing component of the Federal Reserve Board Index of Industrial Production (1957–59 = 100). This is given in the *Survey of Current Business* of April 1966, *Business Statistics, 1965,* and *Industrial Production, 1957–59 Base.*

Output Per Man-Hour

Output per man-hour is defined as real output divided by man-hours and is expressed as an index number with 1957–59 equal to 100. Average weekly hours are a weighted average of the hours of wage and salary workers and the hours of the self-employed. The weights applied were

TABLE J–2

Specific Cycle Turning Points

Series	Peaks	Troughs
Construction employment	12/48	1/50
	2/53	5/53
	6/56	6/58
	12/59	2/61
Manufacturing output (FRB index)	7/48	10/49
	7/53	4/54
	2/57	4/58
	1/60	1/61
Manufacturing output (deflated sales)	9/48	10/49
	7/53	10/54
	2/57	4/58
	1/60	1/61
Deflated retail sales	7/50	4/51
	3/53	1/54
	7/57	3/58
	4/60	4/61
Deflated wholesale sales	7/50	7/51
	7/53	1/54
	1/57	2/58
	2/60	1/61

the proportion of total employment accounted for by each group. Average weekly hours of wage and salary workers were given by BLS payroll data of hours of production workers. It was postulated that nonproduction workers worked the same number of hours as production workers. This corresponds to the supposition made by Thor Hultgren in *Cost, Prices and Profits: Their Cyclical Relations,* New York, NBER, 1965. For the self-employed, CPS estimates of the average weekly hours of the nonagricultural self-employed were used. It was assumed that the self-employed worked the same number of hours in every industry.

TABLE J–3

Average Rates of Change of Output During Business Cycles,
Selected Industries, 1947–65
(per cent per annum)

Industry [a]	Average Rate of Change in		Average Cyclical Change Net of Trend
	Expansions	Contractions	
Retail trade	5.0(0.2)	−6.5(3.0)	11.5(3.0)
Wholesale trade	7.0(1.1)	−10.1(2.0)	17.1(2.2)
Manufacturing (FRB index)	9.8(2.3)	−11.2(3.0)	21.0(2.9)
Manufacturing (deflated sales)	8.6(1.2)	−8.2(2.0)	16.8(1.9)
Nondurable manufacturing	6.4(1.6)	−2.3(1.1)	8.7(1.3)
Durable manufacturing	12.7(3.8)	−18.2(4.2)	30.9(4.3)
Food stores	4.7(0.4)	−0.2(0.7)	4.9(1.0)
Apparel stores	4.8(0.7)	−4.3(1.4)	9.1(1.6)
Auto dealers	5.0(2.9)	−17.6(8.9)	22.6(8.8)

Note: Figures in parentheses are average deviations.
Source: See Table 58.
[a] Figures for retail trade, food and apparel stores and auto dealers are based on turning points in deflated retail sales; wholesale trade, based on turning points in deflated wholesale trade sales; manufacturing (FRB index) and durable and nondurable manufacturing based on turning points in manufacturing production; and manufacturing (deflated sales), based on turning points in deflated manufacturing sales.

TABLE J-4

Average Rates of Change of Output Per Man-Hour During
Business Cycles, Selected Industries, 1947–65 [a]
(per cent per annum)

Industry	Average Rate of Change in		Average Cyclical Change Net of Trend
	Expansions	Contractions	
Retail trade	4.4(1.3)	−1.7(1.9)	6.1(2.3)
Wholesale trade	4.8(1.0)	−8.8(1.8)	13.6(2.4)
Manufacturing (FRB index)	4.9(1.7)	0.1(1.6)	4.8(2.9)
Manufacturing (deflated sales)	3.0(0.2)	1.7(1.1)	1.3(1.2)
Nondurable manufacturing	4.3(0.8)	3.2(1.0)	1.1(1.6)
Durable manufacturing	5.6(2.4)	−2.5(2.2)	8.1(3.8)
Food stores	4.0(1.6)	1.6(1.7)	2.4(2.9)
Apparel stores	3.7(1.2)	−1.8(3.4)	5.5(4.0)
Auto dealers	3.4(3.1)	−14.0(8.6)	17.4(8.2)

[a] For notes and source, see Table J-3.