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## IV

### *The 1966 List of Indicators*

#### I. GENERAL FRAMEWORK

The classification scheme devised for the 1966 list of indicators provides the following:

A. A list of series classified primarily by cyclical timing with a subclassification by economic process, this order being chosen because timing differences are of prime interest in short-run forecasting.<sup>1</sup> This list covers a broad range of economic activities with many closely related series that complement one another in various ways. It includes some series that do not move in close conformity to business cycles.

B. A short, unduplicated list of series, superior in quality as indicators and meeting high standards for conformity to business cycles, classified by timing alone. This set of data provides a convenient means of summarizing what the principal indicators reveal

about the current situation and outlook, though the results need to be checked as well as amplified by reference to the full list.

C. A principal timing classification based on peak and trough behavior taken together, without reference to length of lead or lag. However, information is provided on timing at peaks and troughs separately, as well as on lengths of lead or lag (cf. Appendixes B and C).

D. An economic-process classification within each broad timing class that facilitates comparisons of similar economic activities with different timing as well as different economic activities with similar timing. The economic-process classes are the same as those used to evaluate economic significance (cf. Section 3, Chapter II).

#### 2. THE FULL LIST

The new list, shown in Table 6 and Chart 1, includes 88 U.S. series: 36 leading, 25 roughly coincident, 11 lagging, and 16 unclassified by timing; 72 are monthly and 16 quarterly. In the previous list, shown in *Business Cycle Developments*, there were 80 U.S. series—30 leading, 15 coincident, 7 lagging, and 28 unclassified by timing. Table 6 shows the number of series within each of the timing and economic process categories in the new list.<sup>2</sup>

<sup>1</sup>The use of timing as the primary basis of classification underscores the fact, important for forecasting, that many economic processes move more or less simultaneously with one another and in advance of others that also move more or less simultaneously with one another.

<sup>2</sup>Of the 72 series classified by timing, the separate peak and trough classifications show that 38 are in the same timing class at peaks and troughs, with 34

One objective of this list is to provide several closely related series for each type of activity having significance for business cycle analysis. Such "duplication" is desirable because some series appear at more frequent intervals and hence are more up to date than others that are conceptually more appropriate (price per unit of labor cost, available monthly, versus profits per dollar of sales, available quarterly); some appear more promptly but are less adequate statistically (percentage of purchasing agents reporting higher inventories of purchased materials versus actual reported changes in purchased materials inventories); some have sharper, more easily identified cyclical move-

in different classes. These proportions do not differ much from those observed in the 1950 study.

ments but are not as comprehensive (labor income in mining, manufacturing, and construction versus total personal income); and some are smoother but less appropriate conceptually (housing permits versus housing starts). Thus, various series measuring similar activities complement one another in interpreting current business conditions and prospects. In general, the availability of closely related series facilitates the process of appraising the errors of measurement and other limitations of individual series, and obtaining a consensus among them.

Another type of duplication is also present in the list, namely, series that represent stocks as well as those that represent flows, or rates

of change in the stock. For example, series on inventories as well as on inventory change, on debt outstanding as well as the net change in debt, on accessions and layoffs as well as on employment, are included. In general, the cyclical peaks and troughs in the flow are reached at earlier dates than those in the stock, so the series appear in different timing categories. We have restricted this kind of duplication to cases where some special significance attaches to both the flow and the stock and both score well as indicators.

The list includes 13 new series, that is, series not on the list appearing in *Business Cycle Developments* as of November 1966:

SERIES	EXPLANATION
Nonagricultural job openings, number pending	Best available series on job vacancies, with cyclical movements similar to those of help-wanted advertising. Its coverage is limited, however, to openings registered with U.S. Employment Service offices.
Change in mortgage debt	Most comprehensive monthly measure of the net volume of mortgage debt extended (residential and nonresidential). Represents, together with change in consumer instalment debt and in bank loans to business, one of the more cyclically volatile components of the flow of private debt.
Delinquency rate, instalment credit loans	One of the few promptly available measures of lending experience on consumer credit. Moves inversely with business cycles, often leading at peaks.
Man-hours, nonagricultural employment	Most comprehensive monthly measure of labor input. This series combines employment from the establishment survey with average hours worked from the labor force survey. The employment data from the establishment survey are used because of their better cyclical performance. The hours data from the labor force survey provide comprehensive industry coverage, but do not match precisely the establishment data.
Unemployment rate, fifteen weeks and over	Supplements other unemployment series, representing unemployment of longer duration and therefore of a more serious nature. Cyclical swings are wider than and lag behind those in the total unemployment rate. Thus it has confirmatory value as an indicator.
Machinery and equipment sales and business construction expenditures	Provides monthly estimates that correspond roughly to quarterly plant and equipment expenditures, and helps identify turning points in actual expenditures that may not appear in the anticipations data.

**TABLE**  
**Eighty-eight Selected Indicators Classified by Timing**  
**A. Individual**

Classification and Series Title (1)	First Business Cycle Turn Covered (2)	Average Score		Scores, Six Criteria					
		Series Short List(*) (3a)	Other Series (3b)	Eco- nomic Signifi- cance (4)	Statis- tical Ade- quacy (5)	Con- form- ity (6)	Tim- ing (7)	Smooth- ness (8)	Cur- rency (9)
<b>LEADING INDICATORS</b>									
<b>1. Employment and unemployment</b>									
<i>Marginal employment adjustments</i>									
*1. Avg. workweek, prod. workers, mfg.	1921	66		50	65	81	66	60	80
*30. Nonagri. placements, BES	1945	68		75	63	63	58	80	80
2. Accession rate, mfg.	1919		65	50	75	78	83	40	40
5. Initial claims, unempl. insur. (inv.)	1945		73	75	63	81	55	80	100
3. Layoff rate, mfg. (inv.)	1919		69	50	75	85	86	60	40
<b>3. Fixed capital investment</b>									
<i>Formation of business enterprises</i>									
*38. Index of net business formation	1945	68		75	58	81	67	80	40
13. New business incorporations	1860		65	75	69	71	61	60	40
<i>New investment commitments</i>									
*6. New orders, dur. goods indus.	1920	78		75	72	88	84	60	80
94. Construction contracts, total, value	1910		59	75	78	45	66	20	40
*10. Contracts and orders, plant and equip.	1948	64		75	63	92	50	40	40
11. New capital appropriations, mfg., Q	1953		45	50	50	76	8	80	0
24. New orders, mach. and equip. indus.	1948		72	50	68	92	82	60	80
9. Constr. contracts, comm. and indus., floor area	1919		46	50	73	75	11	0	40
7. Private nonfarm housing starts	1918		63	50	75	69	80	0	80
*29. New building permits, private housing units	1918	67		50	60	76	80	60	80
<b>4. Inventories and inventory investment</b>									
<i>Inventory investment and purchasing</i>									
21. Change in business inventories, all indus., Q	1921		61	75	75	81	28	40	50
*31. Change in book value, mfg. and trade inventories	1945	65		75	67	77	78	20	40
37. Purchased materials, % reptg. higher inventories	1948		62	50	58	76	55	60	80
20. Change in bk. val., mfrs.' inventories of materials and supplies	1945		47	50	67	48	50	0	40
26. Buying policy, mater., % reptg. commitments 60+ days	1953		62	50	51	66	71	60	80
32. Vendor performance, % reptg. slower deliveries	1948		69	50	53	78	82	80	80
25. Change in unfilled orders, dur. goods indus.	1945		68	50	67	81	82	40	80
<b>5. Prices, costs, and profits</b>									
<i>Sensitive commodity price indexes</i>									
*23. Industrial materials prices	1919	67		50	72	79	44	80	100

3  
and Economic Process: Scores and Timing Characteristics  
Series

Timing at Peaks and Troughs						
Business Cycle Turns Covered (10)	Leads (11)	Rough Coinci- dences <sup>a</sup> (12)	Lags (13)	Median Lead(-) or Lag(+) in Months (14)	Timing Class <sup>c</sup> (15)	Classification and Series Title (1)
<b>36 SERIES)</b>						
						1. Employment and unemployment
						<i>Marginal employment adjustments</i>
19	13	4(2)	2	-5	L	*1. Avg. workweek, prod. workers, mfg.
10	8	4(0)	1	-3	L	*30. Nonagri. placements, BES
21	19	6(2)	0	-4	L	2. Accession rate, mfg.
10	6	4(2)	1	-6	L	5. Initial claims, unempl. insur. (inv.)
21	19	6(1)	0	-7	L	3. Layoff rate, mfg. (inv.)
						3. Fixed capital investment
						<i>Formation of business enterprises</i>
10	8	3(1)	0	-7	L	*38. Index of net business formation
50	33	13(2)	7	-5	L	13. New business incorporations
						<i>New investment commitments</i>
20	16	7(1)	0	-4	L	*6. New orders, dur. goods indus.
26	19	8(1)	1	-6	L	94. Construction contracts, total, value
8	7	2(0)	1	-6	L	*10. Contracts and orders, plant and equip.
6	4	3(0)	2	-4	L	11. New capital appropriations, mfg., Q
8	8	2(0)	0	-6	L	24. New orders, mach. and equip. indus.
21	11	8(1)	3	-2	L	9. Constr. contracts, comm. and indus., floor area
22	17	5(1)	1	-6	L	7. Private nonfarm housing starts
22	17	5(1)	1	-6	L	*29. New building permits, private housing units
						4. Inventories and inventory investment
						<i>Inventory investment and purchasing</i>
19	10	8(1)	8	-2	L	21. Change in business inventories, all indus., Q
10	9	2(1)	0	-8	L	*31. Change in book value, mfg. and trade inventories
8	6	3(1)	1	-4	L	37. Purchased materials, % reptg. higher inventories
10	8	4(0)	1	-6	L	20. Change in bk. val., mfrs.' inventories of materials and supplies
6	6	3(0)	0	-4	L	26. Buying policy, mater., % reptg. commitments 60+ days
8	8	1(0)	0	-8	L	32. Vendor performance, % reptg. slower deliveries
10	10	2(0)	0	-12	L	25. Change in unfilled orders, dur. goods indus.
						5. Prices, costs, and profits
						<i>Sensitive commodity price indexes</i>
21	13	9(4)	2	-2	L	*23. Industrial materials prices

Classification and Series Title (1)	First Busi- ness Cycle Turn Cov- ered (2)	Average Score		Scores, Six Criteria					
		Series on List(*) (3a)	Other Series (3b)	Eco- nomic Signifi- cance (4)	Statis- tical Ade- quacy (5)	Con- form- ity (6)	Tim- ing (7)	Smooth- ness (8)	Cur- rency (9)
LEADING INDICATORS									
<i>Stock price indexes</i>									
*19. Stock prices, 500 common stocks	1873	81		75	74	77	87	80	100
<i>Profits and profit margins</i>									
*16. Corporate profits after taxes, Q	1920	68		75	70	79	76	60	25
22. Ratio, profits to income orig., corp., all indus., Q	1948		61	75	63	52	72	60	25
18. Profits per dollar of sales, corporate, mfg., Q	1948		58	50	63	74	72	60	0
*17. Ratio, price to unit labor cost, mfg.	1919	69		50	67	84	72	60	80
6. Money and credit									
<i>Flows of money and credit</i>									
98. Change in money supply and time deposits <sup>d</sup>	1908		68	75	75	72	68	0	100
85. Change in money supply <sup>d</sup>	1914		70	75	75	89	63	0	100
110. Total private borrowing, Q	1953		60	75	67	88	39	60	0
*113. Change in consumer instalment debt	1929	63		50	79	77	60	60	40
112. Change in bank loans to businesses	1938		53	50	47	65	41	20	100
33. Change in mortgage debt	1957		43	50	60	54	20	20	40
<i>Credit difficulties</i>									
14. Liabilities of business failures (inv.)	1879		68	75	74	86	66	0	80
39. Delinquency rate, instal. loans (inv.)	1948		59	50	73	72	50	60	40
ROUGHLY COINCIDENT									
1. Employment and unemployment									
<i>Job vacancies</i>									
301. Nonagri. job openings, number pending, BES	1948		72	75	63	74	58	100	80
46. Help-wanted advertising	1919		76	75	60	96	58	100	80
<i>Comprehensive employment series</i>									
501. Man-hours in nonfarm establishments, employees	1945		71	75	60	89	52	80	80
*41. Employees in nonagri. establishments <sup>e</sup>	1929	81		75	61	90	87	100	80
42. Total nonagri. employment	1945		69	75	62	81	47	80	80
<i>Comprehensive unemployment series</i>									
*43. Unemployment rate, total (inv.)	1929	75		75	63	96	60	80	80
45. Insured unemployment rate (inv.)	1949		76	75	56	73	76	100	100
40. Unemployment rate, married males (inv.)	1957		60	75	55	52	38	80	80
2. Production, income, consumption, and trade									
<i>Comprehensive production series</i>									
49. GNP in current dollars, expenditure estimate, Q	1921		80	75	75	92	82	100	50

(Continued)

## Timing at Peaks and Troughs

Business Cycle Turns Covered (10)	Leads (11)	Rough Coincidences <sup>a</sup> (12)	Lags (13)	Median Lead(-) or Lag(+) in Months (14)	Timing Class <sup>c</sup> (15)	Classification and Series Title (1)
(CONCLUDED)						
44	33	14(2)	5	-4	L	<i>Stock price indexes</i> *19. Stock prices, 500 common stocks
20	13	11(4)	2	-2	L	<i>Profits and profit margins</i> *16. Corporate profits after taxes, Q
8	7	2(1)	0	-7	L	22. Ratio, profits to income orig., corp., all indus., Q
8	7	3(1)	0	-7	L	18. Profits per dollar of sales, corporate, mfg., Q
21	17	10(1)	3	-3	L	*17. Ratio, price to unit labor cost, mfg.
6. Money and credit						
<i>Flows of money and credit</i>						
27	24	0(0)	1	-15	L	98. Change in money supply and time deposits <sup>d</sup>
23	19	1(0)	1	-14	L	85. Change in money supply <sup>d</sup>
6	4	2(1)	1	-8	L	110. Total private borrowing, Q
14	11	4(0)	1	-10	L	*113. Change in consumer instalment debt
11	6	4(2)	1	-4	L	112. Change in bank loans to businesses
4	3	1(1)	0	-8	L	33. Change in mortgage debt
<i>Credit difficulties</i>						
43	31	5(2)	3	-7	L	14. Liabilities of business failures (inv.)
8	6	5(0)	2	-3	L	39. Delinquency rate, instal. loans (inv.)
INDICATORS (25 SERIES)						
1. Employment and unemployment						
<i>Job vacancies</i>						
8	3	4(2)	2	0	C(U)	301. Nonagri. job openings, number pending, BES
21	6	14(7)	6	0	C	46. Help-wanted advertising
<i>Comprehensive employment series</i>						
10	6	8(2)	2	-1	C	501. Man-hours in nonfarm establishments, employees
14	6	12(6)	2	0	C	*41. Employees in nonagri. establishments <sup>e</sup>
10	7	7(1)	2	-2	C(L)	42. Total nonagri. employment
<i>Comprehensive unemployment series</i>						
14	4	8(3)	6	0	C	*43. Unemployment rate, total (inv.)
7	3	5(2)	2	0	C	45. Insured unemployment rate (inv.)
4	2	2(0)	2	-4	C(U)	40. Unemployment rate, married males (inv.)
2. Production, income, consumption, and trade						
<i>Comprehensive production series</i>						
19	6	14(3)	6	0	C	49. GNP in current dollars, expenditure estimate, Q



(Continued)

Timing at Peaks and Troughs						
Business Cycle Turns Covered	Leads	Rough Coincidence <sup>a</sup>	Lags	Median Lead(-) or Lag(+) in Months	Timing Class <sup>c</sup>	Classification and Series Title (1)
(10)	(11)	(12)	(13)	(14)	(15)	
<b>INDICATORS (CONCLUDED)</b>						
17	7	9(3)	3	-2	C(U)	*50. GNP in constant dollars, expenditure estimate, Q
21	9	13(9)	3	0	C	*47. Industrial production/ <i>Comprehensive income series</i>
19	10	12(2)	5	-1	C	*52. Personal income
14	4	12(6)	4	0	C	53. Labor income in mining, mfg., and constr. <i>Comprehensive consumption and trade series</i>
19	6	7(0)	9	+3	C(U)	57. Final sales in current dollars, Q
8	4	6(4)	0	0	C	*816. Mfg. and trade sales
21	5	7(1)	6	0	C(U)	*54. Sales of retail stores
						3. Fixed capital investment <i>Backlog of investment commitments</i>
10	6	4(1)	3	-3	C(L)	96. Mfrs.' unfilled orders, dur. goods indus.
6	2	2(0)	3	+3	C(U)	97. Backlog of cap. appropriations, mfg., Q
						5. Prices, costs, and profits <i>Comprehensive wholesale price indexes</i>
24	2	10(2)	9	+1	C(U)	55. Wholesale prices exc. farm products and foods
24	7	7(1)	7	0	C(U)	58. Wholesale price index, mfd. goods
						6. Money and credit <i>Money market interest rates</i>
20	10	10(0)	6	-1	C(U)	114. Treasury bill rate
8	4	4(0)	4	0	C(U)	116. Corporate bond yields
21	7	9(3)	8	0	C(U)	115. Treasury bond yields
21	7	8(1)	13	+2	C(Lg)	117. Municipal bond yields <sup>g</sup>
						<i>Bank reserves</i>
14	5	6(1)	3	-1	C(U)	93. Free reserves (inv.) <sup>h</sup>
<b>(11 SERIES)</b>						
						1. Employment and unemployment <i>Long-duration unemployment</i>
8	1	5(1)	6	+2	Lg	*502. Unempl. rate, persons unempl. 15+ weeks (inv.)
						3. Fixed capital investment <i>Investment expenditures</i>
20	2	16(5)	13	+1	Lg(C)	*61. Bus. expend., new plant and equip., Q
8	2	7(0)	6	+2	Lg	505. Mach. and equip. sales and bus. constr. expend.
						4. Inventories and inventory investment <i>Inventories</i>
10	2	7(0)	8	+2	Lg	*71. Book value, mfg. and trade inventories

TABLE 6

Classification and Series Title (1)	First Business Cycle Turn Covered (2)	Average Score		Scores, Six Criteria					
		Series on Short List(*) (3a)	Other Series (3b)	Eco- nomic Signifi- cance (4)	Statis- tical Ade- quacy (5)	Con- form- ity (6)	Tim- ing (7)	Smooth- ness (8)	Cur- rency (9)
LAGGING INDICATORS									
65. Book value of mfrs.' inventories, finished goods	1938		65	50	63	72	68	100	40
5. Prices, costs, and profits									
<i>Unit labor costs</i>									
68. Labor cost per dollar of real corp. GNP, Q <sup>i</sup>	1948		67	75	63	88	56	80	25
*62. Labor cost per unit of output, mfg. <sup>i</sup>	1919	68		50	70	83	56	80	80
6. Money and credit									
<i>Outstanding debt</i>									
66. Consumer instalment debt	1929		51	50	79	24	32	100	40
*72. Comm. and indus. loans outstanding	1937	57		50	47	67	20	100	100
<i>Interest rates on business loans and mortgages</i>									
*67. Bank rates on short-term bus. loans, Q <sup>i</sup>	1919	60		50	55	82	47	80	50
118. Mortgage yields, residential <sup>i</sup>	1948		55	50	43	70	24	100	80
OTHER SELECTED									
5. Prices, costs, and profits									
<i>Comprehensive retail price indexes</i>									
81. Consumer price index	1913		45	75	50	20	12	100	40
7. Foreign trade and payments									
89. U.S. balance of payments, Q	1945		49	75	63	64	10	40	25
88. Merchandise trade balance (inv.)	1867		53	75	72	64	6	60	40
86. Exports, exc. military aid	1867		39	75	72	4	6	40	40
861. Export orders, durable goods	j		n.a.	50	53	n.a.	n.a.	0	40
862. Export orders, machinery	1957		n.a.	50	45	n.a.	n.a.	60	40
87. General imports	1867		53	75	75	67	9	40	40
8. Federal government activities									
95. Fed. surplus or deficit, income and prod. acct., Q	1948		60	75	63	77	44	60	25
84. Fed. cash surplus or deficit	1879		56	75	65	84	4	20	80
83. Fed. cash receipts from public	1879		56	75	65	94	8	0	80
82. Fed. cash payments to public	1879		38	75	69	6	2	0	80
101. Natl. defense purch., GNP component, current dollars, Q	1948		39	50	68	4	9	80	50
91. Defense Dept. oblig., total	1953		44	50	57	52	40	0	40
90. Defense Dept. oblig., procurement	1953		45	50	57	56	40	0	40
99. New orders, defense products	1953		40	50	62	30	19	0	80
92. Military contract awards in U.S.	1953		45	50	46	66	44	0	40

(Continued)

Timing at Peaks and Troughs						Classification and Series Title (1)	
Business Cycle Turns Covered (10)	Leads (11)	Rough Coincidences <sup>a</sup> (12)	Lags (13)	Median Lead(-) or Lag(+) in Months (14)	Timing Class <sup>c</sup> (15)		
(CONCLUDED)							
11	2	3(0)	9	+5	Lg	65. Book value of mfrs.' inventories, finished goods	
5. Prices, costs, and profits							
<i>Unit labor costs</i>							
8	1	1(0)	7	+7	Lg	68. Labor cost per dollar of real corp. GNP, Q <sup>i</sup>	
21	0	1(0)	14	+8	Lg	*62. Labor cost per unit of output, mfg. <sup>i</sup>	
6. Money and credit							
<i>Outstanding debt</i>							
14	1	4(0)	9	+4	Lg	66. Consumer instalment debt	
12	1	6(0)	7	+2	Lg	*72. Comm. and indus. loans outstanding	
<i>Interest rates on business loans and mortgages</i>							
21	2	5(1)	15	+5	Lg	*67. Bank rates on short-term bus. loans, Q <sup>i</sup>	
8	1	3(0)	6	+4	Lg	118. Mortgage yields, residential <sup>i</sup>	
SERIES (16 SERIES)							
5. Prices, costs, and profits							
<i>Comprehensive retail price indexes</i>							
24	2	5(1)	11	+4	U	81. Consumer price index	
7. Foreign trade and payments							
10	3	1(0)	1	-4	U	89. U.S. balance of payments, Q	
47	14	16(4)	13	0	U	88. Merchandise trade balance (inv.)	
47	9	6(2)	9	0	U	86. Exports, exc. military aid	
no timing comparisons						U	861. Export orders, durable goods
4	0	0(0)	1	+4 <sup>k</sup>	U	862. Export orders, machinery	
47	17	23(4)	16	0	U	87. General imports	
8. Federal government activities							
8	5	2(0)	3	-6	U(L)	95. Fed. surplus or deficit, income and prod. acct., Q	
43	15	13(3)	17	0	U	84. Fed. cash surplus or deficit	
43	15	17(7)	14	0	U	83. Fed. cash receipts from public	
43	10	7(2)	9	0	U	82. Fed. cash payments to public	
8	1	1(0)	3	+6	U	101. Natl. defense purch., GNP component, current dollars, Q	
6	5	0(0)	0	-11	U(L)	91. Defense Dept. oblig., total	
6	5	0(0)	0	-11	U(L)	90. Defense Dept. oblig., procurement	
6	3	0(0)	0	-11	U	99. New orders, defense products	
6	5	0(0)	0	-10	U(L)	92. Military contract awards in U.S.	

TABLE 6  
B. Group

Economic Process and Number of Series in Group (1)	Average of Scores, Six Criteria						
	Average of Average Score (2)	Eco- nomic Signifi- cance (3)	Statis- tical Ade- quacy (4)	Con- form- ity (5)	Timing (6)	Smooth- ness (7)	Cur- rency (8)
							LEADING
Marginal employment adjustments (5)	68	60	68	78	70	64	68
Formation of business enterprises (2)	66	75	64	76	64	70	40
New investment commitments (8)	62	59	67	77	58	40	55
Inventory investment and purchasing (7)	62	57	63	72	64	43	64
Sensitive commodity price indexes (1)	67	50	72	79	44	80	100
Stock price indexes (1)	81	75	74	77	87	80	100
Profits and profit margins (4)	64	62	66	72	73	60	32
Flows of money and credit (6)	60	62	67	74	48	27	63
Credit difficulties (2)	64	62	74	79	58	30	60
							ROUGHLY COINCIDENT
Job vacancies (2)	74	75	62	85	58	100	80
Comprehensive employment series (3)	74	75	61	87	62	87	80
Comprehensive unemployment series (3)	70	75	58	74	58	87	87
Comprehensive production series (3)	75	75	71	92	59	93	60
Comprehensive income series (2)	76	62	71	92	62	100	80
Comprehensive consumption and trade series (3)	69	75	74	79	39	87	63
Backlog of investment commitments (2)	62	50	58	76	54	100	40
Comprehensive wholesale price indexes (2)	63	62	72	80	10	100	80
Money market interest rates (4)	61	50	69	78	27	65	100
Bank reserves (1)	60	75	59	80	5	60	100
							LAGGING
Long-duration unemployment (1)	69	50	63	98	52	80	80
Investment expenditures (2)	77	75	66	94	76	90	60
Inventories (2)	68	62	65	74	67	100	40
Unit labor costs (2)	68	62	66	86	56	80	52
Outstanding debt (2)	54	50	63	46	26	100	70
Interest rates on business loans and mortgages (2)	58	50	49	76	36	90	65
							OTHER SELECTED
Comprehensive retail price indexes (1)	45	75	50	20	12	100	40
Foreign trade and payments (4) <sup>1</sup>	48	75	70	50	8	45	36
Federal government activities (9)	47	61	61	52	23	18	57

\* On short list of indicators (25 series).

<sup>a</sup> Rough coincidences include exact coincidences (shown in parentheses) and leads and lags of 3 months or less. Leads (lags) include leads (lags) of 1 month or more. The total number of timing comparisons, which can be less than the number of business cycles covered by the series, is the sum of the leads, exact coincidences, and lags. Leads and lags of quarterly series are expressed in terms of months.

<sup>b</sup> Median for the group is the median of the medians for the individual series.

<sup>c</sup> L = leading; C = roughly coincident; Lg = lagging; U = unclassified by timing. The classification is based on the median lead or lag plus a probability test applied to the number of leads, rough coincidences, or lags relative to the number of business cycle turns covered (see text). Where the final designated class differs from that obtained by application of this rule, the latter is shown in parentheses.

*(Continued)*  
Summaries

## Timing at Peaks and Troughs

## Total Number of

Business Cycle Turns Covered (9)	Leads (10)	Rough Coincidences <sup>a</sup>			% of Business Cycle Turns			Median Lead ( - ) or Lag ( + ) in Mos. <sup>b</sup> (16)	Timing Class <sup>c</sup> (17)	Economic Process and Number of Series in Group (1)
		Coincidence <sup>a</sup> (11)	Lags (12)	Leads (13)	Rough Coincidence <sup>a</sup> (14)	Lags (15)				
INDICATORS										
81	65	24(7)	4	80	30(9)	5	-5	L	Marginal employment adjustments (5)	
60	41	16(3)	7	68	27(5)	12	-6	L	Formation of business enterprises (2)	
133	99	40(5)	9	74	30(4)	7	-6	L	New investment commitments (8)	
71	57	23(3)	10	80	32(4)	14	-6	L	Inventory investment and purchasing (7)	
21	13	9(4)	2	62	43(19)	10	-2	L	Sensitive commodity price indexes (1)	
44	33	14(2)	5	75	32(5)	11	-4	L	Stock price indexes (1)	
57	44	26(7)	5	77	46(12)	9	-5	L	Profits and profit margins (4)	
85	67	12(4)	5	79	14(5)	6	-9	L	Flows of money and credit (6)	
51	37	10(2)	5	73	20(4)	10	-5	L	Credit difficulties (2)	
INDICATORS										
29	9	18(9)	8	31	62(31)	28	0	C	Job vacancies (2)	
34	19	27(9)	6	56	79(26)	18	-1	C	Comprehensive employment series (3)	
25	9	15(5)	10	36	60(20)	40	0	C	Comprehensive unemployment series (3)	
57	22	36(15)	12	39	63(26)	21	0	C	Comprehensive production series (3)	
33	14	24(8)	9	42	73(24)	27	0	C	Comprehensive income series (2)	
48	15	20(5)	15	31	42(10)	31	0	C(U)	Comprehensive consumption and trade series (3)	
16	8	6(1)	6	50	38(6)	38	0	C(U)	Backlog of investment commitments (2)	
48	9	17(3)	16	19	35(6)	33	0	C(U)	Comprehensive wholesale price indexes (2)	
70	28	31(4)	31	40	44(6)	44	0	C(U)	Money market interest rates (4)	
14	5	6(1)	3	36	43(7)	21	-1	C(U)	Bank reserves (1)	
INDICATORS										
8	1	5(1)	6	12	62(12)	75	+2	Lg	Long-duration unemployment (1)	
28	4	23(5)	19	14	82(18)	68	+2	Lg	Investment expenditures (2)	
21	4	10(0)	17	19	48(0)	81	+4	Lg	Inventories (2)	
29	1	2(0)	21	3	7(0)	72	+8	Lg	Unit labor costs (2)	
26	2	10(0)	16	8	38(0)	62	+3	Lg	Outstanding debt (2)	
29	3	8(1)	21	10	28(3)	72	+4	Lg	Interest rates on business loans and mortgages (2)	
SERIES										
24	2	5(1)	11	8	21(4)	46	+4	U	Comprehensive retail price indexes (1)	
151	43	46(10)	39	28	30(7)	26	0	U	Foreign trade and payments (4) <sup>d</sup>	
169	64	40(12)	46	38	24(7)	27	-6	U	Federal government activities (9)	

<sup>a</sup> Also analyzed invertedly, in which case the series is classed as lagging.<sup>b</sup> Earlier segment omitted, 1914-28 (production worker employment).<sup>c</sup> Earlier segment omitted, 1890-1918 (volume of business activity, Babson).<sup>d</sup> Earlier segment omitted, 1857-1918.<sup>e</sup> Also analyzed positively, in which case the series is classed as lagging.<sup>f</sup> Also analyzed invertedly, in which case the series is classed as leading.<sup>g</sup> Data not available before October 1962.<sup>h</sup> Based on fewer than 3 timing observations.<sup>i</sup> Two series (export orders, durable goods and export orders, machinery) omitted because complete set of measures is not available.

HOW TO READ THE CHARTS

**Peak (P)** of cycle indicates end of expansion and beginning of Recession (shaded areas) as designated by NBER.

**Trough (T)** of cycle indicates end of recession and beginning of Expansion (white areas) as designated by NBER.

See Appendix G for complete titles and sources of series.

(May) (Feb.)  
P T

**Solid line** indicates monthly data. (Data may be actual monthly figures or MCD moving averages.)

**Arabic number** indicates latest month for which data are plotted. ("12" = December)

**Broken line** indicates actual monthly data for series where an MCD moving average is plotted.

**Roman number** indicates latest quarter for which data are plotted. ("II" = second quarter)

**Parallel lines** indicate a break in continuity (data not available, changes in series definitions, extreme values, etc.)

**Dotted line** indicates anticipated data.

**Solid line with plotting points** indicates quarterly data.

**Various scales** are used to highlight the cyclical patterns of the individual series. "Scale A" is an arithmetic scale, "scale L-1" is a logarithmic scale with 1 cycle in a given distance, "scale L-2" is a logarithmic scale with 2 cycles in that distance, etc. The scales should be carefully noted because they show whether or not the plotted lines for various series are directly comparable.

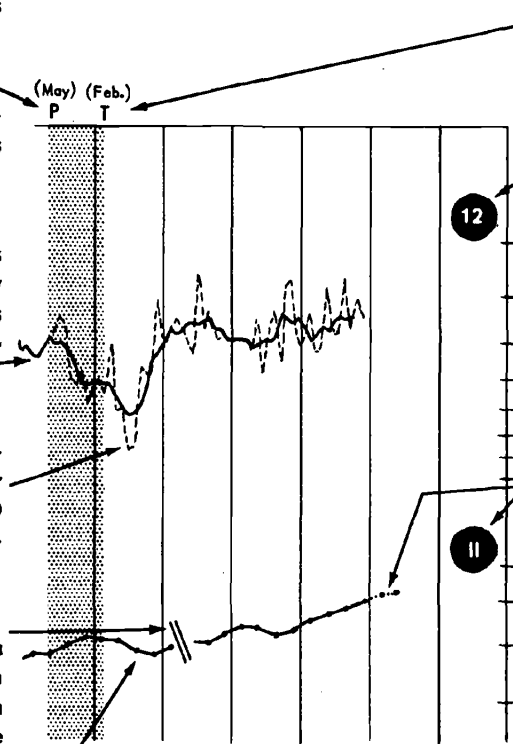
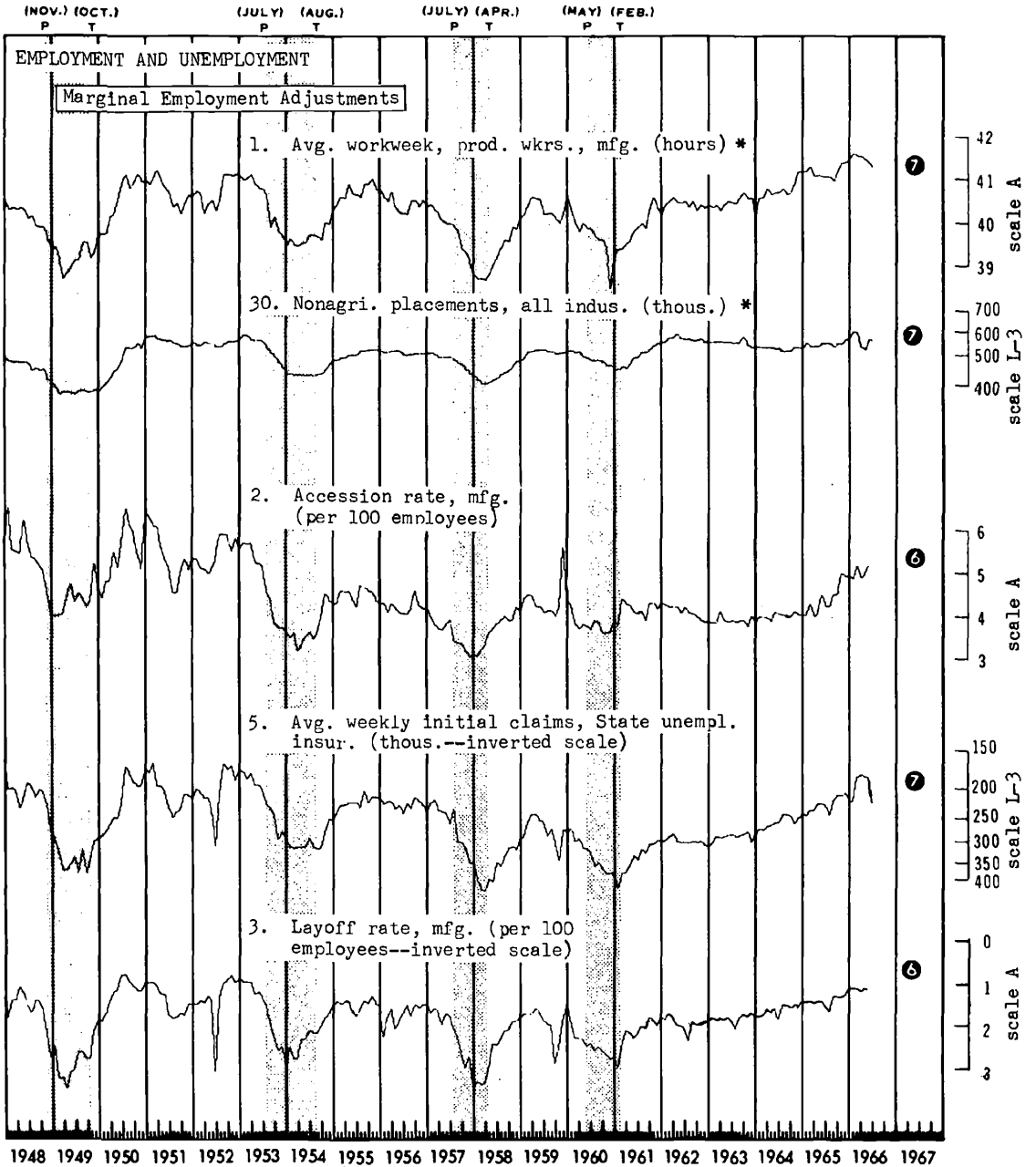


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process  
Leading Indicators, 36 Series



\* Short list.

Note: Numbers in the dark circles indicate latest month plotted.

CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process  
 Leading Indicators, 36 Series (Continued)

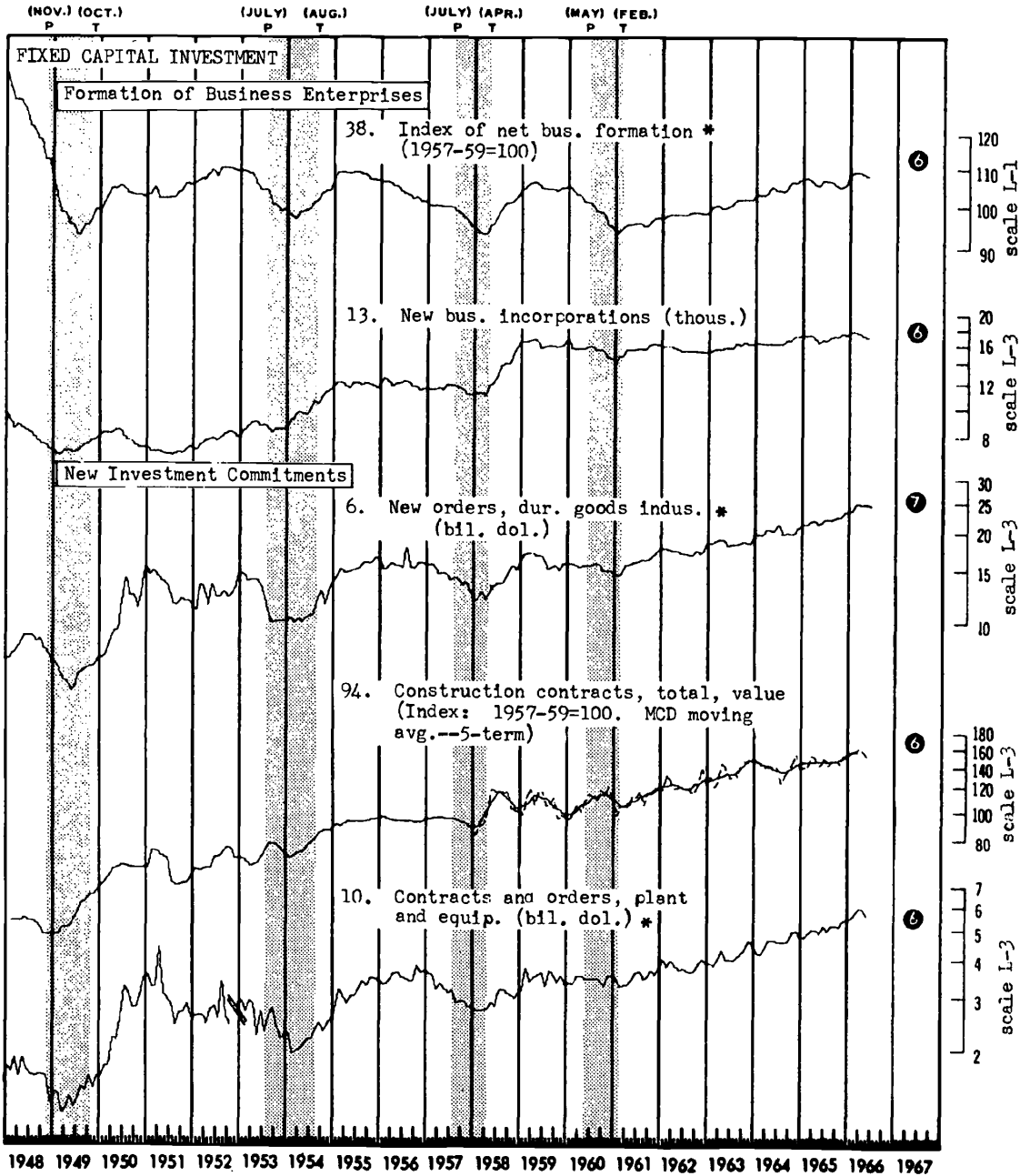


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process  
 Leading Indicators, 36 Series (Continued)

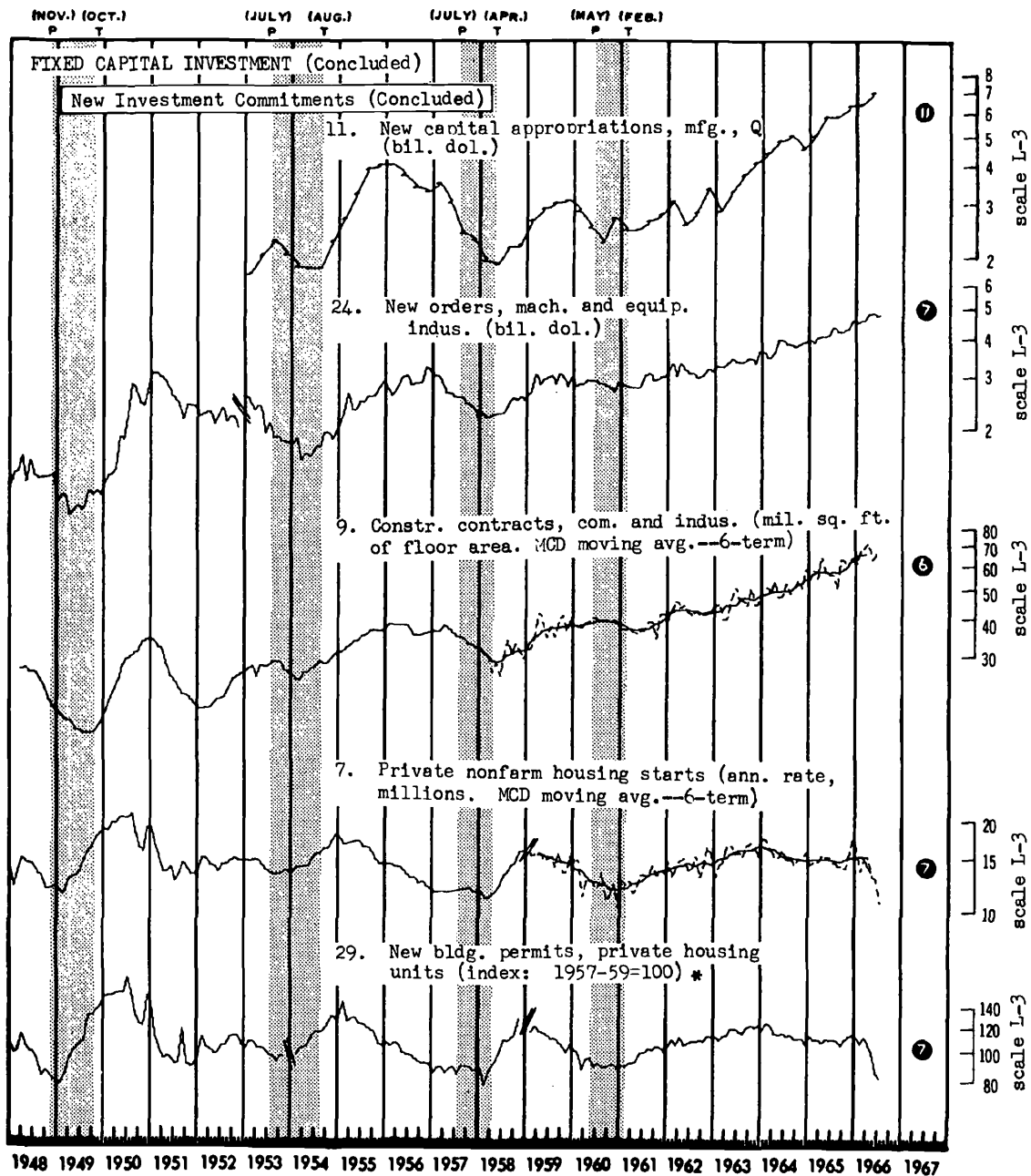


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process

Leading Indicators, 36 Series (Continued)

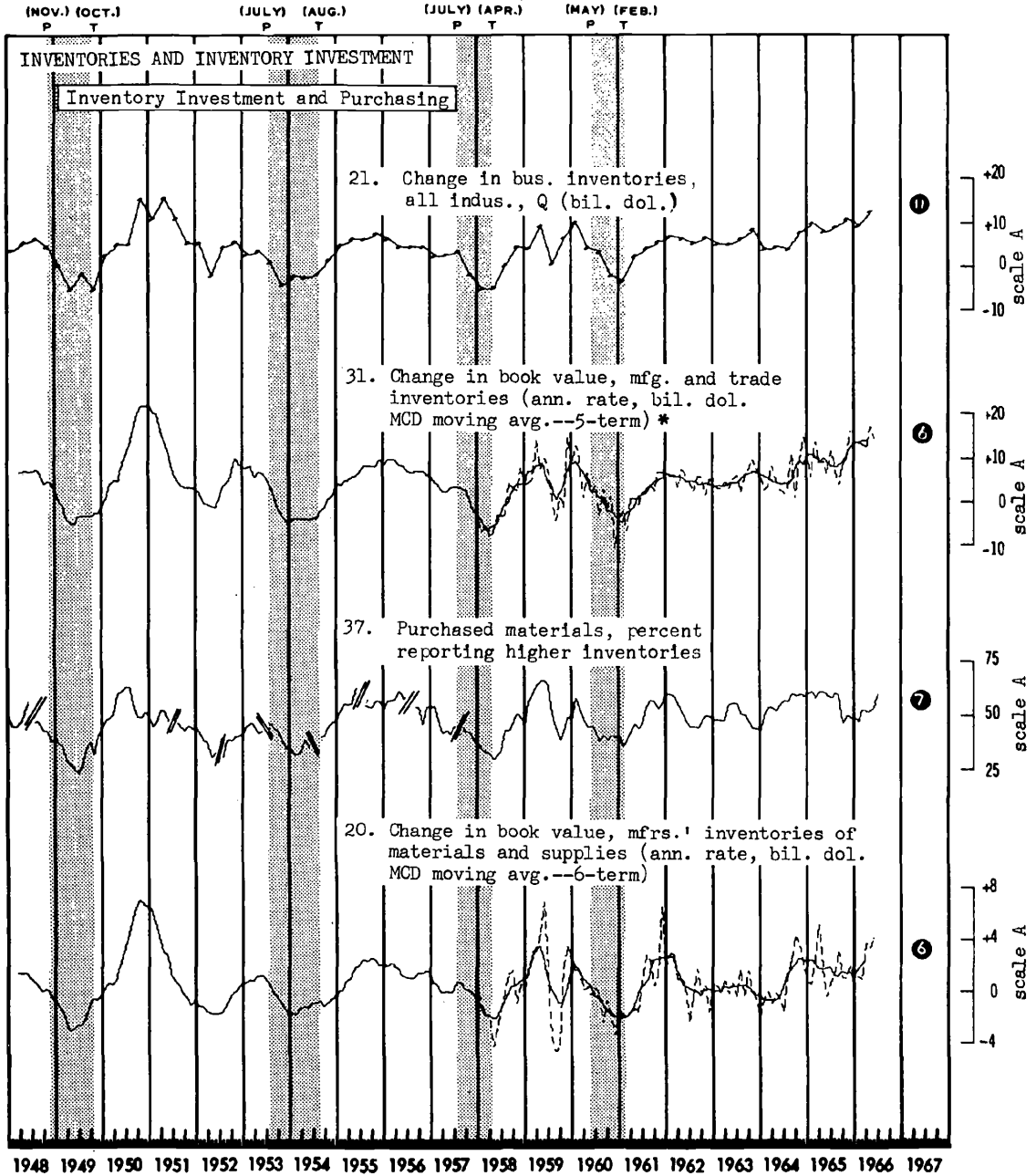


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process

Leading Indicators, 36 Series (Continued)

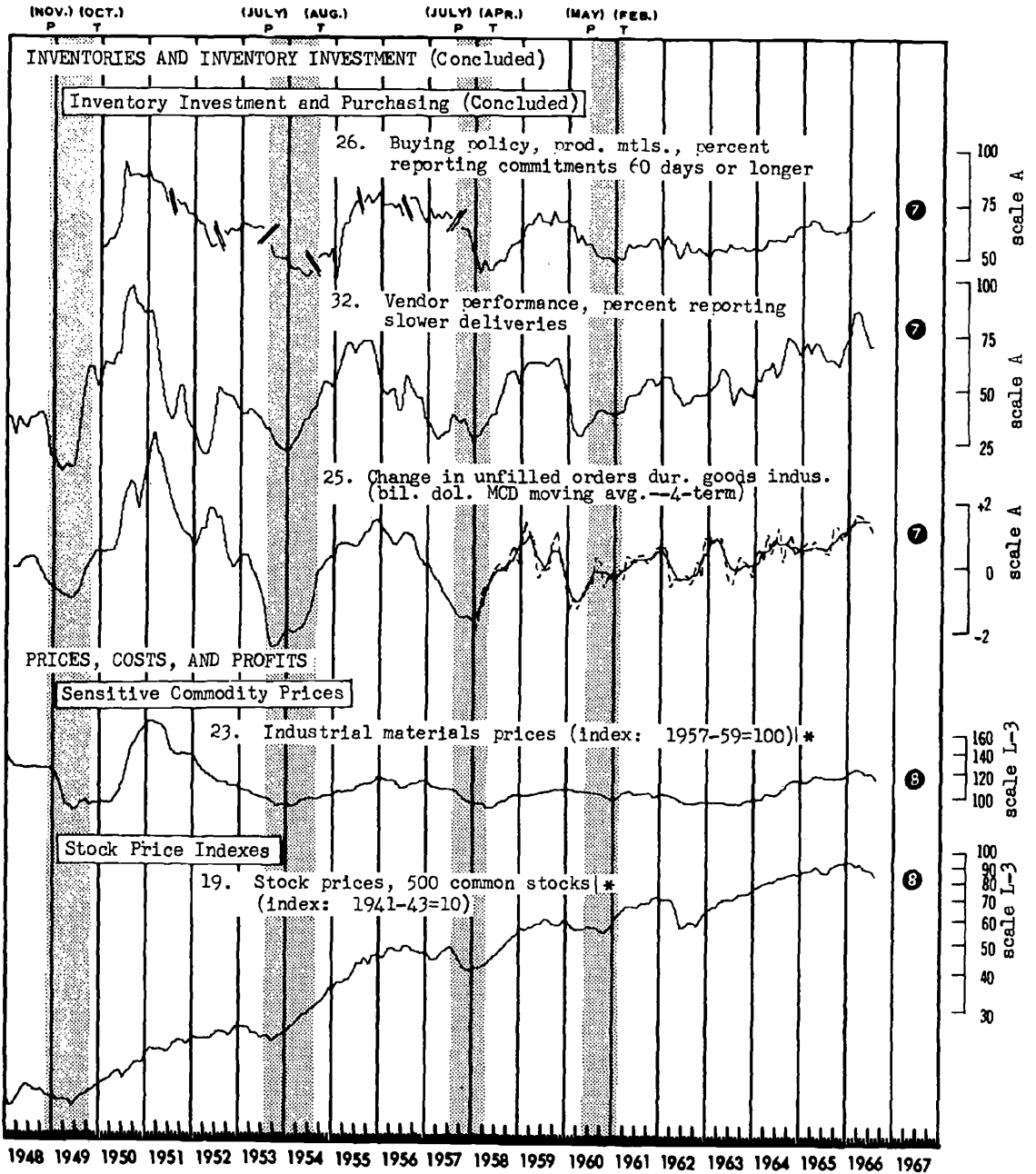


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process

Leading Indicators, 36 Series (Continued)

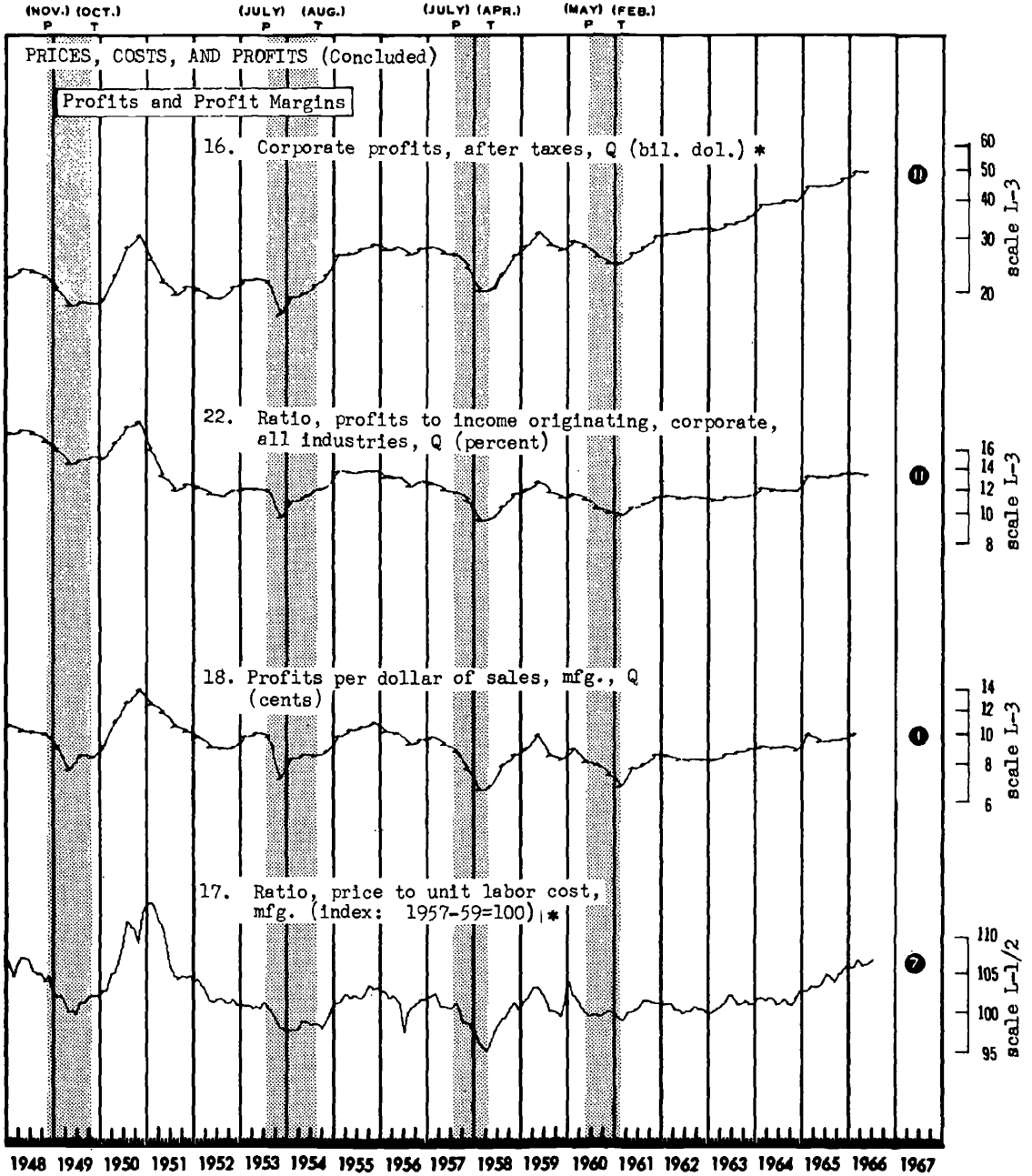


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process  
 Leading Indicators, 36 Series (Continued)

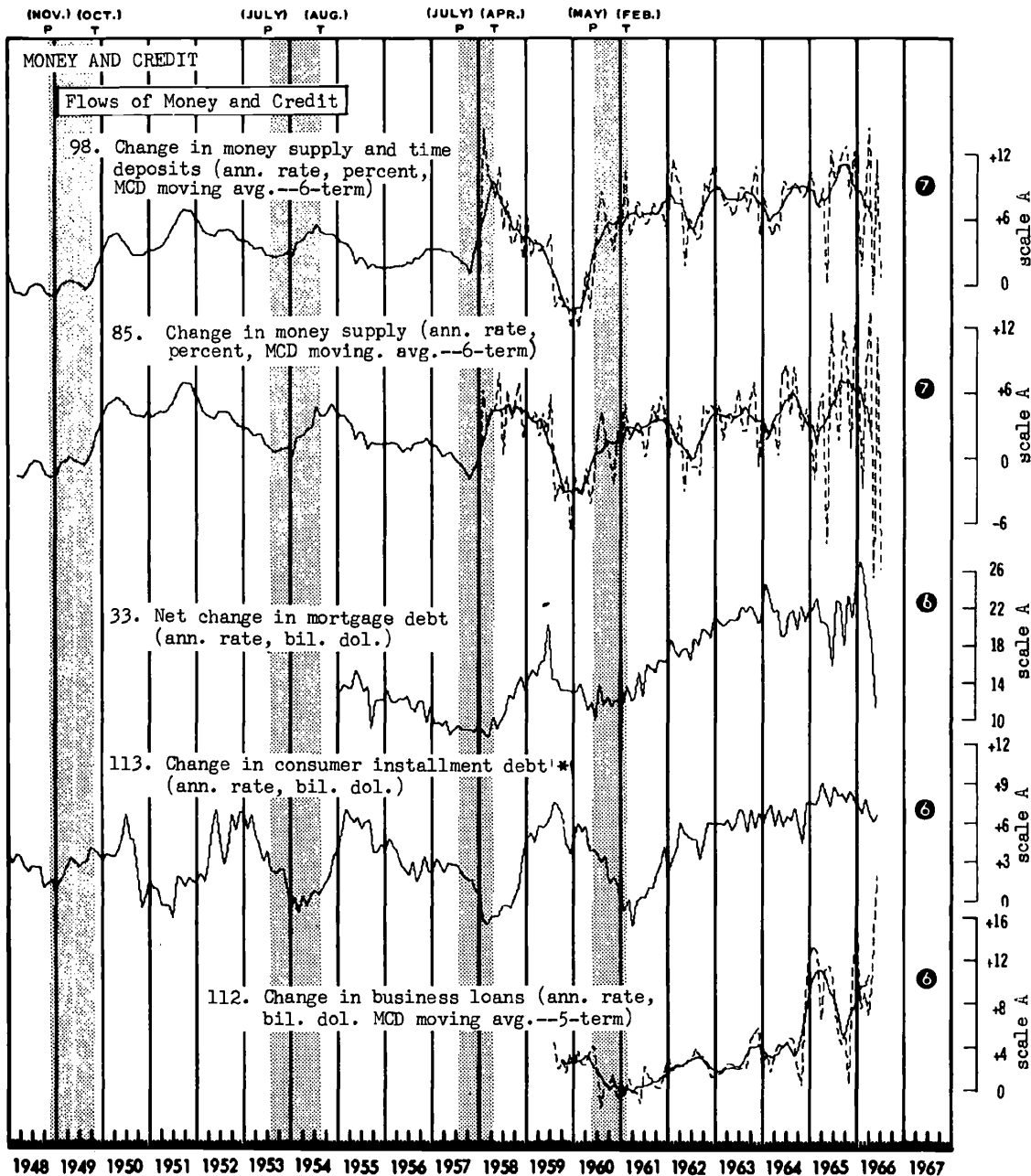


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process

Leading Indicators, 36 Series (Concluded)

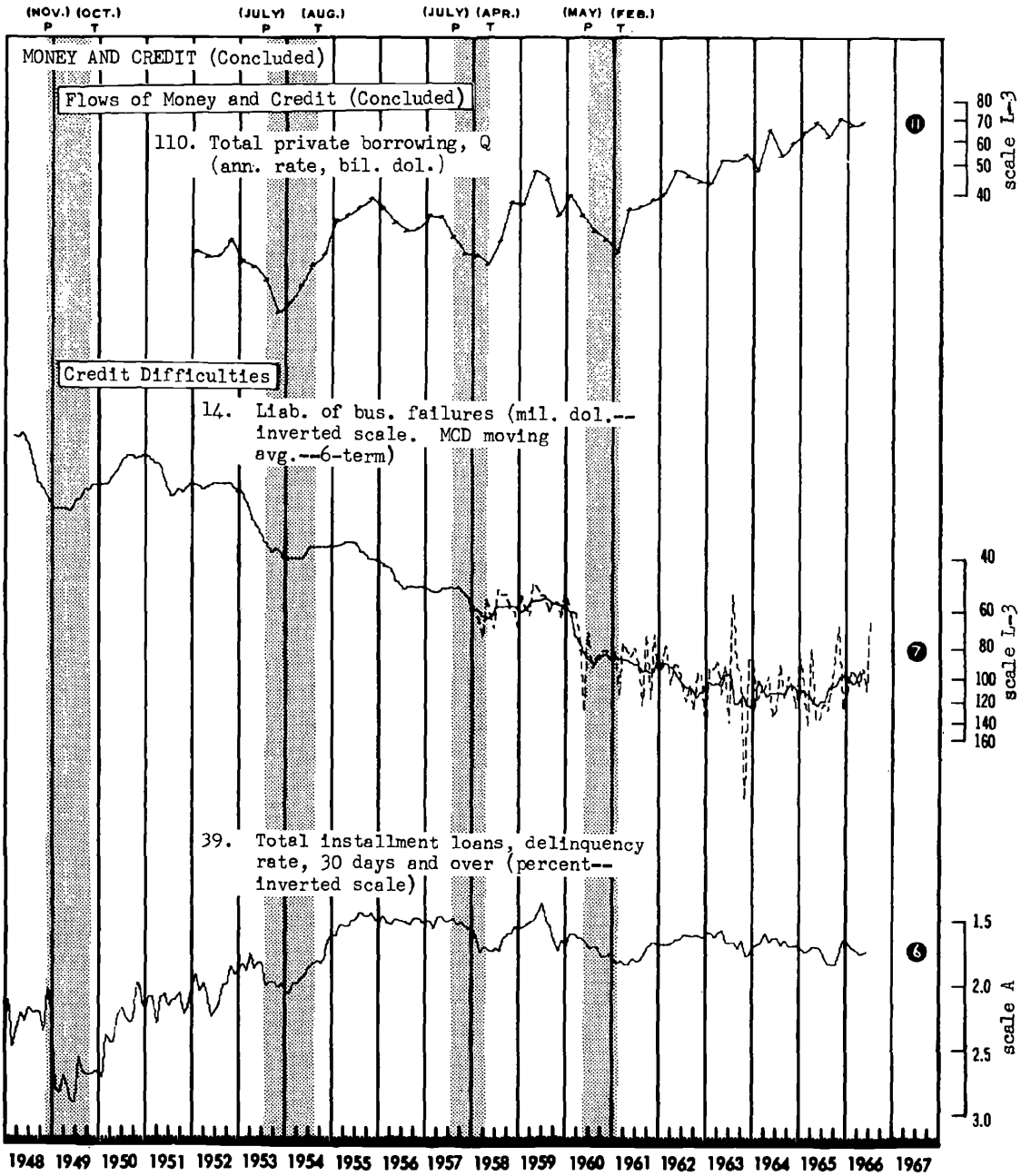


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process  
Roughly Coincident Indicators, 25 Series

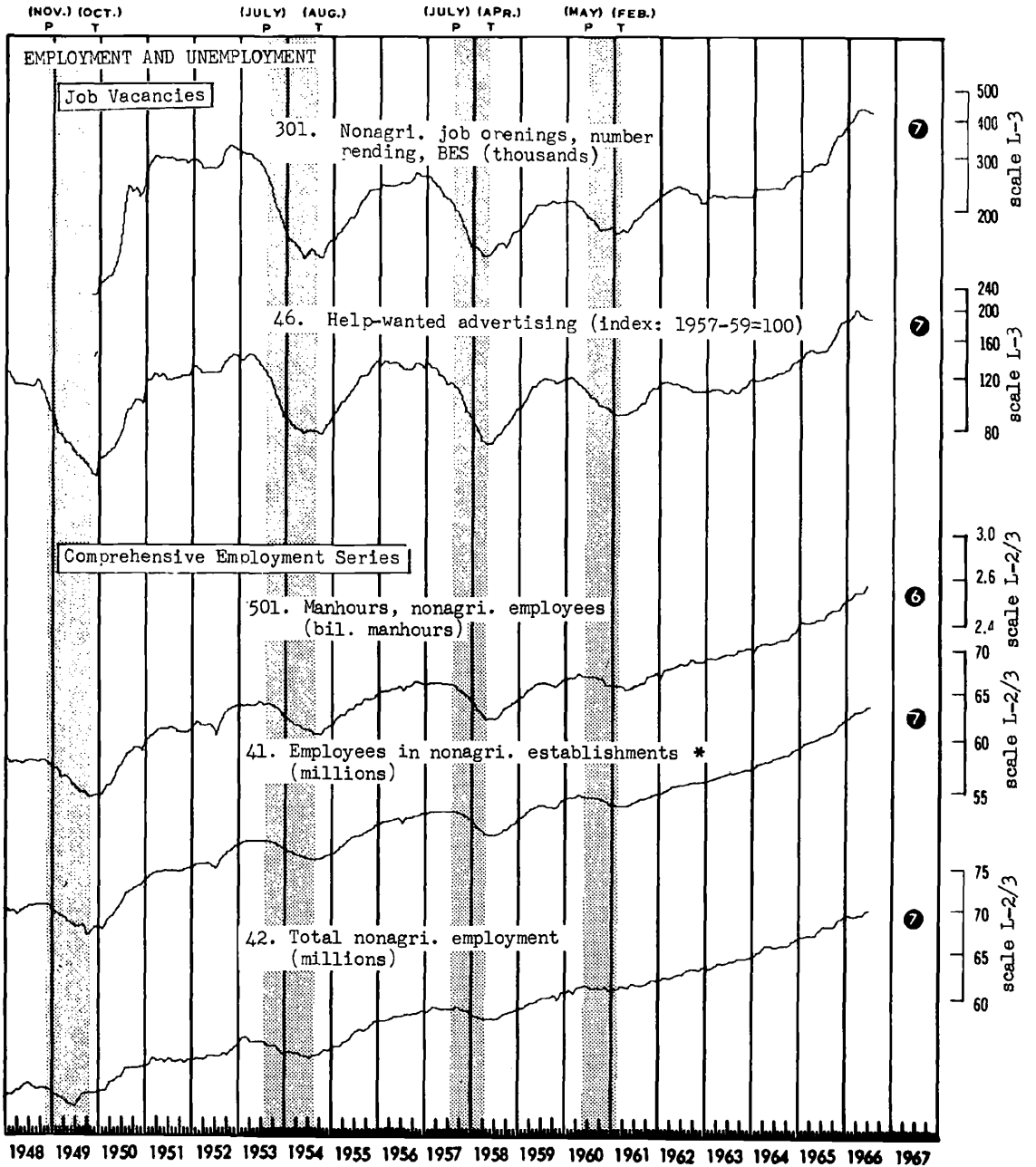


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process  
Roughly Coincident Indicators, 25 Series (Continued)

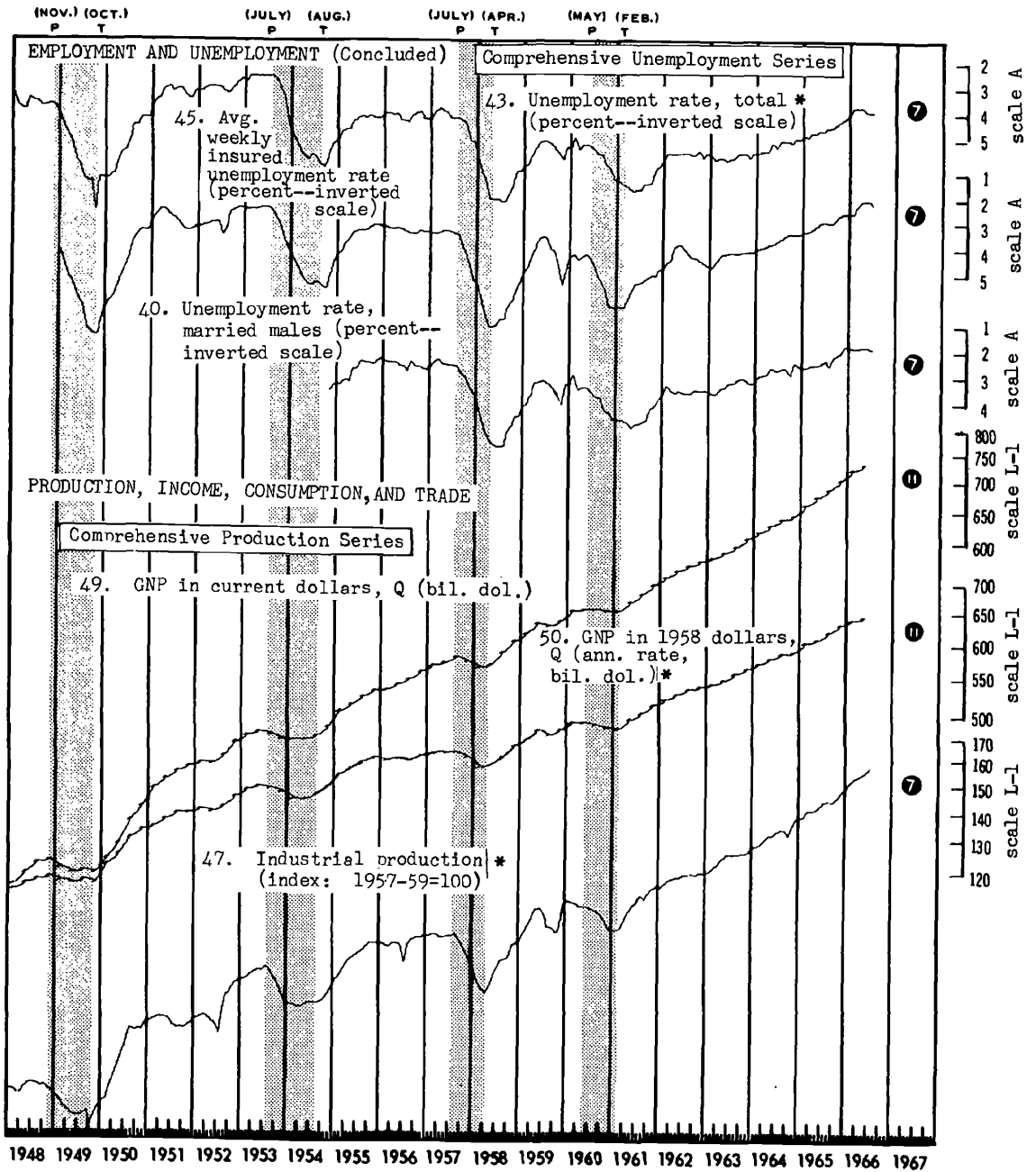


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process  
 Roughly Coincident Indicators, 25 Series (Continued)

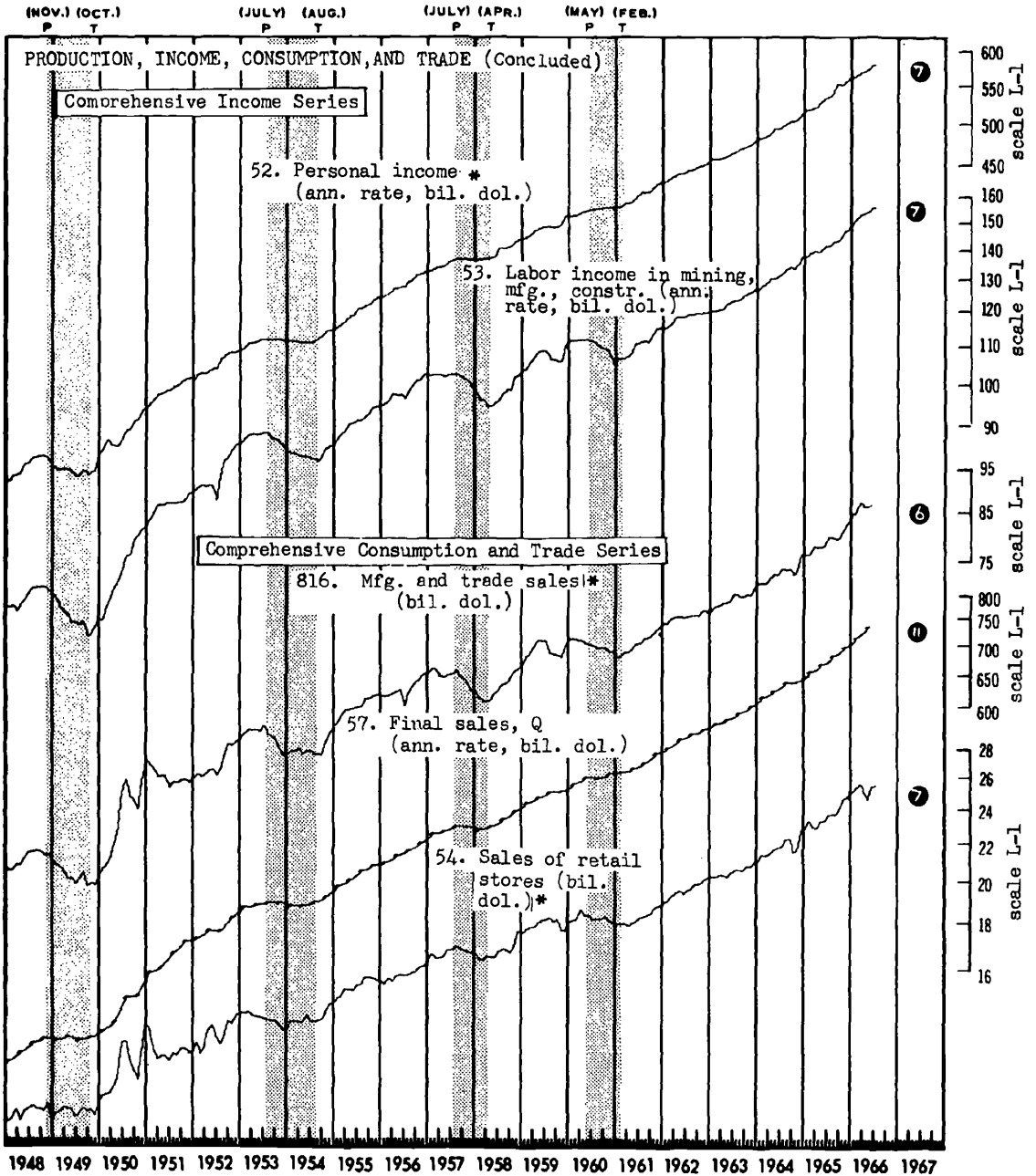


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process

Roughly Coincident Indicators, 25 Series (Continued)

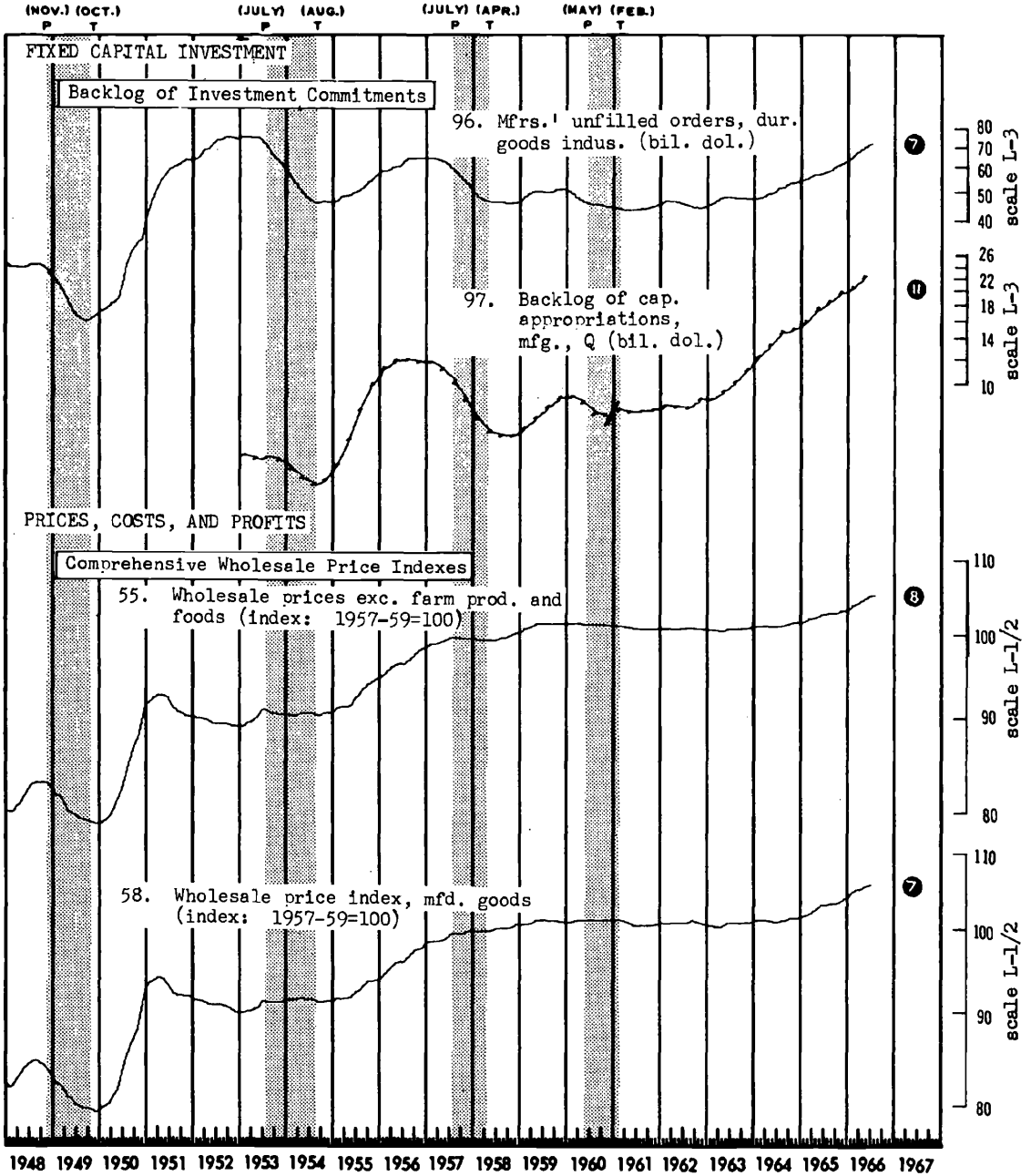


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process  
Roughly Coincident Indicators, 25 Series (Concluded)

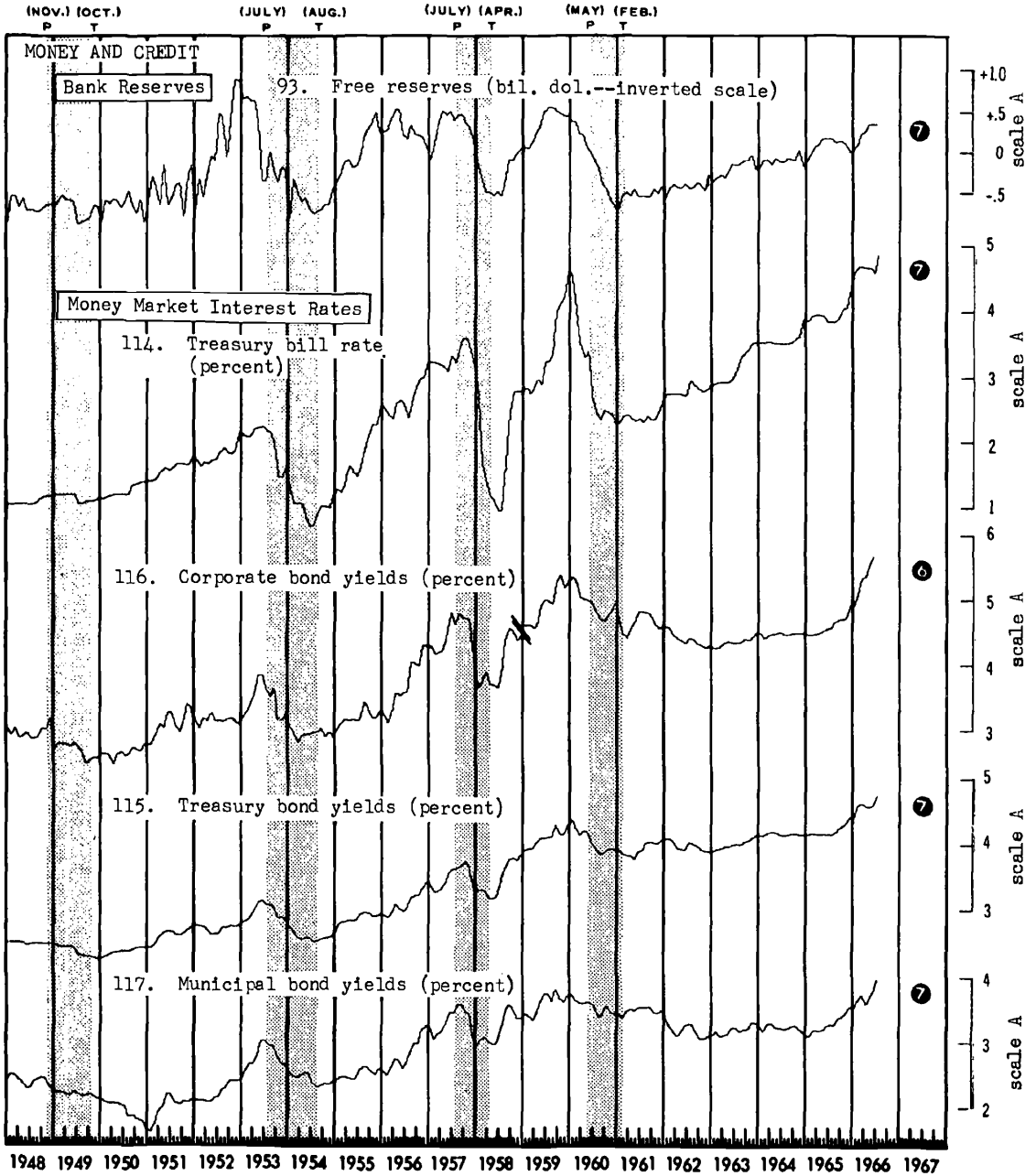


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process  
Lagging Indicators, 11 Series

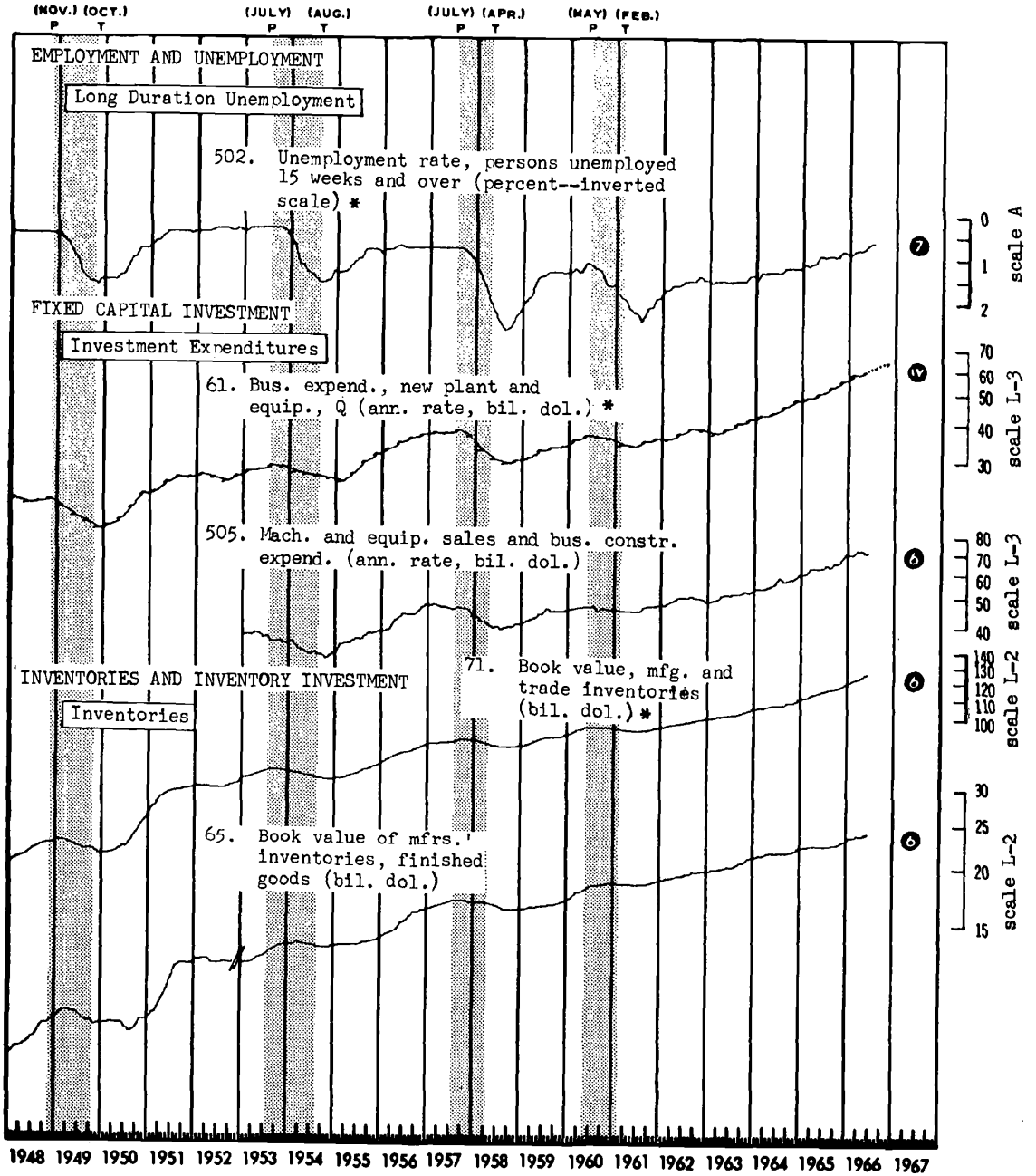


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process

Lagging Indicators, 11 Series (Concluded)

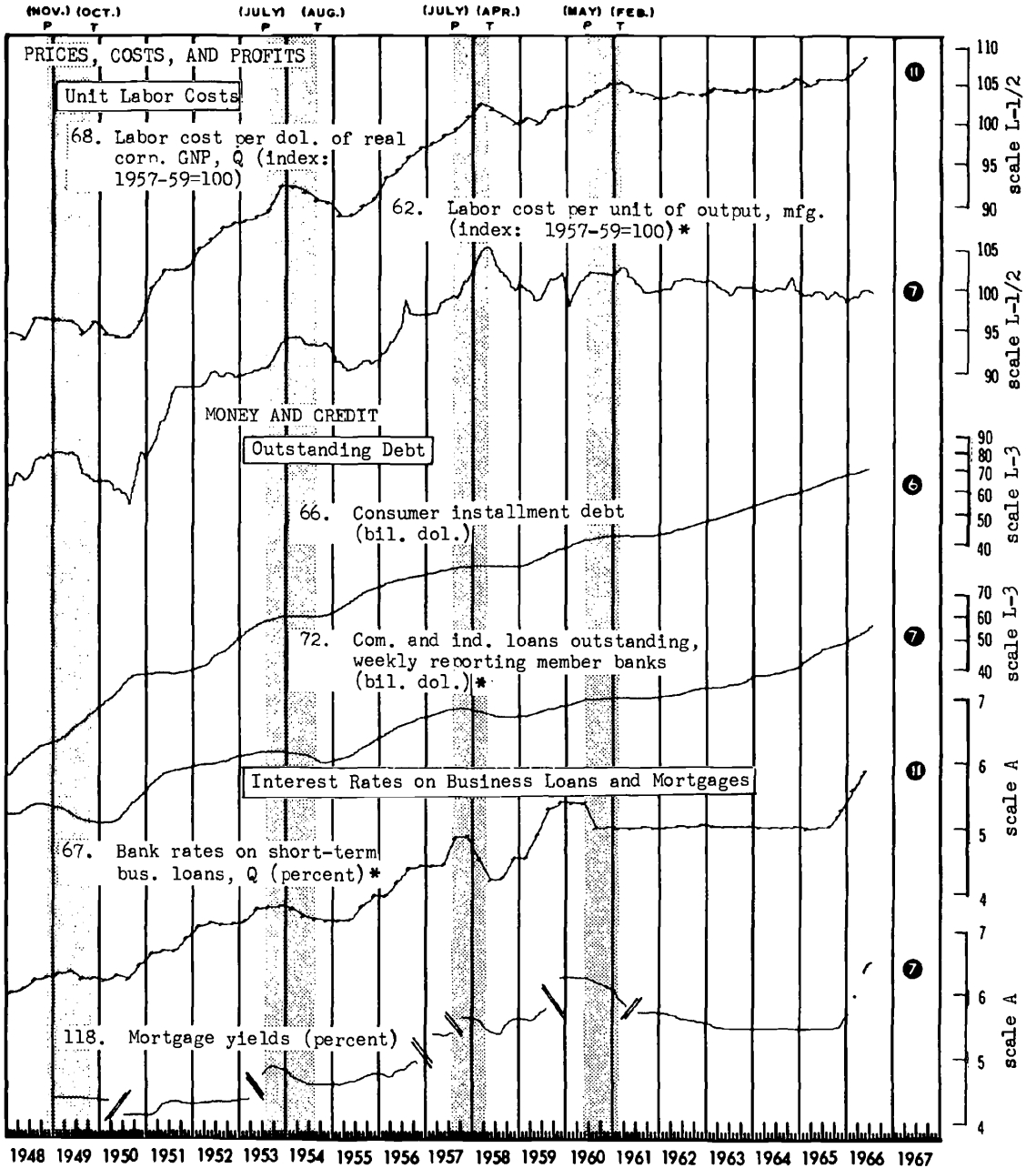
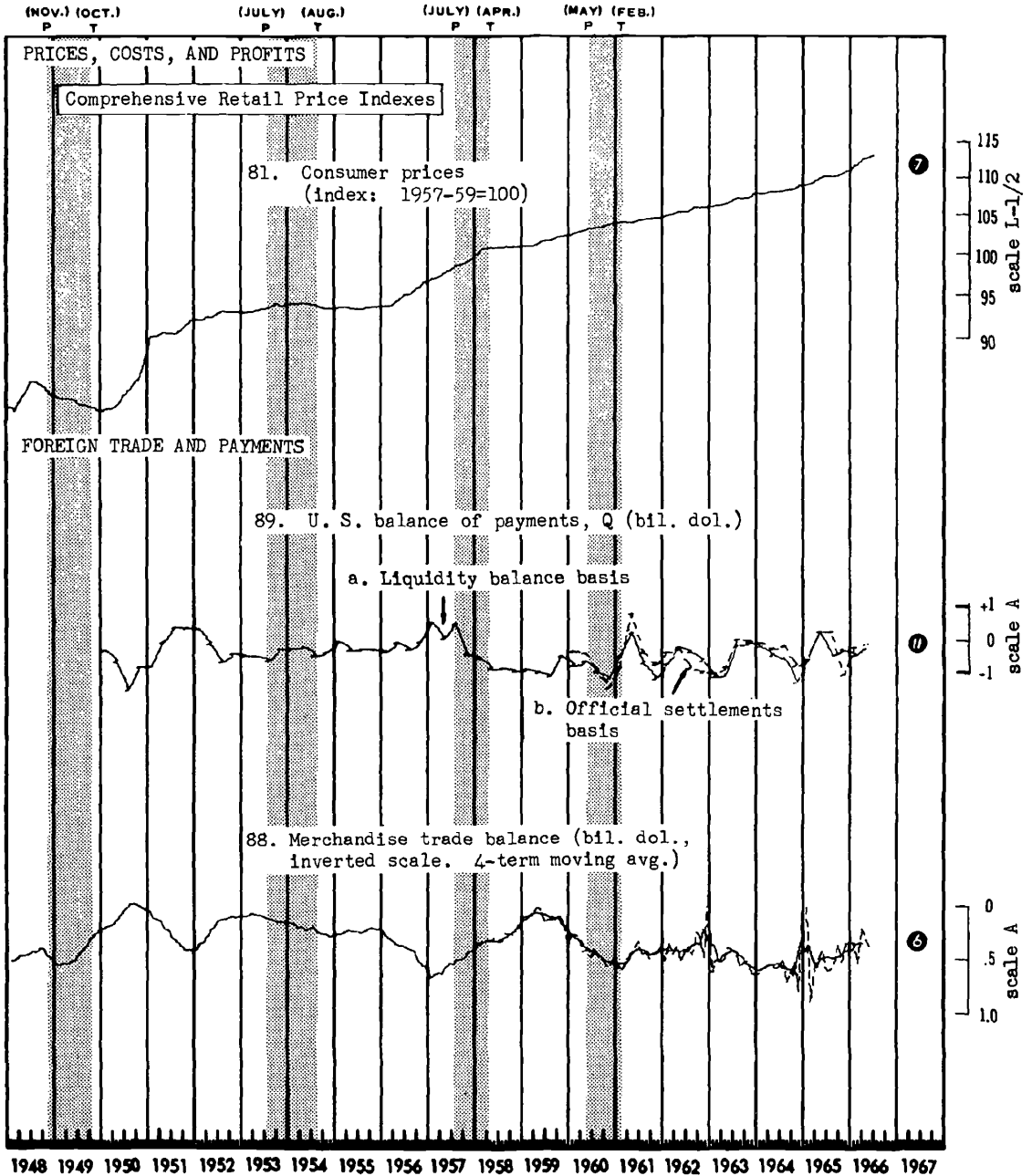


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process  
Other Selected Series, 16 Series



1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967

**CHART 1**  
 Eighty-eight Selected Indicators Classified by Timing and Economic Process  
 Other Selected Series, 16 Series (Continued)

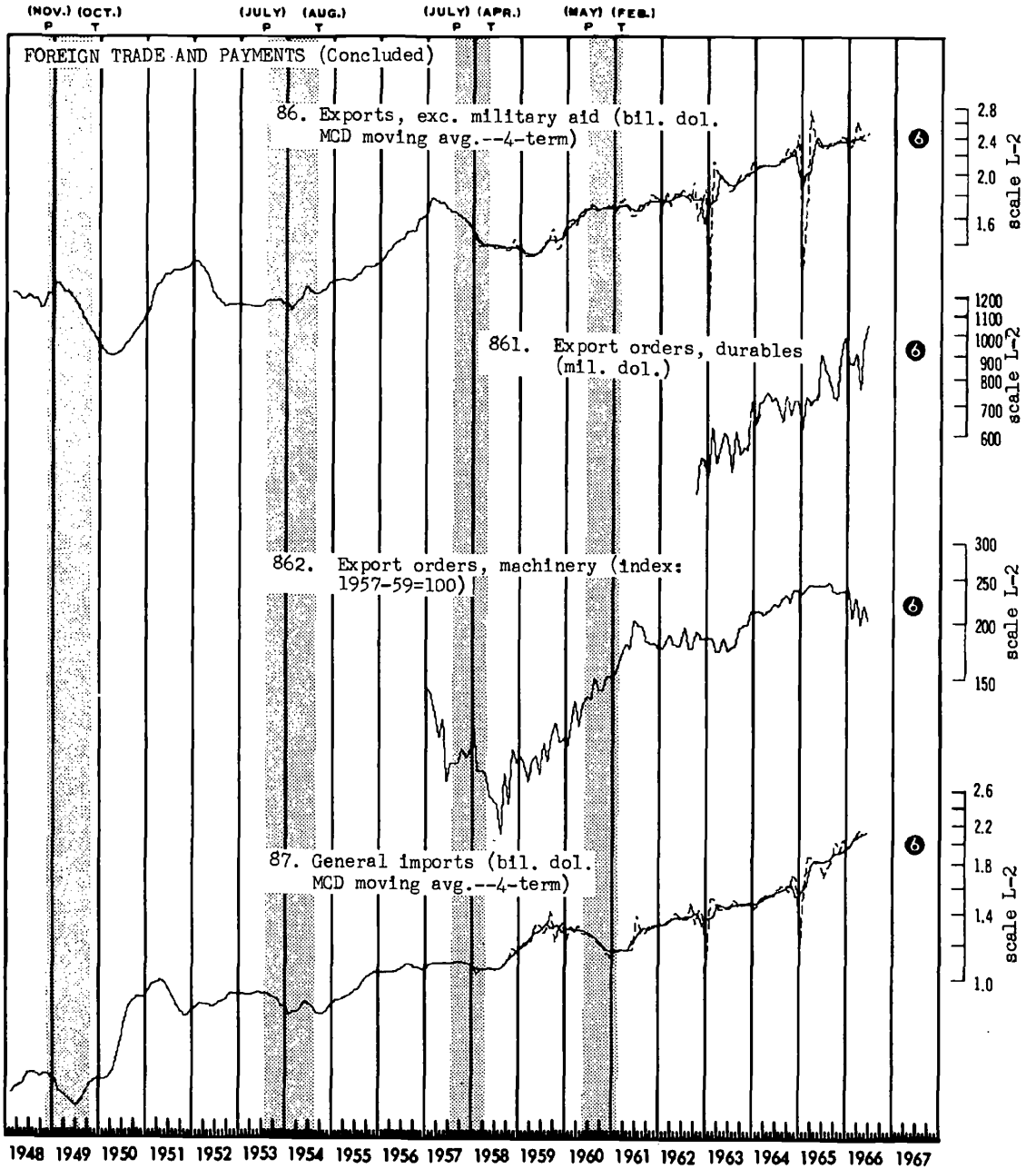


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process

Other Selected Series, 16 Series (Continued)

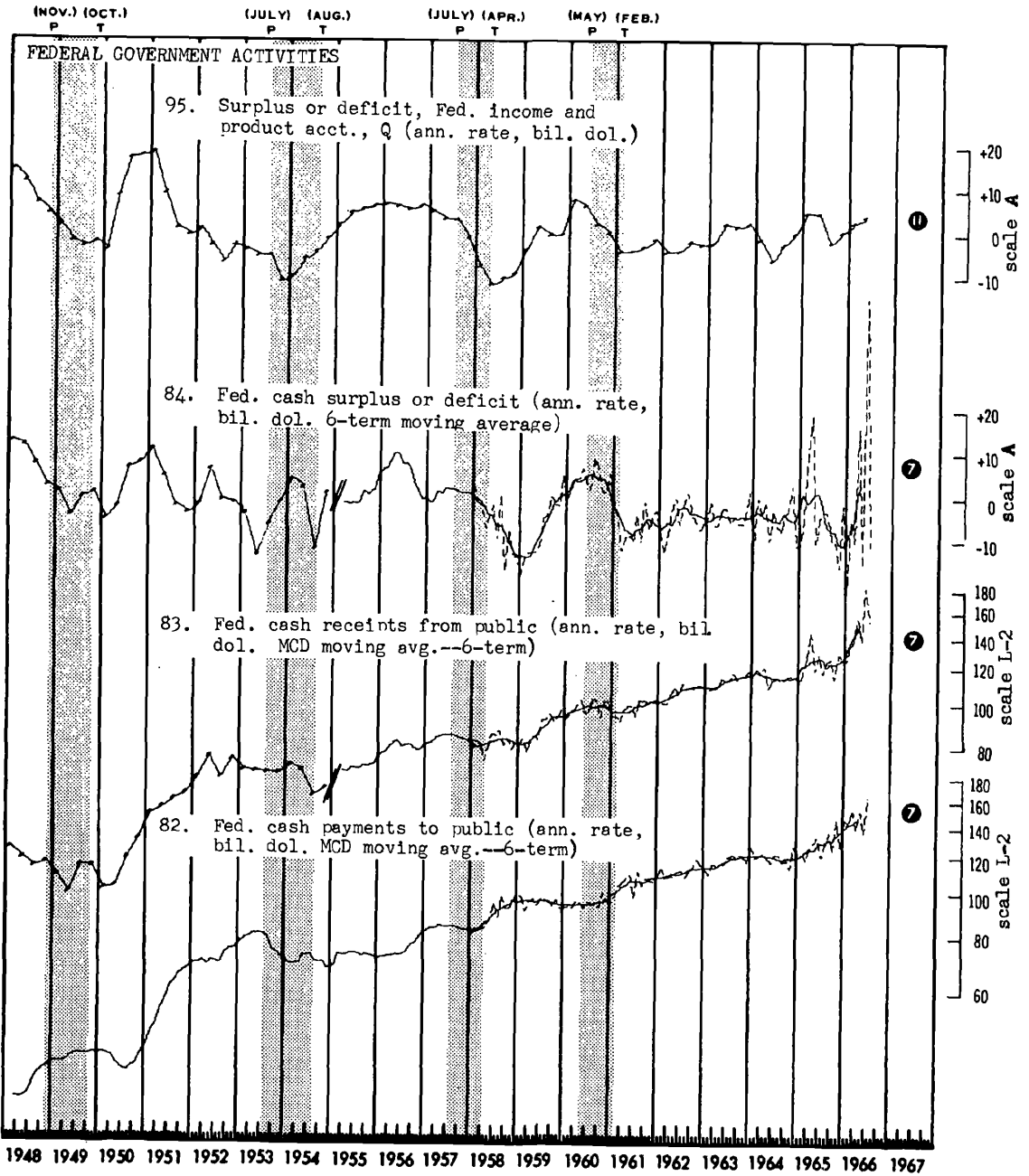
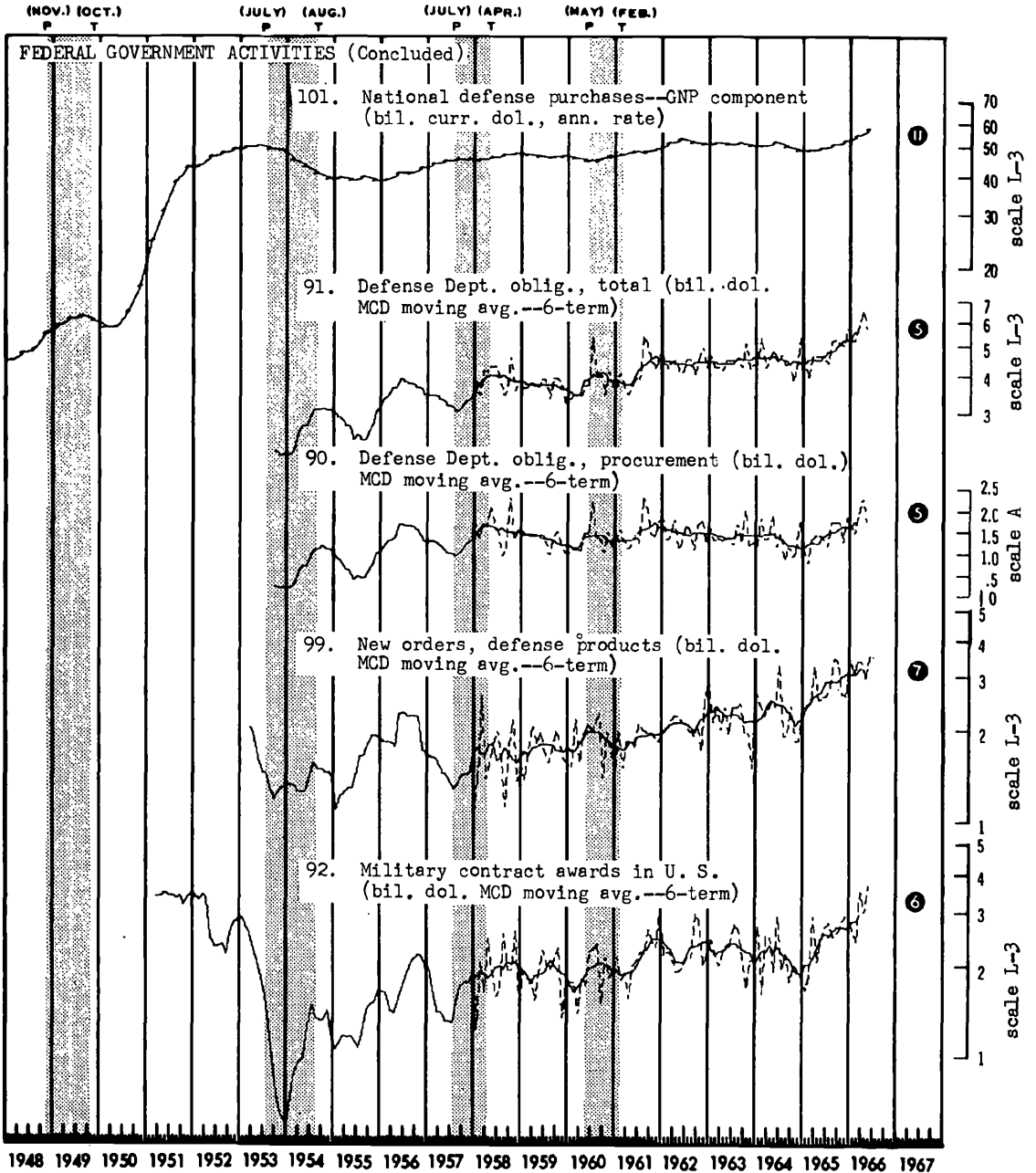


CHART 1

Eighty-eight Selected Indicators Classified by Timing and Economic Process

Other Selected Series, 16 Series (Concluded)



SERIES	EXPLANATION
Book value, manufacturing and trade inventories	Most comprehensive monthly series on inventories.
Commercial and industrial loans outstanding, weekly reporting member banks	Important cyclical component of total bank loans, reflecting financing of business inventories in significant degree, and available weekly.
Wholesale price index, manufactured goods	Numerator of the ratio of price to unit labor cost; hence helpful in interpreting the movements of that series. Also, the diffusion index of wholesale prices of manufactured goods is based on components of this index.
Export orders, durables Export orders, machinery	Early indicators of demand for important classes of exports. The durables series is more comprehensive than the machinery series, but the latter covers a longer period.
Manufacturing and trade sales	Most comprehensive monthly series on sales, covering manufacturers, wholesalers, and retailers. Comparable with manufacturing and trade inventories.
National defense purchases	GNP component related to the several series on defense orders, contracts, and obligations.

The new list omits five series on the previous list:

SERIES	EXPLANATION
Temporary layoffs	Initial claims for unemployment insurance contributes the same kind of information, has better coverage, is smoother, and is available weekly.
Number of large business failures	Since 1950 the cyclical movements in both this series and the liabilities of business failures have been obscured not only by short-term irregularities but also by the strong upward trend. The liabilities series was selected to remain on the full list because it is more significant from an economic point of view, especially in its bearing on the quality of business credit. However, the lead in the liabilities series is attributable to the early timing of failures of the larger business concerns.
Bank debits outside New York City	Though still the most comprehensive record of economic transactions, it is not as useful analytically as other available series, partly because it can be subdivided only on a geographic basis. Since 1950 its timing and conformity record has been poor.
Corporate gross savings	Score is low relative to other closely related series, such as corporate profits.
Manufacturers' inventories, book value	Replaced by the more comprehensive series, manufacturing and trade inventories.

Fourteen series, previously in the group "other series with business cycle significance," have been assigned a timing classification. Most of these series were added in 1963 in order to provide additional information on financial markets, but it was not feasible at that time to assign a timing classification. They are as follows: residential mortgage yields, change in consumer instalment debt, change in bank loans to business, total funds raised,

free reserves, change in money supply, change in money supply plus time deposits, Treasury bill rate, yield on long-term U.S. bonds, corporate bond yields, municipal bond yields, total construction contracts, unfilled orders for

durable goods, and backlog of capital appropriations. The timing classification of all other series presently shown in *Business Cycle Developments* remains the same.

### 3. THE SHORT LIST

The short list, identified by asterisks in Table 6 and Chart 1, and listed separately in Table 7, includes 25 U.S. series—12 leading, 7 coincident, and 6 lagging; 21 are monthly and 4 quarterly. All the series on this list have high scores, and they involve very little duplication.

Fourteen series are retained from the 1960 list of 26 indicators and six are substitutes for fairly closely related series on the 1960 list. Five substantially new series are put on the list and six are dropped.<sup>3</sup> Table 8 recapitulates these changes and explains them briefly.

Although the general character of the new short list does not differ substantially from the 1960 list, the improvements are not, we believe, negligible. Whereas on the 1960 list seven of the series were quarterly, the new list includes only four quarterly series. Whereas

the 1960 list contained six series pertaining to manufacturing industries alone, the new list includes only four series with such limited coverage. Whereas the 1960 list includes six series with rather low scores for timing or conformity or both, only two series in the new list fail to measure up to the rest in this respect.<sup>4</sup> Further, the new list contains three important series that had not been constructed at the time the 1960 list was compiled: contracts and orders for plant and equipment, ratio of prices to unit labor cost in manufacturing, and index of business formation. Hence the new short list is more promptly available, has broader coverage, has achieved a superior record of performance, and includes several new and improved indicators.

### 4. THE OTHER SERIES SCORED

Altogether 122 series were covered in the present review, with 88 placed on the full list of indicators and 34 excluded. The scores and timing classifications of the excluded series are shown in Table 9 and the series are plotted in Chart 2. These series fall primarily into two groups. First, series with good records and high scores were excluded because they did not seem to contribute sufficiently to warrant displacing other series or increasing the length of the list. Examples are gross national product as estimated from the income side of the accounts (score: 75), steel ingot production (67), and employment in com-

modity-producing industries (78). Such series are unquestionably valuable in their own right for purposes of business cycle analysis. The other group is made up of series with relatively low scores, which indicate that they have certain limitations as cyclical indicators. Examples are employment in the service industries (47), personal consumption expendi-

<sup>3</sup> Five of the six series dropped from the short list are retained on the full list. The exception, bank debits outside New York City, is explained above. Note, however, that the latter's geographic breakdown makes it valuable as a regional or local indicator.

<sup>4</sup> The six series on the 1960 list with low scores are liabilities of business failures (which has a good record over its long history but not since 1948); contracts for commercial and industrial construction; bank debits outside New York; wholesale price index, excluding farm products and foods; sales of retail stores; and consumer instalment debt outstanding. The two low-scoring series on the new list are sales of retail stores, retained because of its broad significance; and commercial and industrial loans outstanding, with a record marred largely by its failure to register a cyclical contraction during the mild 1960-61 recession.

TABLE 7  
Short List of Indicators: Scores and Timing Characteristics

Classification and Series Title (1)	First Busi- ness Cycle Turn Cov- ered (2)	Scores, Six Criteria							Timing at Peaks and Troughs				
		Average Score (3)	Eco- nomic Signifi- cance (4)	Statis- tical Ade- quacy (5)	Con- form- ity (6)	Tim- ing (7)	Smooth- ness (8)	Cur- rency (9)	Busi- ness Cycle Turns Cov- ered (10)	Leads (11)	Rough Coinci- dences <sup>a</sup> (12)	Lags (13)	Mo- nths (14)
<i>Leading indicators (12 series)</i>													
1. Avg. workweek, prod. workers, mfg.	1921	66	50	65	81	66	60	80	19	13	4(2)	2	
30. Nonagri. placements, BES	1945	68	75	63	63	58	80	80	10	8	4(0)	1	
38. Index of net business formation	1945	68	75	58	81	67	80	40	10	8	3(1)	0	
6. New orders, dur. goods indus.	1920	78	75	72	88	84	60	80	20	16	7(1)	0	
10. Contracts and orders, plant and equipment	1948	64	75	63	92	50	40	40	8	7	2(0)	1	
29. New building permits, private housing units	1918	67	50	60	76	80	60	80	22	17	5(1)	1	
31. Change in book value, mfg. and trade inventories	1945	65	75	67	77	78	20	40	10	9	2(1)	0	
23. Industrial materials prices	1919	67	50	72	79	44	80	100	21	13	9(4)	2	
19. Stock prices, 500 common stocks	1873	81	75	74	77	87	80	100	44	33	14(2)	5	
16. Corporate profits after taxes, Q	1920	68	75	70	79	76	60	25	20	13	11(4)	2	
17. Ratio, price to unit labor cost, mfg.	1919	69	50	67	84	72	60	80	21	17	10(1)	3	
113. Change in consumer instalment debt	1929	63	50	79	77	60	60	40	14	11	4(0)	1	
<i>Roughly coincident indicators (7 series)</i>													
41. Employees in nonagri. establishments	1929	81	75	61	90	87	100	80	14	6	12(6)	2	
43. Unemployment rate, total (inv.)	1929	75	75	63	96	60	80	80	14	4	8(3)	6	
50. GNP in constant dollars, expenditure estimate, Q	1921	73	75	75	91	58	80	50	17	7	9(3)	3	
47. Industrial production	1919	72	75	63	94	38	100	80	21	9	13(9)	3	
52. Personal income	1921	74	75	73	89	43	100	80	19	10	12(2)	5	
816. Mfg. and trade sales	1948	71	75	68	70	80	80	40	8	4	6(4)	0	
54. Sales of retail stores	1919	69	75	77	89	12	80	100	21	5	7(1)	6	
<i>Lagging indicators (6 series)</i>													
502. Unempl. rate, persons unempl. 15+ weeks (inv.)	1948	69	50	63	98	52	80	80	8	1	5(1)	6	
61. Bus. expend., plant and equip., Q	1918	86	75	77	96	94	100	80	20	2	16(5)	13	
71. Book value, mfg. and trade inventories	1945	71	75	67	75	66	100	40	10	2	7(0)	8	
62. Labor cost per unit of output, mfg.	1919	68	50	70	83	56	80	80	21	0	1(0)	14	
72. Comm. and indus. loans outstanding	1937	57	50	47	67	20	100	100	12	1	6(0)	7	
67. Bank rates, short-term bus. loans, Q	1919	60	50	55	82	47	80	50	21	2	5(1)	15	

<sup>a</sup> Rough coincidences include exact coincidences (shown in parentheses) and leads and lags of 3 months or less. Leads (lags) include leads (lags) of 1 month or more. The total number of timing comparisons, which can be less than the number of business cycle turns covered by the series, is the sum of leads, exact coincidences, and lags. Leads and lags of quarterly series are expressed in terms of months.

**TABLE 8**  
**Relation Between the 1966 and the 1960 Short Lists of Indicators**

1966 List	1960 List	Reason for Change
<i>Leading series</i>		
Average workweek, mfg.	Same	
New orders, dur. goods	Same	
Indus. mater. price index	Same	
Stock price index	Same	
Corp. profits after taxes, Q	Same	
Nonagri. placements	Accession rate, mfg.	Placements provide broader coverage and prompter availability
Index of bus. formation	Net change in bus. pop., Q	Net change series discontinued
New bldg. permits, housing	Housing starts	Permits series is smoother
Change in book value, mfg. and trade inventories	Change in business inventories, Q	Monthly series more current
Contracts and orders, plant and equipment		Most comprehensive series on new investment commitments by business enterprises; new since 1960 list
Ratio, price to unit labor cost, mfg.		Best available monthly index of profit margins; new since 1960 list
Change in consumer instal. debt		Wide cyclical movements and consistent leads; replaces consumer debt outstanding
	Layoff rate, mfg.	Workweek and placements enough for short list
	Liabilities of bus. failures	Poor timing and conformity record since 1948
	Constr. contracts, comm. and indus., floor space	Poor timing and conformity record since 1950. The equivalent value series, plus privately owned public utilities, is included in the series on contracts and orders
<i>Roughly coincident series</i>		
Nonagri. employment	Same	
Unemployment rate, total	Same	
GNP in constant \$, Q	Same	
Industrial production	Same	
Personal income	Same	
Sales of retail stores	Same	
Mfg. and trade sales		Most comprehensive monthly series on sales, comparable with mfg. and trade inventories
	GNP in current \$, Q	Constant \$ GNP sufficient for short list, especially in view of inclusion of current \$ series on mfg. and trade sales
	Bank debits outside N.Y.C.	Poor timing and conformity record since 1950
	Wholesale price index, excl. farm products and foods	Poor timing and conformity record since 1950
<i>Lagging series</i>		
Plant and equip. expend., Q	Same	
Unit labor cost, mfg.	Same	
Bank rates on bus. loans, Q	Same	
Book value, mfg. and trade inventories	Book value, mfg. inventories	Most comprehensive monthly series on inventories
Comm. and indus. loans outstanding	Consumer instalment debt	More cyclically sensitive than consumer debt; net change in consumer debt included in leading group
Unemploy. rate, 15+ weeks		Represents longer duration and hence more serious unemployment

tures for durable goods (51), and new orders for machine tools (59).

It must be emphasized that these series may be helpful in other important uses, for example, in industry studies or studies of long-term economic growth. They are also of value in business cycle analysis, else they would not have been reviewed at all. Series on particular industries or occupations help to identify areas of strength and of weakness, and contribute to an understanding of recent trends and prospects. Similarly, series that distinguish employment in the relatively stable service industries from the more cyclical commodity-producing industries are useful in assessing the effect on the business cycle of the far more rapid secular growth in the service industries.

The distinction between the series in this excluded group that have relatively low scores

and series included in the full list but unclassified by timing is not clearly defined. The scoring plan does not help much here, since both groups generally have low scores. Inclusion or exclusion of these series is primarily a matter of judgment as to the degree of interest attaching to particular series. Furthermore, we have undoubtedly given this matter less attention than it warrants, and some series that are important in assessing short-run business prospects, despite weaknesses as business indicators, do not appear in either the excluded or the included (unclassified) group. Examples that come to mind are series on hourly earnings, output per man-hour, labor force, and capital stock or industrial capacity. Further study should be devoted to this matter in later work, with a view to improving and perhaps enlarging the "unclassified" group.

## 5. THE ROLE OF QUANTITATIVE STANDARDS

In setting up the classification scheme and the final selection of indicators, it became evident that the scoring plan could not be used mechanically, for several reasons.

First, the rules for designating the timing classification of the individual series did not always yield sensible results. In some instances the behavior of the series since 1948 did not support the classification based on the entire period, and the evidence of the shorter but more recent period had to be weighed against that of the longer period. In other instances closely related series were inconsistently classified by the mechanical rules, because the series covered different periods or experienced different irregular fluctuations. Most of these inconsistencies were of small moment, and it seemed unwise either to emphasize or to perpetuate them in a classification. Hence we decided to determine the appropriate timing classification for each of the minor economic groups of series in Table 6, column 1, basing the decision on the evidence provided by the series in the group. In this way, the evidence for closely related series could be brought to

bear on the classification of individual series, and in most cases this seemed to yield sensible results. Hence the final timing classification for a series is the same as that for the group within which it is placed. The instances where this conflicts with the application of the mechanical rules for classifying individual series are indicated in the table.<sup>5</sup>

A second type of deviation from a mechanical application of the scoring plan in selecting indicators was occasioned by the advantage of including two closely related series even though one had a substantially lower score than the other. For example, new capital appropriations of manufacturing industries is included despite its lower score than contracts and orders for plant and equipment; profits per dollar of sales in manufacturing is included despite its lower score than the ratio of prices to unit labor costs. The merits of one series compensate for some of the limitations

<sup>5</sup> The group classification procedure has not been extended to the separate classifications of peak and trough timing shown in Appendixes B and C. There the classification is based simply on the mechanical rules.

of the other. On the other hand, an effort was made to eliminate duplication where no important purpose appeared to be served by it. It also seemed desirable to restrict the proportion of series pertaining to manufacturing alone, and to restrict the number of series that were components of or aggregates derived from series included. Examples of series with high scores omitted for these reasons are manufacturers' inventories and nonagricultural employment in commodity-producing industries. Finally, as mentioned above, the scoring plan was not especially helpful in aiding decisions on series in the group unclassified by cyclical timing.

In making up the short list, several additional factors were taken into account:

1. A very low score for one of the six scoring categories was considered sufficient reason for deciding against a series when two related series with very close total scores were being considered. For this reason, e.g., housing permits was selected over housing starts.

2. Series with uncertain timing or conformity were rejected. This uncertainty may take the form of leads which are equal to or longer than the corresponding business cycle phases (a lead at troughs which starts before the preceding business cycle peak has been reached) or which cross opposite specific turns. The uncertainty may also pertain to whether timing comparisons should be made positively or invertedly. The series on the rate of change in the money supply provides an example of such uncertainty on both counts (cf. Chapter II, note 9).

3. The score for the period since 1948 was weighed more heavily. Thus, the wholesale price index was excluded from the short list because of its poor timing record in the four most recent business cycles.

Some or all of these additional criteria might, indeed, have been taken into account in setting up the scoring plan. Thus, although the present scoring plan enlarges the role of quantitative criteria in selecting indicators, it does not go as far as may be possible. It is a further, but not the ultimate, extension of the role of quantitative standards that have been used in making the selections of NBER indicators over the years.

Average scores for various groups of series are provided in Table 10. It is interesting to observe that the series on the short list (line 2) have the highest final score on the average (70), and that the averages for the short list exceed those for the full list in each of the six categories. The series on the full list unclassified by timing (line 1d) have the lowest average score (47). The series scored but omitted from the final list (line 3) have a fairly high average score, but, as noted, many high-scoring series were omitted for special reasons stated above.

These results are no accident since the scores and the information on which they were based were used in selecting the series. It is evident, however, from our previous discussion that we did not follow the scores mechanically in selecting series. The averages show that we did not ignore them either.

The table also shows that the leading indicators are the most erratic and the lagging indicators the smoothest. The coincident indicators have the shortest publication lag. The coincident indicators also have the highest conformity scores, an expected result since the NBER business cycle chronology is largely based on these series. The statistical adequacy scores for each group are about the same on the average.

## 6. THE CONTRIBUTION OF THE NEW LIST

The question is often—and properly—raised as to how useful the business cycle indicators are in making short-term forecasts. This ques-

tion has been dealt with in previous publications of the National Bureau as well as in articles prepared by others, and we shall not

TABLE 9  
Thirty-four Other Series Classified by Economic Process: Scores and Timing Characteristics

Economic Process and Series Title (1)	First Business Cycle Turn Covered (2)	Scores, Six Criteria						Timing at Peaks and Troughs					
		Average Score (3)	Economic Signifi- cance (4)	Statistical Ade- quacy (5)	Con- form- ity (6)	Tim- ing (7)	Smooth- ness (8)	Cur- rency (9)	Cov- ered (10)	Leads (11)	Rough Coinci- dences <sup>a</sup> (12)	Median Lead(-) or Lag(+) in Months (14)	
<b>1. Employment and unemployment</b>													
<i>Marginal employment adjustments</i>													
805. Accession rate, new hires, mfg.	1953	57	50	66	66	42	80	40	6	5	2(1)	0	-6
806. Accession rate, rehires, mfg. (inv.) <sup>b</sup>	1953	56	50	66	57	68	40	40	6	3	3(0)	3	0
4. No. of persons on temporary layoff (inv.)	1948	62	75	63	98	24	20	80	8	5	3(2)	0	-9
<i>Job vacancies</i>													
809. Help-wanted display ads, exec. positions	1954	52	50	30	54	56	60	80	5	5	1(0)	0	-5
<i>Employment</i>													
801. Man-hours, nonagri. employees, persons with a job	1945	68	75	62	81	50	60	80	10	6	4(1)	1	-4
802. Man-hours, nonagri. employees, persons at work	1945	68	75	65	81	48	60	80	10	6	4(1)	1	-2
807. Nonagri. empl., commodity-prod. indus.	1945	78	75	60	89	78	100	80	10	5	6(3)	2	-2
808. Nonagri. empl., service indus.	1945	47	50	60	20	16	100	80	10	1	5(1)	4	+1
<i>Unemployment</i>													
803. Unemployment rate, under 5 weeks (inv.)	1948	62	50	63	72	66	40	80	8	6	5(2)	0	-2
804. Unemployment rate, 5-14 weeks (inv.)	1948	62	50	63	73	52	60	80	8	5	5(0)	3	-1
<b>2. Production, income, consumption, and trade</b>													
<i>Production</i>													
810. GNP in current \$, income estimate, Q	1945	74	75	70	91	70	100	25	10	3	9(3)	4	0
811. GNP in constant \$, income estimate, Q	1948	75	75	68	88	90	80	25	8	2	8(3)	3	0
814. Steel ingot production	1899	67	50	82	96	38	40	100	32	18	17(7)	7	-1
813. Auto production, passenger cars	1913	58	50	82	77	11	40	100	22	8	9(3)	7	0
<i>Consumption and trade</i>													
51. Bank debits outside N.Y.C.:	1919	65	75	80	86	16	60	80	21	6	11(3)	3	0

503. Manufacturers' sales, total	1926	65	50	73	94	50	80	40	10	10	0	11(2)	3	0
56. Wholesale sales, merchant wholesalers	1919	66	50	77	84	59	80	40	18	11	11	10(3)	2	-2
815. Index of truck tonnage hauled	1948	61	50	58	50	78	80	60	8	7	4(1)	0	0	-4
817. Personal consumption expend., dur. goods, Q	1945	51	50	70	44	27	80	50	10	5	5(2)	1	1	-2
3. Fixed capital investment														
<i>New investment commitments</i>														
825. New orders, machine tools	1945	59	50	73	89	44	40	40	9	7	2(0)	1	1	-8
<i>Investment expenditures</i>														
819. Gross priv. dom. investment, total, Q	1945	63	75	70	70	34	80	50	10	7	6(1)	2	2	-3
818. Gross priv. dom. investment, bus. sec., Q	1945	65	75	70	72	44	80	50	10	1	7(3)	4	4	0
821. Mfrs.' sales, prod. dur. equip., value	1948	63	50	61	92	51	80	40	8	2	6(0)	6	6	+2
820. Index of equipment production	1948	70	50	58	92	59	100	80	8	2	7(2)	4	4	0
822. New construction expend., bus. sec.	1945	42	50	62	4	24	100	40	10	2	4(1)	5	5	+2
4. Inventories and inventory investment														
<i>Inventories</i>														
64. Mfrs.' inventories, total, value	1926	73	50	73	92	80	100	40	16	3	9(0)	13	13	+3
<i>Inventory investment and purchasing</i>														
826. Change in stocks on hand and on order, dept. stores	1945	53	50	60	72	62	0	40	10	8	2(0)	0	0	-10
6. Money and credit														
<i>Flows of money and credit</i>														
827. New nonfarm mortgages recorded, \$20,000 and under	1945	40	50	65	44	9	60	0	10	6	0(0)	0	0	-10
111. Corporate gross savings, Q	1953	45	75	67	29	26	60	0	6	4	4(1)	1	1	-2
824. Stock offerings, mfg. corp., Q	1953	36	50	71	15	42	0	0	6	4	3(1)	1	1	-4
823. Stocks, shares sold, N.Y.S.E.	1879	66	50	85	70	65	20	100	43	32	8(2)	5	5	-7
<i>Credit difficulties</i>														
15. No. of bus. failures, liab. \$100,000 and over (inv.)	1894	63	50	74	86	67	0	80	35	25	10(2)	7	7	-6
828. Delinquency rate, auto direct loans (inv.)	1948	59	50	73	72	48	60	40	8	6	4(0)	2	2	-4

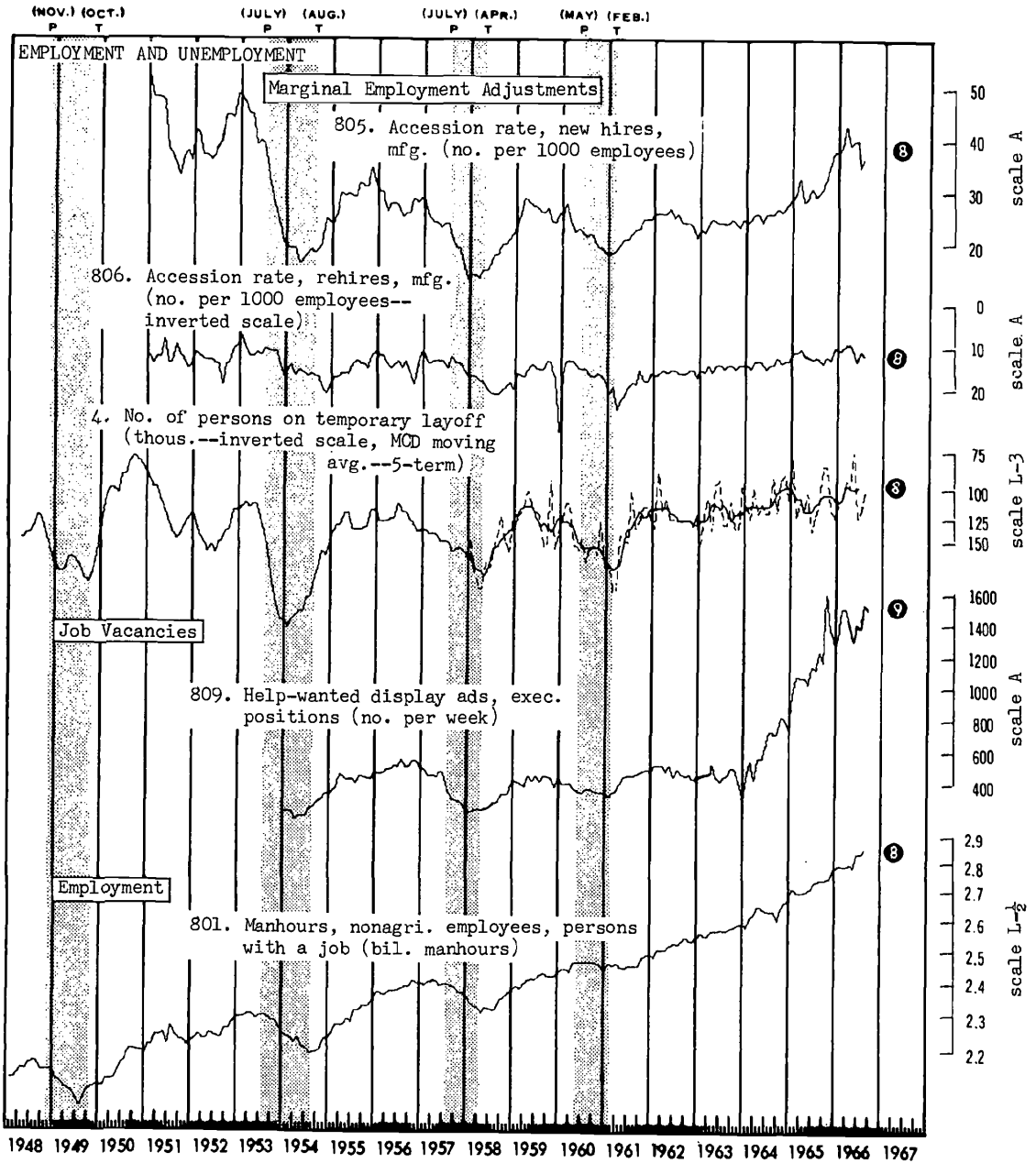
\* Rough coincidences include exact coincidences (shown in parentheses) and leads and lags of 3 months or less. Leads (lags) include leads (lags) of 1 month or more. The total number of timing comparisons, which can be less than the number of business cycle turns covered by the series, is the sum of the leads, exact coincidences, and lags. Leads and lags of quarterly series are expressed in terms of months.

<sup>b</sup> Also analyzed positively, in which case the series is classed as leading.

<sup>c</sup> Earlier segment omitted, 1879-1918 (bank clearings).

CHART 2

Thirty-four Other Series Classified by Economic Process



Note: Numbers in the dark circles indicate latest month plotted.

CHART 2

Thirty-four Other Series Classified by Economic Process (Continued)

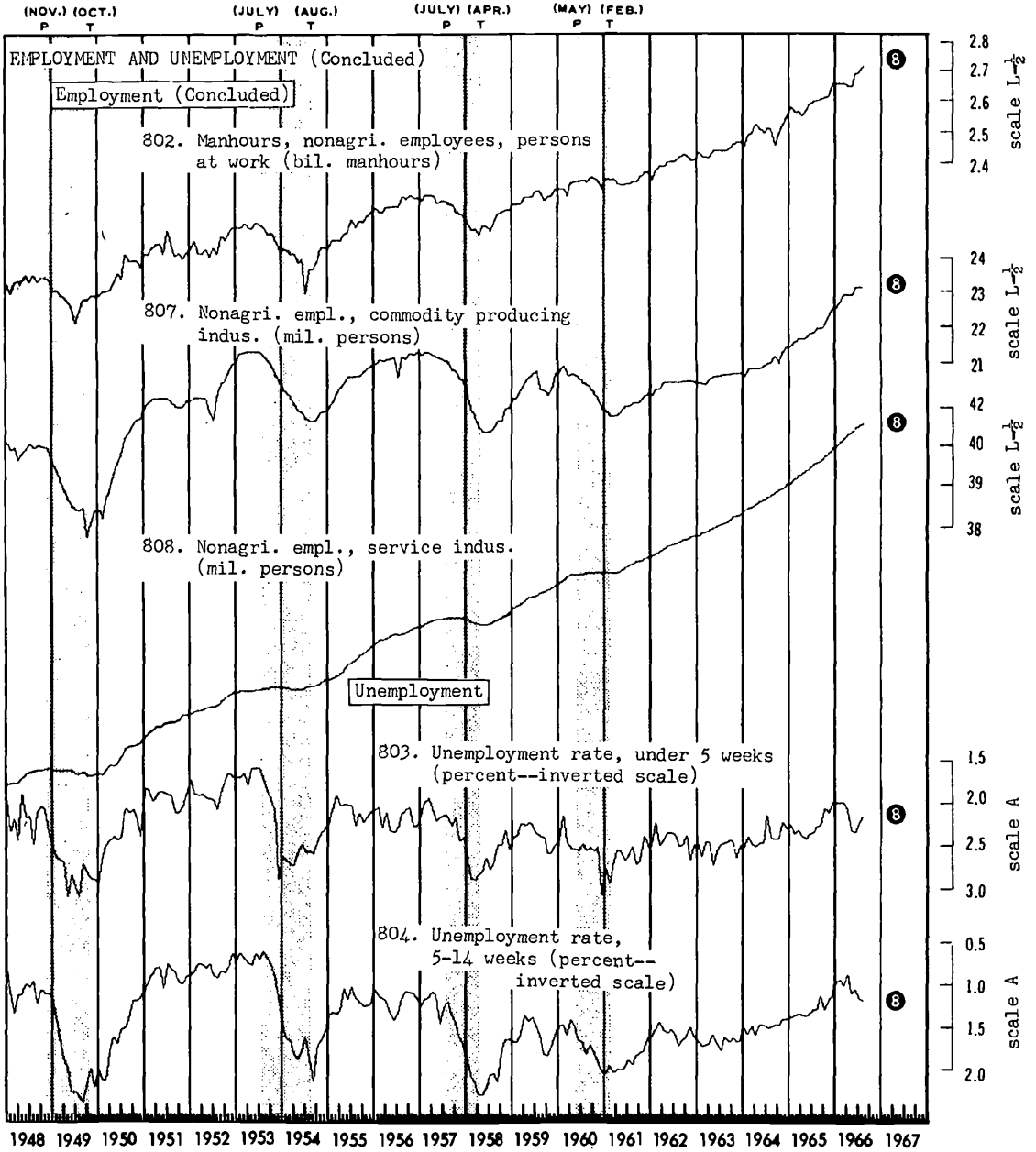


CHART 2

Thirty-four Other Series Classified by Economic Process (Continued)

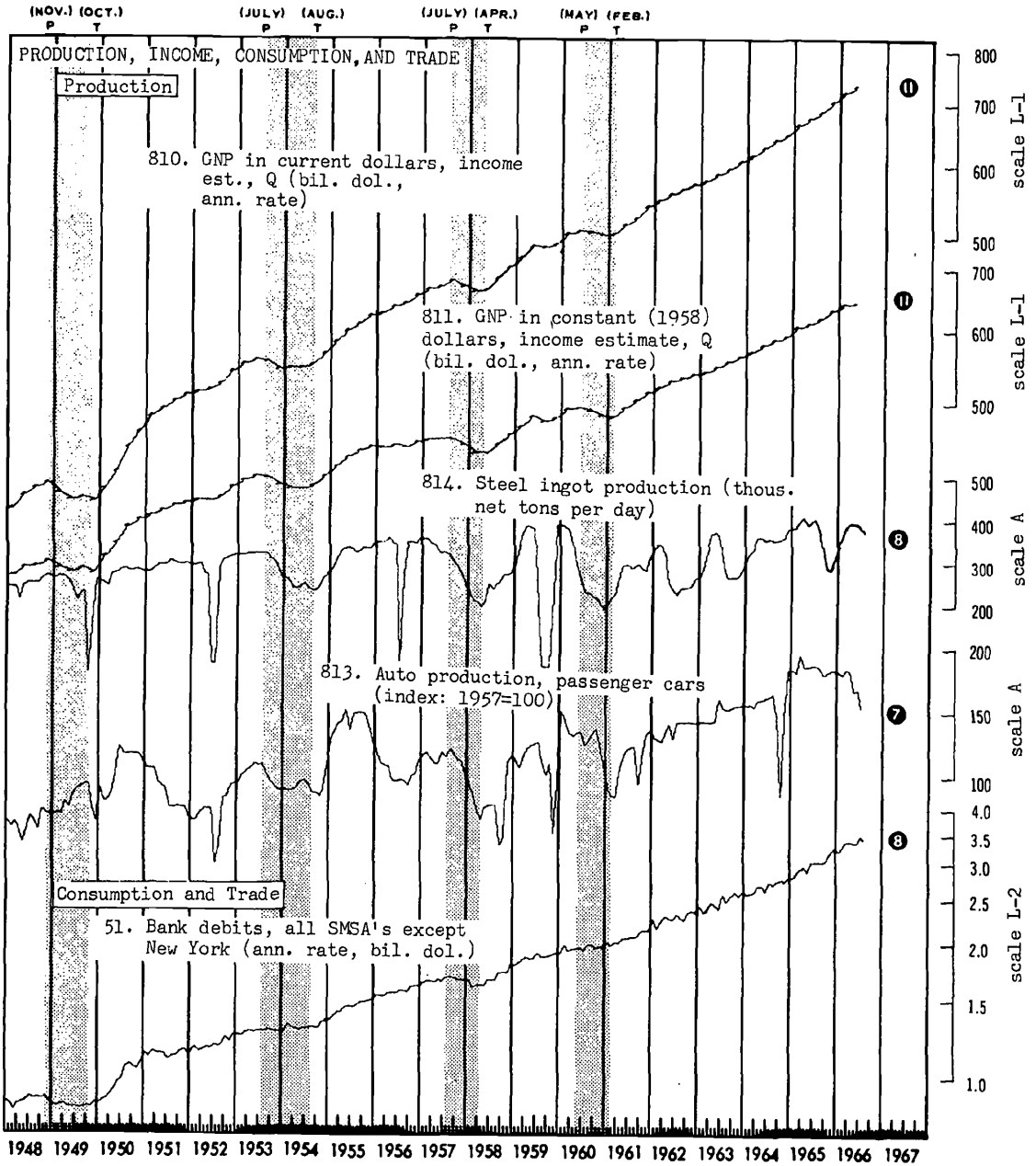


CHART 2

Thirty-four Other Series Classified by Economic Process (Continued)

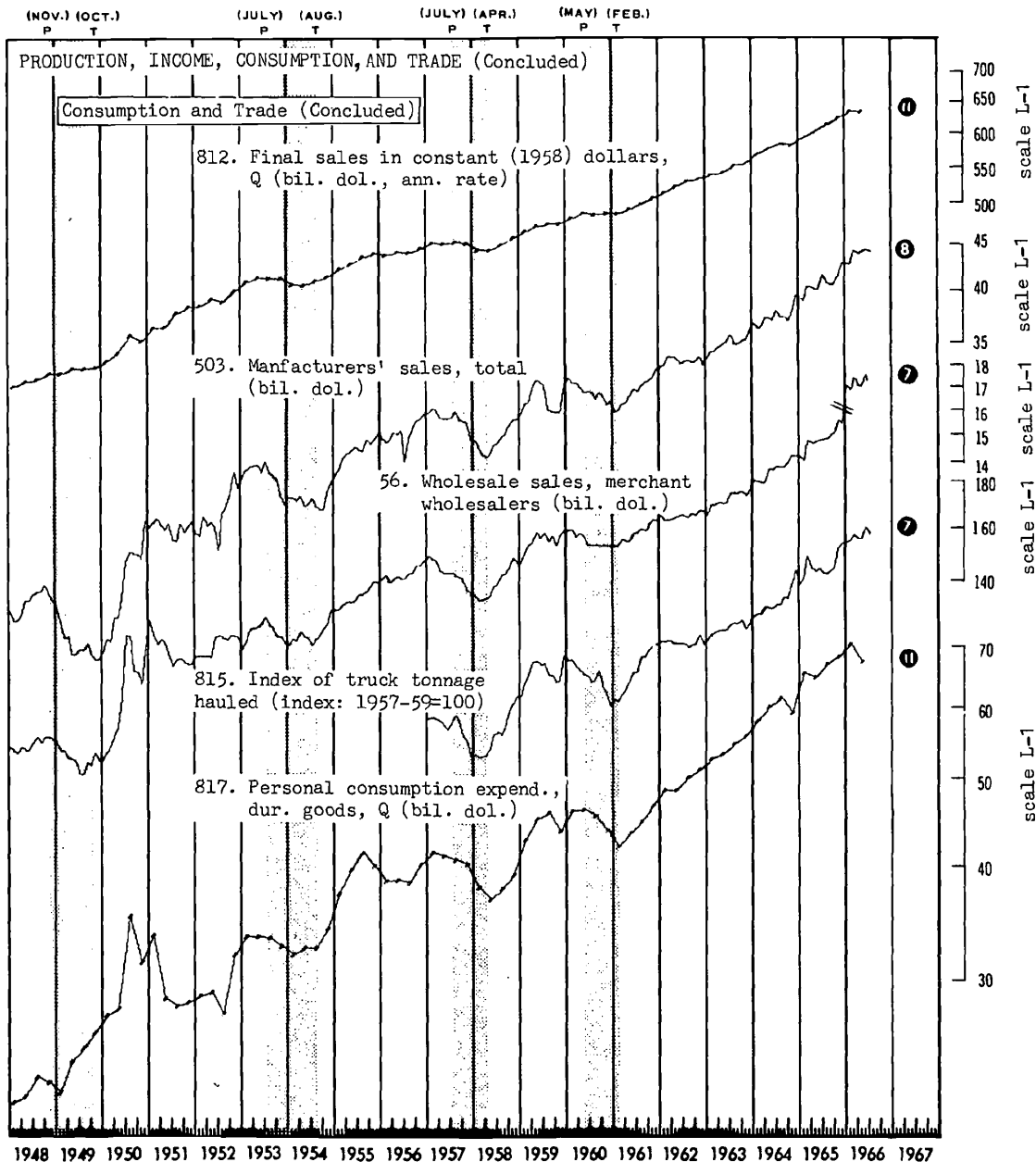


CHART 2

Thirty-four Other Series Classified by Economic Process (Continued)

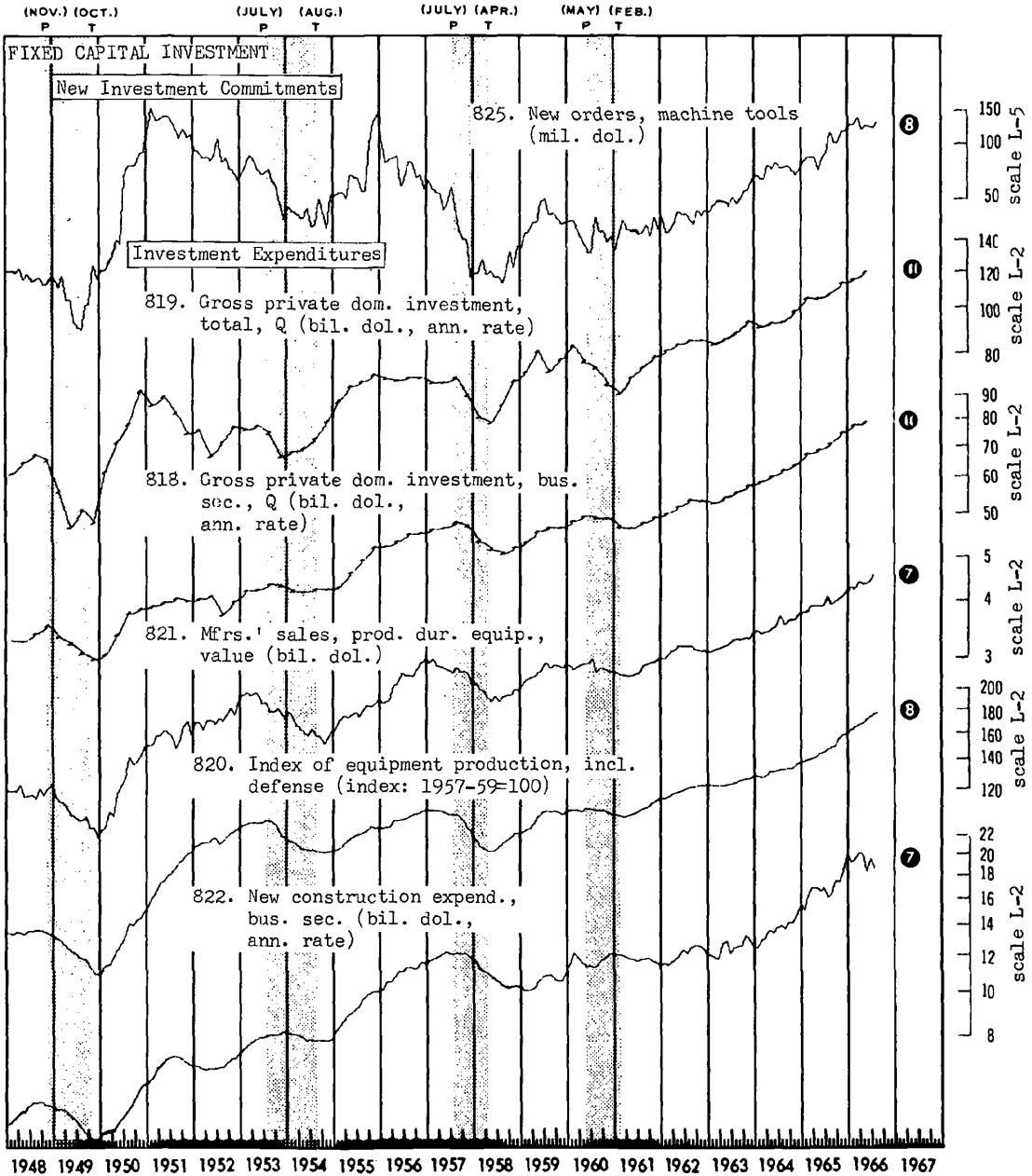


CHART 2

Thirty-four Other Series Classified by Economic Process (Continued)

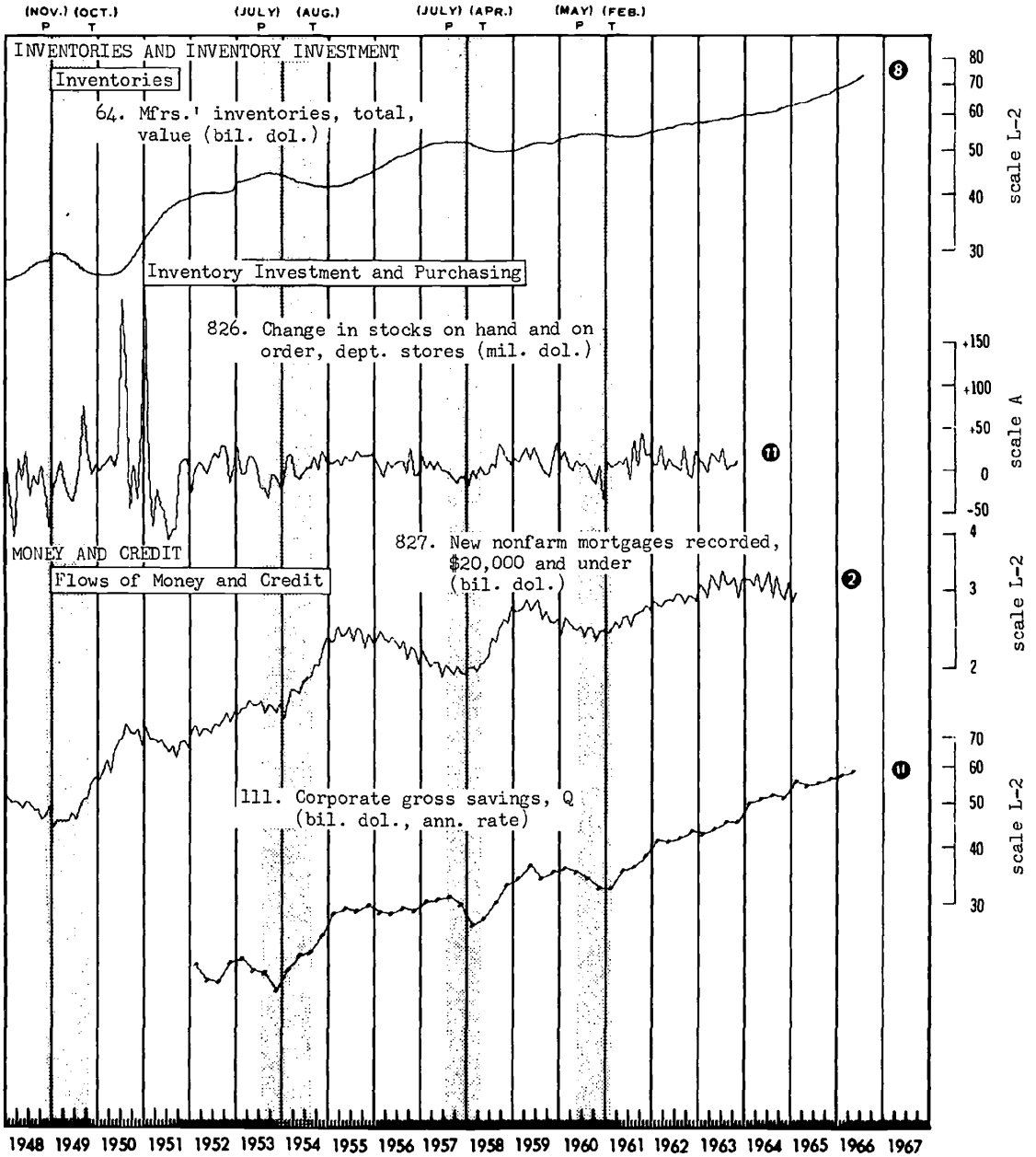


CHART 2

Thirty-four Other Series Classified by Economic Process (Concluded)

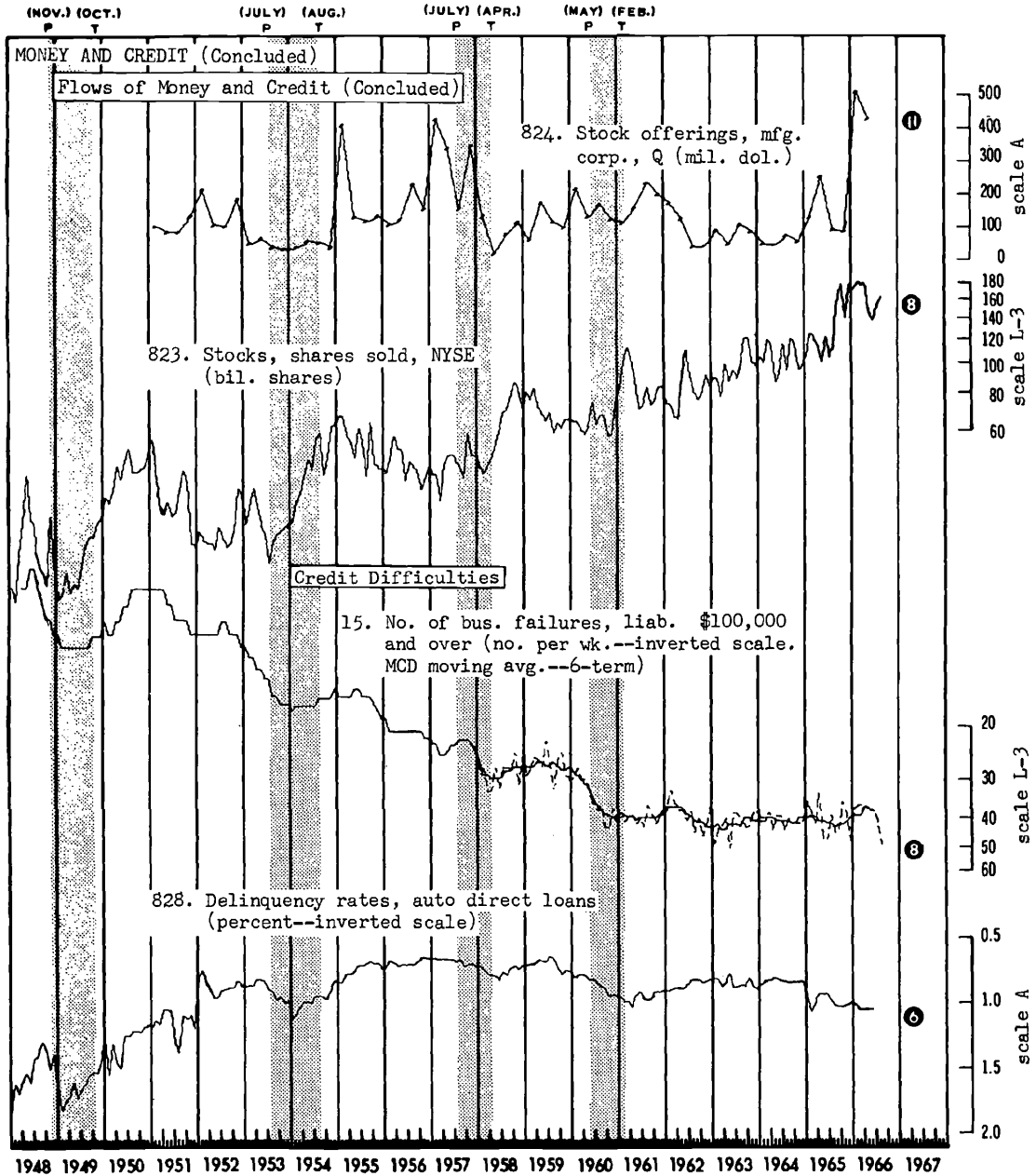


TABLE 10  
Average Scores for Selected Groups of Indicators

	All Cri- teria <sup>a</sup>	Eco- nomic Signifi- cance	Statis- tical Ade- quacy	Con- formity	Timing	Smooth- ness	Cur- rency
1. Full list (86 series) <sup>b</sup>	63	63	65	73	49	62	63
a. Leading (36 series)	64	61	67	75	61	47	59
b. Coincident (25 series)	69	67	66	82	45	87	77
c. Lagging (11 series)	65	59	62	77	52	91	60
d. Unclassified (14 series) <sup>b</sup>	47	66	63	49	18	31	50
2. Short list of leading, coincident, and lagging indicators (25 series)	70	66	67	83	61	76	69
3. Other series, not on full list (34 series)	60	58	67	68	47	62	56
4. All series (120 series) <sup>b</sup>	62	62	66	72	48	62	61

<sup>a</sup> Smoothness and currency weighted one-half each; other criteria weighted one each.

<sup>b</sup> Export orders of durables and export orders of machinery omitted because complete set of measures is not available.

deal with it here again.<sup>6</sup> In addition the more specific question is asked as to what improvements take place when a revised list of National Bureau indicators is released. In each report in which a revised list has been released, an appraisal of the previous list, as well as the new list, has been made. This will also be done here.

A comparison of the old and new list can be made in terms of their aggregate performance and in terms of the individual series.

First, let us consider how well the 1960 list performed in the period after which it was compiled. Table 11 shows the timing of the

1960 list of indicators prior to and subsequent to their selection. The principal finding from this table is that the timing behavior of the series at the two business cycle turning points that have taken place since the list was initially compiled (the May 1960 peak and the February 1961 trough) is essentially the same as in the earlier period. Eleven of the 12 leading series led at the 1960 peak; one failed to reach a peak. Their performance was less uniform in this respect at the 1961 trough: 7 led, 3 coincided, and 2 experienced no turning point. The median lead at the 1960 peak was longer than the median at earlier peaks and the median at the 1961 trough was shorter. With a few exceptions, the roughly coincident series met the standards for that class. Three series, personal income, bank debits outside New York, and wholesale price index (excluding farm products and foods) skipped the mild 1960-61 recession entirely; also, there was a predominance of leads at the peak. Among the lagging indicators, there was a clear predominance of lags at both turns.

Thus the three groups of indicators in the 1960 list exhibited some variation from their expected pattern, but for the most part it was well within the range of earlier variations, as can be seen from the table. Counting up the number of timing observations that are con-

<sup>6</sup> See, for example, *Business Cycle Indicators*, Vol. I, especially Chaps. 3, 4, and 10; Julius Shiskin, *Signals of Recession and Recovery*, Occasional Paper 77, New York, NBER, 1961, pp. 89-115; Sydney S. Alexander, "Rate of Change Approaches to Forecasting—Diffusion Indexes and First Differences," *Economic Journal*, June 1958, pp. 288-301; Arthur L. Broida, "Diffusion Indexes," *American Statistician*, June 1955, pp. 7-16; Alexander Sachs, "The Cyclical Indicator Approach," *The Conference Board Business Record*, April 1957; Leonard H. Lempert, "On the Value of Cyclical Indicators," *The Conference Board Business Record*, June 1957; Arthur M. Okun, "On the Appraisal of Cyclical Turning Point Predictors," *Journal of Business*, April 1960, pp. 101-120; Donald J. Daly and Derek A. White, "Economic Indicators in the 1960's," and Robert C. Turner, "An Appraisal of Various Approaches to Short-Term Forecasting," *Proceedings of the Business and Economic Statistics Section*, American Statistical Association, 1966, pp. 64-83.

**TABLE 11**  
**Timing of 1960 List of Twenty-six Indicators Prior to and Subsequent to Their Selection**

	First Business Cycle Turn Covered	Timing at Peaks Through 1957			Timing at May 1960 Peak	Timing at Troughs Through 1958			Timing at February 1961 Trough
		Range				Range			
		from	to	Median		from	to	Median	
<i>Leading group</i>									
		LEAD(-) OR LAG(+), IN MONTHS							
Average workweek, mfg.	1921	-20	+2	-5	-12	-8	+5	-4½	-2
Gross accession rate, mfg.	1919	-35	-3	-10	-14	-27	0	-4	-4
Layoff rate, mfg. (inv.)	1919	-27	-1	-9	-12	-11	-1	-7	0
New orders, durable goods	1920	-35	-3	-6	-13	-11	0	-2½	-1
Housing starts <sup>a</sup>	1918	-31	+8	-11	-17	-12	0	-6	-2
Comm. and indus. building contracts	1919	-32	+2	-9	n.c.	-5	+3	-1½	n.c.
Net change in bus. pop.	1945	-33	-10	-28	-13	-7	0	-4	-1
Bus. failures, liab. (inv.)	1879	-28	+3	-7	-12	-13	+7	-7	n.c.
Corporate profits after taxes, Q	1920	-20	0	-4	-12	-9	+1	-2	0
Common stock price index	1873	-21	+2	-4	-10	-21	+9	-5	-4
Change in business inventories	1921	-26	+9	-5½	-3	-11	+6	+1	0
Indus. raw materials prices	1919	-29	+3	-7½	-6	-8	+9	0	-2
Median of leading group				-7¼	-12			-4	-1½
<i>Roughly coincident group</i>									
Employment in nonagri. establishments	1929	-15	+2	-2½	-1	-1	+1	0	0
Unemployment rate (inv.)	1929	-6	+2	-4	-11	0	+7	+1½	+3
Industrial production	1919	-15	+5	0	-4	-8	+4	0	0
GNP in current \$, Q	1921	-2	+3	+½	0	-3	+4	-1	-3
GNP in constant \$, Q	1921	-2	+3	0	-3	-7	+4	-3½	0
Bank debits outside N.Y.C.	1919	-3	+6	0	n.c.	-2	+1	-1	n.c.
Personal income	1921	-5	+9	+1	n.c.	-12	0	-2	n.c.
Sales by retail stores <sup>b</sup>	1919	-4	+6	+1	-1	-7	+8	-1	+2
Wholesale price index, excl. farm prod. & foods	1913	-15	+6	+½	n.c.	0	+7	+1	n.c.
Median of roughly coincident group				0	-2			-1	0
<i>Lagging Group</i>									
Plant & equip. expend., Q	1918	-3	+4	+1	0	-1	+6	+2	+3
Labor cost per unit of output, mfg. <sup>c</sup>	1919	+5	+10	+7½	+10	+3	+24	+9	+ <sup>d</sup>
Manufacturers' inventories, book value	1926	-10	+9	+2	+4	-6	+13	+3	+4
Consumer instal. debt	1929	+3	+7	+5½	+8	-2	+6	+3½	+3
Bank rates, bus. loans, Q	1919	-20	+13	+5	-5	+2	+39	+5	+49
Median of lagging group				+5	+4			+3½	+4

n.c. = No timing comparison.

<sup>a</sup> Residential building contracts, 1918-38.<sup>b</sup> Department store sales, 1919-35.<sup>c</sup> Production worker wage cost per unit of output, 1919-48.<sup>d</sup> Length of lag uncertain.

sistent with the series' classification, we find that 69 per cent of the 26 possible timing comparisons were consistent at the 1960 peak, and 69 per cent were consistent at the 1961 trough. This corresponds well with a similar test of the 1950 list of 21 indicators during a period subsequent to their selection, namely, 1948-58. Here 67 per cent were found to be "consistent."<sup>7</sup>

The performance of the indicators may be appraised also by considering the behavior of monthly indexes of the various groupings of indicators classified by their typical timing. Activities such as production, employment, and income are heterogeneous in the sense that they cannot be added to any meaningful total. They are homogeneous, however, in the sense that they measure related aspects of business change and undergo similar cyclical fluctuations. Composite indexes constructed from such series provide single measures of the complex of economic activities which experience common fluctuations. For this reason they are helpful in business cycle studies. Such indexes have been prepared separately for leading, coincident, and lagging indicators, and for the 1960 and 1966 lists (Chart 3).

The measures used for this purpose are "amplitude-adjusted" composite indexes. They are constructed by standardizing the month-to-month percentage changes of each series so that all the series are expressed in comparable units. To do this, each series is adjusted so that its average month-to-month change, without regard to direction, is 1. The individual amplitude-adjusted series are weighted and combined in an index. The weights are the scores earned under the plan described in this paper. This index is also adjusted so that its average month-to-month change is 1. The amplitude-adjusted indexes provide a composite measure of the amplitude and pattern of the business cycle, and indexes for different groups of series and different periods can be compared. In addition, they facilitate the interpretation of current changes; if an index shows an increase of 2.0 in the current month,

it is rising twice as fast as its average rate of change in the past; if the increase is 0.5, it is rising only half as fast as the historical average.<sup>8</sup>

The composite indexes in Chart 3 yield two interesting results. First, the indexes based upon the 1966 list are virtually the same as the corresponding indexes based upon the 1960 list. Many of these graphic similarities are quantified in Table 12. This reflects the fact that on an over-all basis the new and the old lists have many common elements. The advantages of the new list are to be found in the new series themselves, in the scores as aids in utilizing both the new and old series, and in the new cross-classification as a contribution toward understanding their economic interrelationships.

The second major finding revealed by this chart is the pronounced differences in the timing properties and the patterns of the leading, coincident, and lagging indexes. Thus, while the leading indexes are scarcely affected by the change in their composition, and neither are the coincident or lagging indexes, nevertheless the leading indexes are quite different from the coincident indexes, and these, in turn, are quite different from the indexes of the lagging series. The principal differences are in the timing properties—the leading indicators usually turn first, the coincident indicators next, and the lagging indicators last. There are other important differences as well: for example, the indexes of the leading indicators show little upward trend since 1948, while the upward trend in the coincident indicators is pronounced. There has also been an upward trend in the indexes of the lagging series, but this seems to have diminished somewhat since 1961.

These two findings point to considerable similarity in behavior within each group of indicators and considerable difference from group to group, and hence attest to the sig-

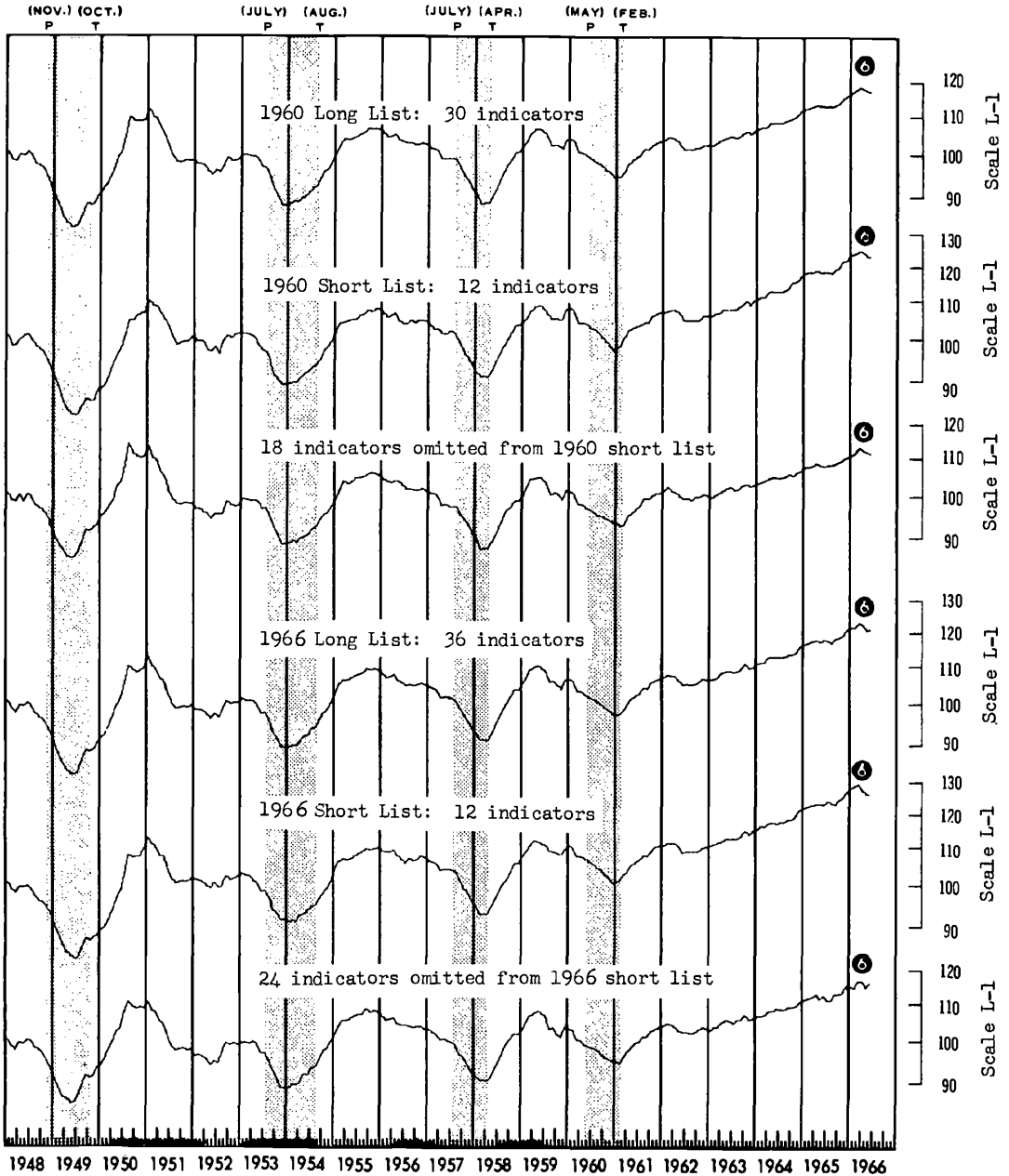
<sup>7</sup> *Business Cycle Indicators*, Vol. I, p. 53.

<sup>8</sup> Shiskin, *Signals of Recession and Recovery*, Appendix A. For a recent innovation, see Shiskin, "Reverse Trend Adjustment of Leading Indicators," *Review of Economics and Statistics*, February 1967.

**CHART 3**

**Composite Indexes Based on the 1960 and 1966 NBER Lists**

**Leading Indicators**



Note: Components are weighted by their average scores. Numbers in dark circles indicate latest month plotted.

CHART 3

Composite Indexes Based on the 1960 and 1966 NBER Lists  
Roughly Coincident Indicators

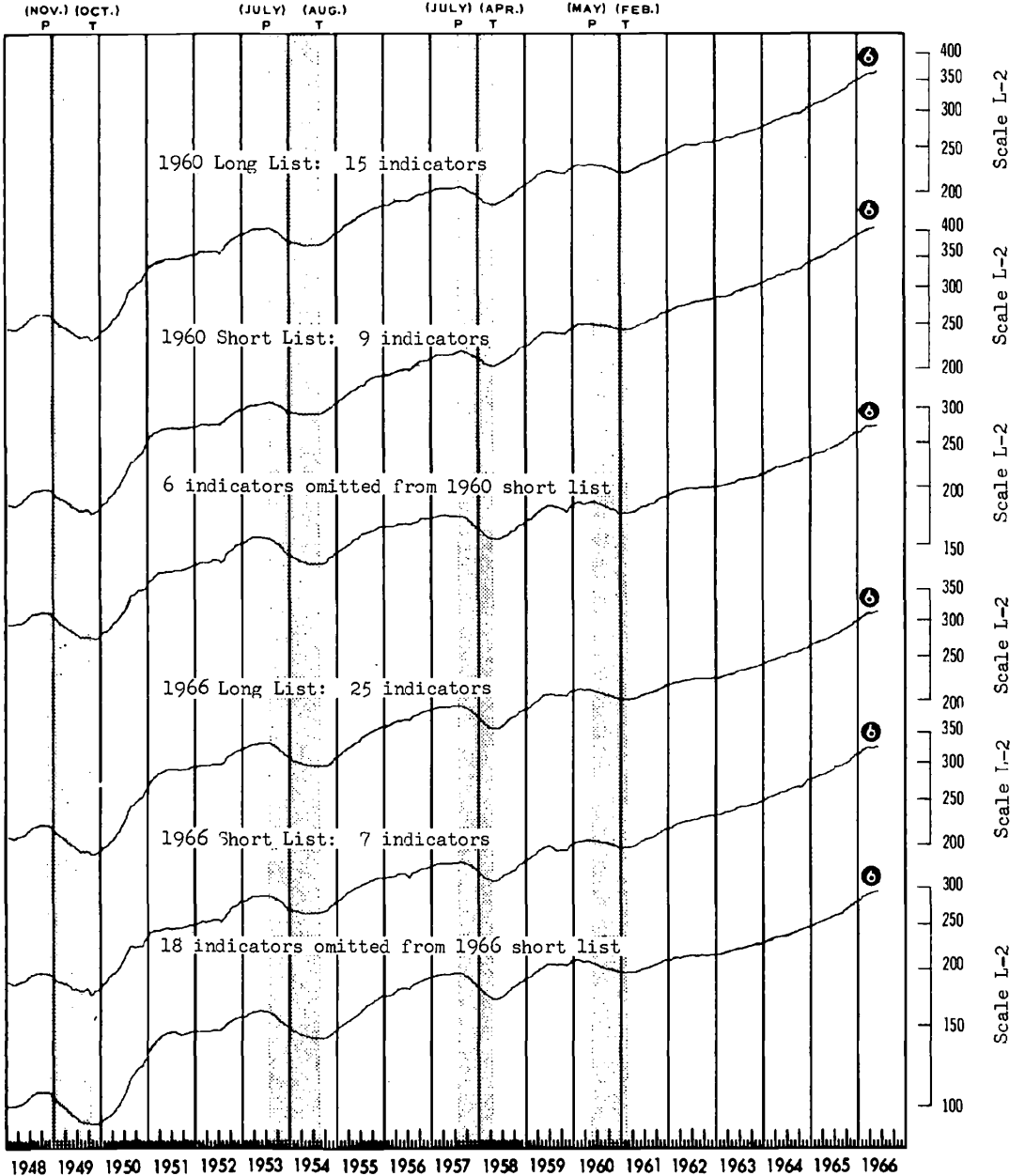


CHART 3

Composite Indexes Based on the 1960 and 1966 NBER Lists

Lagging Indicators

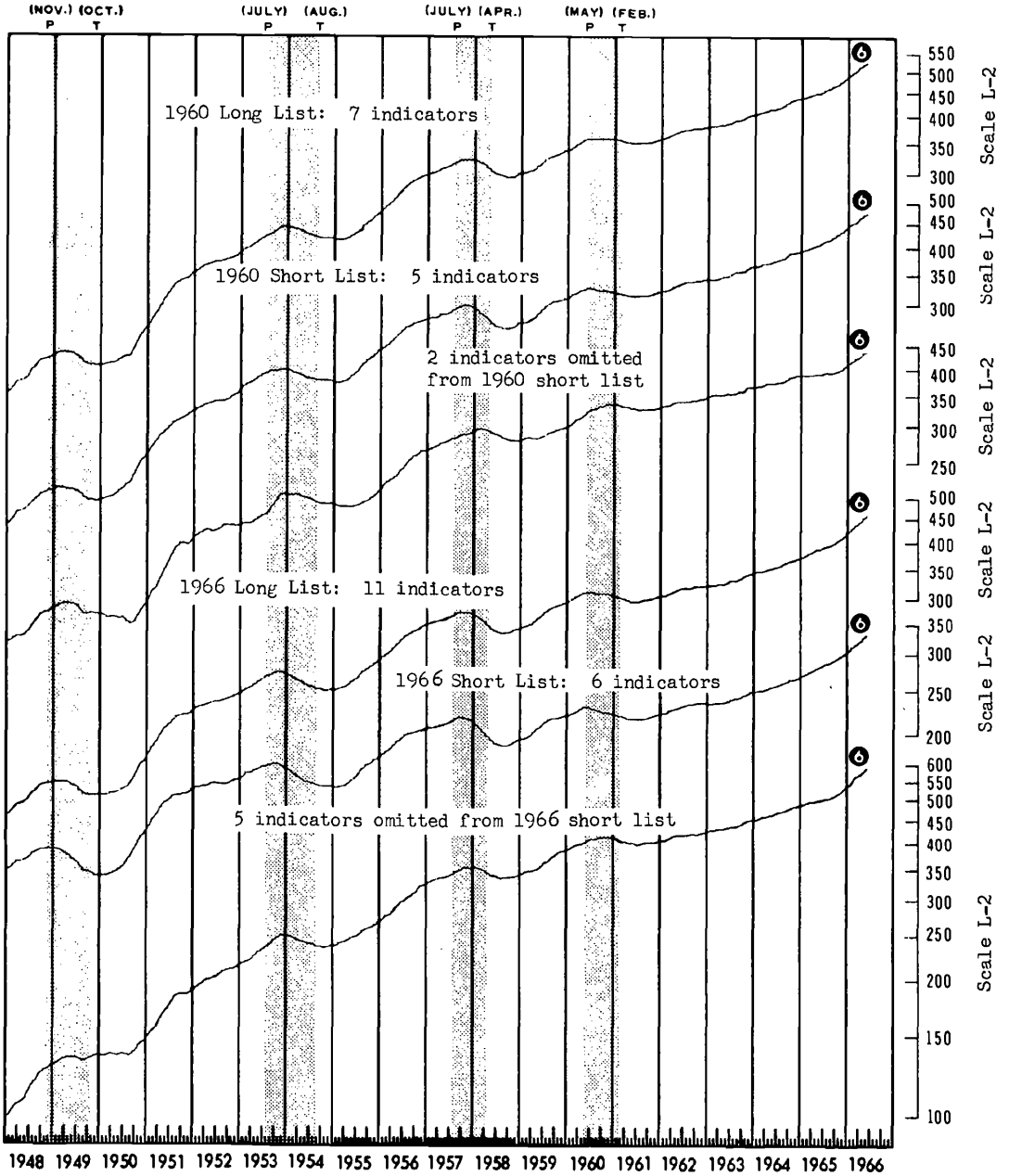


TABLE 12  
Summary Measures for Composite Indexes Based on NBER 1960 and 1966  
Lists of Indicators, 1948-66

Composite Index	$\bar{CI}$	$\bar{I}$	$\bar{C}$	$\bar{I}/\bar{C}$	MCD	$\bar{I}/\bar{C}$ for MCD Span	Average Duration of Run			
							CI	I	C	MCD
<i>Leading</i>										
1960 long list: 30 indicators	1.00	.52	.76	.69	1	.69	3.4	1.8	12.3	3.4
1960 short list: 12 indicators	.99	.56	.76	.73	1	.73	3.8	1.7	10.1	3.8
18 indicators not on 1960 short list	1.00	.61	.72	.84	1	.84	3.3	1.7	14.8	3.3
1966 long list: 36 indicators	1.00	.56	.76	.73	1	.73	3.0	1.7	12.3	3.0
1966 short list: 12 indicators	.99	.59	.74	.79	1	.79	3.1	1.8	11.1	3.1
24 indicators not on 1966 short list	1.01	.63	.73	.86	1	.86	3.0	1.6	13.9	3.0
<i>Roughly Coincident</i>										
1960 long list: 15 indicators	1.00	.40	.90	.45	1	.45	5.8	1.8	17.1	5.8
1960 short list: 9 indicators	1.01	.42	.90	.47	1	.47	5.3	1.8	17.1	5.3
6 indicators not on 1960 short list	1.00	.48	.86	.56	1	.56	4.4	1.8	20.2	4.4
1966 long list: 25 indicators	1.00	.37	.92	.40	1	.40	5.3	1.8	17.1	5.3
1966 short list: 7 indicators	1.01	.53	.83	.64	1	.64	4.6	1.7	20.2	4.6
18 indicators not on 1966 short list	1.00	.33	.94	.36	1	.36	6.3	1.8	20.2	6.3
<i>Lagging</i>										
1960 long list: 7 indicators	1.01	.29	.97	.30	1	.30	13.9	2.1	24.7	13.9
1960 short list: 5 indicators	1.00	.29	.95	.30	1	.30	11.1	1.9	24.7	11.1
2 indicators not on 1960 short list	1.01	.45	.88	.52	1	.52	4.0	1.9	24.6	4.0
1966 long list: 11 indicators	1.01	.28	.97	.29	1	.29	13.1	1.8	24.7	13.1
1966 short list: 6 indicators	1.01	.33	.95	.35	1	.35	8.9	1.8	20.2	8.9
5 indicators not on 1966 short list	1.01	.39	.93	.42	1	.42	7.7	1.7	20.2	7.7

Note: For a description of these measures, see *Business Cycle Indicators*, Vol. I, pp. 535-545.

nificance of the classification of series into the three timing groups.

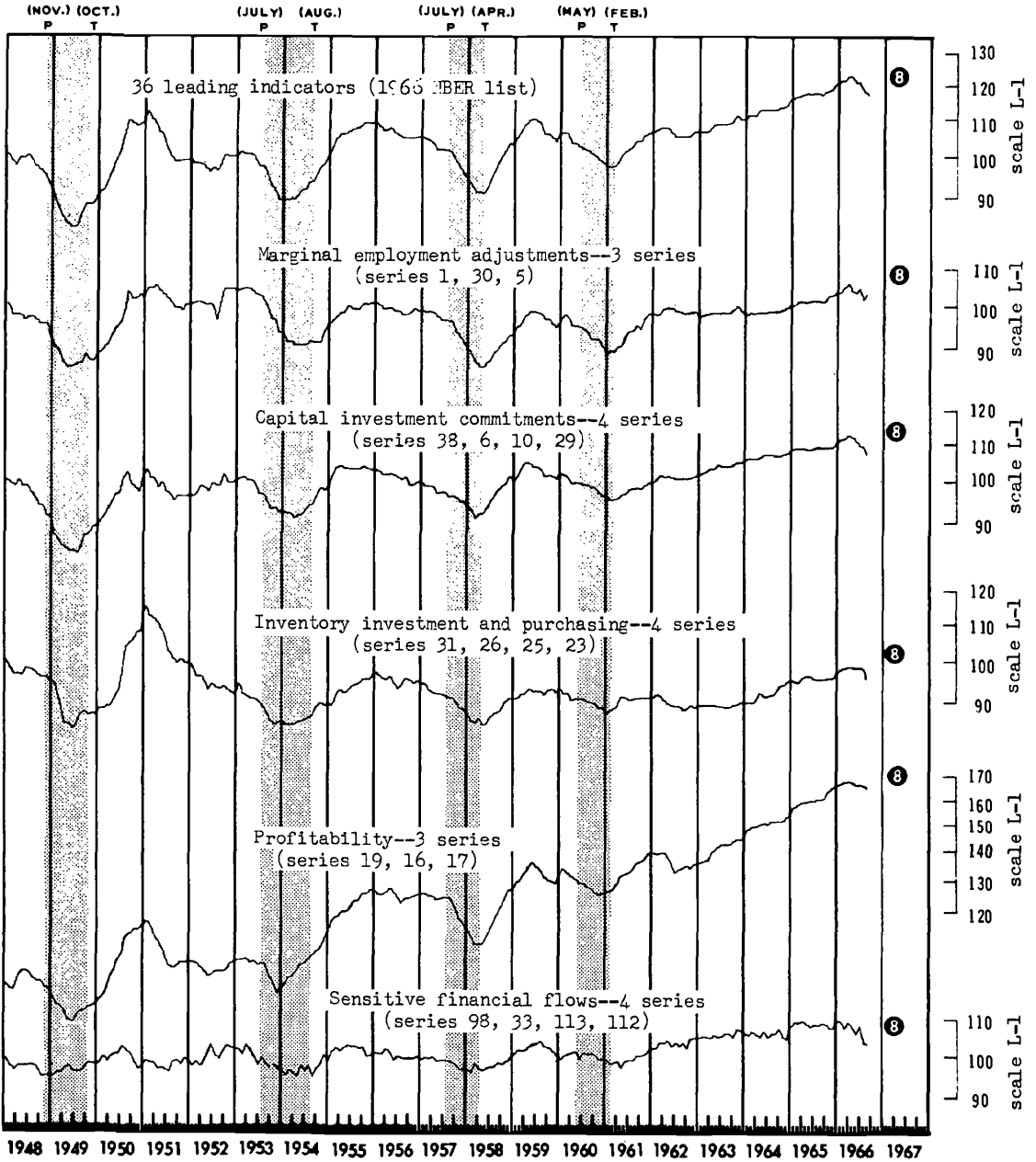
Homogeneity in the behavior of different types of series within the leading group is also suggested by a new set of composite indexes that make use of the economic process groupings developed in this study. Chart 4 presents indexes for five of the economic process groups that are classified as leading. Each index is based upon three or four series, selected to provide broad coverage of the particular group without much duplication.<sup>9</sup> The twelve lead-

<sup>9</sup> The series included in the five indexes come from the corresponding groups in Table 6, with two exceptions. Series 38 (net business formation) is included in the index of capital investment commitments and series 23 (industrial materials prices) is included in the index of inventory investment and purchasing.

ing indicators on the short list are all included, as well as six additional series, or eighteen in all. These indexes exhibit a rather striking family resemblance in timing as well as in general configuration, despite the variety of economic activities they represent. No one of them is likely to be mistaken for the index of coincident series or for the index of lagging series. One is led, therefore, to conclude that the several economic processes represented in Chart 4 act and react upon one another with greater speed and determination than they do upon the processes represented in the coincident and lagging groups. To the extent that this is plausible, it promotes confidence that the future performance of the new list of indicators will accord well with past performance.

CHART 4

Amplitude-Adjusted Composite Indexes for Economic Subgroups of  
Leading Indicators



Note: Numbers in dark circles indicate latest month plotted.