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Volume Title: Determinants and Effects of Changes in the Stock of Money, 1875–1960

Volume Author/Editor: Philip Cagan

Volume Publisher: NBER

Volume ISBN: 0-870-14097-3

Volume URL: <http://www.nber.org/books/caga65-1>

Publication Date: 1965

Chapter Title: Appendices

Chapter Author: Philip Cagan

Chapter URL: <http://www.nber.org/chapters/c1647>

Chapter pages in book: (p. 299 - 372)

# APPENDIX A

## *Supplementary Measures of the Relative Contributions of the Three Determinants*

THIS APPENDIX presents various measures of the relative contributions of the determinants to specific cycles in the rate of change in the money stock in order to check and amplify the results in Chapter 2.

Table A-1 gives weighted averages of the relative contributions to five specific-cycle stages, where the weight for each stage is the number of cycles covered. This treats the relative contributions in each stage with equal emphasis, no matter how large or small the value of the money series in each stage. Table 4, in effect, weights the relative contributions in each stage by the amplitude of the money series.<sup>1</sup> It should be noted that the measure of Table A-1 for any group of cycles cannot be expressed as a weighted average of the relatives for the subgroups, as is true for Table 4 (under very general conditions). This explains why the relative contribution of the currency ratio can be lower in all nonwar cycles than in any of the subgroups, and also why the relative contributions of high-powered money and the reserve ratio can be larger in the nonwar cycles than in either the mild- or the severe-cycle group. At first sight, the figures seem to be inconsistent.

<sup>1</sup> The measure of Table A-1 for high-powered money can be written:

$$\sum_s \left( \frac{\bar{h}_s}{\bar{m}_s} \frac{N_s}{\sum_s N_s} \right),$$

where  $h$  and  $m$  are defined as in Chapter 2,  $N$  is the number of cycles, and the subscript  $s$  enumerates the five stages. The bar over a variable designates its average value. If we weight the relatives, not by  $N_s/\sum N_s$ , but by the amplitude of the money series for each stage weighted by the number of cycles for which a figure for the stage was computed, we have

$$\sum_s \left( \frac{\bar{h}_s}{\bar{m}_s} \frac{|\bar{m}_s| N_s}{\sum_s |\bar{m}_s| N_s} \right).$$

Since  $|\bar{m}_s|/\bar{m}_s$  gives the sign of  $\bar{m}_s$ , we can write the preceding measure as

$$\frac{\sum_s \bar{h}_s N_s (\text{sign of } \bar{m}_s)}{\sum_s |\bar{m}_s| N_s},$$

which was used for Table 4. An identical demonstration holds for the contributions of the currency and reserve ratios.

Table A-1 reproduces the main outline of the results in Table 4. The currency ratio was responsible for one-half or more of the nonwar cycles, and the other two determinants for the remaining one-half; although, in comparison with Table 4, high-powered money was relatively more important, and the reserve ratio relatively less. The similarity between the two tables also holds for the main differences between the major subgroups of cycles. In particular, the currency ratio maintains its primacy in all, with only small

TABLE A-1

FIRST ALTERNATIVE MEASURE OF THE RELATIVE CONTRIBUTIONS  
OF DETERMINANTS TO SPECIFIC CYCLES IN THE TREND-ADJUSTED  
RATE OF CHANGE IN THE MONEY STOCK, 1877-1953  
(per cent)

Specific Cycles	Total <sup>a</sup>	High-Powered Money	Currency Ratio	Reserve Ratio
16 nonwar, 1877-1953	100	32	48	19
10, 1877-1913	100	16	50	33
6, 1918-53	100	46	52	1
6 most severe, 1877-1953 <sup>b</sup>	100	28	54	18
10 mild, 1877-1953 <sup>b</sup>	100	17	69	14

Source: Same as for Table 3.

Note: Relative contributions of determinants computed as follows: Averages for each of five stages of the trend-adjusted contribution of each determinant to cycles in the group were divided by the corresponding average for the money series. The ratios were then averaged for the five stages; the figures for each stage were weighted by the number of cycles used in computing the average contributions for the stage (see text footnote 1).

<sup>a</sup>Lines may not add exactly to total because of rounding and approximation error.

<sup>b</sup>Same as in Table 4.

differences between mild and severe cycles. High-powered money and the reserve ratio, as in Table 4, switch rankings in the two periods: in the pre-1913 period, high-powered money was insignificant and the reserve ratio important, whereas in the post-1918 period, the converse relationship held.

One difference between Tables A-1 and 4 is the reversal of ranking of the relatives for the two ratios between severe and mild cycles. As measured by Table 4, the relative for the currency ratio is slightly higher, and that for the reserve ratio lower, in severe than in mild cycles; while the figures in Table A-1 exhibit the opposite ranking. These differences are small, however.

The over-all similarity between Tables A-1 and 4 for the nonwar cycles suggests that the stage-by-stage variations in the average contributions of the determinants are not closely related to the amplitudes of the corresponding variations in the money series. Such a relation for any determinant, if positive, associates the larger weights with the larger relatives in the measure of Table 4 (see footnote 1). Given such an association, this measure would then exceed the corresponding measure in Table A-1, which is not weighted; and,

conversely for a negative relation. Since treating the average contributions in each cycle stage equally, as in Table A-1, does not affect the over-all results, the conclusion is that the behavior inferred from Table 4 was not importantly influenced by the particular stages in which the money series typically reached its highest and lowest levels.

The chief effect of the formula used for Table A-1 as compared with that in Table 4 is to increase the relative contributions of high-powered money in all the cycle groups. The cyclical pattern of this determinant explains the difference. High-powered money, with its double-peak pattern, made its smallest contribution, in both absolute and relative terms, to the peak and trough stages of the money series. And it is these stages to which the measures of Table 4 give the heaviest weight, because the money series then reaches the extremes of its cycle.

The counterpart of the greater contribution of high-powered money shown in Table A-1 is the lesser contribution of the reserve ratio. (Such differences in the contributions of the currency ratio shown in the two tables are small and not uniform, as we might expect.) The small differences between the two tables in the contributions of the reserve ratio mean that its average contribution correlates positively over cycle stages with the average amplitude of the money series. The corresponding correlation for high-powered money is negative. The reason for these correlations is that the reserve ratio made its largest relative contributions in the trough and peak stages, when the deviation of the money series from trend was greatest; and conversely, for the relative contributions of high-powered money.

The contrasting cyclical patterns of high-powered money and the reserve ratio are brought out in another way by Table A-2, with two measures of the relative contributions to the average amplitude of contractions in the non-war cycles of the money series. Both measures automatically eliminate the trend without further adjustment. The first covers the change from peaks to troughs of specific cycles. By omitting the intraphase variations, it shows, as might be expected, that the two ratios account for virtually all the movement in the money series. High-powered money accounts for almost nothing, because its contribution in the peak and trough stages deviates very little from trend.

The second measure deals with the change from the expansion to the contraction phases of step cycles. Friedman and Schwartz derived these phases from changes in the average level of the money series, that is, they selected dates when the series "steps" noticeably to a higher or lower level. Such cycles provide meaningful intervals, if the time series approximates a step function, which cyclical fluctuations in the money series do, to some extent. Since the step phases are averages for the entire upward and the entire downward movements, they catch the major contributions of high-powered money and so, as the table shows, elevate its relative importance compared with the change of specific cycles from peaks to troughs.<sup>2</sup>

<sup>2</sup> For a further description of step cycles, see Milton Friedman and Anna Jacobson Schwartz, "Trends and Cycles in the Stock of Money in the United States, 1867-1960," a National Bureau Study, in preparation, Chap. 5.

TABLE A-2

RELATIVE CONTRIBUTIONS OF DETERMINANTS TO AMPLITUDE OF  
CONTRACTIONS IN NONWAR SPECIFIC AND STEP CYCLES IN THE  
RATE OF CHANGE IN THE MONEY STOCK, 1877-1953  
(per cent)

	Total <sup>a</sup>	High-Powered Money	Currency Ratio	Reserve Ratio
Specific cycles				
Difference between peak and succeeding trough stage	100	1	52	46
Step cycles				
Difference between expansion and succeeding con- traction phase	100	29	51	20

Source: Specific cycles, Table F-1; step cycles, Table F-3.

Note: Relative contributions of the determinants computed as follows: Averages of the difference between the contributions of each determinant to the two stages or phases of each cycle were divided by the corresponding average for the money series. No weighting was necessary because every cycle has a value for these stages or phases. No adjustment for trend was necessary, because taking the difference between these stages or phases automatically adjusts for intracyclical trend in the money stock.

<sup>a</sup> Lines may not add exactly to total because of rounding and approximation error.

Because they average the entire movement within each phase, the step cycles necessarily have a smaller average amplitude of variation than the specific cycles have. In addition, the step dates differ from the peak and trough dates of the specific cycles. Despite these differences, the step cycle measures for nonwar specific cycles closely follow those in Table A-1. By both measures, the currency ratio accounts for one-half the movement, the reserve ratio for about one-fifth, and high-powered money for about one-third. The similarity of the results justifies some confidence that they are not wholly dependent on the particular measures of the data used here and in Chapter 2.

As a further check on the results, the relative-of-averages type of measure, used in Tables A-1 and A-2, may be contrasted with the average-of-relatives type, presented in Table A-3. The latter is an unweighted average of the relative contributions over all stages of all cycles in a group. The measure used in Table A-1 can be interpreted as a weighted average of relative contributions, where the weights are the corresponding value of the money series relative to its average value over the same stage of all cycles in the group.<sup>3</sup>

<sup>3</sup> The unweighted average is

$$\frac{\sum_s \sum_c \frac{h_{sc}}{m_{sc}}}{\sum_s N_s},$$

TABLE A-3

SECOND ALTERNATIVE MEASURE OF THE RELATIVE  
CONTRIBUTIONS OF DETERMINANTS TO SPECIFIC  
CYCLES IN THE TREND-ADJUSTED RATE OF CHANGE  
IN THE MONEY STOCK, 1877-1953  
(per cent)

Specific Cycles	Total <sup>a</sup>	High-Powered Money	Currency Ratio	Reserve Ratio
16 nonwar, 1877-1953	100	20	88	-10
10, 1877-1913	100	8	105	-18
6, 1918-53	100	37	64	3
6 most severe, 1877-1953 <sup>b</sup>	100	18	66	15
10 mild, 1877-1953 <sup>b</sup>	100	21	101	-24

Source: Same as for Table 3.

Note: Relative contributions of determinants computed as follows: The trend-adjusted contributions of each determinant for the five stages of each cycle in the group were divided by the corresponding value of the money series. An unweighted average of the ratios was taken for each determinant, covering all stages of the cycles in the group, except some of the expansion and contraction stages of the pre-1907 cycles, which are lacking.

<sup>a</sup> Lines may not add exactly to total because of rounding and approximation error.

<sup>b</sup> Same as for Table 4.

The measure of Table A-3, unlike the previous ones, shows the relative importance of the determinants without regard to the size of concurrent levels of the money series. Contributions of the determinants occurring with large values of the money series count equally with those occurring with small values. Because this measure is not weighted as is the measure in Table A-1, it is apt to be distorted by extreme relative contributions in particular stages and, in

where the subscript  $c$  enumerates specific cycles and the other symbols are the same as in footnote 1. The weighted average referred to in the text is

$$\frac{\sum_s \sum_c \frac{h_{sc}}{m_{sc}} \frac{m_{sc}}{\bar{m}_s}}{\sum_s \sum_c \frac{m_{sc}}{\bar{m}_s}},$$

which (since  $\sum_c \frac{m_{sc}}{\bar{m}_s} = N_s$ ) equals

$$\frac{\sum_s \frac{\bar{h}_s}{\bar{m}_s} N_s}{\sum_s N_s},$$

the measure used in Table A-1. An identical relation holds for the currency and reserve ratios.

that respect, may be less representative of the over-all relative contributions of the determinants than the other measures are.

From the results in Table A-3, the currency ratio appears even more important than previously indicated. Its contributions are responsible for almost nine-tenths of all nonwar cycles in the rate of change of the money stock and for over 100 per cent of the pre-1913 cycles and of the mild cycles. The over 100 per cent contribution implies that the contribution of at least one of the other determinants (and the combined contribution of the other two) is a negative one—in all cases the reserve ratio. High-powered money has a lower relative contribution than in Table A-1 but not a negative one. The major over-all difference in results of the second alternative measure is the enhanced importance of the currency ratio gained primarily at the expense of the reserve ratio.

The measure of Table A-3 can be interpreted as showing the average percentage reduction in amplitude of cycles in the money series if one of the determinants had remained constant and the others had behaved as they actually did. The negative figures mean that, had the reserve ratio been constant, the amplitude of the money-series pattern would have been increased, and the figures over 100 per cent (plus) mean that, had the currency ratio been constant, the pattern would have been inverted. (These percentage reductions are to be distinguished from the numerical amount of reduction in amplitude, discussed in Chapter 2.) While formally correct, however, such an interpretation of Table A-3 is misleading. The results do not mean that, had the currency ratio been constant, the over-all amplitude of nonwar cycles in the money series would have been reduced by nine-tenths, or that the pre-1913 cycles would have been negligible. The measure, as noted, can be abnormally affected by a few extreme values as, in fact, it was. The trend-adjusted value for the money series was typically small in stage III, and the value for the contribution of the currency ratio was high, so the figure for this determinant occasionally had extreme values in that stage. Consequently, the high average relative contribution of this determinant would be reduced if stage III were omitted. What the results mean, therefore, is that (1) while the average amplitude of the money series would be reduced greatly without the contribution of the currency ratio, much of the reduction would occur in stage III; and (2) the numerical amount of the reduction, though large *relative* to the level of the money series in that stage, would be fairly small relative to the level in other stages.

## APPENDIX B

### *Some Evidence on Fisher's Explanation of the Gibson Paradox*

ONE TEST of Fisher's explanation (Chapter 6) is to compare yields on bonds and common stocks during periods of rising or falling commodity prices. If Fisher is right, the Gibson Paradox reflects an adjustment of bond yields to allow for the expected rate of change in prices, while stock yields—which need no such adjustment—will be uncorrelated with price movements, except perhaps in short-run business cycles. Since Fisher's explanation allows for

TABLE B-1  
BOND AND STOCK YIELDS AND THEIR DIFFERENTIALS:  
AVERAGE REFERENCE CYCLE STANDINGS, 1873-1913  
(per cent per year)

Period Between Reference Cycle Bases, Centered at Peaks	Bonds <sup>a</sup>	Common Stock <sup>b</sup> Dividends			Excess <sup>c</sup> over Bond Yields of Stock Dividends		
		Indus- trials	Utili- ties	Rail- roads	Indus- trials	Utili- ties	Rail- roads
PERIOD OF DEFLATION							
Oct. '73 - Mar. '82	5.0	5.2	5.1	5.5	0.1	0.1	0.5
Mar. '82 - Mar. '87	4.0	5.7	6.9	5.0	1.7	2.9	1.0
Mar. '87 - July '90	3.7	4.7	5.5	3.7	1.0	1.8	0.1
July '90 - Jan. '93	3.8	5.1	5.1	3.7	1.4	1.3	0.0
Jan. '93 - Dec. '95	3.6	5.7	5.6	4.1	2.1	2.0	0.4
PERIOD OF INFLATION							
Dec. '95 - June '99	3.3	4.8	4.1	3.4	1.4	0.7	0.1
June '99 - Sept. '02	3.2	4.3	3.9	3.2	1.1	0.7	0.0
Sept. '02 - May '07	3.5	4.5	4.5	3.6	1.0	1.0	0.1
May '07 - Jan. '10	3.7	4.8	4.8	4.9	1.1	1.1	1.2
Jan. '10 - Jan. '13	3.8	5.0	5.1	4.7	1.2	1.2	0.8

<sup>a</sup> Average of monthly money yields, beginning and terminal peaks weighted one-half, Macaulay's series adjusted for drift (Frederick R. Macaulay, Some Theoretical Problems Suggested by the Movements of Interest Rates, Bond Yields and Stock Prices in the United States Since 1856, New York, NBER, 1938, Table 10, col. 5).

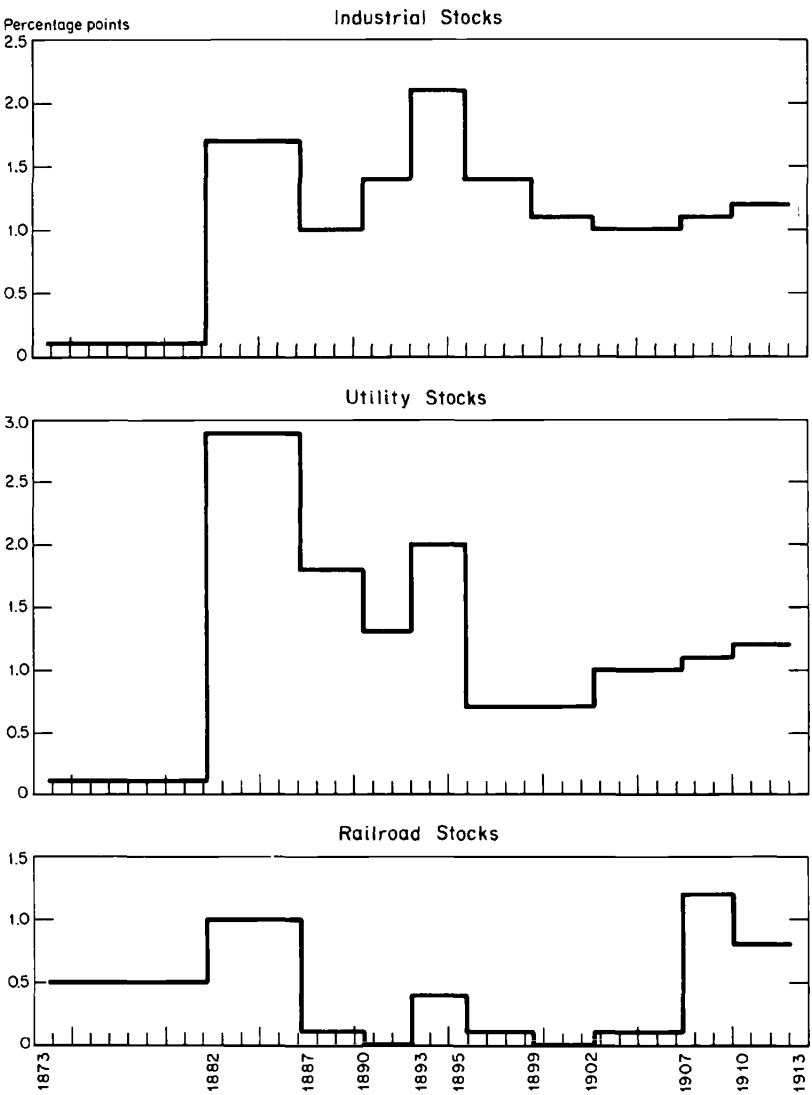
<sup>b</sup> Average of prevailing dividend rates for each month divided by prices, beginning and terminal peaks weighted one-half (A. Cowles and Associates, Common-Stock Indexes 1871-1937, Bloomington, 1938, Series Y-2, Y-3, and Y-4).

<sup>c</sup> Numerical difference may not exactly equal difference between yields shown because of rounding.



CHART 25

*Yield Differentials of Stocks over Bonds: Average Reference Cycle Standings, 1873-1913*



Source: Table B-1.

long-run changes common to yields on all assets, it pertains to the differential between stock and bond yields, not to their absolute levels.

Long periods of more or less continual inflation or deflation are necessary to reveal clearly whether yield differentials support or conflict with Fisher's explanation. One period satisfying this requirement in recent U.S. history is the downward and subsequent upward sweep of commodity prices from 1873 to World War I, though most of the rise ended by 1910. Since then, price trends have been either horizontal or too volatile for simple classification. The relevant figures for the pre-1913 period, presented in Table B-1, were averaged for each reference cycle to avoid so far as possible the influence of short-run fluctuations. The differentials are plotted in Chart 25. For bonds, Macaulay's yields on railroad debentures were used and, for common stocks, Cowles' dividend-price ratios for industrials,<sup>1</sup> utilities, and railroads. Conceptually, earnings-price ratios might be more appropriate, but dividend data, less volatile and more reliable than earnings data, seemed preferable for comparison with bond yields. The behavior of earnings-price ratios for that period, apart from their greater volatility, was about the same as that of dividend-price ratios.

For these data, the magnitude of the movement in bond yields appears consistent with Fisher's explanation. Wholesale prices fell at an average rate of 2.4 per cent per year from 1873 to 1895, and rose 2.5 per cent per year from 1895 to 1910 (computed between reference cycle bases centered at the reference peaks). Bond yields fell and rose during those respective periods somewhat less: a fall of 1.4 percentage points in the first period (or 1.7 points allowing for the lagged upturn) and a rise of 0.1 point in the second period (or 1.0 point from their trough in 1899–1902 to a prewar high for the 1913–18 reference cycle, not shown in the table). Bond yields in money terms, therefore, seem to have accounted gradually and slowly for roughly half the average rate of initial appreciation and subsequent depreciation of money; and, the longer the movement of commodity prices in one direction, the larger was the adjustment. Furthermore, the timing of the upturn in bond yields, which came in the 1899–1902 cycle and lagged behind the upturn in prices in 1896, is consistent with Fisher's explanation; but it is incompatible with a theory which relates movements in both series to exogenous changes in aggregate demand.<sup>1</sup>

<sup>1</sup> David Meiselman (see "Bond Yields and the Price Level: The Gibson Paradox Regained," in *Banking and Monetary Studies*, D. Carson, ed., Irwin, 1963) has regressed interest rates on lagged changes in prices in a test similar to Fisher's but covering a longer period. Meiselman finds some support for the theory but concludes that the evidence is inconclusive.

A suggested explanation (not opposed to Fisher's theory) why bond yields do not adjust fully to the rate of change in prices is that real money balances and saving are affected. Inflation, for example, allegedly reduces the amount of real money balances demanded and thereby reduces total real wealth. Hence, real saving, which depends on real wealth, increases, reducing the real rate of interest and the amount of increase in the money rate required to adjust it to the inflation (see Robert Mundell, "Inflation

The differentials of stock over bond yields present a mixed picture. By Fisher's explanation the differentials should widen or be higher during deflation and narrow or be lower during inflation.

1. **INDUSTRIALS.** The differential displays such a pattern; it rose considerably during the pre-1895 period of deflation and fell moderately during the post-1895 period of inflation. The magnitudes of the movements were less than the respective average rates of price change, which would be true of lagged adjustments.

2. **UTILITIES.** The differential cannot be said to display the same pattern. Possibly it might, if the high yields in the 1882-87 reference cycle could be dismissed as unduly high for other reasons, though the rising trend of the differential after 1895 is still troublesome. Apart from the low yield in the 1873-82 reference cycle, which might be unduly low, the differential was apparently higher on the average before 1895 than after, which is consistent with Fisher's explanation without an adjustment lag. But by that interpretation the differentials for utilities and industrials were not consistent with each other. The pattern for utilities, therefore, is a puzzle, but it is even more of a puzzle if interpreted according to the Wicksell-Keynes explanation.

3. **RAILROADS.** The differential cannot be reconciled with Fisher's explanation. It fell in the pre-1895 period and rose thereafter. Railroad stock yields, therefore, fell more than bond yields did during deflation and rose more than bond yields did during inflation; this is consistent with the Wicksell-Keynes explanation, as a constant differential would be also.

Why the railroad differential displays a different pattern from the others is perplexing, and I have discovered no satisfactory explanation. One important difference between railroad and industrial stocks even accentuates the disagreement. Railroads have large amounts of bonds outstanding, the real burden of which varies inversely with the price level, so that railroad net income in money as well as real terms is affected by price movements. Industrials as a group may also be net monetary debtors and so be affected in the same way, but certainly less. The effect of changes in the real burden of bonds on net income reflects a change in the average return on a firm's previously invested equity, rather than reflecting the estimated return on new additions to equity—relevant here. Insofar as a change in prices is expected, stock market yields are adjusted to allow for the expected gains or losses resulting from a firm's indebtedness already incurred. For this reason, railroad stock yields should rise, relative to industrial stock yields, during deflation and fall during inflation, just the opposite to their actual behavior shown in

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and Real Interest," *Journal of Political Economy*, June 1963, pp. 280-283). A more plausible argument to me along these lines would be that inflation induces people to shift from money and other assets with fixed nominal values to common stocks and real assets, raising the price and lowering the yield on the latter assets for a prolonged period until suppliers of assets adjust to the change in demand. Contrary to either argument, however, such changes in real money balances seem normally too small to have much effect on the real rate of interest.

Chart 25. Utilities, like railroads, also have large amounts of bonds outstanding, and the yield on their stock did change in the inflation and deflation in the expected manner. This might explain some of our difficulty in reconciling the pattern of utilities stock differentials over bond yields with the pattern shown by industrials.

These observations take no account of changes over time in premiums for risk. Risk premiums on widely traded assets probably have declined as the economy has matured, but whether more so on bonds than on stocks, or the reverse, is not known. In any event, a constant secular decline in risk premiums would affect yields before and after 1895 in the same direction and should not disturb the foregoing comparisons of the two periods before and after that year. Conceivably, one might explain these results by pointing to the 1890's as a period of extreme economic instability, which might have raised yields on industrial and utility stocks, but not yields on railroad stocks, higher in that decade than they would have been. But that is conjecture.

In summary, Fisher's explanation is neither firmly supported nor rejected outright by these data.<sup>2</sup> One may nevertheless conclude that the Gibson Paradox shows up much less clearly—if at all—in stock than in bond yields, and not solely because stock yields are more volatile. This is some slight confirmation that Fisher's explanation accounts for at least part of the paradox. Yet even this weak conclusion must be hedged. Table B-1 covers only two movements, one down and one up, which essentially give two observations in the allegedly long history of the Gibson Paradox. The subject clearly requires a good deal more careful investigation than it has so far received.<sup>3</sup>

<sup>2</sup> As Rendigs Fels also concluded from such evidence (see his *American Business Cycles, 1865-1897*, Chapel Hill, 1959, pp. 71-72).

<sup>3</sup> Three other explanations of the Gibson Paradox may be mentioned.

1. R. G. Hawtrey (*Good and Bad Trade*, London, 1913) denies that investors (and savers?) have any long-run expectations of price movements and so rules out an explanation of Fisher's kind. Hawtrey argues instead that price movements cause rates of return and profits to move in the same direction, because of a lag in wages. For this reason money, prices, and interest allegedly move together.

2. F. R. Macaulay (*Some Theoretical Problems Suggested by the Movements of Interest Rates, Bond Yields and Stock Prices in the United States since 1856*, New York, NBER, 1938, Chap. VI) was vehemently critical and highly skeptical of Fisher's empirical results. Macaulay's explanation of the paradox was that rising prices induce increases in investment expenditures and thereby cause interest rates to rise; and, conversely, for falling prices.

3. J. R. Hicks (*A Contribution to the Theory of the Trade Cycle*, Oxford, 1950, p. 154n) attributes the paradox to a tendency of the monetary growth rate to fluctuate more when its secular trend is higher, because banks take more risks; with greater monetary fluctuation, short-term interest rates rise more sharply in booms, which allegedly keeps long rates at a higher average level. And, conversely, for low secular trends in monetary growth.

I doubt the adequacy of all three of these explanations for long-run movements.

## APPENDIX C

### *Four Theories of How Price Changes May Affect Output in the Long Run*

SOME STUDIES have pointed to a tentative relation between long-run swings in prices and output (Chapter 6, p. 260). If such a relation does exist, it apparently runs primarily from prices to output, not the other way. The evidence is inconsistent with the second part of a connection from output to prices to money (Chapter 6), and there is no evidence of an important effect of output on money. (For short-run cyclical movements, of course, there probably are such effects.) Economists have long found it plausible that the rate of change in prices might affect the rate of change in output in the long run. Of the explanations offered, four can be distinguished and are discussed here.

1. If price movements are largely unforeseen, or at least unprepared for, business firms are said to gain from inflation, which stimulates them to expand, and to lose from deflation, which induces or forces them to curtail investment and (the rate of increase in) output. Unforeseen price rises would confer gains on business firms, and unforeseen price declines impose losses, if firms are generally net monetary debtors (that is, liabilities fixed in money terms exceed assets fixed in money terms), or if wage contracts are fixed in money terms for a fairly long time. Yet, the question remains whether such windfall profits would stimulate purchase of additional capital goods, since by hypothesis the expected rate of return on new investment need not have changed. If they did stimulate capital investment, the reasons might be that inflation redistributed income in favor of businessmen, who supposedly tend to save more than others, and that the resulting addition to the supply of loanable funds reduced rates on new borrowing. Even granting that much, there remain the two assumptions underlying the cause-and-effect relation of rising prices to gains for business: most business firms are net debtors; and wages lag behind prices. The validity of these assumptions is doubtful for recent decades and unknown for earlier periods.<sup>1</sup> Despite its long standing, therefore, this explanation is by no means established.

<sup>1</sup> See R. Kessel and A. Alchian, "The Inflation-Induced Lag of Wages," *American Economic Review*, Mar. 1960, pp. 43-66; A. Rees, *Real Wages in Manufacturing 1890-1914*, Princeton University Press for NBER, 1961, especially pp. 10-11, 13, and 125-126. A wage lag is alleged for the 1897-1913 inflation by F. Lavington (*The English Capital Market*, London, 1921, Chap. IX).

Actually, if recognized at the time, a lag in wages ought to increase the use of labor

2. A different kind of lag is reflected in the discrepancy Irving Fisher noted between the market rate of interest and the real rate, that is, adjusted for future price changes. His argument is presented in Chapter 6 as a possible explanation of the Gibson Paradox. If such a discrepancy were to affect the level of investment and so the growth of output in a way that would explain an association between output and prices, however, that would require lenders and borrowers systematically to disagree on expected price movements. Indeed, borrowers would always have to foresee future price trends more accurately than lenders would, which is difficult to rationalize. To the extent that a discrepancy between money rates and real rates of interest explains the Gibson Paradox, both lenders and borrowers would have to be slow in perceiving new price trends; but then the discrepancy cannot explain a long-run association between prices and output.

3. An association between prices and output in the long run might be created by variations in the severity of cyclical contractions. Contractions might tend to be more severe in a long-run period of falling prices than in one of constant or rising prices, even though business firms were generally not net debtors and wages did not lag behind prices. In cyclical expansions, a downward price trend will be temporarily counteracted, and prices might rise slightly or be constant, avoiding the downward pressure on inflexible wage levels and other costs. In cyclical contractions, a downward price trend will accentuate the cutback in production and employment. Successive cyclical contractions have a cumulative effect on the long-run growth of output, provided the amplitudes of contractions and expansions are not positively related (although some evidence suggests they are). A deflationary period of unusually severe contractions would then retard long-run growth compared with an inflationary period of mild contractions. This theory claims only that falling prices retard growth, not that rising prices stimulate growth.

4. A fourth explanation—more appealing to me than the others because it does not rest on lags or inflexibilities—is that changes in the rate of growth of the money stock affect the supply of loanable funds and so induce increases in investment, in periods of rising prices, and reductions, in periods of falling prices. Such an effect seems to imply that interest rates move inversely to changes in monetary growth. Because actual behavior has shown the reverse relation—the Gibson Paradox again—this explanation has often been dismissed. If we accept Fisher's hypothesis to account for the paradox, however, and formulate the argument in terms of real interest rates, it is possible that real rates do move in a direction consistent with this explanation. To be sure, our examination of stock yields in Appendix B does not clearly reveal such behavior

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and not of capital goods. The wage lag might temporarily make employment "fuller" than it would otherwise be, but it hardly seems able to account for variations in the secular growth of output. Of course, if the lag is recognized at the time, even if only by employers, bidding for labor would remove the lag. Such a lag, therefore, presupposes that price movements are unforeseen.

(no clear-cut response of stock yields either up or down to deflation and inflation could be established). But this might mean only that real interest rates are not very sensitive to changes in the supply of loanable funds, possibly because the investment curve is fairly elastic in the long run to interest rate changes or is highly dependent on prevailing expectations of the future state of business.

Historical variations in the growth of the money stock were sufficient to have had sizable effects on the supply of loanable funds, assuming that nearly all new money enters into circulation through bank loans. Table 28 shows that the growth rate of the money stock varied between reference cycle bases often by 2 percentage points or more. Taking into account the probable ratio of the money stock to the supply of loanable funds, we may expect such changes in monetary growth to have increased or decreased the amount of loanable funds supplied by as much as 10 per cent or more. All increases in those funds could not have been hoarded or all decreases offset by dishoarding, for, if they had been, money and prices would not have been highly correlated. Apparently most of the funds supplied were spent, therefore, on whatever they were borrowed to procure, presumably consumers' and producers' investment goods. Whether an increase in investment of about 10 per cent would stimulate the growth of output very much would depend upon the importance of increases in capital equipment relative to autonomous technological improvements.<sup>2</sup>

These are the standard rationalizations of a long-run association between prices and output. Though none of the four can be ruled out, none seems compelling either, which is one reason for doubts about the firmness of the empirical connection between the two variables. The question is of considerable importance and merits further research.

<sup>2</sup> If increased growth of the money stock removed some pockets of persistent unemployment, this too would add to aggregate output. That effect on the long-run rate of growth of output, however, is limited and would be negligible, notwithstanding the exaggerated emphasis accorded the effect in recent discussions of growth.

## APPENDIX D

### *Mathematical Analysis of a Purely Monetary Cycle*

THE RELATIONS outlined in Chapter 6 (pp. 276–277) can be expressed as follows:

$$\begin{aligned} (1) \quad & Y_{t+\theta} = \phi(\dot{M}_t) \\ (2) \quad & \dot{M}_{t+\eta} = \Omega(\dot{Y}_t), \end{aligned}$$

where  $Y_t$  is an index of economic activity and  $M_t$ , of the money stock, both measured at time  $t$  as deviations from their respective secular trends. Overhead dots signify the rate of change in the variable.

Equation 1 expresses the lagged dependence of activity on the rate of growth of the money stock, where  $\theta$  is the length of the lag. The first derivative of  $\phi$  is positive, and also assumed to be more or less constant (i.e.,  $\phi$  is linear) over the relevant range. The evidence does not clearly indicate whether the rate of change or the level of the money stock should be related to the level of economic activity. Consequently, the results of using the level of the money stock (adjusted for trend) as the argument of equation 1 will be examined later in this appendix.

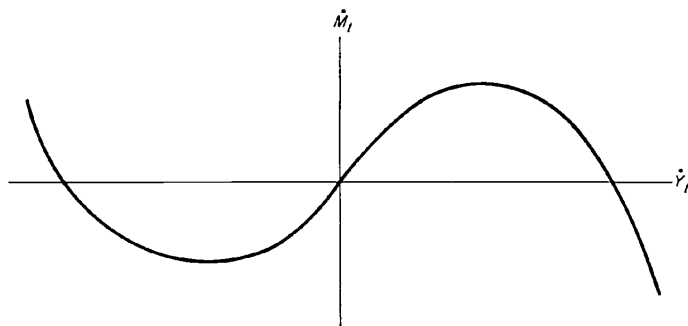
Equation 2 describes the effect of economic activity on the rate of change in the money stock. The lag time  $\eta$  is assumed to be short and will be omitted hereafter. The argument of  $\Omega$  is shown in 2 as the rate of change in economic activity, which seems plausible. Hence, by integration, the stock of money is a function of the level of economic activity. (Note that a similar model results from making  $Y_{t+\theta}$  depend on  $M_t$ , and  $\dot{M}_t$  depend on  $Y_t$ .)

The analysis of the behavior of  $\dot{M}$  (Chapter 2, summarized in Chart 2) suggests that equation 2 has the general form shown in Figure 1. The evidence suggests that the function passes through the origin and has two turning points, one in the first and one in the third quadrant. (Remember that the variables are measured as deviations from their respective secular trends.) Otherwise, the exact shape of the function cannot be specified and, in particular, whether it is approximately symmetrical or not. For present purposes, however, such details do not seem necessary.

It should be emphasized that Figure 1 is based solely on the average behavior of  $\dot{M}$  over business cycles. Besides ignoring differences among individual cycles, the diagram translates an empirical covariation into a fixed relation. The evidence of this study pertains only to the observed values of the variables



FIGURE 1  
The  $\Omega$  Function



over the cycle, during which they appear to be associated in the manner shown. We cannot be certain that the value of  $\dot{M}$  corresponding to a given  $\dot{Y}$  on the diagram does not in fact change over time even though  $\dot{Y}$  were to remain unchanged. (The behavior of the reserve ratio, in particular, is subject to this qualification.) What this qualification amounts to is the possibility that  $\ddot{M}$  or higher-order derivatives rather than  $\dot{M}$  are stable functions of (the rate of change in) economic activity. This possibility is ignored in what follows.

Combining (1) and (2) to eliminate  $\dot{M}$  gives

$$(3) \quad Y_{t+\theta} = \phi(\Omega[\dot{Y}_t]).$$

We may approximate the left-hand side at time  $t$  with the first two terms of a Taylor expansion, which gives

$$(4) \quad Y_t + \theta \dot{Y}_t = \phi(\Omega[\dot{Y}_t]).$$

$$(5) \text{ Letting } \psi(\dot{Y}_t) = \phi(\Omega[\dot{Y}_t]) - \theta \dot{Y}_t,$$

$$(6) \text{ we have } Y_t = \psi(\dot{Y}_t).$$

The shape of  $\psi$  can be surmised from Figure 1. If  $\phi$  is roughly linear in the relevant range,  $\psi$  will have the shape of  $\Omega$  in Figure 1 with the curve pulled progressively downwards to the right of the origin and progressively upwards to the left by the second term on the right in equation 5, and pulled in the same or the opposite direction, respectively, as the first derivative of  $\phi$  is less or greater than unity. Hence the phase map of equation 6, which is a first-order nonlinear differential equation, may be sketched as in Figure 2.<sup>1</sup>

There is one equilibrium point, at the origin, but it is unstable, so that from there the movement proceeds to either  $A$  or  $C$ . Both  $A$  and  $C$  are unstable

<sup>1</sup> Equation 6 is similar mathematically (not in derivation) to one presented by R. M. Goodwin in his paper on nonlinear investment accelerators, and I have followed his analysis. See "The Nonlinear Accelerator and the Persistence of Business Cycles," *Econometrica*, Jan. 1951, equation 5a (with  $\alpha = 0$ ) and Figure 5.

positions, and there is a discontinuous jump in  $\dot{Y}$  to  $B$  from  $A$  and to  $D$  from  $C$ . A solution of equation 6, therefore, is a cyclical movement following the closed loop  $ABCD$ . The discontinuous jump in  $\dot{Y}$  at  $A$  and  $C$  is partly a consequence of neglecting higher-order terms of the Taylor expansion of  $Y_{t+\theta}$  in equation 4. Equation 3 would presumably have a similar solution but with less abrupt turning points.

As noted earlier, it might be more appropriate to use  $M$  (adjusted for trend) as the argument of equation 1. If so, equation 3 becomes, if we write equation 2 as  $M_t = \pi(Y_t)$ ,

$$(3a) \quad Y_{t+\theta} = \phi(\pi[Y_t]) .$$

The cycle produced by equation 3a is somewhat different, and considerably easier to analyze. Whether  $Y$  moves continually in one direction or oscillates depends on whether

$$(7) \quad \frac{dY_{t+\theta}}{dY_t} = \phi' \pi' ,$$

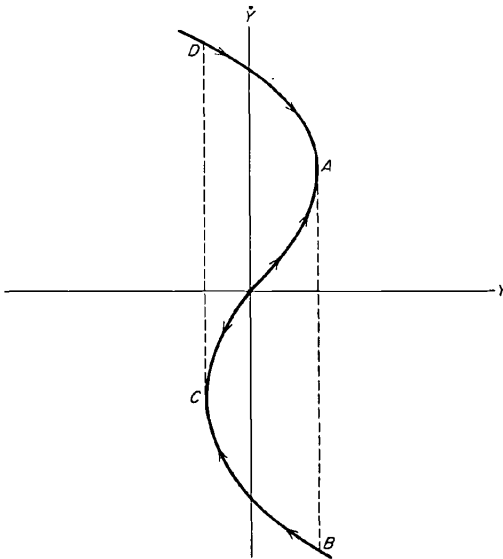
is positive or negative, respectively; and whether the movement is explosive or damped depends on whether

$$(8) \quad \frac{d^2 Y_{t+\theta}}{dY_t^2} = \phi' \pi'' + \phi'' \pi'$$

is positive or negative, respectively. (The primes indicate derivatives.)

FIGURE 2

Phase Map of  $\psi$



Suppose  $\phi'$  and  $\pi'$  were always positive and, because of barriers that tighten gradually,  $\phi''$  is negative. If  $\pi''$  is negative or, if positive, constant, so that the first term is gradually reduced by the decline in  $\phi'$ , equation 8 will either be always negative or eventually become negative, implying a damped, one-way movement. Equation 7, however, though at times positive, becomes negative at certain times because  $\pi'$  gradually turns negative after  $Y$  increases or decreases a certain amount, then becomes positive again sometime after  $Y$  turns back from either its peak or trough level.

Peaks and troughs in  $Y$  will be rounded rather than cusps (explosive) if the positive value of the second term of equation 8 (produced by negative values of  $\pi'$  and  $\phi''$ ) is outweighed, as seems plausible, by the negative value of the first term (produced by a negative value of  $\pi''$  occurring sometime before the change in sign of  $\pi'$  from plus to minus).

A cusp would occur if the negative value of  $\phi''$  became sufficiently large. In that event the extreme levels of  $Y$  would be determined (as in the multiplier-accelerator model cited of Goodwin, for example) by physical—not monetary—barriers to further increases or decreases in output. Output would then remain at this barrier level, however, until  $\pi'$  declined. There is no reason for  $\dot{M}$  to decline simply because  $Y$  hits a barrier. This model therefore differs from the multiplier-accelerator type in having no accelerator—that is, no relation involving the rate of change of output—whereas the first model presented above has.

It is possible to obtain a self-generating cycle from the purely monetary relations posited by equations 1 and 2 in either form. These models bear a mathematical resemblance to those describing interactions between the multiplier and accelerator. The foregoing paragraphs should be viewed only as illustrative of the statements made in Chapter 6. They hardly constitute a complete theory of cycles. Some of the as yet unknown characteristics of the functions may alter the results in important ways. In addition, the model, as presented, does not allow for changes in the demand to hold money balances, which a complete theory needs to specify.

## APPENDIX E

### *Interest Payments and Service Charges on Bank Deposits*

THIS APPENDIX brings together scattered data on deposit rates and charges from which are inferred the major secular movements in the net rate of return on deposits.

The available data on member and insured banks are presented in Table E-1. Service charges were first reported separately in 1933. It is not known when charges were first imposed, but they were not common before the 1930's. The Banking Act of 1933 prohibited interest on demand accounts at member banks, and the Banking Act of 1935 extended the prohibition to insured banks. In interpreting these data, one should bear in mind that (except interbank deposits, which are excluded from these figures) interest was paid mainly on U.S. Treasury deposits (included here until mid-1933) and other large accounts, and that charges have been levied only on small checking accounts. Table E-1 gives an average rate on deposits, on many of which no interest was paid or charges levied. The rates applicable to deposits on which interest was paid or charges levied, therefore, were higher (in absolute amount) than the average rates shown. Interest is paid on virtually all time deposits, though the rates vary. Interest payments were not reported separately for demand and time deposits before 1927.

The rates paid by mutual savings banks are presented in Table E-2. These rates and those on time deposits and savings and loan shares are graphed in Chart 18. The post-World War I data all agree in showing little change during the 1920's and a sharp decline after 1929. Thereafter, rates paid on time and savings deposits reached a trough in 1946-47 and then rose. Charges on demand deposits were roughly constant during the 1930's and 1940's and then doubled during the 1950's.

For the years before 1919, the data are much less satisfactory, consisting of only some indirect evidence on the average rate paid on total deposits at commercial banks. One relevant series is the annual rate of return received on loans and investments by national banks. That rate fell gradually from 6.5 per cent in 1890, the year such data were first reported, to 4.8 per cent in 1905 and rose to 6.2 per cent by 1913.<sup>1</sup> Such movements are consistent with the well-documented fall in long-term interest rates in the economy at large

<sup>1</sup> See "Trends in Rates of Bank Earnings and Expenses," *Federal Reserve Bulletin*, Feb. 1938, especially p. 103.

TABLE E-1

AVERAGE RATE OF INTEREST OR CHARGE ON DEMAND AND TIME  
DEPOSITS, ANNUALLY, 1927-60  
(per cent per annum)

Year	Average Rate on Demand Deposits of:		Average Rate of Interest on Time Deposits
	Interest	Charge	
1927	1.25		3.34
1928	1.28		3.36
1929	1.32		3.34
1930	1.23		3.31
1931	0.84		2.99
1932	0.69	b	2.80
1933	0.32	0.16	2.55
1934	a	.18	2.41
1935		.19	2.01
1936		.18	1.72
1937		.20	1.62
1938		.23	1.55
1939		.24	1.43
1940		.22	1.30
1941		.21	1.20
1942		.19	1.11
1943		.17	0.93
1944		.17	0.88
1945		.15	0.86
1946		.15	0.84
1947		.17	0.87
1948		.20	0.90
1949		.22	0.91
1950		.23	0.94
1951		.24	1.04
1952		.24	1.15
1953		.26	1.24
1954		.29	1.32
1955		.30	1.38
1956		.33	1.58
1957		.38	2.08
1958		.41	2.11
1959		.43	2.36
1960		.47	2.56

Source: Annual Report, Federal Deposit Insurance Corporation (FDIC), and Banking and Monetary Statistics, Board of Governors of the Federal Reserve System, 1943, pp. 262-263. See also Cagan, The Demand for Currency Relative to Total Money Supply, New York, NBER, Occasional Paper 62, 1958, Appendix.

Demand deposits: Amounts paid and charged both divided by the same Dec.-June-Dec. weighted average of demand deposits to which the data on payments pertain (see The Demand for Currency). Data are for member banks, 1927-41, and insured banks, thereafter. No deductions were made for losses. The small federal tax levied on checks from June 21, 1932, to Jan. 1, 1935, has been ignored.

## NOTES TO TABLE E-1 (concluded)

Time deposits: Amounts paid divided by a Dec.-June-Dec. weighted average of total time deposits at member banks, 1927-33, and at insured banks, thereafter. No deductions were made for losses.

<sup>a</sup>No interest was paid on demand deposits at member banks after 1933.

<sup>b</sup>Not reported separately before 1933.

TABLE E-2

AVERAGE RATE OF INTEREST PAID BY MUTUAL SAVINGS BANKS,  
ANNUALLY, 1920-34 AND 1945-60  
(per cent per annum)

1920	4.1	1945	1.6
1921	4.1	1946	1.6
1922	4.1	1947	1.6
1923	4.2	1948	1.7
1924	4.2	1949	1.8
1925	4.2	1950	1.9
1926	4.3	1951	2.0
1927	4.3	1952	2.3
1928	4.2	1953	2.4
1929	4.2	1954	2.5
1930	4.6	1955	2.6
1931	4.2	1956	2.8
1932	4.2	1957	2.9
1933	3.8	1958	3.1
1934	3.5	1959	3.2
		1960	3.4

Source: 1920-34: A weighted average of interest rates reported for each state, begun in 1920 and discontinued after 1934, in *Annual Report* of the Comptroller of the Currency. Earlier rates, which are comparable but not as accurate, are given in Cagan, *The Demand for Currency*, Table C.

1945-60: An average rate of interest for all mutual savings banks from The National Association of Mutual Savings Banks. (No comparable figures are available for 1935-44. Data given by the FDIC for that period are for insured banks only and are not representative.)

until the turn of the century and the rise, thereafter, until World War I. The rate paid by mutual savings banks shows the same pattern, though the magnitude of movement was smaller.<sup>2</sup> Commercial bank earnings were sufficient

<sup>2</sup> See Cagan, *The Demand for Currency Relative to Total Money Supply*, New York, NBER, Occasional Paper 62, 1958, p. 29. Fragmentary data on the rate paid by commercial banks on time and savings deposits (*ibid.*) are also consistent with this pattern though, for reasons given in footnote 5, below, these data seem unreliable.

The reserve ratio of commercial banks began a long-run decline around the turn of the century (Chapter 5), which had the small effect of raising earnings per dollar of deposits and allowing banks to pay more, but that would not have been a sufficient reason for a rise in the interest paid on deposits.

TABLE E-3

AVERAGE RATE OF INTEREST PAID ON DEPOSITS AT STATE AND  
PRIVATE BANKS IN KANSAS, 1897-1927, AND AT ALL MEMBER  
BANKS, 1919-26  
(per cent per annum)

	Kansas Banks		Kansas Banks	Member Banks
1897	1.15 <sup>a</sup>	1913	1.29	
1898	0.93	1914	1.49	
1899	0.77	1915	1.44	
1900	0.71	1916	1.45	
1901	0.56	1917	1.55	
1902	0.63	1918	1.53	
1903	0.63	1919	1.54	1.87
1904	0.71	1920	1.68	1.91
1905	0.73	1921	1.83	2.04
1906	0.76	1922	1.94	2.07
1907	0.79	1923	1.83	2.05
1908	0.90	1924	1.90	2.06
1909	0.86	1925	1.78	2.03
1910	0.94	1926	1.75	2.04
1911	1.05	1927	1.73	
1912	1.21			

Source: Biennial Report of the Bank Commissioner of the State of Kansas and Banking and Monetary Statistics, pp. 262-263.

Note: Interest rate was computed by dividing interest paid on total deposits by a weighted average of total deposits (including interbank deposits) on call dates.

<sup>a</sup>Not available before 1897.

on the average, therefore, to allow an increase in the rates paid on deposits after 1905. The number of commercial banks increased rapidly in the decades before and after the turn of the century and, from all indications, competition for deposits intensified.

Confirmation is provided by data on state and private commercial banks in Kansas, the only state that collected data on bank earnings and expenses well before World War I (Table E-3). From 1897, when the reports started, to 1902, the annual rate paid on all deposits fell. From 1902 to 1903, it stayed the same and then began to rise, adding two-thirds of a percentage point by 1913 and just over a full point by 1920. For comparison, an average rate paid on all deposits at member banks, which can be computed back to 1919, is also shown.

The only comparable figure for earlier years is a lone statement of the Comptroller of the Currency on the amount of interest paid by national banks in 1870 which, divided by the total deposits of those banks, gives an average rate of 1 per cent.<sup>3</sup> That is below the rate paid by member banks in the 1920's and about equal to that paid by Kansas nonnational banks around 1897-98.

These pre-1919 data portray an uncertain picture. The Kansas data are

<sup>3</sup> *Annual Report*, 1870, p. xii; see also Cagan, *The Demand for Currency*, p. 24n.

not necessarily representative of all commercial banks, though they do agree fairly well in direction of change with rates paid by all member banks during the 1920's. Even if the average rate on all deposits did behave as previously described, however, there is no certainty that rates on demand deposits behaved the same way; the rates on time deposits may have produced most of the change in the total. The latter comprised only 12 per cent of total deposits at commercial banks in 1900 but grew in relative importance thereafter, reaching 30 per cent by 1915.<sup>4</sup> This means that the averages shown progressively understate the rate on time deposits. It is plausible but not certain that the two rates usually moved more or less together, as they did from 1927 to 1933, though they differed later partly because interest payments on demand deposits were prohibited. The evidence is admittedly hazy, therefore, and needs to be supplemented by more exact data on when and by how much the demand deposit rate rose.<sup>5</sup> Perhaps a more intensive search of early sources would turn up more than has so far been found. In the meantime the evidence suggests that the rate paid on time deposits (and perhaps also on large demand accounts) was constant or falling from 1890, or earlier, to around the turn of the century; and that it then rose appreciably until World War I and more slowly thereafter until 1929.

<sup>4</sup> See Chapter 5, sect. 1, subsect. Shifts Between Time and Demand Deposits.

<sup>5</sup> I have intentionally ignored one other piece of evidence: a rate of 2.35 per cent on demand deposits reported by the Comptroller of the Currency for national banks in 1910 (see *Annual Report*, 1910, p. 57). That figure is much higher than the data show for the 1920's and for 1870. (Although the 1870 rate of 1 per cent was an average for total deposits, we may assume that the demand rate was lower and the time rate, higher.) A rate of 2.35 per cent seems much too high compared with all the other data. This figure has puzzled me for a long time and I have finally concluded that it is unrepresentative and should be ignored. It seems to be an unweighted average of rates paid by reporting banks, and it very likely excludes banks or deposits that paid nothing—possibly a not inconsequential part of the total. In the Comptroller's survey (*Annual Report*, 1870), for example, one-third of the banks paid no interest. The 2.35 rate is probably typical, however, of the rate then paid on interbank deposits and large accounts.



# APPENDIX F

TABLE F-1

CONTRIBUTIONS OF THE THREE DETERMINANTS TO MATCHED SPECIFIC CYCLES  
IN THE RATE OF CHANGE IN THE MONEY STOCK, 1877-1953  
(per cent per year)

Matched Reference Cycles (trough to trough)	Specific Cycle Stage			AVERAGE RATE OF CHANGE IN MONEY STOCK			
	Number	Dates (end of month)	Total	Contributed by:			
				High- Powered Money	Currency Ratio	Reserve Ratio	
Mar. 1879-	I	Feb. 1877 - Aug. 1877	-7.5	0.6	-6.5	-1.5	
May 1885	III	Aug. 1877 - Aug. 1888	7.8	8.3	0.0	-0.6	
(1)	V	Aug. 1880 - Feb. 1881	20.2	6.7	2.8	10.2	
	VII	Feb. 1881 - June 1883	9.4	7.0	1.0	1.3	
	IX	June 1883 - June 1884	-1.7	0.4	0.0	-2.2	
May 1885-	I	June 1884 - June 1885	2.6	3.6	5.5	-6.2	
Apr. 1888	III	June 1885 - June 1886	8.3	-3.2	6.0	5.3	
(2)	V	June 1886 - June 1887	6.2	5.1	0.5	0.4	
	VII	June 1887 - June 1888	2.5	4.0	-0.5	-0.8	
	IX	June 1888 - June 1889	5.3	0.7	2.8	1.7	
Apr. 1888-	I	June 1889 - June 1890	9.8	3.5	0.9	5.3	
May 1891	III	June 1890 - June 1891	2.8	4.8	-0.5	-1.7	
(3)	V	June 1891 - June 1892	10.6	6.5	5.1	-0.9	
May 1891-	I	June 1892 - June 1893	-6.5	-1.0	-6.5	1.1	
June 1894	III	June 1893 - June 1894	0.9	3.5	5.9	-8.5	
(4)	V	June 1894 - June 1895	5.8	-4.4	2.8	7.3	
June 1894-	I	June 1895 - June 1896	-4.8	-7.2	0.5	1.9	
June 1897	III	June 1896 - June 1898	9.3	10.4	-0.4	-0.9	
(5)	V	June 1898 - June 1899	16.1	4.8	5.6	5.6	
June 1897-	I	June 1899 - June 1900	5.5	7.9	-2.7	0.4	
Dec. 1900	III	June 1900 - June 1901	14.0	5.7	5.5	2.5	
(6)	V	June 1901 - June 1903	7.5	4.3	0.6	2.5	
Dec. 1900-	I	June 1903 - June 1904	5.3	6.4	2.6	-3.7	
Aug. 1904	III	June 1904 - June 1905	11.4	2.7	3.4	5.4	
(7)	V	June 1905 - Dec. 1907	3.4	8.3	-2.7	-2.1	
Aug. 1904-	I	Nov. 1907 - Feb. 1908	-13.4	12.2	-8.7	-16.9	
June 1908	III	Jan. 1908 - Apr. 1908	1.6	0.0	19.3	-18.0	
(8)	V	Apr. 1908 - July 1908	13.0	-3.6	11.3	5.2	
June 1908-	I	July 1908 - Oct. 1908	13.4	-0.8	9.2	4.7	
Jan. 1912	III	Sept. 1908 - Dec. 1908	13.4	-0.8	3.3	10.9	
(9)	V	Nov. 1908 - Apr. 1909	9.2	-0.7	5.5	4.3	
	VII	Apr. 1909 - Oct. 1909	7.7	0.2	3.6	4.0	
	VIII	Oct. 1909 - Mar. 1910	4.8	1.0	3.8	-0.2	
	IX	Feb. 1910 - May 1910	0.4	0.8	1.5	-1.4	
Jan. 1912-	I	Apr. 1910 - Oct. 1910	4.4	3.2	-1.9	2.9	
Dec. 1914	III	Oct. 1910 - Mar. 1911	4.3	4.5	5.0	-5.1	
(10)	V	Mar. 1911 - Sept. 1911	6.5	0.2	2.9	3.2	
	VII	Aug. 1911 - Nov. 1911	9.9	0.8	8.5	0.5	
	VIII	Oct. 1911 - Apr. 1912	7.3	2.4	1.8	3.2	
	IX	Apr. 1912 - Nov. 1912	5.7	1.0	1.3	3.3	
	X	Nov. 1912 - May 1913	1.6	1.8	-2.4	2.0	

(continued)

TABLE F-1 (continued)

Matched Reference Cycles (trough to trough)	AVERAGE RATE OF CHANGE IN MONEY STOCK						
	Specific Cycle Stage			Contributed by:			
				Total	High- Powered Money	Currency Ratio	Reserve Ratio
	Number	Dates (end of month)					
Dec. 1914- Apr. 1919 (11)	IX }	Apr. 1913 - July 1913	-2.8	5.2	-0.7	-6.9	
	I }	June 1913 - Aug. 1914	4.3	2.9	1.7	-0.1	
	III	Aug. 1914 - Sept. 1915	8.6	6.4	4.2	-1.9	
	IV	Sept. 1915 - Nov. 1916	18.6	13.7	1.0	3.8	
	V	Oct. 1916 - Jan. 1917	23.7	24.1	-1.1	0.6	
	VI	Dec. 1916 - May 1917	15.6	23.5	-12.1	4.0	
	VII	May 1917 - Nov. 1917	6.3	19.8	-12.6	-1.1	
	VIII	Nov. 1917 - Apr. 1918	12.6	19.4	-6.2	-0.8	
	IX }	Mar. 1918 - June 1918	-1.6	5.6	-13.1	5.6	
Apr. 1919- July 1921 (12)	I }	May 1918 - July 1918	17.7	13.6	-17.1	21.4	
	II	July 1918 - Sept. 1918	31.0	44.0	-12.5	0.0	
	III	Sept. 1918 - Nov. 1918	1.2	2.4	-5.0	3.6	
	V	Oct. 1918 - Jan. 1919	23.7	-13.4	20.8	16.0	
	VI	Dec. 1918 - Aug. 1919	12.7	2.4	9.7	0.4	
	VII	Aug. 1919 - Apr. 1920	15.0	12.8	-1.3	3.4	
	VIII	Apr. 1920 - Dec. 1920	-0.8	0.6	-1.8	1.6	
	IX }	Nov. 1920 - Feb. 1921	-6.0	-17.2	10.3	0.7	
	I }	Jan. 1921 - June 1921	-11.6	-15.1	2.8	0.7	
July 1921- July 1924 (13)	II	June 1921 - Oct. 1921	-3.6	-14.1	9.0	1.8	
	III	Oct. 1921 - Mar. 1922	1.9	-1.4	7.5	-3.9	
	IV	Feb. 1922 - May 1922	14.5	7.9	8.0	-1.6	
	V	Apr. 1922 - Sept. 1922	11.7	5.5	2.7	3.4	
	VI	Sept. 1922 - Jan. 1923	9.2	8.6	4.0	-3.5	
	VII	Jan. 1923 - June 1923	6.2	5.7	-5.7	6.2	
	VIII	May 1923 - Aug. 1923	-1.2	3.2	-3.1	-1.6	
	IX }						
	I }	July 1923 - Mar. 1924	3.1	2.7	1.8	-1.3	
July 1924- Nov. 1927 (14)	II	Mar. 1924 - Nov. 1924	11.1	5.0	6.8	-0.6	
	III	Nov. 1924 - July 1925	6.9	0.1	3.2	3.6	
	IV	June 1925 - Sept. 1925	10.3	5.0	6.5	-0.7	
	V	Aug. 1925 - Jan. 1926	3.8	3.1	0.6	0.1	
	VI	Jan. 1926 - June 1926	2.9	0.7	0.7	1.1	
	VII	June 1926 - Nov. 1926	-1.7	-2.7	0.0	1.1	
	VIII	Oct. 1926 - Jan. 1927	0.0	0.0	-0.7	0.9	
	IX }						
	I }	Dec. 1926 - Mar. 1927	9.5	6.7	3.5	-0.7	
Nov. 1927- Mar. 1933 (15)	II	Mar. 1927 - July 1927	3.9	-0.6	3.7	0.7	
	III	July 1927 - Oct. 1927	2.0	-3.2	4.0	0.9	
	IV	Sept. 1927 - Dec. 1927	2.8	-0.8	5.7	-1.9	
	V	Nov. 1927 - Feb. 1929	1.3	-0.1	0.6	0.7	
	VI	Feb. 1929 - June 1930	-1.6	-2.6	1.0	0.0	
	VII	June 1930 - Sept. 1931	-8.2	6.8	-10.6	-4.4	
	VIII	Aug. 1931 - Nov. 1931	-31.4	4.7	-33.1	-2.6	
	IX }						
	I }	Oct. 1931 - Apr. 1933	-18.7	4.5	-15.9	-7.5	
Mar. 1933- June 1938 (16)	II	Apr. 1933 - Sept. 1934	10.3	13.3	7.0	-10.2	
	III	Sept. 1934 - Mar. 1936	12.3	12.7	2.7	-3.2	
	IV	Feb. 1936 - May 1936	16.5	1.6	4.4	10.5	
	V	Apr. 1936 - Oct. 1936	11.1	22.8	-0.3	-11.5	
	VI	Oct. 1936 - Mar. 1937	6.9	9.4	-0.2	-2.4	
	VII	Mar. 1937 - Sept. 1937	-1.6	1.8	-2.0	-1.2	
	VIII						
	IX }						

(continued)

TABLE F-1 (concluded)

Matched Reference Cycles (trough to trough)	AVERAGE RATE OF CHANGE IN MONEY STOCK							
	Specific Cycle Stage		Total	Contributed by:				
				High- Powered Money	Currency Ratio	Reserve Ratio		
June 1938- Oct. 1949 (17)	IX } I	Aug. 1937 - Nov. 1937	-8.5	2.0	-1.8	-8.6		
	II	Oct. 1937 - Aug. 1939	5.8	17.2	0.4	-11.8		
	III	Aug. 1939 - July 1941	12.3	12.4	-1.1	1.0		
	IV	July 1941 - May 1943	17.6	11.7	-5.7	11.7		
	V	Apr. 1943 - July 1943	37.4	17.6	2.0	17.7		
	VI	June 1943 - Apr. 1945	17.4	18.1	-3.1	2.4		
	VII	Apr. 1945 - Jan. 1947	7.8	4.1	2.1	1.5		
	VIII	Jan. 1947 - Nov. 1948	0.9	3.6	1.4	-4.1		
	IX }	Oct. 1948 - Jan. 1949	-1.2	-5.2	0.8	2.9		
Oct. 1949- Aug. 1954 (18)	I	Dec. 1948 - Oct. 1949	-0.2	-11.2	1.0	10.0		
	II	Oct. 1949 - Aug. 1950	3.7	0.8	2.5	0.3		
	III	Aug. 1950 - June 1951	3.1	7.6	0.1	-4.5		
	IV	May 1951 - Aug. 1951	8.3	6.1	0.9	0.6		
	V	July 1951 - Apr. 1952	5.7	5.6	0.4	-0.4		
	VI	Apr. 1952 - Jan. 1953	4.1	3.3	-0.2	1.0		
	VII	Jan. 1953 - Oct. 1953	3.2	-0.8	0.7	3.2		
	VIII	Sept. 1953 - Dec. 1953	2.8	0.8	1.9	-0.2		
	IX							
AVERAGES								
10, 1877- 1913	I		-1.7	2.9	-2.1	-2.5		
	III		6.2	3.9	4.3	-2.1		
	V		12.0	2.2	4.4	5.2		
	VII		6.7	4.3	0.7	1.6		
	IX		-1.3	3.4	-1.5	-3.0		
6 nonwar, 1918-53	I		-6.9	-1.5	-6.5	1.0		
	II		0.0	0.2	-4.0	3.8		
	III		9.4	8.1	2.8	-1.3		
	IV		4.6	3.0	2.1	-0.6		
	V		12.7	1.1	7.7	3.8		
	VI		7.7	6.6	2.3	-1.2		
	VII		6.1	5.4	0.7	-0.1		
	VIII		-0.5	1.7	-3.2	1.1		
6 most severe, 1877-1953	IX		-7.4	-1.1	-4.4	-1.9		
	I		-5.4	3.7	-8.5	-0.5		
	III		13.2	16.2	-0.4	-2.5		
	V		14.2	0.6	7.0	6.6		
	VII		6.6	6.9	-0.4	0.0		
10 mild non- war, 1877- 1953	IX		-11.2	0.2	-6.6	-4.8		
	I		-2.6	-0.2	-0.8	-1.6		
	III		5.2	1.2	5.4	-1.4		
	V		11.0	2.5	4.8	3.6		
	VII		6.2	3.3	1.5	1.3		
IX		1.0	2.6	-0.2	-1.3			

## NOTES TO TABLE F-1

Source: Milton Friedman and Anna Jacobson Schwartz, A Monetary History of the United States, 1867-1960, Princeton for NBER, 1963, Tables A-1 and B-3, except that the data here exclude from bank reserves vault cash at mutual savings banks and do not incorporate minor later revisions made in the Friedman and Schwartz estimates.

Vault cash at mutual savings banks was excluded from currency outside banks (inadvertently) and from reserves of commercial banks (correctly), whereas it is included in high-powered money (correctly). Hence the relation shown by the formula does not hold exactly, though the error on this account is small. For this reason and also because of rounding and approximation error, the total rate may not equal exactly the sum of the other three columns.

Note: Specific cycle dates and matched reference cycles: Based on an earlier version of Table 1. The differences are as follows: For Table F-1, a peak is dated in Nov. 1880 instead of May 1881, as in Table 1, a peak in Nov. 1908 instead of Oct. 1908, a trough in July 1923 instead of June 1923, a peak in Aug. 1925 instead of Aug. 1924, a trough in Dec. 1948 instead of Jan. 1949, a peak in July 1951 instead of Nov. 1951, and a trough in Nov. 1953 instead of Sept. 1953. A few of these changes are large, but over-all they would not greatly affect the tables in Chapter 2.

The nonmatched phases in Table 1 are suppressed here; that is, the Feb.-Oct. 1941 specific cycle contraction was suppressed and the period from Oct. 1937 to June 1943 was treated as one expansion matched with the 1938-45 reference expansion. (Also, there is no specific cycle to match the reference cycle, with trough in Oct. 1945 and peak in Nov. 1948. Consequently, the June 1943-Dec. 1948 specific cycle contraction was matched with a reference cycle contraction assumed to run from Feb. 1945 to Oct. 1949 by suppressing the short 1945 contraction.)

The specific cycle dates shown are for the money-stock figures used to compute the rates of change. (Table 1 gives the corresponding peak and trough dates for the rate-of-change series.) The specific cycle stages were dated by the usual National Bureau procedure. Stages II, III, and IV divide into thirds the expansion phase between the peak and trough in the rate of change; and stages VI, VII, and VIII divide into thirds the contraction phase. The rates for peak and trough stages in the monthly data are derived from the four end-of-month dates surrounding the mid-month rate-of-change peak or trough month (hence are based on the rates of change for the three months surrounding the peak or trough month) and so overlap the adjacent stages. For the annual and semiannual data, stages II, IV, VI, and VIII were omitted, and sometimes also stage III or VII, if too short to be computed satisfactorily with these data.

Rates of change: Computed by formula 2 in Chap. 2. The four differentials,

$$\frac{d \log_e H}{dt}, \frac{d \log_e M}{dt}, \frac{d \frac{C}{M}}{dt}, \frac{d \frac{R}{D}}{dt},$$

in the formula were approximated for finite periods by numerical changes in C/M and R/D and in the natural logarithms of M and H (hence the rates for the latter two are compounded instantaneously). The factors M/H (1-C/M) and M/H (1-R/D) were approximated by averages of the beginning and ending values of the factors for each stage.

Averages at end of table: An arithmetic average of the relevant cycles for which a figure for the stage had been computed. War cycles are numbers 11 and 17; the six severe cycles are numbers 1, 4, 8, 12, 15, and 16. These are the matched reference contractions ranked in Table 1 as the 6 most severe by an average of three indexes of business activity (see Business Cycle Indicators, G. H. Moore, Ed., 1961, Vol. 1, p. 104). All others are mild nonwar cycles. The sixth most severe reference contraction, 1882-85, is a marginal one, but is considerably more severe by Moore's rankings than the seventh most severe, 1895-97 (and even ranks slightly ahead of the protracted 1873-79 decline).

TABLE F-2

CONTRIBUTIONS OF THE THREE DETERMINANTS TO NONWAR REFERENCE CYCLE  
PATTERNS OF THE RATE OF CHANGE IN THE MONEY STOCK, 1878-1961  
(per cent per year)

AVERAGE RATE OF CHANGE IN THE MONEY STOCK					
		Contributed by:			
Reference Cycle Stages		Total	High-Powered Money	Currency Ratio	Reserve Ratio
FISCAL-YEAR DATA					
1878-85	I	-12.2	-5.6	-3.7	-2.9
	II	5.0	-0.5	1.6	4.0
(1)	III	5.8	11.0	-1.3	-4.0
	IV	11.9	6.9	-0.2	5.3
	V	-3.8	-5.4	0.5	1.1
	VII	-5.0	-3.8	-0.5	-0.7
	IX	-5.6	-3.0	4.4	-7.0
	Cycle Average	8.2	6.6	1.2	0.5
1885-88	I	-3.0	1.7	2.5	-7.3
	III	2.6	-5.0	3.0	4.7
(2)	V	0.5	3.1	-2.5	-0.2
	IX	-3.1	2.2	-3.5	-1.9
	Cycle Average	5.7	1.9	3.0	0.8
1888-91	I	-3.4	1.2	-1.6	-3.0
	III	-0.6	-2.2	1.7	-0.1
(3)	V	3.9	0.7	-0.1	3.4
	IX	-3.2	1.9	-1.6	-3.4
	Cycle Average	5.9	2.9	1.1	1.9
1891-94	I	0.8	1.6	-0.9	0.1
	III	8.7	3.2	4.7	0.7
(4)	V	-8.5	-4.2	-6.9	2.6
	IX	-1.2	0.4	5.4	-6.8
	Cycle Average	2.0	3.2	0.5	-1.7
1894-97	I	-0.4	5.4	3.8	-9.5
	III	4.5	-2.5	0.7	6.3
(5)	V	-6.1	-5.3	-1.6	0.8
	IX	3.6	10.3	-2.1	-4.7
	Cycle Average	1.3	-1.8	2.1	1.0
1897-1901	I	-6.3	0.5	-1.2	-5.7
	III	3.7	0.5	1.2	2.0
(6)	V	-5.7	-0.1	-4.0	-1.6
	IX	2.8	-2.2	4.3	0.8
	Cycle Average	11.2	8.0	1.2	2.0
1901-04	I	5.8	0.9	3.8	1.2
	III	0.5	-1.4	0.8	1.2
(7)	V	-2.0	0.3	-3.2	0.8
	IX	-2.9	1.5	0.9	-5.3
	Cycle Average	8.2	4.9	1.7	1.6
1904-08	I	-0.1	0.2	2.3	-2.6
	II	6.0	-3.6	3.0	6.6
(8)	III	2.2	0.0	-0.3	2.4
	IV	2.0	2.3	-1.0	0.7

(continued)

TABLE F-2 (continued)

AVERAGE RATE OF CHANGE IN THE MONEY STOCK					
Reference Cycle Stages	Total	Contributed by:			
		High-Powered Money	Currency Ratio	Reserve Ratio	
MONTHLY DATA					
V	-8.1	-10.0	8.1	-6.2	
VI	-12.7	-9.0	3.7	-7.5	
VII	-17.8	22.1	-30.2	-9.8	
VIII	-0.5	-9.4	17.4	-8.5	
IX	8.2	-7.8	9.6	6.2	
Cycle Average	5.4	6.2	0.4	-1.2	
1908-12	I	6.2	-3.6	6.5	3.3
	II	5.8	-0.5	2.9	3.4
(9)	III	2.3	0.4	2.5	-0.6
	IV	-0.7	-2.4	-1.7	3.3
	V	-2.7	-1.8	-1.5	0.7
	VI	-4.0	1.8	-3.5	-2.2
	VII	-0.2	1.3	-0.9	-0.6
	VIII	-0.9	-1.1	2.6	-2.4
	IX	-0.5	0.8	0.2	-1.7
Cycle Average	7.3	2.1	3.5	1.7	
1912-14	I	2.7	0.8	3.5	-1.6
	II	2.6	1.7	-6.8	7.7
(10)	III	1.3	-2.7	2.1	2.1
	IV	0.5	0.5	2.9	-2.9
	V	-0.4	0.6	-0.3	-0.7
	VI	-2.7	-0.6	-1.5	-0.6
	VII	0.5	-1.9	6.0	-3.6
	VIII	-0.1	4.9	-4.0	-1.0
	IX	-5.7	-24.7	16.1	2.8
Cycle Average	4.1	2.1	0.3	1.6	
1919-21	I	9.8	6.2	5.8	-2.1
	II	8.2	3.0	7.9	-2.7
(11)	III	15.9	8.9	2.6	4.3
	IV	15.3	11.5	-2.4	6.3
	V	8.2	10.2	-4.8	3.0
	VI	2.1	9.3	-6.6	-0.6
	VII	-5.7	-3.1	-2.4	-0.3
	VIII	-18.1	-18.6	2.0	-1.4
	IX	-12.7	-16.5	4.0	-0.1
Cycle Average	4.3	0.4	2.0	1.9	
1921-24	I	-14.2	-18.0	2.4	1.4
	II	-5.1	-10.8	6.1	-0.4
(12)	III	6.8	4.1	0.5	2.2
	IV	2.4	4.7	-3.4	1.1
	V	0.8	1.6	-7.4	6.6
	VI	-4.8	1.1	-4.8	-1.1
	VII	-2.9	-0.9	-0.5	-1.5
	VIII	1.8	1.6	1.0	-0.7
	IX	7.2	3.5	8.0	-4.2
Cycle Average	5.9	1.9	3.6	0.4	

(continued)

TABLE F-2 (continued)

AVERAGE RATE OF CHANGE IN THE MONEY STOCK					
		Contributed by:			
Reference Cycle Stages	Total	High-Powered Money	Currency Ratio	Reserve Ratio	
MONTHLY DATA					
1924-27	I	8.0	4.3	8.8	-4.9
	II	3.5	0.2	1.4	2.0
(13)	III	2.3	2.7	0.3	-0.7
	IV	-3.7	-1.4	-2.3	0.0
	V	-6.9	-5.3	-2.1	0.4
	VI	-1.8	-1.5	-1.9	1.5
	VII	-1.0	5.3	1.1	-7.4
	VIII	-2.0	-5.0	0.5	2.4
	IX	-2.2	-2.1	3.0	-3.3
Cycle Average		5.0	1.1	2.8	1.2
1927-33	I	9.8	-4.4	13.1	1.0
	II	7.9	-3.4	6.1	5.1
(14)	III	10.0	-4.4	11.2	3.2
	IV	6.3	-3.4	5.9	3.8
	V	10.5	-5.0	13.8	1.9
	VI	4.6	-7.6	9.9	2.4
	VII	-9.2	7.3	-11.9	-4.6
	VIII	-4.7	7.6	-8.3	-4.1
	IX	-48.4	-13.1	-32.7	-2.5
Cycle Average		-6.9	3.5	-7.3	-3.1
1933-38	I	-61.8	-19.5	-43.3	1.0
	II	2.0	-1.4	8.0	-4.7
(15)	III	6.4	4.7	0.2	1.6
	IV	2.3	1.8	-3.4	3.9
	V	-8.8	-10.6	-4.8	6.6
	VI	-6.8	-6.9	-5.4	5.4
	VII	-12.3	-8.7	-3.1	-0.5
	VIII	-8.6	3.1	-3.3	-8.4
	IX	-6.7	6.7	-3.8	-9.6
Cycle Average		6.5	9.9	3.3	-6.6
1945-49	I	9.9	7.4	3.0	-0.6
	II	3.9	2.2	1.2	0.5
(16)	III	1.4	1.7	0.2	-0.3
	IV	-2.7	5.3	-0.8	-7.3
	V	-4.2	6.8	-1.0	-9.7
	VI	-4.2	-2.7	-0.4	-1.3
	VII	-2.0	-9.8	-0.9	9.0
	VIII	-3.4	-19.8	-0.6	16.4
	IX	-3.4	-11.1	-0.5	7.9
Cycle Average		2.6	0.1	1.7	0.8

(continued)

TABLE F-2 (concluded)

AVERAGE RATE OF CHANGE IN THE MONEY STOCK					
Reference Cycle Stages		Total	Contributed by:		
			High-Powered Money	Currency Ratio	Reserve Ratio
MONTHLY DATA					
1949-54	I	-4.7	-13.2	0.1	8.2
	II	-0.6	-0.3	0.9	-1.3
(17)	III	1.4	4.6	-0.7	-2.7
	IV	0.1	0.9	-1.1	0.6
	V	-1.2	-3.9	-0.5	3.0
	VI	-1.5	-2.3	0.0	0.9
	VII	-1.1	-4.1	1.4	1.4
	VIII	0.3	-4.7	1.4	3.6
	IX	1.0	-12.1	2.8	10.5
Cycle Average		3.8	2.3	1.1	0.5
1954-58	I	1.9	-10.2	2.9	9.5
	II	0.6	0.3	0.3	0.0
(18)	III	-1.2	0.1	-0.9	-0.3
	IV	0.2	1.0	-0.1	-0.8
	V	-0.1	-1.1	0.3	0.3
	VI	-1.0	-0.3	0.0	-0.3
	VII	-3.5	0.9	-1.5	-2.3
	VIII	3.6	-1.2	2.3	2.2
	IX	5.7	-4.4	2.6	7.7
Cycle Average		2.9	0.3	1.0	1.5
1958-61	I	5.5	-3.1	2.4	6.5
	II	3.0	1.6	1.1	0.4
(19)	III	0.1	3.1	-0.7	-2.4
	IV	-4.3	-0.9	-1.8	-1.6
	V	-3.1	0.9	-0.6	-3.7
	VI	0.6	1.8	1.3	-2.2
	VII	3.5	-4.0	1.3	5.8
	VIII	-0.1	-10.7	1.2	9.6
	IX	4.6	6.8	2.9	-5.7
Cycle Average		3.1	-0.9	1.2	2.8
AVERAGES					
7 mild cycles	I	0.2	1.0	2.5	-3.2
	III	2.0	-1.8	1.7	2.2
1878-1914	V	-1.8	-0.4	-1.9	0.5
	IX	-1.3	-1.5	2.0	-1.9
6 mild cycles	I	1.1	-5.5	3.3	3.4
	II	0.9	-1.1	1.8	0.2
1919-61	III	1.8	2.7	-0.2	-0.7
	IV	-1.3	1.6	-1.6	-1.3
	V	-2.4	-0.2	-1.9	-0.5
	VI	-2.1	-0.6	-1.0	-0.4
	VII	-1.2	-2.1	0.2	0.8
	VIII	0.0	-6.6	1.0	5.6
	IX	2.2	-3.2	3.1	2.2



## NOTES TO TABLE F-2

Source: Friedman and Schwartz, A Monetary History, Tables A-1 and B-3, extended to 1961. These data differ slightly from those used for Table F-1.

Note: These patterns are numerical deviations from cycle averages. Add the cycle average to derive the actual rates of change. Because of rounding and approximation error, the total rate may not equal exactly the sum of the other three columns.

Rates of change: Computed the same way as for Table F-1, except that the rates of change were first computed for each year or month and then averaged for the reference cycle stages. Although semiannual data are available before 1882, cycle 1 is based on Jan. figures only, centered on preceding Dec.

Mild cycles: Same as for Table F-1.

TABLE F-3  
CONTRIBUTIONS OF THE THREE DETERMINANTS TO STEP CYCLES IN  
THE RATE OF CHANGE IN THE MONEY STOCK, 1877-1954  
(per cent per year)

AVERAGE RATE OF CHANGE IN THE MONEY STOCK					Contributed by:		
Step Cycle Phase				Total	High-Powered Money	Currency Ratio	Reserve Ratio
Expansion	Feb.	1879 - Aug.	1881	19.3	15.7	1.2	2.1
Contraction	Aug.	1881 - June	1885	3.3	2.7	2.1	-1.4
Expansion	June	1885 - June	1887	7.2	0.9	3.3	2.8
Contraction	June	1887 - June	1888	2.5	4.0	-0.5	-0.8
Expansion	June	1888 - June	1890	7.5	2.2	1.9	3.4
Contraction	June	1890 - June	1891	2.8	4.8	-0.5	-1.7
Expansion	June	1891 - June	1892	10.6	6.5	5.1	-0.9
Contraction	June	1892 - June	1893	-6.5	-1.0	-6.5	1.1
Expansion	June	1893 - June	1895	3.3	-0.4	4.6	-0.9
Contraction	June	1895 - June	1896	-4.8	-7.2	0.5	1.9
Expansion	June	1896 - June	1899	11.5	8.5	1.6	1.3
Contraction	June	1899 - June	1900	5.5	7.9	-2.7	0.4
Expansion	June	1900 - June	1901	14.0	5.7	5.5	2.5
Contraction	June	1901 - June	1904	6.8	5.0	1.2	0.5
Expansion	June	1904 - June	1907	8.4	5.2	1.1	2.1
Contraction	June	1907 - Feb.	1908	-11.4	12.2	-9.3	-14.3
Expansion	Feb.	1908 - Aug.	1909	10.8	-0.9	9.1	2.6
Contraction	Aug.	1909 - Aug.	1910	2.6	1.3	1.0	0.2
Expansion	Aug.	1910 - June	1912 <sup>a</sup>	7.1	1.4	2.4	3.3
Contraction	June	1912 - July	1913 <sup>a</sup>	2.2	2.5	0.5	-0.8
Expansion	July	1913 - May	1914 <sup>a</sup>	6.1	3.0	3.9	-0.7
Contraction	May	1914 - Dec.	1914 <sup>a</sup>	1.4	-3.6	-0.4	5.4
Expansion	Dec.	1914 - July	1917	15.8	15.7	-0.2	0.2
Contraction	July	1917 - Aug.	1918	7.8	18.9	-13.6	2.4
Expansion	Aug.	1918 - Mar.	1920	17.0	9.0	5.0	3.0
Contraction	Mar.	1920 - July	1921	-6.1	-7.7	0.8	0.9
Expansion	July	1921 - May	1923	7.3	1.8	4.2	1.3
Contraction	May	1923 - Feb.	1924	1.9	1.9	1.0	-1.1
Expansion	Feb.	1924 - Sept.	1925	9.3	2.5	5.2	1.6
Contraction	Sept.	1925 - Dec.	1926	0.2	0.6	-0.7	0.2
Expansion	Dec.	1926 - Apr.	1928	6.1	1.3	4.1	0.8
Contraction	Apr.	1928 - Apr.	1933	-9.0	2.3	-8.4	-3.4
Expansion	Apr.	1933 - July	1936	12.1	14.1	4.5	-6.7
Contraction	July	1936 - May	1938	0.4	8.0	-0.6	-7.0
Expansion	May	1938 - Sept.	1945	14.9	15.0	-2.5	2.4
Contraction	Sept.	1945 - Oct.	1949 <sup>a</sup>	2.3	0.0	1.8	0.5
Expansion	Oct.	1949 - Aug.	1952	4.4	4.5	1.0	-1.1
Contraction	Aug.	1952 - June	1954	2.9	-0.4	0.8	2.6

## NOTES TO TABLE F-3

Source: Step cycle dates were derived by Friedman and Schwartz (see Table 1 of "Money and Business Cycles"). The published dates have been revised from those used above. The differences are as follows: The Aug. 1909 peak has been revised to June 1909, the Aug. 1918 trough to May 1918, the Feb. 1924 trough to Mar. 1924, the Sept. 1945 peak to Oct. 1945, the Oct. 1949 trough to Jan. 1950, the Aug. 1952 peak to Dec. 1952, and the June 1954 trough to April 1954.

Rates of change were computed by the method described for Table F-1.

<sup>a</sup> July 1913 trough and May 1914 peak in step cycles do not correspond to reference cycles. All others do, though there is no step cycle corresponding to a reference cycle trough in Oct. 1945 and peak in Nov. 1948.

TABLE F-4

CONTRIBUTIONS OF THE THREE DETERMINANTS TO SECULAR MOVEMENTS IN  
THE MONEY STOCK, 1877-1953: AVERAGE RATE OF CHANGE BETWEEN  
SPECIFIC CYCLE BASES CENTERED AT PEAKS  
(per cent per year)

AVERAGE RATE OF CHANGE IN THE MONEY STOCK				
Period Between Specific Cycle Bases, Centered at Peaks	Total	Contributed by:		
		High-Powered Money	Currency Ratio	Reserve Ratio
Nov. 1880 - Dec. 1885	6.8	4.7	2.0	0.1
Dec. 1885 - Dec. 1889	4.7	2.2	1.7	0.8
Dec. 1889 - Dec. 1891	8.1	5.3	1.8	1.0
Dec. 1891 - Dec. 1894	0.5	1.1	0.4	-1.0
Dec. 1894 - Dec. 1898	3.6	1.4	1.4	0.8
Dec. 1898 - Dec. 1900	20.7	13.3	3.1	4.3
Dec. 1900 - Dec. 1904	7.9	5.3	1.6	1.0
Dec. 1904 - Nov. 1908	3.7	3.8	1.3	-1.5
Nov. 1908 - Oct. 1911	5.6	1.0	2.8	1.8
Oct. 1911 - Dec. 1916	6.1	4.5	0.9	0.7
Dec. 1916 - Dec. 1918	23.3	25.1	-5.1	3.4
Dec. 1918 - Apr. 1922	2.4	-1.5	2.6	1.3
Apr. 1922 - Aug. 1925	5.5	2.4	2.4	0.7
Aug. 1925 - Nov. 1927	4.7	0.9	2.9	0.9
Nov. 1927 - Apr. 1936	-2.0	4.5	-2.8	-4.0
Apr. 1936 - June 1943	12.3	15.8	-1.2	-2.4
June 1943 - July 1951	6.6	5.0	-0.1	1.7

Source: Rates of change were computed by the approximation to formula 2 in Chap. 2 (and hence are compounded continuously), between average levels of the money stock and the determinants from the initial to the terminal trough of each matched specific cycle and centered at the specific cycle peak. The data and specific cycle dates are the same as for Table F-1. Total may not equal sum of other cols. because of rounding and approximation error. (Comparable figures on a reference cycle basis are given in Table 28.)

TABLE F-5

SOURCES OF CHANGE IN HIGH-POWERED MONEY, FISCAL YEARS, 1876-1955  
(millions of dollars)

Year Ending June 30	SOURCES OF CHANGE IN HIGH-POWERED MONEY									
	Treasury Operations									
	Total (1)	Monetary Gold Stock (2)	Federal Reserve Operations (3)	National Bank Notes (4)	Silver Purchases (5)	Total Excluding Silver (6)	Budget (7)	Public Debt (8)	Deposits at Banks (9)	Miscellaneous Accounts (10)
1876	-20	10		-24	11	-17	-29	20	-4	-4
1877	5	33		-4	12	-36	-40	-14	0	18
1878	5	44		9	20	-68	-21	-72	40	-15
1879	18	34		9	22	-47	-7	-138	161	-63
1880	159	106		10	25	18	-66	207	-200	77
1881	135	123		-6	23	-5	-100	85	4	6
1882	52	24		-3	24	7	-146	166	0	-13
1883	59	34		3	26	-4	-133	134	1	-6
1884	6	2		-17	24	-3	-104	100	1	0
1885	45	42		-25	24	4	-63	46	-3	24
1886	-41	0		-26	23	-38	-94	45	6	5
1887	68	60		-72	26	54	-103	128	7	22
1888	49	50		-15	24	-10	-111	75	35	-9
1889	9	-26		-26	25	36	-88	121	-11	14
1890	47	15		-3	27	8	-85	105	-17	5
1891	67	-53		-2	54	68	-27	101	-4	-2
1892	96	11		17	51	17	-10	24	-12	15
1893	-10	-79		13	46	10	-2	1	0	11
1894	50	28		17	9	-4	61	-50	0	-15
1895	-68	0		6	0	-74	31	-81	1	-25
1896	-102	-45		21	0	-78	14	-131	1	38
1897	126	89		-2	0	39	18	0	0	21
1898	197	163		-8	0	42	38	0	23	-19
1899	83	105		10	0	-32	89	-199	38	40
1900	122	57		66	1	-2	-46	23	22	-1
1901	116	85		53	0	-22	-63	36	1	4
1902	70	66		-9	0	13	-77	56	24	10
1903	116	55		53	0	8	-45	17	28	8
1904	145	76		39	0	30	43	18	-35	4
1905	70	28		51	0	-9	23	1	-40	7
1906	147	116		58	0	-27	-25	0	17	-19
1907	172	124		38	8	2	-87	0	88	1
1908	264	152		64	10	38	57	-6	-19	6
1909	61	24		29	3	5	89	-15	-88	19
1910	13	-6		33	1	-15	18	1	-19	-15
1911	118	117		10	1	-10	-11	-2	-4	7
1912	47	65		24	3	-45	-3	-48	2	4
1913	92	53		13	1	25	0	-2	27	0
1914	32	20		0	7	5	0	-2	9	-2
1915	178	95	11	0	6	66	63	-2	-8	13

(continued)

TABLE F-5 (concluded)

Year Ending June 30	SOURCES OF CHANGE IN HIGH-POWERED MONEY									
	Treasury Operations									
	Total (1)	Monetary Gold Stock (2)	Federal Reserve Operations (3)	National Bank Notes (4)	Silver Purchases (5)	Total Excluding Silver (6)	Budget (7)	Public Debt (8)	Deposits at Banks (9)	Miscellaneous Accounts (10)
1916	466	459	131	-46	7	-85	-48	-2	-21	-14
1917	919	775	296	-15	8	-145	853	-1,754	782	-26
1918	824	-57	748	21	34	78	9,032	-9,279	736	-411
1919	629	-50	955	-4	-193	-89	13,363	-13,240	-492	280
1920	677	-248	763	11	-19	169	-291	1,176	-649	-67
1921	-672	410	-1,118	16	66	-46	-509	320	145	-2
1922	-205	510	-845	22	57	51	-736	1,014	-248	21
1923	365	265	-42	-6	70	78	-713	630	147	14
1924	162	438	-283	10	20	-23	-963	1,094	-120	-34
1925	73	-128	187	-81	3	92	-717	770	-3	42
1926	173	87	86	3	5	-8	-865	844	53	-40
1927	90	140	-32	0	5	-23	-1,155	1,130	-2	4
1928	-58	-478	400	-2	4	18	-939	904	41	12
1929	-61	215	-262	0	2	-16	-734	673	101	-56
1930	-172	211	-409	3	3	20	-738	736	-76	98
1931	366	421	-4	-13	1	-39	462	-618	148	-31
1932	469	-1,037	1,409	13	1	83	2,735	-2,650	-14	12
1933	184	399	-263	78	1	-31	2,602	-3,002	425	-56
1934	1,601	1,040	332	-32	47	214	3,630	-4,311	862	33
1935	1,440	1,239	-39	-476	202	514	2,791	-1,341	-896	23
1936	968	1,551	-286	-222	396	-471	4,425	-5,282	327	59
1937	1,794	1,820	392		125	-543	2,777	-2,760	-482	-78
1938	1,142	520	-40		202	460	1,177	-799	-74	156
1939	2,688	3,188	-272		195	-423	3,862	-3,311	196	-1,170
1940	4,496	3,854	-564		122	1,084	3,918	-2,553	35	-316
1941	1,054	2,664	-882		83	-811	6,159	-6,011	-75	-884
1942	2,134	46	1,098		70	920	21,490	-23,474	1,086	1,818
1943	4,222	-360	4,076		12	494	57,420	-63,454	6,185	343
1944	6,123	-1,205	7,559		-29	-202	51,423	-64,223	11,489	1,109
1945	5,859	-900	6,741		-48	66	53,941	-56,881	4,875	-1,869
1946	2,595	47	2,376		-40	212	20,676	-11,862	-10,964	2,362
1947	221	1,076	-1,790		17	918	-754	13,143	-12,057	586
1948	952	2,323	-128		31	-1,274	-8,419	5,001	813	1,331
1949	242	897	-2,224		33	1,536	1,811	-663	124	264
1950	-2,447	-306	-1,712		37	-466	3,122	-4,468	1,497	-617
1951	3,185	-2,459	4,979		33	632	-3,510	2,110	2,531	-499
1952	2,075	1,660	419		35	-39	4,017	-3,918	-211	73
1953	1,503	-1,011	2,081		32	401	9,449	-6,963	-2,179	94
1954	-1,316	-494	-584		31	-269	3,117	-5,102	1,953	-237
1955	-264	-297	-538		32	539	4,180	-2,983	-477	-181

Note: For schematic description, see Table 9.

## NOTES TO TABLE F-5

## Source, by Column

(1): Change in currency outside the Treasury and Federal Reserve Banks, less national bank notes in vaults of issuing banks, plus deposits of commercial banks with Federal Reserve Banks. This series differs slightly from that in Friedman and Schwartz, A Monetary History, Table B-3, chiefly because of no seasonal adjustment and no adjustment for gold correction (see col. 2 and col. 1, c, below). The quantity of high-powered money outstanding at the beginning of each fiscal year is shown in Table F-6, col. 7, and was derived by adding:

a. National bank notes secured by lawful money (the difference between national bank notes in circulation and national bank notes secured by U.S. bonds): Historical Statistics of the United States, 1789-1945, Bureau of the Census, 1949 (Historical Statistics, 1949), Series N-165, p. 275; and Annual Report, Comptroller of the Currency, 1908, pp. 123-129; 1926, pp. 138-140; 1931, pp. 178-179; 1934, p. 176; 1935, p. 184.

b. Note liabilities of national banks: 1875-1918: Annual Report, Comptroller of the Currency, 1918, Vol. II, pp. 254 ff.; values interpolated between closest June call dates in years for which national banks did not report on June 30th. 1919-35: Historical Statistics, 1949, Series N-33, p. 263.

c. Treasury and Federal Reserve currency, i.e., the difference between money in circulation and national bank notes in circulation, 1875-1935; thereafter, money in circulation: Money in circulation is based on the published series in Banking and Monetary Statistics, Board of Governors of the Federal Reserve System, 1943, pp. 408-09, thereafter the Circulation Statement of U.S. Money in Federal Reserve Bulletin, with corrections for: lost gold 1875-1907, as estimated in Annual Report, Director of the Mint, 1907, pp. 87 and 94; fractional currency presumed lost 1875-78; subsidiary silver error 1891-1910, as estimated in ibid., 1910, p. 54. The series does not include: minor coin; an adjustment for gold presumed lost 1907-33. The original figures exclude \$287 million of gold coin in circulation beginning with 1914, the amount presumed lost in 1934. In computing the change from 1913 to 1914 this amount was restored.

d. Deposits of commercial banks at Federal Reserve Banks (i.e., member bank reserves at Federal Reserve Banks less float, plus nonmember bank clearing accounts). Member bank deposits at Federal Reserve Banks less float, i.e., uncollected items less deferred availability items, excluding through April 1929 miscellaneous components not properly classified as deferred availability items (last Fri. of June 1915-21; last Wed. thereafter): 1915-16, Net deposits from Annual Report, Federal Reserve Board, 1915, p. 46 and FRB, 1916. 1917-21, FRB. 1922-41, deposits from Banking and Monetary Statistics, pp. 378-394 and float from FRB. 1942-55, deposits and float from FRB. Nonmember bank clearing accounts, beginning 1917: Figure for 1917 is for July 6, from FRB. 1918-55, straight-line estimates between Dec. 31 figures are shown on Reserve System balance sheets in Annual Report, Federal Reserve Board and, after 1935, Board of Governors, FRS, 1917-21, 1926-43, 1945-55. So derived, high-powered money excludes deposits at Federal Reserve Banks of certain government agencies (in addition to Treasury deposits, which are excluded intentionally). The first exclusion is inconsistent with the inclusion in the money stock of deposits of such agencies at commercial banks, though the quantities involved are quite small. Minor coin (nickels and pennies) is ignored because of unavailability of early data and its quantitative insignificance, though it is reported by banks in vault cash data. Silver coinage is included in high-powered money.

(2): Change in domestic monetary gold stock (i.e., all gold coin and bullion at par value outside and inside banks and the Treasury): 1875-1907, Annual Report, Mint, 1907, p. 87. 1908-13, Circulation Statement of

## NOTES TO TABLE F-5 (continued)

United States Money. 1914-41, Banking and Monetary Statistics, pp. 373-77 and 536, with the corrections noted below. 1942-55, FRB. No adjustment was made for the premium on gold before the resumption of specie payments in 1879. For the post-1913 data, the three following corrections were made.

a. Gold in the active portion of the Exchange Equalization Fund, reported in Banking and Monetary Statistics, p. 526, and in Report on the Finances, Secretary of the Treasury, 1940, p. 789, was added to the figures shown in sources listed above, beginning 1934.

b. The official figures, beginning 1914, exclude (arbitrarily) \$287 million gold coin, the amount unaccounted for when gold coin was retired in 1933. In computing the change from 1913 to 1914 that amount was re-stored.

c. Part of the increase in the gold stock from 1933 to 1934 in the official figures (\$2,811 million) resulting from the devaluation of the dollar in 1934, was excluded in computing the change from 1933 to 1934. (The gold-stock series is shown annually in col. 1, Table F-7, with a different adjustment for lost gold.)

- (3): Change in Federal Reserve currency outside Federal Reserve Banks, less all currency and gold held (here and abroad) by Federal Reserve Banks, plus deposits at Reserve Banks of the Treasury and of commercial banks, less float. The actual figures were derived as follows.

a. Federal Reserve notes and Federal Reserve Bank notes outside Federal Reserve Banks (last Fri. of June 1915-20, June 30th thereafter): 1915-36, compiled directly from Annual Report, Federal Reserve Board and FRB, or by deduction of Federal Reserve notes at other Banks from amounts in circulation. 1937-50, Federal Reserve notes outstanding minus notes held by Federal Reserve Banks and agents, from Report on the Finances. 1951-55, "Statement of Condition of Federal Reserve Banks," FRB.

b. Reserve cash, redemption fund, nonreserve cash, other cash and gold held abroad: 1915-55, Annual Report, FRS, and FRB.

c. Deposits of the Treasury at Federal Reserve Banks (last Friday of June 1915-20, end of June thereafter), FRB, and Banking and Monetary Statistics, pp. 374-77.

d. Deposits of commercial banks at Federal Reserve Banks, less float: Same series described in note to col. 1, d. Before 1923, currency holdings of Reserve Banks exclude nickels, cents, and unassorted currency which are shown in "other resources," but with only small error.

- (4): Liabilities of national banks for notes in circulation: Same series described in note to col. 1, b, excluding Treasury liability for the notes (col. 1, a).

- (5): Acquisition or sale by the Treasury of silver bullion (excluding U.S. coin) by cash payment, not by exchange for silver bars. This series measures net silver purchases at cost and represents increase or decrease in silver coin issued (or to be issued) or held at the Treasury as backing for silver certificates or Treasury notes of 1890. No appropriation of tax revenues was made for those purchases, which do not appear in the budget figures in col. 7. Seigniorage, when spent, was treated before 1934 as a budget receipt (see footnote 32, Chap. 3). 1934-55, purchase and sale under various acts (including lend-lease programs to cancel U.S. foreign debts) from Annual Report, Mint, 1955, pp. 56-84 (see 1954, pp. 36-39 for explanatory text), and amounts acquired and sold by the Exchange Equalization Fund in 1934 from Report on the Finances, 1940, p. 789. 1895-1933, cost of purchases (including amounts combined with gold ore purchased by the mints) from Annual Report, Mint, for each year. Amounts deducted were realized from sale to India in 1919 under the Pittman Act

## NOTES TO TABLE F-5 (concluded)

and from open-market sales in 1920 (D.H. Leavens, Silver Money, Bloomington, 1939, pp. 147 and 152). 1878-94, cost of purchases under the Bland-Allison Act of 1878 and the Sherman Silver Purchase Act of 1890 from Annual Report, Mint, for each year (see also summaries in ibid., 1894, pp. 16-17, and in Report on the Finances, 1897, pp. 192-193). The figure for 1878 includes \$7.1 million purchased for fractional coinage in addition to the \$13.0 million purchased under the act of 1878. 1875-77, cost of purchases under the acts of 1873 and 1875 from Annual Report, Mint for 1875 and 1877. Since only total purchases for 1876-77 are given, that total was divided between the two fiscal years according to deposits of silver bullion at mints in each year.

(6): Sum of cols. 7-10.

(7): Fiscal year deficits or surpluses of the budget (minus signs indicate Treasury receipts, and conversely): 1875-1931, Historical Statistics, 1949, Series P-98, pp. 295-297. 1932-55, Report on the Finances, 1957, p. 332. The budget figures do not include transactions recorded in other Treasury accounts (cols. 8, 9, and 10) or net operating income of certain government agencies, such as trust funds and government corporations--the latter included here in the nongovernment sector. Budget figures for various years up to 1896 include premiums over par paid or received by the Treasury for U.S. bonds, but in inconsequential amounts (see Report on the Finances, 1899).

(8): Change in par value of interest-bearing and matured debt of the Treasury: Historical Statistics, 1949, Series P-134 and P-136, pp. 305-306; and Report on the Finances, 1955, pp. 404-405 (minus signs indicate payment of high-powered money by the public to the Treasury, and conversely).

(9): Change in deposits of the Treasury and its disbursing officers at commercial banks: 1876-1918, Report on the Finances. 1918-47, All-Bank Statistics, United States, 1896-1955, Board of Governors, FRS, 1959. 1947-55, FRB. This series was taken from bank statements for the years after 1918 in order to omit amounts in transit between banks and the Treasury. For the years before 1919, since banks did not consistently report on June 30, Treasury statements were used. Transit items are excluded in the Report on the Finances, 1914-18.

(10): Col. 1 minus cols. 2-5 and 7-9. Figures represent changes in miscellaneous (nonmonetary) Treasury assets and liabilities not shown in other columns. On the asset side are: disbursing officers' balances at sub-treasuries (largely warrants issued but not paid); minor coin and fractional currency in Treasury offices; prepaid interest on the public debt and other prepaid items; and moneys in the Treasury, received but not yet registered by the issue of warrants. On the liability side are: checks and warrants outstanding; redemption fund for Federal Reserve Bank notes (but not the 5 per cent or retirement fund for national bank notes, shown as changes in note liabilities of national banks, col. 4); and Post Office funds on deposit at the Treasury.



TABLE F-6

SOURCES OF CHANGE IN HIGH-POWERED MONEY AS PERCENTAGE OF HIGH-POWERED  
MONEY, FISCAL YEARS, 1876-1955  
(per cent per year)

Year Ending June 30	SOURCES OF CHANGE IN HIGH-POWERED MONEY						Quantity of High-Powered Money at Beginning of Fiscal Year (\$ millions)
	Total (1)	Monetary Gold Stock (2)	Federal Reserve Operations (3)	National Bank Notes (4)	Treasury Operations		
					Silver Purchases (5)	Total, Excluding Silver (6)	
1876	-2.6	1.3		-3.1	1.4	-2.2	770
1877	0.7	4.4		-0.5	1.6	-4.8	750
1878	0.7	5.8		1.2	2.6	-9.0	755
1879	2.4	4.5		1.2	2.9	-6.2	760
1880	20.4	13.6		1.3	3.2	2.3	778
1881	14.4	13.1		-0.6	2.5	-0.5	937
1882	4.9	2.2		-0.3	2.2	0.7	1,072
1883	5.2	3.0		0.3	2.3	-0.4	1,124
1884	0.5	0.2		-1.4	2.0	-0.3	1,183
1885	3.8	3.5		-2.1	2.0	0.3	1,189
1886	-3.3	0.0		-2.1	1.9	-3.1	1,234
1887	5.7	5.0		-6.0	2.2	4.5	1,193
1888	3.9	4.0		-1.2	1.9	-0.8	1,261
1889	0.7	-2.0		-2.0	1.9	2.7	1,310
1890	3.6	1.1		-0.2	2.0	0.6	1,319
1891	4.9	-3.9		-0.1	4.0	5.0	1,366
1892	6.7	0.8		1.2	3.6	1.2	1,433
1893	-0.7	-5.2		0.9	3.0	0.7	1,529
1894	3.3	1.8		1.1	0.6	-0.3	1,519
1895	-4.3	0.0		0.4	0.0	-4.7	1,569
1896	-6.8	-3.0		1.4	0.0	-5.2	1,501
1897	9.0	6.4		-0.1	0.0	2.8	1,399
1898	12.9	10.7		-0.5	0.0	2.8	1,525
1899	4.8	6.1		0.6	0.0	-1.9	1,722
1900	6.8	3.2		3.7	0.1	-0.1	1,805
1901	6.0	4.4		2.8	0.0	-1.1	1,927
1902	3.4	3.2		-0.4	0	0.6	2,043
1903	5.5	2.6		2.5	0	0.4	2,113
1904	6.5	3.4		1.7	0	1.3	2,229
1905	2.9	1.2		2.1	0	-0.4	2,374
1906	6.0	4.7		2.4	0.0	-1.1	2,444
1907	6.6	4.8		1.5	0.3	0.1	2,591
1908	9.6	5.5		2.3	0.4	1.4	2,763
1909	2.0	0.8		1.0	0.1	0.2	3,027
1910	0.4	-0.2		1.1	0.0	-0.5	3,088
1911	3.8	3.8		0.3	0.0	-0.3	3,101
1912	1.5	2.0		0.7	0.1	-1.4	3,219
1913	2.8	1.6		0.4	0.0	0.8	3,266
1914	1.0	0.6		0.0	0.2	0.1	3,358
1915	5.7	3.1	0.4	0.0	0.2	2.1	3,390
							3,103
1916	14.2	14.0	4.0	-1.4	0.2	-2.6	3,281
1917	24.5	20.7	7.9	-0.4	0.2	-3.9	3,747
1918	17.7	-1.2	16.0	0.5	0.7	1.7	4,666
1919	11.5	-0.9	17.4	-0.1	-3.5	-1.6	5,490
1920	11.1	-4.1	12.5	0.2	-0.3	2.8	6,119
1921	-9.9	6.0	-16.5	0.2	1.0	-0.7	6,796
1922	-3.3	8.3	-13.8	0.4	0.9	0.8	6,124
1923	6.2	4.5	-0.7	-0.1	1.2	1.3	5,919
1924	2.6	7.0	-4.5	0.2	0.3	-0.4	6,284
1925	1.1	-2.0	2.9	-1.3	0.0	1.4	6,446

(continued)

TABLE F-6 (concluded)

Year Ending June 30	SOURCES OF CHANGE IN HIGH-POWERED MONEY						Quantity of High-Powered Money at Beginning of Fiscal Year (\$ millions) (7)
	Total (1)	Monetary Gold Stock (2)	Federal Reserve Operations (3)	National Bank Notes (4)	Treasury Operations		
					Silver Purchases (5)	Total, Excluding Silver (6)	
1926	2.7	1.3	1.3	0.0	0.1	-0.1	6,519
1927	1.3	2.1	-0.5	0.0	.1	-0.3	6,692
1928	-0.9	-7.0	5.9	0.0	.1	0.3	6,782
1929	-0.9	3.2	-3.9	0.0	0	-0.2	6,724
1930	-2.6	3.2	-6.1	0.0	0	0.3	6,663
1931	5.6	6.5	-0.1	-0.2	0	-0.6	6,491
1932	6.8	-15.1	20.5	0.2	0	1.2	6,857
1933	2.5	5.4	-3.6	1.1	0.0	-0.4	7,326
1934	21.3	13.8	4.4	-0.4	0.6	2.8	7,510
1935	15.8	13.6	-0.4	-5.2	2.2	5.6	9,111
1936	9.2	14.7	-2.7	-2.1	3.8	-4.5	10,551
1937	15.6	15.8	3.4		1.1	-4.7	11,519
1938	8.6	3.9	-0.3		1.5	3.5	13,313
1939	18.6	22.1	-1.9		1.3	-2.9	14,455
1940	26.2	22.5	-3.3		0.7	6.3	17,143
1941	4.9	12.3	-4.1		0.4	-3.7	21,639
1942	9.4	0.2	4.8		0.3	4.1	22,693
1943	17.0	-1.5	16.4		0.0	2.0	24,827
1944	21.1	-4.1	26.0		-0.1	-0.7	29,049
1945	16.7	-2.6	19.2		-0.1	0.2	35,172
1946	6.3	0.1	5.8		-0.1	0.5	41,031
1947	0.5	2.5	-4.1		0.0	2.1	43,626
1948	2.2	5.3	-0.3		0.1	-2.9	43,847
1949	0.5	2.0	-5.0		0.1	3.4	44,799
1950	-5.4	-0.7	-3.8		0.1	-1.0	45,041
1951	7.5	-5.8	11.7		0.1	1.5	42,594
1952	4.5	3.6	0.9		0.1	-0.1	45,779
1953	3.1	-2.1	4.3		0.1	0.8	47,854
1954	-2.7	-1.0	-1.2		0.1	-0.5	49,357
1955	-0.5	-0.6	-1.1		0.1	1.1	48,041

Source, by Column

(1)-(6): Table F-5, cols. 1-6, respectively, divided by col. 7 of Table F-6.

(7): Same series for which changes are shown in col. 1, Table F-5. The first figure for 1915 includes, and the second excludes, the \$287 million presumed lost between 1907 and 1934. The figure for 1956 is \$47,777 million.

Note: Detail may not add exactly to total because of rounding.

TABLE F-7

STOCK OF MONETARY GOLD, ITS RELATION TO HIGH-POWERED  
MONEY, AND COMMODITY VALUE OF GOLD,  
ANNUALLY, 1875-1955

Year (end of June)	Stock of Monetary Gold (\$ millions)		Ratio of High-Powered Money to Gold Stock (3)	Index of Commodity Value of Gold (1926=100) (4)
	Current Par Value (1)	Pre-1934 Par Value (2)		
1875	89	a	8.65	142
1876	99		7.58	148
1877	132		5.72	144
1878	176		4.32	162
1879	210		3.70	162
1880	316		2.96	146
1881	439		2.44	142
1882	463		2.43	135
1883	497		2.38	145
1884	499		2.38	157
1885	541		2.28	172
1886	541		2.21	178
1887	601		2.10	172
1888	651		2.01	170
1889	625		2.11	180
1890	640		2.13	178
1891	587		2.44	179
1892	598		2.56	192
1893	519		2.93	187
1894	547		2.87	209
1895	547		2.74	205
1896	502		2.79	215
1897	591		2.58	215
1898	754		2.28	206
1899	859		2.10	192
1900	916		2.10	178
1901	1,001		2.04	181
1902	1,067		1.98	170
1903	1,122		1.99	168
1904	1,198		1.98	168
1905	1,226		1.99	166
1906	1,342		1.93	162
1907	1,466		1.88	153
1908	1,607		1.88	159
1909	1,620		1.89	148
1910	1,603		1.91	142
1911	1,709		1.86	154
1912	1,763		1.82	145
1913	1,805	a	1.82	143
1914	1,814		1.83	147
1915	1,898		1.83	144
1916	2,346		1.68	117
1917	3,110		1.56	85
1918	3,041		1.86	76
1919	2,980		2.11	72
1920	2,721		2.55	65

(continued)

TABLE F-7 (continued)

Year (end of June)	Stock of Monetary Gold (\$ millions)		Ratio of High-Powered Money to Gold Stock (3)	Index of Commodity Value of Gold (1926=100) (4)
	Current Par Value (1)	Pre-1934 Par Value (2)		
1921	3,120		2.01	102
1922	3,619		1.67	103
1923	3,873		1.65	99
1924	4,300		1.52	102
1925	4,161		1.59	97
1926	4,237		1.60	100
1927	4,366		1.57	105
1928	3,877		1.75	103
1929	4,081		1.64	105
1930	4,281		1.52	116
1931	4,691		1.47	137
1932	3,643		2.01	154
1933	4,031		1.86	194
1934	7,877	4,652	1.16	225
1935	9,116	5,384	1.16	212
1936	10,667	6,300	1.08	210
1937	12,487	7,375	1.07	196
1938	13,007	7,682	1.11	215
1939	16,195	9,565	1.06	220
1940	20,049	11,841	1.08	215
1941	22,713	13,414	1.00	194
1942	22,759	13,441	1.09	171
1943	22,399	13,229	1.30	164
1944	21,194	12,517	1.66	163
1945	20,294	11,986	2.02	160
1946	20,341	12,013	2.15	140
1947	21,417	12,649	2.05	114
1948	23,740	14,021	1.89	105
1949	24,637	14,551	1.83	111
1950	24,331	14,370	1.75	107
1951	21,872	12,918	2.09	96
1952	23,532	13,898	2.03	99
1953	22,521	13,301	2.19	100
1954	22,027	13,009	2.18	100
1955	21,730	12,834	2.20	99

<sup>a</sup> Not shown, because same as col. 1, through 1933.

Source, by Column

- (1): Same as for Table F-5, col. 2, except that instead of corrections under (C) for lost gold in the notes to that table the following adjustment was made: The \$287 million gold coin presumed lost was distributed over the period 1908-33; that is, \$11.05 million was deducted from each of those years, on the assumption that the estimates of the Director of the Mint for the period before 1908 allow for lost coin. This seems preferable to assigning the entire loss to one arbitrary year.
- (2): 1934-55: Col. 1 times the ratio of the old to the new dollar value, \$20.67/\$35 or \$0.5906.
- (3): Table F-6, col. 7, for the end of the corresponding fiscal year, adjusted for gold coin presumed lost (see correction for gold stock figures in col. 1) divided by col. 1.
- (4): Index of average monthly wholesale prices due to Warren and Pearson 1875-89 and Bureau of Labor Statistics thereafter (Historical Statistics, 1949, Series App. 23-24, p. 344), adjusted for monthly variations in the dollar price of gold, 1875-78 (from W. C. Mitchell, Gold Prices Under the Greenback Standard, Berkeley, 1908), and 1933-34 (from G. F. Warren and F. A. Pearson, Gold and Prices, New York, 1935, p. 154), and for the devaluation of the dollar in 1934.

TABLE F-8  
DEPOSITS AND RESERVES AT COMMERCIAL BANKS, ANNUALLY AND SEMIANNUALLY, 1875-1955

Date (end of month)	National Banks			Other Commercial Banks			All Commercial Banks		
	Deposits (1)	Net Due to Nonnational Banks (2)	Reserves (3)	Deposits (4)	Reserves (5)	Deposits (6)	Reserves (7)	Due to Mutual Savings Banks (8)	
(million dollars)									
1875 Aug.	575	38	167	610	74	1,185	242	29	
1876 Feb.	560	43	156	598	71	1,158	227	29	
Aug.	549	36	160	603	71	1,152	230	29	
1877 Feb.	577	36	158	589	71	1,166	229	30	
Aug.	529	35	150	563	71	1,092	221	30	
1878 Feb.	532	32	155	521	69	1,053	225	29	
Aug.	525	30	152	501	74	1,026	226	28	
1879 Feb.	533	33	152	490	69	1,023	221	28	
Aug.	674	38	157	527	76	1,201	233	31	
1880 Feb.	699	51	174	596	86	1,295	261	29	
Aug.	715	60	198	665	99	1,380	297	30	
1881 Feb.	808	55	184	737	95	1,545	279	33	
Aug.	837	70	208	865	96	1,702	304	38	

(continued)

TABLE F-8 (continued)

Date (end of month)	National Banks			Other Commercial Banks			All Commercial Banks		
	Deposits (1)	Net Due to Nonnational Banks (2)	Reserves (3)	Deposits (4)	Reserves (5)	Deposits (6)	Reserves (7)	Due to Mutual Savings Banks (8)	
(million dollars)									
1882 June	894	68	208	893	97	1,787	305	38	
1883 June	943	65	223	1,012	94	1,955	317	40	
1884 June	900	56	216	1,023	120	1,922	336	43	
1885 June	982	70	293	1,074	146	2,057	438	41	
1886 June	1,059	73	265	1,270	163	2,330	426	44	
1887 June	1,142	73	278	1,344	174	2,486	452	50	
1888 June	1,209	87	298	1,332	175	2,541	473	51	
1889 June	1,330	105	314	1,394	170	2,724	484	52	
1890 June	1,422	108	297	1,598	166	3,020	463	53	
1891 June	1,443	110	325	1,655	173	3,098	498	57	

(continued)

TABLE F-8 (continued)

Date (end of month)	National Banks			Other Commercial Banks			All Commercial Banks		
	Deposits (1)	Net Due to Nonnational Banks (2)	Reserves (3)	Deposits (4)	Reserves (5)	Deposits (6)	Reserves (7)	Due to Mutual Savings Banks (8)	
(million dollars)									
1892 June	1,650	155	382	1,891	202	3,541	584	67	
1893 June	1,436	99	308	1,767	204	3,203	512	71	
1894 June	1,602	155	460	1,739	208	3,341	668	71	
1895 June	1,642	159	392	1,954	211	3,596	603	73	
1896 June	1,582	134	360	1,852	189	3,434	549	73	
1897 June	1,671	175	433	1,939	201	3,609	634	81	
1898 June	1,914	209	482	2,205	205	4,120	687	97	
1899 June	2,301	277	503	2,665	218	4,966	721	99	
1900 June	2,279	397	520	2,908	225	5,187	745	102	
1901 June	2,617	454	560	3,487	261	6,104	821	107	

(continued)

TABLE F-8 (continued)

Date (end of month)	National Banks			Other Commercial Banks			All Commercial Banks		
	Deposits (1)	Net Due to Nonnational Banks (2)	Reserves (3)	Deposits (4)	Reserves (5)	Deposits (6)	Reserves (7)	Due to Mutual Savings Banks (8)	
(million dollars)									
1902 June	2,831	502	585	3,898	262	6,729	847	107	
1903 June	2,952	461	561	4,171	281	7,123	842	105	
1904 June	3,140	584	661	4,440	324	7,580	985	118	
1905 June	3,488	607	656	5,108	321	8,596	977	116	
1906 June	3,711	585	672	5,567	354	9,278	1,026	116	
1907 June	4,054	603	714	5,823	383	9,877	1,097	120	
Dec. 1908	3,901	610	758	5,246	430	9,147	1,188	129	
June Dec. 1909	4,093	747	864	5,370	479	9,463	1,343	138	
	4,390	864	895	5,839	478	10,229	1,373	139	
June Dec. 1909	4,564	876	895	6,279	543	10,843	1,438	139	
	4,751	771	860	6,495	550	11,246	1,410	137	

(continued)



TABLE F-8 (continued)

Date (end of month)	National Banks			Other Commercial Banks			All Commercial Banks		
	Deposits (1)	Net Due to Nonnational Banks (2)	Reserves (3)	Deposits (4)	Reserves (5)	Deposits (6)	Reserves (7)	Due to Mutual Savings Banks (8)	
(million dollars)									
1910									
June	4,806	809	848	6,551	587	11,357	1,435	135	
Dec.	4,917	821	915	6,792	551	11,709	1,466	144	
1911									
June	5,147	877	942	7,023	582	12,170	1,524	154	
Dec.	5,291	885	970	7,427	614	12,718	1,584	152	
1912									
June	5,539	878	953	7,596	532	13,135	1,485	150	
Dec.	5,676	853	949	7,809	601	13,485	1,550	153	
1913									
June	5,649	865	937	7,847	581	13,496	1,518	155	
Dec.	5,794	904	1,034	8,136	554	13,930	1,588	163	
1914									
June	5,986	934	1,006	8,313	625	14,299	1,631	172	

(continued)

TABLE F-8 (continued)

Date (end of month)	Member Banks			Other Commercial Banks			All Commercial Banks		
	Deposits (1)	Net Due to Nonmember Banks (2)	Reserves (3)	Other Commercial Banks		Deposits (6)	Reserves (7)	Due to Mutual Savings Banks (8)	
				Deposits (4)	Reserves (5)				
(million dollars)									
1914 Dec.	5,986	681	1,003	8,457	617	14,443	1,620	177	
1915 June	6,445	977	1,128	8,811	620	15,256	1,748	182	
Dec.	7,155	1,143	1,307	9,855	637	17,010	1,944	196	
1916 June	7,904	1,228	1,278	10,285	671	18,189	1,949	211	
Dec.	8,625	1,364	1,574	11,667	842	20,292	2,416	212	
1917 June	9,558	1,465	1,723	11,758	676	21,316	2,399	212	
Dec.	13,534	1,441	1,923	9,104	503	22,638	2,426	205	
1918 June	14,528	1,435	1,835	7,834	427	22,362	2,262	199	
Dec.	15,729	1,526	2,018	9,168	391	24,897	2,409	198	
1919 June	17,234	1,549	2,095	9,228	421	26,462	2,516	197	
Dec.	19,027	1,548	2,182	10,316	428	29,343	2,610	197	
1920 June	19,514	1,662	2,224	10,949	436	30,463	2,660	196	
Dec.	19,441	1,463	2,303	10,584	404	30,025	2,707	189	

(continued)

(continued)

TABLE F-8 (continued)

Date (end of month)	Member Banks			Other Commercial Banks			All Commercial Banks		
	Deposits (1)	Net Due to Nonmember Banks (2)	Reserves (3)	Deposits (4)	Reserves (5)	Deposits (6)	Reserves (7)	Due to Mutual Savings Banks (8)	
(million dollars)									
1921									
June	18,451	1,354	2,041	9,839	379	28,290	2,420	182	
Dec.	18,726	1,364	2,089	9,434	359	28,160	2,448	188	
1922									
June	20,389	1,499	2,236	9,756	367	30,145	2,603	194	
Dec.	21,648	1,622	2,248	10,288	393	31,936	2,641	191	
1923									
June	21,751	1,612	2,245	10,817	378	32,568	2,623	188	
Dec.	22,035	1,627	2,373	11,043	401	33,078	2,774	202	
1924									
June	22,893	1,908	2,446	11,303	399	34,196	2,845	216	
Dec.	24,349	2,133	2,679	11,722	418	36,071	3,097	213	
1925									
June	25,560	1,990	2,640	12,363	412	37,923	3,052	209	
Dec.	25,874	1,984	2,757	13,183	428	39,057	3,185	209	
1926									
June	26,930	1,984	2,694	12,799	414	39,729	3,108	208	
Dec.	26,441	1,908	2,698	12,621	399	39,062	3,097	215	
1927									
June	27,828	2,135	2,842	12,777	405	40,605	3,247	223	
Dec.	28,282	2,297	2,907	12,872	403	41,154	3,310	214	

(continued)

TABLE F-8 (continued)

Date (end of month)	Member Banks			Other Commercial Banks			All Commercial Banks		
	Deposits (1)	Net due to Nonmember Banks (2)	Reserves (3)	Deposits (4)	Reserves (5)	Deposits (6)	Reserves (7)	Due to Mutual Savings Banks (8)	
(million dollars)									
1928									
June	29,088	2,000	2,803	13,018	387	42,106	3,190	206	
Dec.	29,442	2,151	2,854	13,359	406	42,801	3,260	196	
1929									
June	29,076	1,829	2,761	13,108	375	42,184	3,136	186	
Dec.	29,152	2,110	2,777	12,989	365	42,141	3,142	218	
1930									
June	29,090	2,344	2,878	12,677	344	41,767	3,222	255	
Dec.	28,857	2,274	2,978	11,590	339	40,447	3,317	298	
1931									
June	28,174	2,302	2,883	10,737	326	38,911	3,209	348	
Dec.	24,448	1,633	2,787	8,842	313	33,290	3,100	364	
1932									
June	22,611	1,409	2,507	7,592	270	30,203	2,777	381	
Dec.	22,793	1,501	2,901	7,198	241	29,991	3,142	371	
1933									
June	20,682	1,303	2,790	5,437	234	26,119	3,024	361	
Dec.	21,664	1,306	3,234	5,219	245	26,883	3,479	406	
1934									
June	23,704	1,619	4,290	5,504	255	29,208	4,495	457	
Dec.	25,064	1,682	4,590	5,948	280	31,010	4,870	465	

(continued)

TABLE F-8 (continued)

Date (end of month)	Member Banks			Other Commercial Banks			All Commercial Banks		
	Deposits (1)	Net Due to Nonmember Banks (2)	Reserves (3)	Deposits (4)	Reserves (5)	Deposits (6)	Reserves (7)	Due to Mutual Savings Banks (8)	
(million dollars)									
1935									
June	27,377	2,027	5,393	6,375	296	33,752	5,689	473	
Dec.	28,864	2,481	6,282	6,839	322	35,701	6,604	495	
1936									
June	31,280	2,704	6,167	7,043	358	38,323	6,525	488	
Dec.	32,184	2,883	7,333	7,427	378	39,611	7,711	503	
1937									
June	32,306	2,887	7,377	7,536	382	39,842	7,759	482	
Dec.	31,213	2,575	7,707	7,317	350	38,530	8,057	481	
1938									
June	31,588	2,516	8,605	7,227	378	38,815	8,983	514	
Dec.	33,579	2,869	9,497	7,444	375	41,023	9,872	512	
1939									
June	34,306	3,220	10,691	7,528	410	41,834	11,101	626	
Dec.	37,278	3,845	12,531	7,764	438	45,042	12,969	729	
1940									
June	39,876	3,998	14,297	7,916	562	47,792	14,859	890	
Dec.	42,265	4,174	14,832	8,111	658	50,376	15,490	866	
1941									
June	44,744	4,205	14,055	8,443	672	53,187	14,727	875	
Dec.	45,675	4,215	13,325	8,822	635	54,497	13,960	691	

(continued)

TABLE F-8 (continued)

Date (end of month)	Member Banks			Other Commercial Banks			All Commercial Banks		
	Deposits (1)	Net Due to Nonmember Banks (2)	Reserves (3)	Deposits (4)	Reserves (5)	Deposits (6)	Reserves (7)	Due to Mutual Savings Banks (8)	
(million dollars)									
1942									
June	49,413	4,264	13,057	8,586	560	57,999	13,617	660	
Dec.	55,022	4,779	13,316	10,021	469	65,043	13,785	561	
1943									
June	63,278	6,052	12,904	11,253	534	74,531	13,438	630	
Dec.	67,881	5,029	13,130	12,409	503	80,290	13,633	699	
1944									
June	70,382	5,182	13,969	13,292	544	83,674	14,513	449	
Dec.	76,343	5,447	14,570	15,169	554	91,512	15,124	487	
1945									
June	83,323	5,831	15,627	16,179	563	99,502	16,190	495	
Dec.	88,110	6,425	16,353	18,158	593	106,268	16,937	504	
	(\$bill.)		(\$bill.)	(\$bill.)		(\$bill.)	(\$bill.)		
1946									
June	93.6	6,120	16.56	18.5	654	112.1	17.20	645	
Dec.	95.7	6,031	17.05	19.6	675	115.3	17.73	706	
1947									
June	97.4	5,851	17.15	20.1	709	117.5	17.86	738	
Dec.	100.1	5,765	18.89	20.4	695	120.5	19.60	762	

(continued)

(continued)

TABLE F-8 (concluded)

Date (end of month)	Member Banks			Other Commercial Banks			All Commercial Banks		
	Deposits (1)	Net Due to Nonmember Banks (2)	Reserves (3)	Deposits (4)	Reserves (5)		Deposits (6)	Reserves (7)	Due to Mutual Savings Banks (8)
	(\$bill.)		(\$bill.)	(\$bill.)			(\$bill.)	(\$bill.)	
1948									
June	99.9	5,739	18.75	19.7	694		119.6	19.46	722
Dec.	98.9	5,609	21.39	20.2	748		119.1	22.14	749
1949									
June	99.6	5,628	19.54	19.9	728		119.5	20.27	683
Dec.	99.7	5,549	17.61	20.5	762		120.2	18.37	738
1950									
June	102.9	5,694	17.41	20.4	763		123.3	18.17	710
Dec.	104.6	6,184	17.96	21.3	788		125.9	18.74	658
1951									
June	106.4	6,127	20.08	21.0	811		127.4	20.88	722
Dec.	110.4	6,544	20.95	21.8	811		132.1	21.76	728
1952									
June	113.2	6,721	21.39	23.2	809		136.3	22.20	826
Dec.	115.0	6,805	20.88	23.5	761		138.5	21.64	763
1953									
June	116.9	6,948	21.13	23.8	815		140.7	21.94	729
Dec.	118.6	7,159	21.05	24.3	845		142.9	21.90	819
1954									
June	120.7	8,131	20.47	24.6	814		145.2	21.29	836
Dec.	124.3	7,868	20.4	25.2	863		149.5	21.26	852
1955									
June	127.1	8,223	20.1	25.3	904		152.3	21.00	831
Dec.	127.8	7,759	19.8	26.1	959		153.9	20.76	887

## NOTES TO TABLE F-8

Note: Semiannual figures are seasonally adjusted.

Source, by Column

- (1): Deposits of the public less float and (beginning June 1911) of the postal savings system at national member banks.

1875-June 1914: For annual data and, for semiannual data, call-date figures from Annual Report, Comptroller, nearest to June 30 seasonally adjusted and interpolated arithmetically to end-of-month dates.

Dec. 1914-55: Call-date figures from Banking and Monetary Statistics and FRB, seasonally adjusted.

Deposits of the public at national banks are individual deposits and dividends unpaid; and at member banks are time and demand deposits, letters of credit, and certified, cashiers', travelers' checks.

Deposits of the postal savings system were estimated for some earlier years (for which they were not reported separately from U.S. deposits) to be the total held at all banks given in Banking and Monetary Statistics (assuming that amounts held at nonmember banks were zero before June 1921 and at nonnational banks were zero before June 1912).

- (2) 1875-June 1914: Due to nonnational banks less due from the same, including the net amount owed on clearing house loan certificates. 1875-1906, for annual data, call-date figures from Annual Report, Comptroller, nearest June 30; for semiannual data, call-date figures seasonally adjusted and interpolated arithmetically to end-of-month dates. June 1907-14, call-date figures from Annual Report, Comptroller, seasonally adjusted and interpolated arithmetically to end-of-month dates.

Dec. 1914-55: Due to all banks less due from the same. Call-date figures from Banking and Monetary Statistics and FRB seasonally adjusted. "Due from" excludes foreign banks after 1919. This series includes "due to less due from" member banks, which may not equal zero because of items in transit.

- (3): Vault cash, plus (Dec. 1914 and after) deposits less float of member banks at Federal Reserve Banks.

Annual data, 1882-1906: Vault cash (all currency and coin on hand).

Semiannual data, 1875-81 and 1907-June 1919: Call-date figures nearest June 30, from Annual Report, Comptroller. Call-date figures, from ibid., and Banking and Monetary Statistics, adjusted for daily and monthly seasonal variations and interpolated arithmetically to end-of-month dates.

Dec. 1919-55: Wed. figures nearest end of June and Dec. (except before June 1921 when it is Fri.) from FRB, adjusted for daily and monthly seasonal variations.

Federal Reserve member bank balances less float (i.e., uncollected items less deferred availability items): Dec. 1914-55 Federal Reserve Bank reports from Banking and Monetary Statistics and FRB for Wed. nearest June 30 and last Wed. in Dec., except June 1915-Dec. 1920, when it is Fri.; Dec. 1914, for which only an end-of-month figure is available; and June 1930-36, for which only end-of-month figures are available for float. All are seasonally adjusted. In 1933 the figures include special deposits of member banks not recorded in their reserve accounts (FRB, 1933 and 1934). (This series is the same as that used to derive high-powered money for Table F-5 except that the latter series contains minor adjustments of reported Federal Reserve float.)

- (4): Deposits less float of the public and postal savings system deposits at other commercial banks.

1875-95: Centered annual and semiannual averages from David I. Fand, "Non-National Banks Estimates: 1867-1896," unpublished Ph.D. dissertation, University of Chicago, 1954.

1896-1906: Call-date figures nearest June 30 for each state from All-Bank Statistics, Board of Governors, FRS, 1943.

June 1914-Dec. 1955: Seasonally adjusted estimates from Friedman and Schwartz, A Monetary History, worksheets underlying Table A-1, col. 4.



## NOTES TO TABLE F-8 (concluded)

- (5): Vault cash plus (Dec. 1914 and after) balances of nonmember commercial banks at Federal Reserve Banks.  
 Vault cash of nonnational commercial banks.  
1875-95: Centered annual and semiannual averages from Fand, "Non-National Banks Estimates."  
1896-1906: Call-date figures nearest June 30, for each state, from All-Bank Statistics.  
1907-42: Vault cash of nonmember commercial and mutual savings banks seasonally adjusted from Friedman and Schwartz worksheets, less vault cash of mutual savings banks on June 30 from All-Bank Statistics and, for Dec., an arithmetic interpolation of June figures. (Vault cash data for the two classes of banks are not available separately in Friedman and Schwartz estimates.)  
1943-1955: Call-date figures from FRB, seasonally adjusted (including a small amount of vault cash in banks in U.S. possessions, excluded from the other series).  
 Balances at Federal Reserve Banks.  
Dec. 1914-55: Balances of nonmember banks at year's end from Annual Report, Federal Reserve Board and Board of Governors, FRS, and FRB, partly estimated for certain years and, for June, an arithmetic interpolation of Dec. figures, less balances of mutual savings banks at Federal Reserve Banks from Annual Report, Federal Deposit Insurance Corporation since Dec. 1947, and assumed zero earlier.
- (6): Deposits at banks of the public and the postal savings system less float. Col. 1 plus col. 4. This series differs slightly from that in Friedman and Schwartz, A Monetary History, Table A-1, col. 4. The differences are due to later revisions made in the latter.
- (7): Col. 3 plus col. 4 before rounding. (The vault cash component of this series is the same as estimates of total vault cash in Friedman and Schwartz, A Monetary History, Table A-2, except for the exclusion here of mutual savings banks vault cash and for minor differences in seasonal adjustment.)
- (8) 1875-1887: Cash assets of mutual savings banks (5.2 per cent of deposits, which is the corresponding average percentage for 1888-92) less their vault cash from Fand, "Non-National Banks Estimates."  
1888-95: Balances of mutual savings banks in each state at commercial banks from Annual Report, Comptroller, interpolated logarithmically to June 30, totaled, and raised by 10 per cent (10 per cent is the average understatement of the uncorrected figures in 1896-97, based on a comparison with the subsequent, more accurate source).  
1896-1934: Balances of mutual savings banks at banks for June 30, from All-Bank Statistics, and interpolated logarithmically for Dec.  
1935-46: Total cash assets of mutual savings banks excluding cash items (Table F-17, col. 2), less their vault cash for June from All-Bank Statistics, and interpolated arithmetically for Dec.  
1947-55: Balances of mutual savings banks at banks, excluding Federal Reserve Banks, from Annual Report, FDIC, seasonally adjusted.

TABLE F-9

PERCENTAGE OF COMMERCIAL BANK DEPOSITS CREATED BY  
NATIONAL OR MEMBER BANKS, ANNUALLY AND SEMIANNUALLY,  
1875-1955

1875	Aug.	49.8	1911	June	43.0	1933	June	79.5
1876	Feb.	49.6		Dec.	42.3		Dec.	80.9
	Aug.	48.9	1912	June	42.8	1934	June	81.4
1877	Feb.	50.8		Dec.	42.7		Dec.	81.1
	Aug.	49.8	1913	June	42.5	1935	June	81.4
1878	Feb.	51.8		Dec.	42.3		Dec.	81.1
	Aug.	52.5	1914	June	42.6	1936	June	81.9
1879	Feb.	53.4		Dec.	42.2		Dec.	81.5
	Aug.	57.2	1915	June	42.9	1937	June	81.3
1880	Feb.	55.0		Dec.	42.7		Dec.	81.2
	Aug.	52.8	1916	June	44.1	1938	June	81.6
1881	Feb.	53.3		Dec.	43.1		Dec.	82.1
	Aug.	50.3	1917	June	45.4	1939	June	82.3
1882	June	51.1		Dec.	60.1		Dec.	83.0
1883	June	49.3	1918	June	65.3	1940	June	83.7
1884	June	48.0		Dec.	63.5		Dec.	84.2
1885	June	48.8	1919	June	65.4	1941	June	84.4
1886	June	46.4		Dec.	65.1		Dec.	84.0
1887	June	47.0	1920	June	64.3	1942	June	85.4
1888	June	48.6		Dec.	65.0		Dec.	84.7
1889	June	49.8	1921	June	65.4	1943	June	85.0
1890	June	48.0		Dec.	66.7		Dec.	84.7
1891	June	47.5	1922	June	67.8	1944	June	84.2
1892	June	47.6		Dec.	68.0		Dec.	83.5
1893	June	46.0	1923	June	67.0	1945	June	83.8
1894	June	49.0		Dec.	66.8		Dec.	83.0
1895	June	46.7	1924	June	67.2	1946	June	83.6
1896	June	47.2		Dec.	67.7		Dec.	83.1
1897	June	47.5	1925	June	67.6	1947	June	83.0
1898	June	47.7		Dec.	66.4		Dec.	83.2
1899	June	47.4	1926	June	68.0	1948	June	83.6
1900	June	45.0		Dec.	67.9		Dec.	83.2
1901	June	43.9	1927	June	68.7	1949	June	83.5
1902	June	43.0		Dec.	68.9		Dec.	83.0
1903	June	42.3	1928	June	69.2	1950	June	83.5
1904	June	42.3		Dec.	68.9		Dec.	83.2
1905	June	41.4	1929	June	69.1	1951	June	83.6
1906	June	40.7		Dec.	69.3		Dec.	83.6
1907	June	41.8	1930	June	69.8	1952	June	83.1
	Dec.	43.4		Dec.	71.6		Dec.	83.1
1908	June	44.1	1931	June	72.7	1953	June	83.2
	Dec.	43.7		Dec.	73.7		Dec.	83.1
1909	June	42.8	1932	June	75.2	1954	June	83.2
	Dec.	42.9		Dec.	76.3		Dec.	83.2
1910	June	43.0				1955	June	83.5
	Dec.	42.7					Dec.	83.1

Semiannual figures are seasonally adjusted.

Sum of Table F-8, cols. 1 and 8, divided by sum of cols. 6 and 8, before rounding. These figures are too high (at most, by a percentage point or two) because col. 8 includes mutual savings bank balances at other commercial banks, which cannot be excluded. The amount of this overstatement is not the same from year to year but probably varies with the relative importance of other commercial banks; hence it is probably smaller for more recent years than earlier.

TABLE F-10

RESERVE RATIOS OF COMMERCIAL BANKS, ANNUALLY AND SEMIANNUALLY, 1875-1955  
(per cent)

Date (end of month)	National Banks, Net Due to Nonnational Banks		Other Commercial Banks (3)	All Commercial Banks (4)
	Included (1)	Excluded (2)		
1875 Aug.	27.2	27.6	12.1	19.9
1876 Feb.	25.9	26.5	11.9	19.1
Aug.	27.4	27.7	11.8	19.5
1877 Feb.	25.8	26.0	12.1	19.1
Aug.	26.6	26.8	12.6	19.7
1878 Feb.	27.5	27.6	13.2	20.8
Aug.	27.4	27.5	14.8	21.4
1879 Feb.	26.9	27.1	14.1	21.0
Aug.	22.1	22.3	14.4	18.9
1880 Feb.	23.2	23.9	14.4	19.7
Aug.	25.5	26.6	14.9	21.1
1881 Feb.	21.3	21.9	12.9	17.7
Aug.	22.9	23.8	11.1	17.5
1882 June	21.6	22.3	10.9	16.7
1883 June	22.1	22.7	9.3	15.9
1884 June	22.6	22.9	11.7	17.1
1885 June	27.8	28.6	13.6	20.9
1886 June	23.4	24.0	12.8	18.0
1887 June	22.9	23.3	12.9	17.8
1888 June	23.0	23.7	13.1	18.2
1889 June	21.9	22.7	12.2	17.4
1890 June	19.4	20.1	10.4	15.1
1891 June	20.9	21.7	10.4	15.8
1892 June	21.2	22.2	10.7	16.2
1893 June	20.1	20.4	11.5	15.6
1894 June	26.2	27.5	12.0	19.6
1895 June	21.8	22.9	10.8	16.4
1896 June	21.0	21.8	10.2	15.7
1897 June	23.5	24.7	10.4	17.2
1898 June	22.7	24.0	9.3	16.3
1899 June	19.5	21.0	8.2	14.2
1900 June	19.4	21.8	7.7	14.1
1901 June	18.2	20.6	7.5	13.2
1902 June	17.6	19.9	6.7	12.4
1903 June	16.4	18.4	6.7	11.6
1904 June	17.7	20.3	7.3	12.8
1905 June	16.0	18.2	6.3	11.2
1906 June	15.6	17.6	6.4	10.9
1907 June	15.3	17.1	6.6	11.0
Dec.	16.8	18.8	8.2	12.8
1908 June	17.9	20.4	8.9	14.0
Dec.	17.0	19.8	8.2	13.2
1909 June	16.5	19.0	8.6	13.1
Dec.	15.6	17.6	8.5	12.4
1910 June	15.1	17.2	9.0	12.5
Dec.	15.9	18.1	8.1	12.4
1911 June	15.6	17.8	8.3	12.4
Dec.	15.7	17.8	8.3	12.3
1912 June	14.9	16.8	7.0	11.2
Dec.	14.5	16.3	7.7	11.4
1913 June	14.4	16.1	7.4	11.1
Dec.	15.4	17.4	6.8	11.3
1914 June	14.5	16.3	7.5	11.3

(continued)

TABLE F-10 (continued)

Date (end of month)		Member Banks Net Due to Nonmember Banks		Other Commercial Banks (3)	All Commercial Banks (4)
		Included (1)	Excluded (2)		
1914	Dec.	15.0	16.3	7.3	11.1
1915	June	15.2	17.0	7.3	11.3
	Dec.	15.3	17.8	6.5	11.3
1916	June	14.0	15.7	6.5	10.6
	Dec.	15.8	17.8	7.2	11.8
1917	June	15.6	17.6	5.7	11.1
	Dec.	12.8	14.0	5.5	10.6
1918	June	11.5	12.5	5.5	10.0
	Dec.	11.7	12.7	4.3	9.6
1919	June	11.2	12.0	4.6	9.4
	Dec.	10.6	11.4	4.1	8.8
1920	June	10.5	11.3	4.0	8.7
	Dec.	11.0	11.7	3.8	9.0
1921	June	10.3	11.0	3.9	8.5
	Dec.	10.4	11.0	3.8	8.6
1922	June	10.2	10.9	3.8	8.6
	Dec.	9.7	10.3	3.8	8.2
1923	June	9.6	10.2	3.5	8.0
	Dec.	10.0	10.7	3.6	8.3
1924	June	9.9	10.6	3.5	8.3
	Dec.	10.1	10.9	3.6	8.5
1925	June	9.6	10.2	3.3	8.0
	Dec.	9.9	10.6	3.2	8.1
1926	June	9.3	9.9	3.2	7.8
	Dec.	9.5	10.1	3.2	7.9
1927	June	9.5	10.1	3.2	8.0
	Dec.	9.5	10.2	3.1	8.0
1928	June	9.0	9.6	3.0	7.5
	Dec.	9.0	9.6	3.0	7.6
1929	June	8.9	9.4	2.9	7.4
	Dec.	8.9	9.5	2.8	7.4
1930	June	9.2	9.8	2.7	7.7
	Dec.	9.6	10.2	2.9	8.1
1931	June	9.5	10.1	3.0	8.2
	Dec.	10.7	11.2	3.5	9.2
1932	June	10.4	10.9	3.6	9.1
	Dec.	11.9	12.5	3.3	10.3
1933	June	12.7	13.3	4.3	11.4
	Dec.	14.1	14.7	4.7	12.7
1934	June	16.9	17.8	4.6	15.2
	Dec.	17.2	18.0	4.7	15.5
1935	June	18.3	19.4	4.6	16.6
	Dec.	20.0	21.4	4.7	18.2
1936	June	18.1	19.4	5.1	16.8
	Dec.	20.9	22.4	5.1	19.2
1937	June	21.0	22.5	5.1	19.2
	Dec.	22.8	24.3	4.8	20.7
1938	June	25.2	26.8	5.2	22.8
	Dec.	26.1	27.9	5.0	23.8

(continued)

TABLE F-10 (concluded)

Date (end of month)		Member Banks, Net Due to Nonmember Banks		Other Commercial Banks (3)	All Commercial Banks (4)
		Included (1)	Excluded (2)		
1939	June	28.5	30.6	5.4	26.1
	Dec.	30.5	33.0	5.6	28.3
1940	June	32.6	35.1	7.1	30.5
	Dec.	31.9	34.4	8.1	30.2
1941	June	28.7	30.8	8.0	27.2
	Dec.	26.7	28.7	7.2	25.3
1942	June	24.3	26.1	6.5	23.2
	Dec.	22.3	24.0	4.7	21.0
1943	June	18.6	20.2	4.7	17.9
	Dec.	18.0	19.1	4.1	16.8
1944	June	18.5	19.7	4.1	17.3
	Dec.	17.8	19.0	3.7	16.4
1945	June	17.5	18.6	3.5	16.2
	Dec.	17.3	18.5	3.3	15.9
1946	June	16.6	17.6	3.5	15.3
	Dec.	16.8	17.7	3.5	15.3
1947	June	16.6	17.5	3.5	15.1
	Dec.	17.8	18.7	3.4	16.2
1948	June	17.7	18.6	3.5	16.2
	Dec.	20.5	21.5	3.7	18.5
1949	June	18.6	19.5	3.7	16.9
	Dec.	16.7	17.5	3.7	15.2
1950	June	16.0	16.8	3.7	14.7
	Dec.	16.2	17.1	3.7	14.8
1951	June	17.8	18.7	3.9	16.3
	Dec.	17.9	18.9	3.7	16.4
1952	June	17.8	18.8	3.5	16.2
	Dec.	17.1	18.0	3.2	15.5
1953	June	17.1	18.0	3.4	15.5
	Dec.	16.7	17.6	3.5	15.2
1954	June	15.9	16.9	3.3	14.6
	Dec.	15.4	16.3	3.4	14.1
1955	June	14.8	15.7	3.6	13.7
	Dec.	14.6	15.4	3.6	13.4

## Source by Column

- (1): Col. 3 divided by sum of cols. 1 and 2, Table F-8.  
 (2): Col. 3 divided by cols. 1 and 8, Table F-8. These figures are slightly too low because col. 8 includes mutual savings bank balances at other commercial banks, which cannot be excluded.  
 (3): Col. 5 divided by col. 4, Table F-8.  
 (4): Col. 7 divided by sum of cols. 6 and 8, Table F-8.

All computations were made before rounding the data from Table F-8. Semi-annual figures are seasonally adjusted.

TABLE F-11  
RESERVE RATIOS OF NATIONAL BANKS, BY CLASS OF BANK, ANNUALLY, 1875-1917  
(per cent)

Year	Central Reserve City Banks				Reserve City Banks				Country Banks				All National Banks			
	Total (1)	Required (2)	Usable (3)	Total (4)	Required (5)	Usable (6)	Total (7)	Required (8)	Usable (9)	Total (10)	Required (11)	Usable (12)	Total (10)	Required (11)	Usable (12)	Total (10)
1875	42.6	34.3	8.3	24.2	13.0	11.2	16.6	2.4	14.2	25.0	13.1	11.9	25.0	13.1	11.9	25.0
1876	43.8	34.9	8.9	26.2	13.4	12.8	16.1	2.5	13.6	25.7	13.4	12.3	25.7	13.4	12.3	25.7
1877	38.7	34.0	4.7	25.9	13.1	12.8	17.0	2.5	14.5	24.5	12.7	11.8	24.5	12.7	11.8	24.5
1878	41.3	37.1	4.2	26.6	13.3	13.3	18.4	2.3	16.1	25.9	13.3	12.6	25.9	13.3	12.6	25.9
1879	38.5	37.1	1.4	26.2	13.5	12.7	17.0	2.8	14.2	24.4	13.4	11.0	24.4	13.4	11.0	24.4
1880	41.7	38.1	3.6	24.5	13.7	10.8	15.7	3.4	12.3	23.9	13.9	10.0	23.9	13.9	10.0	23.9
1881	35.3	36.5	-1.2	22.1	13.9	8.2	14.0	3.9	10.1	20.5	13.1	7.4	20.5	13.1	7.4	20.5
1882	36.2	34.8	1.4	21.7	13.7	8.0	14.1	4.1	10.0	20.3	12.5	7.8	20.3	12.5	7.8	20.3
1883	39.0	35.7	3.3	22.9	13.6	9.3	14.0	4.2	9.8	21.0	12.5	8.5	21.0	12.5	8.5	21.0
1884	48.9	33.4	15.5	26.9	13.6	13.3	16.0	4.3	11.7	25.5	12.6	12.9	25.5	12.6	12.9	25.5
1885	52.7	34.7	18.0	27.4	14.0	13.4	16.1	4.4	11.7	26.8	13.4	13.4	26.8	13.4	13.4	26.8
1886	39.5	35.4	4.1	23.5	14.0	9.5	15.5	4.8	10.7	22.0	12.8	9.2	22.0	12.8	9.2	22.0
1887	39.8	33.9	5.9	22.1	14.2	7.9	14.7	5.1	9.6	21.8	13.4	8.4	21.8	13.4	8.4	21.8
1888	40.9	35.1	5.8	21.5	14.7	6.8	14.1	5.4	8.7	21.9	14.3	7.6	21.9	14.3	7.6	21.9
1889	38.5	35.8	2.7	19.6	14.8	4.8	13.1	5.5	7.6	20.0	14.1	5.9	20.0	14.1	5.9	20.0
1890	38.4	34.1	4.3	18.2	14.4	3.8	12.6	5.5	7.1	19.4	13.7	5.7	19.4	13.7	5.7	19.4
1891	38.2	33.7	4.5	20.6	14.2	6.4	13.2	5.5	7.7	20.3	13.6	6.7	20.3	13.6	6.7	20.3
1892	37.1	34.3	2.8	19.3	14.4	4.9	12.5	5.5	7.0	19.4	13.8	5.6	19.4	13.8	5.6	19.4
1893	48.6	31.8	17.0	23.0	13.7	9.3	17.4	5.2	12.2	25.8	13.2	12.6	25.8	13.2	12.6	25.8
1894	46.6	33.3	13.3	19.5	14.2	5.3	13.8	5.3	8.5	23.7	14.8	8.9	23.7	14.8	8.9	23.7
1895	37.8	32.8	5.0	17.9	13.8	4.1	12.7	5.4	7.3	20.1	14.1	6.0	20.1	14.1	6.0	20.1
1896	38.6	32.1	6.5	21.1	13.6	7.5	15.7	5.2	10.5	22.3	13.5	8.8	22.3	13.5	8.8	22.3
1897	40.3	34.8	5.5	19.9	14.4	5.5	13.1	5.3	7.8	21.5	14.8	6.7	21.5	14.8	6.7	21.5
1898	39.4	36.7	2.7	19.6	14.6	5.0	12.5	5.4	7.1	20.9	15.5	5.4	20.9	15.5	5.4	20.9
1899	36.9	36.4	0.5	17.4	15.2	2.2	11.1	5.5	5.6	19.1	15.7	3.4	19.1	15.7	3.4	19.1
1900	41.0	36.5	4.5	17.7	15.2	2.5	10.3	5.4	4.9	19.8	15.7	4.1	19.8	15.7	4.1	19.8
1901	36.6	34.7	1.9	16.2	15.2	1.0	9.6	5.4	4.2	18.1	15.3	2.8	18.1	15.3	2.8	18.1
1902	34.6	35.6	-1.0	15.3	15.1	0.2	8.8	5.5	3.3	16.2	14.6	1.6	16.2	14.6	1.6	16.2
1903	35.3	32.8	2.5	16.3	14.3	2.0	9.3	5.3	4.0	16.9	13.7	3.2	16.9	13.7	3.2	16.9
1904	36.4	33.0	3.4	16.0	14.5	1.5	8.8	5.3	3.6	17.8	14.8	3.0	17.8	14.8	3.0	17.8

(continued)

TABLE F-11 (concluded)

Year	Central Reserve City Banks			Reserve City Banks			Country Banks			All National Banks		
	Total (1)	Required (2)	Usable (3)	Total (4)	Required (5)	Usable (6)	Total (7)	Required (8)	Usable (9)	Total (10)	Required (11)	Usable (12)
1905	34.5	33.4	1.1	16.0	14.6	1.4	8.6	5.3	3.3	16.7	14.3	2.4
1906	34.5	35.1	-0.6	15.1	14.4	0.7	8.2	5.3	3.0	15.0	13.3	1.7
1907	33.9	33.9	2.0	16.5	14.3	2.2	8.4	5.3	3.1	15.6	12.9	2.7
1908	37.9	33.7	4.2	17.5	14.1	3.4	9.3	5.2	4.1	18.0	14.0	4.0
1909	34.0	33.1	0.9	16.2	14.1	2.1	8.7	5.2	3.4	16.2	13.7	2.5
1910	35.5	33.1	2.4	15.9	13.9	2.0	8.5	5.3	3.2	15.9	13.1	2.8
1911	34.6	33.0	1.6	15.8	13.9	1.9	8.2	5.3	2.9	15.6	13.2	2.4
1912	33.1	33.1	0.0	15.2	13.9	1.3	8.0	5.3	2.7	14.7	12.9	1.8
1913	33.8	31.4	2.4	15.5	14.0	1.5	7.7	5.5	2.2	14.6	12.5	2.1
1914	31.9	30.7	1.2	16.1	13.8	2.3	8.3	5.9	2.4	15.1 <sup>b</sup>	13.0	2.1
1915	37.6	<sup>a</sup>	<sup>a</sup>	13.4	<sup>a</sup>	<sup>a</sup>	8.7	<sup>a</sup>	<sup>a</sup>	16.4	<sup>a</sup>	<sup>a</sup>
1916	26.3			14.7			10.1			15.0		
1917	21.2			15.1			10.4			14.2		

Source: Ratio of reserves to deposits for call date nearest Oct. 1st from Annual Report, Comptroller, and National Bank Call Report. The usable ratio is the difference between the total and the required ratios. Cols. 10, 11, and 12 are presented back to 1865 in Table 24.

Deposits (all cols.): 1875-1914, Individual deposits and dividends unpaid (and deposits of postal savings system first shown separately in 1913-14) less float; and due to less due from state banks, trust companies, and savings banks. 1915-17, Demand deposits (excluding Treasury balances, which are shown for all banks only and so were distributed one-third to each class) less float, time deposits including postal savings, dividends unpaid (shown separately 1915-16); and due to less due from nonnational banks (estimated 1915-16 for each class of banks by multiplying "due to banks" of the class by the ratio for all national banks of "net due to banks" to "gross due to banks").

High-powered reserves (cols. 1, 4, 7, and 10): All currency and coin on hand (including clearing house loan certificates in 1885 and 1914) and (beginning 1915) balances at Federal Reserve Banks.

Required high-powered reserves (cols. 2, 5, 8, and 11): Requirements in effect times net amount of deposits subject to requirements reported in Annual Report, Comptroller, less (1875-1913) the 5 per cent redemption fund for national bank notes, which counted toward reserve requirements until 1914.

<sup>a</sup>Not computed for years after 1914 (see Table F-12 for all national banks).

<sup>b</sup>Figure for December 1914 (just after Federal Reserve Act came into effect) is 14.8.

TABLE F-12  
 REQUIRED AND USABLE RESERVE RATIOS OF MEMBER BANKS,  
 SEMIANNUALLY, 1914-55  
 (per cent)

Date		Reserve Ratio		Date		Reserve Ratio	
(end of month)		Required	Usable	(end of month)		Required	Usable
		(1)	(2)			(1)	(2)
1914	June	13.3	1.2	1935	June	8.9	9.4
	Dec.	10.3	4.7		Dec.	8.6	11.4
1915	June	10.3	4.9	1936	June	8.7	9.4
	Dec.	11.9	3.9		Dec.	13.0	7.9
1916	June	11.6	2.4	1937	June	17.5	3.5
	Dec.	12.4	3.4		Dec.	16.9	5.9
1917	June	13.4	2.2	1938	June	15.3	9.9
	Dec.	8.9	3.9		Dec.	14.9	11.2
1918	June	8.6	2.9	1939	June	15.9	12.6
	Dec.	9.0	2.7		Dec.	15.4	15.1
1919	June	8.9	2.3	1940	June	16.1	16.5
	Dec.	8.7	1.9		Dec.	15.6	16.3
1920	June	8.8	1.7	1941	June	16.3	12.4
	Dec.	8.1	2.9		Dec.	18.4	8.3
1921	June	8.4	1.9	1942	June	18.8	5.5
	Dec.	8.1	2.3		Dec.	18.3	4.0
1922	June	8.3	1.9	1943	June	16.0	2.6
	Dec.	7.9	1.8		Dec.	15.8	2.2
1923	June	8.1	1.5	1944	June	15.8	2.7
	Dec.	7.8	2.2		Dec.	15.3	2.5
1924	June	8.1	1.8	1945	June	15.2	2.3
	Dec.	8.0	2.1		Dec.	15.1	2.2
1925	June	8.0	1.6	1946	June	15.3	1.3
	Dec.	8.0	1.9		Dec.	15.2	1.6
1926	June	7.8	1.5	1947	June	15.1	1.5
	Dec.	7.8	1.7		Dec.	15.3	2.5
1927	June	7.9	1.6	1948	June	15.9	1.8
	Dec.	7.8	1.7		Dec.	18.2	2.3
1928	June	7.7	1.3	1949	June	16.7	1.9
	Dec.	7.5	1.5		Dec.	14.5	2.2
1929	June	7.7	1.2	1950	June	14.4	1.6
	Dec.	7.6	1.3		Dec.	14.7	1.5
1930	June	7.8	1.4	1951	June	16.6	1.2
	Dec.	7.5	2.1		Dec.	16.7	1.2
1931	June	7.7	1.8	1952	June	16.9	0.9
	Dec.	7.5	3.2		Dec.	16.6	0.5
1932	June	7.6	2.8	1953	June	15.6	1.5
	Dec.	7.8	4.1		Dec.	15.2	1.5
1933	June	8.3	4.4	1954	June	14.4	1.5
	Dec.	8.1	6.0		Dec.	13.9	1.5
1934	June	8.4	8.5	1955	June	13.5	1.3
	Dec.	8.4	8.8		Dec.	13.7	0.9

Source

1914-June 1917, National Banks Only, by Column

- (1): Ratio of required reserves to deposits. Denominator is deposits of the public and postal savings system, less float and due to less due from nonnational banks, for call dates nearest end of June and Dec. from Banking and Monetary Statistics, seasonally adjusted. This series is the same as the sum of cols. 1 and 2, Table F-8, except for the exclusion of state member banks.



## NOTES TO TABLE F-12 (concluded)

The latter banks were unimportant during that period, and their exclusion has little effect on the figures. Numerator is the required reserves of national banks on corresponding call dates from Annual Report, Comptroller, Vol. II, 1917, pp. 244-48, seasonally adjusted.

- (2): Ratio of usable reserves to deposits. Denominator is the same as for col. 1. Numerator is high-powered reserves minus required reserves used for col. 1. High-powered reserves are the same as col. 3, Table F-8, except for the exclusion of state member banks.

Dec. 1917-55, All Member Banks, by Column

- (1): Ratio of required reserves to deposits. Denominator is the sum of cols. 1 and 2, Table F-8. Numerator is member bank reserve balances (excluding excess reserves) at Federal Reserve Banks, for Wed. nearest end of June and Dec., from Banking and Monetary Statistics and FRB seasonally adjusted.

- (2): Col. 1 subtracted from col. 1, Table F-10.

Note: Figures are seasonally adjusted. The corresponding total reserve ratio (sum of cols. 1 and 2) is given in Table F-10, col. 1.

TABLE F-13  
RESERVE RATIOS OF MEMBER BANKS, BY CLASS OF BANK,  
ANNUALLY, 1918-55  
(per cent)

Year	Central Reserve City Banks (1)	Reserve City Banks (2)	Country Banks (3)	All Member Banks (4)	Year	Central Reserve City Banks (1)	Reserve City Banks (2)	Country Banks (3)	All Member Banks (4)
1918	20.4	12.6	9.5	13.9	1938	46.5	22.0	13.9	26.5
1919	17.5	12.2	9.4	12.6	1939	52.1	24.0	14.3	29.7
1920	15.9	11.2	9.0	11.5	1940	55.7	28.8	16.0	34.5
1921	14.8	10.6	8.5	10.8	1941	43.5	28.3	16.2	29.9
1922	15.7 <sup>a</sup>	10.1	8.2	10.8	1942	33.3	24.5	16.9	25.0
1923	16.5	10.2 <sup>a</sup>	7.8	10.5	1943	21.7	21.0	16.0	19.6
1924	18.9	10.1	8.1	11.0	1944	21.6	20.3	15.5	18.9
1925	18.7	10.1	8.1	10.9	1945	22.0	19.8	14.7	18.4
1926	17.8	9.7	7.9	10.5	1946	21.3	18.5	13.4	17.2
1927	17.0	9.3	7.7	10.2	1947	21.0	18.0	13.4	16.9
1928	15.2	9.0	7.1	9.6	1948	25.1	18.5	13.9	18.2
1929	15.4	9.0	7.1	9.6	1949	24.9	19.2	14.5	18.7
1930	18.2	8.9	7.5	10.2	1950	22.4	16.7	11.9	16.1
1931	17.0	9.0	7.7	10.3	1951	25.9	19.1	13.4	18.3
1932	17.6	8.9	8.0	10.7	1952	25.7	17.9	13.7	17.9
1933	18.9	11.1	9.1	12.7	1953	25.9	17.5	13.2	17.5
1934	26.9	15.5	11.6	17.5	1954	22.5	17.1	12.8	16.5
1935	30.3	16.1	12.2	19.3	1955	20.3	15.7	11.6	15.0
1936	30.7	18.3	12.3	20.1					
1937	34.9	20.5	14.4	22.6					

Source: Ratio of high-powered reserves to deposits for call dates nearest June 30, from Banking and Monetary Statistics and Member Bank Call Report.

Deposits: Demand deposits (including certified, cashiers', and travelers' checks listed separately 1919-22) less float; time deposits including postal savings (except 1942, when they are not separated from U.S. time deposits); and due to non-member banks less due from (estimated by multiplying "due to banks" of each class by the ratio for all member banks of "net due to banks" to "gross due to banks"). "Due from banks" excludes foreign banks except in 1918 and excludes reciprocal bank balances after 1941. "Due to banks" excludes foreign banks, foreign branches of domestic banks, and reciprocal bank balances after 1941.

High-powered reserves: All currency and coin on hand and balances at Federal Reserve Banks.

<sup>a</sup>St. Louis was a central reserve city until 1922; its reserve city status begins with the 1923 figure.

TABLE F-14

HYPOTHETICAL RESERVE RATIO OF NATIONAL OR MEMBER BANKS,  
 BASED ON 1914 DISTRIBUTION OF DEPOSITS AMONG BANKS,  
 ANNUALLY, 1875-1955  
 (per cent)

Actual Ratio Minus Hypothetical Ratio (2)			Actual Ratio Minus Hypothetical Ratio (2)		
Year	Hypothetical Ratio (1)	Year	Hypothetical Ratio (1)	Year	Hypothetical Ratio (1)
1875	23.9	1.1	1916	14.6	0.4
1876	24.3	1.4	1917	13.8	0.4
1877	23.7	0.8	1918	12.5	1.4
1878	25.2	.7	1919	11.8	0.8
1879	23.8	.6	1920	11.0	0.5
1880	23.3	.6	1921	10.4	0.4
1881	20.4	0.1	1922	10.2	0.6
1882	20.6	-0.3	1923	10.2	0.3
1883	21.4	-0.4	1924	10.8	0.2
1884	25.5	0.0	1925	10.8	0.1
1885	26.5	0.3	1926	10.4	0.1
1886	22.5	-0.5	1927	10.0	0.2
1887	21.7	0.1	1928	9.2	0.3
1888	21.5	.4	1929	9.3	0.4
1889	19.9	.1	1930	10.0	0.2
1890	19.3	.1	1931	10.0	0.3
1891	20.2	.1	1932	10.2	0.5
1892	19.3	.1	1933	11.6	1.1
1893	25.2	0.6	1934	15.7	1.8
1894	21.9	1.8	1935	16.9	2.4
1895	19.1	1.0	1936	17.6	2.5
1896	21.8	0.5	1937	20.1	2.5
1897	20.4	1.1	1938	22.6	3.9
1898	19.8	1.1	1939	24.5	5.2
1899	18.0	1.1	1940	27.4	7.1
1900	18.5	1.3	1941	24.9	5.0
1901	16.8	1.3	1942	22.2	2.8
1902	15.7	0.5	1943	18.5	1.1
1903	16.4	0.5	1944	18.0	0.9
1904	16.3	1.5	1945	17.5	0.9
1905	15.8	0.9	1946	16.3	0.9
1906	15.4	-0.4	1947	16.1	0.8
1907	16.1	-0.5	1948	17.4	0.8
1908	17.2	0.8	1949	17.8	0.9
1909	15.8	0.4	1950	15.3	0.8
1910	15.9	0.0	1951	17.4	0.9
1911	15.5	0.1	1952	17.2	0.7
1912	15.0	-0.3	1953	16.9	0.6
1913	15.0	-0.4	1954	15.9	0.6
1914	15.1	0.0	1955	14.4	0.6
1915	15.8	0.6			

Source, by Column

- (1): Weighted average of reserve ratios for three classes of national or member banks (Table F-11, cols. 1, 4, and 7; and Table F-13, cols. 1, 2, and 3), where the weights are the proportionate amount of deposits at each class in 1914: central reserve city banks, 20.3 per cent; reserve city banks, 26.0 per cent; and country banks, 53.7 per cent.

## NOTES TO TABLE F-14 (concluded)

- (2): Table F-11, col. 1 subtracted from col. 10 (1875-1917) and Table F-13, col. 4 (1918-55).

An algebraic expression for col. 2 is derived as follows: Let  $R_t^i$  represent the reserve ratio for the  $i$  class of banks at time  $t$ , and  $w_t^i$ , the amount of deposits at this class as a fraction of those at all classes at time  $t$ . The operator  $\Delta$  signifies the change in a variable over the period  $t-1$  to  $t$ . Then the actual ratio  $R_t^a$  and the hypothetical ratio  $R_t^h$  are given by

$$R_t^a = R_t^1 w_t^1 + R_t^2 w_t^2 + R_t^3 w_t^3$$

$$R_t^h = R_{t-1914}^1 w_{t-1914}^1 + R_{t-1914}^2 w_{t-1914}^2 + R_{t-1914}^3 w_{t-1914}^3.$$

The difference between them is

$$R_t^a - R_t^h = R_t^1 (w_t^1 - w_{t-1914}^1) + R_t^2 (w_t^2 - w_{t-1914}^2) + R_t^3 (w_t^3 - w_{t-1914}^3). \quad (1)$$

We may similarly express the total change in  $R^a$  as

$$\Delta R_t^a = \sum_1^3 \Delta (R_t^i w_t^i). \quad (2)$$

Expanding and rearranging terms, we get:

$$\Delta R_t^a = \sum_1^3 R_t^i \Delta w_t^i + \sum_1^3 w_t^i \Delta R_t^i - \sum_1^3 \Delta R_t^i \Delta w_t^i. \quad (3)$$

This divides the total into three subchanges: one representing the change in weights, one, the change in reserve ratios, and one, the interaction between the two subchanges, respectively.

The change in  $R^a - R^h$ , using (1), is

$$\Delta (R_t^a - R_t^h) = \sum_1^3 \Delta (R_t^i w_t^i) - \sum_1^3 w_{t-1914}^i \Delta R_t^i, \text{ since } \Delta w_{t-1914}^i = 0.$$

Collecting terms and using (3), we get:

$$\Delta (R_t^a - R_t^h) = \sum_1^3 R_t^i \Delta w_t^i + \sum_1^3 (w_t^i - w_{t-1914}^i) \Delta R_t^i - \sum_1^3 \Delta R_t^i \Delta w_t^i. \quad (4)$$

In most periods the absolute difference between  $\Delta w_t^i$  and  $(w_t^i - w_{t-1914}^i)$ , that is,  $w_{t-1}^i - w_{t-1914}^i$ , is small, since the weights in fact have small year-to-year changes and no trend. Consequently, the second term on the right side approximates in magnitude the interaction (last) term, and the two tend to cancel each other. Hence, changes in the difference between the actual and the hypothetical ratio reflect mainly changes in the weights.

TABLE F-15

TOTAL CASH RESERVE RATIO OF NATIONAL OR MEMBER BANKS,  
BY CLASS OF BANK, ANNUALLY, 1875-1955  
(per cent)

Year	Central Reserve City Banks (1)	Reserve City Banks (2)	Country Banks (3)	All National or Member Banks (4)
1875	35.8	40.7	40.7	39.3
1876	37.1	42.5	41.8	40.7
1877	34.8	39.9	40.4	38.7
1878	33.6	42.4	44.7	40.9
1879	29.9	43.1	45.3	40.4
1880	31.7	43.0	43.7	40.1
1881	30.2	36.5	39.6	36.3
1882	32.0	34.9	34.3	34.0
1883	32.4	38.1	33.7	34.7
1884	40.9	39.7	35.9	38.2
1885	42.0	40.9	38.7	40.2
1886	32.8	36.9	36.4	35.7
1887	36.2	37.1	34.1	35.4
1888	36.1	38.7	35.1	36.3
1889	35.0	37.1	34.9	35.5
1890	36.3	35.3	32.3	34.1
1891	36.0	37.3	32.8	34.8
1892	34.5	36.8	33.9	34.8
1893	44.3	39.6	34.5	38.5
1894	40.7	38.6	36.0	38.2
1895	35.0	36.5	32.9	34.5
1896	36.9	38.9	33.9	36.1
1897	36.4	41.1	37.5	38.1
1898	35.4	39.8	36.7	37.1
1899	33.0	38.5	37.8	36.6
1900	36.0	40.9	36.0	37.4
1901	34.7	38.7	33.3	35.2
1902	33.5	37.5	31.2	33.6
1903	35.0	38.3	29.8	33.5
1904	34.3	41.6	30.8	34.8
1905	32.7	39.6	31.1	33.9
1906	32.6	37.4	29.4	32.5
1907	33.6	37.1	28.1	31.9
1908	34.5	41.1	29.9	34.3
1909	31.9	38.2	28.2	32.1
1910	33.7	37.8	26.2	31.4
1911	33.2	37.3	26.3	31.2
1912	32.9	37.5	26.4	31.2
1913	33.0	36.9	24.8	30.1
1914	32.9	34.5	24.1	29.1
1915	33.6	34.9	24.0	29.7
1916	26.6	33.2	26.5	28.4
1917	20.8	24.1	23.1	22.8
1918	24.6	26.4	20.8	23.7
1919	22.1	23.3	20.3	21.8
1920	18.1	20.0	17.7	18.5
1921	16.8	17.6	15.4	16.5
1922	17.1	18.4	16.3	17.2
1923	17.7	17.4	15.3	16.6

(continued)

TABLE F-15 (concluded)

Year	Central Reserve City Banks (1)	Reserve City Banks (2)	Country Banks (3)	All National or Member Banks (4)
1924	19.9	19.2	16.1	18.0
1925	20.2	17.6	16.2	17.6
1926	18.7	17.2	15.5	16.8
1927	18.0	16.2	15.2	16.2
1928	16.4	15.7	13.8	15.1
1929	17.4	15.8	13.3	15.2
1930	19.5	18.2	14.9	17.2
1931	18.4	18.4	16.4	17.7
1932	19.0	17.8	14.7	17.0
1933	20.4	22.1	18.5	20.4
1934	25.7	27.6	24.1	25.9
1935	29.0	28.1	26.4	27.9
1936	27.9	30.9	27.9	29.0
1937	32.1	29.0	27.3	29.4
1938	40.8	33.8	29.2	34.6
1939	45.1	36.1	31.3	37.7
1940	47.8	41.3	36.0	42.3
1941	38.1	39.6	36.6	38.2
1942	30.5 <sup>a</sup>	32.2 <sup>a</sup>	34.7 <sup>a</sup>	32.3 <sup>a</sup>
1943	20.5	25.7	30.7	25.7
1944	20.3	24.8	28.8	24.8
1945	20.7	23.7	27.2	24.1
1946	20.3	21.9	22.6	21.8
1947	20.1	21.4	21.7	21.2
1948	23.8	21.8	21.7	22.2
1949	23.7	22.3	21.8	22.4
1950	21.2	19.7	20.0	20.2
1951	24.5	22.0	21.1	22.2
1952	24.2	21.0	22.0	22.2
1953	24.3	20.7	21.0	21.6
1954	21.2	20.4	21.1	20.9
1955	19.3	18.8	19.1	19.0

Source: 1875-1917: Call date nearest Oct. for national banks from Annual Report, Comptroller; and National Bank Call Report.

1918-55: Call date nearest June 30 for member banks from Member Bank Call Report.

Denominator is the same as for Tables F-11 and F-13 except that interbank deposits are treated differently: gross (not net) amounts due to all (not just other commercial) banks are included (except that deposits of foreign banks and reciprocal balances were excluded when available separately).

Numerator is high-powered reserves used in Tables F-11 and F-13 plus amounts due from all banks (excluding deposits of foreign banks and reciprocal balances when available separately).

These reserve ratios represent a combination of banks without cancellation of interbank deposits in contrast to all the ratios used elsewhere in this study, in which the banking system is consolidated and interbank deposits cancel out.

The cash reserve ratio is high-powered reserves and amounts due from other banks divided by deposits of the public and amounts due to banks.

<sup>a</sup>Exclude reciprocal balances beginning 1942 (see notes to table). Ratios for 1942, including these balances, are, reading left to right: 30.8, 33.6, 34.9, and 33.1.

TABLE F-16

TOTAL CASH RESERVE RATIO OF OTHER COMMERCIAL BANKS,  
ANNUALLY AND SEMIANNUALLY, 1896-1955  
(per cent)

1896	June	24.6	1924	June	16.2	1943	June	32.4
1897	June	27.8	1925	June	17.2		Dec.	28.8
1898	June	27.0	1926	June	16.4	1944	June	28.9
1899	June	25.7	1927	June	16.3		Dec.	26.5
1900	June	25.3	1928	June	14.4	1945	June	27.2
1901	June	23.5	1929	June	13.5		Dec.	25.2
1902	June	22.6	1930	June	14.3	1946	June	23.6
1903	June	21.9	1931	June	16.3		Dec.	21.0
1904	June	25.3	1932	June	16.4	1947	June	20.7
1905	June	21.8	1933	June	19.8		Dec.	20.2
1906	June	21.2	1934	June	23.8	1948	June	20.1
1907	June	21.7		Dec.	25.4		Dec.	19.3
1908	June	25.6	1935	June	26.0	1949	June	19.6
1909	June	24.2		Dec.	27.0		Dec.	18.7
1910	June	22.9	1936	June	28.1	1950	June	19.9
1911	June	24.0		Dec.	28.9		Dec.	20.2
1912	June	22.5	1937	June	26.1	1951	June	20.8
1913	June	22.0		Dec.	25.6		Dec.	22.0
1914	June	22.2	1938	June	27.3	1952	June	20.5
1915	June	23.3		Dec.	27.0		Dec.	20.0
1916	June	22.6	1939	June	28.3	1953	June	20.0
1917	June	22.6		Dec.	30.8		Dec.	19.9
1918	June	21.9	1940	June	33.9	1954	June	19.9
1919	June	20.3		Dec.	34.6		Dec.	19.2
1920	June	17.8	1941	June	35.5	1955	June	18.9
1921	June	16.1		Dec.	35.0		Dec.	18.4
1922	June	17.0	1942	June	35.6			
1923	June	16.7		Dec.	34.6			

Source: This series is the same as Table F-10, col. 3, except for the inclusion here in the numerator of the amount due from banks and inclusion here in the denominator of the amount due to banks from All-Bank Statistics, FRE, and Annual Report, FDIC, seasonally adjusted after 1933. This series is comparable to the national or member bank ratio shown in Table F-15.

Note: Semiannual figures are seasonally adjusted; not available before 1896.

TABLE F-17

DEPOSITS, RESERVES, AND RESERVE RATIO OF MUTUAL SAVINGS BANKS,  
ANNUALLY AND SEMIANNUALLY, 1875-1955

Date (end of month)	Deposits (\$ millions) (1)	Reserves (\$ millions) (2)	Reserve Ratio (per cent) (3)
1875 Aug.	837		
1876 Feb.	842		
Aug.	847		
1877 Feb.	841		
Aug.	818		
1878 Feb.	797		
Aug.	772		
1879 Feb.	751		
Aug.	744		
1880 Feb.	787		
Aug.	829		
1881 Feb.	867		
Aug.	957		
1882 June	952		
1883 June	1,004		
1884 June	1,034		
1885 June	1,068		
1886 June	1,125		
1887 June	1,183		
1888 June	1,237	66	5.3
1889 June	1,300	68	5.2
1890 June	1,373	68	5.0
1891 June	1,427	71	5.0
1892 June	1,517	83	5.5
1893 June	1,546	88	5.7
1894 June	1,571	89	5.7
1895 June	1,650	91	5.5
1896 June	1,693	91	5.4
1897 June	1,784	98	5.5
1898 June	1,869	114	6.1
1899 June	1,999	116	5.8
1900 June	2,128	120	5.6
1901 June	2,260	124	5.5
1902 June	2,389	123	5.1
1903 June	2,504	121	4.8
1904 June	2,601	135	5.2
1905 June	2,743	133	4.8
1906 June	2,911	132	4.5
1907 June	3,011	141	4.7
Dec.	3,017	149	4.9
1908 June	3,000	157	5.2
Dec.	3,055	157	5.1
1909 June	3,133	157	5.0
Dec.	3,221	156	4.8
1910 June	3,290	155	4.7
Dec.	3,356	162	4.8
1911 June	3,429	169	4.9
Dec.	3,501	168	4.8
1912 June	3,587	166	4.6
Dec.	3,658	169	4.6

(continued)



TABLE F-17 (continued)

Date (end of month)		Deposits (\$ millions) (1)	Reserves (\$ millions) (2)	Reserve Ratio (per cent) (3)
1913	June	3,732	171	4.6
	Dec.	3,786	181	4.8
1914	June	3,841	193	5.0
	Dec.	3,862	199	5.2
1915	June	3,873	205	5.3
	Dec.	3,986	220	5.5
1916	June	4,103	236	5.8
	Dec.	4,277	238	5.6
1917	June	4,342	238	5.5
	Dec.	4,359	229	5.3
1918	June	4,344	222	5.1
	Dec.	4,498	222	4.9
1919	June	4,715	222	4.7
	Dec.	4,926	223	4.5
1920	June	5,146	222	4.3
	Dec.	5,362	213	4.0
1921	June	5,492	205	3.7
	Dec.	5,572	215	3.9
1922	June	5,683	225	4.0
	Dec.	5,919	220	3.7
1923	June	6,189	215	3.5
	Dec.	6,416	229	3.6
1924	June	6,582	243	3.7
	Dec.	6,819	240	3.5
1925	June	7,033	236	3.4
	Dec.	7,218	235	3.3
1926	June	7,424	234	3.2
	Dec.	7,678	242	3.2
1927	June	7,953	251	3.2
	Dec.	8,264	242	2.9
1928	June	8,508	234	2.8
	Dec.	8,752	225	2.6
1929	June	8,836	216	2.4
	Dec.	8,794	249	2.8
1930	June	9,050	287	3.2
	Dec.	9,387	332	3.5
1931	June	9,854	383	3.9
	Dec.	9,940	407	4.1
1932	June	9,880	432	4.4
	Dec.	9,871	426	4.3
1933	June	9,576	420	4.4
	Dec.	9,503	460	4.8
1934	June	9,638	506	5.3
	Dec.	9,702	511	5.3
1935	June	9,777	516	5.3
	Dec.	9,839	541	5.5
1936	June	9,918	536	5.4
	Dec.	10,018	553	5.5
1937	June	10,094	533	5.3
	Dec.	10,129	535	5.3
1938	June	10,155	570	5.6
	Dec.	10,238	572	5.6

(continued)

TABLE F-17 (concluded)

Date (end of month)	Deposits (\$ millions) (1)	Reserves (\$ millions) (2)	Reserve Ratio (per cent) (3)
1939 June	10,377	690	6.6
Dec.	10,481	799	7.6
1940 June	10,573	967	9.1
Dec.	10,615	944	8.9
1941 June	10,595	955	9.0
Dec.	10,500	771	7.3
1942 June	10,344	741	7.2
Dec.	10,637	641	6.0
1943 June	11,070	709	6.4
Dec.	11,678	776	6.6
1944 June	12,390	524	4.2
Dec.	13,297	563	4.2
1945 June	14,331	572	4.0
Dec.	15,295	585	3.8
1946 June	16,172	730	4.5
Dec.	16,769	790	4.7
1947 June	17,500	822	4.7
Dec.	17,700	858	4.8
1948 June	18,100	815	4.5
Dec.	18,400	841	4.6
1949 June	18,800	781	4.2
Dec.	19,300	834	4.3
1950 June	19,800	801	4.0
Dec.	20,000	754	3.8
1951 June	20,300	822	4.0
Dec.	20,900	836	4.0
1952 June	21,700	928	4.3
Dec.	22,600	872	3.9
1953 June	23,500	838	3.6
Dec.	24,400	928	3.8
1954 June	25,300	955	3.8
Dec.	26,300	967	3.7
1955 June	27,200	951	3.5
Dec.	28,100	904	3.2

Source, by Column

- (1): Deposits of the public: Estimates of Friedman and Schwartz, A Monetary History, Table A-1, col. 5, not incorporating minor later revisions in the latter.
- (2): Vault cash; and balances at commercial banks, not available before 1888. (For the purposes of Table F-8, col. 8, balances at commercial banks were estimated indirectly by extrapolating later reserve ratios back in time, which is not appropriate here.)  
 1888-95: Balances of mutual savings banks in each state at commercial banks from Annual Report, Comptroller, interpolated logarithmically to June 30, totaled, and raised by 10 per cent (which is the average understatement of this series in 1896-97, based on a comparison with the subsequent, more accurate source) plus vault cash from Fand, "Nonnational Banks Estimates."  
 1896-1934: Total cash assets, excluding cash items in process of collection, for June from All-Bank Statistics and interpolated logarithmically for Dec.

## NOTES TO TABLE F-17 (concluded)

1935-46: Total cash assets from Annual Report, FDIC, for 1935-38 and FRB for 1939-46, seasonally adjusted, less cash items, for June from All-Bank Statistics, and for Dec. an arithmetic interpolation of June figures.

1947-55: Total cash assets excluding cash items and balances at Federal Reserve Banks from Annual Report, FDIC, seasonally adjusted.

This series, less balances at commercial banks, shown in Table F-8, col. 8, equals vault cash of mutual savings banks.

Note: Semiannual figures are seasonally adjusted.

TABLE F-18

RATIO OF CURRENCY TO CONSUMER EXPENDITURES,  
DECENNIALLY AND ANNUALLY, 1869-1960  
(per cent)

1869-78	9.0 <sup>a</sup>	1911	5.9	1936	8.3
1879-88	8.7 <sup>a</sup>	1912	5.7	1937	8.2
1889	8.4	1913	5.6	1938	8.5
1890	9.3	1914	5.6	1939	8.8
1891	9.1	1915	5.6	1940	9.3
1892	9.1	1916	5.2	1941	10.2
1893	9.4	1917	5.6	1942	12.8
1894	9.4	1918	6.7	1943	16.2
1895	8.5	1919	7.0	1944	19.2
1896	8.3	1920	6.7	1945	20.7
1897	8.0	1921	6.4	1946	17.9
1898	9.0	1922	5.9	1947	15.8
1899	8.3	1923	5.7	1948	14.4
1900	8.7	1924	5.4	1949	13.8
1901	8.1	1925	5.4	1950	12.6
1902	8.0	1926	5.1	1951	12.0
1903	8.2	1927	5.0	1952	12.0
1904	8.0	1928	4.8	1953	11.7
1905	7.8	1929	4.5	1954	11.3
1906	7.5	1930	4.8	1955	10.5
1907	7.6	1931	6.3	1956	10.2
1908	7.9	1932	9.3	1957	9.7
1909	6.5	1933	10.2	1958	9.5
1910	6.2	1934	8.8	1959	9.0
		1935	8.4	1960	8.6

Source: Currency outside banks from Friedman and Schwartz, A Monetary History, Table A-1. Annual and semiannual data before 1907, for dates near the middle of year; thereafter, averages of monthly data. Currency includes state bank notes 1869-75.

Consumer expenditures from John W. Kendrick, Productivity Trends in the United States, Princeton for NBER, 1961, pp. 296-297, extended with Department of Commerce figures.

<sup>a</sup>Ten-year averages of annual figures.