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ESTIMATES FOR THE PERIOD SINCE 1867

FOR THE PERIOD after the Civil War, numerous private individuals used the official compilations of currency and deposit data or rearranged and added to them in various ways.¹ However, only three constructed estimates for the period before World War I that are sufficiently close to our own to justify detailed attention: Edwin W. Kemmerer, who constructed estimates of currency held by the public, 1879–1904; Irving Fisher, who constructed estimates of currency held by the public and deposits, 1896–1909; and Wesley C. Mitchell, who revised and extended Fisher's estimates to cover the period 1890–1911. All these were annual (see section 1, below).

The establishment of the Federal Reserve System produced new

¹ See, for example, M. L. Muhleman, *The Money of the United States*, New York, 1894, where annual figures, 1873–93, are given for the stock of currency, by kinds, in and outside the Treasury; for the "supply of retail money" (the sum of small-denomination notes, silver coin, and gold coin held by the public) in aggregate and per capita; and for total deposits at national and state banks (pp. 42–43, 56, 59). See also *idem*, *Monetary Systems of the World*, New York, 1896, an enlarged edition of the previous work, extending the earlier tables to 1895–96 and including a table of the stock of U.S. currency in and outside the Treasury, decennially, 1800–30, and annually, 1831–61, as shown in the Comptroller of the Currency, *Annual Report*, 1896, p. 544. Muhleman prepared or verified the tables at the end of each chapter in A. B. Hepburn, *History of Coinage and Currency in the United States and the Perennial Contest for Sound Money*, New York, 1903. The same tabular material appears in a revised and enlarged version, *A History of Currency in the United States*, New York, 1915, but Muhleman is not acknowledged as he was in the earlier volume.

Muhleman's impact on the development of monetary statistics in the U.S. came with the publication of his criticism of the official gold stock estimates for years beginning 1873 (see his "Stock of Gold in the United States," *Political Science Quarterly*, Mar. 1901, p. 96). This criticism influenced the Director of the Mint in 1907 to correct the error in the estimate that had been accumulating since 1873 (see Chapter 6, footnote 5, above). Muhleman's own earlier revisions of the gold stock were superseded by the Director of the Mint's new series. His estimates of gold coin held by the public was the only significant new trail blazed by Muhleman in his statistical work.

banking and monetary data. W. I. King was perhaps the first scholar to use these to construct currency and deposit estimates. He combined them with data for earlier years to produce annual estimates for the years 1881–1920. He also used them to make the first estimates on a monthly basis—for 1914–20.

Mitchell published annual estimates for 1919–26 of deposits subject to check that had been constructed by Carl Snyder of the Federal Reserve Bank of New York; and Y. S. Leong made detailed monthly, call date, and annual estimates for the years 1914–29 (section 2).

King, Mitchell, and Leong followed earlier practice in stressing the components, not their total. The first estimates stressing the total quantity of money came after the Great Contraction. They were constructed by Lauchlin Currie and James W. Angell. Both considered explicitly the question of how to define money, constructed estimates for alternative variants, and in other ways went considerably farther than earlier scholars (see section 3).

Although the Federal Reserve became a major source of basic data immediately after it began operations, it did not itself publish a historical series on the aggregate quantity of money until 1941.² These estimates were superseded in 1943 by the annual series the Board published in 1943 in *Banking and Monetary Statistics*. That series in turn was revised and extended in 1959 in *All-Bank Statistics, 1896–1955*. The annual series in *All-Bank Statistics*, as continued, as well as new monthly and weekly series developed since and published currently have become the standard coin of the field of monetary economics (section 4). We adopted the annual series in *All-Bank Statistics* as the backbone of our own estimates for the period for which they overlap, with one important exception. That exception is the Federal Reserve's estimated subdivision of total commercial bank deposits into demand and time deposits before 1914.³ We present in the appendix to this chapter the evidence that persuaded us that that subdivision is subject to an intolerably large margin of error—much larger than the margin of error in our

² Board of Governors of the Federal Reserve System, *Banking Studies*, Baltimore, 1941, p. 447. This was an annual series of bank deposits and currency beginning 1890, combining Angell's estimates for 1890–1918 with the Board's own estimates, 1919–40, "from reports of condition of all banks in the United States" (p. 447).

³ H. A. Latané was mistaken when he wrote (in reference to *Banking and Monetary Statistics*), "The demand deposit estimates before 1914 are based on bank call date data and are published by the Federal Reserve Board . . ." ("Income Velocity and Interest Rates—A Pragmatic Approach," *Review of Economics and Statistics*, Nov. 1960, p. 447).

estimates of total deposits before 1914 or of demand and time deposits separately thereafter.

1. Estimates by Kemmerer, Fisher, and Mitchell

Currency Held by the Public

E. W. Kemmerer was the first scholar to construct estimates of currency held by the public in the period since 1867. He made annual estimates, 1879–1904, simply by rearranging official figures. His base was currency outside the Treasury as reported by the Treasury. From this total he subtracted amounts in national banks and in nonnational banks, as reported by the Comptroller of the Currency. He did not adjust the reported figures for nonreporting banks or for other possible sources of error, and he made no attempt to estimate deposits.⁴ As we noted in discussing the estimates before 1867, Crawford, Gallatin, and Seaman had earlier recognized the significance of the concept of currency in the possession of the public. No one continued their estimates of that item. Decades later, the concept had to be rediscovered. After Kemmerer, its acceptance was secure. His estimates served as the starting point of the estimates made successively since, beginning with Irving Fisher's, which have refined the base and the subtrahend.

Fisher's estimates were for a briefer period, ending five years later, 1896–1909. He improved on Kemmerer's currency estimates in two ways.⁵ First, he corrected the Treasury figures on the stock of currency for revisions in the estimated gold stock for 1906 and earlier years made by the Director of the Mint in his 1907 annual report.⁶ Second, he estimated vault cash in nonnational banks that did not report to the Comptroller of the Currency. In computing currency in the hands of the public, he subtracted this amount as well as reported vault cash, and currency held by the Treasury.

Fisher based his estimate of nonreported vault cash on estimates published by the Comptroller for 1900 and 1902–09 of the number and aggregate deposits of nonreporting banks—all of which, of course, were

⁴ E. W. Kemmerer, *Money and Credit Instruments in their Relation to General Prices*, New York, 1907, pp. 98–100. Kemmerer estimated check transactions (*M'V'*) but not deposits and their velocity separately.

⁵ Irving Fisher, *Purchasing Power of Money*, New York, 1911, pp. 432, 435.

⁶ See Chapter 6, footnote 5, above.

nonnational. Fisher extrapolated and interpolated these deposit estimates to obtain a continuous series for 1896–1909; he then estimated vault cash in nonreporting banks by multiplying the estimated deposits by the ratio of vault cash to deposits in reporting banks, i.e., he assumed that the two classes of banks held the same amount of vault cash per dollar of deposits.

Mitchell made two further changes. First, he corrected bank vault cash for reporting banks by subtracting “cash items” included in the published figures for nonnational banks.⁷ These “cash items” represent checks in the process of collection rather than specie or bank notes of other banks. Second, he used a different method of estimating vault cash in nonreporting banks. His method involved assuming that nonreporting banks were on the average identical with private banks that reported rather than with all banks that reported. This approximation was suggested by the estimated size of nonreporting banks which was closest to that for private banks. He therefore estimated vault cash in nonreporting banks by multiplying the average vault cash per reporting private bank by the estimated number of nonreporting banks. This number, in turn, he derived from a set of annual figures in the National Monetary Commission publication by Barnett, referred to above.⁸

Deposits Held by the Public

The deposit component that both Fisher and Mitchell estimated was “individual deposits subject to check.” The term “individual” referred to all holders of deposits other than banks and the U.S. government. That is, it corresponded to what we now term individuals, partnerships, corporations, states, counties, and municipalities. “Deposits subject to check” is a component of demand deposits as currently defined but does not exhaust that class of deposits.⁹ Mitchell wrote that, until publication

⁷ W. C. Mitchell, *Business Cycles*, Berkeley, 1913, pp. 315–316, 318–322.

⁸ George E. Barnett, *State Banks and Trust Companies Since the Passage of the National Bank Act*, National Monetary Commission, 1911, S. Doc. 587, 659, 61st Cong., 3rd sess. Barnett's estimates improved upon the Comptroller's but in turn needed correction for double-counting of some banks, 1900–08. Mitchell therefore revised them.

⁹ See *All-Bank Statistics*, p. 88, for a list of components of demand deposits (other than interbank and U.S. government deposits). The principal components in addition to deposits subject to check are letters of credit and travelers' checks, sold for cash and outstanding; certified, cashiers', and treasurers' checks; dividends unpaid; demand certificates of deposit; time certificates of deposit payable within thirty days; and deposits subject to withdrawal within thirty days.

Note also the Comptroller of the Currency's statement that even if national banks establish a savings department and pay interest on deposits, “Deposits in commercial banks are presumed to be subject to demand” (*Annual Report*, 1912, p. 11).

of the National Monetary Commission's 1909 data for all banks, it had been customary "to assume that the volume of deposit currency available for business use is best represented by the individual deposits of the commercial banks."¹⁰ The 1909 data, however, classified individual deposits for the first time as (1) subject to check; (2) savings deposits or deposits in interest or savings department; (3) demand certificates of deposit; (4) time deposits, including time certificates of deposits; (5) certified checks; (6) cashiers', treasurers', or secretaries' checks outstanding; (7) deposits not classified.¹¹

The revelation that only a fraction of individual deposits was subject to check had a marked impact on economists. At the time, a number of them were trying to test the quantity theory of money in transactions form statistically by substituting values for MV , $M'V'$, and T in the equation of exchange and then comparing the calculated with the actual price level. Kemmerer had made such a test by multiplying his currency estimates (M) by 47, which he assumed to be the average velocity of circulation of currency, and adding an independent estimate of $M'V'$, obtained by multiplying bank clearings by 2.86, on the assumption that clearings were 35 per cent of "total check circulation." Fisher estimated each of the five magnitudes separately, confining his estimate of M' to item 1 of the classification of individual deposits.

The same magnitudes interested Mitchell for the purpose of determining their behavior during business cycles—not for testing the quantity theory. Like Fisher, however, he estimated M' as deposits subject to check, describing items 2 to 6 of individual deposits as "deposits . . . made on conditions which precluded their free use as deposit currency." His segregation of item 1 from the other items is understandable in light of his emphasis on transactions. However, he proceeded not only to segregate the remaining items but to ignore them completely, even though he gave figures on deposits at savings banks (the sum of mutual and stock savings bank time deposits) and analyzed their cyclical behavior, noting that in depression years "people seem to put into the savings banks funds which they would have kept in hand or in checking deposits if trade had remained active."¹² Clearly, there is a hiatus in his analysis.

¹⁰ *Business Cycles*, 1913, p. 318.

¹¹ *Special Report from the Banks of the United States*, National Monetary Commission, 1910, S. Doc. 225, 61st Cong., 2nd sess.

¹² *Business Cycles*, pp. 318, 390, 393.

In order to get earlier data comparable to those for 1909, Fisher asked A. Piatt Andrew to furnish breakdowns for a sample of earlier years. Andrew complied for 1896, 1899, and 1906. For each year, he subdivided individual deposits into the seven classes of deposits listed above for six classes of banks (national, state, stock savings, mutual savings, loan and trust, private).¹³ As we shall see later, these breakdowns, despite the extensive use that has been made of them, are of questionable accuracy (see below, appendix to this chapter).¹⁴

Fisher used Andrew's data for the three years plus the data for 1909 as bench-mark data, adjusting them to get the concept he wanted. He made two main adjustments. First, he added estimated deposits subject to check of nonreporting banks—using the 1896–1909 annual series that he constructed from the Comptroller's estimates for 1900 and 1902–09 (to which we referred above, in discussing Fisher's estimate of nonreporting bank vault cash). Second, he subtracted clearinghouse exchanges (estimated by raising clearinghouse exchanges of national banks by 25 per cent to allow for those of nonnational banks). Fisher ignored cash items, which national banks also reported, and which, following current usage, would be combined with clearinghouse exchanges to estimate float.¹⁵

To interpolate between the four bench-mark dates, Fisher constructed what he termed "corrected individual deposits." To individual deposits at all national and reporting nonnational banks, as shown in the Comptroller's annual reports, Fisher added the Comptroller's estimate of indi-

¹³ A. P. Andrew, *Statistics for the United States, 1867–1909*, National Monetary Commission, 1910, S. Doc. 570, 61st Cong., 2nd sess., p. 151.

¹⁴ Fisher wrote that "deposits subject to check" were regularly reported by individual banks to the Comptroller of the Currency, but that the published figures in the 1860's omitted the category and lumped all individual deposits together. Subsequent reports simply followed the precedent established. Writing in 1910, Fisher noted that the Comptroller intended in the future to separate in his reports the item of deposits subject to check (Irving Fisher, *Purchasing Power of Money*, pp. 440–441). If national banks regularly reported deposits subject to check as a separate item, it is puzzling that at call dates, 1910–14, when the Comptroller began to show separately national bank demand certificates of deposit, time certificates of deposit, certified and cashiers' checks—all components of individual deposits—he nevertheless combined deposits subject to check and savings deposits—also components of individual deposits. The reason may well be the "lack of uniformity" in bank reports of their savings or interest-bearing accounts, a condition to which he referred in his 1912 annual report (p. 11) (see further discussion in appendix to this chapter).

¹⁵ Clearinghouse exchanges represented checks on other banks in the process of collection through clearinghouses, i.e., part of what we now term bank float. Fisher was the first monetary statistician to note that a part of deposits corresponding to bank float is counted doubly—as having been credited to the drawee but not yet debited to the drawer (*Purchasing Power of Money*, pp. 436–437).

vidual deposits at nonreporting banks, described above. From the total, he deducted clearinghouse exchanges (as reported for national banks, multiplied by five-fourths) and a number of other items to obtain "corrected individual deposits."¹⁶

For each of the bench-mark years (1896, 1899, 1906, and 1909) Fisher computed the ratio of estimated individual deposits subject to check to the corresponding "corrected individual deposits." For intervening years he estimated corresponding ratios by straight-line interpolation and estimated individual deposits subject to check by multiplying "corrected individual deposits" by the estimated ratios.

Mitchell had essentially the same basic data as Fisher, except that he also had breakdowns of individual deposits for 1910 and 1911 provided by the Comptroller, and he used roughly the same procedure, but with some variations. First, for both the bench-mark and other years he estimated deposits for nonreporting banks by multiplying average deposits per private reporting bank by the estimated number of nonreporting banks, described above. Second, he adjusted the 1896, 1899, and 1906 published deposits subject to check of five classes of non-national banks by deducting \$20 million time deposits "in proportion to their quotas of deposits subject to check," and he adjusted the 1909 and 1910 figures by adding to each class of banks a fraction of much larger amounts reported as "deposits not classified," dividing the amounts "proportionately between the deposits which are and the deposits which are not subject to check."¹⁷ Third, he interpolated before deducting float, making that deduction the last step in his estimate.¹⁸ And fourth, he interpolated separately for each class of banks (except mutual savings banks, which he excluded) the ratio of deposits subject to check to individual deposits. For 1890-95, he used the 1896 ratio for each class of banks and for the remaining years he interpolated along a straight line between the bench-mark years.¹⁹

¹⁶ For 1896-1908 he deducted amounts he assumed were interbank deposits misclassified as individual deposits at national banks, though he subsequently decided that no deduction was needed in 1900 and that the 1896-99 revisions were excessive. He also deducted individual deposits at mutual savings banks—inadvertently using the wrong figures—and at stock savings banks, though the latter are classified as commercial banks.

¹⁷ *Business Cycles*, p. 319.

¹⁸ Mitchell estimated clearinghouse exchanges for all banks as Fisher did, except that he divided the national bank item by .797 instead of by .80 to allow for non-national banks.

¹⁹ In addition, Mitchell did not follow Fisher in correcting for misclassification of interbank deposits of national banks. He decided the correction was not needed.

2. Estimates by King and Leong

For nearly two decades after the pioneer estimates by Fisher and Mitchell, only one set of estimates was published, namely, Mitchell's presentation of Snyder's estimates.²⁰ Beginning 1929, however, four different ones appeared within a seven-year period. The first was by King, who constructed annual estimates of currency held by the public and deposits subject to check for the period 1881–1920, and monthly estimates for six and a half years, 1914–20, including and excluding Treasury cash and government deposits at commercial banks and Federal Reserve Banks.²¹ King did not explain how he derived his estimates.²² The second of the post-World War I estimates was by Leong, who published monthly, call-date, and annual estimates for the period 1914–26, with considerable detail on sources and methods.²³

For his annual estimates, Leong extended Mitchell's 1900–11 estimates to 1926, using essentially the same method of construction. With "deposits not classified," he followed the procedure Mitchell used for 1909 and 1910, allocating them for each class of reporting banks, 1912–26, between deposits that are and are not subject to check, according to the distribution of classified deposits.²⁴ Like Mitchell, he estimated vault

²⁰ In *Business Cycles*, National Bureau of Economic Research, 1927, p. 126.

²¹ W. I. King, "Is Our Currency Elastic?" *Interlocking Chart Series*, No. 4, Special Service II), No. 23, Sept. 21, 1920 (Bankers Statistics Corporation, New York, pp. 9–10).

²² Leong, however, examined King's worksheets and found that his method of estimating currency and deposits annually was similar to Fisher's (*Journal of Political Economy*, Oct. 1929, pp. 587–589; Apr. 1930, pp. 167–168). King's currency estimates are virtually identical with Fisher's during the period for which they overlap, but his deposit estimates are somewhat higher. Assuming that time deposits, open account, at national banks were subject to check, King included them in deposits subject to check, while Fisher did not. In addition, King assumed that the fraction of deposits not classified in nonnational banks that was subject to check was higher than Fisher did.

King's monthly series (of bank vault cash and deposits subject to check) were derived by a double interpolation: a call-date series was first estimated on the basis of national bank data, and a monthly series was interpolated along a straight line between the call date estimates. The vault cash monthly estimates and monthly data on currency in the Treasury and Federal Reserve Banks were deducted from monthly Treasury data on the stock of currency.

²³ Y. S. Leong, "Money in Circulation in the United States," *Journal of Political Economy*, Apr. 1930, pp. 171, 178, 184–187; "An Estimate of the Volume of Deposit Currency in the United States," *ibid.*, Oct. 1929, pp. 596, 599, 603.

²⁴ Currie criticized this procedure, noting that "practically all the unclassified deposits are in country [member] state banks and trust companies" (*The Supply and Control of Money*, p. 25). He also noted that up to 1926, unclassified deposits of national banks in the Comptroller's reports were classed as demand deposits in Federal Reserve reports. Had Leong used member-nonmember, rather than national-nonnational bank data, he could have avoided the problem of unclassified deposits.

cash and deposits subject to check in nonreporting banks by multiplying the corresponding per bank figure for reporting private banks by the estimated number of nonreporting banks, using the Comptroller's estimates of the number of such banks to continue the Barnett series Mitchell used. However, he carried this procedure farther than Mitchell had, using it also to estimate clearinghouse exchanges of nonreporting banks.

Leong constructed a call date series by using data for national banks to interpolate the annual estimates. He constructed his monthly series for 1914-17 by interpolating along a straight line between the call date estimates; and for 1918-26 by using data for weekly reporting member banks to interpolate the call date estimates.²⁵ Leong regretted that he was driven to use a demand deposit series for weekly reporting member banks to interpolate deposits subject to check. He used it, nevertheless, because he found "surprising" agreement between the weekly reporting series and the all-bank estimates, "despite the incomparability" of the two classes of deposits.

3. Estimates by Currie and Angell

The estimates of King and Leong were published at the start of the Great Contraction; those of Currie and Angell were published after it had ended.²⁶ The Great Contraction was a watershed in the construction of estimates of money. Thereafter, the sum of deposits and currency, not merely the separate components of the quantity of money, was the focus of interest.

Currie estimated the quantity of money annually, 1921-33, using reports of the Federal Reserve System for member banks as well as the Comptroller's reports for national and nonnational banks on which his predecessors had relied. He was the first investigator to broaden the coverage of demand deposits subject to check. Earlier investigators had

²⁵ His method of interpolation in constructing his call date estimates is equivalent to multiplying the relevant values on a straight-line trend between the annual estimates (treated as end-of-June values) by the relatives to a similar trend of the series used as interpolator, though both his description and his actual computational procedure are more complex. Similarly, in constructing his monthly estimates for 1918-26, he used this procedure to interpolate between the call date estimates.

²⁶ L. Currie, *The Supply and Control of Money in the United States*, Cambridge, Mass., 1935, 2nd ed. rev., p. 33 (1st ed., 1934); J. W. Angell, *The Behavior of Money*, New York, 1936, pp. 175, 178-179.

limited it to the item, "individual deposits subject to check." In addition, Currie included in his total cash letters of credit, certified checks, demand certificates of deposits, and U.S. government deposits. His concept of demand deposits is closer to ours than to that of earlier investigators, but we have followed them rather than him in excluding U.S. government deposits. Currie designated his concept "adjusted demand deposits" to distinguish it from "net demand deposits"—the total subject to reserve requirements, which included some interbank deposits and excluded U.S. government deposits. From his adjusted demand deposit total, Currie also deducted float, but for him "adjusted" referred primarily to the exclusion of interbank and the inclusion of U.S. government deposits rather than the exclusion of float. However, when the Federal Reserve System adopted the term in November 1935, "adjusted demand deposits" was given the meaning now in current use, namely, demand deposits held by the public adjusted for items in the process of collection.²⁷

Currie retrogressed by comparison with earlier investigators by making no allowance for nonreporting banks. For currency held by the public, he used the Comptroller of the Currency's estimates directly, except that he subtracted \$287 million from each annual estimate to correct for gold supposedly lost, destroyed, or exported without record (see Chapter 6, footnote 6, above).

For adjusted demand deposits Currie combined figures for member banks, as reported at June call dates by the Federal Reserve, with figures for nonmember banks taken as the excess of the Comptroller's estimates for nonnational banks over Federal Reserve estimates for state member banks. His chief statistical problems for nonmember banks were how to distribute unclassified deposits and how to estimate float. He did both mainly by adopting a device similar to that used by Mitchell for estimating nonreporting figures: he treated nonmember banks as comparable to country state member banks.²⁸

²⁷ Currie, *The Supply and Control of Money*, p. 13; *Federal Reserve Bulletin*, Nov. 1935, p. 714.

²⁸ For 1929, gross deposits at nonmember commercial banks other than stock savings banks were fully classified as either time or demand; for 1921-28, a substantial amount of deposits was listed as "unclassified" and for 1930-33, a small amount. Currie extrapolated the ratio of time to gross deposits at nonmember banks in 1929 to earlier years, by assuming that it had changed at the same rate as the corresponding ratio at country state member banks for which data are available in Federal Reserve reports. He then multiplied gross deposits of nonmember banks by the extrapolated ratios and

Angell constructed two variants of the quantity of money, one designated total money, the other circulating money, annually for 1890–1934. Total money is comparable to our next-to-the-most inclusive series (Table 1, column 11), except that total money includes U.S. government deposits at commercial banks and Federal Reserve Banks, which our series excludes, and excludes dividends unpaid and deposits in the Postal Savings System, which our series includes. Circulating money equals total money minus time deposits, demand certificates of deposit, and time certificates of deposits; it is comparable to our narrowest series (Table 1, column 8), except again that it includes U.S. government demand deposits, which our series excludes, and excludes demand certificates of deposit and dividends unpaid, which our series includes. In addition, Angell constructed monthly series of currency held by the public and of circulating deposits, 1919–34.

Like Currie, Angell retrogressed by comparison with earlier investigators by making no allowance in his annual and monthly estimates for either vault cash or deposits at nonreporting banks. His annual series of currency held by the public was derived by precisely the method used by Kemmerer, that of simply subtracting vault cash in reporting banks and in Federal Reserve Banks and Treasury cash from the official series of the total stock of currency.²⁹ Angell did not adjust the stock of currency, 1890–1906, for the discontinuity introduced by the revised level of the gold stock component beginning 1907, and he did not make any adjustment for vault cash in nonreporting banks.

For his annual series of total deposits Angell simply accepted the Comptroller's figures on deposits minus float of national and nonnational

subtracted the resulting time deposit series from gross deposits to get demand deposits. For 1930–33, unclassified deposits at nonmember banks were distributed between demand and time deposits in the same proportions as classified deposits.

Float at nonmember commercial banks other than stock savings banks was estimated by multiplying their estimated gross demand deposits by the ratios of the float of country state member banks to their gross demand deposits.

For stock and mutual savings banks Currie interpolated on a straight line between reported figures of gross demand deposits in 1921, 1923, and 1927, when unclassified deposits were small. For 1928–33, he used reported gross demand deposits of these banks. He estimated float by multiplying gross demand deposits by the ratio of float to gross demand deposits at country state member banks.

Angell challenged two assumptions implicit in Currie's procedure: (a) deposits are similarly defined in Federal Reserve and Comptroller of Currency reports; (b) the average nonmember bank resembles the average country state member bank. Angell, however, presents no evidence to support these challenges (*The Behavior of Money*, p. 177).

²⁹ The reporting bank series agrees with the series in Mitchell's and Fisher's books, 1890–1900. For 1901–11 it is \$5–\$13 million larger; the reason is not known to us.

banks reporting (including mutual savings banks), except that he substituted U.S. government deposits in member banks, 1917-30, for the unaccountably smaller all-bank figures in the Comptroller's reports. Angell notes that his deductions for float are incomplete, since, unlike Currie, he took no account of items in process of collection at Federal Reserve Banks.

For his annual series of circulating deposits, Angell used Mitchell's estimates of deposits subject to check for 1890-1908. For later years he used the figures on various categories of deposits reported by the Comptroller, simply distributing unclassified deposits among the various categories of individual deposits in the same proportions as classified deposits in each class of reporting banks.

For his monthly estimates of currency held by the public, Angell estimated vault cash in member banks by interpolating³⁰ between reported call date figures on the basis of the monthly series of currency outside the Treasury, and in nonmember banks by straight-line interpolation between reported June data.

His monthly estimates of circulating deposits are the sum of adjusted demand deposits at member and nonmember banks, of U.S. government deposits, and of deposits by foreign banks and others at Federal Reserve Banks. Adjusted demand deposits at member banks were obtained monthly by interpolating between reported figures for call dates on the basis of reported net demand deposits.³¹ Adjusted demand deposits at nonmember banks are straight-line interpolations between estimates for June dates. A monthly series of U.S. government deposits at member banks was calculated separately by raising deposits at weekly reporting member banks to allow for deposits at other banks.³² Government deposits at nonmember banks were ignored. Figures on U.S. government deposits at Federal Reserve Banks and deposits at Federal Reserve Banks by foreign banks and others are, of course, readily available monthly in Federal Reserve publications.

³⁰ The method of interpolation is not stated.

³¹ Member bank net demand deposits are first available for months beginning April 1923. Angell does not state what series was used as the monthly interpolator for earlier dates. The method of interpolation is not stated.

³² The ratio of member bank call date figures (taken as end-of-month dates) to weekly reporting member bank figures for the week nearest the corresponding end of month was computed, and averaged "over long periods of time." The average ratio used was changed in 1930. The weekly reporting member bank figures at end of months were then multiplied by the average ratio to obtain estimated U.S. government deposits at member banks.

4. Estimates by Federal Reserve System

The Federal Reserve System did not publish comprehensive estimates of the total quantity of money in the United States until 1941, when an annual series of bank deposits and currency, 1890–1940, appeared in *Banking Studies*. This was something of a patchwork job, combining some of Angell's estimates with Board estimates.³³

The System made a much more significant contribution in 1943, when it published *Banking and Monetary Statistics*, an invaluable compendium of historical data on a variety of monetary topics.³⁴ That volume contained estimates of currency outside banks; demand deposits adjusted; time deposits at commercial banks, at mutual savings banks, and in the Postal Savings System; U.S. government deposits; and various totals of deposits and currency, for end-of-June dates, 1892–1922, and end-of-June and end-of-December dates, 1923–41. In February 1944, the System began publication in the *Federal Reserve Bulletin* of comparable end-of-month data to provide series continuing those in *Banking and Monetary Statistics*, giving semiannual estimates for 1942 and monthly estimates from January 1943. In March 1947, the Federal Reserve shifted the dating of its monthly estimates to last-Wednesday-of-the-month and has continued to publish the series in the *Federal Reserve Bulletin* on that basis to date. In October 1960, it introduced new semi-monthly series of currency outside banks, demand deposits adjusted,

³³ *Banking Studies*, p. 447. Adjusted demand deposits and total time deposits, including commercial bank time, mutual savings bank, and Postal Savings System deposits, are Angell's figures, 1890–1918; thereafter, the Board's own estimates "from reports of condition of all banks in the United States" (p. 447). The currency figures were obtained by deducting bank vault cash, for which no details of construction are given, from the Board's revision of Treasury published figures of money in circulation. The revision involved deducting on a cumulative basis, 1880–97, \$6.6 million of gold coin; 1898–1913, \$10.5 million; and annually, 1914–33, \$287 million, in full. Aggregates are given of total deposits, including U.S. government deposits, and of total deposits and currency.

³⁴ See p. 261. The series on currency outside banks and deposits held by the public at various classes of banks shown in this source (pp. 34–35) were superseded by the revised annual series at these banks shown in *All-Bank Statistics*, pp. 31–32, 35–36, 47–48. *All-Banks Statistics* (p. 60) compares the revised series of total deposits at all banks, at commercial banks, and at mutual savings banks, and that of demand deposits adjusted with the corresponding series in *Banking and Monetary Statistics* from 1896 on, but does not give a revised series of currency outside banks. Since *All-Bank Statistics* gives revised figures for commercial bank vault cash, it follows that currency outside banks shown in *Banking and Monetary Statistics* must be superseded. Nevertheless, *Historical Statistics, 1960*, which was published after *All-Bank Statistics* and refers to it in the Banking part of Chapter X on Banking and Finance, ignores it in the part on Money Supply and Gold in the same chapter, and gives only the superseded *Banking and Monetary Statistics* series for deposits adjusted and currency outside banks, 1892–1941 (p. 646, Series 266–274).

and the total, based on averages of daily figures, giving data back to 1947. In August 1962, it revised slightly the three series of semimonthly averages of daily figures and added a fourth series, time deposits at commercial banks, giving data back to 1947 for all four. At that time it also started publishing the same four series weekly, giving data back to 1959. All the series so far cited are unadjusted for seasonal movements.

The System first began regular publication of seasonally adjusted figures in the March 1955 *Bulletin*. For each month back to 1947, seasonally adjusted estimates were given of currency outside banks, demand deposits adjusted, and their sum derived from the last-Wednesday-of-the-month estimates. These estimates have periodically been revised, mostly because of revisions in the seasonal adjustment. At the same time as it started publishing semimonthly averages of daily figures in 1960, the Federal Reserve started publishing seasonally adjusted figures, giving comparable figures back to 1947 and unadjusted weekly averages of daily figures for the current year. In 1962, when it first published time deposits at commercial banks, it also gave seasonally adjusted monthly averages of daily figures as well as revised seasonally adjusted figures for the other three series, again back to 1947, and corresponding unadjusted weekly averages of daily figures back to 1959. In June 1964 the System published revisions of the four series back to 1955 and monthly as well as semimonthly averages back to 1947. In July 1965 it published a new monthly seasonal correction back to 1959, and for the first time gave seasonally adjusted weekly averages of daily figures. In August 1967 it published revisions of both the monthly and the weekly averages back to 1959, in June 1968, further revisions of the monthly and weekly averages back to 1963, and in October 1969, the complete monthly and weekly record beginning 1947, incorporating the latest bench-mark and seasonal revisions.⁸⁵

In 1959 the System published *All-Bank Statistics, 1896-1955*, which gives revised annual figures for the historical series originally published in *Banking and Monetary Statistics*, omitting the initial years there covered and extending the series to 1955. Its main contribution is a set of detailed estimates of deposits by state, as well as of other balance sheet

⁸⁵ For the period since 1945 we have made no commercial bank estimates of our own but have used the Federal Reserve's—for 1946, at end of month; thereafter, seasonally adjusted monthly averages of daily figures in the latest revision available (see Chapter 14, section 4). For the period since 1947 we have made no mutual savings bank estimates but have used the Federal Reserve's—last-Wednesday-of-the-month, seasonally adjusted by ourselves and centered at midmonth by a two-month moving average (see Chapter 15, section 5).

items by classes of banks in operation. The estimates provide more complete coverage of banks than previously available and for all practical purposes eliminate, for the period they cover, the problem of non-reporting banks that in the past plagued estimators of monetary totals. In addition, the principal balance sheet items are presented on a standard basis, although the detailed classification of items in the original bank reports varies widely. This enforced uniformity means that a good deal of estimation was required to cast the actual data into the desired form. For the period 1896–1946 we keyed our estimates to these annual estimates with a few minor exceptions stemming from adjustments and a single major one. The major exception is our rejection of the Federal Reserve annual estimates of the division of total commercial bank deposits between demand and time deposits for 1896–1913.

These estimates of demand and time deposits seem to us subject to such a wide margin of error as to be unacceptable, and we know of no data that would enable us to improve them significantly. Accordingly, for the period before 1914 we constructed estimates only of total deposits held by the public at commercial banks. The statistical problem reflects an economic fact of life discussed at some length in Chapter 4 (section 2)—the distinction between demand and time deposits had little economic meaning before 1914, and whatever meaning it did have does not correspond to the meaning it later came to have.

In view of the widespread use that has been made of the Federal Reserve demand deposit estimates for earlier years by other scholars, and the attention that has been devoted to the question of whether money should be defined to include or exclude time deposits, it seems desirable to explain fully the basis of our misgivings about the accuracy of the Federal Reserve estimates of demand deposits for 1896–1913. Accordingly, in the appendix to this chapter, we examine in detail the Federal Reserve estimates.

Appendix to Chapter 8

FEDERAL RESERVE ESTIMATES OF DEMAND AND TIME DEPOSITS BEFORE 1914

Our misgivings about these estimates derive both from the inadequacy of the basic data available on the subdivision of deposits and from the rather arbitrary character of the extensive interpolation and extrapola-

tion that have been required to derive the final estimates from the basic data. As noted in Chapter 4, these misgivings about statistical accuracy are reinforced by our doubts about the conceptual comparability of even accurate data on time deposits before and after 1914.

The basic data available to the Federal Reserve when it constructed the estimates published in *Banking and Monetary Statistics* were those used by Mitchell and Fisher and already described above: (1) the special survey made by the National Monetary Commission for the call date of April 28, 1909, which for the first time gave comprehensive evidence on demand and time deposits separately; (2) the corresponding figures compiled by A. P. Andrew for 1896, 1899, and 1906; and (3) the Comptroller of the Currency's annual reports for 1910-13, which for one date a year gave estimates for a breakdown similar to, but not quite as detailed as, the 1909 breakdown.

In the process of compiling *All-Bank Statistics*, the Federal Reserve accumulated a fourth body of data for nonnational banks, primarily from the reports of the banking authorities in the several states. Though it continued to use Andrew's 1896, 1899, and 1906 estimates for national banks, it discarded them entirely for nonnational banks. For some states, it substituted estimates based on its own compilations for 1896-1908. For the remaining states, it substituted estimates derived by extrapolating back its own estimates for later years.

Because of the very different methods and sources used for national and nonnational banks, it is advisable to consider each class of banks separately.

1. National Banks

Table 15 summarizes the 1909 survey and Andrew's estimates for both national banks and the five other classes of banks distinguished. Although for years other than 1909 only the data for national banks are used in the Federal Reserve final estimates, all the data are presented to permit relevant comparisons.

The form sent to all banks by the National Monetary Commission, requesting a report of condition on April 28, 1909, explicitly asked information for some forty-odd resource and liability items. Of these the form took all but one as self-explanatory. The exception was item 3 in Table 15, savings deposits or deposits in interest or savings department, which the form defined as follows: "Saving deposits may be defined as

TABLE 15

*Classification of Individual Deposits in Banks of the United States at Four Dates, 1896-1909,
According to Andrew and the National Monetary Commission*

Class of Banks	Year	Reported Individual Deposit Components as Per Cent of Total										Per Cent of Classified Deposits That Would Currently be Subgrouped as:
		Total of (millions dollars)	Indi- vidual Deposits Subject to Check	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
National	1896	1,668.4	85.2	0	8.7	4.1	1.2	0.8	a	95.9	4.1	
	1899	2,522.2	85.3	a	7.2	3.5	2.7	1.3	0	96.5	3.5	
	1906	4,055.9	78.9	0.1	9.0	7.0	3.7	1.3	0	92.9	7.1	
	1909	4,826.1	72.8	7.8	7.8	7.6	2.4	1.5	0	84.5	15.4	
State	1896	715.8	80.0	8.3	0.5	11.1	0.1	a	0	80.6	19.4	
	1899	1,099.0	78.9	8.5	1.8	10.7	0.1	0.1	0	80.9	19.2	
	1906	2,528.2	73.3	10.3	2.2	13.8	0.1	0.3	0	75.9	24.1	
	1909	2,467.0	57.1	18.3	4.8	16.8	1.7	0.4	1.0	64.0	35.1	
Stock savings	1896	175.2	0.8	99.2	0	0	0	0	0	0.8	99.2	
	1899	201.3	1.6	98.3	a	0.1	a	a	0	1.6	98.4	
	1906	353.7	12.6	84.7	0.6	1.9	a	0.1	0	13.3	86.6	
	1909	568.8	17.7	64.4	1.7	15.7	0.1	0.2	0.2	19.7	80.1	

(continued)

TABLE 15 (concluded)

Class of Banks	Year	Reported Individual Deposit Components as Per Cent of Total							Per Cent of Classified Deposits That Would Currently be Subgrouped as:	
		Total (millions of dollars)	Individual Deposits Subject to Check (2)	Savings Deposits or Deposits in Interest or Savings Dept. (3)	Demand Certificates of Deposits (4)	Time Deposits including Time Certificates of Deposits (5)	Cashier's, Treasurer's, or Secretary's Check Outstanding (7)	Deposits Not Classified (8)		
Private	1896	65.5	94.4	0	0.8	4.8	0	0	95.2	4.8
	1899	74.1	88.4	0.2	1.1	10.3	a	a	89.5	10.5
	1906	102.9	84.1	6.6	0.9	8.2	0.1	0.1	85.2	14.8
	1909	193.3	52.9	8.0	13.6	22.0	0.3	0.1	66.9	30.0
Loan and trust	1896	605.6	91.0	5.4	0.3	2.9	0.2	0.1	a	8.3
	1899	1,148.6	89.0	5.0	0.2	5.3	0.2	0.2	a	10.3
	1906	2,333.4	75.0	12.4	1.7	9.7	0.6	0.4	0.2	22.1
	1909	2,835.8	64.4	20.3	3.2	10.6	0.6	0.4	0.5	30.9
Mutual savings	1896	1,739.8	0	100.0	0	0	0	0	0	100.0
	1899	2,025.4	0	100.0	0	0	0	0	0	100.0
	1906	2,999.1	0	100.0	0	0	0	0	0	100.0
	1909	3,144.6	0.1	99.9	a	a	0	a	a	99.9

^a Less than one-tenth of one per cent.

Source: A. P. Andrew, *Statistics for the United States, 1867-1909*, p. 151; *Special Report from the Banks of the United States*, National Monetary Commission, 1910.

deposits (*a*) which may be withdrawn only on presentation of the pass book, or other similar form of receipts which permits successive deposits or withdrawals to be entered thereon; or (*b*) which at the option of the company may be withdrawn only at the expiration of a stated period after notice of intention to withdraw has been given; or (*c*) upon which no interest is allowed until the funds have remained on deposit for at least three months.”

The reason it was necessary to define savings deposits is explained by the Comptroller of the Currency: ³⁶

Beginning with the call of November 27, 1908, an effort was made to ascertain the extent to which so-called “savings deposits” are held by national banks, in view of the fact that a number of associations conduct savings departments and others carry deposits classed as “savings accounts,” although not in a special department [*Annual Report*, 1909, pp. 166–167]. It further appears that in savings deposits are included both time and demand certificates. The question as to what should be reported as savings deposits has been the occasion of considerable correspondence, but the conclusion was reached that it was a question to be determined by the bank upon the advice that “all deposits accepted with the understanding between the officers of the bank and the depositors that they were savings deposits” should be so reported. The same question was raised in connection with the preparation of blanks for use by the National Monetary Commission in obtaining returns from the banks under date of April 28, 1909. The schedule provided for reporting deposits included the item “savings deposits,” and the latter were characterized by the commission as . . .

The explanation suggests that savings deposits were not classified as such on the books of the individual banks. Nevertheless, in response to the National Monetary Commission’s request, the reporting banks entered their deposit liabilities under one or another of the rubrics on the form. There was no place on the form for item 7, deposits not classified, and only a negligible fraction (three-tenths of one per cent of all deposits at all banks) was shown as unclassified in the final computation.

We have no detailed information on how Andrew constructed the totals for 1896, 1899, and 1906—only the general statement in a footnote to his table: “Statistics for national banks are compiled from statements made to the Comptroller of the Currency for date nearest June 30 of the years indicated; statistics for banks other than national are compiled from the annual reports of state bank superintendents and are

³⁶ *Annual Report*, 1910, p. 7.

necessarily for varying dates, in some instances it being found necessary to use figures for a date near the close of the year in order to obtain the proper classification of deposits." There is, however, evidence that, for national banks, the pre-1909 reports by individual banks contained information on only five or six of the seven categories of deposits in Table 15, "savings deposits" and perhaps "not classified" being excluded; that the category later designated savings deposits was included with either deposits subject to check or certificates of deposit; and that from the November 1908 call date on, while the standard report submitted by national banks continued to give only the fivefold classification, the national banks were asked to submit a supplementary report on their savings deposits. This evidence is from the 1910 and later annual reports of the Comptroller.³⁷

Andrew's figures in Table 15 for national banks are consistent with this evidence. His figures for categories 3 to 6 seem plausible by comparison with those for 1909. His figures for savings deposits do not. He shows no such deposits for 1896; a negligible amount for 1899; an amount equal to one-tenth of one per cent of individual deposits for 1906, and then a sudden jump to 7.8 per cent of individual deposits for 1909. It seems clear that this jump was primarily a change in what was reported, not in the amount of savings deposits of national banks. The only mystery is where he got the trivial amounts he recorded for 1899 and 1906.

Doubts about the accuracy of Andrew's figures on savings deposits of national banks are confirmed by a comparison of his estimates for other classes of banks with the 1909 National Monetary Commission figures. For every class of banks except mutual savings banks, there are

³⁷ Comptroller of the Currency, *Annual Report*, 1910, p. 7; 1911, p. 28; 1912, p. 11. For the first supplementary report on savings deposits, beginning with the November 1908 call date, see the 1909 volume, pp. 166-167.

When the Comptroller (*Annual Report*, 1910) published for the first time a classification of individual deposits of national banks into these five categories (for the call dates in March, June, and September 1910), he introduced the breakdown as follows: "Prior to March 29, 1910, while the individual deposits were classified in the reports made by the banks, the details were not incorporated in the abstracts. The expressed interest in this feature of the report was an inducement to the publication of the information in detail . . ." (p. 7).

At a later point, the same report gives a consolidated statement of deposits at national banks and six classes of nonnational banks for a midyear date. This table repeats the fivefold classification of national bank deposits, though it contains for other banks a sixth class, savings deposits. In the column for national banks, there is no entry on the line for savings deposits, but instead a footnote stating that savings deposits of a specified amount were "included with individual deposits, demand or time certificates of deposit" (p. 792).

differences in the amount reported as savings deposits that seem much too large to be explained by anything other than reporting error.³⁸ The Federal Reserve was wise to reject Andrew's figures for nonnational banks; it was unwise, in our opinion, to continue to use his figures for national banks without at least making some adjustment in his obviously incorrect figures for savings deposits.

The Comptroller's deposit breakdowns for national banks for 1910-13 vary in form from year to year and even for different dates for the same year. For each year, there are two sets of figures, one for all call dates in the year; a second, for a midyear date only, as part of a table for all banks, nonnational as well as national. The first set shows, in all four years, only a fivefold division of individual deposits, namely, into the same items 2, 4, 5, 6, and 7 of Table 15. For 1910 and 1911 the second set of figures is virtually identical with the first for the mid-year call date. However, an attached footnote, referring to the 1910 total, specifies, "\$580,889,677.65 savings deposits included with individual deposits, demand or time certificates of deposit."³⁹ No estimate is given of the fraction of savings deposits included in deposits subject to check and in certificates of deposit.⁴⁰ For 1912 and 1913 the second

³⁸ For example, in 1896 New York State banks, which held 29 per cent of total individual deposits at all state banks, did not segregate demand from time deposits in their reports to the state banking superintendent; neither did New York loan and trust companies, which held one-half of total individual deposits at all loan and trust companies.

Presumably, Andrew included all these deposits in his category, "deposits subject to check," since he states that "in a number of States where banks were not required to classify deposits in their reports of condition, such unclassified deposits are included with 'deposits subject to check' in the above compilation." Yet a footnote to the category "individual deposits subject to check" for all banks, which supposedly specifies the estimated time deposits in these unclassified deposits erroneously included with deposits subject to check, shows an insignificant amount—less than one per cent of total individual deposits subject to check. This comment applies equally to the 1899 and 1906 breakdowns for New York and for other large states, like Ohio and California.

Andrew's table records more nonnational banks and a larger total of deposits in each of the three years than does the Comptroller in his annual reports. The largest difference in number is 3.1 per cent for 1906, and in deposits is 7.1 per cent for 1899. These discrepancies are not surprising since the Comptroller's figures for nonnational banks, as mentioned above, were seriously incomplete. The figures in *All-Bank Statistics*, in fact, are substantially higher than Andrew's—for 1896, the number of nonnational banks it records is 42.2 per cent higher and total deposits, 9.1 per cent higher. For 1909, *All-Bank Statistics* records 8 per cent more banks in operation than the National Monetary Commission survey, and 3.1 per cent more deposits.

³⁹ Comptroller of the Currency, *Annual Report*, 1910, p. 792; for the corresponding footnote in 1911, see the *Annual Report*, p. 791. In the second set of figures, 1910-12, demand and time certificates of deposit are not separately distinguished; in 1913, they are.

⁴⁰ So painstaking an investigator as Wesley Mitchell nevertheless showed the deposits subject to check of national banks in 1910 and 1911 inclusive of the savings deposit

set of figures differs from the first, savings deposits being shown separately, with deposits subject to check and certificates of deposit together reduced by the corresponding amount.

There is much evidence that the Comptroller regarded the figures on savings deposits with great suspicion and sought to improve reports of them. In 1911, for example, he sent a questionnaire to the 7,301 national banks about their practices with respect to receiving savings deposits, "In view of the questionable accuracy of statistics presented in relation to this subject."⁴¹ Of 6,813 respondents, 3,502 stated that they received savings deposits. About two-thirds of the banks operated the savings department as a separate division, but virtually all that received savings deposits did not maintain a room for savings deposits separate from the commercial department. A total of 810 banks stated that deposits in the savings department were subject to withdrawal by check, and 2,329 stated that presentation of the passbook was required. The two categories together totaled 363 banks fewer than the number of banks stating that they received savings deposits. No question was asked on what fraction of deposits in savings accounts was subject to check.

The following year the Comptroller again commented on the problems of classifying savings deposits:

During the past two years especial attention has been given to the work of obtaining returns from national banks in relation to the volume of their savings accounts and the number of participants therein. In an appreciable percentage of banks paying more than nominal rates of interest on deposits, there is a lack of uniformity in the characterization of savings or interest bearing accounts. That this condition exists is evident from the examination of the reports of various banks from date to date, as discrepancies occur in the volume of savings accounts and the number of savings depositors which would not appear if there was a complete segregation of accounts of this character from other deposits. Notwithstanding this fact, it is evident that national banks and commercial banks generally are competing to a certain extent with the savings banks, and the reports show a steady increase in deposits of this character in national banks.

There is nothing in the Federal law authorizing the establishment of a savings department by national banks, but as the right to pay interest on

figures, and with no footnote indicating that he had used the Comptroller's figure unadjusted. The reason for Mitchell's oversight is apparently that he used the midyear call date figures in the annual reports and did not refer to the midyear national bank breakdowns, where the presence of savings deposits in the deposits subject to check figures is indicated. See *Business Cycles*, 1913, pp. 318, 320, and Comptroller of the Currency, *Annual Report*, 1910, p. 792; 1911, p. 737.

⁴¹ *Annual Report*, 1911, p. 28.

deposits is recognized, the position of the office is that the question of the conduct of a savings or interest department is a matter for the determination of the directors of each bank. Deposits in commercial banks are presumed to be subject to demand, but whether such institutions have the right to enter into a different arrangement with their customers is a matter for determination by the courts.⁴²

Table 16 shows how the Federal Reserve constructed its estimates of demand and time deposits at national banks for 1896-1913.⁴³ The fig-

⁴² *Annual Report*, 1912, p. 11.

⁴³ The Federal Reserve gives these estimates in *All-Bank Statistics* on a state-by-state basis as well as in aggregate. For 1909-13 the data for the separate states are taken from the same sources as the aggregate in the table. For 1896-1908, total time deposits were allocated among the states in the same proportions as for 1909.

Notes to Table 16

^aRedeposited postal savings, which are not shown, are 0.3 per cent of total deposits (Comptroller of Currency, *Annual Report*, 1913, table showing abstracts of reports of condition of national banks, dollar figure expressed as percentage of sum of cols. 5 and 6).

Source, by Column

1. Comptroller of the Currency, *Annual Report*, 1896-1913, table showing abstracts of reports of condition of national banks, excluding banks in the Possessions.

2. *Italicized* figures are percentages of col. 6 to sum of cols. 5 and 6, from unrounded figures. Other figures are Federal Reserve interpolations. Note that the base in col. 1 includes dividends unpaid; hence the discrepancies between the percentages shown here and those in the final col. of Table 15 for national banks.

3. Figures underlying Table 15, col. 3, for national banks, and Comptroller of the Currency, *Annual Report*, 1910-13, table showing amounts of savings deposits at national banks, expressed as percentages of col. 1.

4. Figures underlying Table 15, col. 5, for national banks, and Comptroller of the Currency, *Annual Report*, 1910-13, table showing classification of individual deposits at national banks, at call date closest to midyear, expressed as percentages of col. 1.

5. *All-Bank Statistics*, p. 40. Col. 1, plus redeposited postal savings, minus col. 6.

6. *Ibid.* 1897-98, 1900-05, 1907-08 are products of col. 1 times col. 2. 1896, 1899, 1906, and 1909-12 are sums of figures underlying cols. 3 and 4. 1913 is the sum of figures underlying cols. 3, 4, and redeposited postal savings deposits.

7. The average rate of growth of the savings deposit percentage, 1910-13, shown in col. 3, was extrapolated backwards.

8. Sum of unrounded figures in col. 4 and col. 7.

TABLE 16

All-Bank Statistics. *Derivation of Demand and Time Deposits at
National Banks in Continental United States, 1896-1913*

Date Close to Midyear	Individual Deposits and Dividends Unpaid (millions of dollars) (1)	Time Deposits as Percentage of Total Deposits (2)	Percentage of Total Deposits in		Deposits Other than U.S. and Interbank (millions of dollars) Demand Time (5) (6)	Estimates of Percentage of Total Deposits in		
			Savings Deposits (3)	Certificates of Deposit (4)		Savings Deposits (7)	All Time Deposits (8)	
1896	1,671	4.1	0.0	4.1	1,603	68	3.9	8.0
1897	1,772	4.1			1,700	73		
1898	2,026	4.1			1,943	83		
1899	2,530	3.4	0.0	3.4	2,443	87	4.8	8.3
1900	2,460	4.0			2,361	98		
1901	2,944	4.5			2,811	132		
1902	3,100	5.0			2,945	155		
1903	3,201	5.5			3,026	176		
1904	3,312	6.0			3,113	199		
1905	3,784	6.5			3,538	246		
1906	4,056	7.1	0.1	7.0	3,766	290	8.1	15.2
1907	4,322	10.0			3,890	432		
1908	4,376	12.0			3,850	525		
1909	4,825	15.4	7.8	7.6	4,082	743	10.2	17.8
1910	5,300	19.1	11.0	8.2	4,286	1,014		
1911	5,477	19.8	11.6	8.2	4,394	1,084		
1912	5,825	20.8	12.3	8.5	4,611	1,214		
1913a	5,952	22.7	13.9	8.8	4,603	1,368		

ures in column 2 for 1896, 1899, and 1906 are from Andrew; and those for 1909, from the National Monetary Commission survey (see Table 15). For 1910–12 the Comptroller's figure for savings deposits from the supplementary report of national banks (also in the footnote to his all-bank table) was added to the figure for time certificates of deposit in the table classifying national bank individual deposits, and the sum was expressed as a percentage of individual deposits plus dividends unpaid. For 1913, the same procedure was followed except that redeposited postal savings deposits (from the regular condition statement) were counted also as time deposits. For the remaining ten of the eighteen years in the table, the figures in column 2 are interpolated, for 1897 and 1898 by being set at the same value as for 1896, for the remaining years apparently by straight-line interpolation.⁴⁴ For these ten years, there is no independent evidence whatever on the division between demand and time deposits. Hence we shall not discuss them further. The method of interpolation is, of course, arbitrary, but it is not clear that it is worse than alternative methods.⁴⁵

For 1910 and 1911 there is some double counting involved in adding reported savings deposits and time certificates of deposit, since the footnote containing the savings deposit figures notes that some part is included in the table entry for time certificates of deposit. However, it is clear from the figures for 1912 and 1913, when both deposits subject to check and time certificates of deposit are reported—both exclusive and inclusive of savings deposits—that the great bulk of the savings deposits were reported by banks as deposits subject to check. Hence the error on this account is minor.⁴⁶

⁴⁴ The description of the procedure for 1899–1909 in *All-Bank Statistics* is as follows: "In 1899 the reported ratio was 3.4 per cent, and in 1909 it was 15.4 per cent; the reported ratio for 1906, at 7.1 per cent, is somewhat less than halfway between the two. For 1907 and 1908, ratios that were interpolated between ratios for 1906 and 1909 were used" (p. 18).

The reason for "apparently" in the sentence to which this footnote is attached is that the ratio for 1908 by straight-line interpolation would be 12.7 rather than the 12.0 shown.

Possibly the results for 1908 are due to an error in computation. To obtain the figures shown in columns 5 and 6 for that year, column 1 must be multiplied by 12.007. If this ratio was inadvertently used for 12.7, there may be no question of principle involved.

⁴⁵ About the only way to get evidence on this point would be to examine similar ratios for later periods for which they are available on a continuous basis and to try alternative methods of interpolation on them.

⁴⁶ As for the inclusion of postal savings redeposited in national banks, beginning 1913 (and in nonnational banks at subsequent dates), the desirable procedure depends on the monetary total under construction (see Chapter 1, section 4). For a broad total in-

A more serious problem with these estimates is in the savings deposit component of estimated time deposits. The estimates for time certificates of deposit seem like a reasonably continuous series, and there is no reason to doubt that they were reported explicitly throughout and that the category had the same meaning throughout. As we have seen, the situation is very different for savings deposits. For 1896, 1899, and 1906 negligible amounts are recorded not because there were no savings deposits but because there are no data. But even for 1909, the internal evidence of the table reinforces our knowledge about the source of the data in suggesting that the figure entered is much too low. This was the first time information was requested on savings deposits, and it would be astounding if the result were not an understatement. The table shows a rise of over 40 per cent from 1909 to 1910 in the percentage of deposits classified as savings deposits. The greater part of this rise must surely be a statistical artifact. Despite a sharp upward trend from 1910 to 1913 in this percentage, the largest year-to-year rise is 15 per cent, and it seems likely that this trend, too, partly reflects the continued effect of improved reporting—note that the upward trend in the percentage of deposits classified as time certificates of deposit is only half as large as in the percentage of deposits classified as savings deposits.

We conclude that the percentage of deposits recorded as time deposits in column 2 of Table 16 is drastically understated for 1896, 1899, and 1906, seriously understated for 1909, and probably understated for 1910–13 as well. In order to give some idea of the possible magnitude of the error, column 7 of Table 16 gives rough alternative estimates for the savings deposit percentage for 1896, 1899, 1906, and 1909 that were constructed by extrapolating backwards the corresponding percentage for 1910 on the basis of the average recorded rate of growth of the percentage from 1910 to 1913. Since, as noted, we believe this rate of growth is itself exaggerated by statistical error, the alternative estimates probably still fall short of the correct magnitude. Column 8 adds these estimates to the recorded percentage for time certificates of deposit to give alternative estimates of the time deposit percentage. The indicated error is clearly of major magnitude: the alternative estimate is double

cluding postal savings deposits, the Federal Reserve would have been better advised to follow the procedure of *Banking and Monetary Statistics* (p. 35) in which postal savings redeposited in banks were excluded from commercial bank time deposits. In any event, for 1913 the effect of this treatment of postal savings redeposited is small—they amounted to a little over one per cent of estimated commercial bank time deposits.

or more than double the Federal Reserve estimate for 1896, 1899, and 1906 and 15 per cent higher than the Federal Reserve estimate for 1909. Of course, the relative error is smaller when expressed as a percentage of estimated demand deposits, but even then it is sizable—over 5 per cent of Federal Reserve estimated deposits for the earlier years. To avoid misunderstanding, we emphasize that we have no confidence in our alternative estimates except as a way to indicate the order of magnitude of the error in the Federal Reserve estimates.

2. *Nonnational Banks*

The Federal Reserve estimates of demand and time deposits at non-national banks in the United States in *All-Bank Statistics* are sums of state-by-state estimates. Before 1909 the state estimates are a brand-new set of figures, compiled either from reports of state banking authorities or estimated by interpolation or extrapolation from later data. Andrew's estimates for 1896, 1899, and 1906, as noted above, were for the total United States without state-by-state detail. The Comptroller's annual reports, on the other hand, which gave figures for each class of nonnational banks in a state, did not differentiate demand and time components of individual deposits. For 1909 the state figures are mainly taken from the National Monetary Commission survey. For 1910 the Comptroller's annual report gave U.S. totals for various classes of non-national banks that differentiated demand from time deposits, but gave no state-by-state detail. The Federal Reserve's figures for that year were either obtained from state banking reports or interpolated between the 1909 National Monetary Commission figures and the 1911 figures in the Comptroller's annual report. For 1911–13 the Federal Reserve used primarily state-by-state figures given by the Comptroller in his annual reports.

Table 17, based on the descriptions in *All-Bank Statistics* of the procedures followed in deriving the estimates for each state, classifies the states into three groups.⁴⁷ For a group of seventeen states—with aggre-

⁴⁷ Table 17 does not summarize the procedures for deriving estimates for unincorporated banks in the eighteen states where a separate balance sheet was compiled for that class of banks. These were states where either most U.S. private banking was concentrated or where most private banks did not report to state banking authorities. The descriptive section in *All-Bank Statistics* for each of the remaining thirty states includes the following sentence: "A separate balance sheet was not compiled for unincorporated banks because adequate data were reported, either separately or in combination with data for other State commercial banks, in the reports of the Comptroller of the Cur-

gate average time deposits of about one-third of the United States non-national bank estimates, 1896-1914—demand and time deposits were reported separately for all or most years before 1914 in state bank reports.⁴⁸ For a second group of twenty-three states and the District of Columbia, with about the same aggregate time deposits, the ratio for each state of time to demand-plus-time deposits, 1896-1908, was mostly extrapolated from its own ratio for later years. For a third group of eight states, with the remaining third of aggregate time deposits, the ratio of time to demand-plus-time deposits, 1896-1908, was derived by first extrapolating a trend value of the ratio for each state to 1896, then interpolating between that extrapolated value and the first observed value on the basis of the ratio for nonnational banks in a Group-I state assumed to be similar. In all, five states in Group I were used in this interpolation process.

For the thirteen years 1896 through 1908, therefore, direct evidence on the division of deposits between demand and time deposits is avail-

recency or the State banking department" (pp. 96, 128 . . . 1101. Only in the District of Columbia were no private banks in operation, 1896-1955.).

The data for private banks are described as "the least accurate component of the revised all-bank series—because they were compiled largely from unofficial sources" (p. 22). On the other hand, "two-thirds of the total assets of all private banks in the revised series in 1898 and nearly all in 1933" (p. 726) are accounted for by two large New York private banks, previously nonreporting, one of which made available to the Board of Governors annual balance sheet statements for the period 1896-1933; the other, for all but four years—1896-97, 1929-30. For the large number of private banks remaining, many of which never reported but whose existence was recorded in bankers' directories, balance sheets were constructed from estimated capital accounts (though private banks, of course, have no capital stock), estimated ratios of capital accounts to total assets, and estimated percentage distributions of assets and liabilities. For these conjectural balance sheets, *All-Bank Statistics* does not, in most cases, explicitly state how the demand and time deposit breakdowns were constructed. For a few states, however, this source notes that the 1909 National Monetary Commission percentage breakdowns for reporting private banks were applied to total deposit estimates, 1896-1908. It is puzzling, in view of the Federal Reserve's reliance on the 1909 data, that no time deposits are shown for Minnesota unincorporated banks (p. 560). According to the National Monetary Commission survey, time deposits accounted for three-fifths of the total deposits of this state's reporting private banks.

The deposits of private banks as a percentage of nonnational commercial bank deposits, judging from the revised series, were not insignificant in 1896, but their relative importance dwindled rapidly thereafter. In 1896, the percentages for demand and time deposits, respectively, were nineteen and nearly fourteen; in 1908, eight and nearly five; in 1913, six and nearly four.

⁴⁸Of the seventeen, only four—Me. (from 1893), Mont. (1874), Neb. (1889), and Vt. (1910)—imposed differential reserve requirements for part or all of the period. On the economic significance of the reported breakdowns for banks of the remaining thirteen states without different reserve requirements for demand and time deposits, see above, pp. 154-155.

Reports of states which imposed differential reserve requirements did not necessarily classify deposits as demand or time. Iowa, for example, enacted differential reserve requirements in 1897, but no breakdowns are available through 1908.

TABLE 17

Classification of States According to Character of Estimates in All-Bank Statistics of Demand and Time Deposits at Nonnational Incorporated Banks,^a 1896-1913

Group I. All or Most Data Reported

State	1896-1913 Average Per Cent of Nonnational Commercial Bank Time Deposits	Years Not Reported 1896-1913	Adjustments of Reported Data and Method of Estimation in Years Not Reported
Florida	0.1	1910	Ratios for December call dates used; average of ratios for 1909 and 1911 used.
Illinois	10.9		
Indiana	1.5	1896-97, 1906	Ratios for October call dates used; average of ratios for preceding and succeeding years used.
Kansas	0.5		
Maine	0.6		Ratios for fall call dates used.
Massachusetts	0.5		Ratios for October call dates used.
Michigan	6.8		
Missouri	3.2		Ratios for fall call dates used.

Montana	0.3	1899, 1901, 1903	Average of ratios for preceding and succeeding years used.
Nebraska	0.8	1896-97, 1900	Ratio for 1898 and average of ratios for 1899 and 1901 used.
New Hampshire	0.6		Ratios for November call dates used 1902, 1908. Reports of various dates adjusted to approximate June 30.
Rhode Island	2.1	1908-10	Average of ratios for 1907 and 1911 used.
South Dakota	0.6	1896	Ratio for 1897 used.
Vermont	1.0		
Washington	0.9	1908	Average of ratios for 1907 and 1909 used.
West Virginia	0.9	1901, 1910	Average of ratios for preceding and succeeding years used; ratios for fall call dates used, 1902-08.
Wisconsin	2.9	1906	Average of ratios for preceding and succeeding years used; ratios for fall call dates used, 1898-1903.
Total	34.2		

(continued)

TABLE 17 (continued)

Group II. 1896-1908 Estimated by Interpolating Data for Same State or Extrapolating Later Data for Same State

State	1896-1913 Average Per Cent of Nonnational Commercial Bank Time Deposits	Years Not Reported 1896-1913	Method of Estimation in Years Not Reported	Class of Banks
Alabama	0.3	1896-1908 1910	Ratios for 1911-23 extrapolated. Average of ratios for 1909 and 1911 used.	
Arizona	0.1	1896-1908	Ratios for 1911-15 extrapolated.	
Connecticut	0.3	1896-1901	Average of adjusted ratios (fall call dates used), 1902-07.	Loan and trust
Delaware	b	1896-1908 1910	Ratios for 1909-16 extrapolated. Average of ratios for 1909 and 1911 used.	Loan and trust Loan and trust and state
District of Columbia	0.2	1902-08 1910 1912	Interpolation between 1901 and 1909 ratios. Average of ratios for 1909 and 1911 used. Average of ratios for 1911 and 1913 used.	Stock savings
Georgia	0.9	1896-1908, 1910 1896-1908 1910	Average ratio of 1909 and 1911 used. Ratios for 1909-25 extrapolated. Average of ratios for 1909 and 1911 used.	Loan and trust

Idaho	0.1	1896-1905, 1907-08, 1910	Ratios for 1906, 1909, 1911-24 extrapolated. Ratio for 1904 used.	Each class esti- mated separately
Louisiana	0.8	1896-1903	Ratios for 1909-24 extrapolated.	Loan and trust State
Maryland	0.6	1896-1908	Ratio for 1909 used.	State
Minnesota	1.9	1896-1908 1910	Average of ratios for 1909 and 1911 used.	
		1896-97, 1901-02	Ratios for 1898 and average of ratios for 1900 and 1903 used.	
Mississippi	0.3	1896-1908	Ratio for 1909 used.	
Nevada	0.1	1896-1908	Ratios for 1909-24 extrapolated.	Loan and Trust
New Jersey	3.2	1896, 1900	Ratio for 1897 and average of ratios for 1899 and 1901 used.	State
New Mexico	b	1896-1906	Average of 1907-09 ratios used.	Loan and trust State
New York	10.3	1896-1908 1896-1908 1910	Ratios for 1909-17, 1920-24 extrapolated. Ratios for 1909-27 extrapolated. Ratio for 1909 used. Average of ratios for 1909 and 1911 used.	Loan and trust and state separately

(continued)

TABLE 17 (continued)

State	1896-1913		Method of Estimation in Years Not Reported	Class of Banks
	Average Per Cent of Nonnational Commercial Bank Time Deposits	Years Not Reported 1896-1913		
North Carolina	0.4	1896-1908	Ratios for 1909-24 extrapolated.	
North Dakota	0.4	1896-1903, 1906, 1908	Ratio for 1909 used.	
Oklahoma	0.1	1896-99, 1903, 1907-08	Ratios for 1900, for 1902 and for 1909, used.	
Oregon	0.5	1896-1908	Ratios for 1909-24 extrapolated.	
Pennsylvania	10.6	1910	Average of ratios for 1909 and 1911 used.	Loan and trust and state separately
		1899-1908	Interpolation of average of ratios for 1896-98 and for 1909, 1911, and 1912.	
South Carolina	0.8	1910	Average of ratios for 1909 and 1911.	
		1896-1905	Ratios for 1906-24 extrapolated.	
Texas	0.1	1896-1906	Ratio for 1907 used.	
Utah	0.5	1896-1908	Ratios for 1909-22 extrapolated.	
Wyoming	0.1	1896-1904, 1906-08	Ratios for 1905, 1909-24 extrapolated.	
Total	32.6			

(continued)

TABLE 17 (concluded)
 Group III. 1896-1908 Estimated by Movements of a Related Series

State	1896-1913 Average Per Cent of Nonnational Commercial Bank Time Deposits		Years Not Reported	Related Series	Period of Correlation of Related Series and Series Interpolated	Other Estimation
Arkansas	0.2		1896-1908	Missouri	1909-24	
California	14.6		1896-1905	Washington	1906-24	
Colorado	0.5		1896-1907	Nebraska	1908-20	1910 based on average of 1909-11 ratios
Iowa	7.8		1896-1908	Missouri	Not stated. ^c	1910 based on average of 1909-11 ratios
Kentucky	0.8		1896-1908	Missouri	1909-24	1910 based on average of 1909-11 ratios
Ohio	8.3		1896-1908	Michigan	Not stated.	1910 based on average of 1909-11 ratios
Tennessee	0.5		1896-1908	Missouri	Not stated.	1910 based on average of 1909-11 ratios
Virginia	0.7		1896-1908	West Virginia	1909-24	
Total	33.4					

able for only one-third of time deposits. For the remaining two-thirds, the Federal Reserve breakdown is based primarily on a hypothetical reconstruction.

How reliable are the breakdowns in the state banking reports for the seventeen states in Group I? For some states the quality of the data is excellent. The classification of deposits is detailed, clear, and consistent over time. Michigan and Illinois are illustrations. For other states the deposit classifications are ambiguous or deposits are not classified uniformly for different classes of nonnational commercial banks (whose report dates may also differ). Wisconsin, Indiana, and Washington are illustrations. The classification of deposits in state banks differs from that in loan and trust companies and each classification is ambiguous about certain deposit items. The most troublesome item is certificates of deposit. Many state reports that differentiate other deposit items do not separate certificates of deposit into demand and time. New Hampshire, Rhode Island, and South Dakota are illustrations. Even if certificates are classified as demand or time, there are sometimes large annual swings in the percentages of the total that each type of certificate is reported as constituting. Washington is an illustration.

Unfortunately, from 1909 on, the data used by the Federal Reserve for these seventeen states are sometimes less accurate than those available from the state reports. For 1911-13, for example, the Comptroller's annual reports, on which the Federal Reserve relied in many instances, did not classify certificates of deposit into demand and time certificates. As a result, Federal Reserve ratios show abrupt swings for a number of

Notes to Table 17

Note: Detail of per cent of nonnational commercial bank time deposits may not add to 100.0, because of rounding.

^aSee Chap. 8, footnote 47.

^bLess than five-hundredths of 1 per cent.

^cNo breakdowns were available for 1915-25 for Iowa, so correlations with the Missouri data could not have been based on this period, but description of estimating procedure is vague.

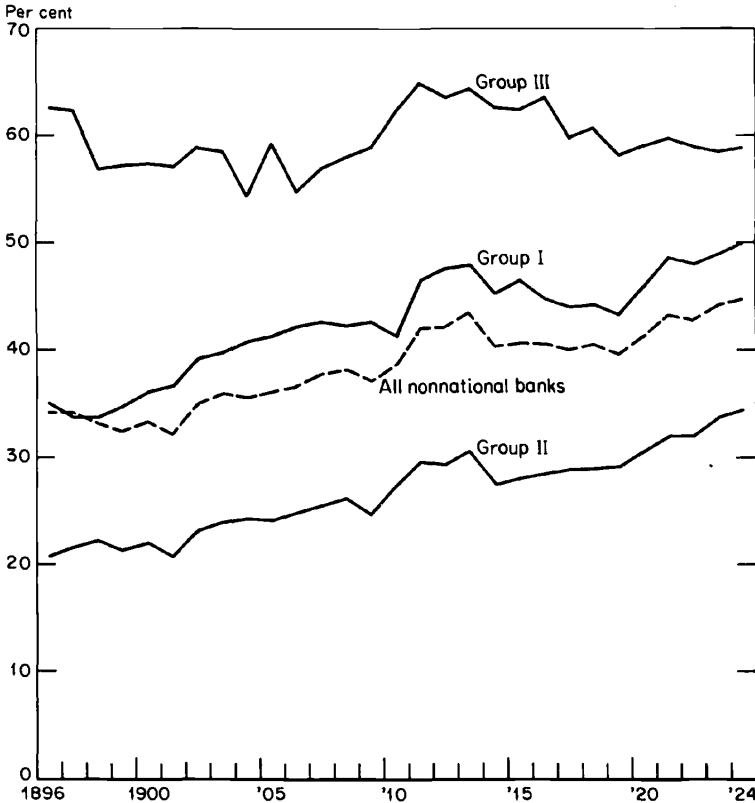
Source: *All-Bank Statistics*, pp. 99, 114, 130, 146, 163, 185, 216, 239, 254, 271, 293, 308, 329, 361, 382, 398, 415, 430, 455, 485, 515, 538, 568, 584, 600, 620, 637, 652, 677, 707, 723, 757, 772, 789, 822, 838, 863, 894, 918-919, 935, 950, 965-966, 989, 1004, 1023, 1049-1050, 1078, 1103-1104, 1129.

states for which state bank reports are excellent and would have raised no problems of classification. Illinois and West Virginia are examples. Rhode Island certificates of deposit were classified by the Federal Reserve mainly as time deposits, 1911-13, and mainly as demand deposits thereafter, because of a change in the Comptroller's presentation.

The ratio of time deposits to the sum of demand and time deposits for Group-I states is plotted in Chart 2. The series is fairly smooth, though there seems to be a jump after 1910 that may well reflect the shift in the basic data relied on. There is every reason to believe that for nonnational

CHART 2

Ratio of Time to Total Demand and Time Deposits for Three Groups of States and for All Nonnational Banks, According to *All-Bank Statistics*, 1896-1924

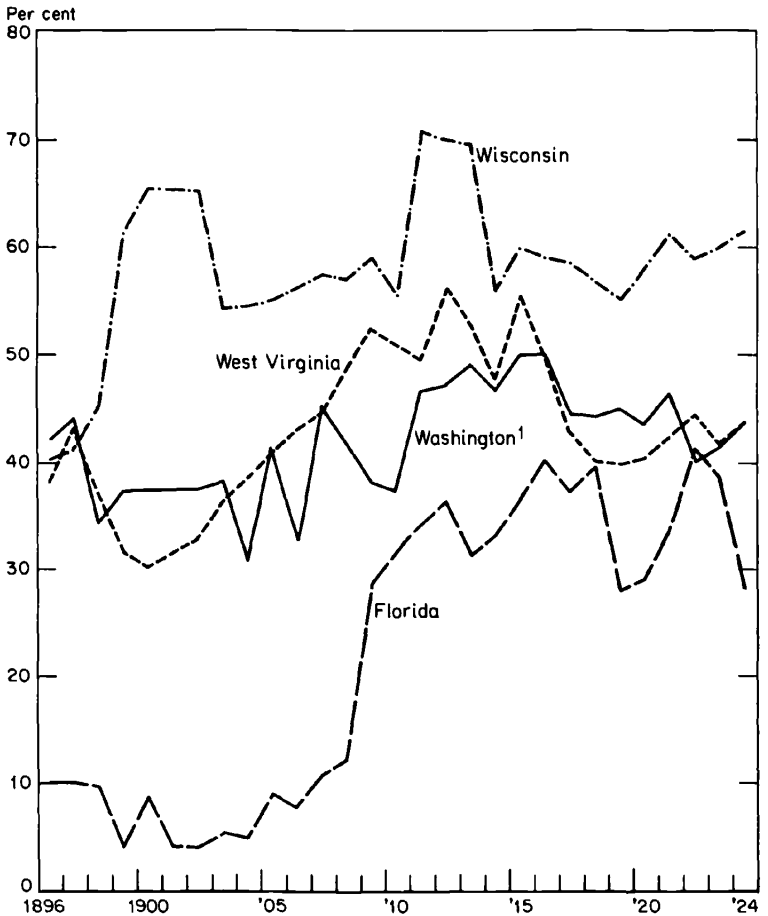


SOURCE: *All-Bank Statistics*, 1896-1955.

as for national banks the increased emphasis by the Comptroller on figures on savings deposits produced an improvement in reporting that accounts for some of the jump. For individual states there is much more pronounced discontinuity (see Chart 3). Discontinuities in the figures at a sample of dates for which we have examined the underlying data

CHART 3

Ratio of Time to Total Demand and Time Deposits
for a Sample of Group I States, 1896-1924



SOURCE: *All-Bank Statistics, 1896-1955.*

¹ Incorporated banks.

clearly occurred because of apparently arbitrary shifts in the classification of some items.

Of the five states in Group I that were used in making estimates for Group-III states, Washington, in particular, has ratios with erratic annual movements. This state accounted for less than one per cent of non-national bank time deposits, but the movements in its ratios were magnified in importance when they were used to estimate California time deposits, which are nearly 15 per cent of nonnational bank time deposits, according to the Federal Reserve estimates.

For Group-II states, three methods of getting estimates for 1896-1908 were used. For fourteen states the trend of reported data for years after 1909 was extrapolated backwards, presumably by computing a least squares straight-line trend from the percentages for later years.⁴⁹ For nine states the ratio for either a single later year or for an average of later years was applied to the earlier years.⁵⁰ For the District of Columbia (stock savings banks) and Pennsylvania, ratios were interpolated along a straight line between data for early and late years.

The resulting estimates of the ratio of time to total deposits for Group-II states as an aggregate are shown in Chart 2. As is enforced by the method of estimation, the pre-1909 figures display a common straight-line trend with later figures. We see no way to determine whether this also corresponds to reality.

For the Group-III states in Table 17, a procedure designated "interpolating technique no. 2" was used. This is an adaptation of a technique suggested by Milton Friedman.⁵¹ It involves estimating the relatives to trend for the series to be interpolated from corresponding relatives for a related series, in this case a nearby state, "for which changes could be assumed to be most nearly similar to those for states with incomplete data." The estimate is based on the correlation between the two sets of relatives for a period when both are available. In order to apply the

⁴⁹ It is not entirely clear from the descriptions in *All-Bank Statistics* how the extrapolation was performed. We have included Utah in this category, even though the description (*ibid.*, p. 989) is somewhat puzzling.

⁵⁰ New York is included with the subgroup of fourteen states because the trend of the ratios for its loan and trust companies was estimated as for the other states. It could also have been included with the subgroup of nine states because the trend of the ratios for its state banks was estimated as for those other states. The District of Columbia (loan and trust companies) could also have been counted as one of the states in the latter subgroup.

⁵¹ *The Interpolation of Time Series by Related Series*, NBER Technical Paper 16, 1962.

technique, trend values are required for the Group-III states. Presumably these were obtained by extrapolation from data for later years. However, there is no explicit statement to this effect in *All-Bank Statistics*. More important, the ratios used do not seem, at least for some Group-III states, to have the same trend for the earlier years, for which they were supposedly estimated in this way, as for the later years for which they are based on reported data. Hence, we are not at all confident that we understand precisely the procedure followed.⁵²

Great emphasis apparently was placed on the geographic proximity of a state with reported figures to the state for which it served as interpolator. The Missouri data were used as the related series for estimates of four geographically adjacent states (Arkansas, Iowa, Kentucky, and Tennessee). Washington, Nebraska, Michigan, and West Virginia were each used once as the related series in estimating figures for a nearby state.⁵³

The final ratios for Group III, as might be expected from the method of estimation, are highly erratic before 1909 (Chart 2). After 1910 they show a decided downward trend, in sharp contrast with the Group-II states.

Table 18 shows the *All-Bank Statistics* final estimates of the ratio of time deposits to total deposits for all nonnational banks. For comparison it also shows the earlier Federal Reserve estimates⁵⁴ and for selected

⁵² A general description of the interpolation technique is given in *All-Bank Statistics*, p. 20. A numerical illustration of technique no. 2 is given on pp. 92-94.

⁵³ In general, the descriptions of procedures for each state given in *All-Bank Statistics* are rather meager despite the mammoth size of the volume. There is a considerable gap between what can be gleaned from the descriptions and what needs to be known for an intelligent assessment of the estimates. For three states (Iowa, Ohio, and Tenn.) the source does not state the later period for which the related series and the series interpolated for earlier years were correlated. In no case are the correlation coefficients presented. No indication is given of possible tests of related series other than the one used. In fact, it is not clear whether the distinction between states in Groups II and III is a systematic one indicating that only after all possible related series were rejected were the procedures used for Group-II states adopted. In the absence of such information, the reader of *All-Bank Statistics* is in no position to judge whether the interpolators were wisely chosen and well matched with the states requiring interpolation.

⁵⁴ *Banking and Monetary Statistics* devotes one sentence to the derivation of the estimates before 1914: "From 1892 through 1913, figures are based on unpublished estimates of demand and time deposits, exclusive of interbank deposits, at all domestic banks, made by the Board's staff from a variety of sources, including compilations of the National Monetary Commission and the Comptroller of the Currency" (p. 11). The nonnational bank component of the all commercial bank series in that source was derived by us by deducting "other demand" and "other time" deposits at national banks, given in *All-Bank Statistics*. We do not know that precisely these figures for national banks were used in the *Banking and Monetary Statistics* series for

TABLE 18

*Alternative Estimates of Ratio of Time to Total Demand and
Time Deposits, Nonnational Commercial Banks, 1896-1913*
(per cent)

Year	Andrew; National Monetary Commission; Comptroller (1)	<i>Banking and Monetary Statistics</i> (2)	<i>All-Bank Statistics</i> (3)	Alter- native Ratio (4)
1896	23.5	27.3	34.2	33.7
1897		29.7	34.1	32.3
1898		24.7	33.1	32.3
1899	21.2	24.9	32.4	33.3
1900		27.6	33.3	34.7
1901		27.8	32.1	35.2
1902		27.1	35.0	37.7
1903		27.5	35.8	38.2
1904		28.4	35.5	39.3
1905		29.5	36.1	39.5
1906	27.2	29.6	36.6	40.6
1907		31.9	37.7	40.8
1908		35.0	38.1	40.5
1909	37.4	39.7	37.0	40.8
1910	38.8 ^a	39.8	38.7	39.7
1911		40.0	42.0	42.1
1912		40.5	42.0	43.1
1913		41.6	43.4	43.4

^aExcluding unclassified deposits.

Source, by Column

1. Same as for Table 15; *Annual Report* of the Comptroller of the Currency, 1910, p. 792. No entries for 1911-13 are given, because we do not know how to distribute reported certificates of deposit between demand and time accounts.

2. *Banking and Monetary Statistics*, p. 34, minus *All-Bank Statistics*, p. 40 (national banks, "other demand" and "other time" deposits).

3. *Ibid.*, p. 44 (state commercial banks, "other demand" and "other time" deposits).

4. See text, Chap. 8, Appendix, section 2.

TABLE 19

*Alternative Estimates of Ratio of Time to Total Demand and
Time Deposits, All Commercial Banks, 1896-1913*
(per cent)

Year	Andrew; National Monetary Commission; Comptroller (1)	<i>Banking and Monetary Statistics</i> (2)	<i>All-Bank Statistics</i> (3)	Alter- native Ratio (4)
1896	13.5	15.8	20.8	22.5
1897		16.5	20.8	21.7
1898		14.3	20.0	21.6
1899	12.3	13.6	19.8	22.8
1900		16.6	21.1	24.5
1901		16.9	21.4	26.1
1902		17.2	23.1	27.6
1903		17.8	24.0	28.4
1904		18.7	24.0	29.4
1905		19.6	25.0	30.4
1906	18.5	19.9	25.8	31.8
1907		22.6	27.5	32.1
1908		24.7	28.0	31.6
1909	27.6	29.0	29.2	32.6
1910		30.6	32.3	32.8
1911		31.2	33.8	33.9
1912		32.0	34.2	34.9
1913		33.5	36.0	35.9

Source, by Column

1. Same as for Table 18. No entries for 1910-13 are given, because the Comptroller does not indicate the fraction of time certificates of deposits for national banks to be added to savings deposits he reports at those banks (see text, Chap. 8, Appendix, section 3, nor the classification of certificates of deposit at nonnational banks, 1911-13.

years the estimates by Andrew, the National Monetary Commission, and the Comptroller. The effect of the revision has been to raise substantially for the earlier years the fraction of nonnational bank deposits classified as time deposits. For comparative purposes we have also included an alternative estimate of our own that (a) is linked to the *All-Bank Statistics* 1913 figure, (b) adjusts for the jump in the ratio from 1909 to 1911, and (c) uses for 1896–1913 only the data for Group I—the one group of states for which there are reasonably reliable data for the whole period.⁵⁵ As for our national bank estimates, we have no confidence in these alternative estimates except as an indicator of the margin of error in those of the Federal Reserve, though they do seem to us no more arbitrary or inaccurate than the Federal Reserve's estimates.

The four sets of estimates differ by sizable amounts: for some of the earlier years the largest is nearly 60 per cent greater than the smallest. The difference between the Federal Reserve final estimates and our alternative one is as much as 11 per cent in some years.

all banks, but they cannot be significantly different from the figures actually used. The residual nonnational bank figures for demand deposits bear the full adjustment for float at all commercial banks, hence the annual percentage that time deposits are of this total (Table 18) is somewhat higher than the true percentage would be. Andrew's estimates are of course unadjusted for float, as are the *All-Bank Statistics* estimates for nonnational banks.

⁵⁵ We accomplished (b) by extrapolating the 1911–13 change recorded for Group-I states back to 1909 and then multiplying the original figures for Group-I states, 1896–1910, by the ratio of the extrapolated value for 1909 to the original value for 1909. This new series for Group I, 1896–1913, was then expressed as relative to the value for 1913 and the results multiplied by 43.4, the *All-Bank Statistics* figure for 1913.

Notes to Table 19 (concluded)

2. Page 34.
3. Pages 36 ("other time" deposits) and 60 (demand deposits adjusted).
4. Based on sums of estimated demand and time deposits at national and nonnational banks. Total deposits at national banks (Table 16, col. 1) were multiplied by ratios of time to total deposits (Table 16, col. 8, 1896–1909, with straight-line interpolations of the ratios for intervening years; col. 2, 1910–13). Demand deposits at national banks are residuals, from which cash items (*All-Bank Statistics*, p. 39) were subtracted. Total deposits at nonnational banks (*ibid.*, p. 44) were multiplied by ratios of time to total deposits (Table 18, col. 4). Demand deposits at nonnational banks are residuals, from which cash items (*All-Bank Statistics*, p. 43) were subtracted.

3. *All Commercial Banks*

Table 19 gives four sets of estimates of the time deposit ratio for all commercial banks. It is clear that the margin of uncertainty in these estimates is very large indeed—far larger, in our opinion, than that which attaches to the estimates of total deposits or any of the other totals in our Table 1. As the preceding discussion emphasizes, for national banks the ratio for ten of the eighteen years is entirely a constructed one, based on no direct evidence whatsoever. The same is true of about two-thirds of estimated time deposits at nonnational banks for most of the years. In view especially of the uncertain economic meaning of the distinction between demand and time deposits before 1914, this seems to us much too small and uncertain a base on which to erect anything that could be described as a structure of economic analysis.