MONETARY AGGREGATES: A USER'S GUIDE

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The monetary aggregates are measures of the nation's money stock. The most narrowly defined monetary aggregate, M1, is the sum of the dollar amounts of currency and nonbank travelers checks in circulation, plus checkable deposits. M2 includes M1 plus overnight repurchase agreements, overnight Eurodollar deposits, general purpose and broker/dealer money market fund balances, money market deposit accounts, and savings and small time deposits. M3 is the sum of M2 and large time deposits, term repurchase agreements, term Eurodollar deposits, and balances in money market funds employed solely by institutional investors. Analysts study the relationships among these monetary measures and other macroeconomic variables, such as national income, employment, interest rates, and the price level. These relationships are then used to forecast changes in economic activity, interest rates, and inflation. The Board of Governors of the Federal Reserve System defines the aggregates and calculates and reports their values.

This article explains the origin and evolution of the monetary aggregates and discusses how they are prepared and released, how they are used, and when and why they are revised. Information on the monetary base is also included.

How the Monetary Aggregates Evolved

Over the years economists have proposed many different groupings of financial assets into something called "money." No single definition of money has been universally acceptable. Two approaches have been used to define money. The first is to identify what financial assets are commonly used for certain purposes. Analysts using this approach generally include as money financial assets serving (1) as a medium of exchange, i.e., assets widely acceptable in payment for goods, services, and debts, and (2) as a store of value. A second approach to defining money is to find the groupings of financial assets the movements of which are most closely correlated with the movements of certain macroeconomic variables such as national income, employment, and prices. Both approaches have contributed to the development of the monetary aggregates constructed by the Federal Reserve. A brief chronology of the evolution of these measures is given below.

In 1944 the Board of Governors of the Federal Reserve System began reporting monthly data on two types of exchange media, (1) currency outside of banks, and (2) demand deposits at banks, i.e., non-interest-bearing deposits transferable by check or convertible into cash "on demand." It also reported the sum of these two. The Board's expressed intent in reporting the data was "to increase the information available to the public on current changes . . . in the nation's money supply." In time the sum of currency outside banks and demand deposits came to be called M1, the narrowest of the Fed's monetary aggregates.

Until 1971 M1 was the only monetary aggregate for which estimates were published by the Board of Governors. In that year, however, the Board began reporting data for two additional aggregates, M2 and M3. Interest in these latter variables reflected the growing importance of the monetary aggregates in formulating monetary policy. It also reflected the view among some economists that the appropriate definition of money should include assets capable of providing a temporary store of value. Accordingly, M2 was defined to include M1 plus savings deposits at commercial banks and time deposits at commercial banks except large negotiable certificates of deposit. Similarly M3 was defined as the sum of M2 and deposits at mutual savings banks and savings and loan associations.

In 1975, the Board began publishing data for even broader collections of financial assets, namely M4 and M5. M4 included M2 plus large negotiable certificates of deposit. M5 was the sum of M3 and large negotiable certificates of deposit.

The decade of the 1970s witnessed the development of many financial instruments. Some of the new assets were close substitutes for demand deposits, namely negotiable order of withdrawal (NOW) accounts which are interest-bearing checkable accounts, savings accounts featuring automatic transfer to checking accounts (ATS accounts), credit union share draft accounts, and money market mutual funds with checking privileges. These new accounts began to be used as exchange media but were not counted in M1 until 1980.

The introduction of these new assets also coincided with what some economists interpreted as changes

in the relationships between the monetary aggregates and economic variables such as income, employment, and prices. These apparent changes provided some of the Fed's motivation for modifying its definitions of the aggregates in 1980.[1] At that time the Fed replaced its M1 definition of money with M1A and M1B. M1A was equivalent to the old M1, including only currency and demand deposits; M1B included all of M1A plus NOW and ATS balances at banks and thrifts, credit union share draft balances, and demand deposits at mutual savings banks.[2] At the same time old M2 through M5 were replaced with new measures of M2 and M3. New M2 included all of M1B and a number of other assets that are easily convertible to transaction account deposits or that can be used in transactions to a limited degree. These were overnight repurchase agreements (RPs) issued by commercial banks and certain overnight Eurodollars held by nonbank U.S. residents, money market mutual fund shares, and savings and small-denomination time deposits at all depository institutions.[3] New M3 added to M2 large-denomination time deposits at all depository institutions and term RPs at commercial banks and savings and loan associations.

In January 1982 the Board of Governors stopped reporting M1A and redesignated M1B as M1. Since then the definitions have been modified only slightly. Table I shows the current magnitudes of M1, M2, and M3.

Monetary Base

The monetary base is composed of currency held by the public and in vaults of depository institutions, plus reserves of depository institutions. In 1968 the Federal Reserve Bank of St. Louis began publishing figures on the monetary base. In 1979 the Board of Governors of the Federal Reserve System also began publishing data on a somewhat different version of the monetary base.

The base can be viewed as the foundation upon which the superstructure of deposits is erected. An increase in the reserves component of the base allows the system of depository institutions to expand deposits. Initially, an increase in reserves—resulting from open market operations or loans by the Fed—leads to an increase in "excess" reserves, that is, reserves beyond the amount needed to meet reserve requirements at depository institutions. These institutions use the excess reserves to make loans and investments which soon become deposits. When these deposits are spent and redeposited, they create additional excess reserves and lead to the extension of more loans. Through a multiplicative process the money supply is increased by a multiple of the Fed's original addition to the monetary base. The extent to which the money stock increases upon an increase in the monetary base depends on the percentages of required and excess reserves held by depository institutions and on the public's holdings of cash relative to deposits.[4]

As noted above, the Board of Governors' and the St. Louis Federal Reserve Bank's estimates of the monetary base differ, and do so in three respects. First, the Board and St. Louis adjust the base differently to cleanse it of changes that are simply the result of changes in reserve requirements.[5] Second, the Board and St. Louis account for vault cash differently. Third, they seasonally adjust their estimates differently.[6]

Preparation and Release of Monetary Data

The Board of Governors constructs its estimates of the monetary aggregates from information supplied by depository institutions, the U.S. Treasury, money market mutual funds, New York State investment companies, nonbank issuers of travelers checks, and foreign central banks. Some of these institutions report every week, others report less frequently. Some report in an abbreviated form not available to larger institutions. To produce weekly and monthly estimates of the aggregates, the Board estimates missing data where detail or frequency of reporting

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[1] See Board of Governors (June 1976) and Board of Governors (January 1979), p. 24.

[2] M1A excluded demand deposits held by foreign commercial banks and foreign official institutions while old M1 did not.

[3] For a thorough discussion of RPs see Stephen A. Lumpkin's article "Repurchase and Reverse Repurchase Agreements" in Cook and Rowe (1986), pp. 65-80.

[4] Humphrey (1987) describes the theory of deposit expansion and its history. Most introductory level college money and banking texts provide a basic discussion of how monetary actions of the Fed affect the base and the money stock. Burger (1971) goes into great detail.

[5] For example, when the reserve requirement against business time deposits with maturities of 2-1/2 to 3-1/2 years was dropped in April 1983, the amount of reserves banks were required to hold declined by $80 million. In order to prevent a corresponding increase in excess reserves the Fed concurrently withdrew this $80 million through open market operations, leading to an identical decline in the monetary base. The Board of Governors and the Federal Reserve Bank of St. Louis then eliminated this $80 million decline in their adjusted monetary base data.

[6] Burger (1979) discusses the causes of the differences between the Board of Governors' and St. Louis' monetary base estimates.

Table I

COMPONENTS OF THE MONETARY AGGREGATES AND MONETARY BASE AND THEIR LEVELS

August 1988

Billions of dollars

M1	**782.5**
Currency	207.2
Travelers checks	7.2
Demand deposits	290.0
Other checkable deposits	278.1
M2	**3032.0**
M1	782.5
Overnight RPs	64.9
Overnight Eurodollars	15.8
MMF balances (general purpose and broker/dealer)	231.2
MMDAs	517.1
Savings deposits	433.8
Small time deposits	985.2
M3	**3847.3**
M2	3032.0
Large time deposits	514.7
Term RPs	121.0
Term Eurodollars	102.4
MMF balances (institution only)	84.0
Monetary Base	**271.2**
Currency	207.2
Reserves	61.1

Sources: Data for M1, M2, M3 and their components are from Board of Governors of the Federal Reserve System H.6 release, "Money Stock, Liquid Assets, and Debt Measures," dated October 6, 1988. Data for Monetary Base are from Board of Governors of the Federal Reserve System H.3 release, "Aggregate Reserves of Depository Institutions and the Monetary Base," dated October 6, 1988. The Currency figure shown below Monetary Base is from H.6 while the Reserves figure is from H.3.

Explanation: M2 and M3 both differ from the sums of their components because these aggregates are seasonally adjusted by adjusting the non-M1 components of M2 and the non-M2 components of M3 as blocks. Several of these components are not reported in seasonally adjusted form while those that are have been adjusted individually. Monetary Base differs from its components because the currency component the Board uses in its Monetary Base computation includes some adjustments excluded from the H.6 currency figure. The Board does not publish the currency portion of Monetary Base separately.

Other checkable deposits are negotiable order of withdrawal (NOW) accounts, automatic transfer service (ATS) accounts, credit union share draft accounts, and demand deposits at thrift institutions.

RPs, repurchase agreements, are loan arrangements in which the borrower sells the lender securities with an agreement to repurchase them at a future date.

Eurodollars are dollar-denominated deposits issued to U.S. residents by foreign branches of U.S. banks worldwide.

MMF, money market mutual funds, are funds investing in money market instruments, offered by investment companies.

MMDA, money market deposit accounts, are savings deposits on which only a limited number of checks can be drawn each month.

Savings deposits are liabilities of depository institutions that do not specify a date of withdrawal or a time period after which deposited funds may be withdrawn, although depository institutions must reserve the right to require at least seven days written notice before withdrawal of savings deposits.

Time deposits are liabilities of depository institutions payable on a specified date, or after a specified period of time or notice period, which in all cases may not be less than seven days following the date of deposit.

Term, as in Term RPs and Term Eurodollars, means maturities of greater than one day.

The *Reserves* component of Monetary Base is total reserves of depository institutions with Federal Reserve Banks plus vault cash used to satisfy reserve requirements and is adjusted for reserve requirement changes.

For a detailed description of each of the components of M1, M2, and M3 see any recent H.6 release or footnotes to the table entitled "Money Stock, Liquid Assets, and Debt Measures," in the statistical section of a recent *Federal Reserve Bulletin*. For a detailed description of the Reserves component of Monetary Base see the footnotes to the H.3 release, or footnotes to the table entitled "Reserves and Borrowings, Depository Institutions" in the statistical section of a recent *Federal Reserve Bulletin*. The Federal Reserve Bank of Richmond's *Instruments of the Money Market* includes a chapter for each of the major money market instruments, including Eurodollars, RPs, and MMF, listed above.

The Federal Reserve, in its H.6 release and in the tables of its *Federal Reserve Bulletin*, publishes estimates of liquid assets and total debt of nonfinancial sectors with the monetary aggregates even though these are not considered monetary aggregates. The liquid assets measure is called L and is made up of M3 plus U.S. savings bonds, short-term Treasury securities, commercial paper, and bankers acceptances. The aggregate labeled "Debt" includes the debt of the U.S. government, state and local governments, and private nonfinancial sectors. L first appeared in the *Federal Reserve Bulletin* in 1980, with Debt following in 1984. Items in L and Debt fall outside of the category of assets that most economists would call money.

are lacking. Table II lists, by component, sources of data used by the Board to calculate the monetary aggregates.

The Board of Governors reports figures for M1, M2, and M3 each week (usually on Thursday afternoon at 4:30 eastern time). Reported values are weekly averages of daily figures for the week ending ten days earlier. The Board publishes both seasonally adjusted and not seasonally adjusted data. Revisions of the seasonally adjusted aggregates can be large due to changing seasonal patterns over time.[7]

The Board of Governors releases its most recent estimates of the monetary base every two weeks. These figures are two-week averages of daily figures for the two weeks ending eight days earlier. The Board publishes a seasonally adjusted monetary base figure adjusted for changes in reserve requirements, a not seasonally adjusted base figure adjusted for changes in reserve requirements, and a not seasonally adjusted figure not adjusted for reserve requirement changes. The St. Louis Federal Reserve Bank also releases a new estimate of the average monetary base every two weeks. It provides only a base figure adjusted for reserve requirement changes and for seasonal change.

[7] For a discussion of the difficulties of seasonal adjustment see Hein and Ott (1983).

Table II

SOURCES OF DATA USED BY THE BOARD OF GOVERNORS IN THE ESTIMATION OF THE MONETARY AGGREGATES AND THE MONETARY BASE

Component	Description of Component	Source of Data on Component and Frequency
M1		
Currency	Currency and coin in the hands of the nonbank public.	Consolidated Statement of Condition of All Federal Reserve Banks (H.4.1)—weekly; vault cash data from Report of Transaction Accounts, Other Deposits and Vault Cash (FR 2900)—weekly, and Quarterly Report of Selected Deposits, Vault Cash, and Reservable Liabilities (FR 2910Q).
Nonbank travelers checks	Travelers checks issued by institutions other than banks. Included in M1 because they can be used directly for purchases.	Report of Travelers Checks Outstanding (FR 2054)—monthly.
Demand deposits and Other checkable deposits	Checkable deposits including regular non-interest-bearing checking accounts, NOW balances, ATS balances, and credit union share draft balances.	FR 2900; FR 2910Q; Reports of Condition and Income (Call Reports)—quarterly; internal Federal Reserve float data; Weekly Report of Assets and Liabilities for Large Banks (FR 2416).
M2		
M1		
Overnight repurchase agreements	Overnight and continuing contract repurchase agreements (RPs) issued by commercial banks. Included in M2 because they are generally considered short-term investments used in managing demand deposit balances.	Report of Selected Borrowings (FR 2415)—weekly; Annual Report of Repurchase Agreements (FR 2090A); Weekly Report of Assets of Money Market Mutual Funds (FR 2051A); Weekly Report of Assets for Selected Money Market Mutual Funds (FR 2051C).
Overnight Eurodollars	Overnight Eurodollars issued to U.S. residents by foreign branches of U.S. banks worldwide. Short-term investments like RPs.	Report of Selected Deposits in Foreign Branches Held by U.S. Residents (FR 2050)—weekly; FR 2051A; FR2051C.
Money market mutual fund (MMF) balances (general purpose and broker/dealer)	Often checkable, but included in M2 rather than M1 because turnover rates are more like savings instruments than transactions instruments.	Investment Company Institute (ICI) gathers FR 2051A and FR 2051C for Fed covering all MMFs.
Money market deposit accounts (MMDAs)	Limited check writing features and turnover rates like savings rather than transactions accounts cause Fed to include this asset in M2 rather than M1.	FR 2900; FR 2910Q; Call Reports.
Savings deposits	Passbook and telephone transfer accounts.	FR 2900; FR 2910Q; Call Reports; FR 2416.
Small time deposits	Time deposits at depository institutions with denominations less than $100,000. Includes RPs with denominations less than $100,000.	FR 2900; FR 2910Q; Call Reports; Monthly Survey of Selected Deposits and Other Accounts (FR 2042); Report of Repurchase Agreements on U.S. Government and Federal Agency Securities (FR 2090Q)—quarterly; FR 2090A.
M3		
M2		
Large time deposits	Time deposits at depository institutions with denominations of $100,000 or more. Held largely by institutions.	FR 2900; FR 2910Q; Call Reports; FR 2416; FR 2051A; FR 2051C.
Term RPs	Denominations $100,000 or greater with more than one day maturity. Held largely by institutions rather than individuals.	FR 2415; FR 2090A; Call Reports; FR 2051A; FR 2051C.
Term Eurodollars	More than one day maturity, held largely by institutions rather than individuals.	Weekly Report of Foreign Branch Liabilities to, and Custody Holdings for, U.S. Residents (FR 2077); information from Bank of Canada and Bank of England; FR 2051A; FR 2051C.
MMF balances (institution only)	Balances held by institutions rather than individuals.	FR 2051A; FR 2051C.
Monetary Base		
Currency	Currency and coin in the hands of the nonbank public plus currency and coin in bank vaults not used to satisfy reserve requirements.	H.4.1; FR 2900; FR 2910Q; Call Reports.
Reserves	Reserves of depository institutions held with Federal Reserve Banks plus vault cash used to satisfy reserve requirements.	FR 2900; H.4.1.

The Board of Governors publishes historical series of the monetary aggregates and many of the components making up the aggregates. These series are periodically updated to reflect revisions or redefinitions of the aggregates. Both the Board and the St. Louis Fed produce historical series for the base. Table III lists the monetary aggregates and their component series as well as the monetary base and its component series available from the Board and St. Louis.

How The Monetary Aggregates Data Are Used

The Fed's legislative mandate is to set a monetary policy consistent with high employment, stable prices, and moderate long-term interest rates. In semiannual testimony to Congress, the Chairman of the Board of Governors of the Federal Reserve System reports the targets set by the Federal Open Market Committee (the Fed's monetary policy-making body)[8] for growth of the monetary aggregates. The Chairman also relates these targeted growth rates to forecasted rates of unemployment, output growth, and inflation. Because of concern with the instability of the behavior of M1, the Federal Open Market Committee has not specified an M1 target range since 1986, although it has continued to set target ranges for M2 and M3.

The Federal Reserve cannot directly control the quantity of money. It can, however, control

[8] The President of the Federal Reserve Bank of New York is a permanent voting member of the Federal Open Market Committee while the other eleven Federal Reserve Bank presidents share four voting memberships on a rotating basis. All seven members of the Board of Governors are also permanent voting members.

Table III

AVAILABILITY OF TIME-SERIES ON MONETARY AGGREGATES AND COMPONENTS MAKING UP MONETARY AGGREGATES

Series	Weekly Averages Available Beginning: sa	Weekly Averages Available Beginning: nsa	Monthly Averages Available Beginning: sa	Monthly Averages Available Beginning: nsa
Aggregates				
M1	1/75	1/75	1/59	1/47*
M2	1/81	1/81	1/59	1/59
M3	1/81	1/81	1/59	1/59
Monetary Base—Board				
Adjusted	1/59**	1/59**	1/59	1/59
Unadjusted		1/59**		1/59
Monetary Base—St. Louis				
Adjusted	1/72**	1/72**	1/50	1/29
Unadjusted		1/72**		1/19
Components of Ms				
Currency	1/75	1/75	1/59	1/47*
Demand deposits	1/75	1/75	1/59	1/47*
Other checkable deposits	1/75	1/75	1/63	1/63
Overnight RPs		1/75		11/69
Overnight Eurodollars		12/79		2/77
MMMF (general purpose and broker/dealer)		2/80		11/73
MMMF (institution only)		2/80		4/74
Nonbank travelers checks	1/75	1/75	1/59	1/59
Savings deposits	1/81	1/81	1/59	1/59
Small time deposits	1/81	1/81	1/59	1/59
Large time deposits	1/81	1/81	1/59	1/59
MMDA		12/82		12/82
Term RPs		1/75		10/69
Term Eurodollars		12/79		1/59
Components of Base				
Reserves—Board				
Adjusted	1/59**	1/59**	1/59	1/59
Unadjusted		1/59**		1/59
Reserves—St. Louis				
Adjusted			1/50	1/47
Currency—St. Louis		1/72**		1/50

Sources: Board of Governors of the Federal Reserve System, H.6, "Historical Money Stock Data," March 1988; Board of Governors of the Federal Reserve System, H.3, "Reserves of Depository Institutions, Historical Data," June 1988; *Banking and Monetary Statistics, 1941-1970*, Board of Governors of the Federal Reserve System, 1976; The Federal Reserve Bank of St. Louis.

* Data from 1/47 until 12/70 can be found in *Banking and Monetary Statistics, 1941-1970*, Board of Governors of the Federal Reserve System, 1976, while data for 1/59 to current are available from Board of Governors of the Federal Reserve System, H.6, "Historical Money Stock Data," March 1988. Definitions used in these two sources differ.

** Weekly data are available until 2/84, after which only biweekly data are available.

sa = Seasonally adjusted

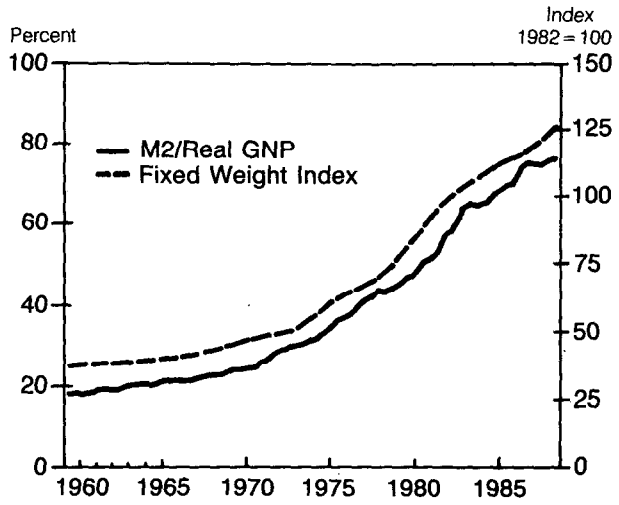
nsa = Not seasonally adjusted

variables that influence short-term interest rates, namely the quantity of reserves held by depository institutions and the monetary base, and thereby influence the growth rate of the aggregates. Greater provision of reserves through Federal Reserve open market purchases of securities tends to push down the federal funds rate and other short-term interest rates. Lower interest rates, in turn, help determine the quantities of the monetary aggregates demanded by the private sector. Downward pressure on federal funds and other rates makes holding money balances, which pay no or low rates of interest, less costly. The lower cost of holding money increases the quantity of money demanded. Assuming money supply equals money demand, the result is an increase in the level of monetary aggregates. Changes in the aggregates normally are followed by temporary changes in aggregate output and employment and by permanent changes in prices.[9] Chart 1 illustrates the relationship between M2 and the price level. As is conventional in such comparisons, M2 is shown per unit of real output, i.e., is divided by real GNP, to adjust for growth in the economy.[10]

The monetary aggregates have been watched closely by those attempting to predict Fed policy moves.[11] In periods when the Fed sought tight control of the growth rate of the aggregates, unusually fast or slow money growth has generated expectations of subsequent policy actions by the Fed to arrest or reverse these movements. In such periods, the financial markets react to the announcement of the weekly M1 figure. The announcement of a higher than expected M1 figure, for example, leads market participants to increase their estimate of the probability that the Fed will put upward pressure on the funds rate, and other short-term rates rise in reaction to these changed expectations.[12]

Many economists study the aggregates to improve their understanding of the links between monetary growth and changes in other macroeconomic variables. Prior to the 1980s empirical studies generally found stable relationships between M1 growth and inflation and GNP growth. These findings were important to the Fed's decision to place more emphasis on the monetary aggregates in monetary policymaking during the 70s and early 80s. With the financial deregulation and disinflation of the early 1980s

M2/REAL-GNP AND
GNP FIXED WEIGHT PRICE INDEX



however, studies began to find that the once stable relationships between M1 growth and inflation and GNP growth were breaking down. These findings led the Federal Reserve in 1982 to de-emphasize M1 in its monetary policymaking process.[13] Recent studies, however, suggest that changes due to disinflation and deregulation have had a smaller effect on M2 than on M1 growth, and that the relationship between M2 growth and inflation has remained fairly stable.[14] In his February 1989 testimony before Congress the Chairman of the Board of Governors stated that "over the long haul there is a close relationship between money [M2] and prices." The Fed, consistent with the view that further reductions in the growth rate of M2 are necessary to achieve long-run price stability, reduced its target range for M2 in both 1988 and 1989.[15]

Revisions to the Monetary Aggregates

Major revisions to the published data on the monetary aggregates occur for four reasons. First, the data are revised as reporting or processing errors are discovered. Second, the aggregates are revised annually to incorporate "benchmark" changes. Third, the seasonally adjusted data are revised annually to incorporate new seasonal adjustment factors. Finally, the historical series are revised whenever there is a redefinition of the aggregates.

[9] See Board of Governors (July 1988), pp. 419-20, and Broaddus (1988), pp. 45-49.

[10] Friedman (1969), p.177.

[11] Loeys (1984).

[12] Walter (1988), pp. 222-25.

[13] Friedman (1988) and Bernanke and Blinder (1988).

[14] Hetzel and Mehra (1988), Mehra (1988), and Reichenstein and Elliott (1987).

[15] Greenspan (April 1989) and Board of Governors (March 1989).

With thousands of institutions reporting to the Federal Reserve System on a weekly basis, it is impossible for the Fed to find and correct all errors before the first release of monetary aggregate data. As errors are discovered the Board revises the data. Most revisions occur within the first month following initial release of a figure, although some can take place months later.

As noted above, to produce estimates of the monetary aggregates the Board of Governors must estimate the deposits held in financial institutions not reporting on a weekly basis. Most of these institutions do report data on a quarterly or annual basis, however. When these quarterly or annual figures become available, they provide points of reference, or "benchmarks," which the Board uses to make more accurate estimates for intervening dates. The Board makes these benchmark revisions to the aggregates each February.

The monetary aggregates are seasonally adjusted to remove those movements that tend to recur at the same time each year, such as the temporary increases in transactions balances before Christmas and before the due date for tax payments. To determine the proper seasonal adjustment factors to apply to a given month's or week's aggregates the Board normally uses data on the aggregates for three years before and three years after the month or week in question. No later data are available for the most recently released aggregates so the Board forecasts fifteen months of the data and appends it to the actual aggregate data. As time passes, the estimates of the seasonal factors can be made more accurately as forecasted data are replaced by actual data and as data errors are corrected and new benchmarks become available. Each February, the Board re-estimates the seasonal factors for the data series used in the monetary aggregates and revises the seasonally adjusted data accordingly. [16]

As discussed earlier, the Federal Reserve changes the definitions of its aggregates from time-to-time following financial market innovations and regulatory changes that affect the way money is held. Some definitional changes are minor and produce only small revisions in the aggregates: others, such as those occurring during the early 1980s, lead to major revisions. When the Fed changes the definitions of the monetary aggregates, it revises the historical data to be consistent over the whole period of the series. (For a list of the beginning dates of various series see Table III.) Previously published data, however, may not bear the same definitions. Thus when comparing data at different dates, users should take care to determine that the data definitions are consistent.

[16] Lawler (1977), Hein and Ott (1983), pp. 16-20, and Cook (1984), pp. 22-25.

Sources of Data

Monetary aggregate data are available from many sources. On each Friday *The Wall Street Journal* publishes a table giving the money stock data released on Thursday afternoon. Historical data can be found in the *Federal Reserve Bulletin*, in the Board of Governor's H.6 release, in the Board's annual historical supplement to the H.6, "Historical Money Stock Data," in the Federal Reserve's *Banking and Monetary Statistics, 1924-1941, Banking and Monetary Statistics, 1941-1970,* and *Annual Statistical Digest* for years since 1970.

Historical data on the monetary base are available directly from the St. Louis Federal Reserve Bank and from the Board of Governors, or in the Board's H.3 release as well as the Board's historical supplement to the H.3, "Reserves of Depository Institutions, Historical Data." Normally, on Friday, *The Wall Street Journal* publishes a table including the most recent figures on the monetary base from the H.3 release.

Suggestions for Further Reading

Most college level money and banking texts discuss the monetary aggregates and the monetary base and their relationship to economic variables. James N. Duprey's "How the Fed Defines and Measures Money" in the Spring-Summer 1982 issue of the Quarterly Review of the Federal Reserve Bank of Minneapolis, examines the aggregates and discusses their construction. "Data Sources Used In Constructing the U.S. Monetary Aggregates," a 1984 monograph by Cynthia Glassman of the Board of Governors of the Federal Reserve System, details the sources used in the estimation of the monetary aggregates. The debate among economists over the best definition of money is discussed in Alfred Broaddus's "Aggregating the Monetary Aggregates: Concepts and Issues" in the Economic Review of the Federal Reserve Bank of Richmond, November/December 1975.

The footnotes found in the Board of Governor's weekly H.6 release provide detailed definitions of the aggregates. The H.6 release also describes components included in each of the aggregates and reports their estimated levels over time.

The February 1980 *Federal Reserve Bulletin* article "The Redefined Monetary Aggregates" by Thomas Simpson, describes the events and intellectual forces that led the Fed to redefine its aggregates in 1980

and specifies how the redefinition was accomplished. This article includes time series charts showing the growth of the pre-1980 aggregates and the post-1980 aggregates.

A Monetary History of the United States, 1867-1960, by Milton Friedman and Anna Schwartz provides a seminal discussion of how changes in growth of the money stock have affected the American economy. The authors discuss and make use of the Fed's monetary aggregates throughout much of the book. *Monetary Statistics of the United States*, also by Friedman and Schwartz, provides estimates of the quantity of money for the period 1867-1968 and discusses sources and methods of construction of historical money stock estimates. This volume also devotes more than 100 pages to alternative approaches to the definition of money.

The *Federal Reserve Bulletin* and the Board of Governors' *Annual Report* generally document and explain definitional changes in the monetary aggregates. *Banking and Monetary Statistics, 1941-1970*, published by the Board of Governors, includes a detailed discussion of the Fed's money stock measures.

"The Monetary Base—Explanation and Analytical Use," by Leonall C. Anderson and Jerry L. Jordan, in the August 1968 Federal Reserve Bank of St. Louis *Review*, explains the construction of the St. Louis version of the monetary base and points out why that concept is of importance to monetary economists. The Board of Governors' H.3 release gives a complete definition of the Board's monetary base in its footnotes. Carl M. Gamb's "Federal Reserve Intermediate Targets: Money or the Monetary Base?" in the January 1980 Federal Reserve Bank of Kansas City *Economic Review*, discusses the pros and cons of use of the monetary base in monetary control and provides a good review of the Board's and St. Louis' construction of the base.

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