Revision of the Monetary Base

ALBERT E. BURGER and ROBERT H. RASCHE

Due to space constraints, a detailed mathematical formulation of the derivation of the reserve adjustment magnitude was omitted from the presentation here. As an Appendix to this article, such maierial will be made available upon request.

THE monetary base, as published by the Federal Reserve Bank of St. Louis, consists of member bank deposits at Federal Reserve Banks, vault cash held by member and nonmember banks, and currency held by the public *plus* an adjustment referred to as the reserve adjustment magnitude (RAM). On the basis of an analysis of the purpose for which RAM is to be used and its historical behavior, it was decided to change the method by which RAM is computed. Consequently, monetary base has been revised to reflect this new method of computing RAM.

This article explains the purpose of a reserve adjustment magnitude and illustrates its computation under the method used in the past (RAM1), an alternative method (RAM2), and the new method (RAM3), which is an approximation to RAM2. After the method of computing the new RAM is explained, the old and revised monetary base series are compared. Revised monetary base data are presented in Appendix I.

Purpose of a Reserve Adjustment Magnitude

In the "monetary base - money multiplier" framework the relationship between the base and the money stock can be expressed as

$$M = mB$$

where the multiplier (m), is equal to

$$\frac{1 + k}{r(1 + t + g) + k}$$

In this formulation of the multiplier, r represents the reserve ratio,[1] t is the ratio of time deposits to private demand deposits (demand deposits included in M_1), g is the ratio of U.S. Government demand deposits at commercial banks to private demand deposits, and k is the ratio of currency held by the nonbank public to private demand deposits.

In a "monetary base - multiplier" framework there are two ways to capture the effects of changes in reserve requirement ratios on the money stock. One way is to allow all the effect of changes in reserve requirement ratios to appear in the r-ratio and, hence, as fluctuations in the money multiplier. In this method the amount of base remains unchanged and the money multiplier rises when reserve requirement ratios are lowered, indicating that a given amount of base held by banks can now support a larger amount of demand deposits. When reserve requirement ratios are raised, the money multiplier falls, indicating that a given amount of base held by banks can now support a smaller amount of demand deposits.

An alternative method of isolating the effect of changes in the reserve requirement ratio is to make an adjustment to the base and to the money multiplier. This adjustment is called the reserve adjustment magnitude (RAM). The effect of this adjustment is to locate the primary impact of reserve requirement ratio changes in fluctuations of the base.

Since changes in the base are dominated by actions of the Federal Reserve System, such as open market operations and lending to member banks, the base is a useful summary measure of the net effect of Federal Reserve actions on the growth of the money stock. The rationale for making a RAM adjustment to the base is that legal reserve requirement ratio changes are also under the complete control of the Federal Reserve. Therefore, if one is interested in a variable that summarizes the effect of Federal Reserve actions on the monetary aggregates, it is appropriate to include these effects in movements of the monetary base.

[1]The reserve ratio consists of legal reserve requirement ratios plus an excess reserve ratio and a nonmember bank vault cash ratio.

Alternative Methods of Computing RAM

This section presents three ways in which the base could be adjusted to include the effect of changes in reserve requirement ratios on the money stock. The examples are kept very simple to illustrate the basics of the process. It is assumed that required reserves are based on current week deposits. Introduction of lagged reserve accounting makes the example more involved, without changing the basic results. The computation of RAM under a system of lagged reserve accounting is discussed at the end of this paper. The actual procedure by which RAM is computed is somewhat more complicated than in the first example because reserve requirement ratios differ by size of deposit. Some of these complications are discussed after the basic examples.

A very simplified representation of the banking system is used to illustrate the alternative computations of the reserve adjustment magnitude. The following assumptions are used:

(1) The only type of deposits that banks hold are demand deposits (D).

(2) There is no currency, hence, the money stock (M) is equal to demand deposits (D).

(3) Since there is no currency, the source base (B) in this example is equal to bank reserves.

(4) The only type of bank reserves (R) are required reserves. Banks always adjust so that excess reserves are zero.

(5) There is only one reserve requirement ratio that applies to all demand deposits at all banks regardless of the amount of deposits held by the bank.

The following notation is used:

RAM = reserve adjustment magnitude

MB = monetary base = B + RAM

$L = \frac{RAM}{D}$

$r = \frac{R}{D}$ = reserve ratio

$r + L = \frac{R}{D} + \frac{RAM}{D}$ = adjusted reserve ratio

E = bank earning assets

In the above simplified example, the money stock (D) can be expressed as:

$$\frac{1}{r} R = D$$

The process of making a reserve adjustment to the source base involves adding RAM to the base and adjusting the reserve ratio by a factor L. Hence:

$$\frac{1}{r+L}(R + RAM) = D$$

$$L = \frac{RAM}{D}$$

The current procedure for computing RAM (denoted as RAM1) consists of accumulating the amount of reserves liberated or absorbed by changes in reserve requirement ratios from some initial starting point (under the current procedure, 1929). This method was originally developed by Karl Brunner and Allan Meltzer.[2] Starting from an initial time period t, RAM1 is computed as follows:

$$RAM1_t = (r_{t-1} - r_t)\, D_{t-1}$$

$$RAM1_{t+1} = RAM1_t + (r_t - r_{t+1})\, D_t$$

$$RAM1_{t+2} = RAM1_t + RAM1_{t+1} + (r_{t+1} - r_{t+2})\, D_{t+1}$$

Under this procedure RAM1 changes only when there is a current change in the reserve requirement ratio. For example, if the reserve requirement ratio in t+1 (r_{t+1}) equals the reserve requirement ratio in the previous period (r_t), then $RAM1_t = RAM1_{t+1}$.

In the case of RAM1, the adjustment (L) to the multiplier depends upon the growth of deposits. For example, suppose that reserve requirement ratios are lowered and then are unchanged thereafter. If deposits continue to grow, say as a result of open market operations expanding bank reserves, then, since RAM1 is constant and D rises, L falls. The multiplier $\frac{1}{r + L}$ drifts upward.

An alternative method (RAM2) is based on the objective of holding the multiplier invariant with respect to reserve requirement ratios. Under this procedure, using the simplified example above, RAM would be computed as follows:

$$RAM2_t = (r_o - r_t)\, D_t$$

$$RAM2_{t+1} = (r_o - r_{t+1})\, D_{t+1}$$

In this method the current reserve requirement ratio is compared to the reserve requirement ratio (r_o) in some fixed initial period. The deposits used to compute RAM2 are current period deposits, instead of lagged deposits as in RAM1. Also, unlike RAM1, the reserve adjustments are not accumulated. The

[2]A discussion of the procedure developed by Brunner and Meltzer and the objective of this procedure is presented in the Appendix which is available upon request. For another discussion of the RAM adjustment see: Peter A. Frost, "Short-Run Fluctuations in the Money Multiplier and Monetary Control," *Journal of Money, Credit and Banking*, Part 2 (February 1977), p. 167.

only factor that determines whether RAM is equal to zero in any period is whether *in that period* the reserve requirement ratio is equal to the reserve requirement ratio (r_0) in the initial period.

This method of computing RAM makes the multiplier invariant with respect to reserve requirement ratios.[3] The computation of RAM2, however, has one serious practical defect. Its computation requires knowledge of current period deposits. If the monetary base is to be used as a control variable, this is a serious deficiency. For example, the Trading Desk would not be able to measure this week's monetary base until it had this week's deposits. Consequently, a third method of computing RAM was developed. The objective of RAM3 is to "approximate" as closely as possible a constant multiplier with respect to reserve requirement ratios, while permitting RAM in the current week to be calculated using data available at the start of the week.

In this example we will assume that at the start of the current week the Federal Reserve knows what deposits were in the previous week. Using the above simplified banking system, RAM3 is defined in the following manner:

$$RAM3_t = (r_0 - r_t)\, D_{t-1}$$

The reader will notice that RAM3 is very similar to RAM2; it is based on a comparison of the current period reserve requirement ratio and some initial reserve requirement ratio (r_0), and it is not cumulative. The basic difference between RAM2 and RAM3 is that RAM3 is computed using lagged and, hence, known deposits, instead of current period deposits.

RAM3 is an "approximation" to an invariant multiplier because lagged deposits are used in its computation. In any period t, under RAM3, the adjustment to the multiplier is:

$$L = (r_0 - r_t)\frac{D_{t-1}}{D_t}$$

To the extent that D_t and D_{t-1} are about the same size, then:

$$\frac{1}{r_t + L} \text{ under RAM3 is approximately the same as } \frac{1}{r_0}$$

Examples of Use of Alternative RAM Adjustments

Let us now turn to a simple numerical example to further illustrate the behavior of the three methods of adjusting the base. This example is based on the simplified model of the banking system outlined in the previous section. We begin by assuming that the legal reserve requirement ratio (r) equals 12.5 percent, and banks hold 200 of source base (reserves (R) in our example). Hence, the multiplier (m) is $\frac{1}{r} = 8$. Each dollar of base held by banks supports 8 dollars of deposits. *In the first period it will be assumed that RAM = 0.* Therefore, in period I the balance sheet of our simplified banking system would appear as follows:

Period I
Banking System

R = 200	D = 1600
E = 1400	

Where: $r = .125$ = ratio of reserves to deposits[4]

$m = \frac{M}{B} = \frac{1}{r} = 8$ = money multiplier

$RAM = 0$

$B = R = 200$

In period I the banking system is in equilibrium in the sense that banks hold the amount of reserves they desire to hold given their legal reserve requirement ratio of .125 and the amount of their deposit liabilities. If banks held more than 200 of reserves, then they would expand their holdings of earning assets and consequently, through the multiple expansion process, demand deposits would rise.

Let us now assume that the Federal Reserve lowers the required reserve ratio from .125 to .10. With deposit liabilities of 1600 and a new, lower reserve requirement ratio of .10, required reserves fall from 200 to 160. Therefore, in period II the banks find themselves with excess reserves. Consequently, under

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[3] If $\frac{1}{r_0}$ is the multiplier in the initial period, then at any time period t the reserve ratio (r_t) is equal to:

$$r_t = r_0 + (r_t - r_0)$$

Since the adjustment factor L is defined as:

$$L = \frac{RAM}{D}$$

under RAM2,

$$L = (r_0 - r_t)$$

Consequently, the adjusted multiplier at any time t is equal to:

$$\frac{1}{r_t + L} = \frac{1}{r_t + r_0 - r_t} = \frac{1}{r_0}$$

[4] In this simple example, required reserves are always assumed to equal total reserves. In actual practice total reserves (R) consist of required reserves and excess reserves.

Table I

Effects of Policy Actions on the Money Multiplier

	PERIODS						
	I	II	III	IV	V	VI	VII
Policy action	None	Lower reserve requirements	None	Increase bank reserves	None	Raise reserve requirements	Reduce bank reserves
r	.125	.10	.10	.10	.10	.125	.125
RAM1	0	40	40	40	40	−22.5	−22.5
RAM2	0	50	50	62.5	62.5	0	0
RAM3	0	40	50	50	62.5	0	0
B	200	200	200	250	250	250	200
MB1	200	240	240	290	290	227.5	177.5
MB2	200	250	250	312.5	312.5	250	200
MB3	200	240	250	300	312.5	250	200
D	1600	2000	2000	2500	2500	2000	1600
m	8	10.000	10.000	10.000	10.000	8.000	8.000
m1	8	8.333	8.333	8.621	8.621	8.791	9.014
m2	8	8.000	8.000	8.000	8.000	8.000	8.000
m3	8	8.333	8.000	8.333	8.000	8.000	8.000

MB = monetary base
B = source base = required reserves in this example
MB1 = B + RAM1
MB2 = B + RAM2
MB3 = B + RAM3

$m = \frac{D}{B}$ $\quad m2 = \frac{D}{MB2}$

$m1 = \frac{D}{MB1}$ $\quad m3 = \frac{D}{MB3}$

the stated assumptions, banks expand their holdings of loans and securities, and deposits expand, until at the end of period II the banking system's balance sheet appears as follows:

Period II
Banking System

R = 200	D = 2000
E = 1800	

We notice that even though the amount of base held by banks (reserves) has not changed (R = 200 in period I and period II) the money stock has risen. Essentially, lowering the reserve requirement ratio has "liberated" 40 of reserves to support more deposits. Deposits expand to 2000 at which point the 40 of reserves have again been absorbed in the sense that they are being used to support deposits.

The reserve adjustment magnitude would be computed, using the three alternative methods, in the following manner:

$$RAM1 = (.125 - .10)\ 1600 = 40$$
$$RAM2 = (.125 - .10)\ 2000 = 50$$
$$RAM3 = (.125 - .10)\ 1600 = 40$$

where: $r_0 = .125$

$r_t = .10$
$D_{t-1} = 1600$
$D_t = 2000$
$RAM_{t-1} = 0$

The monetary base (MB) in period II is then computed by adding the selected RAM adjustment to the source base (reserves in our example) in period II:

$$MB1 = 200 + 40 = 240$$
$$MB2 = 200 + 50 = 250$$
$$MB3 = 200 + 40 = 240$$

In all three cases, the monetary base is increased by the RAM adjustment. Most of the effect of lowering the reserve requirement ratio is now reflected in a movement of the monetary base. However, as shown in Table I, only in RAM2 is all the effect located in the base; this is the only case where the multiplier remains constant. Using either RAM1 or RAM3 the multiplier rises, although much less than in the case where all the effect appears in the multiplier (m). This result occurs because lowering reserve requirement ratios has two effects: (1) an initial effect resulting from reserves being liberated to support a larger volume of deposits, and (2) a continuing effect that lasts as long as the lower reserve requirement ratio prevails, because each dollar of reserves supports a

Table II

Explanation of Computation of RAM in Table I

Period III

RAM1 = (.10 — .10) 2000 + 40 = 40
RAM2 = (.125 — .10) 2000 = 50
RAM3 = (.125 — .10) 2000 = 50

Period IV

RAM1 = (.10 — .10) 2000 + 0 + 40 = 40
RAM2 = (.125 — .10) 2500 = 62.5
RAM3 = (.125 — .10) 2000 = 50

Period V

RAM1 = (.10 — .10) 2500 + 0 + 0 + 40 = 40
RAM2 = (.125 — .10) 2500 = 62.5
RAM3 = (.125 — .10) 2500 = 62.5

Period VI

RAM1 = (.10 — .125) 2500 + 0 + 0 + 0 + 40 = -22.5
RAM2 = (.125 — .125) 2000 = 0
RAM3 = (.125 — .125) 2500 = 0

Period VII

RAM1 = (.125 — .125) 2000 — 62.5 + 0 + 0 + 0 + 40 = -22.5
RAM2 = (.125 — .125) 1600 = 0
RAM3 = (.125 — .125) 2000 = 0

larger volume of deposits than previously. Only RAM2 captures both of these effects in period II. It should be noted that the difference between RAM3 and RAM2 in this example is somewhat exaggerated because of the large change in deposits in the example. In actual practice the week-to-week or month-to-month change in deposits would be much smaller and, hence, RAM3 would be a closer approximation of RAM2.

In period III, RAM1 and RAM2 would be unchanged. However, RAM3 would change, rising to 50. This would result because RAM3 is computed using lagged deposits. In period III, RAM3 would be computed using the new, higher level of deposits (2000). Consequently, after the initial period, the multiplier associated with the monetary base, MB3, would again return to the value that existed prior to the policy change. These results are shown in Tables I and II.

The main difficulty with computing the reserve adjustment as RAM1 (the current procedure) is that (1) it does not capture the full effect of changing legal reserve requirement ratios and (2) it imparts a drift to the money multiplier as other policy actions, such as open market operations, take place. These results are illustrated in Table I, where the results of a series of policy actions are outlined. In this set of examples, the legal reserve requirement ratio is first lowered and the banking system is allowed to adjust to this change. Then, bank reserves are increased, for example through open market operations, and the banks are allowed to adjust to this change. Then, through a series of steps, the reserve requirement ratio is raised to its initial level and bank reserves are reduced to their initial level. Although the range of variation of the money multiplier (m1) associated with a RAM1 adjusted monetary base (MB1) is much less than with no adjustment (m), there is still a noticeable drift in m1 over time.

The multiplier (m2) associated with the monetary base (MB2) with the reserve adjustment RAM2 is unaffected by policy actions, remaining at 8 throughout the whole process of adjustment to the policy changes. The multiplier (m3) also shows some variation. However, the variation in m3 is only of a short-term nature associated with the fact that m3 is computed using lagged deposits. Aside from this short-term variation, m3 remains invariant with respect to the legal reserve requirement ratio. Consequently, RAM3 has essentially the same properties as the adjustment factor RAM2, plus the additional advantage that it is computed using lagged and, hence, known deposits.

RAM With A Fully Specified Multiplier

Let us now examine the properties of the RAM adjustment in the context of a complete money multiplier specified as follows:

$$m = \frac{1+k}{r\,(1+t+g)+k}$$

The objective of the reserve adjustment magnitude (RAM3) is to hold the multiplier invariant with respect to changes in legal reserve requirement ratios to the nearest approximation possible while allowing RAM to be computed using lagged and, hence, known data.

Therefore, with this goal in mind, RAM3 is specified as:

$$RAM3 = (r_o^D - r_t^D)\,(D^P_{t-2} + D^G_{t-2}) + (r_o^T - r_t^T)\,T_{t-2} = [(r_o^D - r_t^D)\,(1 + g_{t-2}) + (r_o^T - r_t^T)\,t_{t-2}]\,D^P_{t-2}$$

It should be noted that *RAM3 is now defined using deposits two weeks earlier,* rather than only the one week lag that appeared in the earlier, simplified examples. A two week lag on deposits is used because this is the most recent deposit data available to the Federal Reserve. On Thursday each week the Federal Reserve has deposit data for the statement week ended one week ago. For example, on Thursday June

16, 1977 the Federal Reserve had preliminary deposit data for the statement week ended Wednesday June 8, 1977. This would be the deposit data used to compute the RAM adjustment for the week ended June 22, 1977.

In the complete form of the money multiplier the reserve ratio r is defined:

$$r = r^D \left(\frac{D^P + D^G}{D^P}\right) + r^T \left(\frac{T}{D^P}\right) + e + v$$

where: r^D = legal reserve requirement ratio on demand deposits
r^T = legal reserve requirement ratio on time deposits
D^P = private demand deposits
D^G = U.S. Government demand deposits at commercial banks
T = time deposits
e = excess reserve ratio
v = nonmember bank vault cash ratio

The purpose of the RAM adjustment is to make the multiplier invariant to changes in legal reserve requirement ratios. Let us ignore the lag on deposits to simplify the notation. This objective can then be stated in mathematical notation as follows:

$$r_o^D \left(\frac{D_t^P + D_t^G}{D_t^P}\right) + r_o^T \left(\frac{T_t}{D_t^P}\right) = r_t^D \left(\frac{D_t^P + D_t^G}{D_t^P}\right) + r_t^T \left(\frac{T_t}{D_t^P}\right) + L$$

Consequently: $$L = (r_o^D - r_t^D)\left(\frac{D_t^P + D_t^G}{D_t^P}\right) + (r_o^T - r_t^T)\frac{T_t}{D_t^P}$$

This expression can be rewritten in the following manner:

$$L = (r_o^D - r_t^D)(1 + g) + (r_o^T - r_t^T)\, t$$

It can be seen from this formulation of the adjusted reserve ratio that the reserve ratio (r) is not held invariant with respect to all factors influencing it. For example, changes in the member bank excess reserve ratio (e), and the nonmember bank vault cash ratio (v) will change the total reserve ratio (r). Because legal reserve requirement ratios on demand deposits are set at different levels from those on time deposits, a shift of deposits between demand and time deposits will also affect the reserve ratio. Further, to the extent that there are different legal reserve requirement ratios on the same type of deposits, as is the current case where reserve requirement ratios are applied in a graduated manner by size of bank deposits, shifts in deposits between different reserve categories will change the r-ratio. The RAM adjustment is not intended to hold the reserve ratio invariant in the face of these types of changes. Also, it is apparent that an adjustment factor designed to hold the multiplier invariant with respect to reserve requirement ratios will depend upon the g- and t-ratios that appear in the multiplier.

Computation of RAM

The new reserve adjustment magnitude is computed taking the reserve requirement ratios that existed in 1929 as the initial values for the reserve requirement ratios. In 1929 these ratios were set as follows:

	Net Demand Deposits	Time Deposits
Central Reserve City Banks	13%	3%
Reserve City Banks	10	3
Country Banks	7	3

These ratios correspond to the r_o used in the simplified example presented in the previous section. They are the ratios that are used each period, along with the current ones, to compute RAM. If current period reserve requirement ratios are equal to the 1929 ratios, RAM is equal to zero.[5] If current period ratios are larger (smaller) than 1929 ratios, then RAM is negative (positive).

Changes in the structure of legal reserve requirement ratios were relatively minor until 1972. The major time deposit change was in mid-1966 when deposits were split into savings deposits, other time deposits of $0-5 million and over $5 million.

On net demand deposits the legal reserve requirements were originally established for three classes of banks — central reserve city, other reserve city and country banks. The central reserve city classification was eliminated in 1962, and in January 1968 the requirement on net demand deposits by class of bank was split into $0-5 million and over $5 million. The major change came in late 1972 when member banks' required reserves were computed on net demand deposits of $0-2, $2-10, $10-100, $100-400, and over $400 million.

As an example of how RAM was computed for the structure of legal reserve requirement ratios in mid-1972, we begin with the following distribution of demand deposits:

	$0-5 million	Over $5 million
Reserve City Banks in N.Y. and Chicago[6]	$ 110 million	$32,015 million
Other Reserve City Banks	779	51,968
Country Banks	21,006	44,075

[5]Since reserve ratios were fixed by law until 1935, RAM is zero up to this date. The first change in legal reserve requirement ratios took place in August 1936.

[6]Formerly central reserve city banks.

The reserve adjustment magnitude associated with demand deposits is then computed by multiplying the deposits in each category by the appropriate difference between current reserve requirement ratios and those that existed in 1929. The structure of legal reserve requirement ratios on demand deposits in mid-1972 was as follows:

	$0-5 million	Over $5 million
Reserve City Banks	.170	.175
Country Banks	.125	.130

Consequently, the reserve adjustment magnitude for demand deposits (RAMD) equals:

$$\begin{aligned} RAMD = & (.13 - .17)\ 110 + (.13 - .175)\ 32{,}015 \\ & + (.10 - .17)\ 779 + (.10 - .175)\ 51{,}968 \\ & + (.07 - .125)\ 21{,}006 + (.07 - .13)\ 44{,}075 \\ = & - \$9{,}197 \text{ million} \end{aligned}$$

The next step in computing the reserve adjustment magnitude is to compute the part associated with time deposits (RAMT). This procedure is essentially the same as that used for RAMD. In 1972, this is somewhat easier than RAMD, because there are fewer deposit categories to consider. All banks faced a reserve requirement ratio of 3 percent on savings deposits and 3 percent on the total amount of other time deposits up to $5 million, and 5 percent on the amount of other time deposits in excess of $5 million. Given the following distribution of time deposits in mid-1972:

Savings	$ 92,686 million
Other Time	
$0-5 million	21,177
Over $5 million	117,776

the reserve adjustment magnitude on time deposits was computed in the following manner:

$$\begin{aligned} RAMT = & (.03 - .03)\ 92{,}686 + (.03 - .03)\ 21{,}177 \\ & + (.03 - .05)\ 117{,}776 = -\$2{,}356 \text{ million} \end{aligned}$$

As can be seen in this example, the only difference between required reserve ratios on time deposits in mid-1972 from those that existed in 1929 is that reserve requirements on the volume of other time deposits in excess of $5 million are 5 percent in 1972, compared to 3 percent in 1929. Hence, the RAM adjustment on savings and other time deposits up to $5 million is zero, and since the reserve requirement ratio on other time deposits in excess of $5 million is greater in 1972 than 1929, this adjustment is negative.

In November 1972 there was a major change in the method by which legal reserves on demand deposits were calculated. The previous division of banks into reserve city and country banks was eliminated. Beginning in November 1972 graduated reserve requirement ratios were applied against the volume of deposits held by a bank. For example, at the end of November 1972 the following set of legal reserve requirement ratios on net demand deposits was in effect:

$0-2 million	8%
$2-10	10
$10-100	12
$100-400	13
Over $400	17½

Since no such reserve requirement categories existed in 1929, this change made it necessary to construct a set of reserve requirement ratios that would have been comparable to the 1929 set. What reserve requirement ratios in 1972, based on the net demand deposit categories, would have been equivalent to the 1929 ratios? The distribution of deposits in November 1972 was used to construct these base period ratios. The proportion of deposits in each category held by: (1) New York and Chicago banks (the former central reserve city banks), (2) other reserve city banks, and (3) country banks was determined. This distribution is given in the table below.

Proportion of Deposits by Deposit Category

Bank Location	$0-2	$2-10	$10-100	$100-400	Over $400 Million
N.Y. & Chicago	.00028	.00112	.01251	.03352	.16212
Other Reserve City	.00198	.00787	.08136	.13708	.12495
Country	.06606	.13468	.18558	.04908	.00180
Sum	.06832	.14367	.27945	.21968	.28887

The numbers in each of the cells were computed by dividing total deposits in that category held by that class of banks by total deposits. For example, country banks holdings of demand deposits in the $0-2 million category were 6.6 percent of total demand deposits subject to reserve requirements. The number at the bottom of each column gives the proportion of total deposits in that category. For example, 27.9 percent of total demand deposits subject to reserve requirements fell in the $10-100 million category.

To compute the appropriate base period (1929 equivalent) reserve requirement ratio for each deposit category, the proportion of deposits in each cell is multiplied by the 1929 ratio applicable to that category of banks. Then this total is divided by the number at the bottom of the column. For example, the 1929 equivalent reserve requirement ratio applicable to deposits in the $0-2 million category is computed in the following manner:

$$\frac{(.00028)\ (.13) + (.00198)\ (.10) + (.06606)\ (.07)}{.06832} = .0711$$

The new set of 1929 equivalent reserve requirement ratios is as follows:

$0-2 million	.0711
$2-10	.0721
$10-100	.0814
$100-400	.0979
Over $400	.1167

As an example of the computation of RAMD under the new reserve requirement categories, in early 1973 the distribution of demand deposits subject to reserve requirements was approximately as follows:

$0-2 million	$10,773 million
$2-10	22,749
$10-100	45,533
$100-400	36,400
Over $400	51,010

Hence, RAMD was computed as follows:

$$\begin{aligned} \text{RAMD} = {} & (.0711 - .08)\ 10{,}773 + (.0721 - .10)\ 22{,}749 \\ & + (.0814 - .12)\ 45{,}533 + (.0979 - .13)\ 36{,}400 \\ & + (.1167 - .175)\ 51{,}010 = -\$6{,}630 \text{ million} \end{aligned}$$

Additional Factors in the Computation of RAM

To complete the computation of the reserve adjustment magnitude requires consideration of some additional factors: (1) vault cash, (2) special reserve requirements imposed on selected bank liabilities, (3) special waivers of penalties for reserve deficiencies, (4) the reserve carryover privilege, and (5) the lag on deposit data and vault cash.

Vault cash — Between mid-1917 and November 1959 member banks could use only their deposits at Federal Reserve Banks to meet their legal reserve requirements. In a series of stages beginning December 1, 1959 member banks were allowed to count part of their vault cash as legal reserves, and after November 23, 1960 they were allowed to count all their vault cash toward meeting legal reserve requirements. This action by the Federal Reserve is viewed in the computation of RAM as a reduction in reserve requirement ratios.[7] Consequently, after November 23, 1960, all current vault cash holdings of member banks are treated as part of RAM.

This method of treating vault cash has an important effect on the level of RAM and some effect on the variability of RAM. Under the old method of computing RAM, the early 1960 release of vault cash to meet required reserves was treated as a one time permanent event. RAM was increased by $2.492 billion, the amount of vault cash released by the end of 1960, and, thereafter, this was unchanged. Under the new procedure, as banks' holdings of vault cash varies, RAM varies. For example, the vault cash adjustment to RAM rose from about $2.5 billion in December 1960 to about $6.5 billion in January 1973, and then increased an additional $2.5 billion by January 1977.

Special reserve requirements — Beginning in October 1969 the Federal Reserve introduced reserve requirements against special classes of bank liabilities.

> Since Oct. 16, 1969, member banks have been required under Regulation M to maintain reserves against foreign branch deposits computed on the basis of net balances due from domestic offices to their foreign branches and against foreign branch loans to U. S. residents. Since June 21, 1973, loans aggregating $100,000 or less to any U. S. resident have been excluded from computations, as have total loans of a bank to U. S. residents if such loans do not exceed $1 million. Regulation D imposes a similar reserve requirement on borrowings from foreign banks by domestic offices of a member bank. The reserve percentage applicable to each of these classifications is 4 per cent. The requirement was 10 per cent originally, was increased to 20 per cent on Jan. 7, 1971, was reduced to 8 per cent effective June 21, 1973, and was reduced to 4 per cent effective May 22, 1975. Initially certain base amounts were exempted in the computation of the requirements, but effective Mar. 14, 1974, the last of these reserve-free bases were eliminated. . . .
>
> A marginal reserve requirement was in effect between June 21, 1973, and Dec. 11, 1974, against increases in the aggregate of the following types of obligations: (a) outstanding time deposits of $100,000 or more, (b) outstanding funds obtained by the bank through issuance by a bank's affiliate of obligations subject to existing reserve requirements on time deposits, and (c) beginning July 12, 1973, funds from sales of finance bills. The requirement applied to balances above a specified base, but was not applicable to banks having obligations of these types aggregating less than $10 million.[8]

There were no reserve requirement ratios in 1929 that corresponded to these special reserve requirements. However, these special requirements absorbed bank reserves in the same manner as an increase in regular reserve requirement ratios. Consequently, these actions are included in RAM by entering, as a negative item, the volume of required reserves generated by these special reserve requirement ratios. This

[7]See the technical Appendix to this article which is available upon request.

[8]Board of Governors of the Federal Reserve System, *Annual Statistical Digest 1971-1975* (Washington, D. C.: Board of Governors of the Federal Reserve System, 1976), p. 328.

negative adjustment to RAM amounted to about $400 million from late October 1969 through March 1970. This adjustment reflected required reserves on bank Eurodollar borrowings. Over the next six months the amount of this adjustment declined, reaching about $100 million in mid-September 1970. Then, for about three months there was a rise in required reserves resulting from the introduction of graduated reserve requirements against funds obtained by member banks through issuance of commercial paper by their affiliates.

Initially this raised the adjustment factor to about $300 million. However, after a few months, the amount of required reserves associated with these special reserve categories had fallen below $100 million, at which level they remained until about mid-1973. With the introduction of the "over the base period" reserve requirements on time deposits and a reserve requirement on the funds from sales of finance bills along with the increased use of Eurodollars by banks, the amount of this adjustment rose sharply, reaching about $1.5 billion in August 1974. In December 1974, with the removal of the "over the base period" requirement on time deposits, the size of this adjustment began to decrease sharply, falling to around $300 million in January 1975. By mid-1975 it amounted to only about $100 million where it has remained.

Waiver of penalties for reserve deficiencies — In November 1972, and again in November 1975, the Federal Reserve instituted a practice of allowing, under certain conditions, Federal Reserve Banks to waive penalties for member bank reserve deficiencies. Beginning with the week ended November 15, 1972, Federal Reserve Banks were allowed to waiver penalties for a transition period in connection with bank adaption to Regulation J, as amended November 9, 1972.[9] These allowable deficiencies averaged $330 million in November, $428 million in December 1972 and then declined through June 1974 after which they were eliminated. Starting with the reserve settlement week of November 19, 1975 a policy of allowable reserve deficiencies was reinstituted in accord with Board policy of permitting transitional relief when a nonmember bank merges with an existing member bank, or when a nonmember bank joins the Federal Reserve System. These waivers averaged $135 million in January 1976, rose to a peak of $160 million in June 1976, and since then have fluctuated between about $150-$160 million.

These actions by the Federal Reserve were essentially the same as an increase in member bank reserves. Instead of directly increasing member bank deposits at Federal Reserve Banks, the Federal Reserve gave the banks an "overdraft privilege." The banks appear to have treated this "overdraft privilege" exactly the same as an increase in deposits at Federal Reserve Banks. For example, the level of excess reserves of member banks, computed to include the allowable deficiencies, remained at about the same level during the period from late 1972 to mid-1974 as in the previous 4 year period. Consequently, the total of these allowable deficiencies are included in RAM for each month in which they were in effect.

The Board of Governors includes these allowable reserve deficiencies in total member bank reserves. Hence, the amount of this item can be computed by subtracting from total member bank reserves the sum of member bank reserves with the Federal Reserve Banks and member bank currency and coin. For historical data these items are available in the Federal Reserve *Bulletin* table entitled "Member Bank Reserves, Federal Reserve Bank Credit, and Related Items," and for current data Table 1.12 "Reserves and Borrowings Member Banks."

Reserve Carryover Privilege

In the September 1968 revision of Regulation D the Federal Reserve also instituted a reserve carryover privilege under which either an excess or deficiency of reserves of up to 2 percent of average required reserves could be carried forward to the next week. In one sense it could be argued that this carryover privilege should be treated as a regulatory change supplying reserves and, hence, should be part of RAM. However, the size of the carryover is determined, within limits, by the banks. Hence, we have chosen not to include this factor in RAM. Instead, its influence remains in the money multiplier where it appears as a factor influencing the variance of the excess reserve ratio. On balance, the influence of the reserve carryover has been very small, remaining at about $100 million with little variation since late 1968.

Lag on Deposit and Vault Cash Data

In any week the most recent deposit and vault cash data are those on deposits and vault cash held by member banks two weeks earlier. Consequently, the RAM adjustment for any class of deposits is com-

[9]Effective November 9, 1972 banks were required to pay cash items presented by a Federal Reserve Bank on the day of presentation in funds available to the Federal Reserve Bank on that day.

Chart I
Monetary Base

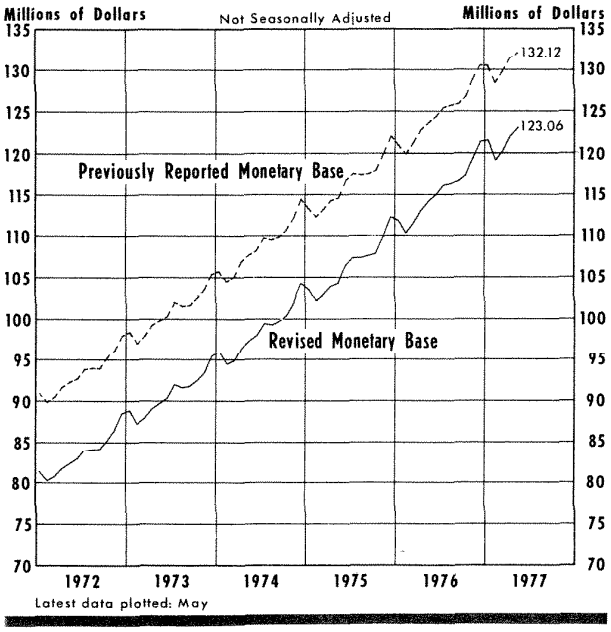
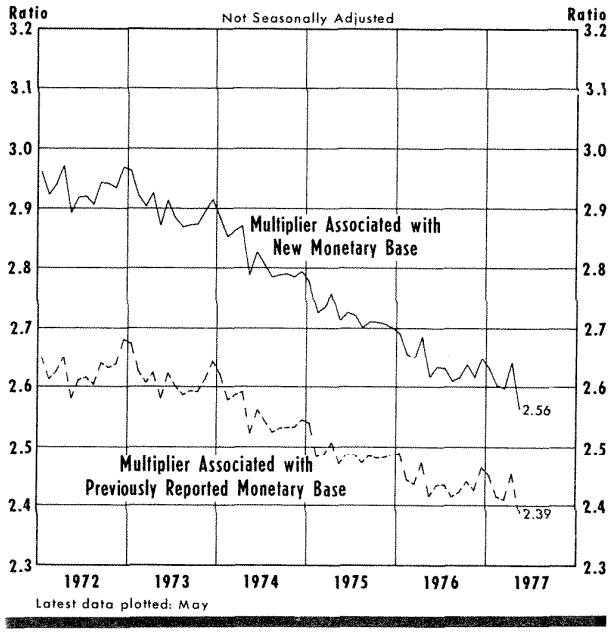


Chart II
Multiplier



puted by taking the difference between the currently effective reserve requirement ratio on the class of deposits and the base period reserve requirement ratio applicable to that class of deposits and multiplying this result by deposits of two weeks earlier. The RAM associated with the ith class of deposits in period t is:

$$RAM_{i,t} = (r_{i,0} - r_{i,t})\, D_{i,t-2}$$

Likewise, the vault cash added to RAM in the current week is vault cash held two weeks earlier.

Summary of the Computation of RAM

The new RAM adjustment is, therefore, computed in the following steps:

(1) Determine the distribution of member bank deposits subject to reserve requirements according to reserve requirement categories two weeks earlier.

(2) Compare the current reserve requirement ratio for each reserve requirement category with the corresponding 1929 equivalent reserve requirement ratio for the category. Multiply the difference between the 1929 equivalent ratio and the current ratio by the amount of deposits in that category two weeks earlier. If the current reserve requirement ratio exceeds the 1929 ratio, this reduces RAM. If the current ratio is less than the 1929 ratio, this amount is a positive entry to RAM.

(3) Follow steps (1) and (2) for demand deposits and time deposits.

(4) Subtract from RAM the amount of required reserves on all deposits subject to special reserve requirements.

(5) Add to RAM the amount of waiver privileges.

(6) Add to RAM the amount of vault cash held by member banks two weeks earlier.

Comparison of the Old and New Monetary Base Series

Table III and Charts I and II present a comparison of the old and new RAM, old and new monetary

Table III

Comparison of OLD and NEW Monetary Base Data: January 1972 - May 1977 (Nonseasonally Adjusted Monthly Data)

	Mean
Old Monetary Base	$110.415 billion
New Monetary Base	$100.592
Old RAM	$ 7.039
New RAM	$ −2.784
Old Multiplier	2.535
New Multiplier	2.788

Table IV

January 1972 - May 1977
Not Seasonally Adjusted Data

	Time	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	Const.
$\ln m_1$	−.001688	−.001805	−.018704	−.018114	−.007138	−.028525	−.015979	−.017531	−.022746	−.015864	−.013939	−.011306	1.001846
	(−13.35)	(− .89)	(−7.27)	(−6.21)	(−2.28)	(−8.74)	(−4.73)	(−5.18)	(−6.93)	(−5.18)	(−5.19)	(−5.55)	(176.79)
				$\bar{R}^2 = .98$		SE = .0043	DW = 2.39	$\hat{\rho} = .768$					
$\ln m_1^*$	−.001678	−.001670	−.018605	−.017944	−.006757	−.028125	−.015526	−.016823	−.022013	−.015109	−.013104	−.011143	1.000114
	(−14.29)	(− .83)	(−7.36)	(−6.27)	(−2.20)	(−8.81)	(−4.69)	(−5.08)	(−6.85)	(−5.03)	(−4.96)	(−5.55)	(189.31)
				$\bar{R}^2 = .98$		SE = .0042	DW = 2.37	$\hat{\rho} = .755$					
$\ln m_1^{**}$	−.002392	−.003430	−.015481	−.013501	−.001858	−.024407	−.013000	−.014951	−.019805	−.013315	−.009555	−.008581	1.117275
	(−16.70)	(−1.76)	(−6.27)	(−4.80)	(− .61)	(−7.71)	(−3.97)	(−4.56)	(−6.25)	(−4.51)	(−3.71)	(−4.42)	(175.15)
				$\bar{R}^2 = .99$		SE = .0042	DW = 2.42	$\hat{\rho} = .802$					

NOTES: Numbers in parentheses are t-statistics
m_1 = M1 ÷ Previously reported monetary base
m_1^* = M1 ÷ (Previously reported monetary base + reserves released by waiver privilege)
m_1^{**} = M1 ÷ New monetary base series based on revision of method of computing RAM
D1, . . ., D11 are dummy variables for January through November

base, and the multipliers (money stock divided by base) for the period January 1972 through May 1977. All data are on a nonseasonally adjusted basis. As shown in Table III, the difference between the mean value of the old RAM and the new RAM is about $10 billion over the last 5 years.[10] Consequently, the old monetary base averaged about $10 billion more than the base using the new method of computing RAM. Correspondingly, the mean of the new money multiplier is about 10 percent higher than the mean value of the old multiplier (2.788 vs. 2.535).

To examine whether the revision of RAM had an effect on the relationship between the monetary base and money (M1), the money multiplier was regressed on a time trend. These results were compared to similar regressions using the previously reported monetary base and the previously reported monetary base with a RAM adjustment that included the waivers that are incorporated in the new RAM. The results of these regressions are reported in Table IV. Nonseasonally adjusted monthly data was used in all the regressions and each regression included seasonal dummy variables.

Since ln m = ln M − ln B, the regressions reported in Table IV indicate how much of the variance of the difference between the growth rate of the money stock and the monetary base is not explained by a time trend in the multiplier, seasonal variation, or autocorrelation in the errors. There have been several changes in reserve requirement ratios in the last five years and, consequently, if there was a major effect resulting from our revision of RAM we would have expected to observe its effects in the last five years. As shown by a comparison of the standard errors associated with the three equations, the revision of the base resulting from changing the method of computing RAM has had essentially no effect on the residual variance in the relationship between the base and M1.

(Appendix I follows on next page.)

[10]Since the new RAM is not a cumulative sum of past changes in RAM, the level of RAM is not influenced by the starting point for computation of RAM.

APPENDIX I

Revised Weekly Monetary Base

(Billions of Dollars)

Week Ended	Nonseasonally Adjusted Source Base	Nonseasonally Adjusted Total RAM	Nonseasonally Adjusted Monetary Base	Seasonally Adjusted Monetary Base
1/ 7/76	113.5	-0.5	113.0	110.5
1/14/76	111.9	0.7	112.6	110.6
1/21/76	111.6	0.4	112.0	110.9
1/28/76	110.2	0.4	110.6	111.1
2/ 4/76	110.2	0.3	110.5	111.5
2/11/76	109.5	0.5	110.1	111.2
2/18/76	111.3	-0.1	111.2	111.9
2/25/76	110.4	-0.3	110.1	111.7
3/ 3/76	110.4	0.2	110.7	112.5
3/10/76	110.1	0.6	110.7	112.4
3/17/76	111.3	0.1	111.5	112.5
3/24/76	111.7	-0.4	111.3	112.7
3/31/76	111.8	0.0	111.8	113.0
4/ 7/76	111.6	0.3	111.8	112.8
4/14/76	112.6	0.5	113.1	113.5
4/21/76	114.3	-0.4	113.9	114.1
4/28/76	113.2	0.1	113.4	114.1
5/ 5/76	114.0	0.3	114.3	114.6
5/12/76	112.7	1.0	113.7	114.0
5/19/76	113.8	0.3	114.2	114.4
5/26/76	113.3	0.3	113.7	114.3
6/ 2/76	113.7	0.7	114.4	114.9
6/ 9/76	113.5	1.0	114.5	114.9
6/16/76	114.7	0.7	115.4	115.4
6/23/76	114.3	0.4	114.7	115.1
6/30/76	115.0	0.7	115.7	115.7
7/ 7/76	115.4	0.9	116.3	115.5
7/14/76	115.3	1.1	116.4	115.3
7/21/76	116.4	0.1	116.5	115.4
7/28/76	115.0	0.8	115.8	115.6
8/ 4/76	115.6	0.9	116.4	116.3
8/11/76	114.8	1.2	116.0	115.9
8/18/76	116.2	0.7	116.9	116.7
8/25/76	115.6	0.4	116.0	116.6
9/ 1/76	115.2	0.9	116.0	116.7
9/ 8/76	115.1	1.3	116.3	116.6
9/15/76	115.6	1.4	117.0	117.3
9/22/76	115.8	0.4	116.2	117.2
9/29/76	115.5	1.1	116.5	117.6
10/ 6/76	115.8	1.1	116.8	117.8
10/13/76	115.8	1.4	117.2	117.7
10/20/76	117.7	0.1	117.8	118.0
10/27/76	116.4	0.7	117.1	118.2
11/ 3/76	116.9	1.1	118.0	118.7
11/10/76	116.8	1.4	118.2	118.6
11/17/76	118.8	0.9	119.7	119.3
11/24/76	118.9	0.5	119.3	119.1
12/ 1/76	119.4	1.1	120.5	119.5
12/ 8/76	118.7	1.4	120.1	119.0
12/15/76	120.0	1.6	121.6	119.6
12/22/76	120.8	0.8	121.6	119.2
12/29/76	121.3	1.2	122.5	119.4
1/ 5/77	121.1	1.5	122.6	119.6
1/12/77	120.0	1.9	121.9	119.9
1/19/77	120.1	1.7	121.8	120.0
1/26/77	119.0	1.7	120.7	120.9
2/ 2/77	117.6	1.8	119.5	120.4
2/ 9/77	117.3	2.0	119.3	120.6
2/16/77	117.8	1.8	119.6	120.5
2/23/77	118.2	1.0	119.3	120.6
3/ 2/77	117.5	1.6	119.2	121.1
3/ 9/77	117.6	1.8	119.3	121.2
3/16/77	118.5	2.0	120.4	121.5
3/23/77	119.4	1.0	120.3	121.9
3/30/77	119.3	1.6	120.9	122.4
4/ 6/77	119.3	1.9	121.2	122.2
4/13/77	119.9	2.3	122.1	122.8
4/20/77	121.9	0.9	122.8	123.1
4/27/77	120.9	1.6	122.4	123.0
5/ 4/77	121.0	2.0	123.0	123.4
5/11/77	120.5	2.4	122.8	123.3
5/18/77	121.4	1.9	123.3	123.4
5/25/77	120.5	1.8	122.3	123.0
6/ 1/77	121.1	2.1	123.2	123.7

Revised Monthly Monetary Base

(Billions of Dollars)

Month	Nonseasonally Adjusted Source Base	Nonseasonally Adjusted Total RAM[1]	Nonseasonally Adjusted Monetary Base	Seasonally Adjusted Monetary Base
1/47	44.9	-7.1	37.9	37.5
2/47	44.3	-7.0	37.3	37.7
3/47	44.3	-6.9	37.4	37.8
4/47	44.1	-6.8	37.3	37.8
5/47	44.1	-6.8	37.3	37.8
6/47	44.4	-6.9	37.5	37.8
7/47	44.6	-6.9	37.7	37.8
8/47	44.7	-7.0	37.7	37.8
9/47	45.5	-7.1	38.4	38.2
10/47	45.7	-7.2	38.5	38.2
11/47	45.6	-7.3	38.3	38.0
12/47	46.2	-7.3	38.9	38.0
1/48	45.8	-7.4	38.4	38.0
2/48	44.9	-7.4	37.5	37.9
3/48	45.0	-7.7	37.3	37.7
4/48	44.7	-7.6	37.0	37.6
5/48	44.7	-7.6	37.1	37.6
6/48	45.2	-7.9	37.3	37.6
7/48	45.5	-8.1	37.4	37.5
8/48	45.7	-8.1	37.6	37.6
9/48	46.7	-8.8	37.8	37.6
10/48	48.0	-10.2	37.8	37.5
11/48	48.1	-10.3	37.9	37.5
12/48	48.4	-10.3	38.1	37.2
1/49	47.8	-10.4	37.5	37.1
2/49	47.1	-10.3	36.8	37.1
3/49	46.9	-10.2	36.7	37.1
4/49	46.6	-10.1	36.5	37.1
5/49	45.6	-8.9	36.6	37.1
6/49	45.5	-8.8	36.7	36.9
7/49	45.0	-8.0	37.0	37.1
8/49	44.3	-7.1	37.1	37.2
9/49	43.5	-6.3	37.2	37.0
10/49	43.6	-6.4	37.2	36.9

Month	Nonseasonally Adjusted			Seasonally Adjusted
	Source Base	Total RAM[1]	Monetary Base	Monetary Base
11/49	43.6	-6.4	37.2	36.8
12/49	44.0	-6.5	37.6	36.6
1/50	43.7	-6.5	37.2	36.9
2/50	43.2	-6.6	36.6	37.0
3/50	43.1	-6.5	36.6	36.9
4/50	43.0	-6.5	36.5	37.1
5/50	43.0	-6.4	36.5	37.1
6/50	43.2	-6.4	36.8	37.0
7/50	43.4	-6.5	36.9	36.9
8/50	43.3	-6.6	36.7	36.8
9/50	43.8	-6.6	37.2	37.0
10/50	44.0	-6.7	37.3	37.0
11/50	44.1	-6.7	37.4	37.1
12/50	45.2	-6.8	38.4	37.4
1/51	45.4	-7.7	37.7	37.4
2/51	46.1	-9.0	37.1	37.5
3/51	46.4	-8.9	37.5	37.8
4/51	46.5	-9.0	37.5	38.1
5/51	46.2	-9.0	37.2	37.8
6/51	46.9	-8.9	38.0	38.1
7/51	47.1	-9.0	38.1	38.1
8/51	47.1	-9.0	38.1	38.2
9/51	47.6	-9.0	38.6	38.5
10/51	48.3	-9.1	39.2	38.9
11/51	48.4	-9.2	39.2	38.8
12/51	49.4	-9.3	40.2	39.1
1/52	49.1	-9.5	39.6	39.3
2/52	48.4	-9.5	38.9	39.3
3/52	48.6	-9.4	39.3	39.6
4/52	48.2	-9.4	38.8	39.5
5/52	48.3	-9.3	39.0	39.6
6/52	49.0	-9.3	39.7	39.8
7/52	49.6	-9.4	40.1	40.1
8/52	49.4	-9.7	39.7	39.8
9/52	49.9	-9.6	40.3	40.2
10/52	50.2	-9.6	40.6	40.3
11/52	50.6	-9.7	40.9	40.5
12/52	51.7	-9.8	41.9	40.8
1/53	50.9	-10.0	40.9	40.6
2/53	50.2	-9.9	40.4	40.8
3/53	50.2	-9.7	40.5	40.8
4/53	49.8	-9.7	40.1	40.8
5/53	49.8	-9.5	40.3	40.8
6/53	50.3	-9.4	40.9	41.1
7/53	49.8	-8.5	41.3	41.3
8/53	49.7	-8.5	41.2	41.3
9/53	49.9	-8.6	41.3	41.2
10/53	49.9	-8.6	41.3	41.1
11/53	50.3	-8.5	41.7	41.3
12/53	50.9	-8.6	42.2	41.1
1/54	50.5	-8.7	41.7	41.5
2/54	49.5	-8.7	40.7	41.2
3/54	49.4	-8.6	40.8	41.1
4/54	49.1	-8.6	40.6	41.1
5/54	49.3	-8.5	40.8	41.4
6/54	49.5	-8.4	41.2	41.3
7/54	49.1	-7.9	41.2	41.2
8/54	48.4	-7.1	41.3	41.4
9/54	48.4	-7.2	41.2	41.2
10/54	49.0	-7.2	41.8	41.6
11/54	49.5	-7.4	42.1	41.6

Month	Nonseasonally Adjusted			Seasonally Adjusted
	Source Base	Total RAM[1]	Monetary Base	Monetary Base
12/54	50.0	-7.5	42.6	41.4
1/55	49.2	-7.5	41.7	41.5
2/55	48.6	-7.5	41.1	41.7
3/55	48.4	-7.4	41.0	41.4
4/55	48.6	-7.3	41.3	41.8
5/55	48.6	-7.4	41.2	41.7
6/55	48.8	-7.4	41.4	41.5
7/55	49.1	-7.4	41.7	41.7
8/55	49.0	-7.4	41.6	41.7
9/55	49.1	-7.4	41.8	41.7
10/55	49.4	-7.4	42.0	41.8
11/55	49.7	-7.5	42.2	41.8
12/55	50.5	-7.5	43.0	41.9
1/56	49.8	-7.6	42.2	42.0
2/56	48.9	-7.6	41.4	42.0
3/56	49.2	-7.4	41.8	42.2
4/56	49.1	-7.4	41.6	42.1
5/56	49.1	-7.4	41.6	42.1
6/56	49.5	-7.4	42.0	42.1
7/56	49.6	-7.5	42.1	42.0
8/56	49.4	-7.4	42.0	42.1
9/56	49.8	-7.4	42.4	42.3
10/56	49.8	-7.5	42.3	42.1
11/56	50.4	-7.5	42.9	42.5
12/56	51.3	-7.6	43.8	42.6
1/57	50.3	-7.7	42.7	42.5
2/57	49.4	-7.6	41.8	42.4
3/57	49.5	-7.4	42.0	42.5
4/57	49.7	-7.5	42.2	42.7
5/57	49.5	-7.6	41.9	42.4
6/57	49.9	-7.5	42.4	42.5
7/57	50.2	-7.5	42.7	42.6
8/57	49.9	-7.6	42.3	42.4
9/57	50.1	-7.4	42.7	42.6
10/57	50.1	-7.5	42.7	42.5
11/57	50.3	-7.6	42.7	42.4
12/57	51.4	-7.5	43.8	42.7
1/58	50.4	-7.7	42.7	42.5
2/58	49.6	-7.6	42.0	42.7
3/58	49.3	-6.9	42.4	42.9
4/58	49.0	-6.5	42.6	43.0
5/58	49.0	-6.2	42.8	43.2
6/58	49.6	-6.3	43.4	43.4
7/58	49.9	-6.4	43.5	43.3
8/58	49.8	-6.4	43.4	43.5
9/58	49.8	-6.4	43.4	43.3
10/58	49.9	-6.4	43.5	43.4
11/58	50.3	-6.4	43.8	43.5
12/58	51.3	-6.5	44.8	43.7
1/59	50.4	-6.6	43.8	43.6
2/59	49.7	-6.6	43.2	43.8
3/59	49.7	-6.5	43.2	43.7
4/59	50.0	-6.4	43.5	43.9
5/59	50.1	-6.5	43.5	43.9
6/59	50.3	-6.5	43.8	43.9
7/59	50.7	-6.5	44.2	44.0
8/59	50.6	-6.5	44.1	44.1
9/59	50.6	-6.5	44.1	44.1
10/59	50.6	-6.5	44.1	44.0
11/59	50.8	-6.5	44.3	44.0
12/59	51.4	-6.5	44.9	43.8

Month	Nonseasonally Adjusted			Seasonally Adjusted
	Source Base	Total RAM[1]	Monetary Base	Monetary Base
1/60	50.6	-6.3	44.3	44.0
2/60	49.5	-6.3	43.3	43.8
3/60	49.4	-6.1	43.3	43.8
4/60	49.6	-6.1	43.5	43.9
5/60	49.7	-6.1	43.6	44.0
6/60	49.9	-6.1	43.8	43.9
7/60	50.4	-6.1	44.3	44.1
8/60	50.2	-6.1	44.1	44.1
9/60	49.8	-5.9	43.9	43.9
10/60	50.0	-5.5	44.6	44.5
11/60	50.2	-5.6	44.6	44.3
12/60	49.7	-5.3	44.4	43.4
1/61	49.0	-4.0	44.9	44.7
2/61	48.4	-4.1	44.3	44.8
3/61	48.3	-4.1	44.1	44.6
4/61	48.4	-4.2	44.2	44.6
5/61	48.4	-4.2	44.3	44.6
6/61	48.8	-4.2	44.6	44.8
7/61	49.1	-4.1	45.0	44.8
8/61	49.3	-4.1	45.1	45.2
9/61	49.5	-4.2	45.3	45.4
10/61	49.9	-4.2	45.7	45.7
11/61	50.4	-4.3	46.1	45.8
12/61	51.2	-4.3	46.9	45.9
1/62	50.5	-4.2	46.3	46.0
2/62	49.8	-4.1	45.6	46.1
3/62	49.9	-4.2	45.7	46.2
4/62	50.3	-4.3	46.0	46.5
5/62	50.4	-4.3	46.1	46.5
6/62	50.8	-4.3	46.5	46.7
7/62	51.3	-4.3	47.0	46.8
8/62	51.1	-4.3	46.8	46.9
9/62	51.2	-4.2	47.0	47.0
10/62	51.5	-4.2	47.3	47.2
11/62	51.3	-3.6	47.7	47.4
12/62	52.2	-3.5	48.7	47.6
1/63	51.5	-3.4	48.1	47.7
2/63	51.0	-3.4	47.5	48.0
3/63	51.1	-3.5	47.6	48.1
4/63	51.4	-3.6	47.8	48.2
5/63	51.6	-3.5	48.1	48.6
6/63	52.1	-3.5	48.6	48.7
7/63	52.7	-3.5	49.2	49.0
8/63	52.5	-3.5	49.0	49.1
9/63	52.8	-3.5	49.4	49.4
10/63	53.0	-3.5	49.6	49.5
11/63	53.7	-3.5	50.2	49.9
12/63	54.9	-3.5	51.4	50.2
1/64	54.1	-3.3	50.7	50.4
2/64	53.4	-3.4	50.0	50.5
3/64	53.8	-3.5	50.3	50.8
4/64	54.0	-3.6	50.4	50.8
5/64	54.2	-3.5	50.7	51.2
6/64	54.9	-3.5	51.4	51.5
7/64	55.3	-3.5	51.8	51.6
8/64	55.4	-3.5	51.9	52.0
9/64	55.8	-3.5	52.3	52.4
10/64	56.1	-3.5	52.6	52.5
11/64	56.7	-3.6	53.2	52.9
12/64	57.7	-3.6	54.1	52.8
1/65	57.0	-3.4	53.6	53.1

Month	Nonseasonally Adjusted			Seasonally Adjusted
	Source Base	Total RAM[1]	Monetary Base	Monetary Base
2/65	56.5	-3.5	53.0	53.4
3/65	56.6	-3.5	53.1	53.7
4/65	57.0	-3.5	53.4	53.9
5/65	57.1	-3.6	53.6	54.0
6/65	57.7	-3.6	54.1	54.2
7/65	58.3	-3.6	54.7	54.5
8/65	58.2	-3.6	54.6	54.8
9/65	58.5	-3.5	55.0	55.0
10/65	59.1	-3.5	55.6	55.5
11/65	59.6	-3.6	56.1	55.8
12/65	61.0	-3.5	57.5	56.2
1/66	60.4	-3.4	57.0	56.4
2/66	59.7	-3.5	56.2	56.6
3/66	59.8	-3.5	56.3	56.9
4/66	60.4	-3.5	56.9	57.4
5/66	60.6	-3.6	57.0	57.5
6/66	61.0	-3.6	57.4	57.5
7/66	62.0	-3.7	58.3	58.1
8/66	61.6	-4.0	57.6	57.8
9/66	62.3	-3.9	58.3	58.5
10/66	62.5	-4.2	58.3	58.3
11/66	63.0	-4.3	58.7	58.4
12/66	64.1	-4.1	60.0	58.7
1/67	63.7	-4.1	59.6	59.0
2/67	63.2	-4.2	59.0	59.4
3/67	63.1	-4.1	59.0	59.6
4/67	63.2	-3.6	59.6	60.0
5/67	63.3	-3.7	59.6	60.1
6/67	64.0	-3.7	60.3	60.5
7/67	64.7	-3.6	61.1	60.9
8/67	64.6	-3.7	60.9	61.0
9/67	65.2	-3.7	61.5	61.6
10/67	65.8	-3.8	62.0	62.0
11/67	66.4	-4.0	62.5	62.2
12/67	67.8	-3.9	63.8	62.5
1/68	67.6	-4.1	63.5	62.8
2/68	67.1	-4.3	62.9	63.3
3/68	67.5	-4.5	63.0	63.7
4/68	67.8	-4.6	63.2	63.7
5/68	68.1	-4.5	63.6	64.0
6/68	68.8	-4.5	64.4	64.6
7/68	69.6	-4.6	65.0	64.7
8/68	69.8	-4.6	65.3	65.3
9/68	70.0	-4.7	65.4	65.5
10/68	70.8	-4.8	65.9	66.0
11/68	71.7	-4.9	66.8	66.5
12/68	73.1	-4.8	68.3	66.9
1/69	72.8	-4.9	67.9	67.2
2/69	71.9	-5.0	66.9	67.4
3/69	71.7	-4.9	66.8	67.6
4/69	72.3	-5.2	67.1	67.5
5/69	73.3	-5.7	67.6	68.1
6/69	73.5	-5.4	68.0	68.2
7/69	73.6	-5.3	68.3	68.1
8/69	73.8	-5.2	68.6	68.6
9/69	73.7	-5.1	68.6	68.7
10/69	74.3	-5.4	68.9	69.0
11/69	75.5	-5.6	69.9	69.6
12/69	76.7	-5.5	71.1	69.7
1/70	76.3	-5.6	70.7	70.0
2/70	75.2	-5.6	69.6	70.2

Month	Nonseasonally Adjusted Source Base	Total RAM[1]	Monetary Base	Seasonally Adjusted Monetary Base
3/70	75.2	-5.6	69.6	70.4
4/70	76.2	-5.7	70.4	70.9
5/70	76.6	-5.6	71.0	71.4
6/70	76.8	-5.3	71.5	71.7
7/70	77.9	-5.5	72.4	72.1
8/70	78.1	-5.6	72.6	72.6
9/70	78.7	-5.6	73.1	73.3
10/70	78.7	-5.2	73.5	73.7
11/70	79.3	-5.1	74.2	73.9
12/70	80.9	-5.1	75.9	74.4
1/71	81.1	-5.3	75.8	75.0
2/71	80.5	-5.4	75.0	75.7
3/71	80.7	-5.4	75.3	76.1
4/71	81.5	-5.5	76.0	76.5
5/71	82.4	-5.5	76.9	77.2
6/71	82.8	-5.4	77.4	77.6
7/71	84.1	-5.5	78.6	78.2
8/71	84.0	-5.4	78.6	78.6
9/71	84.4	-5.5	78.9	79.1
10/71	84.6	-5.5	79.1	79.3
11/71	85.4	-5.5	79.9	79.7
12/71	86.7	-5.5	81.2	79.8
1/72	87.2	-5.8	81.4	80.5
2/72	86.1	-5.8	80.2	81.0
3/72	86.7	-5.9	80.8	81.6
4/72	87.9	-6.1	81.7	82.2
5/72	88.5	-6.2	82.3	82.6
6/72	88.9	-6.0	82.9	83.1
7/72	90.0	-6.0	84.0	83.6
8/72	90.2	-6.0	84.1	84.2
9/72	90.1	-5.9	84.2	84.4
10/72	91.5	-6.3	85.2	85.5
11/72	90.2	-3.6	86.5	86.3
12/72	90.9	-2.4	88.5	86.9
1/73	91.5	-2.6	88.8	87.9
2/73	90.0	-2.8	87.2	88.1
3/73	90.9	-3.0	87.9	88.8
4/73	92.3	-3.3	89.0	89.4
5/73	92.9	-3.2	89.7	89.9
6/73	93.4	-3.1	90.3	90.5
7/73	95.6	-3.6	92.0	91.4
8/73	95.8	-4.2	91.6	91.6
9/73	96.1	-4.4	91.7	92.1
10/73	97.4	-4.9	92.4	92.8
11/73	98.2	-4.8	93.4	93.1
12/73	100.0	-4.5	95.5	93.8
1/74	100.4	-4.4	96.0	95.0
2/74	99.0	-4.6	94.4	95.4
3/74	99.5	-4.7	94.9	95.8
4/74	101.6	-5.1	96.5	96.9
5/74	102.7	-5.3	97.4	97.6
6/74	103.4	-5.4	98.0	98.2
7/74	105.1	-5.6	99.5	98.9
8/74	105.0	-5.7	99.3	99.3
9/74	105.3	-5.5	99.7	100.1
10/74	105.6	-5.2	100.4	100.8
11/74	106.9	-4.9	102.0	101.6
12/74	108.7	-4.5	104.2	102.3
1/75	107.5	-3.9	103.6	102.6
2/75	105.5	-3.3	102.2	103.4
3/75	105.6	-2.8	102.9	103.9
4/75	106.6	-2.7	103.9	104.3
5/75	106.7	-2.4	104.3	104.5
6/75	108.6	-2.1	106.5	106.6
7/75	109.2	-1.8	107.4	106.7
8/75	109.0	-1.6	107.4	107.4
9/75	109.1	-1.5	107.6	108.0
10/75	109.5	-1.6	107.9	108.3
11/75	111.0	-1.1	109.9	109.4
12/75	113.0	-0.7	112.3	110.2
1/76	111.6	0.2	111.9	110.9
2/76	110.2	0.1	110.3	111.6
3/76	111.4	0.1	111.5	112.6
4/76	112.9	0.1	113.0	113.5
5/76	113.6	0.5	114.2	114.4
6/76	114.3	0.7	114.9	115.1
7/76	115.4	0.7	116.1	115.4
8/76	115.5	0.8	116.4	116.5
9/76	115.6	1.0	116.6	117.2
10/76	116.4	0.9	117.3	117.9
11/76	118.4	1.0	119.4	118.9
12/76	120.2	1.2	121.4	119.3
1/77	119.8	1.7	121.6	120.5
2/77	117.5	1.6	119.1	120.6
3/77	118.7	1.6	120.3	121.5
4/77	120.4	1.7	122.1	122.6
5/77	121.0	2.0	123.1	123.3

Components of Revised RAM

(Billions of Dollars)

Month	Nonseasonally Adjusted RAM on Net Demand Deposits	RAM on Time Deposits	Other Ram[2]	Vault Cash	Total Ram[3]
1/72	-9.5	-2.1	-0.1	5.9	-5.8
2/72	-9.2	-2.1	-0.1	5.5	-5.8
3/72	-9.1	-2.1	-0.1	5.4	-5.9
4/72	-9.3	-2.1	-0.1	5.4	-6.1
5/72	-9.4	-2.2	-0.1	5.5	-6.2
6/72	-9.2	-2.2	-0.1	5.5	-6.0
7/72	-9.4	-2.2	-0.1	5.7	-6.0
8/72	-9.4	-2.3	-0.1	5.7	-6.0
9/72	-9.3	-2.4	-0.1	5.8	-5.9
10/72	-9.5	-2.4	-0.1	5.7	-6.3
11/72	-7.3	-2.4	0.3	5.8	-3.6
12/72	-6.4	-2.5	0.4	6.1	-2.4
1/73	-6.8	-2.6	0.2	6.5	-2.6
2/73	-6.4	-2.6	0.2	6.0	-2.8
3/73	-6.3	-2.7	0.2	5.9	-3.0
4/73	-6.4	-2.9	0.1	5.8	-3.3
5/73	-6.4	-2.9	0.1	6.0	-3.2
6/73	-6.2	-3.0	0.0[4]	6.1	-3.1
7/73	-6.8	-3.0	-0.2	6.3	-3.6
8/73	-7.0	-3.1	-0.4	6.3	-4.2
9/73	-6.9	-3.3	-0.6	6.4	-4.4
10/73	-7.1	-3.3	-1.0	6.4	-4.9
11/73	-7.1	-3.2	-0.8	6.4	-4.8
12/73	-7.2	-3.2	-0.7	6.6	-4.5
1/74	-7.8	-3.3	-0.5	7.2	-4.4
2/74	-7.2	-3.4	-0.7	6.6	-4.6

Month	Nonseasonally Adjusted				
	RAM on Net Demand Deposits	RAM on Time Deposits	Other Ram[2]	Vault Cash	Total Ram[3]
3/74	-7.1	-3.4	-0.7	6.5	-4.7
4/74	-7.3	-3.5	-0.8	6.4	-5.1
5/74	-7.3	-3.6	-1.0	6.6	-5.3
6/74	-7.1	-3.7	-1.3	6.7	-5.4
7/74	-7.4	-3.7	-1.3	6.8	-5.6
8/74	-7.1	-3.9	-1.5	6.8	-5.7
9/74	-7.1	-3.9	-1.4	6.9	-5.5
10/74	-7.2	-4.0	-0.9	6.8	-5.3
11/74	7.2	4.0	0.7	6.9	4.9
12/74	-7.4	-3.8	-0.4	7.2	-4.5
1/75	-7.4	-3.9	-0.3	7.8	-3.9
2/75	-6.4	-3.7	-0.3	7.1	-3.3
3/75	-5.9	-3.5	-0.2	6.8	-2.8
4/75	-6.0	-3.4	-0.2	6.9	-2.7
5/75	-6.0	-3.2	-0.2	6.9	-2.4
6/75	-6.0	-3.0	-0.1	7.0	-2.1
7/75	-6.1	-2.8	-0.1	7.2	-1.8
8/75	-6.0	-2.8	-0.1	7.3	-1.6
9/75	-6.0	-2.8	-0.1	7.4	-1.5
10/75	-6.0	-2.8	-0.1	7.3	-1.6

Month	Nonseasonally Adjusted				
	RAM on Net Demand Deposits	RAM on Time Deposits	Other Ram[2]	Vault Cash	Total Ram[3]
11/75	-6.1	-2.2	-0.1	7.4	-1.1
12/75	-6.2	-2.2	-0.1	7.8	-0.7
1/76	-6.5	-1.8	0.0[4]	8.4	0.2
2/76	-6.2	-1.4	0.1	7.6	0.1
3/76	-6.1	-1.4	0.1	7.5	0.1
4/76	-6.2	-1.3	0.1	7.6	0.1
5/76	-6.2	-1.2	0.1	7.8	0.5
6/76	-6.1	-1.2	0.1	7.9	0.7
7/76	6.2	1.2	0.1	8.1	0.7
8/76	-6.2	-1.1	0.1	8.0	0.8
9/76	-6.2	-1.0	0.1	8.1	1.0
10/76	-6.3	-1.0	0.1	8.0	0.9
11/76	-6.4	-0.9	0.1	8.2	1.0
12/76	-6.4	-0.9	0.1	8.5	1.2
1/77	-6.3	-1.0	0.1	8.9	1.7
2/77	-5.8	-0.9	0.1	8.3	1.6
3/77	-5.7	-0.9	0.1	8.1	1.6
4/77	-5.9	-0.8	0.1	8.4	1.7
5/77	-5.9	-0.8	0.1	8.6	2.0

[1]Monthly averages of weekly totals.

[2]Includes reserves required against Eurodollar borrowings, commercial paper, ineligible acceptances, waiver privileges, and "over the base period" requirements on certain time deposits.

[3]Sum of monthly averaged weekly components.

[4]Less than $50 million.