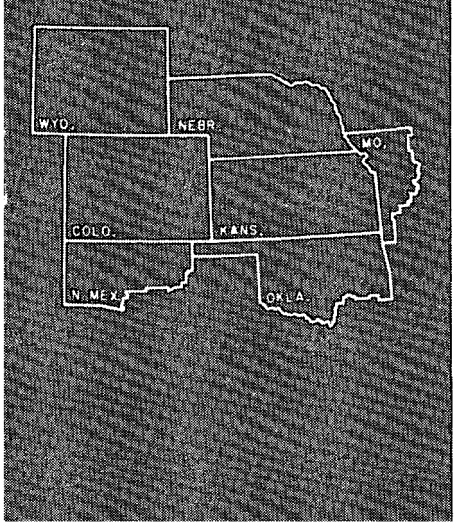

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Reserve Requirements and Monetary Control

By J.A.Cacy

The Federal Reserve System requires that its member banks hold a minimum volume of reserves, either as vault cash or on deposit at Federal Reserve Banks. The required minimum is equal to certain percentages of various types of deposits that the public maintains at member banks. These percentages —established by the Board of Governors of the Federal Reserve System—are referred to as reserve requirements.

Reserve requirements are one of the instruments the Federal Reserve uses in controlling the money supply. In recent years, however, the precise role that requirements play in monetary control has been a subject of some controversy. Some observers have claimed that requirements are necessary if the monetary authorities are to effectively carry out their responsibility of controlling the nation's money supply. Other observers argue that requirements are not needed. Disagreement also exists concerning the coverage and structure of reserve requirements. Many observers hold that effective monetary control requires that nonmember banks as well as nonbank financial institutions be subject to reserve requirements. This contention is disputed by those who claim that an extension of reserve requirements beyond member banks is not needed for effective monetary control. With regard to the structure of reserve requirements, some observers argue that requirements should be applied uniformly on all types of deposits, while others favor the current system of nonuniform requirements.

In this article the role that reserve requirements play in monetary control is analyzed. The article also discusses the impact on monetary control that would result from an extension of reserve requirements to nonmember banks and nonbank financial institutions. The first section of the article provides a background by discussing the sources of monetary control as well as the factors that tend to weaken monetary control.

SOURCES OF MONETARY CONTROL

The money supply is importantly influenced by Federal Reserve actions such as open market operations and changes in reserve requirements. The money supply also is affected by factors that are not under the control of the monetary authorities. For this reason, monetary control is imprecise in that the Federal Reserve can seldom establish the money supply at precisely the level the System considers desirable. Monetary control would be precise if changes in the noncontrollable factors

and their impact on money were predictable. In this case, the Federal Reserve could take offsetting action. However, the impact of the noncontrollable factors is not entirely predictable. Thus, while the Federal Reserve exercises a degree of control over the nation's money supply, monetary control is made imprecise by the existence and unpredictability of noncontrollable factors.

Controllable Factors

The Federal Reserve exercises a degree of control over the nation's money supply for several reasons. One reason is that the System can maintain fairly precise control over the nation's monetary base, and the base affects the money supply. The Federal Reserve can control the monetary base because the base consists primarily of the deposit and currency liabilities of Federal Reserve Banks. The System controls these liabilities by controlling its assets. For example, when the Federal Reserve brings about a net increase in its assets—by buying U.S. Government securities or making loans to banks—the increase in assets is typically accompanied by an increase in the System's deposit or currency liabilities that constitute the monetary base.[1]

The monetary base affects the money supply because base money, if held by the public as currency, is a part of the money supply. Moreover, base money not held by the public as currency flows into commercial banks and other depository institutions and provides these institutions with reserves. Therefore, increases or decreases in the monetary base tend to add to or subtract from the reserves of the financial system. With higher or lower reserves, financial institutions tend to acquire larger or smaller portfolios of loans and investments, thereby creating a larger or smaller money supply. The money supply then is positively related to and partly determined by the monetary base. For example, when the Federal Reserve buys U.S. Government securities to increase the monetary base, the rise in the base tends to increase bank reserves. The increase in reserves tends to result in an increase in the money supply.

Another factor providing the Federal Reserve some control over money is the System's authority to establish and alter reserve requirements on deposits at member banks. Reserve requirements contribute to monetary control in two ways. First, changes in reserve requirements tend to produce changes in the money supply. For example, a reduction in requirements will increase the excess reserves of the banking system and thereby tend to result in a rise in the money supply. Second, the level and structure of requirements affect the magnitude of the impact on money of noncontrollable factors. This second aspect of the role of reserve requirements is discussed in detail later.

Noncontrollable Factors

There are a number of noncontrollable factors that affect the money supply and tend to weaken monetary control. One is shifts in the composition of deposits. Compositional shifts affect the money supply because such shifts affect the required reserves ratio, which in turn affects the money supply. The required reserves ratio, or simply the r-ratio, is defined as the amount of reserves that financial institutions are required to hold as a per cent of the deposit component of the money supply.[2] An example of a compositional shift that

[1] Various concepts of the monetary base have been used The concept used in this article is sometimes referred to as the "source base." It is defined as deposits of private financial institutions (mainly member banks) at Federal Reserve Banks plus Federal Reserve and Treasury currency held by financial institutions and the public.

[2] The deposit component of the money supply depends on the definition of money. For the narrowly defined money supply, M1, the deposit component consists of demand deposits at commercial banks other than interbank and U.S. Government deposits. For the M2 definition of money. the deposit component consists of the deposit component of M1 plus time and savings deposits at commercial banks other than large negotiable CD's. For M3, the deposit component consists of the deposit component of M2 plus deposits at savings and loan associations, mutual savings banks, and credit unions. Theoretically, deposits of these nonbank institutions at commercial banks should be excluded from the deposit component of M3.

affects the r-ratio is a shift out of demand deposits at member banks and into demand deposits at nonmember banks. Since nonmember bank deposits are not subject to reserve requirements set by the Federal Reserve, this shift will reduce required reserves and, therefore, reduce the r-ratio.

The required reserves ratio affects the money supply by influencing the volume of resources that banks allocate to idle balances. In this way, the r-ratio affects the volume of loans and investments that banks hold, which in turn influences the money supply. For example, if the r-ratio is high, banks will be required to maintain relatively large idle balances. Therefore, the volume of loans and investments that banks can acquire will be small. In turn, the small volume of loans and investments will tend to produce a low money supply. The money supply then is inversely related to the r-ratio. Thus, shifts in the composition of deposits that cause the r-ratio to decline--such as shifts out of demand deposits at member banks and into demand deposits at nonmember banks—will cause the money supply to increase. By the same token, shifts that cause the r-ratio to increase will lead to a decline in the money supply.

An additional noncontrollable factor that affects the money supply is the excess reserves ratio, or the e-ratio. The e-ratio is the volume of excess reserves held by financial institutions as a per cent of the deposit component of the money supply. Excess reserves are reserves held in excess of required reserves.[3] The e-ratio affects the money supply in the same manner as the r-ratio. That is, a high e-ratio means that financial institutions maintain large idle balances and low portfolios of loans and investments. Thus, the money supply is inversely related to and partly determined by the e-ratio.

A third noncontrollable factor affecting the money supply is the currency ratio, or c-ratio. This ratio is defined as the amount of currency held by the public as a per cent of the money supply.[4] The c-ratio influences the money supply because it affects the total reserves financial institutions have available. That is, if the c-ratio is high, publicly held currency will be high and the amount of base money that is available for reserves will be low. Thus, the money supply is inversely related to and partly determined by the c-ratio. For example, suppose the c-ratio is 25 per cent and the money supply is $250 billion, so that the volume of currency held by the public is $62.5 billion. Now suppose the public wishes to increase its c-ratio to 30 per cent. Since the public now wishes to hold $75 billion rather than $62.5 billion in currency, the public will increase its currency and decrease its deposits by $12.5 billion. The decline in deposits will result in a decline in bank reserves. Banks will respond to the decline in their reserves by reducing their holdings of loans and investments, which in turn will result in a further decline in deposits and in a drop in the money supply. Thus, an increase in the c-ratio will tend to result in a decline in the money supply.

Determinants of the Money Supply

In summary, the money supply is affected by the monetary base and the r-, e-, and c-ratios. The precise relationship between the money supply and its determinants may be stated as a formula:[5]

$$M = B \frac{1}{r + e + c\,(1 - e - r)}$$

[3] For the M1 and M2 definitions of money. excess reserves include excess reserves of member banks plus base money (currency and deposits at Federal Reserve Banks) held by nonmember banks. For M3. excess reserves consists of excess reserves for M2 plus any base money held by nonbank financial institutions.

[4] Currency held by the public consists of currency outside commercial banks (other than any currency held by U.S. governmental agencies). For M3. currency held by the public should theoretically exclude currency held by nonbank financial institutions.

[5] The formula is general and holds for any definition of money A particular formula may be derived for each definition.

The letters in the formula are defined as follows:

M = money supply.
B = monetary base.
r = r-ratio = required reserves as a per cent of the deposit component of the money supply.
e = e-ratio = excess reserves as a per cent of the deposit component of the money supply.
c = c-ratio = currency held by the public as a per cent of the money supply.

That part of the formula containing the three ratios is known as the money multiplier, which may be represented by the letter m. Then, $m = 1/[r + e + c(1-e-r)]$ and $M = Bm$. For example, suppose the r-ratio is .15, the e-ratio is .05, and the c-ratio is .25. In this case, the value of the multiplier is 2.5 and the money supply is equal to 2.5 times the base. That is:

$$M = Bm = B\frac{1}{r + e + c(1 - e - r)}$$

$$= B\frac{1}{.15 + .05 + .25(1 - .05 - .15)} = B(2.5).$$

The formula for the money supply may be used to illustrate the extent that the Federal Reserve can control money as well as the way that noncontrollable factors weaken monetary control. Suppose the multiplier is 2.5 during some month and the Federal Reserve wants the money supply to equal 250 in the following month. If the three ratios do not change, the Federal Reserve can completely control money by taking action to establish the base at 100, so that $M = Bm = 100(2.5) = 250$.

Even if the ratios change, the Federal Reserve can completely control money if the changes in the ratios can be predicted. For example, suppose the c-ratio increased to .30. The rise in the c-ratio will reduce the multiplier to 2.27 and tend to reduce the money supply below 250. If the increase in the c-ratio can be predicted, though, the monetary base can be increased above 100 precisely enough to offset the impact of the rise in the c-ratio. The base would need to equal 110, so that $M = Bm = 110(2.27) = 250$. However, to the extent that the change in the c-ratio cannot be predicted, the Federal Reserve cannot determine the precise level of the monetary base that will result in the money supply being equal to 250.

The degree of precision, then, in the Federal Reserve's control over money depends on the magnitude of unpredictable changes in the noncontrollable factors and the extent that such changes affect the money supply. The extent that money is affected by changes in noncontrollable factors depends partly on the level and structure of reserve requirements.

THE LEVEL OF RESERVE REQUIREMENTS AND MONETARY CONTROL

The level and structure of reserve requirements, then, affects the Federal Reserve's ability to control the money supply. The level of requirements refers to the general level of requirements on all types of deposits, while structure refers to the relative levels of requirements on different types of deposits.

Monetary control is affected by the level of requirements because, in the first instance, requirements help determine the size of the r-ratio. That is, high or low requirements produce a high or low r-ratio. Secondly, the r-ratio's size affects the impact on money of changes in the noncontrollable currency ratio and excess reserves ratio. Alterations in these ratios lead to small changes in money when the r-ratio is high and to large changes in money when the r-ratio is low. In other words, the impact of changes in the e- and c-ratios varies inversely with the size of the r-ratio.

The impact on money of changes in the currency ratio varies inversely with the level of requirements because when the r-ratio is high, alterations in the c-ratio produce small alterations in the excess reserves of financial institutions. For example, suppose the public decides to increase its c-ratio by augmenting its currency holdings and reducing its deposits, that is, by withdrawing currency from banks.

Table 1

THE LEVEL OF THE r-RATIO AND CHANGES IN THE c-RATIO AN ILLUSTRATION

	Case 1		Case 2	
	r-ratio=.15		r-ratio=.20	
	Initial Position (c=.25)	Subsequent Position (c=.30)	Initial Position (c=.25)	Subsequent Position (c=.30)
r-ratio	.15	.15	.20	.20
e-ratio	.05	.05	.05	.05
c-ratio	.25	.30	.25	.30
Multiplier (m)	2.50	2.27	2.29	2.11
Monetary base (B)	100.0	100.0	109.4	109.4
Money supply (M=Bm)	250.0	227.3	250.0	230.2
Currency (C=cM)	62.5	68.2	62.5	69.1
Deposits (D=M-C)	187.5	159.1	187.5	161.2
Required reserves (R=rD)	28.1	23.9	37.5	32.2
Excess reserves (E=eD)	9.4	8.0	9.4	8.1
Currency outflow		5.7		6.6
Decline in required reserves		4.3		5.3
Decline in excess reserves		1.4		1.3
Decline in money supply		22.7		19.8

The currency outflow will reduce the reserves of the banking system, with a portion of the decline occurring in excess reserves and the remainder in required reserves—reflecting the drop in deposits associated with the outflow. The decline in required reserves will be large if the r-ratio is high. Thus, if the r-ratio is high, a given outflow of currency from banks (that is, a given increase in the c-ratio) will produce a small drop in the excess reserves of banks. The small decline in excess reserves, in turn, will lead to a small decline in loans and investments, in deposits, and in the money supply.

The role of the level of reserve requirements in affecting the impact of changes in the c-ratio may be illustrated further by using the formula for the money supply. In Table 1, two cases—different only with regard to the r-ratio—are analyzed and compared. In case 1, the r-ratio is assumed to equal .15, that is, reserves must equal at least 15 per cent of deposits. In case 2, the r-ratio is assumed to equal .20. In all other aspects the cases are similar. It is assumed that the Federal Reserve wants the money supply to equal 250, and initially money is 250. In addition, the e-ratio is assumed to be .05, and the c-ratio is assumed initially to equal .25 and then unexpectedly to increase to .30.

In case 1, the multiplier initially is 2.5. Given this value of the multiplier, the Federal Reserve establishes the money supply at 250 by taking action to establish the monetary base at 100[M=Bm=100(2.5)=250]. A subsequent increase in the c-ratio from .25 to .30 reduces the multiplier from 2.5 to 2.27. The currency outflow from banks is 5.7, required reserves decline 4.3, so that the drop in excess reserves is 1.4. Since the rise in the c-ratio was not

predicted, the Federal Reserve maintains the base at 100 and the money supply declines to 227.3 or by 22.7.

In case 2, which assumes a higher r-ratio, the initial value of the multiplier is 2.29. Thus, the Federal Reserve can establish the money supply at 250 by setting the base at 109.4. The subsequent rise in the c-ratio to .30 reduces the multiplier to 2.11. Excess reserves decline 1.3 and the money supply falls by 19.8. The decline in excess reserves and in the money supply is less in case 2 than in case 1 because the r-ratio is high. Put another way, the deviation of the money supply from the desired level is less when the r-ratio is high. Therefore, high reserve requirements tend to enhance monetary control when the source of imprecision of control is changes in the c-ratio.[6]

The role of reserve requirements in affecting the impact on money of changes in the excess reserves ratio is similar to requirements' role in affecting the impact of changes in the c-ratio. That is, the magnitude of the impact on money of changes in the e-ratio varies inversely with the level of requirements. This statement could be illustrated by using the formula for the money supply, and the illustration would be similar to that in the preceding paragraph. It would show that unpredicted changes in the e-ratio cause small changes in the money supply when the r-ratio is high and large changes in money when the r-ratio is low.

In summary, then, high reserve requirements tend to enhance monetary control when the imprecision of control results from anpredicted changes in the e- and c-ratios.

THE STRUCTURE OF RESERVE REQUIREMENTS AND MONETARY CONTROL

The Federal Reserve's ability to control money is affected by the structure as well as the level of reserve requirements. The structure of requirements may refer to the relative levels of requirements on different types of deposits included in the definition of money. Alternatively, structure may refer to the level of requirements on included deposits relative to the level on excluded deposits. Both types of structure affect monetary control by affecting the impact on money of various shifts in the composition of deposits.

Structure with Regard to Included and Excluded Deposits

The structure of requirements with regard to included and excluded deposits affects the impact on money of shifts between included and excluded deposits. These compositional shifts have their impact on money through the r-ratio, as may be seen by the following formula:

$$r = r_n + r_x g,$$

where

r_n = reserve requirements on included deposits,
r_x = reserve requirements on excluded deposits, and
g = g-ratio = the ratio of excluded to included deposits.

[6] The lagged reserve accounting system that is now in operation is a technical factor that should be considered in an analysis of the impact on monetary control of reserve requirements. Under this system, required reserves during any statement week are based on the level of deposits 2 weeks earlier. For this reason, noncontrollable factors, such as changes in the currency ratio, do not affect required reserves during the week they occur Instead, the *immediate* impact of these changes is felt entirely in excess reserves. For example, a change in the currency ratio that results in a $1 currency outflow would produce a $1 decline in excess reserves in the week the outflow occurs. Two weeks later, however, the outflow would produce a decline in required reserves. The lagged decrease in required reserves would be accompanied by a rise in excess reserves that would offset part of the original $1 decline. The *eventual* net drop in excess reserves would be the same under the lagged as under a nonlagged system. In both cases, furthermore, the eventual impact would depend on reserve requirements.

Theoretically, lagged reserve accounting could prevent reserve requirements from affecting monetary control. That is because, under the lagged system, a change in noncontrollable factors would have the same immediate impact on excess reserves whether reserve requirements are high or low. For this reason, requirements might not affect the *immediate* portfolio response of banks to changes in noncontrollable factors. Furthermore, while requirements would affect the eventual impact of noncontrollable factors on excess reserves and bank portfolio adjustments, the lagged system could allow the eventual impact to be predicted and offset by Federal Reserve action. Thus, lagged reserve accounting could prevent the level and structure of reserve requirements from having any effect on the Federal Reserve's ability to control money.

In practice, however, reserve requirements undoubtedly do affect the immediate portfolio response of banks to changes in noncontrollable factors. The reason is that banks, in making portfolio adjustments, are likely to consider the impact of immediate changes in noncontrollable factors on their eventual excess reserves. Since reserve requirements, under the lagged system. would affect the eventual impact on excess reserves, requirements would likely affect immediate portfolio adjustments. If so, the Federal Reserve's ability to control money would be affected by the level and structure of reserve requirements.

In the context of the formula, a shift in the composition of deposits between included and excluded deposits is reflected as a change in the g-ratio. Changes in the g-ratio cause changes in the r-ratio which lead to alterations in the money supply.

A given change in the g-ratio will have a relatively small impact on money when the level of requirements on excluded deposits is low relative to requirements on included deposits. In other words, the g-ratio's impact on money varies directly with the size of r_x relative to that of r_n. That is because a given change in the g-ratio will result in a relatively large change in excess reserves if requirements on excluded deposits are low relative to requirements on included deposits.

For example, suppose the public decides to alter the composition of its deposits by increasing its time deposits, which are excluded from M1, and reducing its demand deposits, which are included in M1. Initially, this change in the g-ratio will reduce M1. However, part of the initial drop in M1 will tend to be offset because the rise in time and decline in demand deposits will reduce required reserves and increase excess reserves. Excess reserves will increase by a large amount if requirements on time deposits are low relative to requirements on demand deposits. The large rise in excess reserves will encourage a large increase in loans and investments, leading in turn to a large increase in the money supply. The large increase in the money supply will offset a large part of the initial drop in money due to the rise in the g-ratio. The Federal Reserve's control over M1, therefore, is enhanced by low reserve requirements on time deposits relative to requirements on demand deposits.

In general, control over any definition of money is enhanced by low requirements on deposits excluded from the definition of money relative to requirements on deposits included in the defmition of money.

Structure with Regard to Different Types of Included Deposits

Monetary control also is affected by the structure of reserve requirements with regard to different types of deposits included in the money supply. The impact on money of shifts among included deposits varies inversely with the degree of uniformity of requirements on various types of included deposits. That is because shifts among included deposits have a small impact on excess reserves when the degree of uniformity is high.

For example, suppose the public shifts out of demand deposits at member banks and into demand deposits at nonmember banks. Since both types of deposits are included in M1, initially the shift will not affect M1. Subsequently, however, M1 will tend to rise because the shift will reduce required reserves and increase excess reserves. That is because requirements on deposits at member banks exceed the requirements on deposits at nonmember banks. Excess reserves would not be affected if member and nonmember banks were subject to uniform requirements.

Thus, control over any definition of money is enhanced by uniform reserve requirements on deposits included in the definition of money.

MONETARY CONTROL AND EXTENDING RESERVE REQUIREMENTS

The impact on monetary control of extending reserve requirements beyond member banks depends on many factors. One important factor is the nature of the extension. For example, extending requirements on demand deposits of nonmember banks would have different consequences than extending requirements on deposits of nonbank financial institutions. Also, the level of the new requirements would have implications for monetary control. In addition, control would be affected if requirements on member banks were simultaneously altered.

Another important factor is the relative importance of the different noncontrollable factors that weaken the Federal Reserve's control over money. A particular extension of requirements may enhance or weaken the System's ability to control money, depending on whether alterations in the currency and excess reserves ratios or shifts in the composition of deposits are more important in contributing to imprecision of monetary control. The definition of the money supply that is to be controlled is another factor that must be considered in analyzing the impact on monetary control of extending reserve requirements. A particular extension may enhance control over one definition of money and weaken control over another definition.

An Illustration: Extending Reserve Requirements to Demand Deposits of Nonmember Banks

The impact of these various factors may be illustrated by tracing out the effect on monetary control of extending reserve requirements in various ways. Suppose, for example, that requirements were extended to the demand deposits of nonmember commercial banks and that such requirements did not exceed current requirements on demand deposits of member banks. The Federal Reserve's control over M1, which consists of publicly held currency plus demand deposits at commercial banks, would likely be enhanced by an extension of this nature. Such an extension would increase the r-ratio for M1 and would, thereby, reduce the impact on M1 of changes in the currency ratio and in the excess reserves ratio.

Some observers have argued, in effect, that an extension of reserve requirements to nonmember banks would not increase Ml's r-ratio. According to this argument, nonmember banks would use their correspondent balances they now hold at member banks to satisfy their reserve requirements. In other words, nonmember banks would transfer deposits they hold at member banks to Federal Reserve Banks. The reduction in deposits at member banks would reduce the required reserves of member banks. It is argued, in effect, that this reduction in the required reserves of member banks would offset the increase in the required reserves of nonmember banks, so that total required reserves and, therefore, Ml's r-ratio would remain unchanged. The argument is not valid, however, because the decline in the required reserves of member banks would be only a fraction of the amount that nonmember banks transferred to the Federal Reserve in satisfaction of their new reserve requirements. Thus, an extension of reserve requirements to nonmember banks would increase the r-ratio for M1.[7]

An extension of reserve requirements to the demand deposits of nonmember banks, in addition to reducing the impact of changes in the currency ratio, also would reduce the impact on M1 of shifts in the composition of deposits. (See Table 2.) For example, the extension would increase the degree of uniformity of requirements on demand deposits of member and nonmember banks. Since both types of deposits are included in M1, an increase in the degree of uniformity of requirements would reduce the impact on M1 of shifts between the two types of deposits. Also, an extension of requirements to nonmember bank demand deposits would increase the requirement on such deposits relative to the requirement on various types of time deposits. Since nonmember bank demand deposits are included in M1 and time deposits

[7] While Ml's r-ratio would increase, an extension of reserve requirements to nonmember banks could possibly fail to reduce the Impact on MI of changes in the currency ratio. This would occur if nonmember banks would use their vault cash to satisfy their reserve requlrements In this case, the excess reserves ratio would decline and offset the increase in the r-ratio. so that the sum of the r-ratio and e-ratio would remain unchanged. Therefore. the size of the c-ratio relative to the size of the r- and e-ratios combined would remain unchanged. If this occurred, the impact of changes in the c-ratio on M1 would remain unchanged. Therefore, an extension of reserve requlrements to the demand deposits of nonmember banks would reduce the impact of changes in the c-ratio only if such requlrements were high enough so they could not be satisfied with vault cash

Table 2
IMPACT ON MONETARY CONTROL OF EXTENDING RESERVE REQUIREMENTS AN ILLUSTRATION

Sources of Imprecision in Monetary Control	Requirements extended to: Demand Deposits of Nonmember Banks			Demand and Time Deposits of Nonmembers & Time Deposits of Nonbanks		
	M1	M2	M3	M1	M2	M3
Changes in e- and c-ratios	improve	improve	improve	improve	improve	improve
Compositional shifts:						
Among commercial bank deposits:						
Demand deposits, member and demand deposits, nonmember	improve	improve	improve	improve	Improve	improve
Demand deposits, member and time deposits, nonmember	no impact	no impact	no impact	weaken	improve	improve
Demand deposits, nonmember and time deposits, nonmember	improve	weaken	weaken	no impact	no impact	no impact
Demand deposits, nonmember and time deposits, member	improve	uncertain	uncertain	Improve	Improve	Improve
Time deposits, member and time deposits, nonmember	no impact	no impact	no impact	improve	improve	improve
Between time deposits of nonbanks and:						
Demand deposits, member	no impact	no impact	no impact	weaken	weaken	improve
Demand deposits, nonmember	improve	improve	weaken	no impact	no impact	no impact
Time deposits, member	no impact	no impact	no impact	improve	weaken	improve
Time deposits, nonmember	no impact	no impact	no impact	no impact	no impact	no impact

are excluded, an increase in the relative level of requirements on nonmember demand deposits would reduce the impact on M1 of shifts between the two categories of deposits.

The Federal Reserve's control over M2 and M3 would be enhanced in some ways and weakened in others by an extension of reserve requirements to the demand deposits of nonmember banks.[8] Control would be enhanced because the extension would increase the r-ratios for these money supply measures and, thereby, reduce the impact on them of changes in the currency and excess reserves ratios. Also, the extension would reduce the impact on M2 and M3 of shifts between member and nonmember bank demand deposits. In addition, the effect on M2 of shifts between demand deposits at nonmember banks and time deposits at nonbank financial institutions would be reduced.

Monetary control over M2 would be weakened when the source of imprecision is shifts between demand and time deposits at nonmember banks. The impact on M2 of shifts between these two types of deposits would be increased because both types are included in M2 and the extension would decrease the degree of uniformity of requirements on them. For the same reason, the extension would increase the impact on M3 of shifts between demand deposits at nonmember banks and

[8] M2 is defined as M1 plus time and savings deposits at commercial banks other than large negotiable certificates of deposit. M3 is defined as M2 plus deposits at savings and loan associations, mutual savings banks, and credit unions. Theoretically, M3 should exclude deposits of nonbank institutions at commercial banks.

both time deposits at nonmember banks and time deposits at nonbank financial institutions. Thus, the net impact on M2 and M3 of extending reserve requirements to the demand deposits of nonmember banks would depend on the relative importance of various shifts in the composition of deposits as well as of changes in the currency and excess reserves ratios in contributing to imprecision in monetary control.

Another Illustration: Extending Reserve Requirements to Nonmember Banks and Nonbanks

For an additional illustration, suppose reserve requirements were extended to demand deposits at nonmember banks and to time deposits at these banks and at nonbank financial institutions. Suppose further that the new requirements were uniform with regard to all types of deposits. An extension of requirements in this way would likely enhance the Federal Reserve's ability to control the M3 definition of money. M3's r-ratio would be increased so that the impact on M3 of alterations in the e- and c-ratios would be reduced. Also, the extension would reduce the impact on M3 of certain shifts in the composition of deposits. For example, the extension would increase the degree of uniformity of requirements on deposits at member banks and deposits at nonbank financial institutions. This would reduce the impact on M3 of shifts between these two types of deposits because both types are included in the definition of M3. (See Table 2.)

The impact on the M1 and M2 definitions of money of a uniform extension of reserve requirements is less certain than in the case of M3. In some ways, the Federal Reserve's ability to control M1 and M2 would be enhanced. Better control would occur in that the r-ratios of M1 and M2 would be increased so that the impact on these measures of alterations in their e- and c-ratios would be reduced. In addition, the impact of certain compositional shifts would be lowered. For example, the extension would increase the degree of uniformity of requirements against demand deposits at both member banks and nonmember banks. This would reduce the impact on M1 and M2 of shifts between these types of deposits because both types are included in the definition of both measures.[9]

In other ways, the uniform extension of reserve requirements would reduce the Federal Reserve's ability to control M1 and M2. Control would be weakened in that the impact on these measures of certain compositional shifts would be increased. For example, a uniform extension of reserve requirements would increase requirements on deposits at nonbank institutions relative to requirements on demand deposits at member banks. Since deposits at nonbanks are excluded from M1 and M2 and demand deposits at member banks are included in both measures, the extension would increase the impact on M1 and M2 of shifts between these two categories of deposits.

Thus, the net impact on the Federal Reserve's ability to control M1 and M2 of a uniform extension of reserve requirements to nonmember banks and to nonbanks would depend on the relative importance of various sources of imprecision of monetary control. If changes in the e- and c-ratios and certain compositional shifts—such as shifts between demand deposits at member and nonmember banks—are important, control over M1 and M2 would be improved. However, if other compositional shifts—such as shifts between demand deposits at member banks and deposits at nonbanks—are important, control over M1 and M2 would be weakened.

[9] It may be maintained that certain deposits at nonbanks, such as NOW accounts at some mutual savings banks, probably should be included in both MI and M2 An extension of requirements to these kinds of deposits likely would strengthen the Federal Reserve's ability to control MI and M2—defined to include these kinds of deposits.

CONCLUSIONS

A major conclusion of this article is that reserve requirements contribute to the Federal Reserve's ability to control the money supply. Requirements enhance monetary control by reducing the extent that factors other than Federal Reserve actions affect the money supply. In this way, requirements increase the reliability of the relationship between the money supply and actions of the monetary authorities.

Another conclusion is that, while requirements contribute to monetary control, the impact on control of extending reserve requirements beyond member banks depends on several considerations. One is the relative importance of various factors that tend to weaken monetary control, such as currency flows and shifts in the composition of deposits. For example, if currency flows are more important in weakening monetary control than compositional shifts, monetary control would be enhanced by any extension in the coverage of reserve requirements. That is because an extension in coverage would increase average requirements, which in turn would reduce the extent that currency flows weaken monetary control.

If shifts in the composition of deposits are more important than currency flows in reducing the precision of monetary control, the impact on control of extending requirements beyond member banks would be uncertain. That is, extending requirements would enhance the Federal Reserve's ability to control some definitions of money, but may reduce control over other definitions. For example, the Federal Reserve's ability to control the **M3** definition of money would be enhanced if reserve requirements were extended to deposits of nonbank financial institutions, such as savings and loan associations, mutual savings banks, and credit unions. That is because control over any definition of money tends to be enhanced by placing reserve requirements on all deposits included in that definition. Since deposits at member banks and at nonbanks are included in **M3,** extending requirements to nonbanks would help prevent shifts between member bank and nonbank deposits from affecting **M3.** In this way, an extension of requirements to nonbanks would enhance the Federal Reserve's control over **M3.**

To the extent that shifts in deposits between member banks and nonbanks are important, however, the extension of requirements to nonbanks would reduce the Federal Reserve's control over the **M1** and **M2** definitions of money. That is because control over any definition of money is weakened by requirements on deposits excluded from that definition. Since deposits at nonbanks are excluded from the definition of **M1** and **M2,** requirements on nonbanks would increase the impact on these measures of shifts between member bank deposits and nonbank deposits. In this way, the Federal Reserve's control over **M1** and M2 may be weakened.

Federal Government Spending on Interest, Transfers, and Grants

By Dan M. Bechter

The changing composition of Federal Government spending tells a story of trends and swings in national priorities during our country's two-century history. From the earliest years through the 1920's, the expenditure side of the Federal budget primarily reflected the nation's involvement in wars. Expenditures would increase to pay the cost of a conflict. Then, after the war, total spending would decline, and the budgetary emphasis would shift from paying for arms to paying interest on a war-inflated public debt.

Those who worry about today's national debt may derive some comfort from knowing that in most years before 1803, interest on the public debt claimed more than half of the outlays of the Federal Government. With the exception of veterans' compensation and pensions, Federal spending for social welfare was virtually unknown during the Republic's first 150 years. During fiscal year 1976, expenditures for income security, health, education, and veterans' benefits will account for 53 per cent of Federal budgetary outlays. In contrast, net interest on the public debt now claims about 8 per cent of the budget.

Federal spending for social welfare has roots in the Great Depression. By 1939, such expenditures had risen to 44 per cent of Federal outlays, or to over 50 per cent, if veterans' services and benefits are included. But World War II reversed this trend by ending the Depression and by requiring enormous defense expenditures. Veterans' benefits increased sharply after the war, but Federal spending on other welfare programs fell to nearly one-fourth the prewar dollar amount. Not until the late 1950's did the Federal Government again spend as much on social welfare as it did in 1939.

Clearly, major shifts in the composition of Federal Government expenditures are nothing new. But the trend of the past 20 years is not a repeat performance of historical cycles in Federal spending. It is a compositional shift that underlines a national commitment to use Federal spending as an instrument for redistributing income in relatively good times as well as in depressed economic periods. Thus the percentage of Federal outlays going for purchases of goods and services (two-thirds of which is currently for national defense) has declined from 64 per cent in 1956 to 55 per cent

in 1966 and, with accelerating momentum, to 35 per cent in 1976. A previous article has dealt with the implications of changes in Federal spending for goods and services.[1] This article is about the other principal subdivisions of Federal outlays — interest on the public debt, domestic transfer payments, and grants-in-aid to state and local governments.

INTEREST ON THE NATIONAL DEBT

All but 1.3 per cent of the gross debt of the U.S. Government is in the form of marketable bonds, notes, and bills and certain nonmarketable series issued by the U.S. Treasury. Issues of several Federal Government agencies, such as the Export-Import Bank, the Tennessee Valley Authority, and the Federal Housing Administration, account for the remainder. A large proportion of gross Federal debt--43 per cent at the end of 1975—is held by Federal Government agencies, primarily in trust funds, and the Federal Reserve Banks. Thus, much of the interest paid on the gross Federal debt amounts to internal bookkeeping transactions that do not affect the public.

Net Federal indebtedness is that amount that the Federal Government owes to domestic and foreign investors. To the extent that the net Federal debt is held by U.S. investors, interest payments do not constitute a net burden on this nation's economy. No external burden is involved on domestically held debt because tax receipts from Americans are used to pay interest to Americans. However, even though "we pay interest to ourselves" on a national debt that "we owe to ourselves," a burden to current and future generations from past wars has been said to exist. This burden, the argument goes, is in the form of what might have been, had wars not interrupted the development of resources and the advancement of technology. According to this point of view, private investment has been crowded out by Government borrowing over the years, and the amount of interest on the Federal debt can be considered a rough estimate of the additional national income that would have been generated by that foregone investment. This argument has merit, but it is by no means clear that Government borrowing always crowds out private investment, or that Government spending slows technological change. In particular, when resources are underutilized, deficit spending by the Federal Government can stimulate economic activity, including private investment.

Americans do not hold as much of the net Federal debt as they did formerly; a growing share is owed to investors outside the United States. Foreign holdings of U.S. debt have increased dramatically in relative importance since 1969. Increases in the early 1970's were due to an overvalued dollar, but more recently oil exporting nations have accumulated dollar claims in several forms, including U.S. Government securities. At the end of 1975, investments of foreign and international accounts included an estimated 20 per cent of the net Federal debt.

The real burden of externally held Federal debt is borne by Americans when foreigners convert this debt to dollars, or use the interest on it to buy U.S. goods and services. To the extent that U.S. debt is held by foreigners, Americans are borrowing from future domestic output to satisfy current demands. On the one hand, it is fortunate that other countries have been willing to accumulate dollar balances because if economic activity is constrained by an inflation-fighting policy, an increase in exports would require an offsetting decrease in domestic purchases of goods and services. On the other hand, were inflation not such a problem, this period of underutilized resources would be an ideal time for the stimulus that a major increase in exports would provide.

Various categories of domestic investors hold net Federal debt. Individuals hold the largest

[1] Dan M. Bechter. "Federal Government Purchases of Goods and Services." Federal Reserve Bank of Kansas City *Monthly Review*, November 1975.

share, about one-fourth of the total. Commercial banks hold almost as much. The remaining 30 per cent that is not part of foreign accounts investment is divided up among state and local governments, thrift institutions, insurance companies, other corporations, nonprofit institutions, corporate pension trust funds, dealers and brokers, and other miscellaneous investors.

Interest payments from the Federal Government to the private sector have risen sharply in recent years, for four reasons. First, the rate of growth of the net Federal debt has accelerated. From **1964** to **1969,** it grew **1.2** per cent; from **1969** to **1974, 17.7** per cent. Then, in fiscal **1975** alone, privately held Federal debt grew **17.5** per cent, a postwar record. Second, interest rates have trended upward. Between **1964** and **1974,** the average annual yield on 3-month Treasury bills increased **122** per cent; on 3 to **5** year issues, it increased **92** per cent. Bond interest—the yield on securities with many years to maturity—increased **60** per cent or more, with the greater increases associated with the shorter maturities. Third, the maturity distribution of the Federal debt has shifted toward shorter issues, where rates have been rising the fastest.[2] In **1964,** the average time to maturity of marketable public debt was **5** years; in **1974,** it averaged **3** years. In **1964, 39** per cent of the marketable public debt came due within the year; in **1974,** that percentage had risen to **52.** Over most of this period, the upward push on interest payments that came from the shift to the shorter maturities with rapidly rising rates was offset by the fact that the shorter debt instruments carried lower yields. But this normal relationship between yield and maturity underwent a twist in **mid-1973,** so that for more than a year there was a fourth reason why interest payments on the Federal debt were rising—Treasury bill rates were higher than those on notes at a time when (and largely because) a growing proportion of the Federal debt was being shifted into bills.

Although the size of the net Federal debt jumped almost 30 per cent during calendar **1975,** interest payments grew less than half as fast, thanks primarily to falling interest rates on Treasury bills. A further decrease, to **2** years **9** months, in the marketable debt's length of time to maturity helped the Treasury draw even greater benefit, for the short term, from declining interest rates.

The Federal Government's interest payments to the public have increased dramatically in the past **10** years, but so have most other economic variables measured in dollars, because of inflation. Relative magnitudes, therefore, are more meaningful. As a share of the nation's potential output, Federal interest payments to the public have stayed about the same for many years.

DOMESTIC TRANSFER PAYMENTS

While all nonpurchase expenditures by the Federal Government must be transfer payments of some sort, the category known as domestic transfer payments includes only certain types. In particular, it excludes interest payments on Federal debt and subsidy payments to business and government enterprises. Domestic transfer payments are payments directly to (or in behalf of) individuals because of their personal (nonbusiness) special circumstances. Included in this category are social insurance and veterans' benefits; food stamp expenditures; retirement benefits for railroad workers, civil servants, and military personnel; benefits to individuals who are learning, training, or employed under manpower programs; and supplemental security income benefits for the aged, blind, and disabled. This is not an exhaustive list of Federal spending for social

[2] A major reason for this shift is the law that limits the rate of interest that the Federal Government can pay on long-term issues. Since the ceiling rate is below the market rate, bonds of longer maturities cannot be sold. Thus the U.S. Treasury has been forced to concentrate on short issues in its debt expansion and refunding operations. By doing so, of course. it has pushed up short rates faster than if a wider range of maturities could have been offered.

welfare. Other "human resources" programs are financed by the Federal Government through grants-in-aid to state and local governments. But these expenditures, considered in the following section, are not Federal transfers directly to persons.

During the fiscal year ending June 30, 1976, domestic transfer payments are expected to total $155 billion, almost 5 times more than 10 years earlier, and more than double the amount in fiscal year 1972. Inflation explains some, but not all, of this growth--consumer prices have not doubled in the past decade. Most of the rapid increase in transfer payments is attributable to escalating benefits under old welfare programs and the adoption of new programs since the early 1960's. These new programs did not come about by chance. For better or worse, the economic and political climates of the 1960's favored the increased use of Federal expenditures as a mechanism to reduce the hardships of those living on low incomes, as well as a means to compensate those unduly harmed by recession and inflation.

In the absence of compensatory measures, inflation and economic growth redistribute income and wealth in favor of the productive members of society and against those who are not employed. One of the ways that Congress has offset prosperity's redistributive effects and simultaneously acted to support persons with low incomes is by legislating substantial increases in old age, survivors, and disability benefits. Between 1965 and 1973, partly because of such legislation and partly as a result of the increases in average benefits and in number of beneficiaries, total payments under these Social Security programs rose at an average annual rate of 14 per cent. Even faster rates of growth were recorded by Federal civil service retirement benefits, military retirement pay, and manpower training programs. Excluding unemployment benefits, which will be discussed separately, the slowest growing domestic transfer programs between 1965 and 1973 were railroad retirement and veterans' benefits which grew at about 10 per cent annual rates. The medicare, food stamp, and coal miner programs were begun and grew rapidly in those years. All told, the average annual rate of growth of domestic transfer payments, excluding unemployment benefits, came to 15 per cent from 1965 to 1973.

National income grew at an 8 per cent rate during that period, substantially less than the 15 per cent increase in transfer payments. Clearly, income was distributed from those who worked to those who did not. About half of the 8 per cent rate of gain in money income of the employed represented an increase in purchasing power, and this was much more than enough to finance the increase in domestic transfer payments. Even though transfers grew faster, their absolute increase of $60 billion from 1965 to 1973 was dwarfed by the $500 billion increase in national income, four-fifths of which was employee compensation. Only relative after-tax shares of national income shifted toward the nonproductive and those of low productivity.

The story was quite different between 1973 and 1975. The two fiscal years from mid-1973 to mid-1975, or fiscal years 1974 and 1975, included five quarters of recession. Because of continued inflation, national income did grow in money terms over that period, by about a 6 per cent annual rate. But domestic transfer payments jumped at a 23 per cent annual rate. A shift in relative shares occurred, and this time some of the gain by transfer recipients did come at the absolute expense of the employed. This is because real output declined, so that the redistributed purchasing power had to be spent on fewer goods and services.

Payments in most categories of domestic transfers continued to rise from mid-1973 to mid-1975. Coal miner benefits were the exception: they were flat. Consumer prices rose at a 10 per cent average annual rate in those 2

years, which partly explains the accelerated rates of growth of civil service retirement benefits (25 per cent), military retired pay (20 per cent), veterans' benefits (15 per cent), medicare (25 per cent), and other Social Security benefits (15 per cent). To some extent, growth of benefits in these categories reflects the recession. Relatively poor economic conditions tend to encourage retirement, for example.

The most pronounced impact of recession on domestic transfer payments is shown in unemployment benefits, which increased more than 2% times between 1973 and 1975, and by food stamp payments, which increased 67 per cent. These increased transfers are similar to the others in that they do represent a redistribution of income from the working to the idle population. They differ, however, in that the unemployed are cyclically idle, drawing benefits that will eventually decline as the economy recovers.

During the current fiscal year which ends June 30, 1976, domestic transfers are estimated to total 18 per cent more than in fiscal 1975. At least half of this increase is attributable to the still depressed ,economy—the high unemployment benefits and other payments that are larger under such conditions. On the brighter side, however, the economy is recovering from the recession of 1974-75, and the increase in real national income will again be far more than enough to "pay" for the increase in real transfer payments.

GRANTS-IN-AID TO MUNICIPAL GOVERNMENTS

Federal grants-in-aid to state and local governments have grown almost as fast as domestic transfer payments in the past decade. The growth rates of the two would have been even closer, had the Federal Supplementary Security Income program, a domestic transfer category new in 1974, not replaced some state income assistance programs that had been funded by Federal grants. For fiscal year 1976, grants-in-aid are estimated to total $60 billion, compared to $155 billion in domestic transfer payments.

More than half of Federal grants-in-aid to state and local governments finance social welfare activities. The programs receiving the most money include aid to families with dependent children, school lunch and other child nutrition, medicaid, and several programs in education, training, and social services. The shorter end of Federal grants-in-aid (about 45 per cent of the total) goes for various purposes. Highways and general purpose fiscal assistance (primarily revenue sharing) split half of nonwelfare grants. Other programs supported include environmental improvement, urban mass transit, airport construction, scientific research, community and regional development, natural resource and energy, and law enforcement and justice.

The amounts of aid granted to states by the Federal Government differ. On a per capita basis, states with relatively more poverty tend to receive the most Federal social welfare assistance. The big, thinly populated western states also rank high in per capita grants because, on a per person basis, they receive more Federal money for highway construction, and because they share, with the Federal Government, revenues from extensive Federal lands within their boundaries. Ranking lowest in per capita aid are the midwestern states, where Federal land is scarce, where relatively few people live on low incomes, and where highway construction is closer to average on a per person basis.

CONCLUDING NOTE ON INCOME REDISTRIBUTION

In the past several years, Federal spending has grown rapidly because of the very large increases in domestic transfer payments and grants-in-aid to state and local governments.

Both of these expenditure categories are weighted heavily toward human resources, or social welfare, programs. Their intent,' as indicated earlier in this article, has been to better spread the costs of the battles against inflation and recession, and to reduce income inequality. Because of the failures and abuses of some programs, and the high cost of the total package, many people, both liberal and conservative, are disillusioned with Federal welfare activity. But there can be little doubt that despite the waste, fraud, and economic inefficiency of Federal redistributive spending, the overall effect of these programs has been to alleviate those severe hardship cases that are directly due to inadequate income. Money measures of income still show more than 10 per cent of U.S residents living below the arbitrarily defined poverty level. But, as Edgar Browning establishes, money income data miss the fact that many welfare programs provide income in kind. In other words, he argues, few Americans today live below a poverty level of consumption.[3]

[3] *Redistribution and the* Welfare *System,* American Enterprise Institute for Public Policy Research. Washington. D.C., 1975.