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1959-88--A NOTE

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* The views expressed in this article are solely those of the authors, and should not be attributed to either Texas Tech University, the Federal Reserve Bank of Dallas, or the Federal Reserve System.

Over the last thirty years, the Federal Reserve System has changed both the range of deposit classifications against which reserves must be held, and the level of reserve requirement ratios on numerous occasions. For example, with passage of the Monetary Control Act in 1980, the Federal Reserve System was given authority to levy reserve requirements against the reservable deposits held at all depository institutions that offer transactions deposits. Prior to 1980, the Federal Reserve's jurisdiction was limited to member commercial banks. In addition, the range of deposits against which reserve requirement ratios are set was also changed in 1980. Unfortunately, such changes make comparisons between aggregate reserve requirement structures extremely complex. Indeed, judging whether reserve requirement changes have been raised or lowered, on net, is difficult, even for professionally trained economists.^{1/}

The purpose of this note is two-fold. First, we describe a simple summary measure of changes in the reserve requirements set by the Federal Reserve System. With this summary statistic, it is possible to characterize the effective path of reserve requirements over the past thirty years. In particular, the effects of modifications to the reserve requirement structure introduced by the Monetary Control Act of 1980 have been puzzling. Cacy and Winningham (1982) and Toma (1988) maintain that reserve requirements were, on net, raised by the Monetary Control Act. The evidence presented in this paper, however, suggests that reserve requirements have fallen.

The second aim of this paper is to discuss the relationship between changes in the reserve requirement structure and the Federal Reserve's holdings of Treasury debt. Note that the adjusted monetary base directly

reflects all Federal Reserve policy actions. Thus, for a given level of the adjusted monetary base, the effects of a change in reserve requirements are countered through the use of the other tools of the Federal Reserve. Open market operations are one way in the Federal Reserve could offset the effects of changes in reserve requirements. Indeed, open market operations are the tool most frequently used to conduct monetary policy, but these transactions involve the Federal Reserve's holdings of Treasury securities. Changes in reserve requirements could have implications for the amount of Federal government debt held by the monetary authority. Specifically, the coordination of changes in reserve requirements and the rising Federal budget deficits are discussed.

1. The St. Louis Reserve Adjustment Magnitude:
A Measure of Changes in Aggregates Reserve Requirements

Table 1 provides a list of reservable deposit classifications and the different reserve requirement ratios for two years: 1978 and 1988. The 1978 reserve requirement structure, which predated the Monetary Control Act of 1980 (hereafter "MCA"), applied to member banks only. In contrast, the reserve requirement structure in 1988 applied to all depository institutions that offer transactions deposits. Thus, the two structures presented in Table 1 highlight one key feature of MCA; the Federal Reserve System administers reserve requirement policies to a greatly expanded set of institutions.^{2/}

There are three factors which make it impossible to infer the direction of change in aggregate reserve requirement ratios from 1978 and 1988 presented in Table 1. First, as Table 1 indicates, the reserve requirement ratio which applied to member banks with net demand deposits levels between

\$0 and \$41.5 million were lowered from 1978 levels. Table 1 also shows, however, that the reserve requirement ratios applied to net demand deposit levels for deposit levels between \$41.5 million and \$100 million were raised. Unfortunately, without information on the size of deposits for which reserve requirements are higher and for those with lower reserve requirements, it is impossible to verify whether aggregate reserve requirements were effectively lowered or raised on net demand deposits from 1978 and 1988.

Secondly, the direction of change for some types of reservable deposits were raised whereas other types were possibly lowered. Even if the reserve requirements for member banks were, on net, lower in 1988 than in 1978, the Federal Reserve unambiguously raised the rates on eurocurrency accounts.

Thirdly, even if ratios could be compared directly for member banks, MCA established the Federal Reserve System as the sole administrator of reserve requirements for depository institutions offering transactions accounts. This feature meant that non-member depository institutions were subject to the same reserve requirement structure as member banks. While non-member depository institutions generally faced higher reserve requirements after MCA, the net effect on member banks and, therefore, on the system as a whole, is indeterminate. Thus, the 1978 and 1988 reserve requirement structures show that drawing inferences based on a time series of the ratios is incomprehensible.

The Federal Reserve Bank of St. Louis (hereafter referred to as "St. Louis"), however, does calculate an aggregate measure of reserve requirement effects. This measure, referred to as the reserve adjustment magnitude ("RAM"), is then combined with the source base to obtain its

measure of the adjusted monetary base. RAM reflects changes in reserve requirements set by the Federal Reserve System. In doing so, RAM provides a dollar measures of changes in reserve requirement ratios.

To illustrate how RAM is calculated, suppose that there is a vector of deposits in existence, D_t , against which a vector of reserve ratios, r_t , is applied (t denotes time). Today's required reserves, then, are represented by the following expression:

$$(1) \quad r_t' D_t.$$

Suppose, further, that the reserve requirement structure during the "base" period is given by the vector r_0 . Thus, for the same deposit classification in (1), the expression for St. Louis RAM is given by:

$$(2) \quad RAM_t = (r_0 - r_t)' D_t .$$

The RAM component of the St. Louis base represents the difference between what total required reserves would have been if the base period reserve requirement structure, r_0 , had been in place today. Thus, RAM measures the dollar amount by which required reserves differ under today's reserve requirement structure and that which was in place during the base period.

RAM provides an aggregate dollar index of the total amount of reserves "absorbed or freed" by reserve requirement ratio changes. To illustrate, suppose all reserve requirement ratios are reduced so that $r_0 < r_t$. With lower reserve requirement ratios, equation (2) indicates that RAM would be positive and therefore, reflects the dollar amount of reserves "freed" by incorporating this new reserve requirement structure. Increases in reserve requirement ratios, on the other hand, would result in a negative RAM,

indicating an absorption of reserves. RAM, therefore, provides qualitative information about the direction of change in reserve requirements.

2. Movements in RAM 1959-88

The reserve adjustment magnitude (RAM) provides information on aggregate reserve requirements as a result of changes in reserve requirement ratios from some given base period. Chart 1 tracks the level of RAM from 1959 through 1988, according to the most recent estimates provided by the Federal Reserve Bank of St. Louis. The present measure reflects a 1976-80 base period for reserve requirement ratios.^{3/}

The time path of RAM displayed in Chart 1 indicates two main results. First, RAM is roughly \$14 billion higher in 1987 than it was in 1959.^{4/} This indicates that reserve requirements have, on net, fallen over the last thirty years. Suppose that reserve requirements had not been changed since 1959. This supposition implies that RAM equals zero, and hence, source base equals adjusted monetary base. With reserve requirements unchanged, the source base must compensate for the quantity of reserves which would otherwise had been "freed" through reserve requirements. Thus, in 1988, the source base would have to increase about \$14 billion to be equal to the adjusted monetary base.

Secondly, the path of RAM over the 1959-88 period is consistent with changes in reserve requirements occurring in waves, which reflect the major changes in the reserve requirement structure that took effect during this period. Between 1959 and 1980, 14 major changes in reserve requirements were implemented. Over the period 1959-1965, only two such changes were implemented. Chart 1 shows that RAM generally increased during the first

half of the 1960s. Thus, over the period 1959-65, the data suggest that reserve requirements were effectively lowered.

Beginning in 1966, changes in reserve requirements occurred more frequently. Indeed, except for 1971, the reserve requirement structure was changed each year between 1966 and 1978. As Chart 1 indicates, RAM generally declined during the period 1966-1974 which indicates that higher reserve requirements were levied on member banks. Beginning in 1974, however, a series of reductions in reserve requirement ratios were initiated. RAM rose during the last half of the 1970s, thus indicating that reserves had been "freed."6/

The 1981-88 period is considered separately because the frequent changes in reserve requirements experienced during this period were the product of MCA. Provisions were included in MCA which allowed for the changes in reserve requirements to be phased-in. There were two separate phase-in schedules for the changes in reserve requirements: members banks were provided a phase-in period of four years while and the transition period for non-member institutions was eight years.7/ During the four years in which member banks reserve requirements were being phased-in, RAM increased nearly \$10 billion. Thus, during the period where both members and non-members were experiencing reserve requirement changes, the evidence suggests that a net decrease in reserve requirements had taken place.

During the 1984-88 period, only the changes in reserve requirements for non-member depository institutions continued to be phased-in. RAM fell slightly during this period, indicating that a slight increase in reserve requirements had occurred. Overall, RAM has increased since 1980 which is consistent with aggregate reserve requirements being effectively lowered due

to MCA.

3. Effects of the Monetary Control Act of 1980

What was the source of the substantial changes in reserve requirements in the 1980s? Interestingly, these changes bear little direct relationship to explicit monetary policy actions. In fact, the reserve requirement schedule currently in place was set by the U.S. Congress, not the Federal Reserve System. Congress, with the passage of MCA, made two important changes in reserve requirements for depository institutions.

3.1 Two Principle Elements of MCA

First, Congress imposed universal reserve requirements on all depository institutions offering transactions deposits. Prior to the MCA, non-member depository institutions (including savings and loan associations, mutual savings banks and credit unions) were subject to a variety of reserve requirements schedules set primarily at the state level, and not by the Federal Reserve.^{8/} MCA outlined a "phase-in" schedule wherein reserve requirement ratios were gradually increased for those institutions previously not under Federal Reserve guidelines. The MCA allowed the Fed to set reserve requirements for all these institutions. Although the Federal Reserve was given this discretion, it did not choose to use these powers.

Second, the MCA effectively provided for reductions in reserve requirement ratios for member banks. Again, a phase-in period was outlined. Reserve requirement ratios for these institutions were to be gradually phased down over the period 1980 to 1987. For example, reserve requirement ratios on transaction deposits were as high as 16 1/4% for large member banks in 1979. By the end of the phase-in, these requirements were reduced

to 12%. The Federal Reserve System was again given the ability to alter this schedule, but decided to stay the four-year transition plan spelled out in MCA.

In summary, the MCA put in place two countervailing forces acting on effective reserve requirement ratios for all depository institutions. System reserve requirement ratios were phased-up, from a base of zero, for non-member depository institutions that offered transaction accounts. At the same time, reserve requirement ratios were phased-down for member banks.

3.2 The "Net" Direction of the Effects

There seems to be some confusion about the net effects of these two forces. Toma, for example, writes that "while lowering the reserve requirements faced by Fed member banks, the act raised the reserve requirements for other banks by enough to increase the overall reserve burden."⁹ This statement suggests that the net effect was an increase in required reserves ratios for all depository institutions combined. A quick glance at Chart 1 indicates, however, that as far as the final effects of the Act are concerned, this conclusion is inaccurate. The substantial rise in the level of RAM, beginning in late 1981, suggests a net reduction in effective required reserves for all depository institutions combined.

The lower reserve requirement ratios for member banks had more of an effect on aggregate required reserves than the imposition of higher reserve requirement ratios for all non-member depository institutions. This is because member banks are the larger depository institutions in our financial system. Consequently, the level of required reserves freed for larger member banks more than offset the level of reserves absorbed by imposing higher reserve requirement on non-member banks.

4. The Monetary Control Act and Some Implications for Federal Government Deficits

As indicated, the St. Louis RAM measure suggests that the most sizeable changes in reserve requirement ratios over the past thirty years occurred in the early 1980s. These changes resulted in sizeable reductions in effective reserve requirements for the banking system. Coincident with reserve requirement ratio changes were sizeable changes in the Federal Reserve's balance sheet. In the face of the net reserve requirement reductions reflecting rising levels of RAM between early 1982 and early 1984, the Federal Reserve had to reduce the source base by about \$10 billion from what it would have been had reserve requirements not been changed. That is, in order to offset the phased-in reductions in reserve requirement ratios, legislated by Congress, the Federal Reserve was forced to sell approximately \$10 billion of its government security portfolio that it could have kept had the pre-Monetary Control Act level of reserve requirement ratios been maintained.^{10/} It is interesting to note that this change, forced on the Federal Reserve, occurred at nearly the same time that the U.S. Treasury was increasing its aggregate borrowing, in response to a growing federal government budget deficit. If net reserve requirements had not been lowered over the period, the Federal Reserve could have held about \$10 billion more of U.S. government debt, without increasing the adjusted monetary base or the money supply.

The irony of these events is that at the same time the Treasury was forced to increase its borrowing through the issuance of government securities, the MCA put in place forces that necessitated that the Federal Reserve reduce its holdings of government securities below what they would have been had the act not been passed.

Summary

The St. Louis reserve adjustment magnitude (RAM) can be used to gauge the aggregate effects of periodic changes in reserve requirements through time. In general, movements in RAM through time suggests that reserve requirements have declined from their 1959 levels. Judging monetary policy on the basis of past reserve requirement policy actions undertaken would indicate an expansionary tendency.

Most recently, reserve requirement ratio changes were introduced with the Monetary Control Act of 1980. The RAM measure indicates that the System effectively lowered reserve requirement ratios, as a result of the Monetary Control Act of 1980. The Monetary Control Act also had implications for Federal Reserve's ability to "monetize" Treasury debt. The net reduction in reserve requirements in the early 1980's meant that the Federal Reserve did not acquire as many government securities as it would have, had MCA not been passed. Interestingly enough, reserve requirement ratio reductions were enacted at roughly the same time as the federal budget deficit increase. The expansionary monetary policy effects of lowering reserve requirement ratios inhibited the Federal Reserve from buying Treasury securities at the rate they would have without the Monetary Control Act.

FOOTNOTES

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1. As testimony to this fact, we cite Toma's (1988) claim that "Although the (Monetary Control) Act lowered reserve requirements for members of the Fed and raised them for nonmembers, on balance the reserve requirement burden increased" (emphasis ours). We provide evidence later in the paper which suggests that the reserve requirement burden was actually reduced for all depository institutions combined.
 2. Santoni (1985) also recognized the problems introduced by the Monetary Control Act of 1980 in comparing reserve requirement structures pre- and post-1980.
 3. The St. Louis adjustment presently has selected 1976-80 as the base period. See Gilbert (1987) for a description of the most recent revision in the procedure adopted by St. Louis to estimate RAM. Issues involved in selecting the base period are discussed separately in Gilbert (1980) and Tatom (1980).
 4. Note that the level of RAM will reflect deposit levels shifts, as well as different reserve requirement ratios, as long as present reserve requirement ratios are different from those of the base period.

Consider the RAM for two different period, both with the same level of reserve requirement ratios, $r_1 = r_2$. Ram for period 1 will be $(r_0 - r_1)' D_1$. Ram for period 2 will be $(r_0 - r_1)' D_2$. Thus, while $r_1 = r_2$, $RAM_1 = RAM_2$ as long as $D_1 = D_2$. Deposit growth, for example, will lead to a larger RAM whenever today's reserve requirement structure is lower than that of the base period. In this way, RAM does not follow a pure step-function pattern, changing only when reserve requirement ratios change. Rather, RAM also changes as deposit levels shift, or as deposits are shifted from one reservable account to another, reflecting differences in required reserves across deposits.

5. Over the period 1959 to 1988, the Federal Reserve increased their government securities holdings by roughly \$200 billion. If reserve requirement ratios had remained at their 1959 levels, the Federal Reserve would have had to increase their government securities holdings by \$214 billion to achieve the same increase in the adjusted monetary base. In other words, the Federal Reserve could have increased it's holdings of government securities by about 7%, if reserve requirement ratios had not been lowered over the period.
6. Table 1 also indicates brief periods where RAM exhibits aberrant behavior. In particular, the sharp upswing in RAM which occurred in 1972 reflects the basic components which are used in the calculation. In 1972, reserve requirements were no longer applied to reserve city banks or country banks. Rather, the new structure was based solely on the size of deposits. This re-structuring was phased-in over several

months, and reserve requirements appear to have effectively fallen briefly. Also contributing to the increase in RAM was the deposit outflow which occurred at this time. Other things being equal, negative deposit growth will result in RAM "changing direction." The sharp reduction in RAM which occurred in the late 1970s reflects negative deposit flows. Reserve requirements were not changed between 1978 and 1980 so that deposit outflows due to high market interest rates explain this aberration.

7. See McNeill (1980) for a more complete description of the transition provisions in MCA as they applied to member commercial banks and non-member financial institutions.
8. State reserve requirement ratios have no effect on the RAM component of the monetary base.
9. Toma's point regarding the overall effect of the Monetary Control Act of 1980 on reserve requirements restates the position taken by Cacy and Winningham. The view that reserve requirements were raised on net for all depository institutions may have initially been true. From 1980 to 1982, RAM fell. The final effects measured by RAM, however, suggest that reserve requirement were, on net, lowered by MCA.
10. See Haslag and Hein (1989) for evidence concerning the coordination of monetary policy tools. Haslag and Hein report that the source base and RAM are negatively (and significantly) correlated over the period 1959-

88, indicating that the Federal Reserve was coordinating policy actions.

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Table 1 - Reserve Requirements of
 Depository Institutions for Selected Years

1988: Applied to All Depository Institutions
Net transactions accounts

Percent of deposits

\$0-\$40.5 million	3
More than \$40.5 million	12

Net personal time deposits

By original maturity	
Less than 1 1/2 years	3
1 1/2 years or more	0

Eurocurrency liabilities

All types	3
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1978: Applied to Member Banks Only

Net Demand

\$0 - \$2	7
\$2 - \$10	9 1/2
\$10 - \$100	11 3/4
\$100 - \$400	12 3/4
over \$400	16 1/4

Time

Savings	3
Other time:	
\$0 - \$5, maturing in	
30 days to 179 days	3
180 days to 4 years	2 1/2
over 4 years	1
Over \$5, maturing in	
30 days to 179 days	6
179 days to 4 years	2 1/2
over 4 years	1

Chart 1
St. Louis Ram

