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Economic Research Note

US: blame the textbook, not the TA, for money multiplier confusion

- **Reserve requirements have become less meaningful over time for US banks**
- **Capital requirements are the only relevant constraint on bank balance sheets**
- **For this reason, the money multiplier is no longer a dependable theory of the money supply**

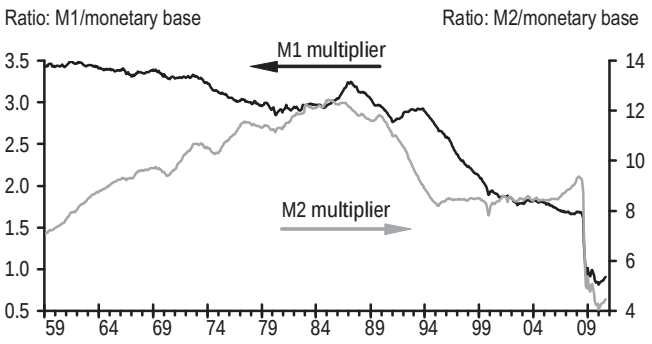
The growth of the Fed's balance sheet, which has been funded by an increase in commercial banks' reserve balances at the Fed, has sparked fears that the "money multiplier" mechanism would translate those reserves into an explosion in bank lending, bank deposits, and inflation. None of these things has happened, because the money multiplier no longer makes sense given the institutional framework of the contemporary banking system. In spite of being almost totally divorced from reality, the money multiplier is still taught in undergraduate economics textbooks, with much resulting confusion.

This will only hurt a bit

As painful as it may be to revisit undergrad econ, it is necessary to go there to lay out the money multiplier logic: Banks are assumed to be required to hold a certain fraction of deposits as reserves at the central bank. To be more concrete, assume this required reserve ratio is 10%. What happens when the central bank injects more reserves into the banking system? The usual textbook experiment is to assume the central bank buys a $100 security from someone. The central bank will credit that person's bank with $100 of reserves and the bank creates a deposit account for the person in that amount.

Here is where the money multiplier kicks in: since the commercial bank is required to hold only $10 as reserves, it will lend out the other $90. If the recipient of that loan deposits the proceeds in another bank, the second bank now has $90 in new deposits and, after reserving $9, can lend the other $81. This process repeats itself until there is $1000 in new deposits in the banking system. More generally, naming the required reserve ratio, rr, there are 1/rr dollars in new deposits in the banking system for every new dollar of reserves. In its simplest form, this is the multiplier: every increase in reserves translates into 1/rr more deposits.

Money multipliers



Following this logic, the ratio of bank deposits to bank reserves should equal 1/rr, the money multiplier. To use this framework to compare broad money measures (like M1 or M2, which is essentially currency plus bank deposits and other financial assets usable for transactions) to base money (currency plus bank reserves), currency holdings have to be incorporated. This generates a money multiplier with more "bells and whistles," but the idea is the same. (Specifically, the money multiplier is (1+cd)/(rr+cd), where cd is the ratio of currency to bank deposits.) The fact that the money multiplier, defined as the ratio of broad money to base money, has fallen dramatically over the past few years even though its fundamental determinants, cd and rr, are little changed is the first clue that something is very wrong with the money multiplier framework.

The preceding description of the money multiplier is informal. The formal framework for thinking about the multiplier was developed by Karl Brunner and Alan Meltzer in the 1960s. That work makes explicit the assumptions for the money multiplier to exist, the most important of which is that reserve requirements are the binding constraint on the size of bank balance sheets.

Reserves in the US

In an increasing number of countries today, the required reserve ratio is zero. To take one example close to home, Canadian banks are not required to hold reserves. According to the simplest application of the above logic, the money multiplier there should be infinite. So if there are no currency withdrawals, a one-looney increase in reserves could lead to an infinite expansion of the Canadian banking system! Of course this is nonsense. Anyone with even a vague familiarity with modern banking would see that capital requirements would quickly bind to prevent an outsized expansion of the banking system.

This highlights a major limitation of applying the Brunner-Meltzer reasoning to current circumstances: capital ratios are not considered a constraint on bank balance sheets. When they were writing in the 1960s, this may not have been such an oversight: reserve requirements were large and meaningful while capital requirements, pre-Basel, were patchwork and less meaningful. When reserve requirements are the binding constraint on bank balance sheets, an increase in central bank reserves allows the aggregate banking system to grow. When capital is the binding constraint on bank balance sheet, an increase in central bank reserves does not affect equity capital in the banking system and therefore does not increase the system's ability to lend.

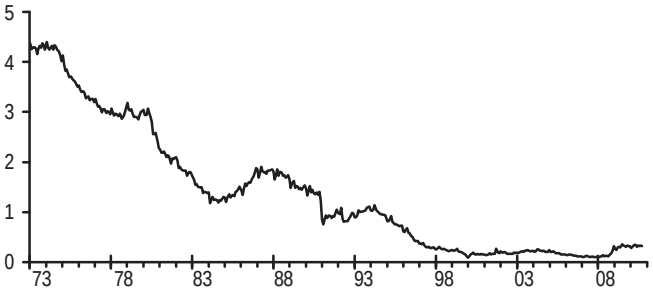
In a country like Canada, clearly reserve requirements will never be the binding constraint. But what about in the US? While there are still formally legal reserve requirements in the US, over time they have become so watered down that they will almost never be a meaningful constraint on the ability of banks—individually or in the aggregate—to expand.

In the US, banks are currently required to hold reserves equal to 10% of transaction deposits. Cash that banks have in their vaults and ATMs counts against this requirement. Throughout the 1980s and 1990s, the scope of reserve requirements was narrowed to exclude nonpersonal or time deposits, but perhaps the most important change was in 1994 when the Fed began allowing banks to use retail deposit-sweeping programs. These software programs allowed banks to temporarily reclassify high-reserve transaction deposits into low- or no-reserve nontransaction deposits. These programs were so effective that for many banks reserve requirements fell to levels that could be entirely met by vault cash that banks would normally keep on hand anyway. In other words, many banks are no longer constrained by reserve requirements at all. While reserve requirements still exist officially in the US, the system is effectively very similar to the Canadian one. And for that reason, the money multiplier is no longer meaningful.

Another, more subtle, assumption in the money multiplier story is that reserves earn no return and so are dominated by other assets with the same risk and duration profile—such as T-bills. Therefore banks would want to shed excess reserves in favor of those competing, return-earning assets. That was true when reserves earned no interest, as was the case when Brunner and Meltzer were writing, but no longer

Effective required reserve ratio

%, required balances at FR banks/Deposits, aggregate US banking system



holds now that reserves earn interest from the Fed. Of course, banks generally aren't in the business of holding a portfolio of T-bills, but for the theory to make sense the return on excess reserves should be dominated in an apples-to-apples comparison with other similar assets. As with the effective elimination of reserve requirements, the establishment of the payment of interest on reserves is an institutional change that overturns a key assumption in the money multiplier analysis.

These institutional changes aren't going away, and so there is no reason to expect the money multiplier to spring back. If anything, the rotation from reserve requirements to capital requirements as the more relevant limitation on bank balance sheets will become even greater in the future, as Fed policymakers have at times expressed an interest in following the global trend of dropping reserve requirements altogether, and as Basel policymakers are increasingly stressing higher capital requirements.

Hey, teacher, leave them kids alone

Empirically, the money multiplier framework has failed miserably for a few years now. The fact that so many still espouse this idea could be the best example of Keynes' famous saying: "Practical men, who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist." In this case, they are slaves to some defunct textbook which pushes an analytical construct that no longer applies in the current institutional environment. This explains not only why inflation hasn't accelerated, but also why the Fed leadership did not appeal to the money multiplier as a channel through which asset purchases would boost the economy.