



Money, reserves, and the transmission of monetary policy: Does the money multiplier exist?

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ABSTRACT

With the use of non-traditional policy tools, the level of reserve balances has risen in the US from roughly \$20 billion before the financial crisis to well past \$1 trillion. The effect of reserve balances in macroeconomic models often comes through the money multiplier, affecting the money supply and the bank lending. In this paper, we document that the mechanism does not work through the standard multiplier model or the bank lending channel. If the level of reserve balances is expected to have an impact on the economy, it seems unlikely that a standard multiplier story will explain the effect.

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1. Introduction

A second issue involves the effect of the large volume of reserves created as we buy assets. [...] The huge quantity of bank reserves that were created has been seen largely as a byproduct of the purchases that would be unlikely to have a significant independent effect on financial markets and the economy. This view is not consistent with the simple models in many textbooks or the monetarist tradition in monetary policy, which emphasizes a line of causation from reserves to the money supply to economic activity and inflation... [W]e will need to watch and study this channel carefully.

Donald L. Kohn, Vice Chairman of the Federal Reserve Board, March 24, 2010

The Federal Reserve's implementation of a range of non-traditional monetary policy measures to combat a severe financial crisis and a deep economic recession resulted in a very large increase in the level of reserve balances in the US banking system. As a result, there has been renewed interest in the transmission of monetary policy from reserves to the rest of the economy. Since the 1980s, two broad transmission mechanisms have been discussed: an "interest-rate" or "money channel," in which interest rates adjust to clear markets and influence borrowing and lending behavior; and a "credit channel," in which the quantity as much as the price of loanable funds transmit monetary policy to the economy. Within the credit channel literature, a narrow "bank lending channel" view of the world follows the textbook money multiplier taught in undergraduate textbooks and suggests that changes in open market operations and the quantity of reserves directly affect the amount of lending that banks can do.

A textbook money multiplier and the bank lending channel imply an important role for money in the transmission mechanism. In the past couple of decades however, New Keynesian models used for macroeconomic policy analysis have excluded

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money. The exceptions in this class of models are those where a money demand equation is appended, and the quantity of money is entirely endogenously determined with no feedback to real variables. This extreme marginalization of money is not universal, however. Some researchers for example, Hafer et al. (2007), Leeper and Roush (2003), Ireland (2004), Meltzer (2001) and most notably, the European Central Bank, put serious weight on the role of money in the macroeconomy and policy analysis. At the other extreme, many economics textbooks and some academic research, such as Freeman and Kydland (2000) or Diamond and Rajan (2006) continue to refer to the very narrow money multiplier and accord it a principle role in the transmission of monetary policy. Indeed, M1 multiplier is published as a regular statistic by the Federal Reserve Bank of St. Louis.¹

The recent rise in reserve balances suggests a need to reassess the link from reserves to money and to bank lending. We argue that the institutional structure in the United States and empirical evidence based on data since 1990 both strongly suggest that the transmission mechanism is inconsistent with the conceptual framework of the standard money multiplier model from reserves to money and bank loans. In the absence of a multiplier, open market operations, which simply change reserve balances, do not directly affect lending behavior at the aggregate level.² Put differently, if the quantity of reserves is relevant for the transmission of monetary policy, a different mechanism must be found. The argument against the textbook money multiplier is not new. Theoretically, the bank lending channel is not operative if banks do not face a perfectly elastic demand for their open-market liabilities (see e.g. Bernanke and Gertler, 1995). The issue, then, is to determine whether or not this channel is operative from an empirical perspective. We supplement our conceptual critique with a quantitative analysis. In their influential work, Kashyap and Stein (2000) found empirical evidence in favor of the narrow bank lending channel over the 1976–1993 period. We argue that the existence of a narrow bank lending channel contradicts the institutional developments over the last two decades that improved the banks' access to external funding drastically. This paper provides institutional and empirical evidence that the money multiplier and the associated narrow bank lending channel are not relevant for analyzing the United States anymore. We find that bank loans are primarily demand driven. Combined with the rising share of loan commitments, these findings imply that bank loans increase following a monetary tightening, which is not consistent with the simple multiplier framework or the narrow bank lending channel. This main argument and the supportive empirical evidence are strongly in line with the new and alternative interpretation of the bank lending channel modeled in Disyatat (2010).

2. The money multiplier: fact or fiction?

The most simple money multiplier described in textbooks links reservable deposits to bank reserves according to Eq. (1):

$$\Delta D = (1/r)\Delta R \quad (1)$$

where ΔR refers to changes in total reserves, ΔD refers to changes in reservable deposits, r is the required reserves ratio, and $(1/r)$ is the simple multiplier. Open market purchases increase the quantity of reserves, because of fractional reserve accounting, banks can lend out extra funds, and the extra lending increases both lending and the money supply because loans are created as demand deposits. Money increases by $1/r$ and lending increases by $(1 - r)/r$. The story is symmetric, so contractionary policy works in precisely the opposite direction.

If we compute the theoretical simple multiplier, $1/r$, against the actual multiplier implied by the data, $\Delta D/\Delta R$, we observe that the constant required reserves ratio since 1992 leads to a constant theoretical multiplier of 10 after that year (not shown). The actual ratio of changes in total reserves to reservable deposits, in contrast, is rather volatile in that period, ranging between 0.20 and 21, and generally greater than the simple multiplier.

During the financial crisis, the divergence has been even greater. Reserve balances have recently increased dramatically, going from around \$15 billion in July 2007 to over \$788 billion in December 2008. Despite this increase by a factor of 50, no similar increase in any measure of money, as suggested by the multiplier, could be found. Hence, while the actual multiplier was about twice the theoretical multiplier in 2003, it was about 1/50th of the theoretical multiplier in 2008. Considering other measures of money, the monetary base, the narrowest definition of money, doubled over that period while M2 grew by only 8½%.³

Casual empirical evidence points away from a standard money multiplier and away from a story in which monetary policy has a direct effect on broader monetary aggregates. The explanation lies in the institutional structure in the United States, especially after 1990. First, there is no direct link between reserves and money—as defined as M2. Following a change in

¹ <http://research.stlouisfed.org/fred2/series/MULT>.

² It is important *not* to interpret the above result as the 'liquidity puzzle.' The Fed can and does affect total balances by changing interest rates. However, the flow of events is different. When the FOMC changes its monetary policy stance (say by raising the funds rate target), demand for reserve balances declines, which in turn prompts the Fed to reduce total balances via open market operations. There are two things to emphasize: First, the decline in supply of balances follows a demand adjustment (and does not precede it), and second, the Fed's control over broader aggregates is limited to total balances. See Carpenter and Demiralp (2008).

³ The simple multiplier abstracts from excess reserves and currency. A more general but perhaps less rigorously derived multiplier links the monetary base to broader monetary aggregates (such as M1) to the monetary base according to: $\Delta M = [(1 + c)/(c + e + r)]\Delta MB$ where c is the ratio of currency in circulation to reservable deposits, e is the ratio of excess reserves to reservable deposits, and r is the required reserves ratio. In the special case where $c = e = 0$, this version of the money multiplier, reduces to the simple multiplier. The discrepancy between this theoretical money multiplier and the implied empirical money multiplier is even greater.

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