11 The behaviour of the money multiplier during and after the Global Crisis: Implications for the transmission mechanism of monetary policy

Alex Cukierman[1]
Tel-Aviv University and Interdisciplinary Centre

One of the basic mechanisms underlying conventional views about the transmission process of monetary policy is that, by changing the monetary base, the central bank affects the quantity of money and through it economic activity and inflation.[2] Although it has perfect control over the monetary base, the central bank does not fully control the quantity of money. How much of a given increase in the monetary base leads to an increase in the money stock depends on the willingness of banks to utilise excess reserves to extend credit and on the fraction of its money balances that the public desires to hold in the form of cash. A widely used textbook device describing the relation between the monetary base and narrow money in the economy is the M1 multiplier. This multiplier is given by

$$m = \frac{1 + c}{rr + \varepsilon + c}$$

where c is the ratio of cash held by the public to total (liquid) deposits owned by the public, rr is the required reserve ratio against such deposits, and ε is the ratio between

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2   Since changes in the central bank's policy rate have to be supported by changes in the base, this argument can also be formulated in terms of the interest rate.

excess reserves and deposits. The relationship between the monetary base, B, and narrow money is then given by

$$M1 = mB$$

Under the widely held (at least until the Global Crisis) view that this multiplier is relatively constant this formulation makes it possible to evaluate the impact of changes in the monetary base on the quantity of money. It has been taught to generations of undergraduate students over dozens of years and appears in money and banking textbooks, even after the onset of the Global Crisis. One example is the ninth global edition of Mishkin's popular money and banking text that was published several years after the start of the crisis (Mishkin 2010: 362-366).[3] In the particular case in which excess reserves are zero (or constant) a given increase in the monetary base, by inducing banks to increase loans and deposits, raises the money supply by the product of the increase in the monetary base and the money multiplier.

Figure 1 shows the behaviour of the money multiplier prior to and during the Global Crisis. The figure reveals that the assumption concerning the relative fixity of the money multiplier was not unreasonable prior to the crisis. However, with the onset of the first quantitative easing operations (QE1), the money multiplier dropped sharply to about half of its previous value and has remained in this range since then. This evidence raises two questions: First, what are the main reasons for the sharp drop in the multiplier? Second, how useful is the monetary multiplier framework for characterisation of monetary policy transmission in the aftermath of the financial crisis?

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3   See also Carlin and Soskice (2006: 270-271).

Figure 1   Behaviour of the US money multiplier, January 2001 to July 2017
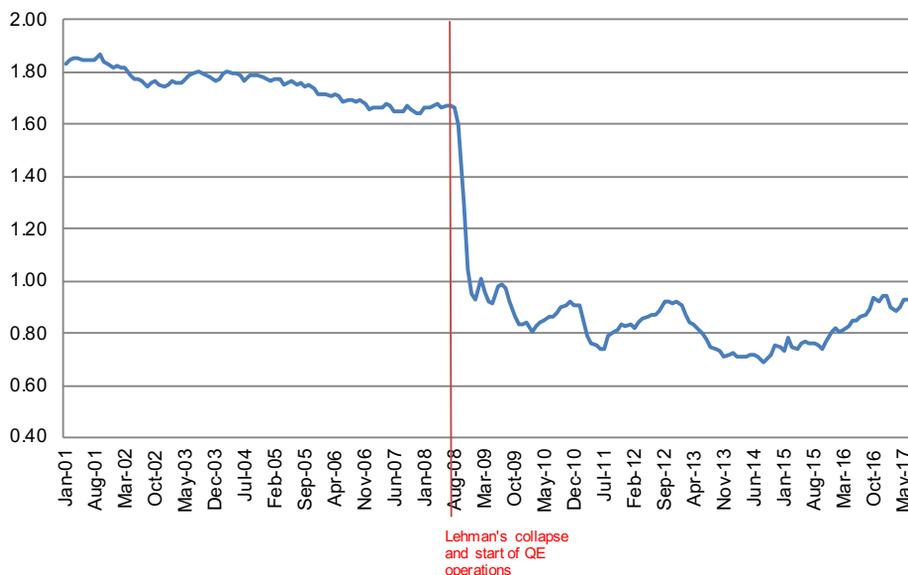
Source: Calculated from data on the monetary base and M1 from the Federal Reserve Bank of St Louis monetary data base.

What caused the drop in the money multiplier?

The main reason for the drop in the multiplier following the onset of QE1 and subsequent large-scale asset purchases is that, in spite of the expansions in the base (and therefore in the reserves of the banking system), total banking credit stagnated during the first three years following Lehman's collapse. When it resumed an upward trend during the subsequent years, the rate of growth of banking credit was anaemic and very far from the predictions of the conventional money multiplier. The impact of this behaviour on the conventional money multiplier can be illustrated by focusing on the total reserve ratio, *r*, defined as

$$r \equiv rr + \varepsilon$$

By definition

$$r \equiv \frac{R}{D} = \frac{R}{L}\frac{L}{D} \equiv r_l l_d$$

where R, D and L are total reserves, total liquid deposits of the public and total banking loans outstanding, respectively. r_l is the ratio between total bank reserves and total bank credit and l_d is the ratio between loans and deposits. Using the last equation, the money multiplier can be rewritten as

$$m = \frac{1 + c}{r_l l_d + c}$$

Following the collapse of Lehman Brothers in September 2008, the cash/deposits ratio, c, and the loans/deposits ratio, l_d, did not change appreciably. However, the ratio, r_l, between total banking reserves and loans increased dramatically due to the Fed's huge base expansion along with the feeble response of total banking credit. It is easy to see from the last equation above that this is the main (semi-technical) reason for the dramatic decrease in the money multiplier. Figure 2 shows the behaviour of the r_l ratio prior to and following Lehman's collapse, along with the start of QE1. It is apparent from the figure that, from that point in time on, there was a huge and persistent increase in the reserves/loans ratio that largely parallels the decrease in the money multiplier in Figure 1. Clearly, the dramatic increase in the reserves/loans ratio was due to the muted response of credit to the huge reserve expansion caused by the Fed's QE operations between September 2008 and September 2014.

Several reasons on the supply side combined to produce the muted response of banking credit. First was the need for banks to rebuild their equity capital following the crisis. This need arose initially because of losses on mortgage-backed securities (MBSs) and other securities, and subsequently due to the 2010 Dodd-Frank act that raised capital requirements particularly on systemically important financial institutions (SIFIs).[4] This was reinforced by the drying up of the repo market which seriously crippled banks' access to liquidity since the summer of 2007 (Gorton and Metrick (2012). It was further compounded during the first couple of years following the collapse of Lehman Brothers by an increase in bailout uncertainty.

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4   Although there is a tradeoff between higher capital and lending in the short and intermediate run, higher equity capital actually encourages lending and financial stability in the long run (Thakor 2014).

The decision not to bailout Lehman Brothers after numerous previous rescue operations spooked financial markets and banks by raising the level of uncertainty about the likelihood of bailouts (Cukierman and Izhakian 2015). In addition, the dramatic events that accompanied Lehman's collapse raised the aversion to this uncertainty. Being akin to a post-traumatic stress disorder, this increase in uncertainty aversion is likely to have had a more persistent effect on the arrest in banking credit than the initial increase in bailout uncertainty.[5]

Credit stagnated also because of a decrease in the demand for credit due to a fall in household consumption demand triggered by negative wealth effects in housing. Using microeconomic evidence on the impact of the fall in housing prices on household consumption and wealth at the county and zip code levels, Mian et al. (2013) find the following:

1. The elasticity of consumption with respect to housing net worth during the Global Crisis was between 0.6 and 0.8 and the average marginal propensity to consume was between 5 to 7 cents for every dollar loss in housing wealth.

2. The marginal propensity to consume was sharply higher for poorer and more leveraged households, implying that tightened credit constraints were partially responsible for the decrease in consumption. Although this evidence supports the view that demand factors also contributed to the credit slowdown, at the same time it reveals that part of this stagnation would not have materialised in the absence of credit rationing, which originates on the side of credit supply.

How useful is the money multiplier framework as a tool for characterisation of monetary policy in the aftermath of the crisis?

I turn next to the second, wider question on the usefulness of the conventional money multiplier in the aftermath of the Global Crisis. This multiplier provides a useful characterisation of the transmission of monetary policy during periods in which the

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5   An elaboration of this mechanism appears in the second half of Section 4 in Cukierman (2016).

binding constraint on banking credit is the level of banking reserves, as was occasionally the case prior to the crisis. However, as long as it is flooded with huge excess reserves, this constraint is no longer the binding constraint on credit extension, and therefore on money growth through credit growth. Instead, factors like the need to rebuild depleted equity capital, higher capital requirements and the risk/return preferences of the banking system and of potential borrowers take front seat in the determination of credit supply.

Figure 2 shows that prior to Lehman's collapse and the simultaneous start of large-scale asset purchases (more popularly known as quantitative easing) the ratio, r_l, between total banking reserves and loans was roughly a negligible one tenth of a percent. Within about a year it rose to about 10%, reaching a peak of over 25% in late 2014. As explained in the previous section, the extraordinary increase in r_l since September 2008 is a consequence of the QE operations in conjunction with the muted impact of those operations on total banking credit. This implies that the textbook money multiplier was not a useful concept for characterisation of the transmission of monetary policy through the banking system in the aftermath of the crisis.

Figure 2   The ratio between total US bank reserves and total US bank credit, January 2001 to July 2017
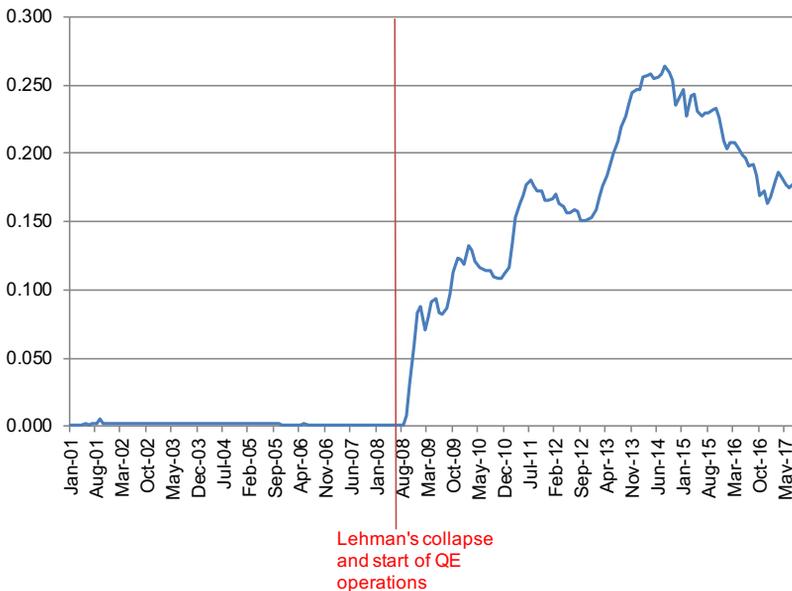
Sources: I. Total bank reserves - Fred; II. Total Bank credit - Bloomberg, index: ALCBBKCR.

An important question is whether this phenomenon will subside as the Global Crisis fades into the distant past, or whether it lasts and become a permanent feature of the transmission of monetary policy to banking credit. The answer to this question depends on whether the binding constraint on credit growth will be the scarcity of banking reserves or other factors in the future. To a large extent this in turn depends on how quickly the Fed will roll back the bloated monetary base that accumulated during the QE operations of the six years following the downfall of Lehman Brothers. As of the end of August 2017 the monetary base was a bit less than $4 trillion. About nine years earlier, just prior to Lehman's downfall, it was a bit less than $0.9 trillion. Although the base receded somewhat from its peak in the latter part of 2014, it is highly likely that the reduction in the base will stretch over many years. Since the level of excess reserves is directly related to the size of the monetary base, it is likely that the conventional money multiplier will continue to be a poor guide for the impact of monetary policy on banking credit, wider monetary aggregates and the real economy for a prolonged period of time.

Concluding remarks

This chapter documents a dramatic decrease in the US conventional money multiplier since the downfall of Lehman Brothers and attributes it to the large-scale quantitative easing operations of the Fed in conjunction with sluggish growth of banking credit. This phenomenon, now almost ten years old, suggests that shortage of reserves has not constituted a binding constraint on the expansion of banking credit since the start of the crisis.[6] An important implication of this observation is that the transmission of expansionary monetary policy through the banking credit channel has weakened considerably since the outbreak of the crisis.

Since the Fed is unlikely to quickly reduce the large balance sheet it accumulated during the crisis, the banking system will have substantial excess reserves for the foreseeable future, implying that reserves will not constitute a binding constraint on credit expansion for quite some time. As a consequence, the conventional money multiplier is likely

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6   The chapter discusses the other, relatively more important, reasons, for the sluggishness in banking credit.

to be of little use as a predictor of the transmission of monetary base expansions to banking credit in the foreseeable future.

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About the author

Alex Cukierman is Professor of Economics at the Interdisciplinary Center in Herzeliya, Professor Emeritus of Economics at Tel-Aviv University, former member of the Bank of Israel's Monetary Committee and Research Fellow at CEPR. He received a PhD in Economics at MIT in 1972, and has been a faculty member at Tel Aviv University since October 1972.

He is the author or co-author of several books and over a hundred scientific articles in the areas of macroeconomics, monetary economics, political economy and monetary policy and institutions. His best known book is *Central Bank Strategy, Credibility and Independence – Theory and Evidence* (MIT Press,1992 and 1998). Cukierman has also worked on the interaction between politics and fiscal policy and on the consequences of asymmetric information in political economy. One of his best known papers (joint with Mariano Tommasi) in this area is "When Does it Take a Nixon to Go to China?", (*American Economic Review*, 1998). Cukierman's recent work focuses on the implications of the global financial crisis for monetary policy and institutions and on the consequences of bailout uncertainty

A former president of the Israeli Economic Association, Cukierman has been a visiting professor or research scholar at Northwestern University, New York University, Carnegie Mellon University, Princeton University, the University of Chicago, Stanford University, the University of Canterbury, the University of California at Santa-Cruz, the Federal Reserve Bank of St. Louis, the World Bank, the ECB, the Universities of Bonn and Munich and the Swiss National Bank.