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## POLICY STUDY

# FEDERAL RESERVE ASSET REDUCTIONS AND THE ECONOMY

Thomas R. Saving  
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# SUMMARY

At its September 2017 meeting, the Board of Governors of the Federal Reserve System announced that they would begin to reverse the massive acquisition of assets that began in 2009. What has been the impact of these asset sales, and what challenges face the Federal Reserve as the asset sales continue?

The answer to these questions lie in the fact that the Federal Reserve pays interest on bank reserves, IOER, making these reserves liabilities for the Fed and investments for the banks. The economic impact of Federal Reserve asset sales or purchases on the economy is now determined by the difference between Fed asset changes and changes in the banking system's holding of excess reserves.

During the 18 months of the Federal Reserve's asset reduction program, Federal Reserve asset holdings declined by 10.8%. However, the M1 measure of the money supply grew by 2.8% as Federal Reserve net assets rose because banks reduced their holdings of excess reserves by 30%.

From the perspective of the effect on the economy, the size of the Federal Reserve asset holdings does not matter so long as the IOER relative to market interest rates is maintained to ensure that Federal Reserve net assets rise. Importantly, in June of 2018 the Federal Reserve separated the interest rate on reserves from its upper bound target Fed Funds rate. This change allows the Federal Reserve to change the IOER without announcing a change in its target Fed Funds rate.

The challenge facing the Federal Reserve is to maintain a path of IOER relative to other market rates that induces banks to reduce excess reserves by just the right amount as the Federal Reserve reduces its total asset holdings.

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## CONTACT US

Private Enterprise Research  
Center  
Texas A&M University  
4231 TAMU  
College Station, TX 77843-4231  
(979) 845-7559  
[perc@tamu.edu](mailto:perc@tamu.edu)

### Cover Photograph

Highsmith, Carol M, photographer. *Entrance to the 1920 Federal Reserve Bank building in Dallas, Texas*, Photograph.  
<https://www.loc.gov/item/2014632598/>

# FEDERAL RESERVE ASSET REDUCTIONS AND THE ECONOMY

## INTRODUCTION

Without the introduction of paying banks to hold reserves, the unprecedented 2008-2015 expansion of Federal Reserve assets would have resulted in an equally unprecedented expansion of the money supply, accompanied by significant inflation. However, the expected effect on the money supply and inflation was circumvented by the introduction of interest on excess reserves, IOER, an interest rate totally determined by the Federal Reserve. Paying banks to hold reserves, now a Federal Reserve liability, led the banking system to expand their holdings of reserves largely mitigating the expansionary effect of the massive increase in Federal Reserve assets.

In October of 2017, the Federal Reserve began a program to reverse the massive asset accumulation that began in late 2008. Is this project as simple as just reversing the combination of Fed asset accumulation and banks' excess reserve accumulation that prevented the threatened inflation? Essentially, can the Federal Reserve keep the IOER in line with market interest rates so that the banking system reduces excess reserves faster than the Fed is reducing assets?

Until June of 2018, the IOER was set equal to the announced upper bound of the Federal Reserve target for the Fed Funds rate. As such, whenever changes occurred they were the target of much fanfare. That fanfare was entirely about the Fed Funds target, an irrelevant number for policy.

But beginning in June of 2018 the IOER was separated from the upper bound Fed Funds target. This change has allowed the Federal Reserve to change this important rate without fanfare. In fact, that is exactly what happened in May of 2019 when the Federal Reserve made no change in the upper bound of the Fed Funds target but reduced the IOER by five basis points.

Before IOER, traditional monetary theory would have said that increases in "high powered money," defined as currency plus bank reserves, would lead to equivalent increases in the money supply. The money supply is the sum of two components, Federal Reserve-produced legal tender, or currency, and privately produced money, transferable deposits, usually held in private banks.

The Federal Reserve was, and remains, the sole producer of both currency and bank reserves. Moreover, this high-powered money produced by the Federal Reserve cannot decrease except by Federal Reserve reductions in assets. The public determines the split between currency and reserves, but the total is determined by the Federal Reserve.

Before IOER, the non-currency use for Federal Reserve produced money was as bank reserves. Banks are required to hold reserves against certain transferable bank deposits that serve as privately produced money. These two uses of Federal Reserve produced money, as currency and as bank reserves, must absorb any increase in Federal Reserve assets. An increase in reserves allows the banking system to expand loans and investments until essentially all of the excess reserves are turned into required reserves. As a result, expansions in Federal Reserve assets would increase the money supply by a multiple of any increase in Federal Reserve assets. But the introduction of IOER has changed this relation as reserves become investments for the banking system.



## EXCESS RESERVES IN THE POST IOER WORLD

Now consider an increase in Federal Reserve assets after IOER. Just as before IOER, the asset increase expands banking system reserves by an amount equal to the asset increase. But now bank reserves have a positive rate of return that will be compared to the return on bank alternative investments. As a result, the effect of an increase in reserves on the money supply will be mitigated to the extent that banks choose to hold reserves directly as investments rather than using these reserves to invest in the economy. In fact, during the most rapid expansion in excess reserves, from the middle of 2010 until mid-2015, the IOER was equal to or exceeded the return on 1-year treasuries.

In the pre-IOER world, bank holdings of excess reserves, or reserves not backing deposits, were on average 2% of required reserves. Since the introduction of IOER, excess reserves have ranged between 1,000% and 2,000% of required reserves. Banks no longer feel compelled to quickly spend down their reserve holdings on interest-bearing assets, as reserves are now themselves an interest-bearing asset.

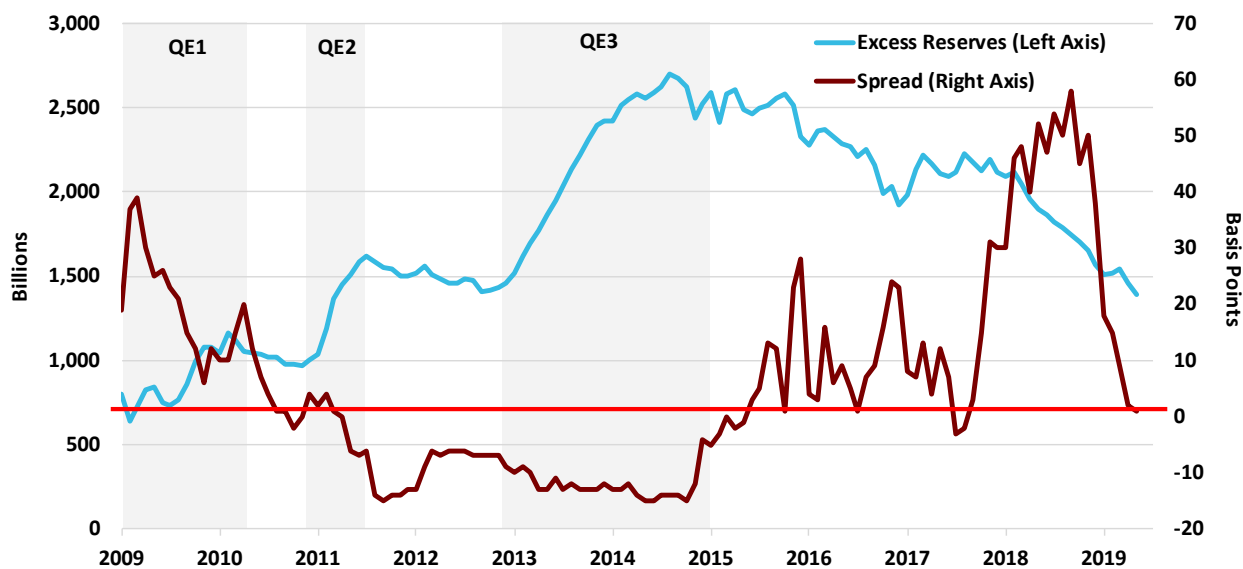
Currently, the ratio of excess reserves to required reserves is declining for at least two reasons. First, the Federal Reserve is no longer expanding its assets, so reserves are no longer growing. Indeed, since October of 2017 the Federal Reserve has been reducing the supply of reserves by reducing its asset holdings. Second, market interest rates have risen relative to the IOER, making the holding of reserves less attractive to banks than it was during the period of rapid excess reserve growth.

Figure 1 shows bank excess reserve holdings and the difference in basis points between the rate of return on 1-year treasuries, a proxy for a bank's alternative to holding excess reserves, and the IOER. A simple inspection of Figure 1 shows the tremendous rise in excess reserves from the beginning of 2009, just after the September 2008 financial crisis, through the close of 2014, the end of the period of Federal Reserve expansion of the monetary base. The three periods of Federal Reserve asset expansion are labelled QE1, QE2 and QE3. The first, QE1, actually began in late 2008 and extended until March of 2010. The second, QE2, began in November of 2010 and lasted until June of 2011. The longest period, QE3, began in November of 2012 and lasted until December of 2014. Two factors were in play in the expansion of bank excess reserve holdings shown in Figure 1. The first was the rapid expansion of bank reserves as the Federal Reserve expanded its assets. The second was the introduction of paying interest on the excess reserves held by the banking system.

The rapid expansion of reserves resulted from the rapid expansion of Federal Reserve assets, labelled QE1, QE2 and QE3. The initial expansion of assets was in the form of commercial paper, mortgage backed securities (MBS) and other assets from financial institutions that were in financial distress, an example of a central bank doing what only a central bank can do. This led to the initial growth of excess reserves from \$1.9 billion in August of 2008, a mere 4% of required reserves, to more than \$1 trillion, 1,600% of required reserves by October of 2010.

Then reserves fell slightly until the second round of Federal Reserve asset expansion, QE2, where the Federal Reserve bought treasuries and mortgage-backed securities. This second expansion led to excess reserves reaching \$1.6 trillion by July of 2011. Then excess reserves again fell slightly to \$1.4 trillion and then expanded rapidly with the onset of the third round of Federal Reserve asset expansion, QE3. Near the close of QE3, excess reserves peaked in August of 2014 at \$2.7 trillion.

**Figure 1.** 1yr Treasury - IOER Spread and Excess Reserves



Source: Federal Reserve Bank of St. Louis FRED

The relation between excess reserve holdings and the difference between market interest rates and the IOER shows that banks viewed these reserves as investments. Since excess reserves are bank investments, the level of such reserves will depend on the rate of return on alternatives to excess reserves.

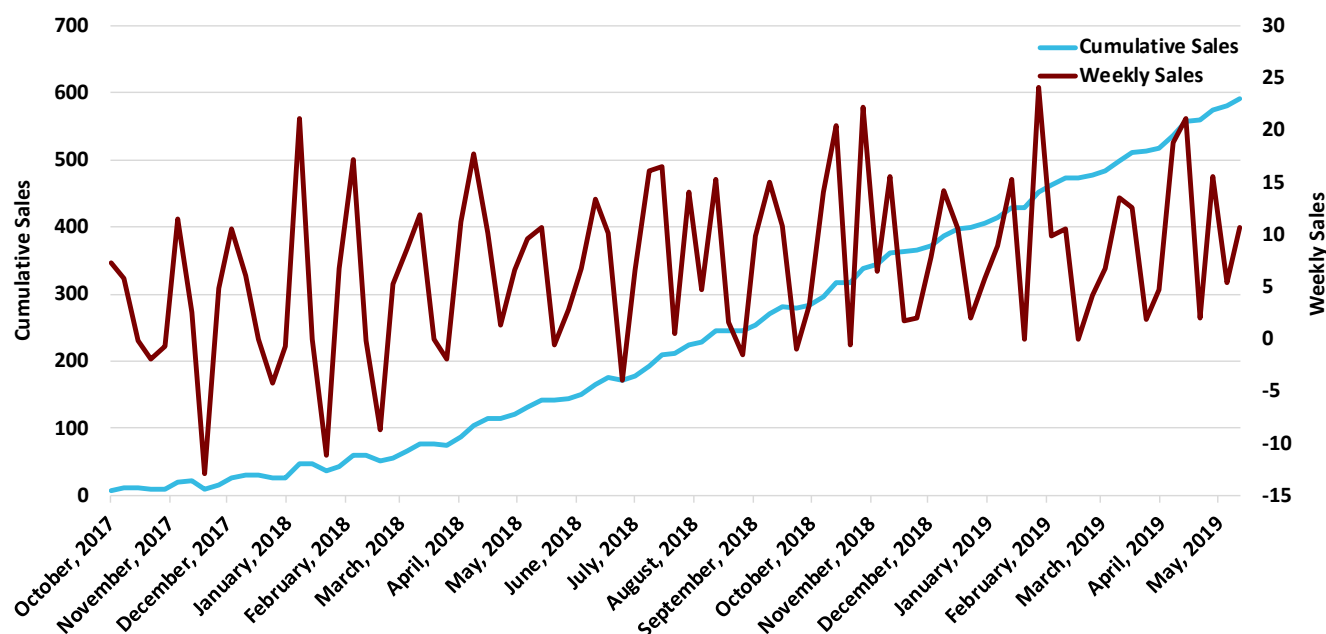
## FEDERAL RESERVE NET ASSETS AND THE MONEY SUPPLY

In October of 2017, the Federal Reserve began its program to reduce its record level of asset holdings. Prior to the asset buildup that began after the 2008 financial crisis, Federal Reserve assets holdings were consistently about 6% of GDP. These asset holdings reached a peak in 2014 of more than 25% of GDP. The Federal Reserve asset share of GDP then began falling, not because of Federal Reserve asset sales, but because of increasing GDP. At the beginning of the asset reduction program, Federal Reserve assets were still 22% of GDP.

Initially, the asset reduction program was not to exceed \$30 billion per month and in fact, it has over the period of its existence averaged just about that figure. Figure 2 shows the weekly and cumulative Federal Reserve asset sales from October 25, 2017 through June 5, 2019. The total reduction in Federal Reserve assets over that 18 month period was \$590 billion, or \$30 billion per month.

The asset sales in Figure 2 serve to reduce bank reserves and before IOER, would have resulted in reductions in the money supply and had a contractionary effect on the economy. Now, however, the fact that reserves can serve an investment changes the way we think about changes in high-powered money, or currency plus reserves. The high powered concept comes from the fact that the private money part of the money supply is based on fractional reserves. As a result, a dollar of reserves can support anywhere from \$10 to \$20 dollars of private money. The production of private money is limited by the public's demand for currency and banks' demand for excess reserves as investments.

**Figure 2.** Weekly and Cumulative Federal Reserve Securities Held Outright Sales  
October 25, 2017 to June 5, 2019



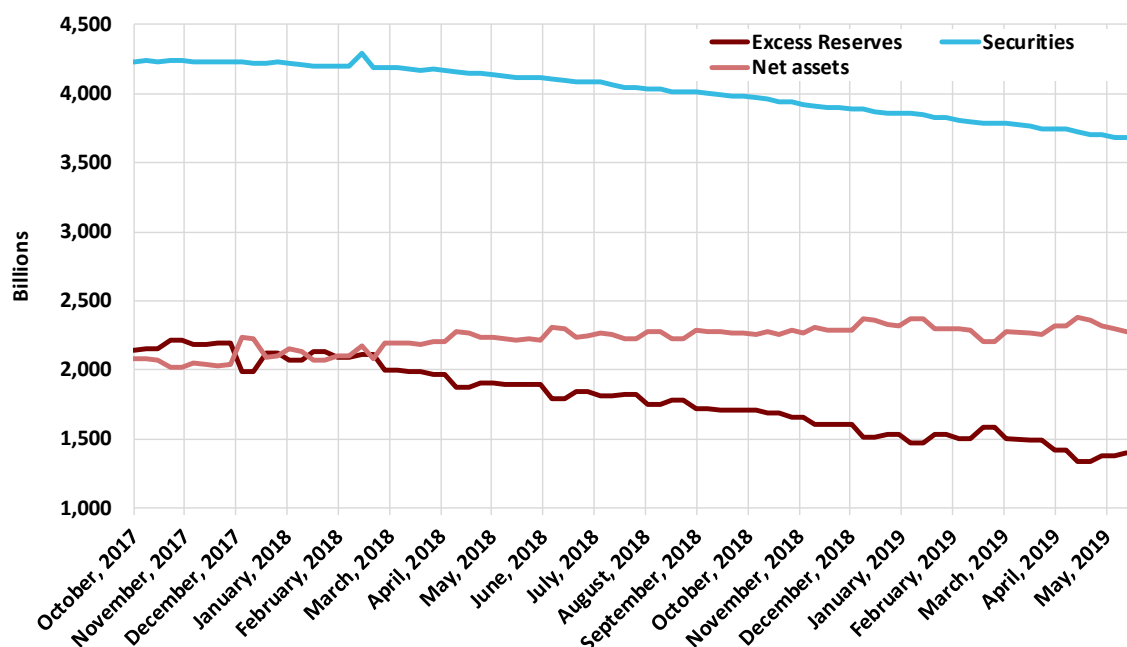
Source: Federal Reserve Board of Governors, Factors Affecting Reserve Balances - H.4.1.

In the past, the Federal Reserve affected the money supply by increasing or decreasing its holdings of assets, usually with treasuries and mortgage-backed securities. But, is this still true? Consider the Federal Reserve asset reductions depicted in Figure 2. In the pre-IOER world with almost no excess reserves, the reduction in reserves that occurs when the Federal Reserve reduces its asset holdings would have forced banks to reduce investments and demand deposits to restore the required ratio of reserves to bank deposits, and the money supply would have fallen.

Today, banks hold a huge quantity of excess reserves, over \$1.4 trillion in April of 2019. In this IOER world, what matters is the change in the Federal Reserve’s net assets, defined here as the difference between Federal Reserve assets and its excess reserve liabilities. Suddenly, Federal Reserve portfolio actions must be compared to what happens to bank decisions concerning excess reserve holdings. If the Fed sells assets and reduces reserves, it now matters how banks deal with this reduction in reserves. Do they reduce required reserves or just reduce excess reserves? In the latter case it is possible that Fed asset sales will result in increases in the money supply if banks reduce excess reserves by more than the Federal Reserve asset sales.

Figure 3 shows the path of Federal Reserve net assets, *securities held outright* less *excess reserves*, since the Federal Reserve began its asset reduction program in October of 2017. Essentially this measure of net assets forms the basis for the monetary base, currency plus bank reserves not invested in Federal Reserve bonds. The reduction in both Federal Reserve holdings of Treasuries and MBSs and the banking system’s holdings of excess reserves is readily apparent in the figure. What is most important is that these asset reductions have not resulted in the reduction of bank required reserves, causing an economic contraction, as would have happened almost automatically before IOER.

**Figure 3.** Federal Reserve Net Assets  
October 25, 2017 to June 5, 2019



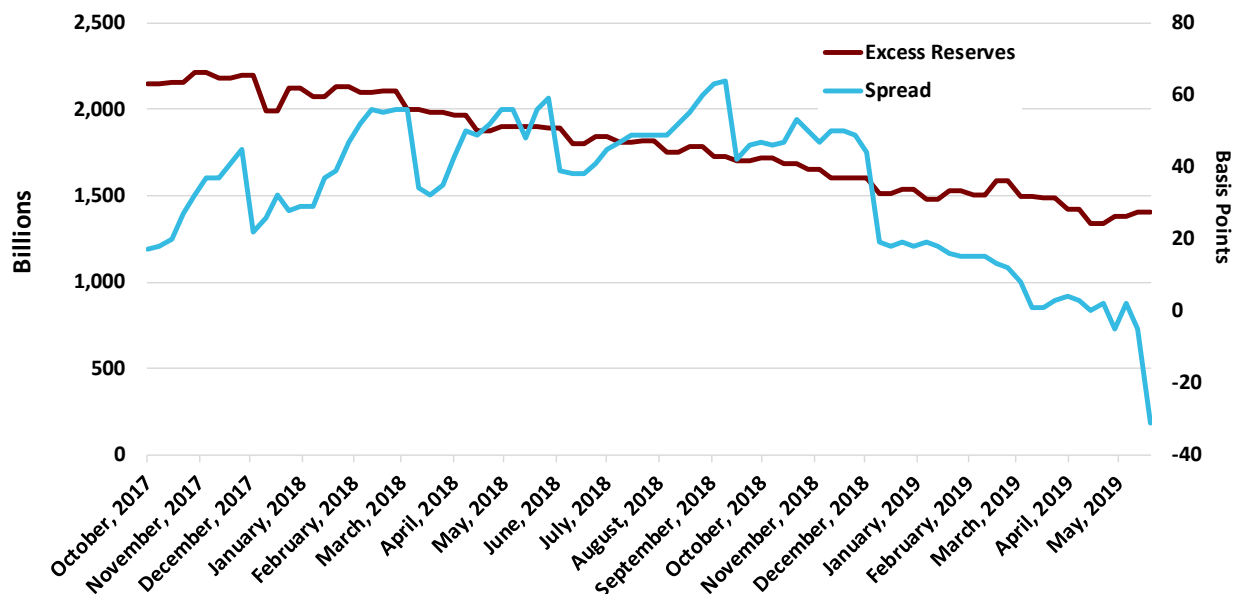
Source: Federal Reserve Bank of St. Louis, FRED

The asset reductions up to June 5, 2019 have totaled just over \$590 billion. Over the same period, excess reserves have fallen by just over \$744 billion. But importantly, excess reserves are now rising. Thus, while Federal Reserve net assets relevant for the monetary base have risen by \$181 billion, just over 9% in 19 months, since early May net assets have been falling. The question is why?

The answer is apparent from an examination of Figure 1, the spread between market interest rates and the IOER has fallen significantly. As a result, the rate of return on bank investment in excess reserves has fallen. To see this clearly, Figure 4 shows excess reserves and the 1-year treasury – IOER spread for the period of the Federal Reserve asset reduction program. The 20 basis point increase in the IOER instituted at the December FOMC meeting is apparent in the figure. As a result of that change and the subsequent fall in market interest rates excess reserves stabilized and net assets stopped rising. At the May FOMC meeting, the IOER was then reduced by 5 basis points. Clearly, given how far interest rate have fallen a much larger reduction in the IOER is called for given the 2% inflation target. In fact what must happen is a 40 to 50 basis point reduction in the IOER.

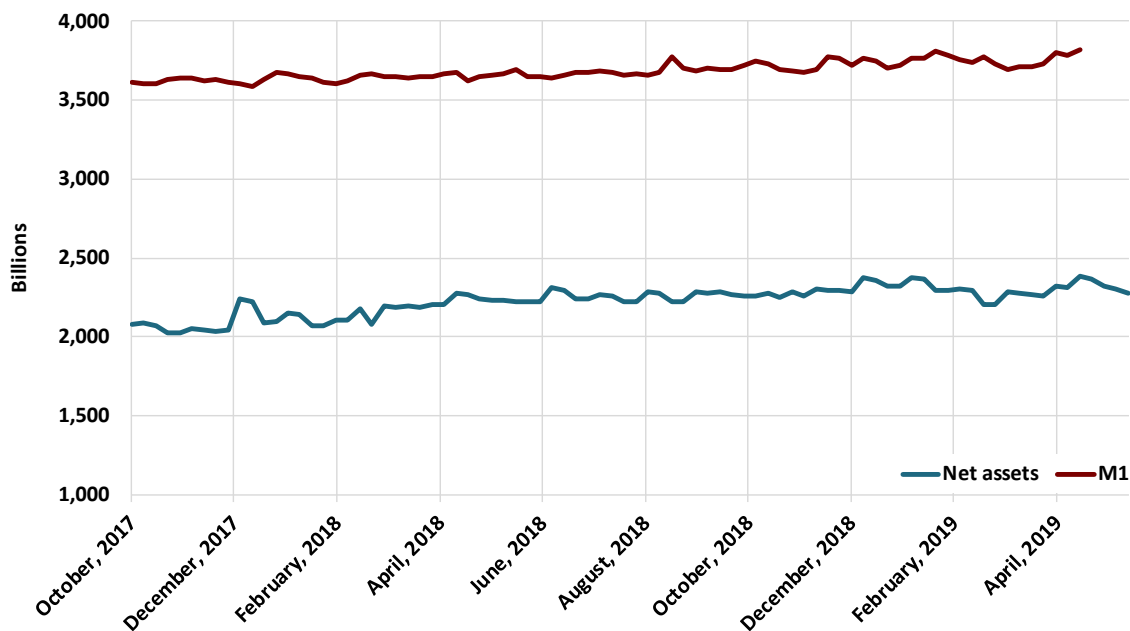
Given the 2% inflation target, what is required to achieve this result is money stock growth that is 2% faster than real GDP growth. Figure 5 shows the relation between the M1 money stock and Federal Reserve net assets that forms the basis for the relevant monetary base. What is clear from the figure is that the growth in both the M1 money stock and Federal Reserve net assets essentially stopped at the beginning of 2019. As Figure 4 shows, these changes have coincided with the rapid fall in the 1-year treasury – IOER spread. This makes it even more apparent that the May reduction in the IOER was much too small if the Federal Reserve intends to continue its asset reduction program.

**Figure 4.** 1yr Treasury - IOER Spread and Excess Reserves



Source: Federal Reserve Bank of St. Louis, FRED

**Figure 5.** Federal Reserve Net Assets and M1 Money Stock  
October 25, 2017 to May 29, 2019



Source: Federal Reserve Bank of St. Louis, FRED

## CONCLUSION

The announcement of the Federal Reserve asset reduction program created concerns that the sales of assets into the economy would negatively affect the money supply and the economy. What are the implications, if any, for the Federal Reserve’s net asset position and therefore on the money supply? First, the asset reduction program did not reduce net assets, but in combination with the rate of reduction in



excess reserves actually resulted in an increase in Federal Reserve net assets and had a positive effect on the money supply and the economy.

The key to everything is the \$1.5 trillion of excess reserves held by the banking system. So long as the Federal Reserve maintains the 'correct' level of interest on reserves, the level of excess reserves should decline at a rate that will maintain the rate of increase in Federal Reserve net assets. If done right, net assets will continue to rise 2% faster than real GDP and the Federal Reserve will achieve its 2% inflation goal. Thus, unlike most of the Federal Reserve's history, changes in Federal Reserve assets will not automatically affect the money supply and economic activity. It is the combination of Federal Reserve asset changes and the banking system's holdings of excess reserves that matters.

The success of the asset reduction program depends on the proper management of the IOER by the Federal Reserve. Now that the IOER and the upper bound of the Fed Funds target are separated this gives the Federal Reserve more leeway in setting the only interest that matters, the IOER. It can change the IOER without any policy statement, as it did in May of 2019.

Today, monetary policy is about the Federal Reserve's net asset holdings, a variable that is not totally under Federal Reserve control. If the Federal Reserve is to achieve its desired 2% inflation, net assets must rise 2% faster than real GDP. This level of change in Federal Reserve net assets can happen whether or not the Federal Reserve is keeping assets at their current level or continuing to engage in the current policy of reducing assets at the rate of \$300 billion per month, as we saw in the recent experience with asset sales. So long as excess reserves fall fast enough, excess reserve changes can cover any reduction in Federal Reserve assets and allow net Federal Reserve assets to grow at the rate required to achieve the 2% inflation goal. The achievement of this goal requires that the Federal Reserve manage the banking system's holdings of excess reserves through the IOER.