



# The Federal Reserve, the Great Recession and the Lost Inflation

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Summary

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Our usual pre-Great Recession theory of the money supply and prices would have suggested that a greater than 20% growth in Federal Reserve assets would result in at least double digit inflation. But none of our dire predictions about inflation happened. In fact, the two measures of inflation, the CPI and the GDP deflator, grew at surprisingly low rates of 1.2% and 1.4% respectively.

The question is why did the predicted inflation not occur? There are at least two potential answers. One, everything we thought we knew about money and prices suddenly became irrelevant. Or, two, we were just ignoring things that made what has happened perfectly consistent with what we used to know.

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## Introduction

Ever since the Federal Reserve began its series of Quantitative Easing (QE), traditional monetary economists have been predicting levels of inflation that would rival the inflation of the late 1970's and early 1980's. The three QEs resulted in a more than quadrupling in the level of Federal Reserve assets in fiscal years 2009-2015. During this seven-year period, Federal Reserve assets grew at an astounding annual rate of about 21%.

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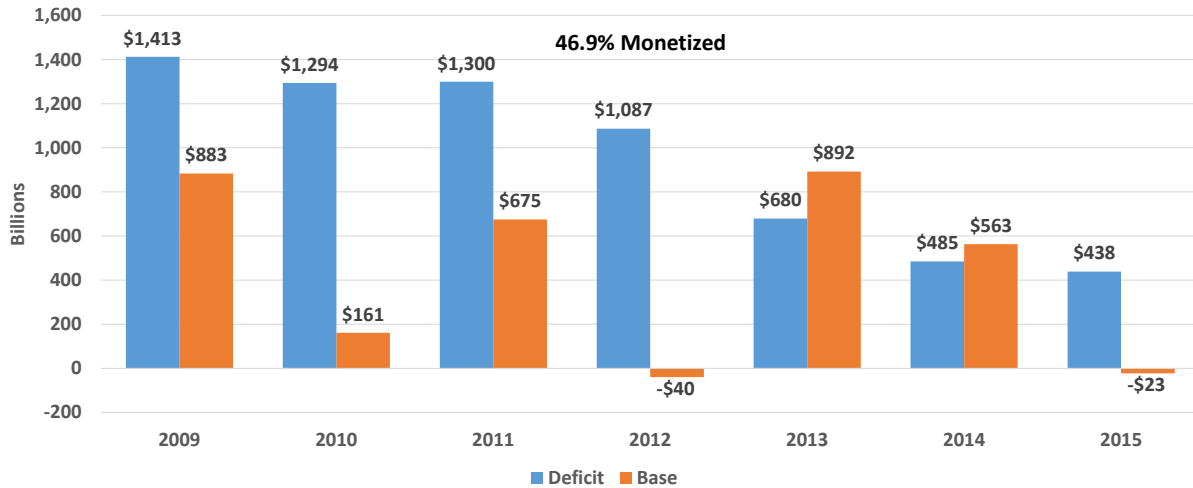
## The Federal Reserve and Monetization of Federal Debt

Up until the beginning of fiscal year 2009, the first decade of this century was similar to other decades of the past half-century at least in terms of Federal Reserve behavior. But then with the onset of the Great Recession, everything seemingly changed. To get a better feel for this dramatic change in policy, consider the 7-year period from October 2008 to October 2015. Both the rate of change in the CPI and real GDP were at historic lows for any similar length period, at least since 1950. Real GDP growth was 1.8% and CPI growth was 1.2%. Moreover, federal deficits for fiscal years 2009 through 2015 expressed both in terms of absolute dollars and as a share of GDP were post-WWII records.

Figure 1 below shows the levels of fiscal year federal deficits and the corresponding changes in Federal Reserve assets, as reflected by changes in the monetary base. The monetary base changes presented in Figure 1 are the result of the changes in the level of Federal Reserve assets.

In general, changes in Federal Reserve assets represent either running the money printing press in the case of increasing assets, or destroying money in the case of Federal Reserve asset reductions. Based on the data in the figure, it appears that for the fiscal 2009 through fiscal 2015 Federal Reserve asset acquisitions financed just under 47% of the federal deficits.

Figure 1. Federal Deficits and Federal Reserve Monetization  
Fiscal Years 2009-2015: Traditional Monetary Base



Except for Federal Reserve responses to the financial crisis, the latter four months of 2008 the increases in the monetary base during this period were the result of increases in Federal Reserve holdings of securities. But the securities held were not all federal debt. The Federal Reserve was buying assets, principally both Treasuries and Mortgage Backed Securities (MBSs). But only their Treasury purchases were directly reducing the level of federal debt held outside the government.

Figure 2: Federal Reserve Holdings - Total and Mortgage Backed Securities

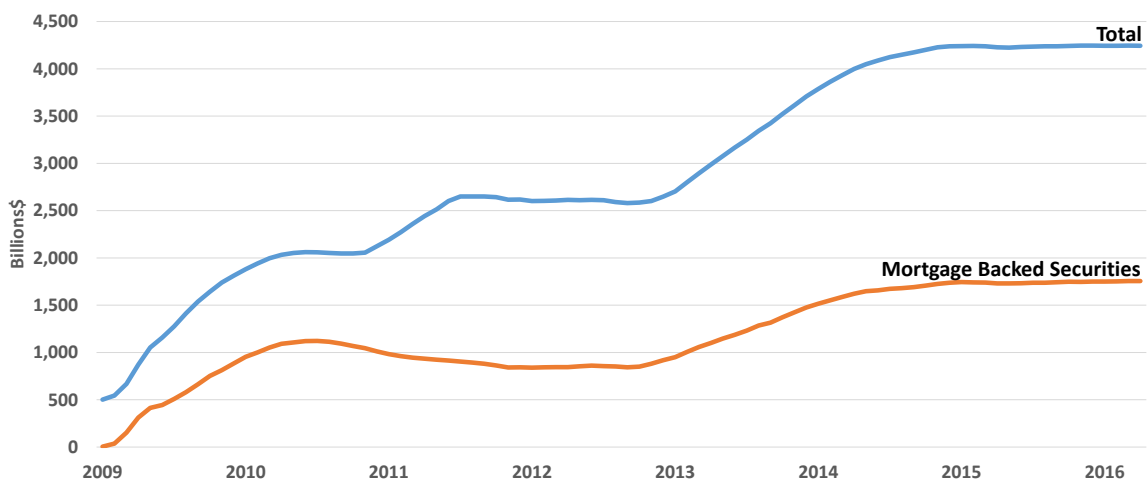


Figure 2 shows the aggregate level of Federal Reserve security holdings and the subset of those holdings that were MBSs. The question is: do Federal Reserve holdings of MBSs contribute in any way to the level of monetization? To solve this puzzle requires analysis of what happens to the revenue from the MBSs. By law, profits of the Federal Reserve after all costs revert to the Treasury. Thus, the Treasury is the residual income recipient of Federal Reserve asset holdings and therefore in one sense at least the Treasury owns the Federal Reserve. As a result, all Federal Reserve earnings on Treasuries and MBSs accrue to the Treasury and reduce the net servicing cost of the federal debt.

**Figure 3. Net Debt Servicing Cost and Federal Reserve Distributions to the Treasury**

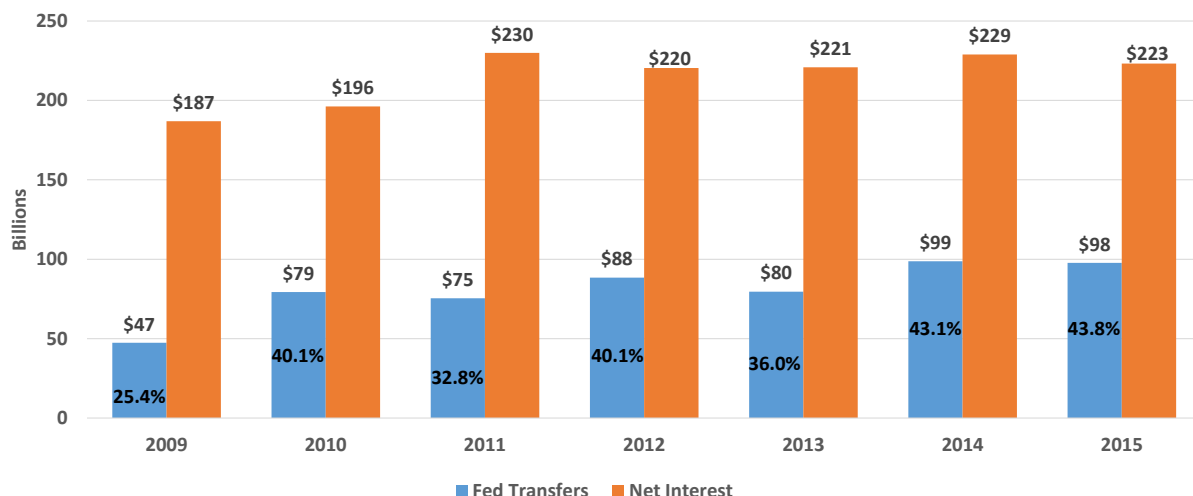


Figure 3 displays the level the net debt servicing cost of the federal debt and the level of Federal Reserve transfers to the Treasury for the fiscal years, 2009 through 2015. Since Federal Reserve holdings of MBSs create income for the Treasury these assets offset federal debt their purchase is equivalent to the Federal Reserve buying Treasuries. As a result, the entire increase in Federal Reserve holdings of securities represent monetization of the federal deficits. Figure 3 shows for fiscal years 2009 through 2015 the level of net debt servicing costs and transfers from the Federal Reserve to the Treasury. For the entire period transfers from the Federal Reserve financed more than 37% of the servicing cost of the debt and over 43% in the last two fiscal years.

Returning to the post-2008 Deficits and Monetization contained in Figure 1, it seemed that the Federal Reserve asset increases did indeed constitute monetization of a significant share of the massive federal debts of this period. But this simple view of the federal debt ignores the fact that the Federal Reserve increased its liabilities almost in step with its increase in assets. The increase in Federal Reserve liabilities was the result of the introduction in October of 2008

of the payment of interest on bank reserves. Essentially, the obligation to pay interest on bank reserves made these reserves a short-term debt of the Federal Reserve. Since all earnings of the Federal Reserve offset the servicing cost of the federal debt, and the interest payments on reserves reduce these transfers by the full amount of the payments, makes bank reserves the equivalent of short-term federal debt. For all practical purposes, the Federal Reserve throughout the QEs was buying long-term federal debt and selling short-term federal debt.

Before interest payments on bank reserves, Federal Reserve actions that increased bank reserves led to an increase in the money supply by a multiple of the increase in reserves. When bank reserves earned nothing, banks moved any excess reserves into market investments, loans, Treasury securities or other investments. This activity increased the money supply by a multiple of the change in reserves. Then, these money supply increases affected the price level. But now these same bank reserve increases represent member bank income earning assets.

### Figure 4: Federal Reserve Holdings - Total and Mortgage Backed Securities

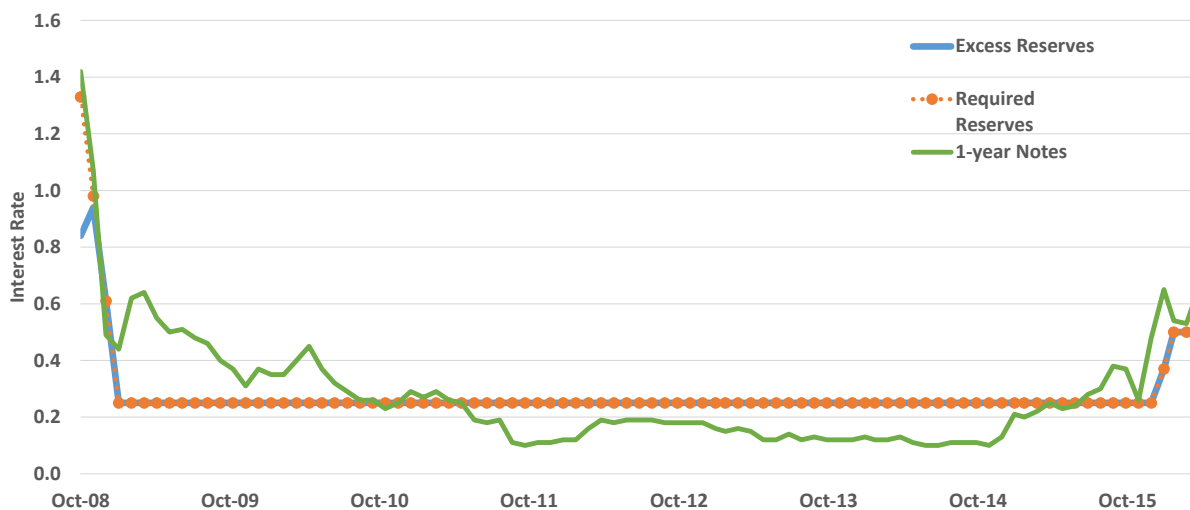


Figure 4 shows the interest rates on required and excess reserves for the period from the beginning of reserve interest payments through the first quarter of 2016. At the onset of reserve interest payments, the rate of return for holding reserves matched the rate on 1-year Treasury Notes. Then for the period from January 2009 until September 2010 the rate of return on the 1-year Notes exceeded the return on reserves. From September 2010 the return to holding reserves exceeded the 1-year Note rate until August 2015. Then in response of rising 1-

year Note rates the interest rate on reserves was raised to 37 basis points and then to 50 basis points.

Importantly, the Federal Reserve sterilized the growth in the base by making reserves a Federal Reserve short-term liability. This sterilization eliminated the normal effect of an increase in bank reserves on the money supply as member banks were paid to hold reserves rather than increase their holdings of economy assets, either loans or securities. Thus, any potential effect of these increased reserves on the money supply was mitigated or eliminated entirely.

During each of the three QEs the Federal Reserve bought long securities in the form of Treasuries and MBSs and created short-term liabilities in the form of bank reserves. As a result, at a minimum the excess reserve component of the monetary base could not contribute to financing the federal debt since it was the equivalent of federal debt.

**Figure 5. Federal Deficits and Federal Reserve Monetization Fiscal Years 2009-2015: Adjusted Monetary Base**

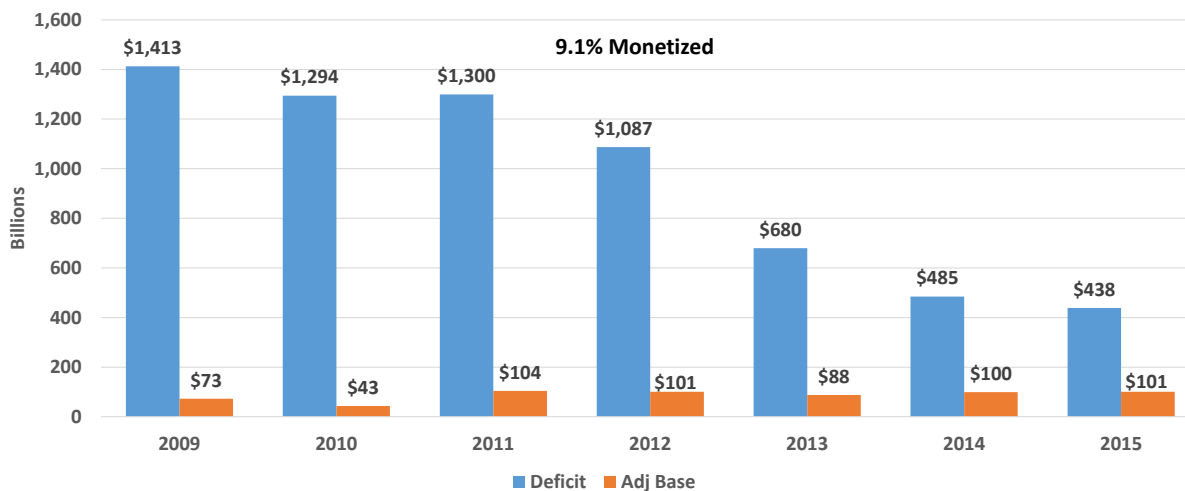


Figure 5 amends Figure 1 by netting out any increase in Federal Reserve liabilities stemming from member banks excess reserve holdings. Essentially, it accounts for the inclusion of the increase in Federal Reserve liabilities, i.e., bank reserves, as an offset to Federal Reserve asset growth.

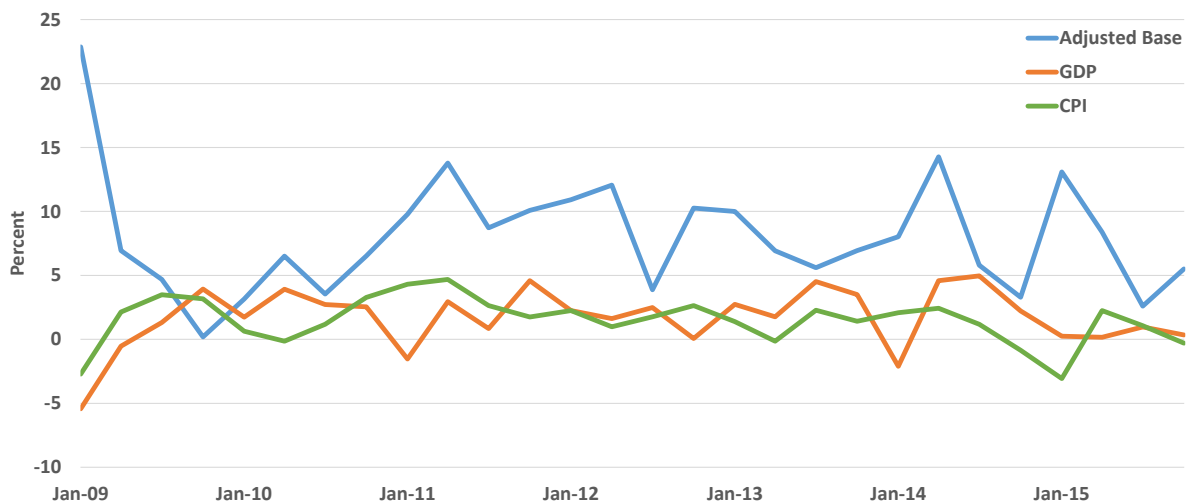
## The Federal Reserve, the Great Recession, and the Lost Inflation

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The Adj Base series in Figure 5 is the difference between traditional monetary base growth and the growth in excess reserves for each fiscal year. This difference then is an estimate of the actual level of monetization of each fiscal year deficit. Using this measure of net Federal Reserve involvement in financing federal deficits for the entire seven fiscal year period the level of deficit monetization was just over 9%.

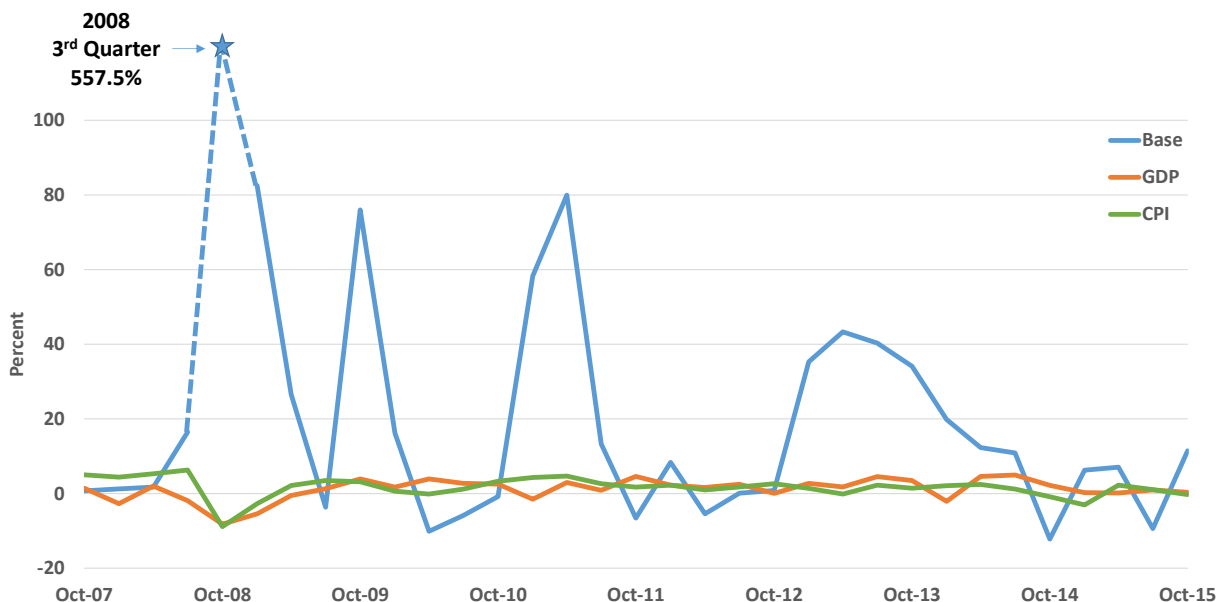
Thus, in spite of the tremendous annual growth in the traditional monetary base of 15.7% the annual inflation rate for the entire period averaged between 1.2% and 1.4% measured in terms of either CPI or GDP deflator growth. For the period fiscal 2009 through 2015 the adjusted monetary base grew at 7.5%. And as mentioned, for the same seven-year period real GDP grew at a slow rate of 1.8%. These seven year growth rates leave us with an unexplained lack of inflation since the difference between adjusted base growth rate and the real GDP growth rate is just under 6%.

Figure 6: Adjusted Monetary Base, CPI, and Real GDP Growth



To illustrate these differences, Figure 6 presents the rate of change in the adjusted base, real GDP and the CPI. The above figure's representation of the path of monetary policy during the Great Recession is based on the monetary base growth adjusted for the transition of excess reserves to the short-term equivalent debt. In contrast, for a depiction of this path without adjusting for this transition of funds, consider the following figure.

Figure 7: Monetary Base, CPI, and Real GDP Growth



A simple glimpse at Figure 7 indicates an astounding feature of this really unique period. In no period of the history of the Federal Reserve has there been growth in the monetary base that was so variable. During the 7 year period from the 3<sup>rd</sup> quarter of 2008 through the 3<sup>rd</sup> quarter of 2015, a period of 28 quarters there were nine quarters with annual monetary base growth rates exceeding 30%. The period as a whole experienced annual growth in the monetary base of 15.7%.

### Is there an Inflation Mystery?

Considering the virtual unprecedented rate of monetary base growth following the onset of the Great Recession, the usual economic projection would have been inflation to match. So the natural is: what happened? In a simple world of constant currency to deposit and bank reserve ratios the rate of change in any of the popular definitions of money would equal the rate of change in the monetary base. It is just this growth in the monetary base that represents the Federal Reserve's effect on the economy through its effect on the money supply, however defined. So in a simple world the 15.7% rate of growth in the monetary base of the last seven years should have, but did not, result in the significant inflation that many economists predicted. Why did this not happen?

First, consider the traditional equation of exchange that relates the rate of change in money to the rate of change in prices adjusting for both velocity growth and real GDP growth. This equation can be expressed as,  $\pi = \mu + v - g$ . Essentially the rate of inflation,  $\pi$  must equal the



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rate of growth in the money supply,  $\mu$ , plus the rate of growth in the velocity of money  $v$  minus the rate of growth in real GDP,  $g$ . For this seven-year period, the rate of growth in the expanded definition of the money stock, M2, was 6.3%, much less than the 15.7% rate of growth in the monetary base. For this same period the GDP velocity of M2 fell at a rate of 2.9% and real GDP grew at 1.8%. The result using the simple equation of exchange is an inflation rate of 1.6% just larger than the measured rate of inflation of the GDP deflator of 1.4%.

Second, what is the reason for the disparity between the 15.7% rate of monetary base growth and the much smaller 6.3% growth in M2? Here the answer lies in the change in the nature of the monetary base, in particular, the reserve component. Traditionally when the Federal Reserve increases its asset holdings, as they did during the three periods of quantitative easing, QE1, QE2, QE3, the proceeds of these purchases became bank reserves. Then since these now excess reserves earned nothing banks put them to use by increasing loans or security holdings.

But this changed in October of 2008 when the Federal Reserve began paying member banks interest on their reserve holdings. Reserves were now investments. In this new world while both kinds of reserves, required and excess, pay interest only excess reserves are truly investments of choice for banks. As a result, for purposes of bank money creation, only required reserves matter.

Figure 8: Monetary Base, M2, Multiplier

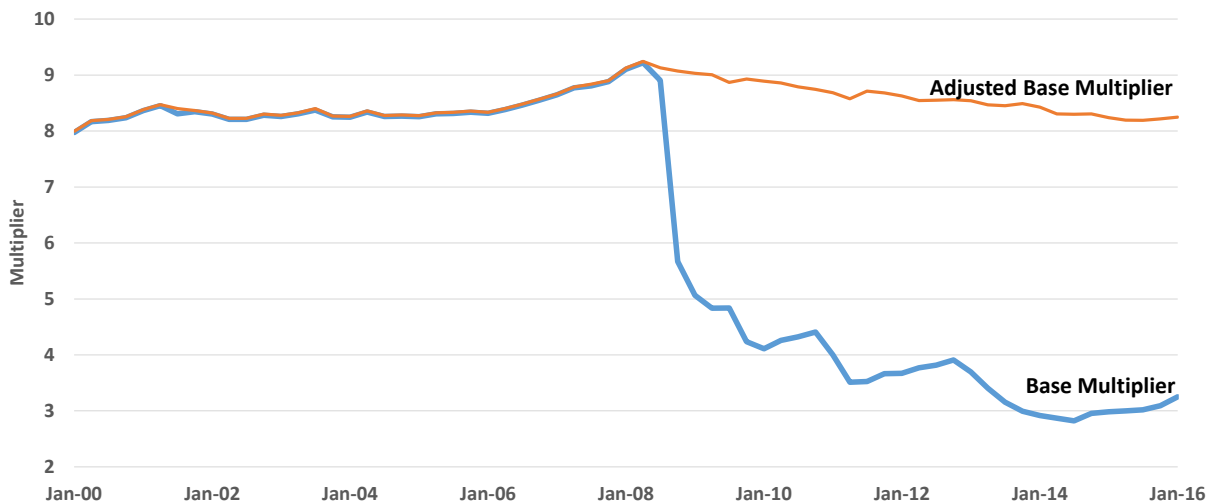


Figure 8 depicts the M2 base multiplier for total reserves and for reserves adjusted for the investment component of bank reserves. The adjustment is a simple reduction in total reserves by the amount of investment excess reserves. Since excess reserves before the payment of

interest on reserves were for all practical purposes zero, the two multipliers were virtually identical. However once we get to October 2008, the traditional M2 base multiplier falls off the chart while the M2 adjusted base multiplier remains almost unchanged.

So, in simplistic terms, what happened to inflation was a remarkable reduction in the velocity of money coupled with a reduction in the effect of the monetary base on the supply of money. Understanding what happened brings two perplexing issues into focus. First, did everything we thought we knew about how the monetary system worked become wrong at the beginning of the fourth quarter of 2008? Second, if not, then why did an unprecedented expansion of Federal Reserve assets not have any real effect on the economy?

The answer to both these questions is the introduction of interest payments on bank reserves. These interest payments on bank reserves created investment opportunities for banks that did not involve the economy. Simultaneously, interest payments on reserves created liabilities on the Federal Reserve balance sheet.

Prior to these interest payments, the largest Federal Reserve liability was currency. But currency could not be considered a liability in any real sense. To see this point, consider what you get when you bring currency to the Federal Reserve. You just get replacement currency. The Federal Reserve gets real resources when it issues currency, just as you would if you issued a personal bond, i.e., borrowed money from a bank. The difference is that you would be required to pay back the loan with interest, that is give up something real, while the Federal Reserve never has to pay back anything.

In this new world of interest payments on reserves, the asset purchases of the Federal Reserve have suddenly been financed, at least partially, by issuing debt. Moreover, this new debt has real consequences because all Federal Reserve earnings accrue to the Treasury. Thus, the interest payments on reserves reduce Federal Reserve transfers to the Treasury. These reduced transfers increase the cost of servicing the federal debt and ultimately increase the federal debt burden.

What is clear is that many economists, myself included, ignored the importance of paying interest on reserves as a game changer in the inflation arena. We warned about the almost certain prospect of double digit inflation as the asset portfolio of the Federal Reserve grew at a double digit rate of just over 20%. In reality, its portfolio net of increased liabilities grew at a much more modest rate of 9.9%. Over this same period the adjusted for liability base grew at 7.5%, just slightly greater than the M2 growth rate of 6.3%. But the inflation specter can come back with a vengeance should the Federal Reserve abandon paying market interest rates on bank reserves. This payment of interest on reserves has fundamentally changed our view of monetary policy.

## **Conclusion**

In the end, then there is no mystery concerning the missing inflation. Further, there is nothing wrong with our more than century old understanding of the effect of monetary base changes on the money supply in a fractional reserve banking system. Many of us were just asleep

at the Federal Reserve wheel and ignored the impact of paying banks to hold reserves at rates that were competitive with what the market had to offer. It is no surprise then that the combination of the velocity of money falling as the cost of holding money fell to near zero and the payment of interest on reserves giving the banks no incentive to invest in the economy resulted in near zero inflation.

The unprecedented increase in Federal Reserve assets associated with QE1, QE2, and QE3 seemed to imply that the Federal Reserve financed over 40% of the periods federal deficits. Such a massive spree of running the Federal Reserve money printing press should have given us the double digit inflation we were all so certain was imminent. However, the simultaneous creation of the equivalent of federal liabilities all but negated the Federal Reserve's effect on federal debt financing. So, in the end, the Federal Reserve's role in financing the federal deficits was on the same order as a share of the deficits in WWII and the Reagan 1980's in the range of 9.1%.

### About the Author

**Thomas R. Saving** is the Director of the Private Enterprise Research Center at Texas A&M University. A University Distinguished Professor of Economics at Texas A&M University, he also holds the Jeff Montgomery Professorship in Economics. Dr. Saving received his Ph.D. from the University of Chicago and served on the faculty at the University of Washington at Seattle and Michigan State University before moving to Texas A&M University in 1968. Dr. Saving's research has covered the areas of antitrust economics, monetary economics, and health economics. He has served as a referee or as a member of the editorial board of the major United States economics journals, and as co-editor of *Economic Inquiry* from 1997-2006. His current research emphasis is on the benefit of markets in solving the pressing issues in health care and Social Security. He is the co-editor of *Medicare Reform: Issues and Answers*, University of Chicago Press, 1999, and the co-author of *The Economics of Medicare Reform*, W.E. Upjohn Institute, 2000, and *The Diagnosis and Treatment of Medicare*, AEI, 2007. In addition, he has many articles in professional journals and two influential books on monetary theory. Dr. Saving has been elected to the post of President of the Western Economics Association, the Southern Economics Association and the Association of Private Enterprise Education. In 2000, President Clinton appointed Dr. Saving as a Public Trustee of the Social Security and Medicare Trust Funds; he served as Trustee until 2007. He also served on President Bush's bipartisan Commission to Strengthen Social Security.