



PRIVATE ENTERPRISE
RESEARCH CENTER
TEXAS A&M UNIVERSITY

POLICY STUDY

THE FEDERAL RESERVE IN TWO CRISES

Thomas R. Saving
PERC Policy Study 2004
November 2020

SUMMARY

The nation has experienced two economic crises in the first two decades of the 21st century. In both, the Federal Reserve responded in order to offset the financial effects of each crisis. Here, I report the actions of the Federal Reserve and evaluate its responses to different aspects of each crisis.

We know now that the tremendous increase in Federal Reserve assets that accompanied the 2008 financial crisis did not result in inflation. But there are significant differences in that episode and the 2020 crisis caused by the pandemic.

First, the level of asset increases in the 2008 crisis occurred over an extended period, ending only at the close of 2014. The asset increase in the 2008 crisis totaled \$3.6 trillion, a 387% increase in Federal Reserve assets over 6.25 years. In just 7-months, the 2020 pandemic asset increase has totaled \$2.6 trillion in securities and \$2.9 trillion in total assets, or just over a 60% increase.

Second, when the 2008 financial crisis occurred, the nation was in a recession that began in the fourth quarter of 2007. At the onset of the 2020 crisis in March, the nation was in a boom that began in 2017. In fact, just before the government-ordered shutdown of the economy, the unemployment rate was at a three-decade low of 3.5%. This record low unemployment rate is remarkable because it was accompanied by rising labor force participation. Thus, while unemployment rates had been on the decline since 2010, much of that decline was due to falling labor force participation. Adjusted for labor force participation, the unemployment rate was actually increasing during much of that time. Further real GDP growth was at 2.5% as compared to negative real GDP growth at the beginning of the 2008 financial crisis.

The important question that cannot yet be answered is: can the Federal Reserve undo the tremendous increase in its assets in a way that allows the economy to return to normal growth without significant inflation? While this is as yet unknown, the comparison of the Federal Reserve response to the two crises points to possible avenues that will allow the culmination of the second crisis to be one of a return to economic growth without double-digit inflation.

Founded in 1977 through the generosity of former students, corporations and foundations, the Private Enterprise Research Center pursues a dual mission of supporting academic research at Texas A&M University and developing market-oriented solutions to public policy problems.

Read the latest publications at perc.tamu.edu

CONTACT US

Private Enterprise Research
Center
Texas A&M University
4231 TAMU
College Station, TX 77843-4231
(979) 845-7559
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/>

THE FEDERAL RESERVE IN TWO CRISES

INTRODUCTION

Central banks have a long history of successfully dealing with financial crises. But before discussing the two most recent financial crises, a brief description of the characteristics of such a crisis would be helpful. A financial crisis occurs when the public desires to change the composition of their assets from a pre-crisis risk composition to a more secure composition. In the crises of the 19th century, this drive to safe assets was accomplished by converting bank deposits to cash. The result was a run on the banks and the financial system coming to a standstill.

The solution to such a crisis was to flood the market with liquidity, but how? This is where a central bank comes in because it owns the money printing press. In a financial crisis, the central bank helps banks convert the assets that underlie their deposits by lending them currency based on those bank assets. Once the public sees that the banks have the currency they want, they no longer want it and the crisis goes away. Then the banks buy back their assets from the central bank.

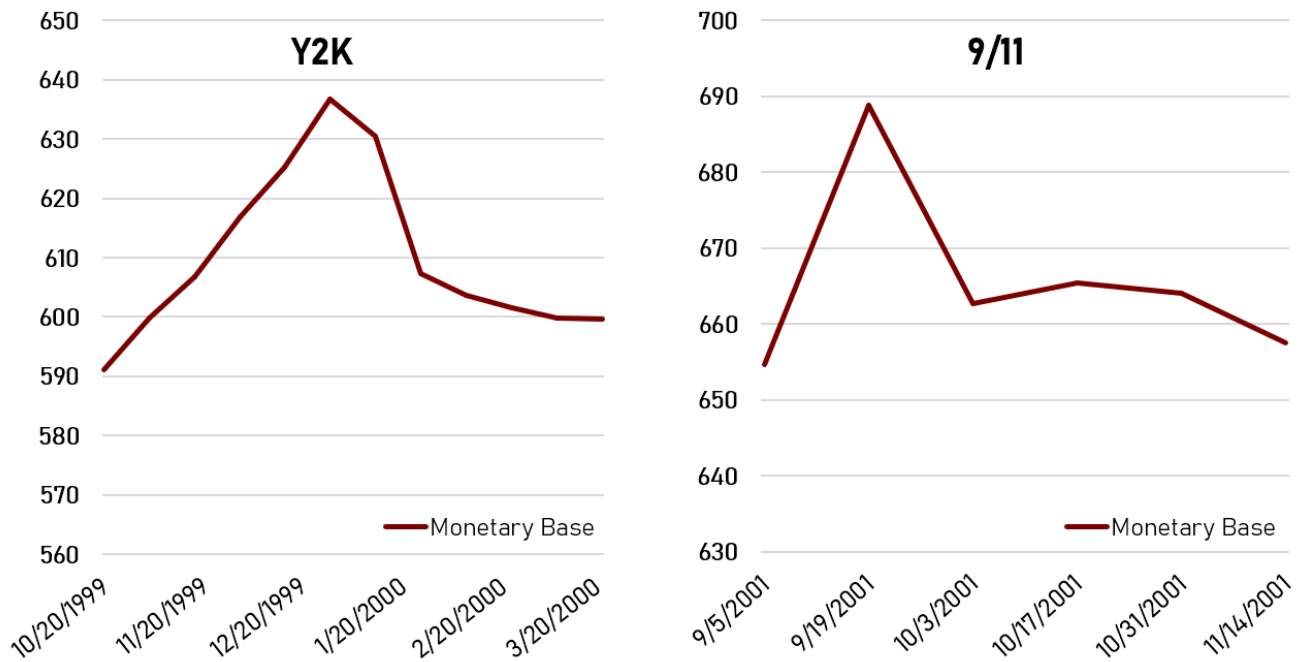
In fact, it was just such a crisis in 1908 that led to the establishment of the Federal Reserve. The importance of a financial system that is flexible in converting one form of asset into another was what led to the passage of the Federal Reserve Act in 1913. In the preamble to the Act is the phrase “to provide an elastic currency,” meaning to provide for the banking system to be able to convert bank deposits into currency in times of financial crises.

I consider here the two most recent crises. First, the financial crisis surrounding the September 2008 collapse of the mortgage backed securities market. Second, the financial crisis following the Covid-19 pandemic-induced economic shutdown. As I write this, the second of these crises is still ongoing.

FEDERAL RESERVE ACTIONS WHEN THE PUBLIC DEMANDS LIQUIDITY

While these last two crises are the most significant since perhaps World War II, there have been a number of smaller crises that, absent the Federal Reserve, would have been financial panics. Figure 1 shows the path of the monetary base for the two most recent financial market panics. Both of these temporary panics were caused by fear that financial markets would shut down making liquid assets unavailable. That fear made the public want currency instead of deposits and could have created a run on banks. Episode one, labeled Y2K in the figure, occurred as the economy was about to transition to the 21st century. It was feared that the computers necessary for the working of the financial system would shut down when the date changed from the 1900s to 2000. The second, labelled 9/11 in the figure, was the result of the fear that the September 11, 2001 attack on the World Trade Center might be the harbinger of a general conflict.

Figure 1. Two Traditional Central Bank Liquidity Crisis Responses
 \$Billions of Monetary Base



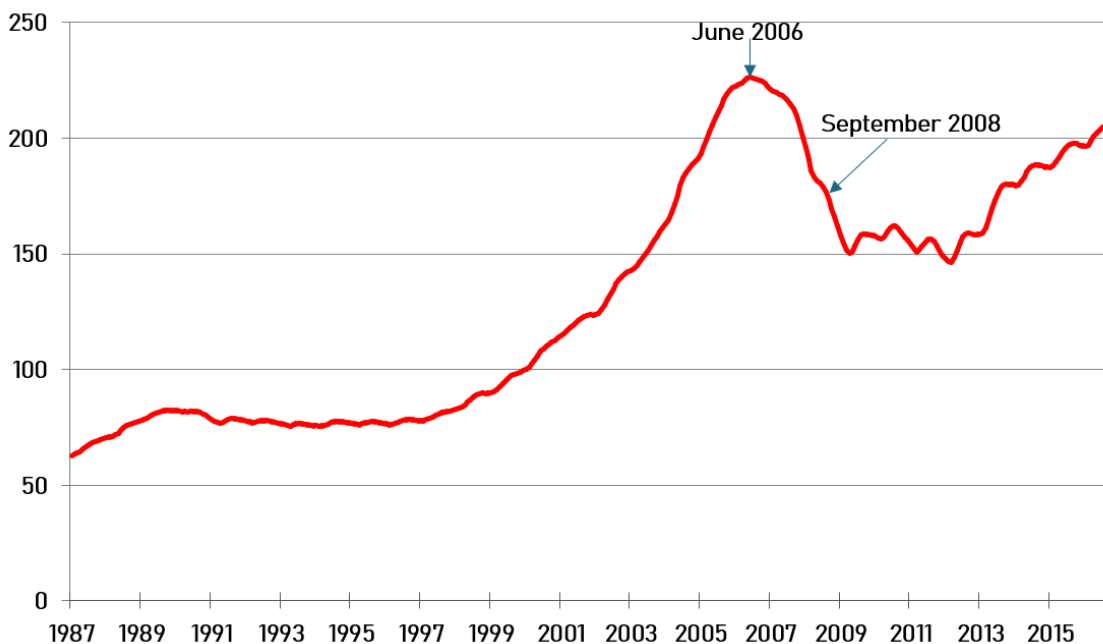
In each of these crises, the response of the Federal Reserve was to increase the monetary base in order to provide liquidity to the economy. In the Y2K crisis, the increase was gradual and began in October of 1999 and peaked at the end of December. Once we proceeded to the year 2000, it was apparent that nation’s computer systems were not going to self-destruct, so that by mid-January most of the monetary base increase was eliminated. In contrast, the speed of the Federal Reserve’s response to the 9/11 terrorist attack was almost instantaneous, which was necessary because the attack was unanticipated. The important takeaway here is that financial crises can be dealt with by both rapid and temporary Federal Reserve actions.

The above two examples of normal liquidity crises, although perhaps no liquidity crisis is “normal”, demonstrate the tremendous value of having a central bank. But it is one thing to quell a sudden shift in the public’s desire to move to liquidity but quite another to deal with massive financial crises. The 2008 and 2020 crises are two examples of central bank actions that were unprecedented but effective in preventing the collapse of financial markets. In both cases, the Federal Reserve did more than just flood the market with liquidity. It actually entered private financial markets to stabilize them and in doing so, actually made significant profits.

FEDERAL RESERVE ACTIONS IN THE FIRST ECONOMIC MELTDOWN

The 2008 financial crisis occurred during an economic recession that began in December of 2007. Even before the financial crisis that began in September 2008, the Federal Reserve was involved in the threatened failure of two of our nation's longest-lived banks, Lehman Brothers and Bear Sterns. Both firms were heavily involved in the sub-prime asset-backed securities markets. As Figure 2 shows, housing prices began falling in June of 2006, eliminating the profitability of house-flipping for sub-prime borrowers. Since these mortgages were the basis for the sub-prime asset-backed securities, only a reversal of the housing price trend would have rescued this part of the asset-backed securities market. Eventually, Bear Sterns was sold to JP Morgan Chase but the Federal Reserve failed to rescue Lehman Brothers which filed for bankruptcy on September 15, 2008.

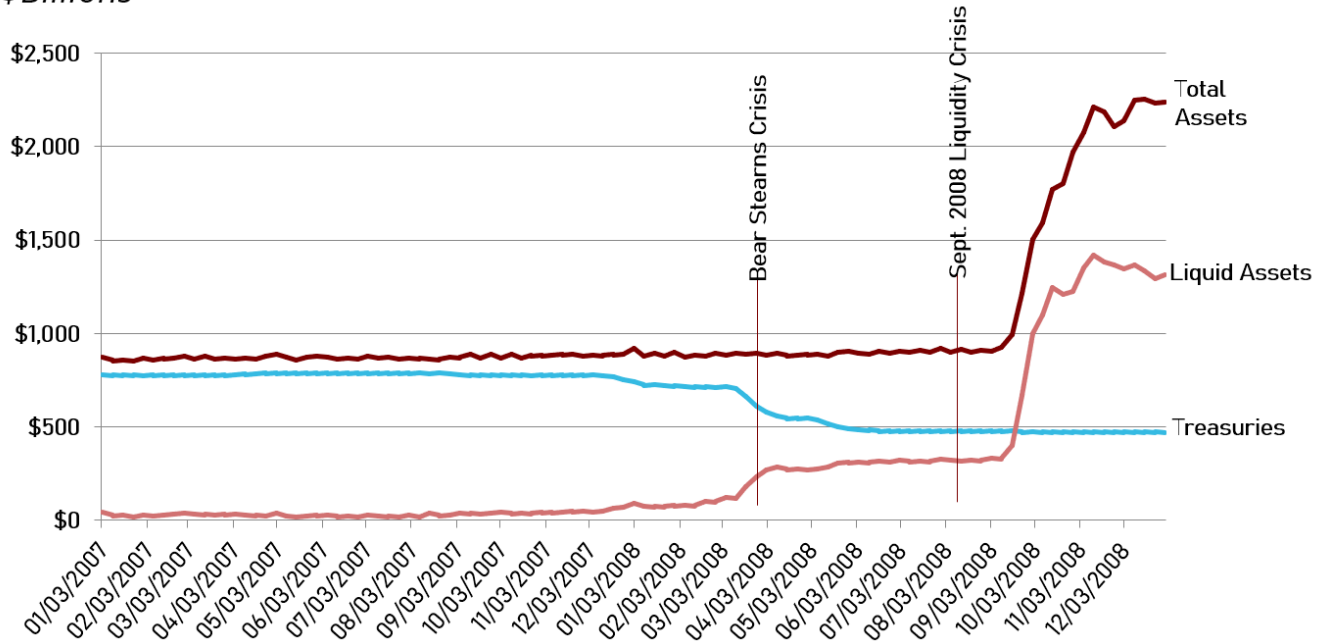
Figure 2. Real Housing Price Index – Top Ten Markets



Source: Standard and Poor's: S&P Case-Shiller Home Price Indices, January 2000 = 100.

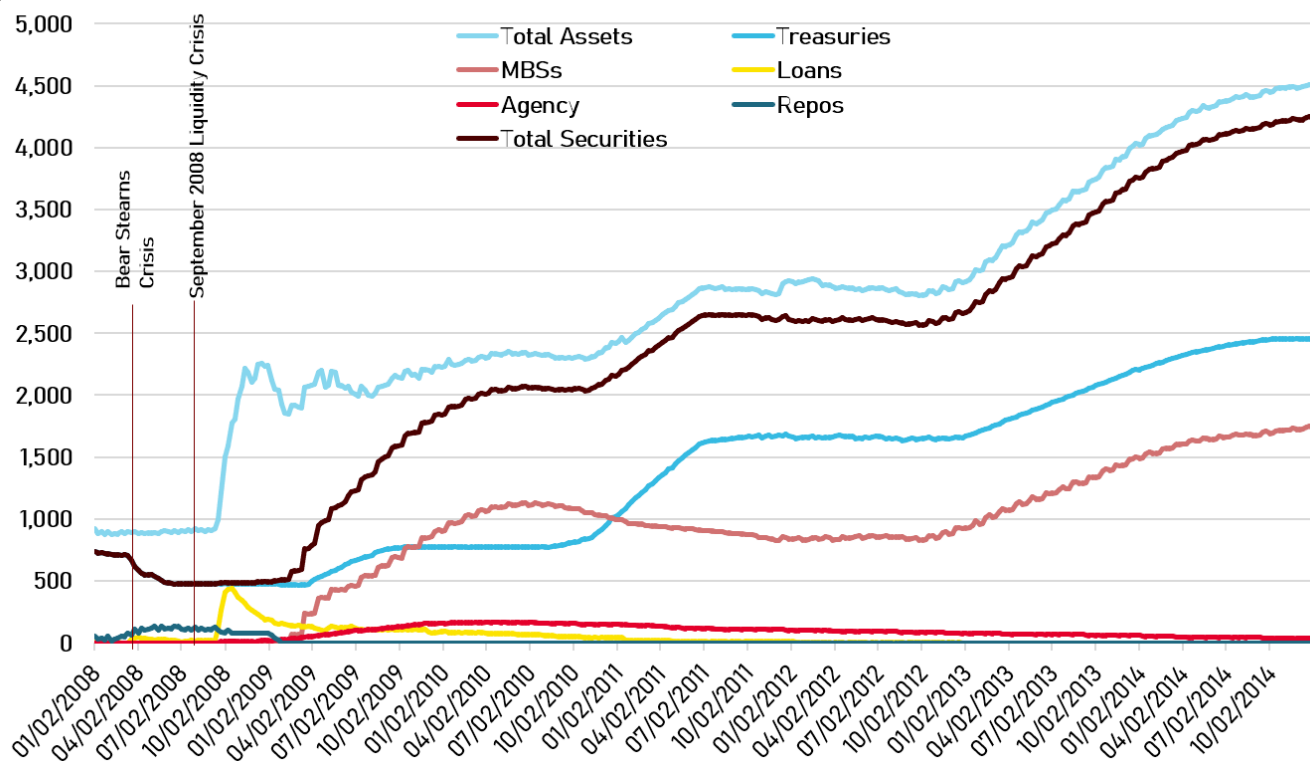
Although the sub-prime asset-backed securities market was in trouble by the beginning of 2007 after six-months of falling prices, the final end was the total collapse of the mortgage-backed securities market in September 2008. The Federal Reserve was very involved in limiting the effects of the pending financial crisis as early as the beginning of 2008. Unlike the current Covid-19 surge in treasury assets, the early Federal Reserve economic support was not an increase in its total assets but a restructuring of the asset portfolio with smaller holdings of Treasuries and increased holdings of liquid assets. Figure 3 shows the path of Federal Reserve assets from the beginning of 2007 through the end of 2008. Here it is easy to see that the early involvement of the Federal Reserve was a transition from Treasuries to liquid assets. Total Federal Reserve assets only increased when the real crisis hit in September 2008.

Figure 3. Federal Reserve Asset Responses to the Recession
\$Billions



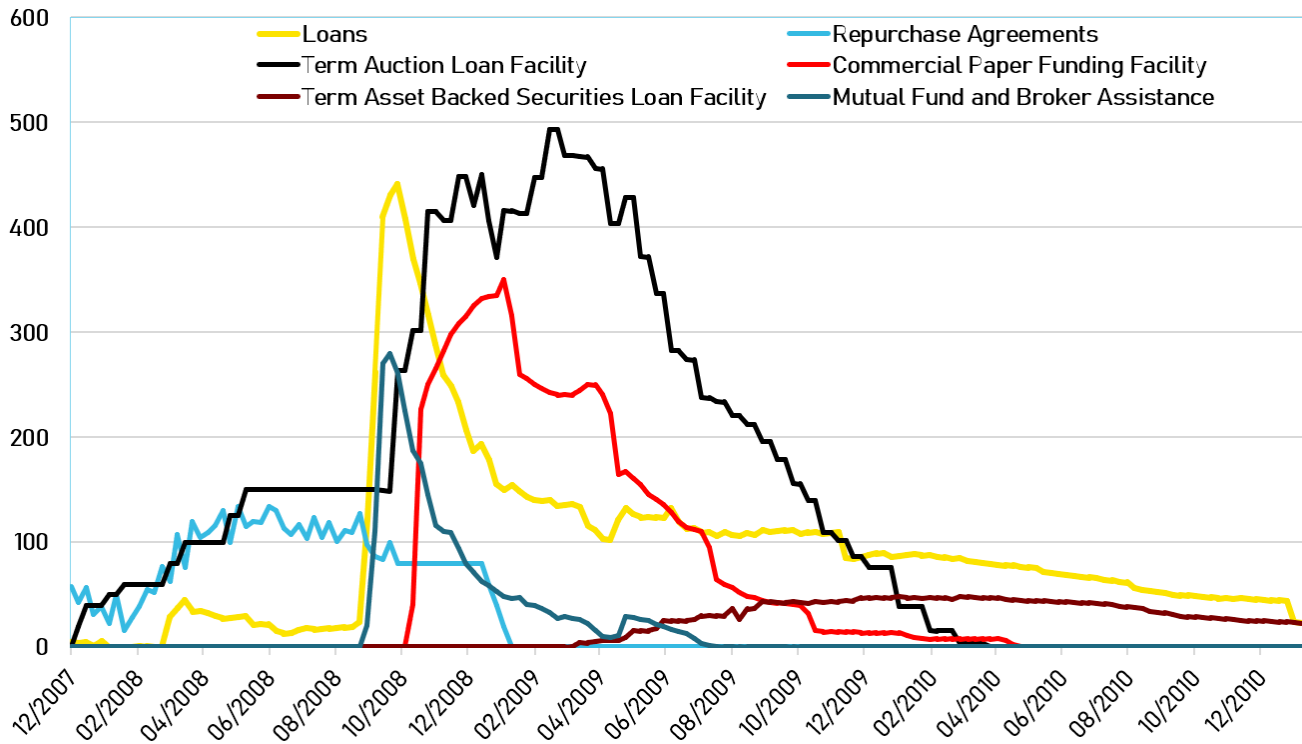
The liquid asset response depicted in Figure 3 was composed of exactly the type of responses that many are concerned about with the Covid-19 Federal Reserve response. Figure 4 shows some details of these early asset responses, sometimes labelled QE1, that preceded the subsequent two periods of quantitative easing (QE2 and QE3). The figure clearly shows that it was not until well into the first quarter of 2009 that the Federal Reserve began to expand its securities holdings and reduce the early liquidity responses. At the same time, this increase in securities holdings included mortgage-backed securities, (MBSs), in addition to Treasuries. The initial asset expansion ended February of 2010 and assets stabilized. The start of the second asset expansion, QE2, in November of 2010 is noticeable as both Treasuries and MBSs rise rapidly. That expansion lasted until June of 2011. Then the last expansion, QE3, began in October 2012 and lasted until the end of 2014.

Figure 4. Total Assets, Total Securities, Treasuries and MBSs, January 2008 to January 2015
\$Billions



There is much talk that the Federal Reserve’s response to the Covid-19 crisis is totally unprecedented. However, as Figure 5 shows, the Federal Reserve’s response to the 2008 crisis was much more than just an asset response. They quickly expanded their ability to provide financial institutions with liquidity by instituting the Term Auction Loan Facility. This facility allowed financial institutions to bid for liquidity loans at rates determined in the auction. At its maximum, it reached almost \$500 billion at a time when total Federal Reserve assets were just over \$2 trillion. Loans expanded rapidly and consisted primarily of Mutual Fund and Broker Assistance and Commercial Paper Market Funding. The Federal Reserve also established a facility to assist the asset-backed securities market. These securities are similar to MBSs but are backed by consumer loans, auto loans and others. These actions were, for all practical purposes, concluded by the close of 2010.

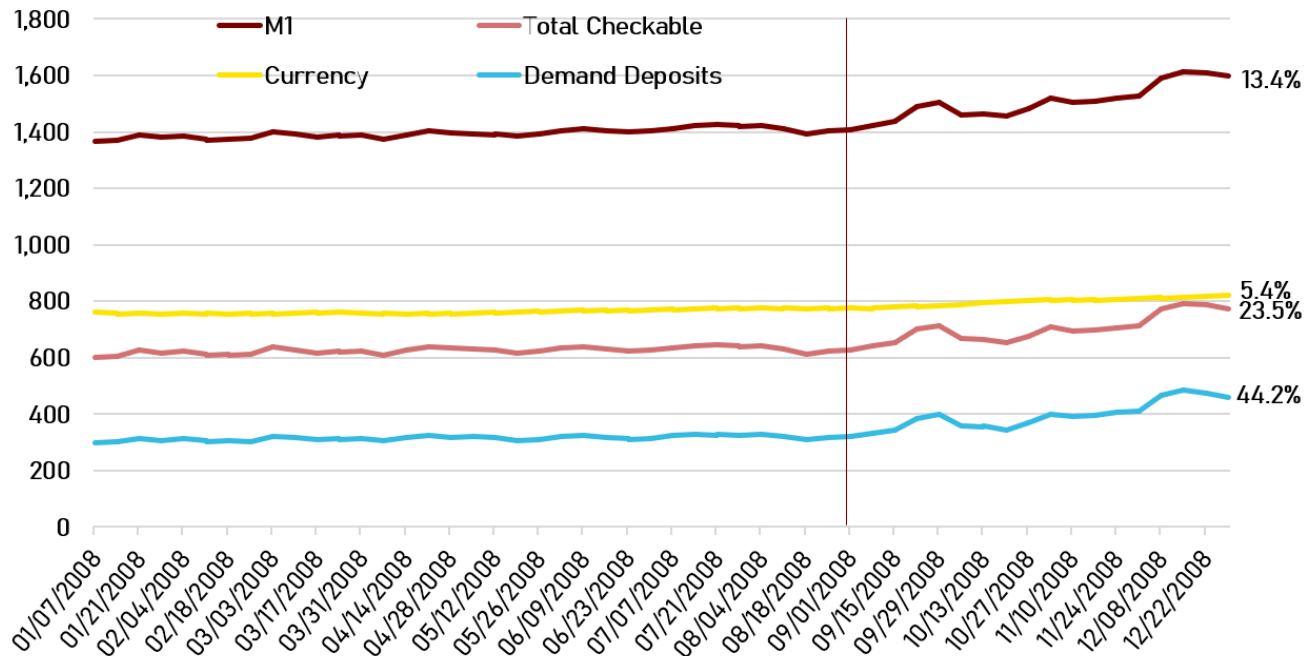
Figure 5. Early Great Recession Interventions,
January 2008 to January 2011
 \$Billions



As a summary of the effect of the Federal Reserve’s 2008 crisis response on the economy, Figure 6 show the its effect on M1 money stock and its components during the early part of the crisis response. The vertical line in the figure represents September 2008. The components of M1 grew significantly in the four months from September through December 2008. The figure displays the four-month percentage growth in M1, checkable deposits, demand deposits and currency. Annualizing the displayed growth shows that M1 grew during this four-month period at an annual rate of 46%! Clearly continued growth of anything resembling level would have created an inflation disaster. But we know that this inflation did not happen because the payment of interest on excess reserves removed much of the increase in the monetary base necessary for M1 growth. In addition, the low interest rates that followed the crisis resulted in falling money velocity and reduced the inflationary effect of the monetary growth.

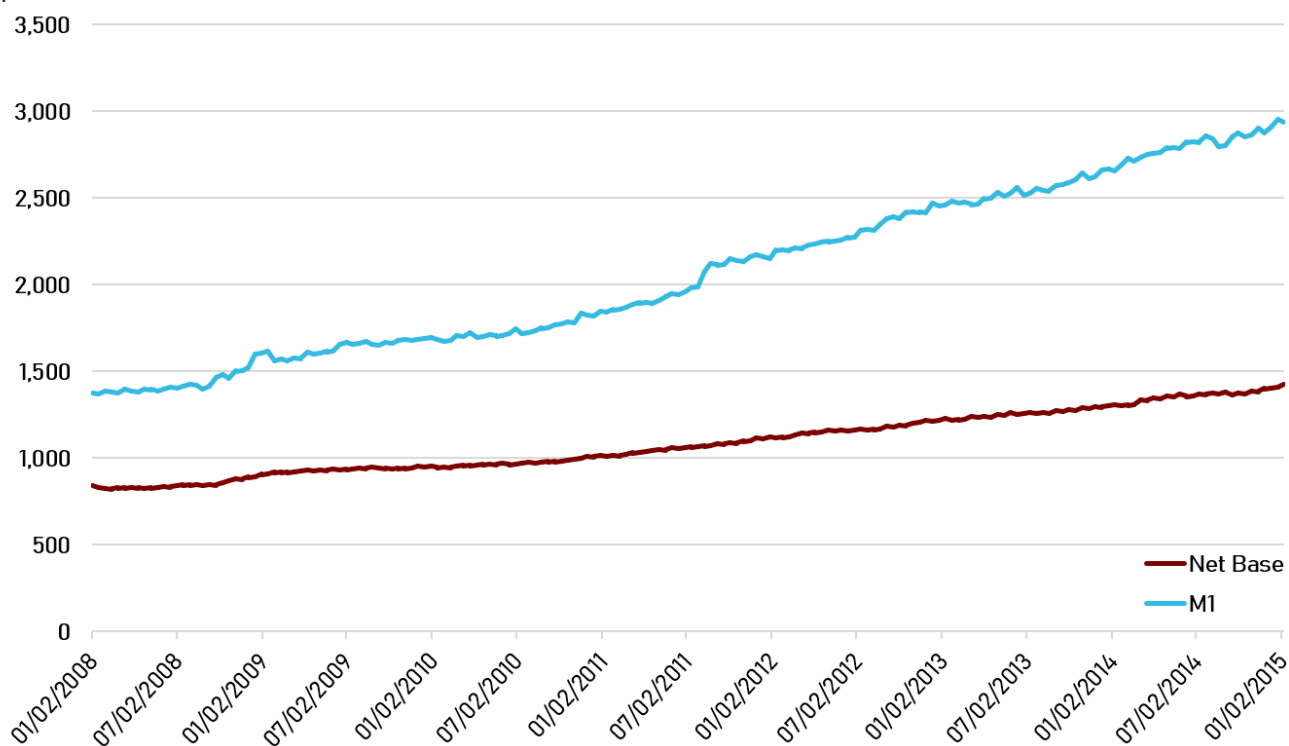
Figure 6. M1 and Components
 January 2008 - January 2009

\$Billions



We know that the rapid growth in the M1 money supply that occurred in the early stages of the 2008 Federal Reserve asset expansion did not cause continued growth in the money supply or inflation. Figure 7 shows the growth in the monetary base, currency plus reserves, adjusted for the fact that much of bank reserve holdings were investments and not eligible for money creation. The brief surge in money growth depicted in Figure 6 is also evident in Figure 7. However, that growth quickly disappeared as the effect of interest on reserves absorbed much of the growth in Federal Reserve assets. As a result, money supply growth returned to a rate more consistent with the growth rate in the net monetary base, although still above the base growth rate.

Figure 7. The M1 Money Supply and the Monetary Base Net of Excess Reserve Liabilities, January 2008 to January 2015
\$Billions



The rate of growth of M1 depicted in Figure 7, while less than the early growth rate of 13.4%, was still above 10% annual growth. With double digit monetary growth why was there so minimal inflation? The answer lies in the almost unprecedented low interest rates of this entire period that made money alternatives less valuable. As the cost of maintaining cash assets fell, the public's desire to hold money increased. This desire can be summarized in the velocity of money, the ratio of total transactions as measured by the nation's GDP and the money stock. Figure 8 shows the velocity of money for the narrow measure of the money stock, M1, the closest of the money stock measures to cash. The velocity of the M1 money stock fell dramatically from the beginning of 2008 to the end of 2014 at an annual rate of -8.3%. Thus, even though the M1 money stock rose during this period at an annual rate of 11.4%, the price impact of this growth was very small as the public increased its demand to hold this essentially cash asset.¹

¹ In a simple quantity theory of the price level the rate of change in prices equals the rate of change in the money supply plus the rate of change in the velocity of money less the rate of change in real output. For this period the M1 money stock grew at an annual rate of 11.4%, the velocity of M1 grew at an annual rate of -8.3% and real output grew at an annual rate of 1.8%. These estimates suggest that price level growth, inflation, would be 1.3%, very consistent with the CPI and PCE measured inflation rates.

Figure 8. The Velocity of the M1 Money Stock
January 2000 to January 2015



THE FEDERAL RESERVE AND THE 2008 CRISIS DEBT SURGE

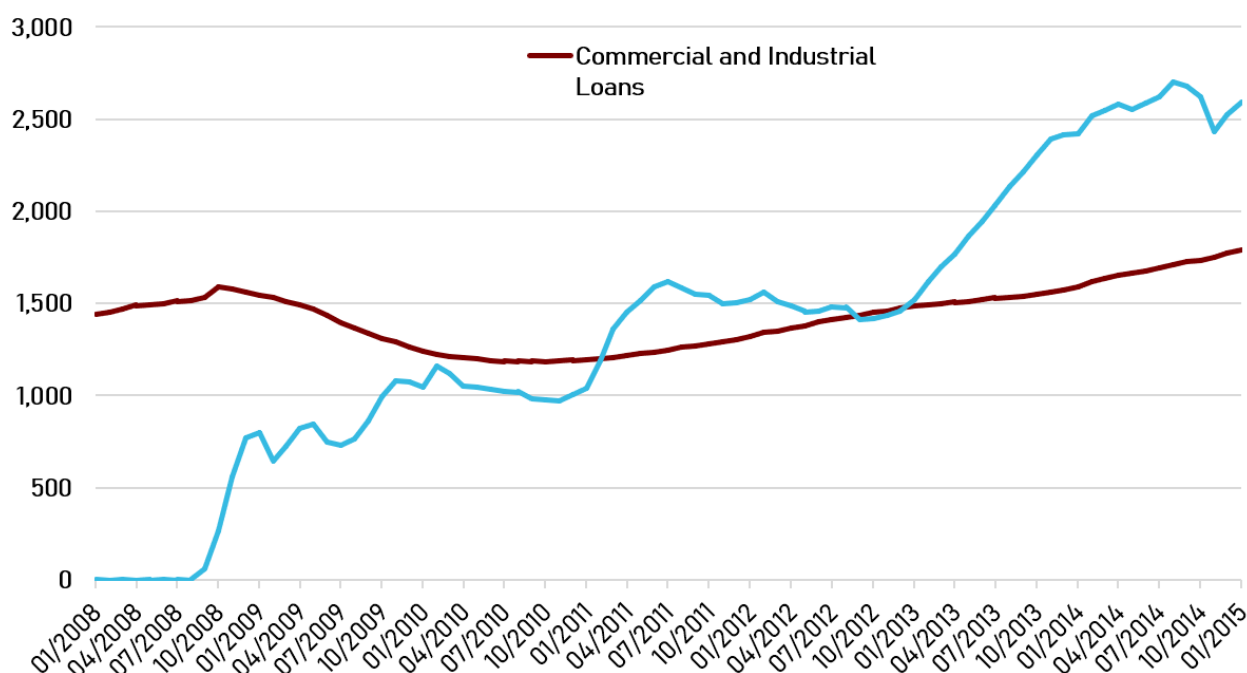
The combination of the recession that began in December of 2007 and the September 2008 financial crisis led to an explosion in federal deficits. The surge in Federal Reserve assets that began in October of 2008, as shown in Figure 4, raises the question of the extent that the Federal Reserve financed these deficits. This is especially relevant since all Federal Reserve revenue after costs revert to the Treasury. As a result, the revenue from all securities purchased by the Federal Reserve are, for the most part, returned to the Treasury.

Consider the periods of the Federal Reserve quantitative easing, QE1, QE2, QE3, that ended at the close of 2014. For the fiscal years 2009 through 2014, the public debt increased by \$6.2 trillion, the sum of the deficits for those five fiscal years. During that same time, Federal Reserve holdings of securities increased by \$3.5 trillion, over a 500% increase in securities holdings.

On the basis of securities alone, it would appear that the Federal Reserve financed 56% of the expansion in federal debt. But this simple analysis fails to consider that in October of 2008 the Federal Reserve began paying interest on bank reserves (IOER), essentially converting bank excess reserves into Federal Reserve liabilities. Since the interest payments on these bank reserves reduce Federal Reserve transfers to the Treasury on a dollar for dollar basis, bank reserves are now the equivalent of federal debt. As a result, the Federal Reserve's contribution to offsetting the federal debt increase must be adjusted for the increase in bank reserves.

In an important sense, the introduction of the payment of interest on reserves has essentially made bank excess reserves loans to the Federal Reserve. At the close of QE3, the last 2008 crisis asset expansion period, the level of these bank loans to the Federal Reserve exceeded \$2.6 trillion. To put this number in perspective, Figure 9 shows the level of commercial bank commercial and industrial loans and their loans to the Federal Reserve. By the beginning of 2009, just three months after the introduction of interest on reserves, bank loans to the Federal Reserve were 50% of all bank commercial and industrial loans. By the beginning of 2011, bank loans to the Federal Reserve exceeded their commercial and industrial loans. Finally, bank loans to the Federal Reserve were 50% larger than their commercial and industrial loans by the close of 2014.

Figure 9. Commercial Bank Commercial and Industrial Loans and Loans to the Federal Reserve
September 2008 – January 2015
\$Billions



Before the introduction of paying interest on reserves, excess reserves were part of what can be referred to as “high-powered money,” since the banking system can convert such reserves into bank loans at a twenty to one ratio. Now interest on reserves has converted bank reserves from a form of high-powered money to a bank investment and Federal Reserve debt. As a result, bank excess reserves are no longer an effective part of the monetary base. Figure 10 shows the federal deficits and the net of banking system excess reserves increase in the monetary base for the fiscal years 2009 through 2014. Using this measure of the Federal Reserve’s contribution to the debt increase dramatically reduces its role in financing the federal deficits. On average, the Federal Reserve financed just 8.8% of the debt increase for the entire six-year period.

Figure 10. Federal Deficits and Federal Reserve Monetization: Effective Monetary Base, Fiscal Years 2009 – 2014
\$Billions

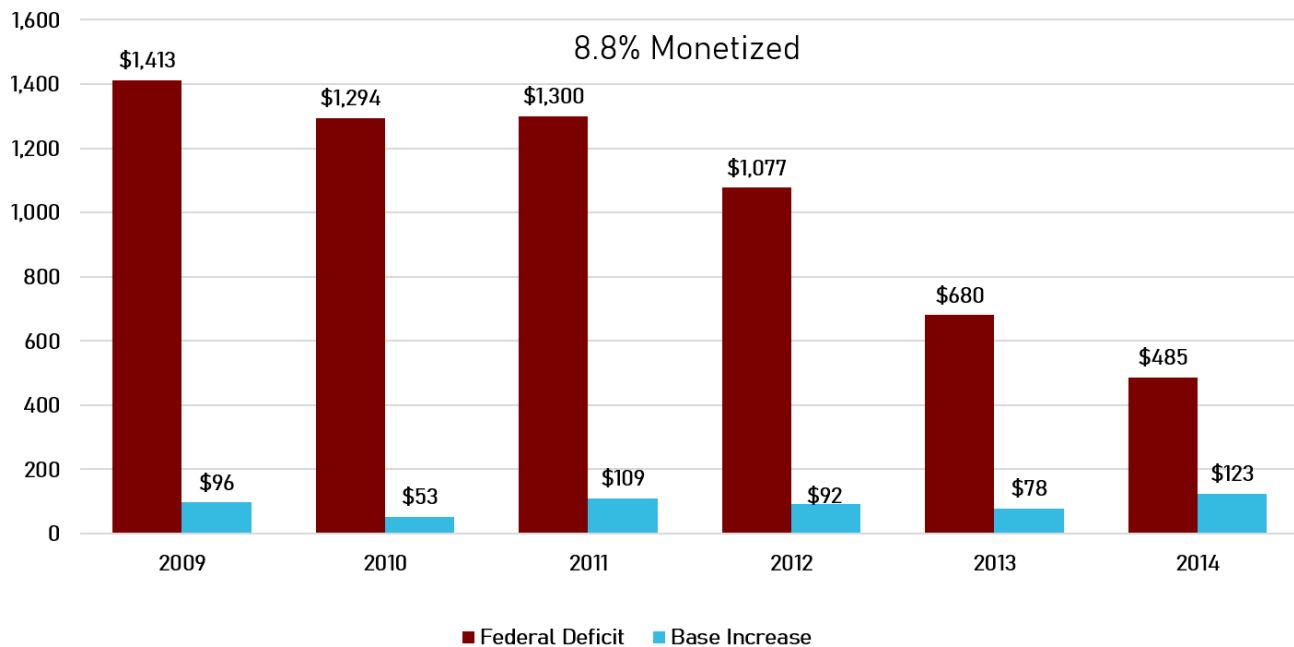
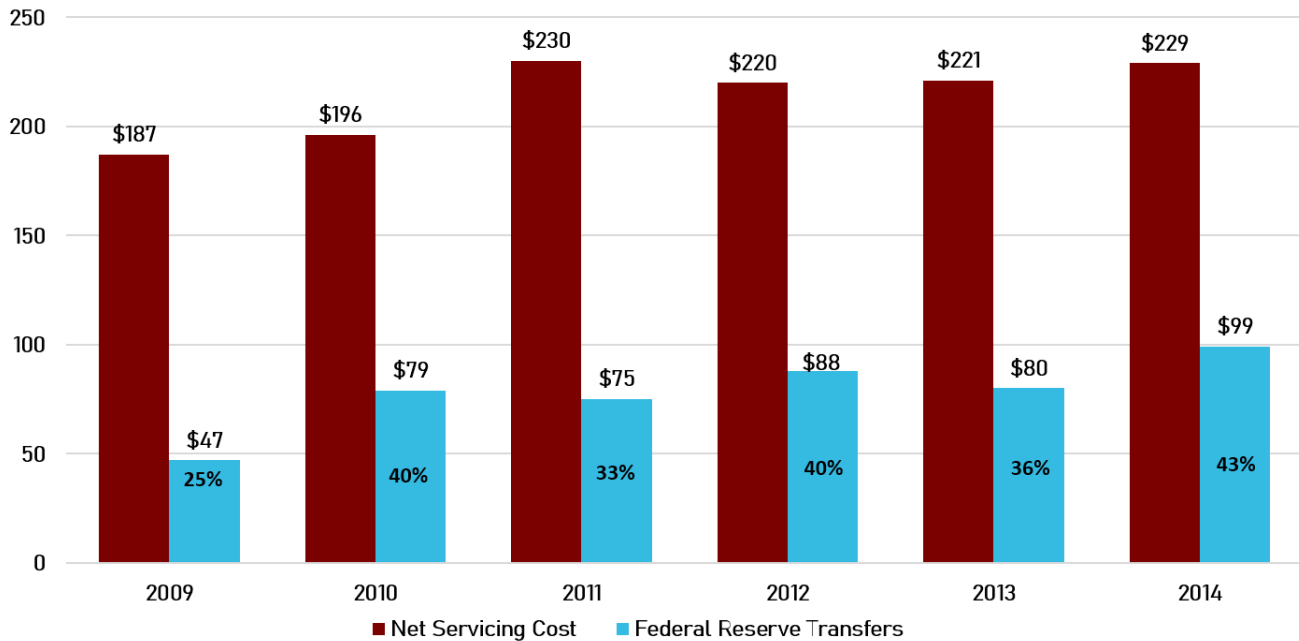


Figure 10 is not the whole picture because it treats the reserve liabilities as equivalent to Federal Reserve income-earning assets in their effect on transfers to the Treasury. The transfers to the Treasury are determined by the difference between the return on the Federal Reserve’s asset portfolio and the IOER. As it turns out, this return was significantly positive even though for most of this period the IOER was actually above the 1-year Treasury interest rate. Importantly however, the Federal Reserve securities portfolio was primarily longer term than one year and averaged 40% mortgage backed securities. Figure 11 shows the role of Federal Reserve transfers to the Treasury in covering the net servicing cost of the federal debt. The tremendous expansion in Federal Reserve assets is clearly shown in the rising level of Federal Reserve transfers to the Treasury. From the perspective of covering the interest cost of the federal debt, Federal Reserve transfers to the Treasury, on average, covered just under 40% of the total federal debt during the 2009 to 2014 fiscal years, not just the crisis debt expansion.

Figure 11. Net Debt Servicing Cost and Federal Reserve Transfers to the Treasury
Fiscal Year 2009 – Fiscal Year 2014

\$Billions



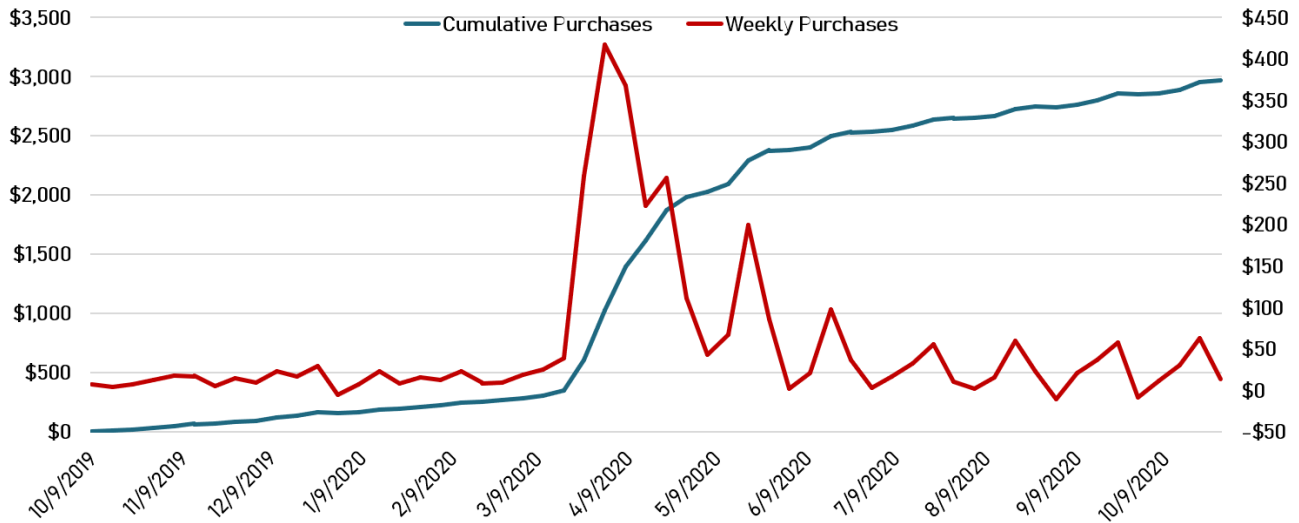
FEDERAL RESERVE’S ACTIONS IN THE SECOND FINANCIAL MELTDOWN: COVID-19

While there is some evidence that the onset of COVID-19 might have been even earlier than January 2020, its impact on the world economy was certainly no sooner than January 2020. However, for all practical purposes, the economic effects of the COVID-19 crisis began in March 2020 as much of the country entered into a shut-down. At that time the Federal Reserve entered the open-market and increased its holdings of Treasuries by unprecedented amounts.

In the first debt surge that began in fiscal year 2009 with a record \$1.4 trillion federal deficit, the Federal Reserve essentially supplied resources to finance \$800 billion of that deficit, or just over 56%. But the decision to pay banks to hold reserves resulted in the majority of that \$800 billion being offset by Federal Reserve liabilities that, essentially, were federal debt. In the final analysis, the Federal Reserve financed only just over 5% of the monumental fiscal 2009 deficit.

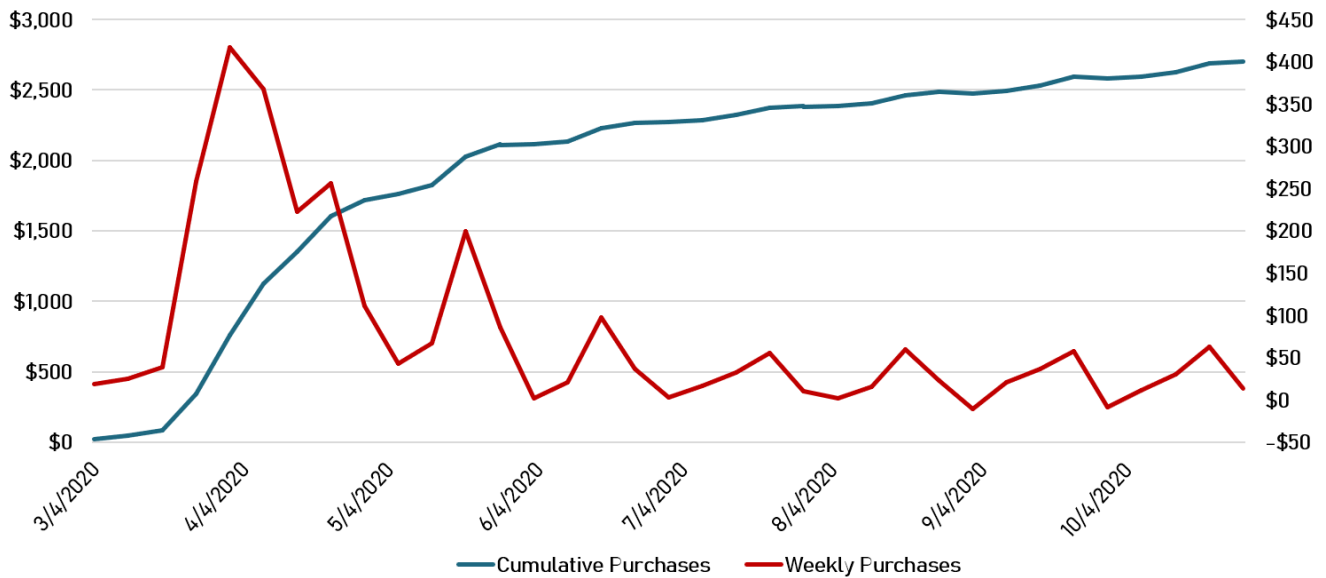
In the first month of fiscal 2020, even before the onset of the pandemic, the Federal Reserve had initiated a securities-held outright acquisition program. With pandemic economic restrictions multiplying and having a real bite, the rate of securities acquisition virtually exploded. Figure 12 shows this securities expansion program from its inception in October 2019 through October 28, 2020, more than the entire fiscal 2020 period. Up to mid-March 2020 the program was a steady asset purchase of less than \$40 billion weekly and usually less than \$20 billion weekly. When the pandemic shutdown really took hold from mid-March 2020 to the end of June 2020, the Federal Reserve added another \$2.25 trillion in securities to its portfolio. In the whole of fiscal year 2020, the Federal Reserve purchased the equivalent of \$2.847 trillion of the fiscal \$3.313 trillion 2020 federal deficit. As of the close of fiscal year 2020, the federal deficit was \$3.31 trillion. The Federal Reserve financed more than 85% of that fiscal 2020 federal deficit.

Figure 12. Weekly and Cumulative Federal Reserve Securities Held Outright Purchases
 October 2, 2019 to October 28, 2020
 \$Billions



But it is the period from the beginning of the COVID-19 response in early March of 2020 that is most astounding. Figure 13 shows this period in detail. In just the first three months of the pandemic, the Federal Reserve added \$2.1 trillion to its securities portfolio, a 60% increase in this part of its asset portfolio. Although Federal Reserve security acquisitions slowed by the close of July 2020, the Federal Reserve has continued to add securities at an average rate of \$26 billion per week. Thus, even though the early huge surge in securities acquisitions ended in July, the Federal Reserve has added another \$415 billion to its securities holdings. To put this slower securities acquisition rate in perspective, in just under four months, the Federal Reserve added to its securities holdings an amount that is more than 57% of its entire January 1, 2008 securities holdings.

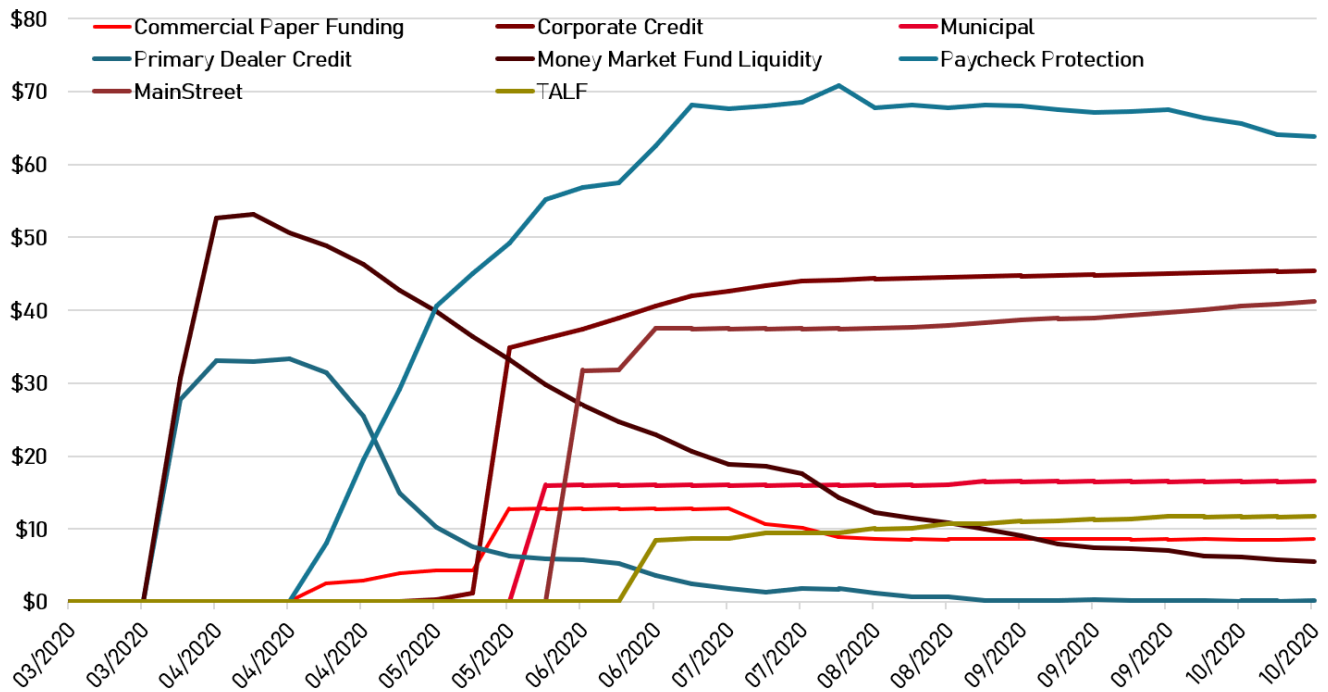
Figure 13. Weekly and Cumulative Federal Reserve Securities Held Outright Purchases
 March 4, 2020 to October 28, 2020
 \$Billions



In addition to the securities asset expansion, the pandemic economic shutdown has brought a return to the Federal Reserve operating in private markets and aiding financial institutions. The private market aid for the pandemic includes all of the aids for the 2008 crisis plus several more specific to the characteristics of this broader crisis. Each of these ‘facilities’ have the characteristics of Federal Reserve investment in the economy and, just as in the 2008 crisis, will be revenue generating. The total list is: *Commercial Paper Funding Facility (CPFF)*, *Municipal Liquidity Facility (MLF)*, *Primary Dealer Credit Facility (PDCF)*, *Primary Market Corporate Credit Facility (PMCCF)*, *Secondary Market Corporate Credit Facility (SMCCF)*, *Term Asset-Backed Securities Loan Facility (TALF)*, *FIMA Repo Facility (FIMA)*, *Main Street Lending Program (MSLP)*. The Treasury has an equity position in the both of the Corporate Credit Facilities and the TALF. The TALF will enable the issuance of asset-backed securities (ABS) backed by student loans, auto loans, credit card loans, loans guaranteed by the Small Business Administration (SBA), and certain other assets.

Figure 14 is the Covid-19 version of Figure 5. In it, many of the items are the same, but as the above paragraph shows, there are at least four additional facilities. These recognize that the government-mandated economic shutdown for Covid-19 affected markets much more than a simple recession, which absent the 2008 financial crisis, the 2008 Federal Reserve actions were adequate to handle. The additional facilities for this last crisis include the two corporate facilities, the municipal facility, the TALF, the FIMA, and the MSLP. The figure also shows the Money Market Fund Liquidity, Primary Dealer Credit and Paycheck Protection components of Federal Reserve loans.

Figure 14. Covid-19 Special Facilities
 March 4, 2020 to October 28, 2020
 \$Billions



At this point in the Federal Reserve COVID-19 response, it is difficult to make comparisons to its 2008 crisis response. The 2008 crisis response in terms of facilities was significantly larger in dollar value as is apparent from Figure 5. Together, the commercial paper and broker assistant facilities reached \$500 billion in the 2008 crisis response. No single Covid-19 response has exceeded \$70 billion and the sum of all the responses never exceeded \$215 billion. On the other hand, the Covid-19 securities response is a magnitude greater than the 2008 response.

In the initial Federal Reserve 2008 crisis securities response, essentially QE2 that began in December 2008 and ended in June 2010, the Federal Reserve added \$1.5 trillion in securities in 18 months, a 180% increase from its pre-crisis securities holdings. The Federal Reserve's complete securities response to the 2008 crisis, QE2 plus QE3, which lasted until the close of 2014, added a total of \$3.5 trillion to the Federal Reserve's securities holdings, a 472% increase from its pre-crisis securities holdings over 6.25 years.

In the first 6 months of the COVID-19 crisis, the Federal Reserve increased its securities holdings by \$2.48 trillion, a 64% increase. Beginning in October 2019, fiscal year 2020, the Federal Reserve has increased its securities holdings by \$2.85 trillion, a 75% increase. Furthermore, the Federal Reserve increased its income-earning assets during the same period by almost \$3 trillion.²

The federal budget fiscal 2020 deficit was \$3.131 trillion, more than double the previous record \$1.4 trillion of the 2009 fiscal year deficit. For another comparison, with the 2008 crisis, consider that for the

² Income earning assets are relevant here because the Treasury is the residual income recipient of the Federal Reserve earnings less costs.

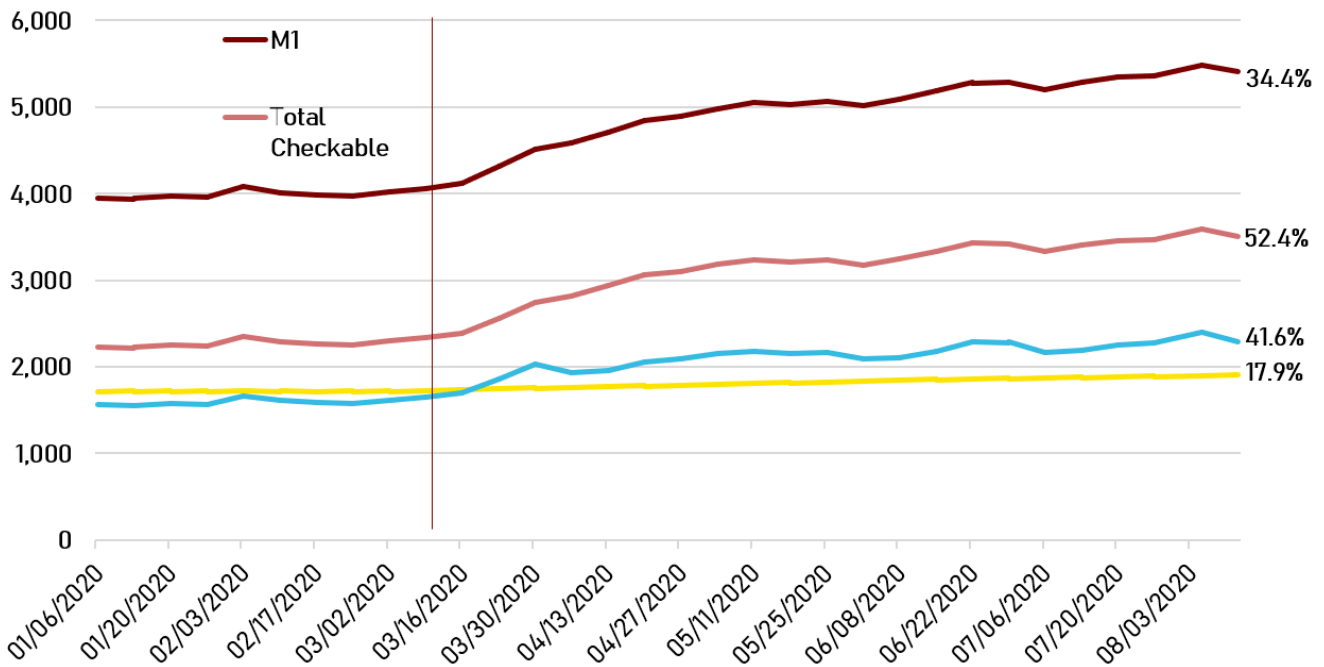
record 2009 fiscal year deficit of \$1.4 trillion, the Federal Reserve increased its earning assets by \$800 billion, covering some 57% of the deficit. In fiscal 2020, the Federal Reserve increased its earning assets by \$2.864 trillion, just over 90% of the fiscal 2020 deficit. On the surface, it would appear that the Federal Reserve financed almost entire deficit. Can it be this simple? Can it be that the tremendous expansion in federal expenditure is essentially a “free lunch?”

We now understand that the payment of interest on bank reserve balances has converted these balances to Federal Reserve debt. Further, because of the financial relation between the Treasury and the Federal Reserve, for all practical purposes, bank reserves are federal debt. As a result, to get an idea of the extent that the Federal Reserve has financed fiscal 2020 deficits, the increase in bank reserve holdings during fiscal 2020 must be deducted from Federal Reserve income-earning asset increases. By this measure, Federal Reserve liabilities in the form of bank reserves increased during fiscal 2020 by \$1.408 trillion. If so, then Federal Reserve net assets during fiscal 2020 have increased by only \$1.408 trillion. By adjusting the increase in Federal Reserve assets by their liability increase, the Federal Reserve still financed 45% of the federal fiscal year 2020 deficit.

There is no doubt that the Federal Reserve Covid-19 asset expansion has resulted in significant monetary growth. Figure 15 is the Covid-19 equivalent of Figure 6 and shows the monetary growth associated with the Federal Reserve’s response to the Covid-19 crisis. While the 46% annual rate of M1 growth for the first 4-months of the 2008 crisis was large, it pales in comparison with the over 200% annualized growth of M1 in just the first 4-months of the Federal Reserve’s response to Covid-19.

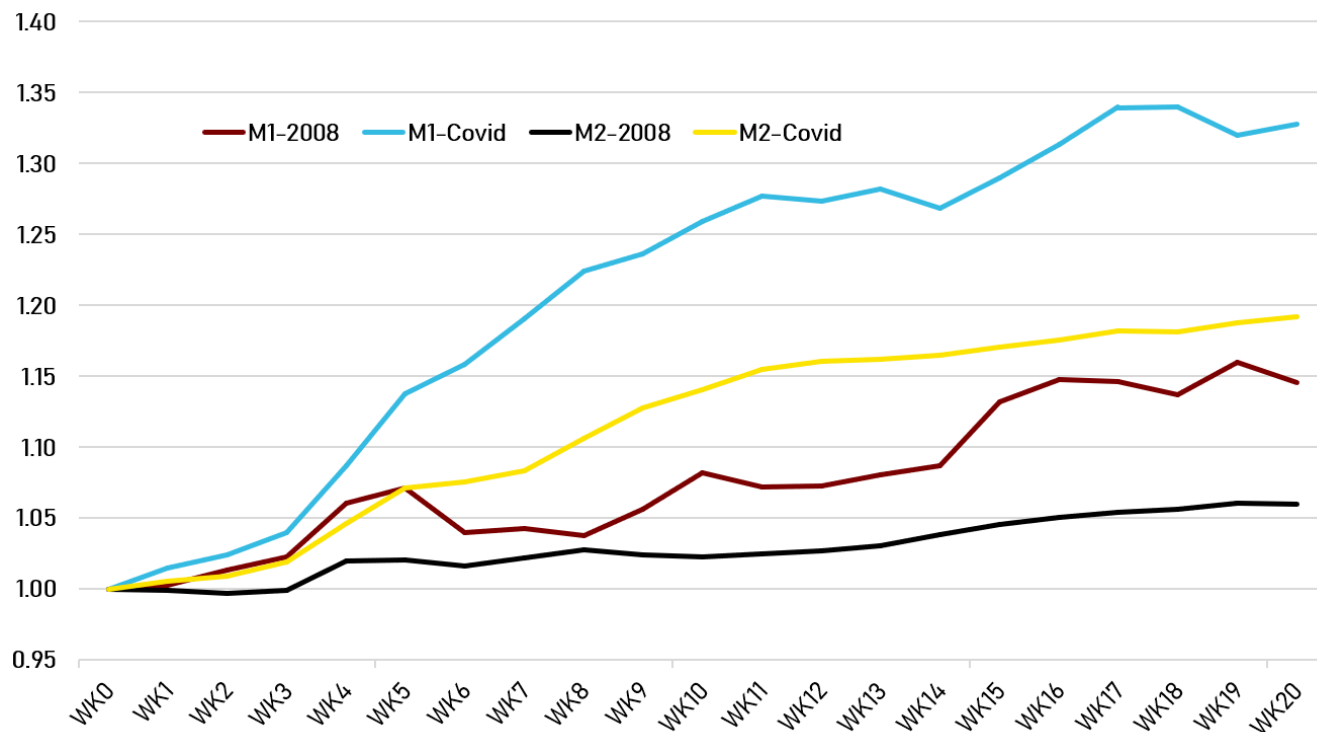
We know now that the early 2008 crisis in monetary growth never turned into inflation because of the subsequent absorption of the tremendous increase in the monetary base by banking system’s holding excess reserves. Thus, the ten-to-twenty-fold increase in bank deposits that would have occurred if the banking system had used these reserves to increase loans and investments never happened. In addition, the almost unprecedented low interest rates in the 2008 crisis resulted in a large increase in the public’s desire to hold cash assets. This increase in the demand to hold money resulted in the significant decline in the velocity of money shown in Figure 8.

Figure 15. M1 and Components
 January 6, 2020 – August 12, 2020
 \$Billions



Once again, just as in the post 2008 budget crisis, the fear is that the tremendous expansion of Federal Reserve assets will lead to double digit inflation. Figure 16 compares the effect on two money supply measures, M1 and M2, of the Federal Reserve’s response to the 2008 financial crisis with its Covid-19 response. In some sense, this figure is a combination of Figures 6 and 10. The date axis represents the weeks after the beginning date of each crisis, denoted as WK0 in the figure. The comparison in Figure 15 dates the beginning of the 2008 financial response as the last August 2008 reporting date and the beginning of the Covid-19 response as the last February 2020 reporting date. The figure shows the weekly level of M1 and M2 relative to their pre-response levels so that all values are 1.00 at WK0. In effect, the levels of the lines in the figure are percentage changes from the base. The difference is startling! The M1 Covid-19 response is double the 2008 response and the M2 Covid-19 response is more than triple the 2008 response.

Figure 16. M1, M2 Growth – Great Recession Versus Covid-19



The annual rates of monetary growth implied by the rates of change shown in the figure for the first 20 weeks of the Covid-19 response are staggering. The annualized Covid-19 M1 growth rate is 109% and the annualized Covid-19 M2 growth is 58%. In contrast, while the 2008 money growth rate responses were very large by historic standards (the 2008 M1 20-week annualized growth rate was 42% and the 2008 M2 annualized growth rate was 16%), they pale in comparison to the early Covid-19 monetary growth response.

The rapid 2008 M1 growth fell rapidly so that by the end of 2009, the M1 money stock was only 20% above its late August 2008 level. In fact, M1 growth for all of 2009 was only 3.7%. There were two reasons for the rapid decline in 2008 M1 growth. First, the facilities that increased the monetary base during the first 20 weeks of the crisis were beginning to decline so that total Federal Reserve assets remained virtually constant until well into 2010. Second, the interest rate on reserves was set during much of this period near and then above many market interest rates so that banks absorbed much of the increase in Federal Reserve assets by increasing their investment in excess reserves. That said, the subsequent Federal Reserve expansions ultimately led to an M1 annual growth rate of 11.4% for the entire expansion period from 2008 to 2015. We now know that this M1 expansion was largely absorbed by an increased demand by the public to hold essentially cash assets.

WHERE DO WE GO FROM HERE?

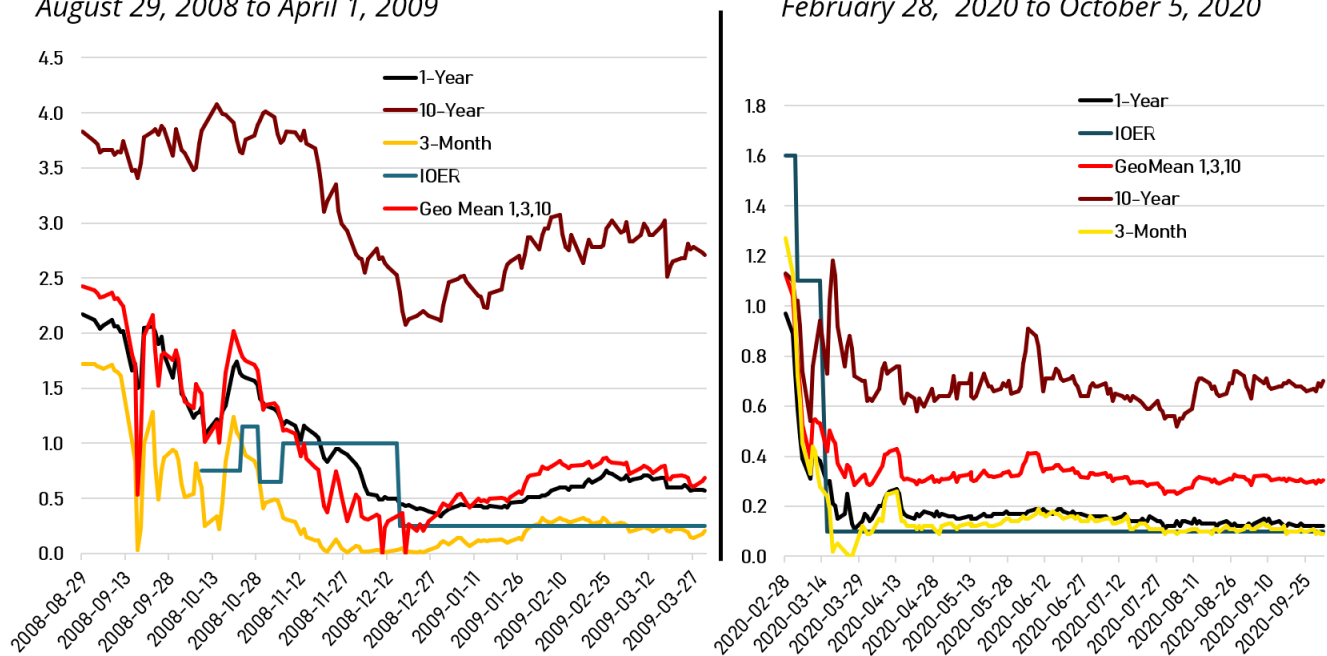
We know that the tremendous increase in Federal Reserve assets that accompanied the 2008 financial crisis did not result in inflation. But there are significant differences in that episode and the 2020 crisis caused by the pandemic.

First, the level of asset increases in the 2008 crisis occurred over an extended period, ending only at the close of 2014. The asset increase in the 2008 crisis totaled \$3.6 trillion, a 387% increase in Federal Reserve assets over 6.25 years. In just 7-months, the 2020 pandemic asset increase has totaled \$2.6 trillion in securities and \$2.9 trillion in total assets, just over a 60% increase.

Second, when the 2008 financial crisis occurred, the nation was in a recession that began in the fourth quarter of 2007. At the onset of the 2020 crisis in March, the nation was in a boom that began in 2017. In fact, just before the government-ordered shut-down of the economy, the unemployment rate was at a three-decade low of 3.5%. This record low unemployment rate is remarkable because it was accompanied by rising labor force participation. Thus, while unemployment rates had been declining since 2010, much of that decline was due to falling labor force participation so that, adjusted for labor force participation, the unemployment rate was actually increasing during much of that time. Further real GDP growth was at 2.5% as compared to negative real GDP growth at the beginning of the 2008 financial crisis.

Both of the crises experienced a rapid fall in market interest rates over the first seven months. Figure 17 shows the path of 3-month, 1-year, 10-year Treasury interest rates and the geometric average of these three rates for the first seven months of each crisis. While market interest rates in 2008 were much higher than at the onset of the 2020 pandemic, both fell by a similar percentage. In 2008, 10-year Treasury rates fell by 50%, or 200 basis points, in the first 4 months of the crisis. In the 2020 pandemic, 10-year Treasury rates fell by 50%, in this case 60 basis points, in less than two months. In both crises, 3-month Treasury rates fell to essentially zero in the first 3 months. The introduction of the payment of interest on bank reserves is noted on the left panel of the figure by the green line. As noted above, it was the payment of interest on reserves that induced the banking system to hold much of the subsequent expansion as reserves.

Figure 17. 3mo, 1yr Treasury, 10yr Treasury, Mean 3mo-1yr-10yr Treasury and IOER August 29, 2008 to April 1, 2009 February 28, 2020 to October 5, 2020



CONCLUSION

Once the world economies open up fully, will financial markets result in a return to pre-crisis interest rates? How will the worlds' central banks deal with the tremendous expansion in their sovereign debt holdings? All of the developed world's governments have run huge pandemic-induced deficits largely financed with central bank expansions. Will these monetary expansions produce runaway inflation? If not, how will central banks neutralize the monetary expansions? We know that the Great Recession monetary expansions did not create inflation in the developed world and, at least for the United States, we understand how the Federal Reserve essentially sequestered much of the expansion in assets through the payment of interest on reserves. But the pandemic expansions are much larger.

Clearly, if we are to prevent the pandemic asset expansion from an inflation disruption of the economy, the Federal Reserve must induce the banking system to retain much of the expanded assets as excess reserves. Even these pre-crisis interest rates were still below the level of interest rates that existed throughout the 20th century. Can the Federal Reserve maintain an IOER that will induce the banking system to hold as excess reserves the tremendous increase in market assets that the Federal Reserve has acquired during the pandemic? If not, are we doomed to see the double-digit inflation that many predicted for the 2008 crisis?