AMERICAN ENTERPRISE INSTITUTE

Statement before the House Financial Services Subcommittee on Monetary Policy and Trade for hearing entitled ''The Federal Reserve's Impact on Main Street, Retirees, and Savings''

The Federal Reserve's Credibility Problem on Main Street

Paul H. Kupiec
Resident Scholar

June 28, 2017

Chairman Barr, Ranking Member Moore, and distinguished members of the subcommittee, thank you for convening today's hearing on the Federal Reserve's impact on main street, retirement and savings. I am a resident scholar at the American Enterprise Institute, but this testimony represents my personal views. My research is focused on banking, financial regulation, financial stability and systemic risk. My prior experience includes senior staff positions at the Federal Reserve Board, the IMF and the FDIC, including four years as chairman of the Research Task Force of the Basel Committee on Banking Supervision. It is an honor for me to be able to testify before the committee today.

There is little doubt that the Federal Reserve is the most powerful independent agency in government. The decisions of the Federal Reserve Board and the Federal Reserve's open market committee have important impacts on the lives of every American and to a lesser degree the citizens in foreign nations. Yet the Fed's decisions are made by unelected officials with little more than proforma oversight by the US Congress. For example, while the Federal Reserve's charter requires it to target price stability and maximum sustainable employment, the Fed unilaterally decided to define price stability as a 2 percent inflation rate without any input, debate or vocal push-back from the Congress. And today some Federal Reserve officials are publicly arguing that the Fed's inflation rate target may need to be increased to enable them to achieve their price stability mandate.[1]

The historical timidity of Congressional oversight is completely understandable for any number of reasons. Few members of Congress are deeply schooled in the arcane details monetary theory. Even those in Congress with in depth subject matter knowledge will find it daunting to stay current with the ever-changing fashions in monetary policy. Economists and central bank officials are continually discovering serious flaws in the theories that guide their policy prescriptions. Moreover, Congressional members that question the propriety of the Fed's monetary policy decision making processes are often branded as economic hooligans who are out to destroy the Fed's mythical shield of "political independence".

Congress needs a new approach to facilitate its oversight of Federal Reserve operations. The current system in which the Federal Reserve, twice a year, submits boilerplate written Congressional testimony followed by hearings where the Fed's chairman does their best to dodge answering controversial questions, has proven to be inadequate given the power Congress has delegated to this agency.

The adequacy of Congressional oversight has become an especially controversial issue in recent years as the Federal Reserve initiated various "unconventional" monetary policies in an attempt to meet its dual mandate. Unconventional policies like near-zero interest rates, paying interest on bank reserves, and quantitative easing operations have had important impacts on the distribution of income and wealth in America. While countercyclical monetary policy is always at the core a redistributive mechanism, in this cycle the redistributive impacts have been so large that they are obvious to main street voters and their elected Congressional representatives.

In the redistribution that has occurred in the wake of the financial crisis, those on the less

[1] See, for example, John Williams, "Monetary Policy in a Low R-Star World," FRBSF Economic Letter, August 15, 2016.

fortunate side of main street have seen fewer gains and a weaker recovery compared to the perceived benefits afforded large "Wall Street" banks and the households living on the tony end of main street. Had unorthodox monetary policy generated the economic growth the public has been conditioned to anticipate, these policies would have been suspended years ago without generating the public disillusionment that has sparked today's "audit the fed" movement.

The Federal Reserve mandate to maintain price stability and maximum sustainable employment does not include any explicit or implied legal obligation to consider the wealth or income redistribution consequences associated with Federal Reserve monetary policy operations. This omission is sensible given the undeniable fact that "monetary policy is a blunt instrument." Still, in my view, the recent call for stricter Fed accountability can largely be attributed to the Fed's inability to stimulate robust growth coupled the Fed's shortsighted political calculus to avoid as far as possible any discussion of the wealth and income redistribution transfers that have occurred under its prolonged experiment with unconventional monetary policies.

The need for more detailed Congressional discussion of the potential impacts of unconventional monetary policy is long overdue. But at present, there is no practical way to catalyze such a discussion. The modest size of Congressional staff provides members with limited resources relative to the very large and highly compensated Federal Reserve staff that skillfully hones the controversial edges off all Federal Reserve testimony. Nor it is clear that proposed legislation such as the "Federal Reserve Transparency Act of 2017" will adequately address this issue.

Perhaps there is a simple change in procedure that, without any new legislation, could help to alleviate this long-standing problem. My suggestion is to require the Federal Reserve's written Humphrey-Hawkins testimony by a prescribed date, and before scheduling the Fed chairman's testimony, distribute the Fed's written testimony to non-Fed experts, and hold hearing requesting their analysis of the Fed's written testimony. This change of process would allow members of Congress additional time and access to additional expert resources to prepare their oversight questions for the Fed chairman's subsequent Humphrey-Hawking's hearings. The is at least an even change that once the Fed's written testimony is subjected to expert public review before it's Chairman testifies, the Fed will be pressured into anticipating controversial issues in its written testimony, especially if the Congress encourages non-aligned experts to focus on issues of Congressional concern.

An outline of my testimony follows. In the following section I review popular theories of the so-called "monetary transmission mechanism", or the mechanism through which Federal Reserve control over short term interest rates can be used to regulate economic growth. I provide this review as background for the analysis that follows, and to provide the reader with some perspective about how economists might have expected the Fed's monetary policy to impact the economy. Section 2 reviews the evidence regarding the actual performance of the transmission mechanism on consumer saving and business investments over a period spanning the financial crisis, the great recession and the subsequent recovery. Section 3 discusses the benefits and costs of the Federal Reserve's unconventional monetary policies from the perspective of main street America. All charts referenced appear at the end of the testimony.

1. The Monetary Transmission Mechanism

The textbook explanation of mechanism through which the Federal Reserve controls economic growth is called the monetary transmission mechanism. The mechanism traces the impact of a changes in the short term interest rate controlled by the Fed on consumption and investment decisions throughout the economy.

The Federal Reserve sets the overnight interest rates that banks charge to lend out their reserves. Reserves are essentially bank checking account deposits at the Federal Reserve. Before the financial crisis, the going rate for borrowing bank reserves was set through the interplay of bank supply and demand. Banks are required to maintain a minimum amount of reserves at the Fed. The minimum reserve amount is determined by the balance in bank customers' savings and demandable deposit accounts. Banks that have an excess of reserves over the required amount can lend these reserves to banks that had a shortage of reserves. The interest rate on loans of bank reserves is called the federal funds rate.

Before the financial crisis, the Fed controlled the federal funds rate by using open market operations to buy and sell Treasury securities from banks. When the Fed purchases a Treasury security owned by a bank, the Fed pays for it by increasing the bank's reserve deposit balance at the Fed. Such a transaction directly increases excess reserves in the banking system which put downward pressure rate banks charge in the federal funds market. In contrast, when a bank buys a Treasury security from the Fed, it pays for the security using its reserve deposits at the Fed. This reduces the banks' excess reserve holdings which in turn puts upward pressure on the federal funds rate.

After the onset of the financial crisis, the Federal Reserve began purchasing a large amount of Treasury securities from banks. These purchases greatly increased banks reserves to a degree that there was little or no demand for bank excess reserves because nearly all banks had a surplus of reserves. To keep the federal funds rate from falling to zero, in late 2008, the Fed began paying banks interest on their reserves. Initially the Fed planned on paying a higher rate of interest on excess reserve balances (the so called IOER rate), but the Fed quickly revised its policy and began paying banks 25 basis points on their entire reserve balances.[2] The rate the Fed pays on bank reserve balances sets a floor on the federal funds rate because no bank would lend their reserves out at a rate below the rate they could earn by keeping them on deposit at the Fed.[3] Since late 2008, the Fed has controlled the federal funds rate using the rate it pays on bank reserves.

The federal funds rate is generally taken to represent an overnight risk free rate. A persistent expected reduction in the overnight risk free interest rates will impact longer maturity Treasury security yields via arbitrage. If the Fed reduces the federal funds rate and the rate reduction is expected to be maintained for some time, shorter-dated Treasury yields will decline. The mechanism is that banks bid up Treasury securities prices (forcing these securities yields down)

[2] The rate is still called the IOER rate even though the rate is actually paid on all reserve balances.

[3] There are non-bank institutions that have reserve accounts at the Fed and who can also borrow and lend federal funds. These institutions (primarily GSEs) do not receive interest on their Fed reserve balances and may lend federal funds below the IOER rate.

until banks no longer earn an expected profit from purchasing these securities and financing them using a series of overnight federal funds loans. Through arbitrage, Federal Reserve targeted changes in the federal funds rate get transferred to the yields on longer-dated Treasury securities. The impact of a change in the Fed federal fund rate target on the yields on long-term Treasury securities depends on investor expectations regarding the future path of the overnight federal funds rate as well as the impact the expected monetary policy change may have on future inflation rates (investor inflation expectations).

When the Fed raises or lowers the target federal fund rate, it (potentially) impacts the yields on all traded fixed-income securities. If the Fed lowers the target rate, short-term and intermediate-term Treasury securities yields decline. The yields on long-dated securities will also decline if inflation expectation remain unchanged. The Treasury term-structure of yields in turn determines the yields on other traded debt securities including corporate bonds and asset-backed bonds with credit (default) risk. A reduction in the target federal funds rate also typically produces a decline in the rates charged by banks for consumer and business loans. Bank typically prefer to lend to business and retail customers when the risk-adjusted margins on this lending exceeds the margin a bank can earned by lending excess reserves. An increase in bank excess reserves usually engenders an increase in supply of bank consumer and business credit and a corresponding reduction in bank business and consumer loan rates.

When interest rates decline, there are two effects that, in theory, stimulate aggregate demand and generate economic growth. In the textbook version of the monetary transmission mechanism, one effect of lower interest rates is an increase in consumption expenditures. The second is an increase in business investment.

The consumption channel

The level of interest rates impacts a households' decision regarding how its splits its current income between consumption and savings. Holding constant inflation expectations, when interest rates decline, the return on household savings declines making it less appealing for households to save out of current income.[4] Alternatively, when interest rates decline, current consumption is less expensive in terms of the future expected consumption the household must forgo when they choose not to save for future consumption. The upshot is that, when interest rates decline, households are expected to decrease savings and borrow to increase their current consumption.

The prior paragraph describes the simplest version of the consumption "gears" in the theoretical monetary transmission mechanism. But the true story is more complex. The first complexity involves households whose income is primarily derived from fixed income investments—retirees living off of accumulated savings. For these households, who comprise an increasing share of households as the population ages, when the Fed cuts the federal funds target rate, their current household income declines. These households may choose to reduce rather than increase their consumption as the yield income on their investments decline.

[4] An alternative "permanent income hypothesis" explanation is that low interest rates increase the present value of a household's lifetime income because future income is discounted less heavily. If households seek to consume a constant fraction of their permanent income as some economic theories speculate, current consumption will increase because the interest rate reduction increases household permanent income.

A second complication is households whose consumption pattern is in part driven by a savings target. At some stage of the household life cycle, (one hopes) a household begins in earnest to save for retirement. The savings rate that is required to accumulate sufficient savings to fund a comfortable retirement depends on the level of interest rates. If interest rates are very low for a sustained period of time, households must channel a very large share of their current labor income into savings if they are to meet a retirement savings goal. The impact of low rates on savings under this channel are uncertain. For some households, a sustained reduction in the Fed's federal funds target could induce a reduction in consumption to achieve the household retirement saving target. However, for other households a rate reduction could make it impossible for some households to meet a savings target and instead induce them to abandon prudent savings habits and consumer more of their current income (see Box 1).

An additional complication regarding the consumption channel of the monetary transmission mechanism is the strength of household balance sheets. Even if lower interest rates tempt a household to reduce savings or to borrow to consume more today, the strength of the household's financial condition may prohibit it from borrowing. Many households that would prefer to borrow do not have access to credit because of the default risk they pose to lenders. Some households with weak credit ratings may be able to borrow at very high risk rates, but instead prefer to pay off debt (save) and build household equity to improve their credit quality to enable them to borrow at lower rates in the future. Credit constrained households may gain additional benefits from a reduction in rates if their household assets (primarily their home) appreciate in value as a consequence of reduced interest rates and thereby improve their access to credit.

The final complication I will mention are wealth effects for non-credit constrained households. For households with strong balance sheets including equity in their home and a portfolio of financial assets, a reduction in the federal funds target rate may generate sizeable capital gains in the market value of their home and financial assets. In addition, it may encourage these households to refinance mortgages and other consumer debt at more favorable interest rates. All of these effects will increase these households' current disposable income as well as their perceived permanent income. Such households may respond by increasing their current consumption.

The overall impact of a reduction of interest rates on household consumption is sum total of all households' response according to these and other channels that I have failed to recognize in my testimony. The mix in household responses that are actually observed is not easily identified when policies are implemented, and even after the fact, they are not readily identified in the aggregate data. In short, there is a lot of uncertainty about how much aggregate consumption will to respond to a change in the target federal funds rate, and the response likely depends on the financial balance sheet strength and lifecycle age profile of households in the economy.

Box 1: Target Savings and Ultra-Low Interest Rates

Financial experts recommend that households accumulate savings for 25 years of retirement spending, consuming at a rate of 80 percent of household income the year before retirement. Some savings will come from social security benefits, but for most households, social security will not provide enough for a comfortable retirement.

Sustained low rates disrupt prudent household savings habits. The 2013 Federal Reserve Board Survey of Consumer Finances, conducted in the midst of the Fed's zero-interest rate policy, found a significant reduction in consumer retirement plan participation.[1] A more recent private sector survey found that 33 percent of Americans have no retirement savings, including 24 percent of those over age 55.[2]

To better understand the link between savings behavior and the level of interest rates, consider the saving decision of young household (age 25) with a starting income of $50K. To keep things simple, assume that the household expects to earn $2.5K more each year until age 45 when household income reaches $100K per year where it until retirement at age 65. This earnings profile closely mirrors the US average for an individual with the equivalent of a 2-year post college degree.

To keep things simple, assume that future social security benefits remain unchanged and there is no inflation. Social security should provide this household about $28K per year in retirement.[3] The savings rate required during earning years to reach retirement goals depends on the interest rate.

If interest rates are 0, accumulated savings earn nothing, and total savings must equal $2 million by age 65 to fund an 80 percent income replacement rate in retirement. Future social security lifetime benefits provide $700K, leaving $1.3 million to accumulate through private savings. To reach this goal at zero rates, the individual would have to save nearly 38 percent of pre-tax earnings each year until retirement.

When interest rates are slightly positive, say 2 percent instead of 0, the required savings rate, while steep, is less daunting. Because interest earned on savings accumulates, the individual's private retirement account must reach a little over $1 million by age 65. This requires saving about 20 percent of each pre-tax dollar earned—slightly more than half the savings rate when interest rates are 0.

Extended periods of ultra-low rates not only put self-funded retirement out of reach for many households, but they also make it more difficult to build precautionary savings or purchase insurance against long-term hazards. Long-term insurance products like life insurance and long-term care insurance become unaffordable for most households.[4] The lack of savings may force many to borrow from high-cost nontraditional sources like payday or auto-title lenders when they experience unanticipated expenses.[5]

Households that do decide to save in a low rate environment face pressure to invest in high-yield risky assets. This stretch for yield will put upward pressure on the price of risky assets—stocks, high-yield bonds, and real estate—and could create a price bubble that will deflate once interest rates normalize. Those that struggle to invest to build a financial nest-egg for the future in a near zero interest rate environment could well experience losses should their investments be whipsawed by changes in central bank monetary policy.

[1] http://www.federalreserve.gov/pubs/bulletin/2014/pdf/scf14.pdf
[2] http://www.gobankingrates.com/retirement/1-3-americans-0-saved-retirement/
[3] $28K is between the high and low estimates produced by on-line social security benefits calculators from government agencies, financial institutions, and the AARP.
[4] http://www.wsj.com/articles/life-insurers-pass-pain-of-low-rates-on-to-consumers-1458466210
[5] http://csd.wustl.edu/Publications/Documents/RB14-13.pdf

The investment channel

If businesses follow the rules laid out in economic textbooks, they will invest in activities that are profitable when expected future revenues exceed expected costs when both are discounted at the firm's average cost of funding the project. Under this decision rule, presuming that lower federal funds target rates are passed on to business borrowers, business investment should increase when the Federal Reserve lowers its federal funds target rate because more investments will appear profitable when a business's cost of borrowing falls.

There are, of course, complications beyond the simple interest rate investment story. On complication concerns the financial conditions of businesses. When businesses have weak balance sheets and little in the way of acceptable collateral, they may have difficulty borrowing even if they have profitable investment opportunities. Business lending is risky, and banks may shy away from business loans unless there is ample collateral protection. In such cases, a reduction in rates may work through a second channel by improving the credit access of businesses whose collateral (such as real estate) increases in value as interest rates decline.

Another complication is the financial condition of banks. There is a significant body of evidence that suggests that banks are reluctant to lend after experiencing losses. This can be, in part, because the credit quality of their customer lending pool has deteriorated along with rising delinquency rates in their legacy loan portfolios. But, there is also evidence that banks are reluctant to lend after they experience non-lending related losses. Weak regulatory capital positions may be a limiting factor is some cases, but the empirical evidence suggests that capital adequacy issues are minor compared to the impact of a negative bank supervisory rating. On average, the evidence shows that banks post large reductions in their loan growth rates following a regulatory downgrade to a CAMELS 3 rating or below.[5] This fact should not be construed as a criticism of bank examiners or the bank examination process. Quite the contrary. Bank examinations are designed to identify banks with safety and soundness issues and bank examiners have a duty to prevent weak banks from making risky loans that subsequently may cause losses for the deposit insurance fund. A well-functioning system of supervision must limit the lending grow of banks that are at risk of failing.

Aside from the financial condition issues that complicate the business investment transmission mechanism, there is growing evidence that many business mangers apparently skipped their economics lectures on evaluating new business investments. A body of research has shown that many firms evaluate investments by discounting future cash flows using a management-set hurdle rate, not their firm's cost of raising new funds.[6] Survey evidence finds that firms set investment hurdle rates between 12 to 15 percent for investments that are similar to their existing business lines, and significantly higher hurdle rates for new business ventures.

Moreover, the evidence from multiple countries suggests that business hurdle rates are "sticky" over time. Firms do not appear to adjust their hurdle rates in response to changes in in central bank short-

[5] See Kupiec, Lee and Rosenfeld, (2017). "Does bank supervision impact loan growth?" *Journal of Financial Stability*, Vol. 28, pp. 29-48.

[6] There are many references to support this claim. For example, Poterba and Summers (1995) "A CEO Survey of U.S. Companies' Time Horizons and Hurdle Rates*", MIT Sloan Management Review*, October; Meier and Tarhan, (2007). "Corporate Investment Decision Practices and the Hurdle Rate Premium Puzzle," http://papers.ssrn.com/sol3/papers.cfm?abstract_id=960161 ; Steve Sharpe and Gustavo Suarez (2014), "Why isn't Investment More Sensitive to Interest Rates: Evidence from Surveys, FEDS Working Paper No. 2014-002, Federal Reserve Board.

term interest rate targets. For example, a recent Federal Reserve Board study concludes that business investment hurdle rates have changed little since the 1980s despite large declines in the federal funds rate and nearly double-digit declines in corporate borrowing costs.[7]

The overall impact of a change in the Federal Reserve target interest rate on business investment is the aggregate sum all of these effects and likely other effects I have not mentioned. Again, it is nearly impossible to formulate an accurate prediction of how aggregate investment will actually respond to a reduction in target rates, especially in the climate of heightened uncertainty in a financial crisis.

2. Economic Performance under Unconventional Monetary Policies

Unconventional monetary policies began in the late summer of 2007 when the Fed lowered is policy rates and initiated special lending programs to both broaden and improve access to the Fed's traditional lender of last resort facilities. On October 6, 2008, the Fed began paying interest on bank reserve balances. When it became clear that near zero interest rate policies and special lending programs would not jump start growth, the Fed undertook an aggressive series of asset purchases. These so-called quantitative easing programs were designed to boost financial asset prices and stem the decline in housing prices. It was anticipated that stabilizing home and financial asset prices would boost investor confidence and generate new consumption and investment demand through the wealth effect. The programs massively expanded the Federal Reserve's balance sheet as well as bank excess reserve balances. Bank reserve balances (nearly all excess reserves) increased from $261 billion in late October 2008 to over $2.8 trillion by the end of July 2014.

The massive Federal Reserve injection of liquidity put downward pressure on yields throughout the economy. The yield on Treasury securities declined at all maturities, with the largest declines posted on short dated instruments (Chart 1).[8, 9] The yield on corporate debt instruments declined as well (Chart 2). After an initial decline in early 2009, investment quality bond spreads relative to the 10-year constant maturity Treasury yield (Chart 3) remained firm until the Fed began its quantitative easing programs in 2011. Overall, Charts 1-3 show that the Federal Reserve's unconventional monetary policies worked to reduce interest rates across nearly all instruments traded in corporate bond and Treasury markets.

The massive expansion in Federal Reserve liquidity put downward pressure on banks' cost of funds (Chart 4[10]). Subsequent Federal Reserve QE operations maintained this pressure, and by early 2012, the national average rate banks paid on all common deposit products (Chart 5) was below the effective federal funds rate, and well below the 25 basis points banks' earned on their reserves. Most banks could earn a profit by simply taking in customer deposits and holding them as reserves.

Despite the historic Fed-engineered increase in liquidity and a substantial reduction in interest rates, households and business did not increase their borrowing to boost consumption or investment. Chart 6 plots estimates of the outstanding amounts of credit borrowed by households, nonfinancial businesses, and the federal government, where each sectors borrowing is measured relative to its outstanding credit balance in 2006Q1. The plots in Chart 6 show that the federal government sector was the only

[7] S. Sharpe and G. Suarez, "Do CFOs Think Investment is Sensitive to Interest Rates? FEDS Notes, Sep 26, 2013.
[8] All charts appear at the end of the testimony. When no source is mention, the charts are based on data reported by the Federal Reserve bank of St Louis in its FRED Economic Database.
[9] Declines in Treasury securities yields posted early in months of the crisis (2007) reflected investor demand for default risk free assets a reduction in inflation expectations rather than expansionary monetary policy as the Fed was still increasing rates at this time.
[10] The data source for Chart 4 is the FDIC's Statistics on Depository Institutions.

sector that took on substantial amounts of additional debt as interest rates declined. Chart 6 shows that it took until late 2012 before nonfinancial business borrowings recovered to 2008 peak levels, and the level of outstanding home mortgage debt has yet to equal its pre-crisis peak. In contrast, by the end of 2016, the outstanding balance of federal government debt was 281 percent larger than the government debt balances in 2006.

Rather than respond to interest rate reductions by reducing savings and increasing consumption, households increased their savings (Chart 7). Net private sector business investment (Chart 8) declined. Business investment failed to recover to pre-crisis levels until 2013, and even then it remained weak, subsequently falling below pre-crisis levels where it remains in 2017Q1.

The impact of weak consumption and private investment demand is reflected in the level of real GDP (Chart 8). Growth in real GDP has been anemic and has yet to recover to trend path of real potential GDP. As a consequence of the decline and slow recovery of real GDP, real median family income (Chart 9) declined from a pre-crisis peak of $70K to a low of $64K before recovering to pre-crisis levels in 2015.

The Federal Reserve experiment with unconventional monetary policy may have made the great recession less severe, but thus far it has been ineffective in stimulating a robust recovery. The slow recovery has caused a prolonged period characterized by outright reductions in household median real incomes so it is understandable why many may on main street may believe that the great recession continued for years longer than the NBER economists who date business cycles.[11]

The continued inability of the Federal Reserve to meet its growth and inflation targets has understandably stoked enthusiasm among some elected officials for increased Federal Reserve oversight. Still, it is important to appreciate that countercyclical monetary policy is difficult "to get right." In fact, while modern central banks have much more data, hundreds of additional economists, and massive computing power, the 1959 Congressional testimony of Milton is still apropos: "it is so difficult as a technical matter in the present state of our knowledge to know what measures one ought to take at any given time."[12]

3. Has Unconventional Monetary Policy Benefited Main Street?

Did main street benefit from Federal Reserve unconventional monetary policies? To the extent that these policies prevented the great recession from turning into a second great depression, main street writ large benefited. Unfortunately, while Federal Reserve officials place great weight on this benefit when self-scoring their own crisis-response performance, no one really know what would have happened had the Fed taken a different approach in responding to the economic crisis. There are historical cases when neither the Federal Reserve nor Congress took any measures to counter a severe economic downturn and the economy recovered far more quickly than it has from the great recession.[13]

If main street were asked to score the Fed's performance, opinions would likely differ depending on who you asked. In the upscale parts of main street, folks are likely to think the Fed has done a good job at reviving the economy. However, folks living a more modest main street lifestyle are probably less likely to give the Fed high markets.

[11] According to the NBER dating committee, the recovery from the great recession began in July 2009.
[12] U.S. Congress, Joint Economic Committee, Hearings, Employment, Growth, and Price Levels, Part 4 (86th Congress, first session, 1959, pp. 615-16.
[13] See James Grant, The Forgotten Depression:1921: The Crash that Cured Itself. Simon & Schuster, 2015.

Initially consider the uneven nature of the recovery regarding household income. The 2013 Federal Reserve Survey of Consumer Finances[14] (the latest survey available) reports that median income for the top 10 percent of earning households was $183, 400, up 5 percent from the 2010 Survey median value for this decile. In contrast, households with incomes in the second quartile of the income distribution (25% to 49.9% in the income distribution), saw their median incomes fall by 5 percent over this period, to $38,600. Among the overall population, only households in the upper 25 percent of the income distribution experienced a gain in median income.

The economic recovery since 2013 is unlikely to have reversed the inequalities reported in the 2013 Survey of Consumer Finances. In its reports, the US Census Bureau estimates that income inequality increased in 2013, 2014, and 2015.[15] In addition, the Census Bureau has document the uneven nature of the recovery in median incomes on a geographic basis (Chart 11).

It is impossible (as far as I know) to firmly establish specific cause and effect regarding specific impacts of the Fed's unconventional monetary policies.[16] Still, I think most people would agree that the Fed's quantitative easing policies have been a force propelling risky financial asset prices, primarily stock prices, higher. QE-driven asset price inflation has pushed household financial asset holdings to new highs (Chart 12). But households must own financial assets if they are to benefit from financial asset price inflation, and financial assets holdings are concentrated in households in the upper deciles of the income distribution.

The 2013 Federal Reserve Survey of Consumer Finances reports that, in 2013, 48.8 percent of all families owned equity shares either directly or indirectly through mutual funds or retirement accounts. This percentage is down from 53.2 percent in 2007. When sorted by income, families in high income deciles are much more likely to own shares relative to families in lower income deciles.

While the Fed survey reports that fewer families held stocks directly or indirectly in 2013, the mean value of family stock holdings increased between 2010 and 2013, reflecting the concurrent increase in stock prices. When families are sorted by income, it is no surprise that families in high income deciles have much higher average stock holding than families in lower income deciles. It is probably also not surprising that families in higher income deciles saw the largest gains in the average value of their stock holding between 2010 and 2013.[17] The data clearly show that benefits of the Fed's QE-catalyzed stock market rally have accrued to the wealthiest households.

There is little doubt that Federal Reserve policies helped to resuscitate the housing market. The benefits from the QE-generated turnaround in the housing market have been more widely shared than the benefits of the stock market rally, but these benefits still vary widely across main street.

The 2013 Federal Reserve Survey of Consumer Finances reports that 65.2 percent of households owned their primary residence (down from 67.3 percent in 2010). For households that do own their primary

[14] "Changes in U.S. Family Finances from 2010 to 2013: Evidence from the Survey of Consumer Finance," *Federal Reserve Bulletin*, Vol 100, No. 4, September 2004.
[15] United States Census Bureau, Household Income: 2013 (September 2014), and Household Income: 2015 (September 2016).
[16] An exception is the federal funds rate which is closely controlled by Fed policies.
[17] *Federal Reserve Bulletin*, Box 6.

residence, on national basis, the dollar value gains that have accrued to those who owned higher-priced properties exceeded the gains on cheaper residences (Chart 13). However, more expensive properties on average fell by larger dollar amounts during the crisis. By now, nationwide average prices in most segments of the housing markets have, by some estimates[18], recovered to their pre-crisis values.

Conditions in local housing markets often differ from national trends. For example, in Lexington Kentucky (Chart 14 upper panel), median housing prices did not post sizeable declines in the crisis, and today all three median prices have posted significant gains over 2008 levels. In Milwaukee Wisconsin (Chart 14 lower panel), median home prices in each segment show a recovery pattern similar to the national trend. Median home prices in all price segments declined during the crisis and subsequently recovered (or nearly recovered) to pre-crisis levels. Unlike the national trend, the highest priced housing segment in Milwaukee county has shown weakness in recent months.

The Fed's QE-engineered housing market recovery greatly benefited large numbers of households. Many escaped negative home equity positions they faced earlier in the crisis (Chart 15). Still, improvements in the negative home equity positions of households have been distributed unevenly geographically (Chart 15) as well as across racial groups (Chart 16).

Aside from the unequal distribution of gains generated by the equity and home price appreciations that can be attributed, at least in part, to Federal Reserve quantitative easing, main street would also likely score the Federal Reserve's post-crisis performance on main street access to small businesses credit. Chart 18 show that bank small business lending[19] has been especially weak during the recovery. Bank C&I small business lending only recently recovered to 2008 levels and small business loans backed by collateral other than farms or residential real estate remain far below 2008 peak level even today. While it is unclear whether the weakness in bank small business lending has been driven by supply constraints, or by lack of small business demand, the data show that the Fed's unconventional monetary policies have not expanded bank credit to small businesses.

Federal Reserve polices have also engineered rate reductions for many common consumer loan products. Chart 19 shows that the interest rates banks charge on consumer credit products other than credit cards have declined more than 2 percentage points over the average rates banks charged on these products prior to the crisis. Yet the decline in the interest rates on consumer credit products are far smaller than the decline banks experienced on their cost of funds. Recall that by early 2012, the average price of all common consumer bank savings products was below the effective federal fund rate (Chart 5) which was itself well below the rate the Fed paid banks on their reserves. Chart 20 shows the spread between interest rates charged on common consumer credit products and the effective federal funds rate. The data in Chart 20 indicates that, post crisis, on average banks have been charging and continue to charge consumers a larger interest mark-up over bank cost of funds. The abundant liquidity and exceptionally cheap funding benefits the Federal Reserve has bestowed on banks has not been fully passed on to consumers.

The tally of benefits is short when consumers and small businesses consider the impact that unconventional Federal Reserve monetary policies have had on their banking relationships. For many years now, bank customers have earned virtually nothing on their bank deposits, while customers have

[18] All housing price and equity related estimates in my testimony are taken from the Zillow public website.
[19] Commercial and Industrial loans, or loans backed by nonresidential real estate or farm collateral with outstanding balances less than $1million.

at the same time faced larger mark-ups for bank borrowings. This lopsided benefits tally tips further in banks favor once you realize that, post-crisis, banks have become more reliant on taxpayer-insured deposits to fund their operations. My own recent research shows that a combination of factors, including the Federal Reserve paying interest on bank reserves, quantitative easing, and Dodd-Frank Act changes in the way deposit insurance is priced have created incentives for banks—especially large banks—to substitute insured deposit funding for nonguaranteed wholesale funding.

Chart 21 show a smoothed histogram[20] of the deposit-to asset ratio of all banks with assets greater than $100 billion in December 2007 (blue) and December 2012 (red). Before the financial crisis (2007), large banks used less insured deposit funding and instead preferred to use cheaper wholesale funding sources like borrowed federal fund and repurchase agreements. The monetary policy and regulatory changes that have occurred since 2008 have made deposits a substantially cheaper source of bank funding relative to other sources, and banks have responded by swapping taxpayer insured deposit funding for wholesale funding.

The change documented in Chart 21 is important because it implies that the largest banks are now more dependent on taxpayer guarantees than they were pre-crisis. Deposits in large banks, while not all explicitly insured by the FDIC, are practically speaking fully insured, because of the large bank resolution process. The FDIC always sells the entire deposit franchise of a failing large bank to another large healthy banking institution. The FDIC covers whatever losses are necessary to make the transfer possible. Depositors in large banks never suffer any losses. Moreover, the FDIC's plan for exercising its orderly resolution authority reinforces the government deposit guarantee because the FDIC has pledged, if need be, it will use bank holding company assets to keep subsidiary banks open and operating.

Through a combination of factors including the Federal Reserve's decision to pay interest on bank reserves, through the abundant liquidity the Federal Reserve has made available through its QE operations, and from Dodd-Frank mandated changes in deposit insurance pricing, households now earn virtually nothing on their bank deposits, pay higher spreads when they borrow from banks, and have been unknowingly saddled with larger obligations to support large banks should they be at risk for failure in the future.

A final issue worth noting is that the Fed's current method for controlling the federal funds rate is likely to generate a new source of future controversy, both on on main street and in the US Congress. The Fed cannot return to its pre-crisis method controlling the federal funds rate using open market operations as long as the banking system is flush with excess reserves. To achieve a target federal funds rate, the Fed must pay banks the target rate on banks' reserve balances. As the Fed raises target interest rates, it must make increasingly large interest payments to banks. This will directly reduce the surplus the Fed remits to the US Treasury and increase the federal budget deficit. This sounds like an issue that should be discussed with Congress.

[20] To be more precise, the smoothed histograms are the kernel density estimates for the distribution of banks in the respective quarters.

CHARTS

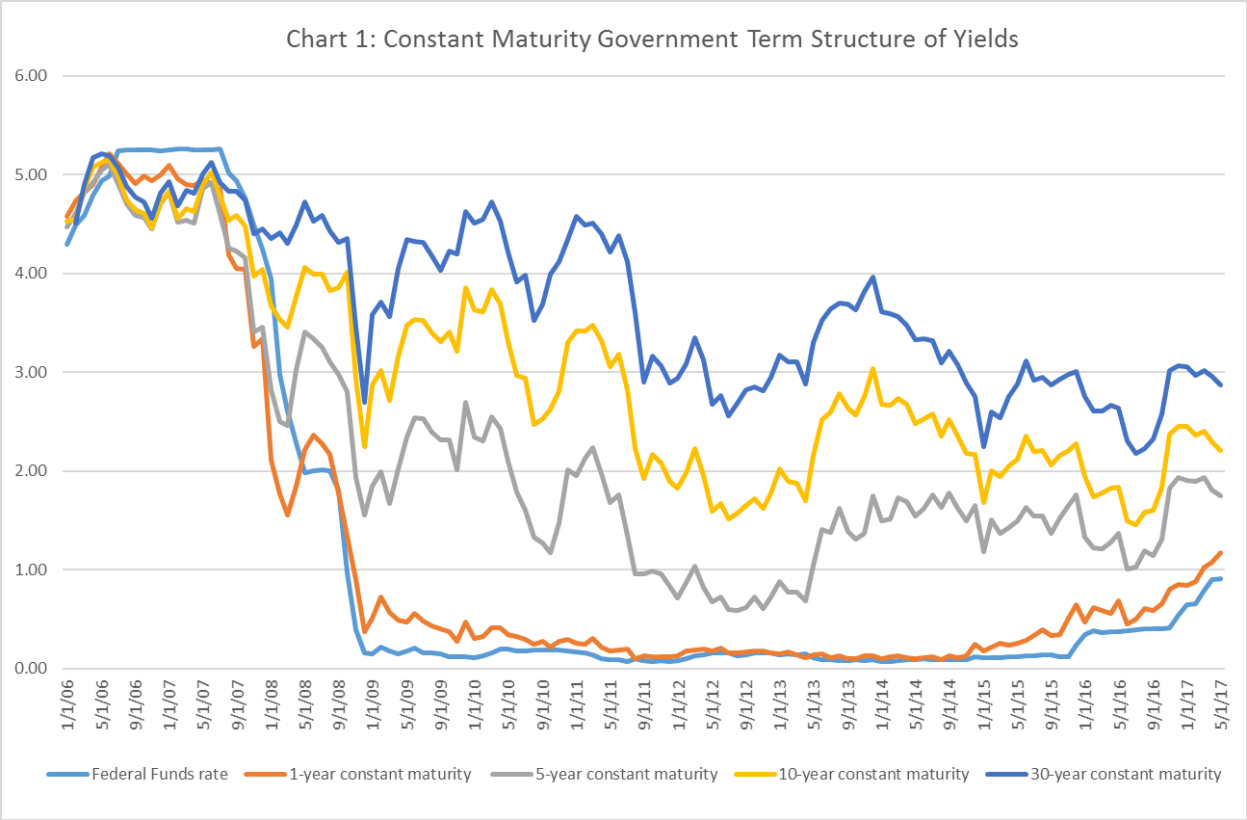


Chart 1: Constant Maturity Government Term Structure of Yields
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/1/06
5/1/06
9/1/06
1/1/07
5/1/07
9/1/07
1/1/08
5/1/08
9/1/08
1/1/09
5/1/09
9/1/09
1/1/10
5/1/10
9/1/10
1/1/11
5/1/11
9/1/11
1/1/12
5/1/12
9/1/12
1/1/13
5/1/13
9/1/13
1/1/14
5/1/14
9/1/14
1/1/15
5/1/15
9/1/15
1/1/16
5/1/16
9/1/16
1/1/17
5/1/17
Federal Funds rate
1-year constant maturity
5-year constant maturity
10-year constant maturity
30-year constant maturity

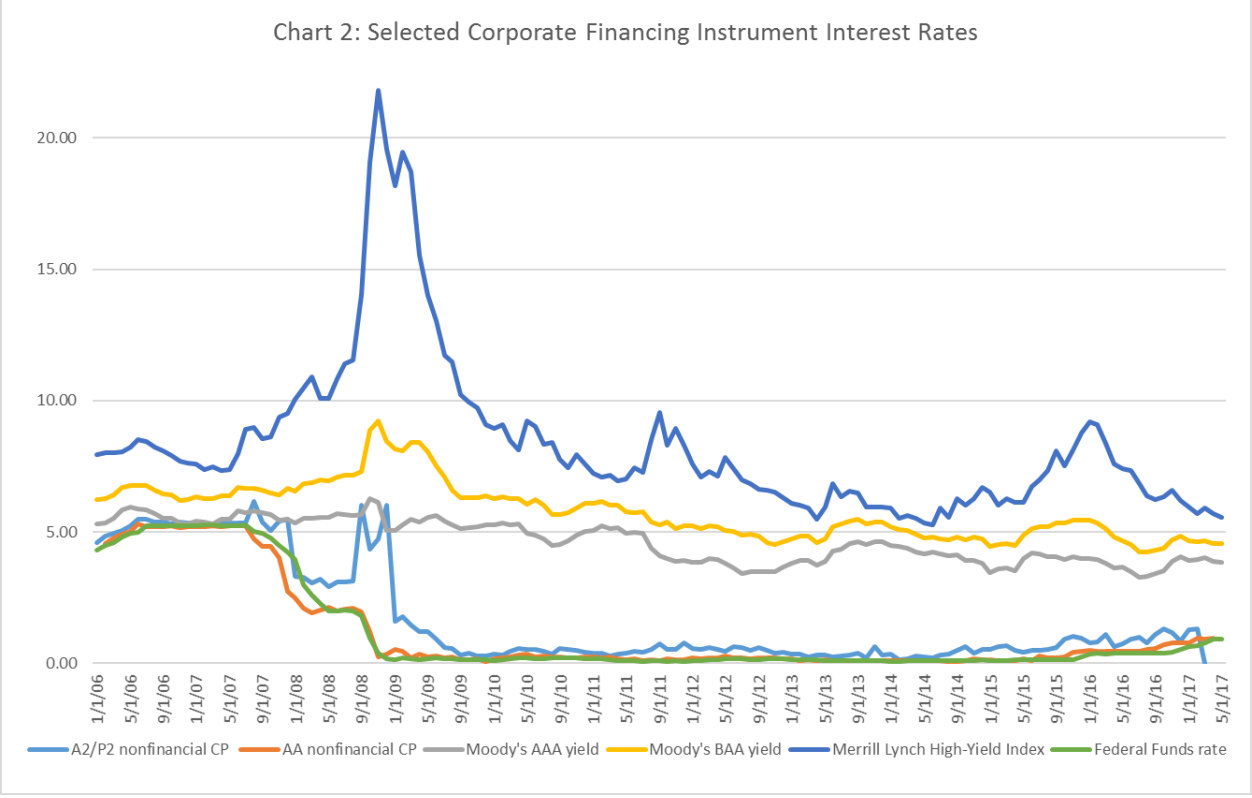


Chart 2: Selected Corporate Financing Instrument Interest Rates
20.00
15.00
10.00
5.00
0.00
1/1/06
5/1/06
9/1/06
1/1/07
5/1/07
9/1/07
1/1/08
5/1/08
9/1/08
1/1/09
5/1/09
9/1/09
1/1/10
5/1/10
9/1/10
1/1/11
5/1/11
9/1/11
1/1/12
5/1/12
9/1/12
1/1/13
5/1/13
9/1/13
1/1/14
5/1/14
9/1/14
1/1/15
5/1/15
9/1/15
1/1/16
5/1/16
9/1/16
1/1/17
5/1/17
A2/P2 nonfinancial CP
AA nonfinancial CP
Moody's AAA yield
Moody's BAA yield
Merrill Lynch High-Yield Index
Federal Funds rate

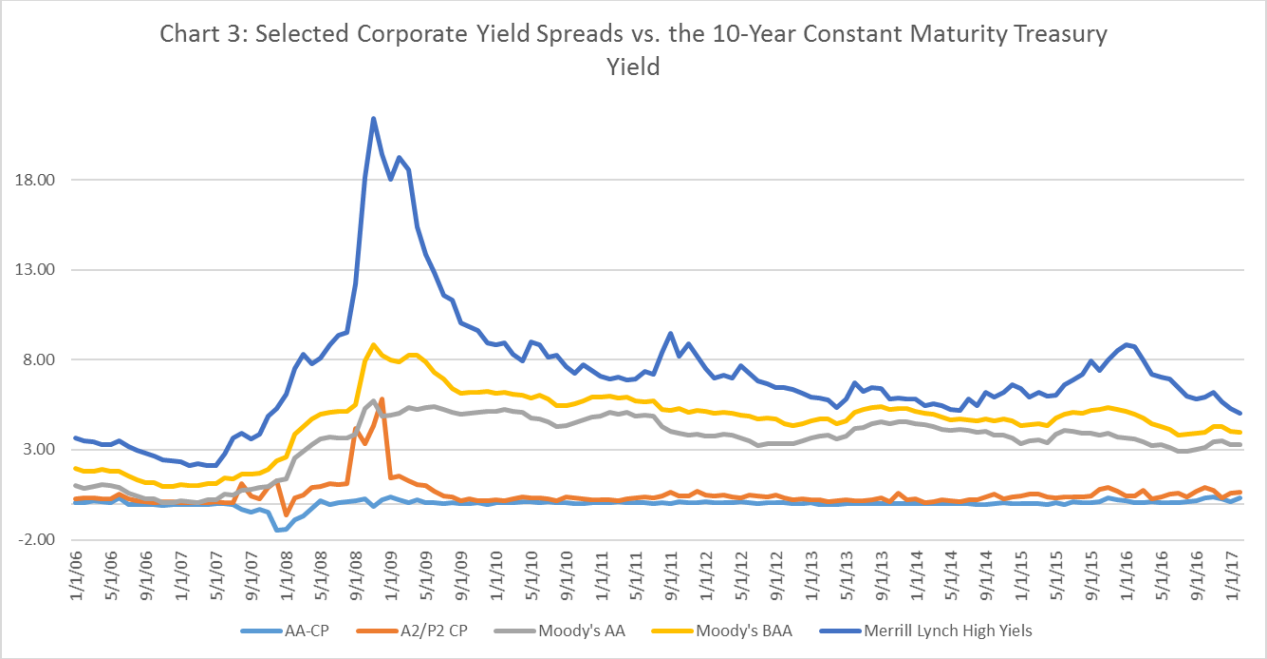


Chart 4: Bank Quarterly Cost of Funding Earning Assets

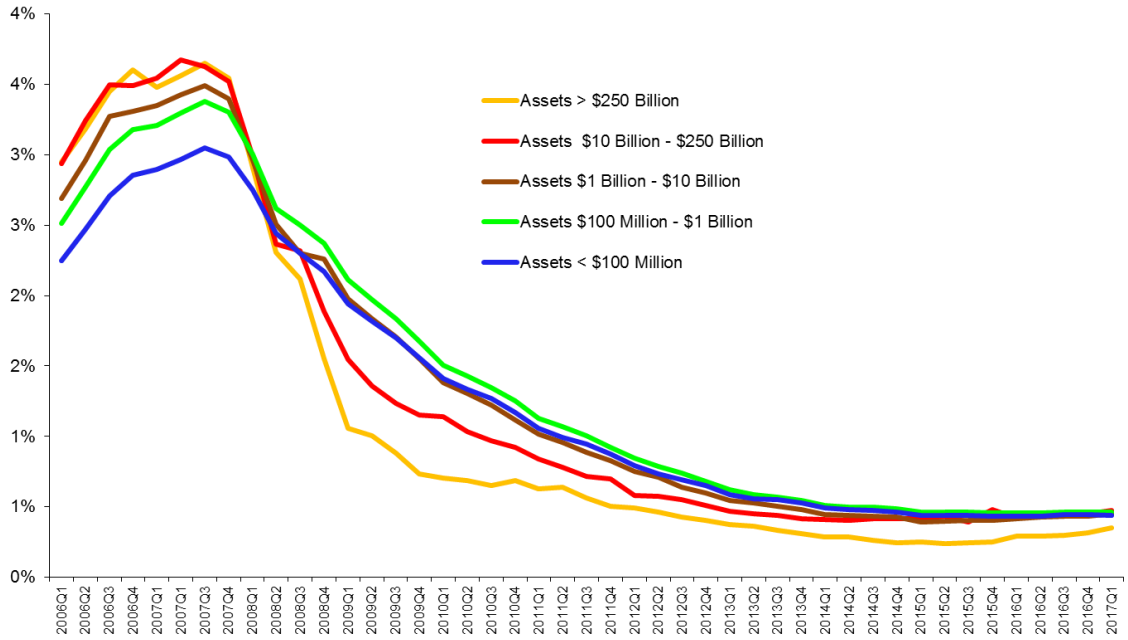


Chart 5: National Average Consumer Savings Rates vs. the Federal Funds Rate

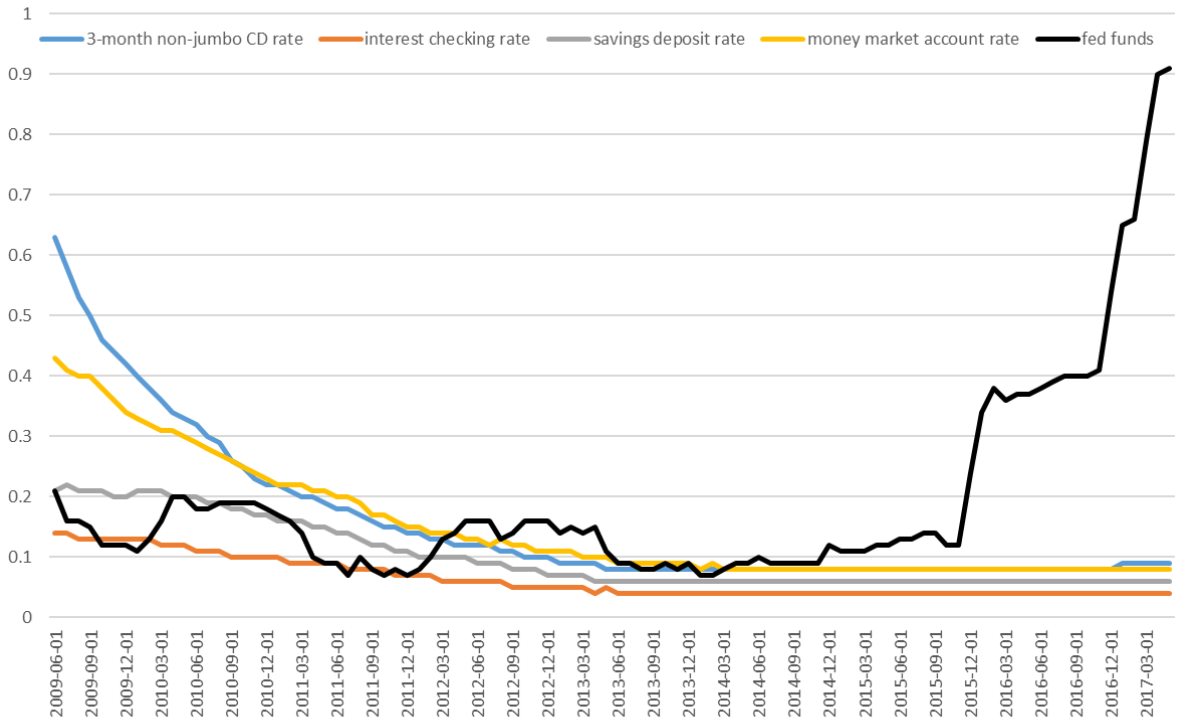
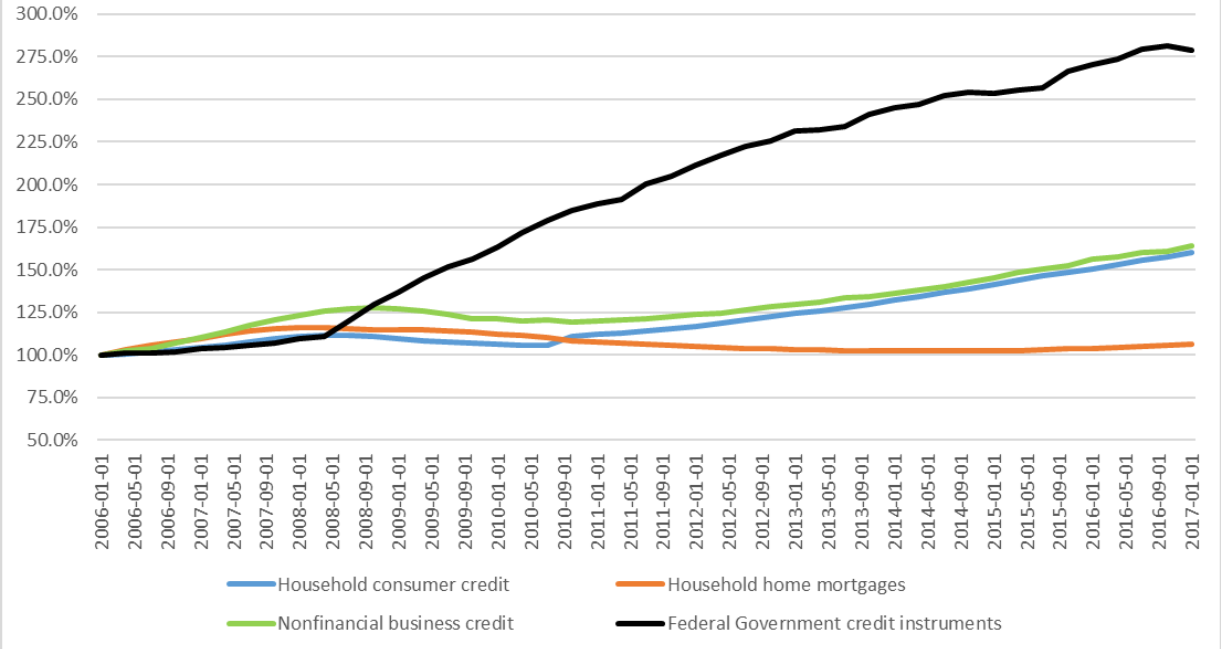


Chart 6: Outstanding Credit by Sector, 2006Q1=100



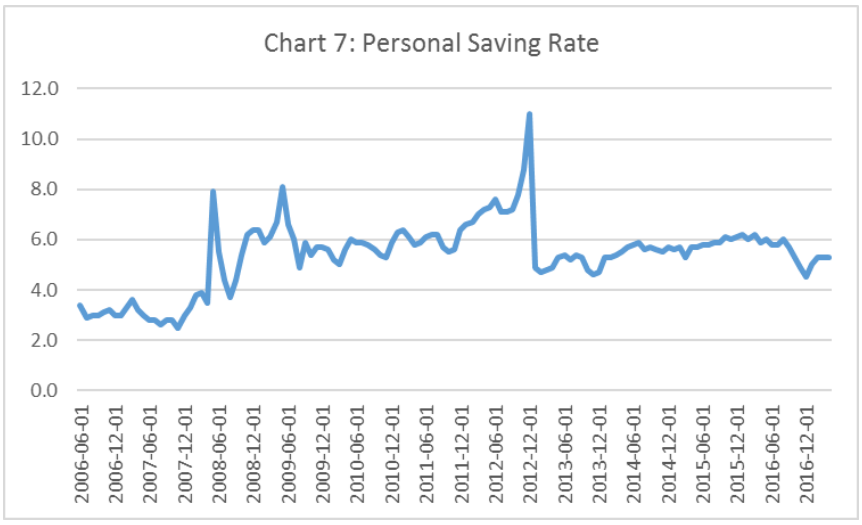


Chart 7: Personal Saving Rate
12.0
10.0
8.0
6.0
4.0
2.0
0.0
2006-06-01
2006-12-01
2007-06-01
2007-12-01
2008-06-01
2008-12-01
2009-06-01
2009-12-01
2010-06-01
2010-12-01
2011-06-01
2011-12-01
2012-06-01
2012-12-01
2013-06-01
2013-12-01
2014-06-01
2014-12-01
2015-06-01
2015-12-01
2016-06-01
2016-12-01

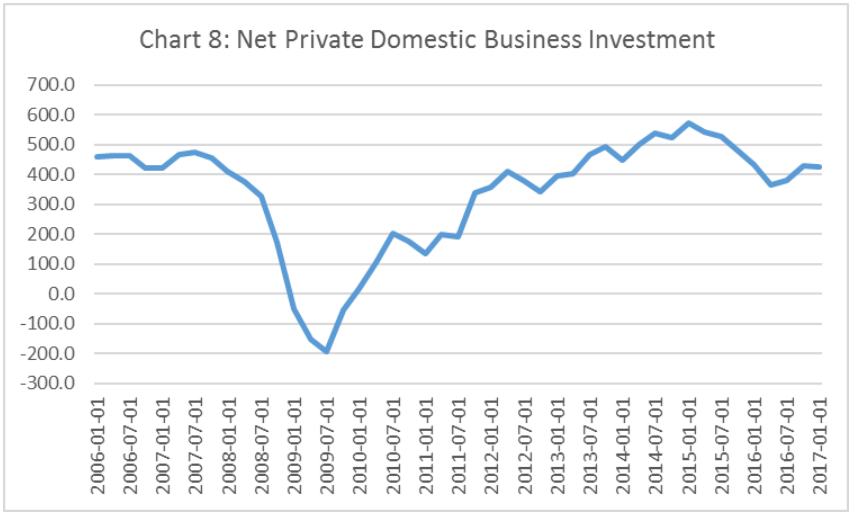


Chart 8: Net Private Domestic Business Investment
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
-200.0
-300.0
2006-01-01
2006-07-01
2007-01-01
2007-07-01
2008-01-01
2008-07-01
2009-01-01
2009-07-01
2010-01-01
2010-07-01
2011-01-01
2011-07-01
2012-01-01
2012-07-01
2013-01-01
2013-07-01
2014-01-01
2014-07-01
2015-01-01
2015-07-01
2016-01-01
2016-07-01
2017-01-01

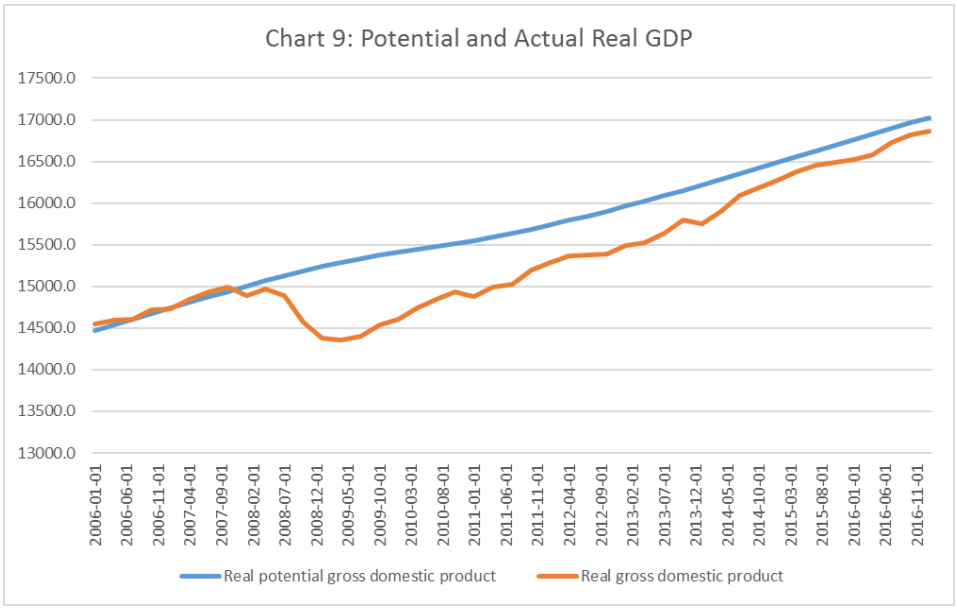


Chart 9: Potential and Actual Real GDP
17500.0
17000.0
16500.0
16000.0
15500.0
15000.0
14500.0
14000.0
13500.0
13000.0
2006-01-01
2006-06-01
2006-11-01
2007-04-01
2007-09-01
2008-02-01
2008-07-01
2008-12-01
2009-05-01
2009-10-01
2010-03-01
2010-08-01
2011-01-01
2011-06-01
2011-11-01
2012-04-01
2012-09-01
2013-02-01
2013-07-01
2013-12-01
2014-05-01
2014-10-01
2015-03-01
2015-08-01
2016-01-01
2016-06-01
2016-11-01
Real potential gross domestic product
Real gross domestic product

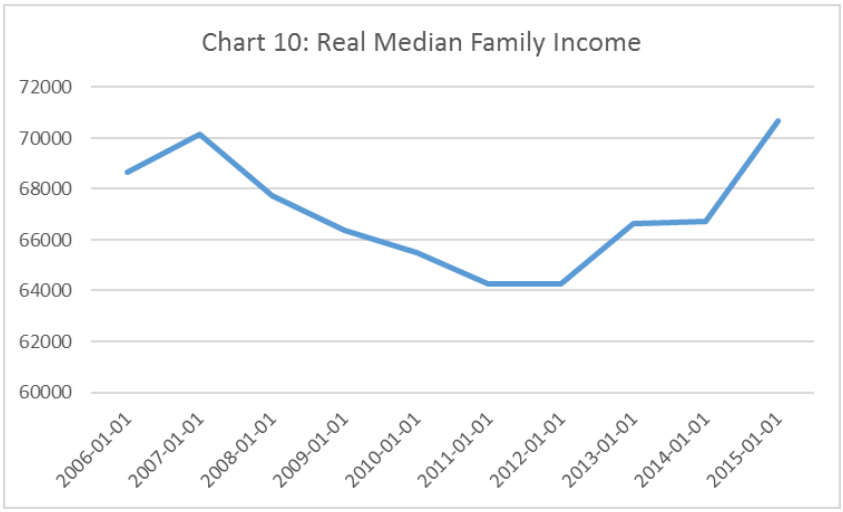
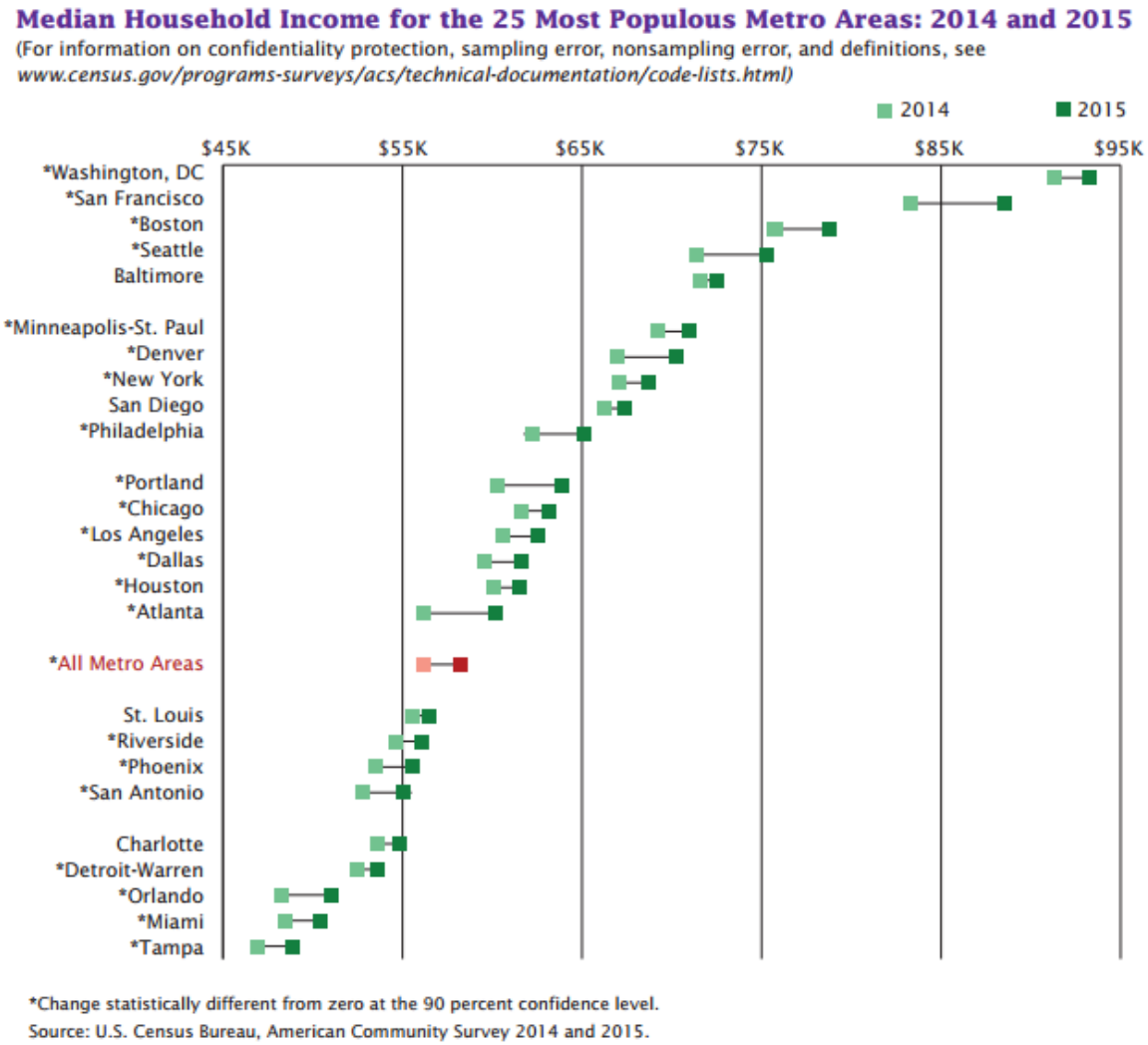


Chart 11: US Census Bureau Estimates of Median Income Gains by Region



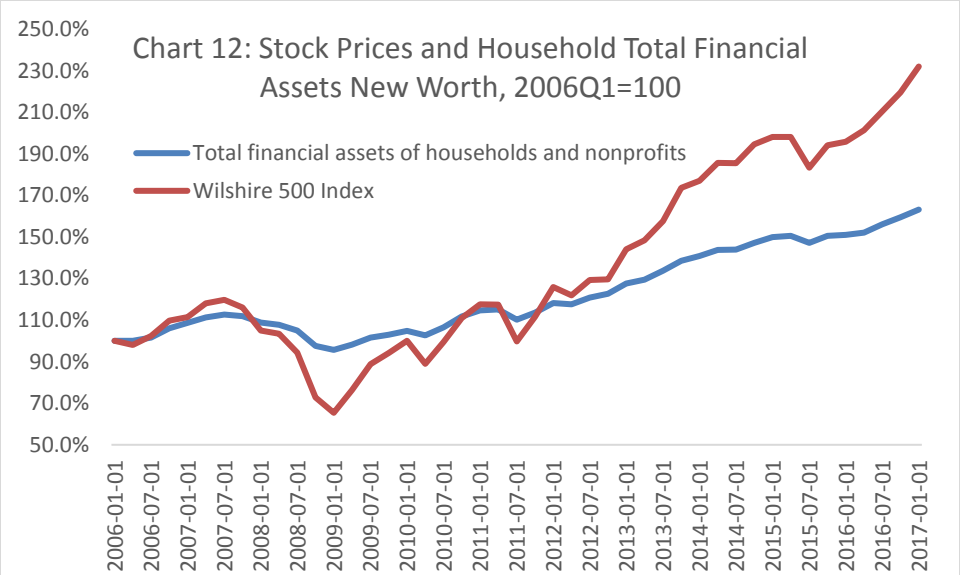


Chart 13: Zillow Estimates of National Median Home Market Values

Zillow Home Value Index, by Thirds Select a region below to view median home values in that metro by bottom, median and top thirds.

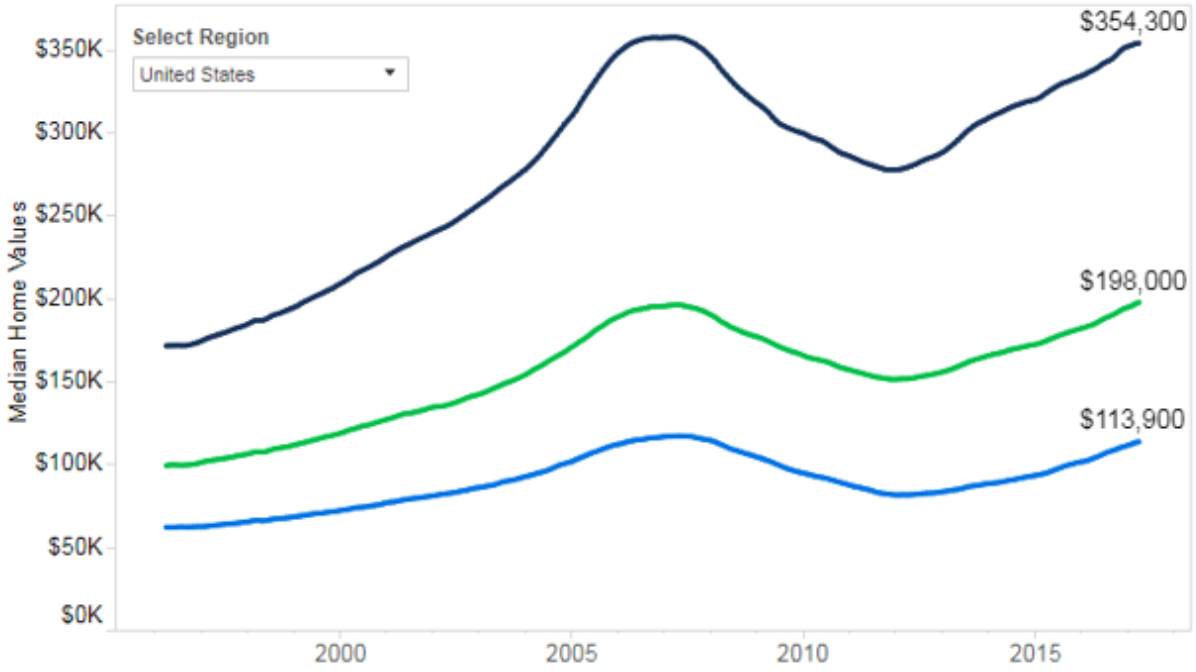
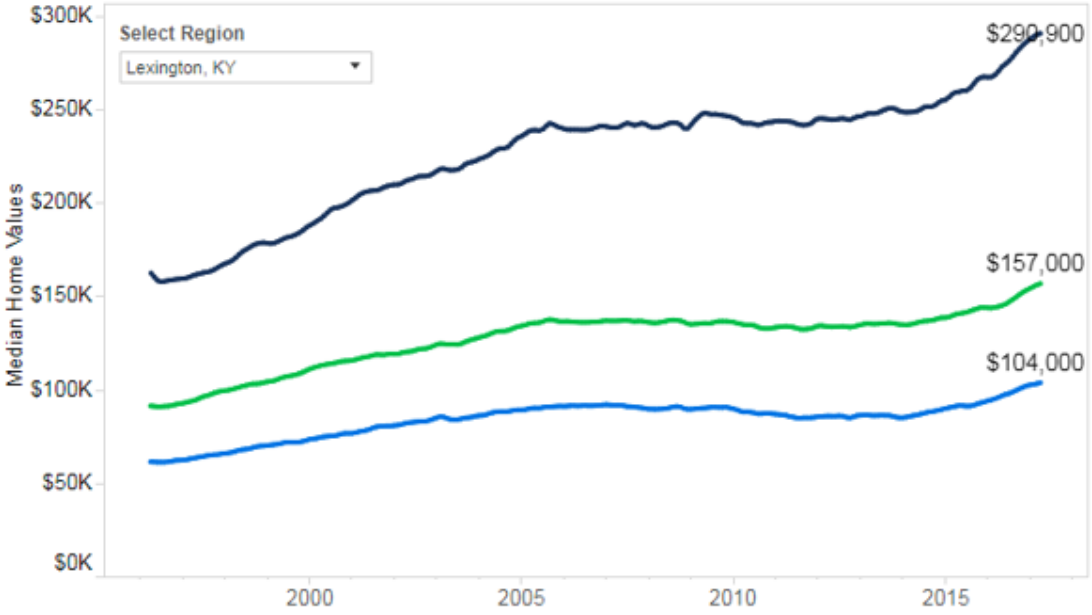


Chart 14: Zillow Estimates of Median Home Values for Selected Counties

Zillow Home Value Index, by Thirds Select a region below to view median home values in that metro by bottom, median and top thirds.



Zillow Home Value Index, by Thirds Select a region below to view median home values in that metro by bottom, median and top thirds.

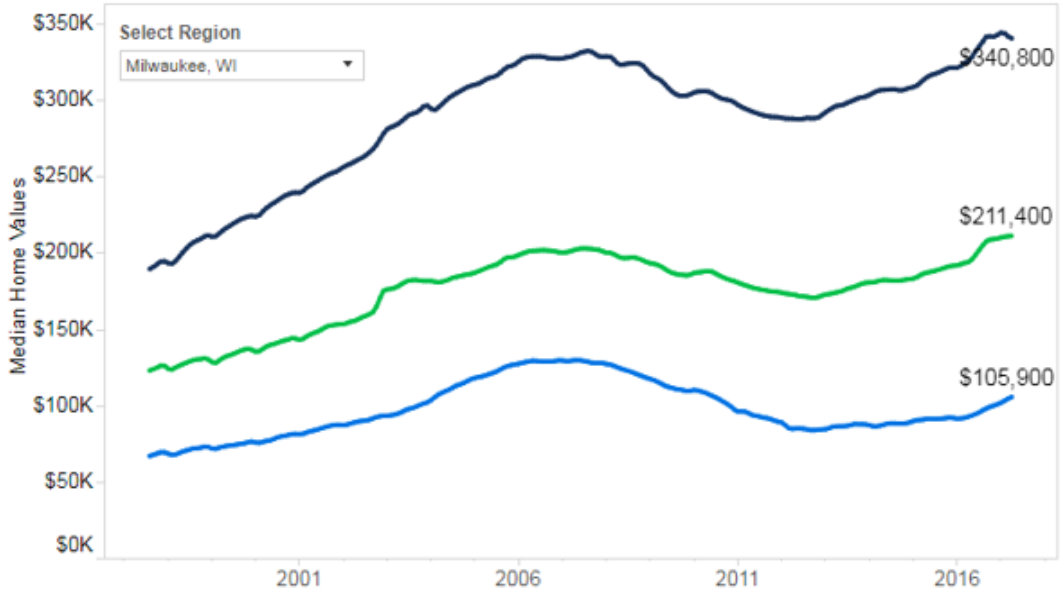


Chart 15: Zillow Estimates of US National Negative Equity Rate, 2016Q4

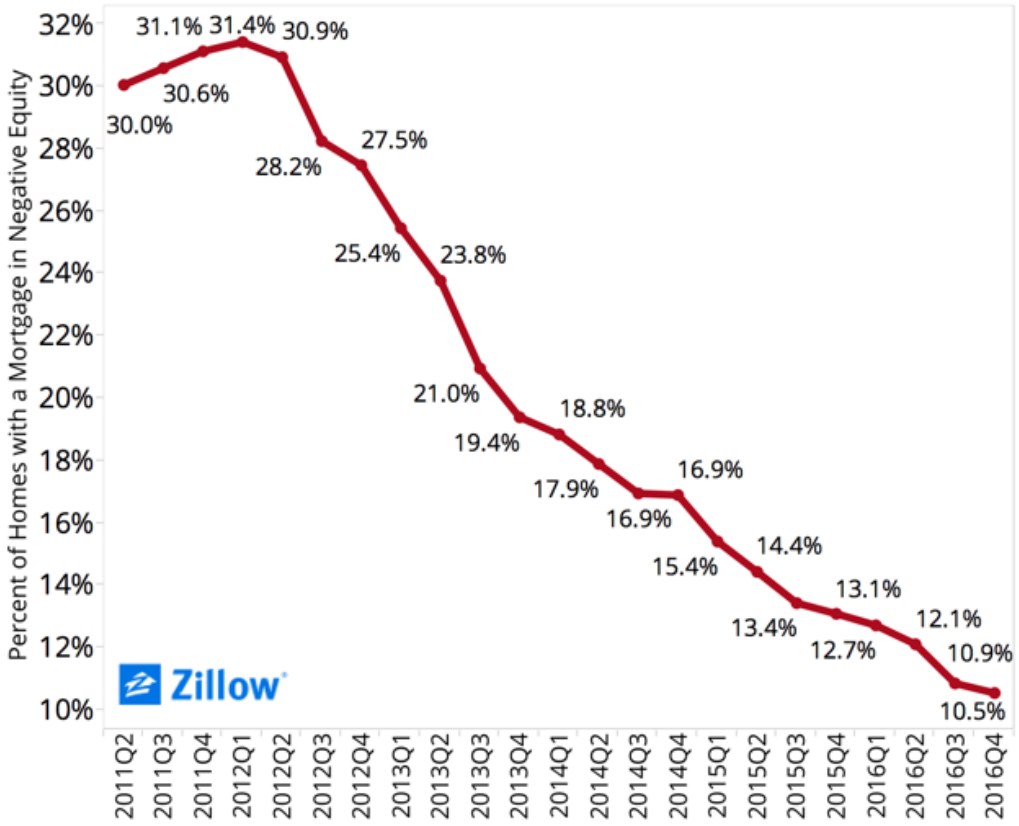
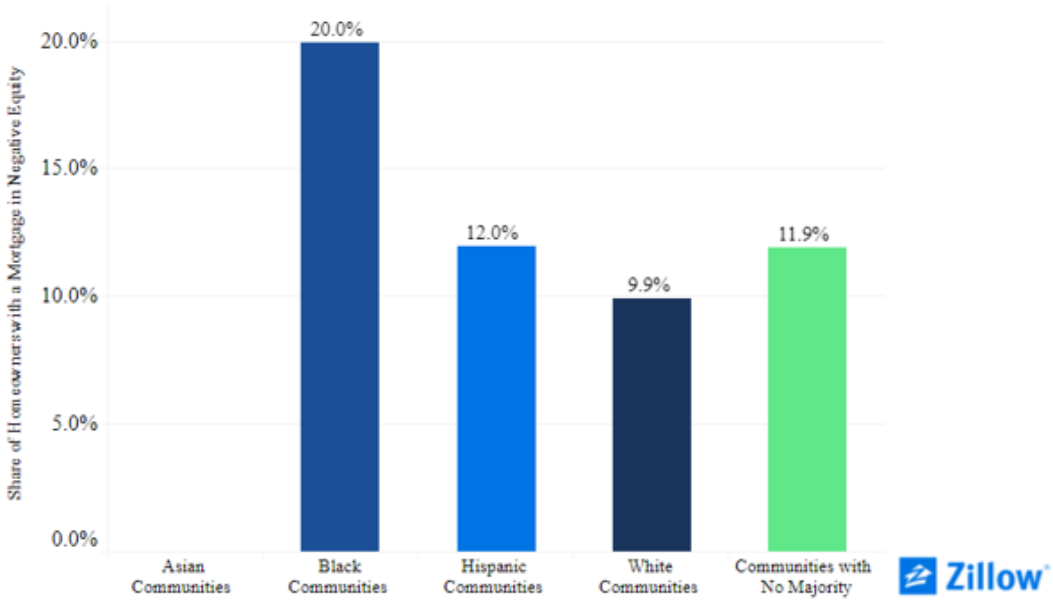


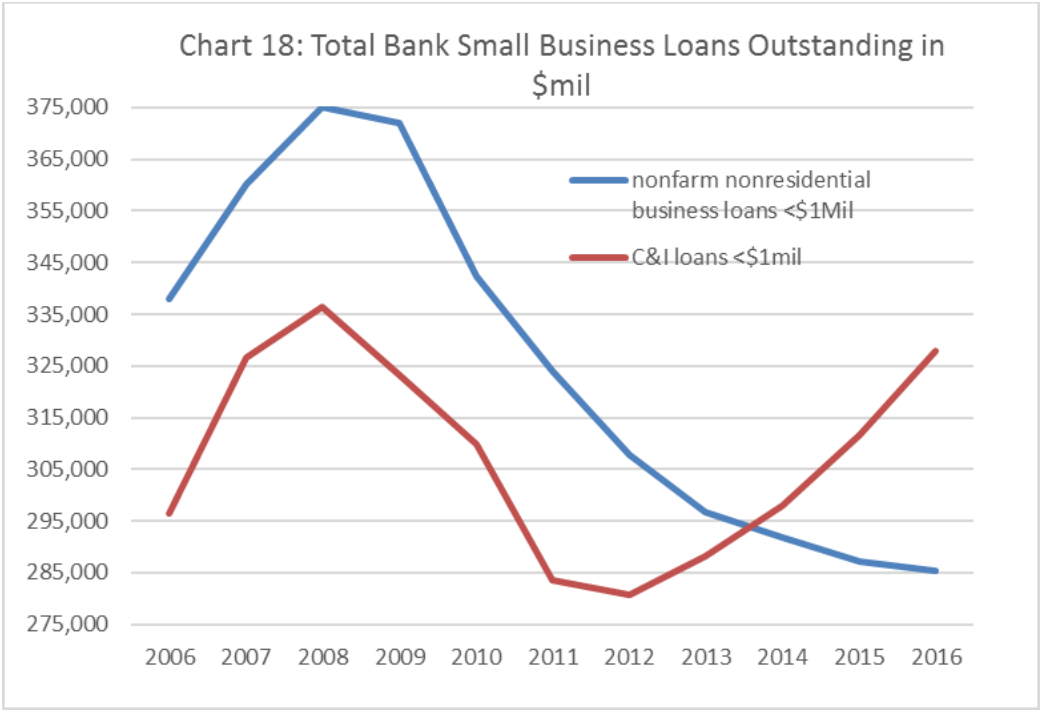
Chart 16: Zillow Estimates of Negative Equity in Selected Counties, 2016Q4

County	Percentage of mortgages with negative equity	Percentage of mortgages with effective negative equity
Bourbon County, KY	7.4	23.9
Clark County, KY	8.7	26.0
Fayette County, KY	13.5	33.6
Milwaukee County, WI	21.2	39.7

Source: Svenja Gudell, "Q4 2016 Negative Equity Report: Improvement continues, but at a much slower rate," Zillow, https://www.zillow.com/research/q4-2016-negative-equity-report-14393/

Chart 17: Zillow Estimates of Negative Equity by Race, 2016Q3





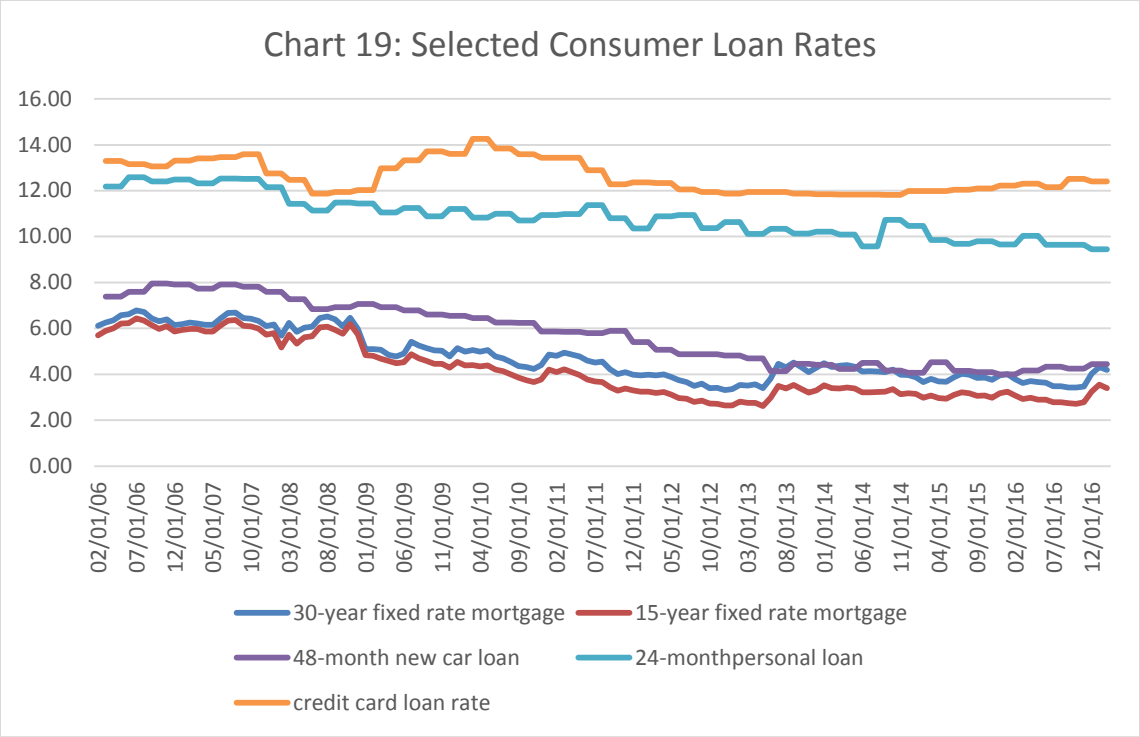


Chart 19: Selected Consumer Loan Rates
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
02/01/06
07/01/06
12/01/06
05/01/07
10/01/07
03/01/08
08/01/08
01/01/09
06/01/09
11/01/09
04/01/10
09/01/10
02/01/11
07/01/11
12/01/11
05/01/12
10/01/12
03/01/13
08/01/13
01/01/14
06/01/14
11/01/14
04/01/15
09/01/15
02/01/16
07/01/16
12/01/16
30-year fixed rate mortgage
15-year fixed rate mortgage
48-month new car loan
24-monthpersonal loan
credit card loan rate

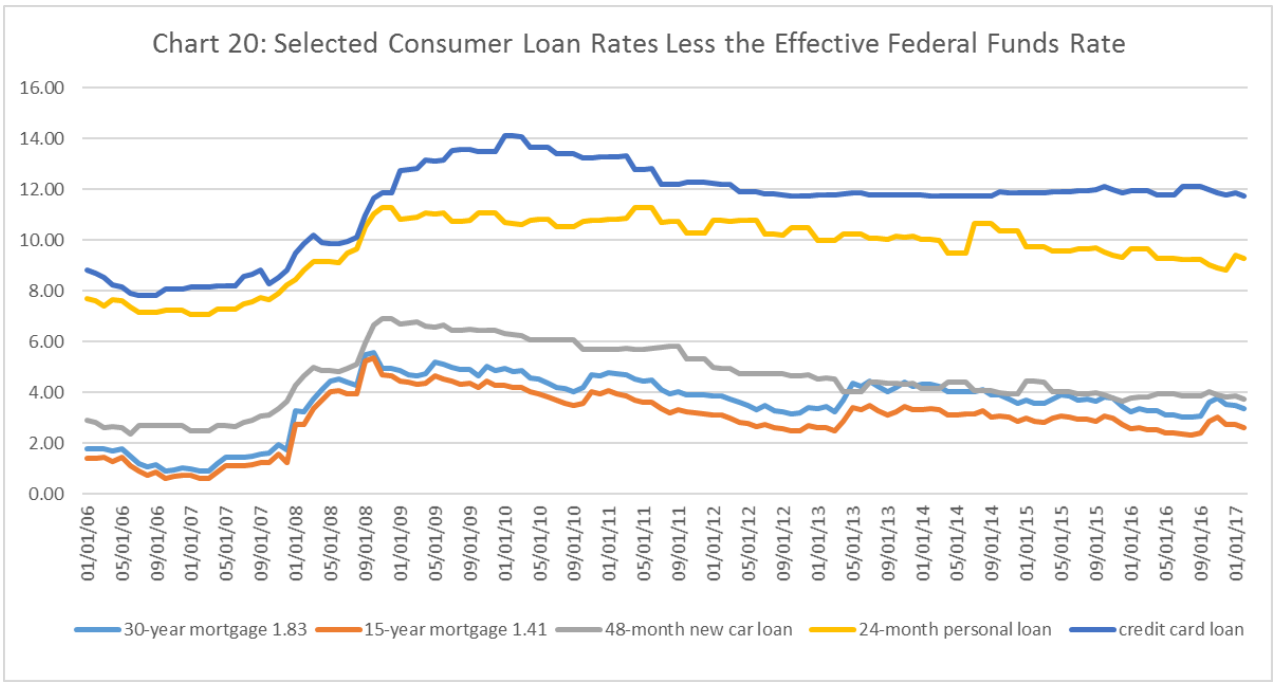


Chart 20: Selected Consumer Loan Rates Less the Effective Federal Funds Rate
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/01/06
05/01/06
09/01/06
01/01/07
05/01/07
09/01/07
01/01/08
05/01/08
09/01/08
01/01/09
05/01/09
09/01/09
01/01/10
05/01/10
09/01/10
01/01/11
05/01/11
09/01/11
01/01/12
05/01/12
09/01/12
01/01/13
05/01/13
09/01/13
01/01/14
05/01/14
09/01/14
01/01/15
05/01/15
09/01/15
01/01/16
05/01/16
09/01/16
01/01/17
30-year mortgage 1.83
15-year mortgage 1.41
48-month new car loan
24-month personal loan
credit card loan

Chart 21: Large Bank Dependence on Insured Deposits