The Financial, Economic, Social, and Political Impact of Quantitative Easing in the United States

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May 2016

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ACKNOWLEDGEMENTS

This report represents the collective efforts of a team of graduate students at Columbia University's School of International and Public Affairs. Our Capstone assignment—to partner with the Markets Room at The United States Department of the Treasury in an examination of the financial, economic, social and political impacts of quantitative easing—has proved to be an unparalleled learning experience for us.

Of course, none of this would have been possible without the Markets Room. We are especially grateful to John Fagan and Albert Lee for designing the terms of reference for this fascinating project and for generously sharing their time, experience and insight with us as we embarked on this unique academic odyssey. Similarly, the resultant research would have been far less rich without the contributions of the many distinguished scholars and industry experts who graciously agreed to be interviewed by the Team for this project, along with the technical expertise of Alexandre Goncalves, PhD candidate, who assisted with our data analysis.

Finally, we are indebted to the leadership of Professor Seamus O'Cleireacain, our avuncular faculty advisor. Professor O'Cleireacain served as the ideal moderator for regular team debates on this controversial subject. His profound technical expertise and abundant reservoir of patience were much needed and often tested!

In the end, any errors or oversights appearing in the final report belong to the Capstone team and the Capstone team alone. Happy reading!

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EXECUTIVE SUMMARY

In the wake of the Lehman Brothers collapse and the ensuing U.S. and global financial crisis, the world economy was on the brink of a major depression. Having rapidly exhausted its conventional monetary policy tools—as the short-term policy rate was already near zero—to stimulate the U.S. economy, the Federal Reserve turned to unconventional monetary policy in the form of large scale asset purchases ("LSAPs"), known as Quantitative Easing ("QE"). QE was intended to provide liquidity to frozen credit markets, lower interest rates of various maturities to stimulate aggregate demand and signal to markets that central bankers were taking decisive steps to avoid the mistakes which led to the Great Depression. While a large body of literature has examined the effects of QE on financial markets, less is known on the other intended and potentially unintended consequences of QE. After revisiting the effects of QE on financial markets, this project will therefore aim to assess the broader economic, social and political impacts of QE in the U.S. This paper will argue that:

- QE achieved its expected financial markets goal by restoring stability and lowering interest rates. But in doing so, QE may have sown the seeds for future crises, with increased dependence of financial markets on central bank intervention, illiquidity in certain markets, increased risk taking in certain asset classes, and concerns about exit strategies;

- QE had mixed to positive effects on the real economy: GDP contraction was less severe than what the country likely would have experienced in the absence of the policy, aggregate demand was partially stimulated and the economy is now almost back at full employment. Despite this, there remain concerns about structural issues, the lack of full recovery in some credit markets to stimulate investment, and deflationary pressures;

- QE more than likely mitigated income inequality in the U.S. That assertion is not unanimously held by those who have studied this question, and it is just as likely that QE exacerbated wealth inequality and consumption inequality over the same period.

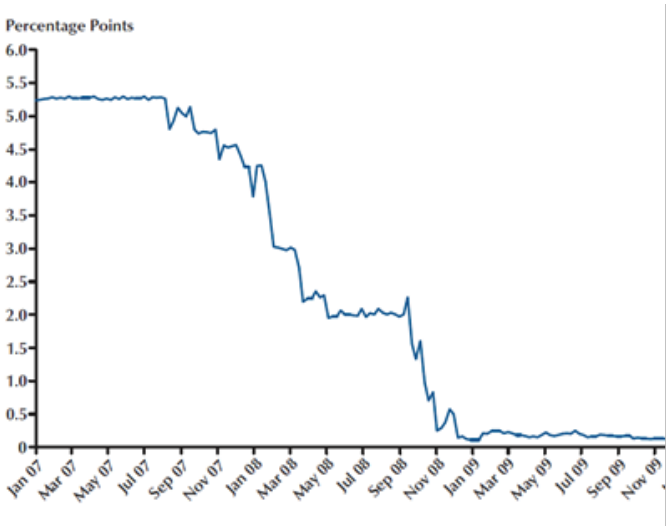
- QE has both contributed to a greater politicization of the Fed itself and affected the political dynamics of domestic politics. In doing so, we offer evidence that the Fed's pursuit of unconventional monetary policy has diminished political support for the nation's central banking system, weakened the Fed's credibility, and permanently altered underlying distinctions between monetary and fiscal policy in the United States.

1. INTRODUCTION

1.1. Monetary Policymaking in an Era of Quantitative Easing

In the midst of the "Great Recession" of 2007-2009, and especially in the immediate aftermath of the Lehman Brothers collapse in September 2008, the United States Federal Reserve ("The Fed") quickly found itself in unfamiliar and potentially dangerous territory. While the Board of Governors of the Fed wished to pursue continued aggressive action to further stabilize financial markets and combat the deflationary pressures of the emerging recession, its conventional monetary policy instrument—targeting the Federal Funds Rate ("FFR")—had approached the so-called "zero lower bound" ("ZLB").

Figure 1: The Effective Federal Funds Rate

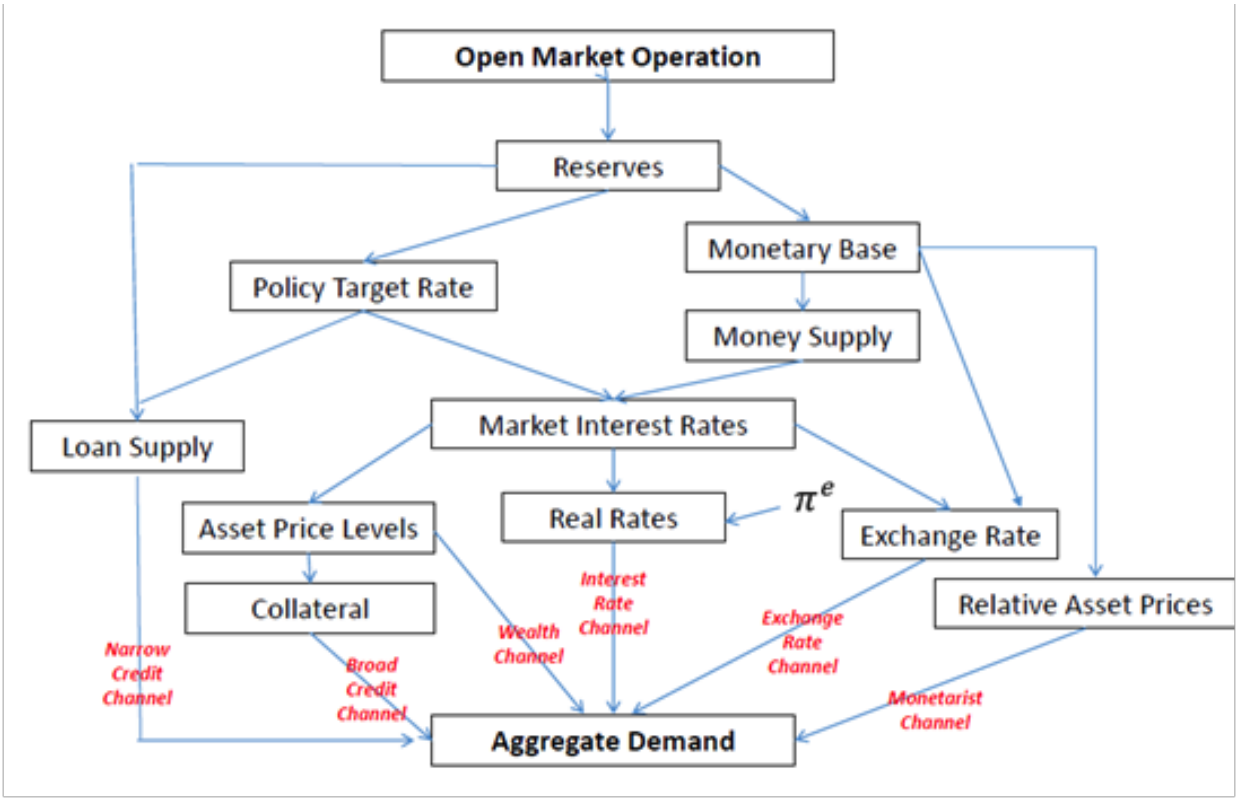


Source: The Federal Reserve

Prior to the financial crisis, the Fed conducted monetary policy by establishing its policy rate—the FFR—to be consistent with its dual mandate for price stability and full employment. The Fed achieved its target by conducting open-market operations ("OMOs") involving the purchase or sale of short-term government securities through its primary dealer network. The purchase of securities by the Fed adds to the supply of reserves in the system with a commensurate decline in the effective policy rate while the sale of securities by the Fed reduces the supply of reserves from the system thereby increasing the effective policy rate. In normal market conditions, the Markets Group of the Federal Reserve Bank of New York which implements these OMOs on behalf of the Federal Reserve Open Market Committee ("FOMC") needs only to make "fine-tuning" adjustments since the credibility of the Central Bank and the efficiency of the market for Fed Funds means a new equilibrium rate is reached almost instantaneously following the announcement of any FOMC policy adjustment.

In such an environment, monetary policy works its way through the financial markets to the real economy through a series of channels as depicted in the below exhibit.

Figure 2: Monetary Transmission Mechanisms

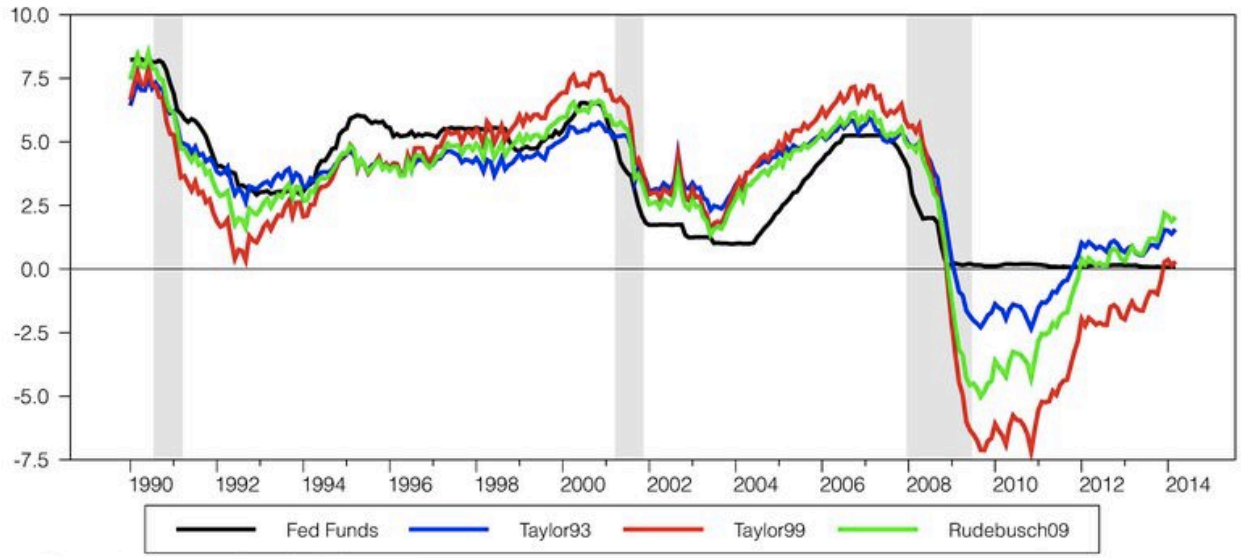


Source: Kuttner & Mosser, 2002

But with the bursting of the real-estate bubble, its propagation to the rest of the economy, and the associated pressure that this placed on the balance sheets of both borrowers and lenders, the Fed found the usual transmission mechanisms for monetary policy to be severely impaired, and its conventional policy tool apparently disabled. Since the FFR was now anchored at the ZLB and traditional bank credit channels were in disarray, the Fed turned to a range of unconventional monetary policies to unfreeze financial and credit markets and ultimately stimulate the economy. Central to the bank's new monetary policy approach was a program of quantitative easing ("QE") which the Fed engineered to inject liquidity and ultimately coax lending through the purchase of large quantities of assets from commercial banks and other investors. In some respects, QE can be viewed as merely an adaptation of conventional monetary policy in an environment where the traditional channels for the dissemination of policy have been impaired. Indeed, the Fed used QE as a way to conduct OMOs by focusing on the long-end of the yield curve instead of the short-end. Fed economists theorized that through a combination of portfolio balance and signaling channels, large-scale asset purchases ("LSAPs") would lower the rates that most directly influence commercial and household savings and

investment decisions. As a consensus emerged that the FFR should theoretically be significantly negative, QE was intended to circumvent the ZLB at the short end by dramatically flattening the yield curve. The exhibit below illustrates that "Taylor-rule" models for monetary policy called for significantly negative policy rates beginning in 2008. But with uncertainty around the efficacy of negative interest rates, the Fed needed to devise an alternative strategy to produce further monetary policy accommodation. QE became the central element of that strategy.

Figure 3: Taylor Rule Applications (Estimated Policy Rules for the Fed Funds Rate)

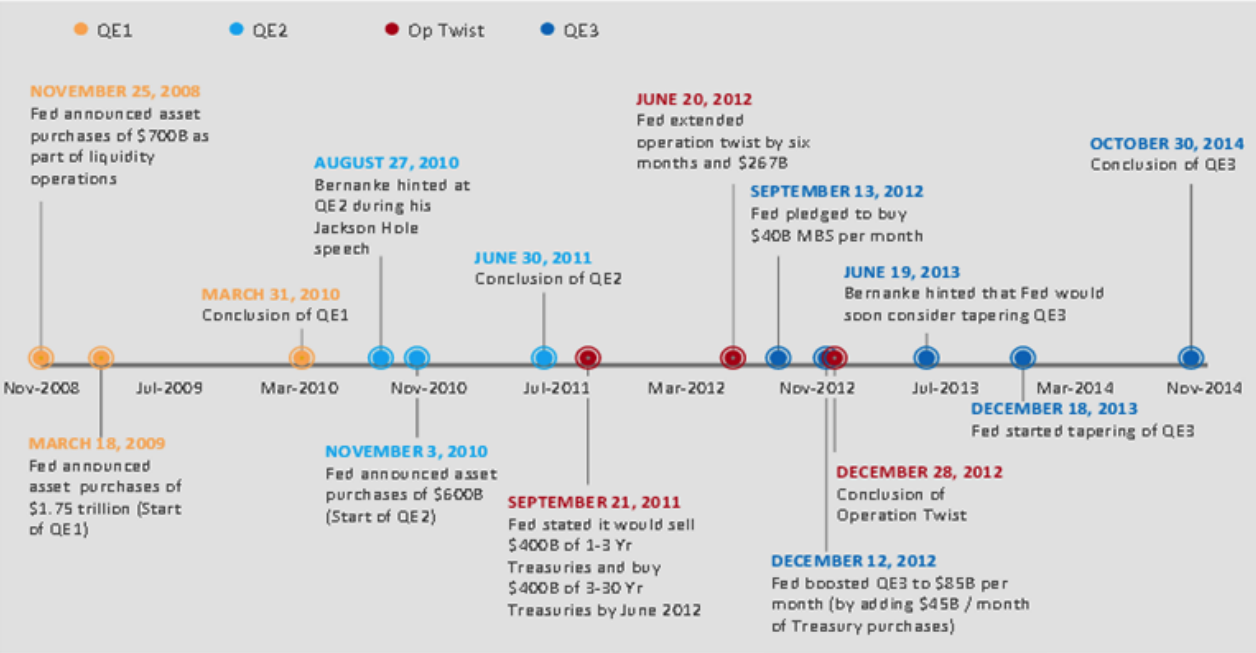


Source: economistsview.typepad.com/

In the United States, QE was implemented in multiple rounds and accompanied by forward guidance from the Fed to instill marketplace confidence. QE 1 was intended to, "help improve conditions in private credit markets."[1] QE 2 was launched to "promote a stronger pace of economic recovery and to help ensure that inflation, over time, [remained] at levels consistent with [the Fed's] mandate."[2] The short-lived Maturity Extension Program known as "Operation Twist" was designed to drive down interest rates on longer-term bonds. Finally, QE 3 aimed to "put downward pressure on longer-term interest rates, support mortgage markets, and help to make broader financial conditions more accommodative."[3] The successive rounds of QE are detailed in the below timeline:

[1] FOMC press release, March 18, 2009
[2] FOMC press release, November 3, 2010
[3] FOMC press release, September 13, 2012

Figure 4: QE Timeline

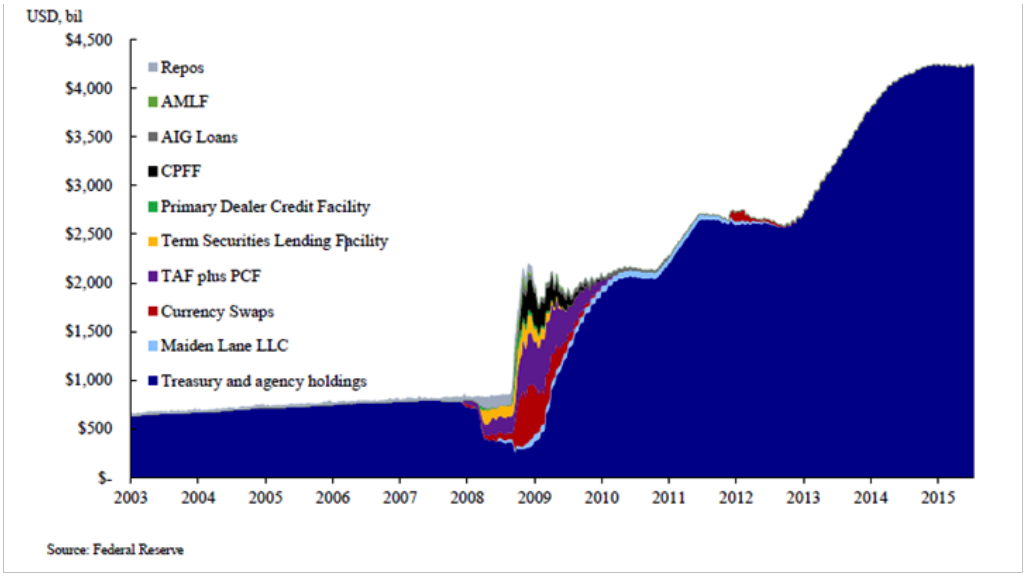


Source: Capital Economics

In total, successive rounds of LSAPs have caused the Fed's balance sheet to grow exponentially. At the time of this writing, the U.S. Central Bank continues to hold over $4 trillion in assets against its liabilities which consist primarily of the aggregate monetary base. Despite initiating lift-off in December 2015 with a modest hike in both the FFR and what has effectively become its new policy rate, the interest rate on excess reserves ("IOER"), the Fed's balance sheet looks to remain enormous for the foreseeable future.[4] Our paper seeks to explore these potential consequences and risks.

[4] One consequence of QE for monetary policy is that since the supply of reserves is now so immense, "modest changes in the supply of reserves will no longer have much influence on the federal funds rate. Rather than varying the supply of reserves, the Fed now manages the federal funds rate by changing the rate of interest it pays on reserves." B. Bernanke and D. Kohn, "The Fed's Interest Payments to Banks," *Brookings Institution*, February 2016, http://www.brookings.edu/blogs/ben-bernanke/posts/2016/02/16-fed-interest-payments-banks

Figure 5: The Fed's Domestic Portfolio



Source: Federal Reserve

1.2. Capstone Project Focus, Methodology, and Outline

Given that the Fed remains far from exiting QE, it is difficult to definitively evaluate the efficiency and efficacy of the program. Though it has become the modern policy instrument of choice in many advanced economies following the Great Recession—the Bank of England followed the U.S. in 2009 and the European Central Bank ("ECB") launched its own QE program in 2015—quantitative easing remains a largely experimental monetary policy tool. It was only first implemented from 2001 to 2006 by the Bank of Japan ("BoJ"), which resorted to LSAPs to increase the balance sheets of Japanese commercial banks. The novelty of the policy means that there are few longitudinal studies on the topic nor is there a consensus in the academic literature on the models to use to assess its effects. Additionally, the post-recessionary period in the U.S. includes a number of concurrent confounding factors (including secular trends in inequality, skill-biased technological change, and fiscal policy interventions) that further complicate the task of isolating the true effects of quantitative easing.

With that in mind, this Capstone Project attempts to evaluate the intended and potentially unintended financial, economic, social, and political effects of the Fed's unconventional monetary policy in the United States since the onset of the Great Recession in late 2008. We consider the direction and magnitude of the policy's effects on various economic sectors and evaluate the costs and benefits associated with the policy by relying on (i) academic and marketplace literature identifying conventional and unconventional monetary transmission channels and (ii) insights sourced from interviews with both academics and various sector stakeholders (see list of interviewees in Appendix 1).

We begin by examining the impact of each round of QE on the financial markets with an assessment of the size and composition of Federal Reserve asset holdings, asset market and exchange rate trends, as

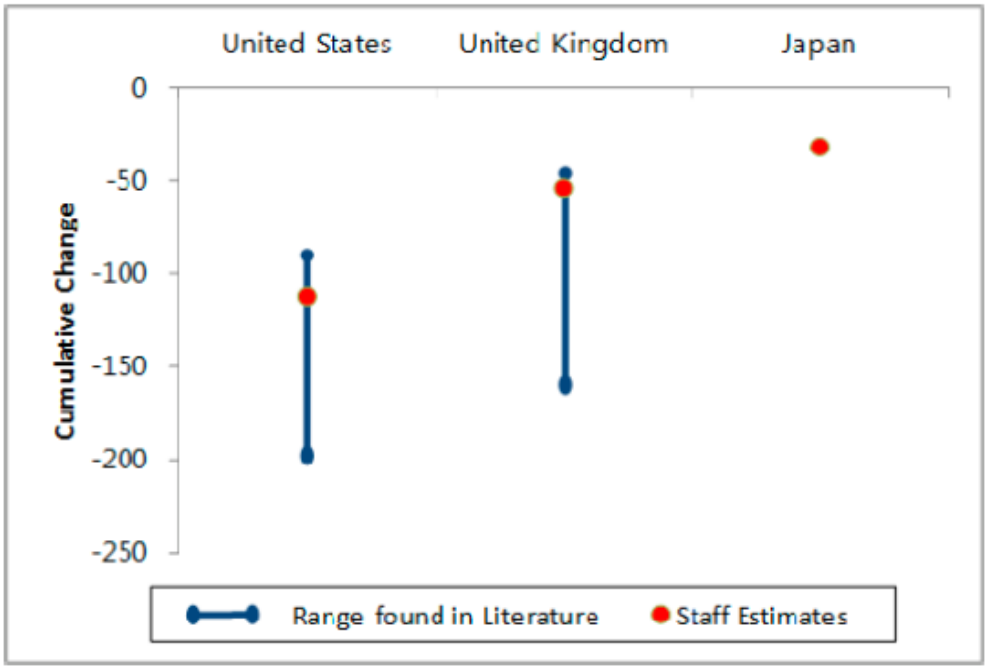
well as inflation expectations. We then define and evaluate transmission mechanisms from the financial sector into the real economy and assess the short-to-medium-term effects of QE on a range of macroeconomic aggregates (including GDP and its main components, inflation, the unemployment rate and wages). Next, the paper draws on its real economy findings to inform an analysis of the social effects of QE identifying transmission mechanisms from the literature and then extending them to consider distributive consequences and “winners” vs. “losers” between various groups (e.g. old vs. young, borrowers vs. savers, wealthy vs. middle-class vs. poor). Evidence of QE’s social impact, such that it exists, is derived largely via an exhaustive literature review of both theoretical and econometric papers and discussions with academics. Additionally, we evaluate the political impact of QE with a focus on interactions between forward guidance, media messaging, and measures of confidence and uncertainty held by the population at large. This segment of the report features the strategic inclusion of QE discussions in political campaigning as well as QE’s potential impact on government spending. Finally, we consider the role of domestic QE policy and the prospect of unwinding in the context of the global political economy.

2. FINANCIAL MARKETS IMPACT ANALYSIS

2.1. QE's Success: Reducing Long-Term Rates

Perhaps the best-documented aspect of QE has been the impact of the policy on financial markets. Since LSAPs were intended to stimulate aggregate demand in the domestic real economy by using financial markets as a conduit, the analysis of these markets serves as a springboard towards an examination of QE's impact on the real economy as well as its social and political impacts. Former Fed Chairman Ben Bernanke has famously described QE as a monetary policy tool that "works in practice but…doesn't work in theory."[5] Our research identifies as a consensus opinion the view that QE did indeed reduce long-term interest rates most likely through a portfolio rebalance channel coupled with signaling effects. That said, given the immense size of the LSAPs the reduction in rates appears quite modest and with diminishing results upon each successive round of the program.

Figure 6: Cumulative Effects of Bond Purchases on 10 Year Government Yields

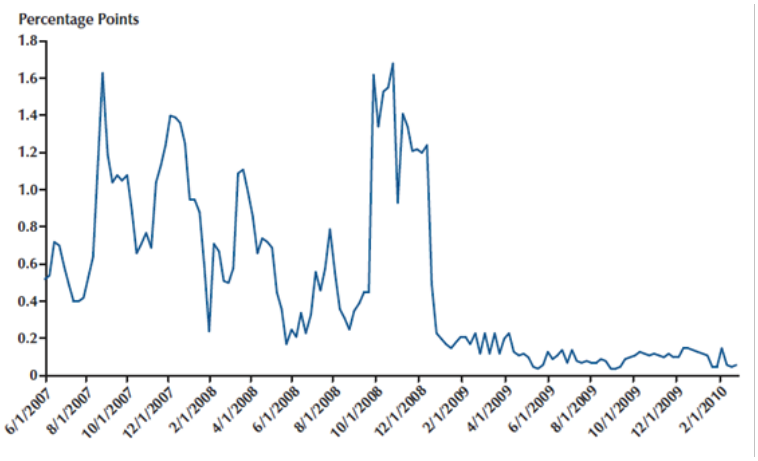


Source: IMF

In addition, the range of emergency facilities created by the Fed to support financial markets at the peak of the panic undeniably played a vital role in restoring some sense of normalcy to what otherwise may have devolved into a prolonged global run on the markets. This effect can be seen in venue after venue, most notably in the market for commercial paper on which many U.S. companies rely for funding ongoing operations. The restoration of stability to this key market following Fed intervention has been one of the clearest successes of U.S. central bank policy in the crisis era.

[5] Bernanke's tongue-in-cheek remark was made during a Brookings Institution interview on January 16, 2014

Figure 7: Commercial Paper vs. T-Bill Risk Spread



Source: Federal Reserve

2.2. QE's Unintended Consequences: Six Areas of Concern

While QE appears to have achieved its proximate target to reduce long-term interest rates, the policy has certainly not been without cost. Our research on the financial market impact of QE focuses on the potential for unconventional monetary policy to generate collateral damage. To that end, we highlight six concerns regarding QE in this area:

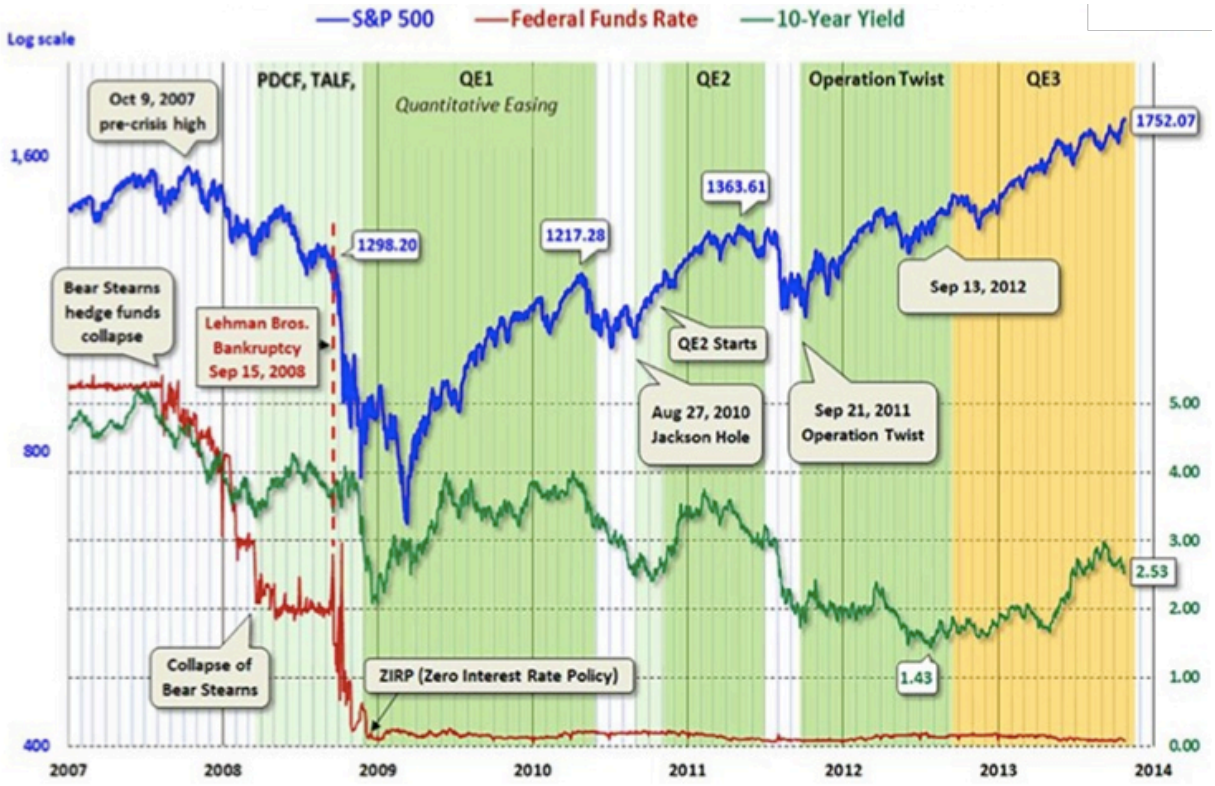
1. Asset Market Dependence on Monetary Policy
2. Diminishing Returns to QE Due to Lack of Policymaker Coordination
3. Illiquidity in Key Financial Markets
4. Systemic risks
5. International effects
6. Unwind risks

For example, while the wealth effect of financial market price appreciation was designed by the Fed to boost the larger economy, it may also have induced higher market cross-correlation and systemic risk. Some of these unintended consequences may have been mitigated had the Fed coordinated more closely with other regulatory, fiscal, and international policy makers. We address these six concerns in the following sub-sections.

2.2.1. Asset Market Dependence on Monetary Policy

One of the key features of the successive rounds of QE is the notably strong correlation between the size of the central bank's balance sheet and asset prices as epitomized in the below chart.

Figure 8: The S&P 500 and Federal Reserve Intervention



Source: Advisor Perspectives

What on the surface looks to be a prolonged U.S. stock market recovery appears, upon closer inspection, to have been built on an unstable foundation as equity rallies failed to persist between rounds of QE. Similarly, although yields clearly move lower over the life of QE, long-term rates dropped more in between rounds of QE (for example during the summers of 2010 and 2011) than across the respective QE periods. Finally, the ability of QE to reduce yields after QE1 appears generally diminished, and the rise in rates at the conclusion of each round of LSAPs exceeded the declines witnessed at the outset of each respective round.

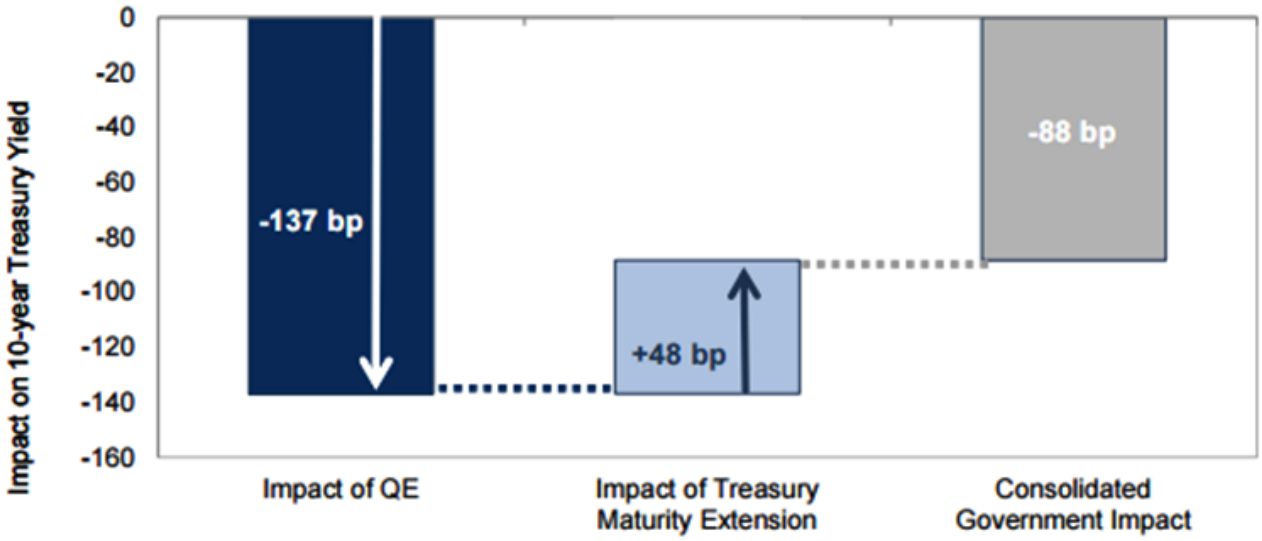
2.2.2. Diminishing Returns to QE Due to Lack of Policymaker Coordination

Another explanation for the diminishing returns achieved by QE2 and QE3 is the Treasury's increased issuance of longer-term debt since 2008. As shown by Harvard University researchers,[6] more than a

[6] R.Greenwood, S. Hanson, J. Rudolph and L. Summers, "Government Debt Management at the Zero Lower Bound," *Hutchins Center on Fiscal and Monetary Policy*, September 2014

third of the long-term rate impact appears to have been negated by long-term debt issuance on the part of the Treasury. The argument for such competing policies, of course, is that prudent debt management calls for locking in cheap financing during periods of historically low interest rates. Nevertheless, the monetary policy objectives of the Fed and the financing objectives of the Treasury have sometimes clearly run at odds since the onset of the crisis.

Figure 9: Contradictory Fed and Treasury Policy Effects

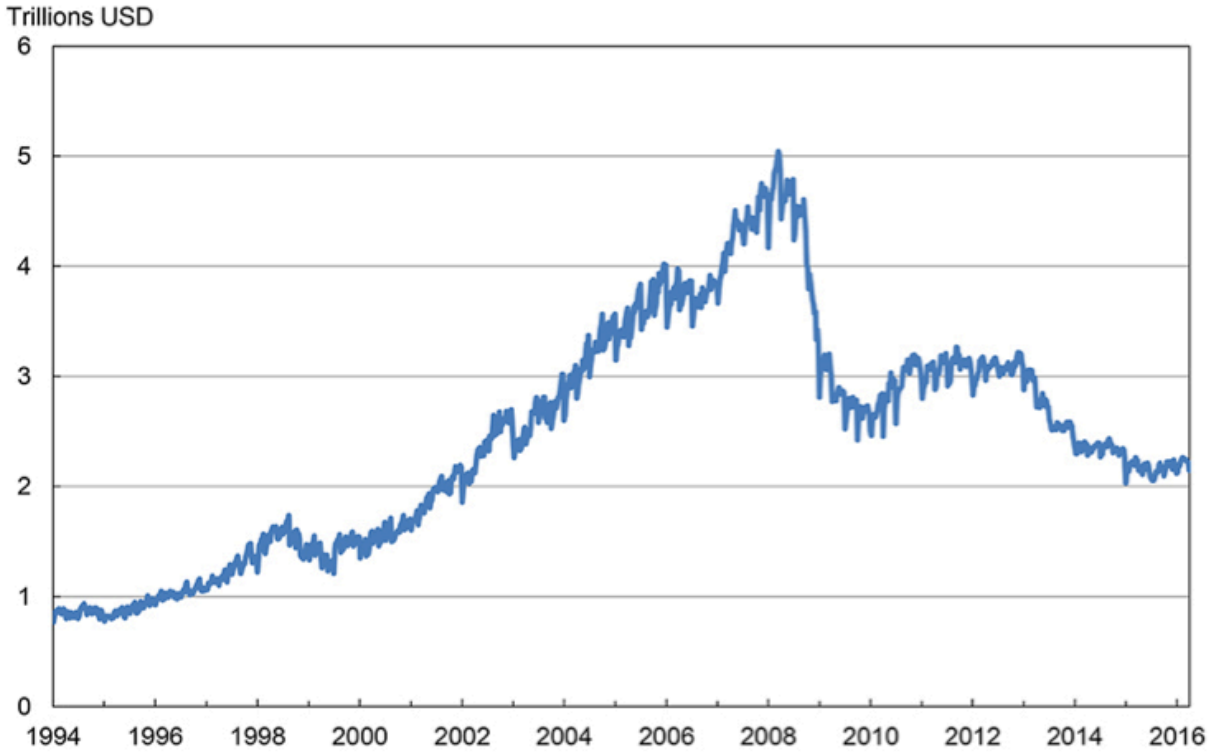


Source: Brookings Institution

2.2.3. Illiquidity in Key Financial Markets

Since 2008, financial market liquidity, particularly as measured by dealer inventories, appears to have dried up in certain key credit markets. This can be attributed to a combination of effects. First, the Fed's LSAPs have depleted the availability of Treasuries and Agency Mortgages that typically make up repo market collateral. Secondly, the Fed's regulatory capital policy under Dodd-Frank,[7] created in part to prevent future bubbles, has significantly constrained broker-dealer balance sheets and their ability to intermediate capital markets.

Figure 10: Dealer Repo Financing



Note: The exhibit plots aggregate primary dealer repo financing (defined as securities out) for Treasuries, agencies, and agency MBS.

Source: Federal Reserve

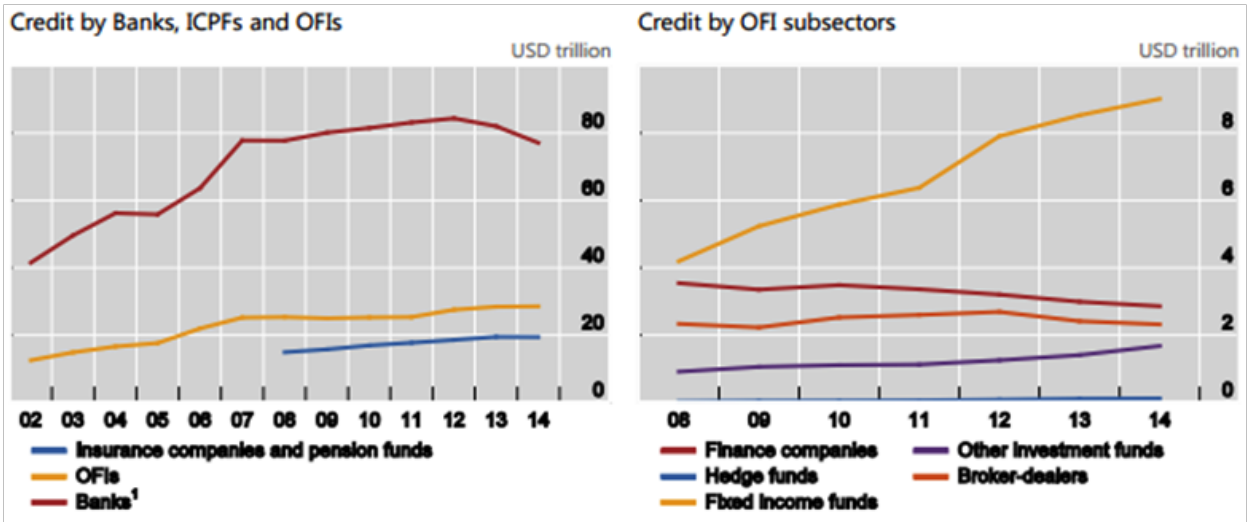
Furthermore, ultra-low interest rates may have spurred significant shadow banking growth.[8] As a prime example, high-yield markets in the energy sector initially benefitted substantially from cheap debt but have suffered immensely when the 10-year old commodity super-cycle came to a screeching halt in 2015.

Despite the best intentions of Dodd-Frank legislation, shadow banking has remained relatively unscathed from regulatory policy as seen in the growing credit provided by non-banks post-2008. However, the Fed and the SEC appear to be catching up on liquidity risks of mutual funds[9] (through "swing pricing"), high

[7] R. Anderson, M. Bordo and J. Duca, "Money and Velocity During Financial Crisis: From the Great Depression to the Great Recession," *National Bureau of Economic Research*, March 2016
[8] N.Valckx, "Shadow Banking Around the Globe: How Large, and How Risky," *International Monetary Fund*, October 2014
[9] "SEC Proposes Liquidity Management Rules For Mutual Funds And ETFs," *U.S. Securities And Exchange Commission*, September 2015

yield bond markets (as underscored by the closing of Third Avenue's credit fund in December 2015), and high-speed trading in treasury markets.[10]

Figure 11: The Importance of Shadow Banking



Source: Financial Stability Board

2.2.4. Systemic Risk

While more liquid than corporate bond markets, equity markets are also showing signs of overheating as measured by average long-term cyclically adjusted PE ("CAPE") ratios. For example, Nobel Laureate Robert Shiller's CAPE suggests that U.S. equity markets are trading at a substantial premium to what might be considered "fair value." In a similar spirit, one market participant with whom we spoke highlighted a divergence between "quality" as measured by an equity factor index and the broader stock market. While quality outperformed dramatically in the period leading up to the financial crisis, the reverse has been true ever since—perhaps a signal that markets are currently driven only by the direction of Fed policy as opposed to macroeconomic fundamentals.

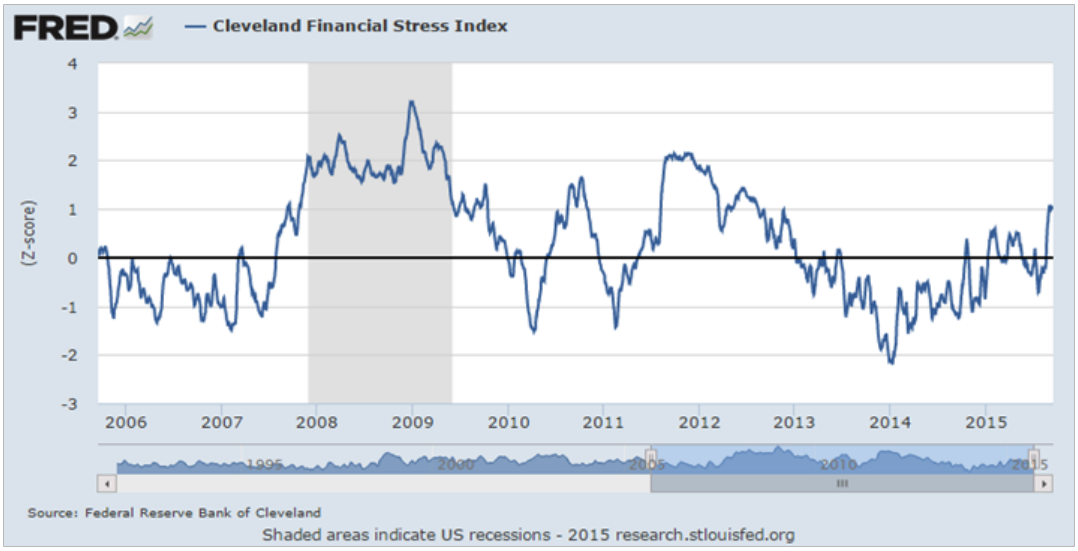
[10] L. Brainard, "An Update on the Outlook, Liquidity, and Resilience," *speech held at the Institute of International Bankers Annual Washington Conference, Washington, D.C.*, March 2016

Figure 12: Trends in the Quality of Equity Indexes

Source: Bloomberg Finance LP, in “Epsilon Theory”, Salient Partners, April 2016

Like the stock market declines which occurred in the middle of 2010 and 2011, systemic risk in the U.S. financial system (measured by the Cleveland Financial Stress Index) has also periodically peaked in between rounds of QE, as illustrated below:

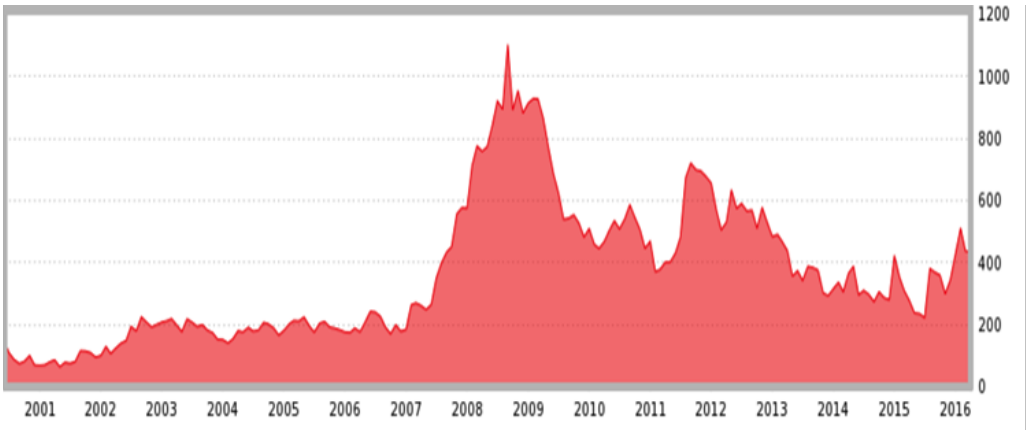
Figure 13: Cleveland Financial Stress Index



Source: Federal Reserve Bank of St. Louis (2015)

Similarly, financial sector capital shortfall risk (the amount that financials would need to cover risk-weighted assets under financial sector-wide stress according to NYU VLAB) spiked each of the three times that a QE round ended. This can be seen in the index levels during the summers of 2010 and 2011, as well as the end of 2014. As an indication of the risks which may await the Fed as it moves towards interest rate normalization, the measure peaked once again following the Fed's 2015 rate increase.

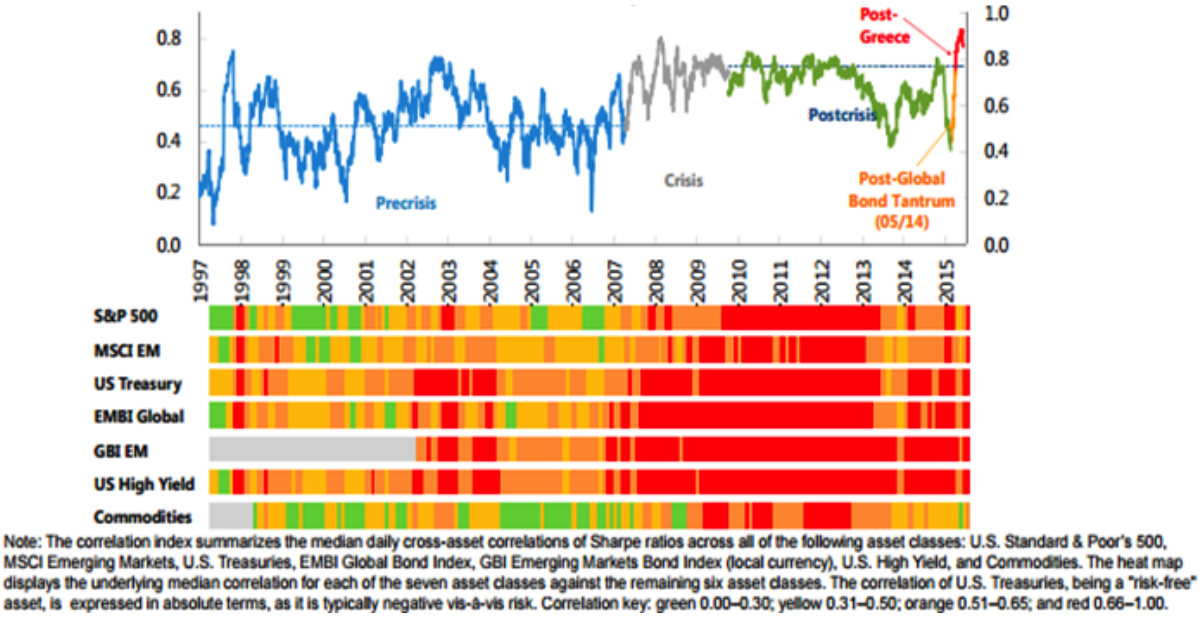
Figure 14: U.S. Total Financial Systemic Risk **(SRISK—US$ Billion)**



Source: New York University, V-Lab (2016)

Furthermore, average cross-asset correlation has increased by two thirds as seen by IMF[11] research below. The benefits of diversification, it seems, may well have been consumed by central banking policy.

Figure 15: Cross-Asset **Correlations (median daily) and Correlation Heat Map**



Note: The correlation index summarizes the median daily cross-asset correlations of Sharpe ratios across all of the following asset classes: U.S. Standard & Poor's 500, MSCI Emerging Markets, U.S. Treasuries, EMBI Global Bond Index, GBI Emerging Markets Bond Index (local currency), U.S. High Yield, and Commodities. The heat map displays the underlying median correlation for each of the seven asset classes against the remaining six asset classes. The correlation of U.S. Treasuries, being a "risk-free" asset, is expressed in absolute terms, as it is typically negative vis-à-vis risk. Correlation key: green 0.00–0.30; yellow 0.31–0.50; orange 0.51–0.65; and red 0.66–1.00.

Source: IMF

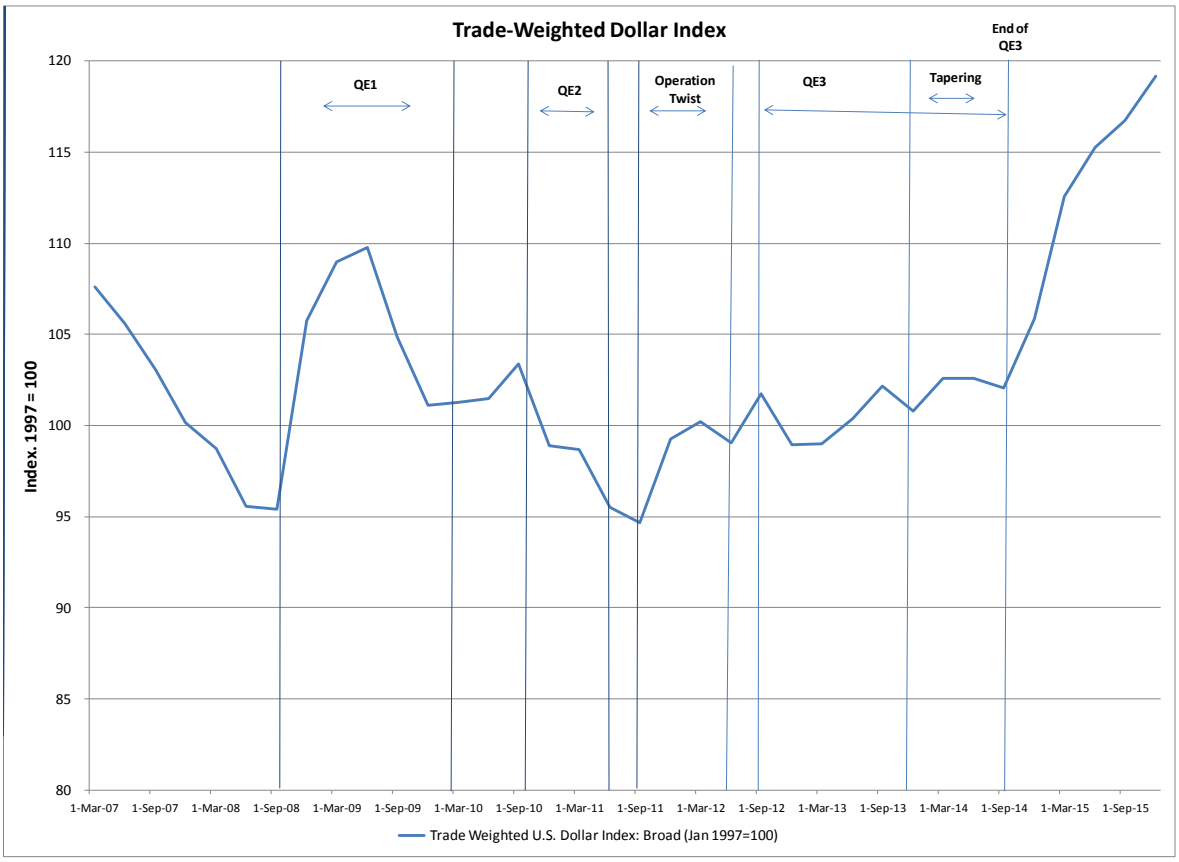
Balance sheet deleveraging may also explain the lack of bank lending from the demand side, where the incentive to borrow at a lower rate in a slowing economy is not enough to overcome a negative household/corporate balance sheet. Another form of transmission breakdown may be the declining of securitization in mortgage and auto markets since the 2008 crisis.[12]

2.2.5. International Effects

While the Fed is primarily concerned with domestic issues, it cannot ignore the consequences of its policies on the rest of the world and conversely, the impact of foreign factors on domestic issues.

[11] "IMF Global Financial Stability Report: Navigating Monetary Policy Challenges and Managing Risks," *International Monetary Fund*, April 2015
[12] E. Benmelech, R. Meisenzahl, R. Ramcharan, "The Real Effects of Liquidity During the Financial Crisis: Evidence from Automobiles," *National Bureau of Economic Research*, April 2016

Figure 16: Dollar Index



Source: Federal Reserve Bank of St. Louis, Authors' Computations

While it initially strengthened at the peak of the financial crisis, the dollar index weakened after QE1 and QE2, but strengthened back as QE3 and competing QE programs in Europe and Japan were implemented. This may have had consequences for the U.S. trade balance (see section 4.4) as well as for U.S. trading partners. More specifically, while U.S. trade partners may not have been hurt by a weakening dollar (during QE1 and 2) owing to a number of other structural strengths, the more recent dollar strengthening may be more of a concern.

First, countries with high levels of dollar-denominated debt are substantially vulnerable to the dollar strengthening. Secondly, dollar appreciation reflects large capital outflows from emerging markets to the U.S. (further fueled by the prospect of Fed's policy rate hike), which can be met by central bank intervention in the form of sales of foreign reserves (of U.S. Treasuries in particular) (see Figure 48). In turn, the sale of foreign reserves by central banks to defend weakening currencies may have two negative effects on the U.S.: first, it contains growth stimulation in foreign economies, which may affect foreign demand in the U.S.; second, it means that ownership of U.S. Treasuries moves from foreign central banks to private investors. As the latter are more rate-sensitive than the former, it follows that volatility and instability in global and U.S. financial markets are likely to increase.

2.2.6. Risks of Unwinding

The Fed mentioned in the minutes of its September 2015 meeting that economic effects would be minimal if it unwound its $4.5 trillion balance sheet when "certain levels of the federal funds rate, such as 1 percent or 2 percent, were reached."[13] If the Fed unloads $200 Billion of its balance sheet each year for 20 years after the fed funds rate reaches 2%, then it may be theoretically successful in normalizing QE without disrupting the natural rate of money growth ($200 Billion is less than 2% of $12 Trillion of M2). However, in the new world of QE, if IOER is the preferred tool for monetary policy then the Fed would also be paying tens if not hundreds of billions of dollars to banks during each of the 20 years. It is easy to see how this would be politically uncomfortable for the Fed.

But even before reaching the problem of paying enormous IOER, the Fed may take a long time to reach its desired 1-2% FFR range due to its preferred gauge of inflation—core PCE. Core PCE not only tends to be low among various inflation measures due to responses from businesses (BEA) as opposed to consumers (e.g. BLS's CPI, see Figure 49), adjustments for improvements in product quality, but also excludes energy and food, the latter of which may account for as much as 15-40% of U.S. households whose income is under $30,000.[14] Therefore, living costs for the poor may become disproportionately high before the Fed starts normalizing its balance sheet (after which actual inflation—and thus living costs for the poor will finally come down).

2.3. Conclusion: QE and the Financial Markets, a Mixed Success

As our research has indicated, emergency measures taken at the height of the global financial crisis proved instrumental in stabilizing financial markets on the brink of collapse. In turn, the Fed's QE program, which was designed for the real economy, relied on the financial markets as its conduit. While the program of LSAPs lowered long-term interest rates as designed, it may have opened a Pandora's box of financial market risks. Those risks may yet prove manageable and may be deemed to be worth the cost if QE indeed has managed to achieve its real economy objectives. In the section that follows, we consider the success of the policy in that arena.

[13] Board of Governors of the Federal Reserve System, "Minutes of the Federal Open Market Committee," *Federal Reserve*, September 16-17, 2015
[14] J. Feldmann, "The Fed as a Moral Enterprise," *Penn State University Press*, 2012

3. REAL ECONOMY IMPACT ANALYSIS

When the Fed extended QE1 in March 2009 to the purchase of long-term Treasuries, it stated, "the Committee anticipates that policy actions [...] will contribute to a gradual resumption of sustainable economic growth"[15]. Similarly, when QE2 was announced in November 2010, the Fed justified the expansion of the program "to promote a stronger pace of economic recovery."[16] Growth resumption—or economic recovery—both require growth in the main components of GDP's aggregate demand: consumption, private investment, government spending and next exports. This section examines the effect of QE on these 4 factors and the resulting impact on key variables of the economy (GDP, inflation and employment).

3.1. Consumption

3.1.1. Expected Results and Transmission Mechanisms

Historically, consumption has been the engine of the U.S. Economy. In the wake of the Lehman collapse, there were fears that massive job cuts and a depressed economic environment would lead to severe consumption contraction. It was therefore key for the Fed to stimulate consumption and maintain its role as the driver of Aggregate Demand. Directly or indirectly, QE was therefore expected to ensure consumption remained robust. There are three main channels through which QE is believed to work on consumption:

- **The interest rate channel:** with both short and long-term interest rates low, consumers can benefit from (i) an intertemporal substitution effect, moving forward consumption which is now cheaper to finance (ii) an income effect if low rates boost aggregate demand, lead to higher employment and higher wages and (iii) a wealth effect via the increase in value of assets (which either allows for revision of consumption smoothing or increases borrowing capabilities with higher collateral)
- **The consumer credit channel:** for the interest channel to operate, it needs to be transmitted at the same time by the various lending institutions. In particular, the consumer credit channel needs to effectively transform QE into more liquidity at low rates to consumers
- **The signaling effect:** QE is expected to restore consumer confidence by convincing the public that the Fed is taking decisive action to ensure that rates remain low for long in order to stimulate the real economy (including consumption)

3.1.2. Observed Outcomes

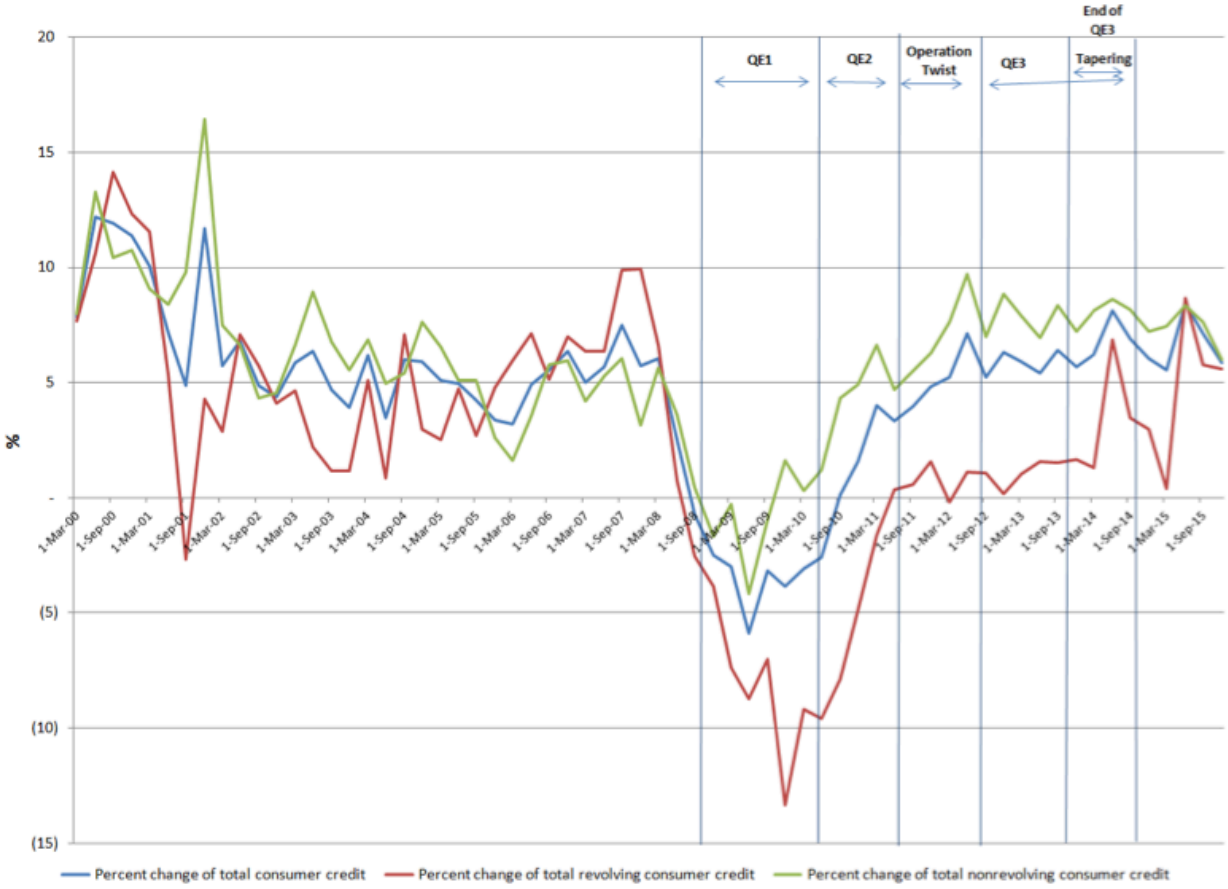
(i) **Consumer Credit: Improved Availability and Conditions**

After recording a rather steady increase of about 5% per annum ("p.a") in the 5 years prior to the onset of the global financial crisis, consumer credit availability dropped by an average 4% in 2009 and 1% in 2010, but recovered to its pre-crisis level by the end of 2011. The total decrease was contained by the limited

[15] See Footnote 1
[16] See Footnote 2

drop and subsequent strong recovery in the availability of non-revolving credit, which has represented the overwhelmingly larger share of total consumer credit since the crisis.[18]

Figure 17: Changes in Consumer Credit Flows

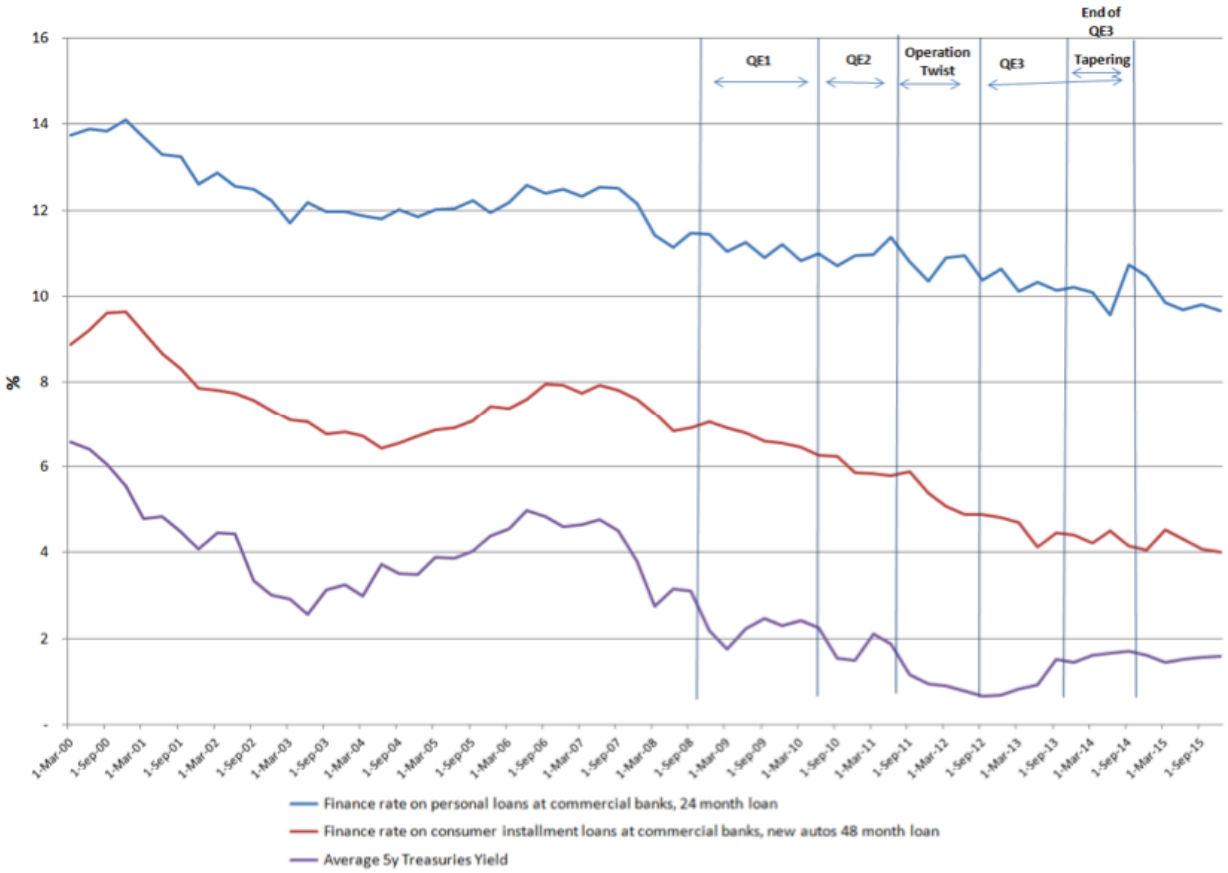


Source: Federal Reserve, Authors' Computations (2016)

Recovery in the consumer credit market is further evidenced by the improvement in financial conditions, both in amounts loaned and average maturities. Average auto loans, which are representative of durable goods, increased from $25,000 to $28,000 (+12%) between the end of 2012 and the end of 2015, while the average maturity increased by 5 months (+8.2%) to over 66 months in the same period. And as expected, consumer interest rates followed the downward trend in yields on Treasuries, with both personal consumption loans and auto loans rates declining at a pace similar to that of long-term Treasuries.

[18] Non-revolving credit includes loans for motor vehicles, boats, trailers, mobile homes, education, vacations.

Figure 18: Consumer Financing Rates



Source: Federal Reserve, Authors' Computations (2016)

(ii) **Impact on Consumer Confidence**

While consumer confidence slumped at the height of the crisis, it started recovering as QE1 was extended to Treasury security purchases and quickly recovered as interest rates kept falling (see Figure 54)—suggesting that rather than behaving as a lagged effect of QE, consumer confidence remained rather healthy and consumption didn't suffer much during the crisis, which supported the U.S. economy.

(iii) **Overall: Steady, Solid Consumption Recovery**

Overall, with increased lending and lower interest rates, consumption remained rather steady and the key engine of the U.S. economy (consistently accounting for about 2/3 of GDP). Contraction was -2% in 2008 and a mere -0.20% in 2009, only to recover to an average 2.3% p.a in the 6 years thereafter. Consumption remained robust for both durable and non-durable goods (with the notable growth of recreational goods and vehicles), as well as for services, supported by robust growth in healthcare services (see Figure 53). On that basis, it would seem that QE had positive effects in supporting consumption. While one could argue that it simply ensured continuity rather than spurring a full-blown recovery, QE appears to have helped to offset a collapse in one of the structural pillars of the U.S. economy.

3.2. Investment

Gross private investment was the hardest hit by the crisis, especially investment in the housing sector in the wake of the real estate collapse in 2006. Although it only accounted for 18% of total U.S. GDP in the decade preceding the crisis, investment dropped by 2.2% in 2007, 15.9% in 2008 and 11.0% in 2009. The bulk of the drop came from fixed investment while previously accumulated inventories were being sold. Unsurprisingly, residential investment experienced a severe contraction (-15.4% p.a on average between 2006 and 2010) which accounted for much of the drop in investment until 2008/9 when the non-residential part of investment (investment in physical structures, equipment as well as software) also crashed.

3.2.1. Expected Results and Transmission Mechanisms

Against this backdrop, QE was expected to stimulate investment through three main channels in a manner very similar to the transmission channels operating on consumption:

- **The interest rate channel:** lower interest would allow for (i) lower funding/borrowing costs and (ii) increase the value of assets owned by firms (or homes owned by individuals) both of which make borrowing easier and cheaper for businesses which in turn can be incentivized to bring their planned investment forward
- **The credit channel:** just like consumption, the credit channel needs to operate effectively for the interest rate channel to be transmitted
- **The signaling effect:** also like consumption, low interest rates are expected to signal support to real investments and can therefore improve business confidence

3.2.2. Observed Outcomes

(i) **Financial Conditions for SMEs**

Small and medium enterprises (SMEs) form the backbone of the United States economy. In the U.S., SMEs make up 99% of all firms, account for about 50% of GDP as well as over 50% of private sector employees, and generate over 65% of net new private sector jobs.[19] SMEs fund their expansion or operations by borrowing primarily from traditional lending institutions[20]. Credit markets enable loan demand from corporations—including SMEs (as well as individuals) and supply from financing institutions—to support SMEs and in turn, the larger domestic economy.

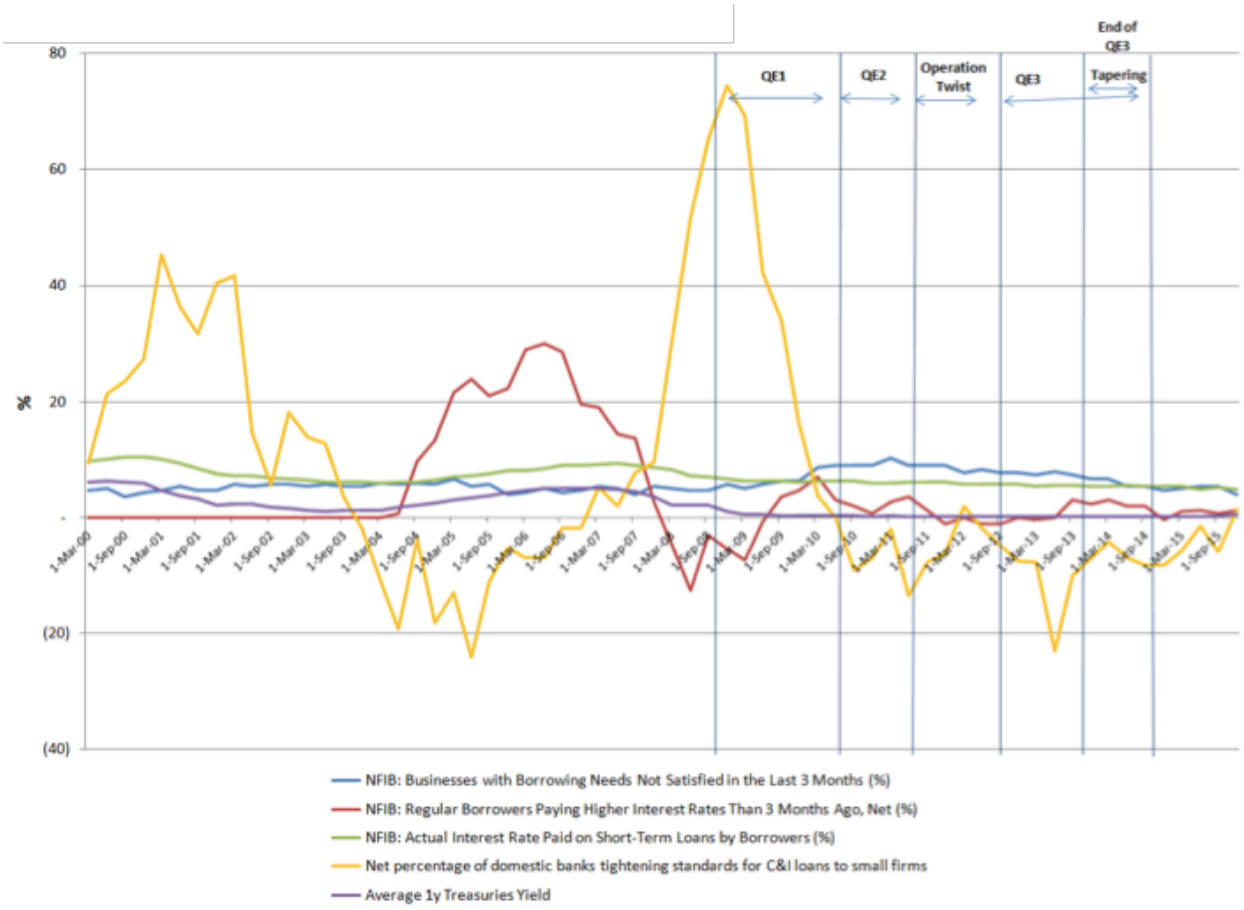
In the face of the 2008-2009 credit crunch, the credit channel was seriously impaired and access to funding, especially for SMEs, deteriorated. How can central bank intervention have an impact on restoring the credit channel? In a seminal paper (Bernanke and Gertler, 1995), ex-Fed Chairman Bernanke argued that monetary policy could be transmitted through the credit channel as actions by the central bank can impact the creditworthiness of borrowers—and therefore demand for credit—as well as the net worth and balance sheet of lenders—thereby affecting loan supply.

Well aware of the key role of the credit channel, a few months into the crisis then-Chairman Bernanke sought to encourage community banks to continue lending to SMEs, saying “I want to conclude by

[19] S. Firoozmand, P. Haxel, E. Jung and K. Suominen, “State of SME Finance in the United States in 2015,” *TradeUp Capital Fund and Nextrade Group, LLC*, March 2015
[20] Small banks represent 52% of credit sources as of 2015 with large banks contributing 42%. - “2015 Small Business Credit Survey,” *Federal Reserve System*, March 2016

encouraging you as community bankers to operate prudently in the current environment, but not to let fear drive your decisions."[21] But with contracted demand, uncertain future and increased regulation (especially with requirements to raise capital adequacy ratios), community banks didn't play the countercyclical role Bernanke would have hoped for. In the three years following the Lehman collapse, credit conditions tightened and loan supply fell—in fact, some studies find that the loan supply shock contributed to 50% of the GDP growth contraction in 2008/9 in the U.S.[23] Could the Fed have done more in that respect? That is what Professor Joseph Stiglitz argued during our interview, stressing that there was "no way QE could work without fixing the bank credit channel."

Figure 19: SME Financing



Source: Federal Reserve, Authors' Computations

While interest rates steadily declined with the successive rounds of QE, the data show two important elements: (i) the net percentage of banks tightening credit standards to SMEs surged in 2008/9 with a commensurate drop in loan supply (ii) although credit standards substantially loosened after QE1, demand for loans also resumed and the number of businesses facing difficulties to meet their borrowing needs actually increased post QE1. This figure almost doubled during QE2 (from 5% to 10% of

[21] B. Bernanke, "The Financial Crisis and Community Banking," *speech held at the Independent Community Bankers of America's National Convention and Techworld, Phoenix, Arizona,* March 2009
[23] G. Wehinger, "SMEs and the credit crunch: Current financing difficulties, policy measures and a review of literature," *OECD Journal: Financial Market Trends, Volume 2013/2*, 2014

businesses claiming their borrowing needs were unsatisfied) before returning to pre-crisis levels as QE was eventually halted. Both of these elements reflect the well-documented fact that SMEs suffer more than large corporates from credit drying up and have to wait longer to benefit from a recovery and credit easing.[24] Given this, one could argue either that (i) QE was not very effective (or even failed), (ii) QE is very slow to operate or (iii) recovery of borrowing demand is due to factors other than QE (general recovery/growth inside the economic cycle).

(ii) **Impact on Investor Confidence**

While business confidence slumped at the peak of the crisis in 2009, it slowly picked up as interest rates kept declining—although it is still lower today than its pre-crisis level (see Figure 57). One important aspect gathered from our research is that business behavior isn't necessarily very responsive to Fed announcements. While low interest rates and credit availability do help, businesses have been rather cautious to invest since 2008/9. Such caution is an immediate result of the crisis and due to larger structural issues which, taken together, hamper aggregate demand and against which QE or any monetary policy might have only moderate effects.

(iii) **Overall: Partial Investment Recovery**

Here we distinguish between two main components of investment:

- **Residential investment:** Studies[25] find that QE1 reduced the spread between mortgage rates and U.S. Treasuries (for the same given maturities) by 100bp, which in turn is found to lead to an increase of 6.2% in residential investment. Looking at national data, residential investment indeed increased by an annual average of 6.8% in the 5 years following QE1 (and a part of QE2), although it was somewhat subdued and only contributed to an average 23% of the recovery in investment
- **Non-residential investment** followed a similar recovery, with an average 5.7% annual increase since 2011 driven by strong growth in equipment (see Figure 56).

3.3. Government Spending

3.3.1. Expected Results and Transmission Mechanisms

While QE was expected to directly impact consumption and investment, it was also implicitly supposed to support aggregate demand via an increase in government spending. For instance, in its announcement of QE1 extension in 2009, the FOMC referred to fiscal stimulus as one of the main factors supporting growth resumption.[26] There are two ways through which QE supported the fiscal stimulus:

- **Increased revenue:** Despite much lower interest rates, the expanded balance sheet of the Fed produced substantially higher revenue from interest earned on the securities held. Interest earned by the Fed is returned to the U.S. Treasury and accounted for in the federal budget. From 2000 to 2008, the average annual revenue transferred from the Fed to U.S. Treasury amounted to $26.5 billion but swelled to an average $78 billion in the seven following years (peaking at $99 billion in 2014). It is worth noting that such increased revenue come from the Government's own borrowings (through Treasuries) and therefore means that the government is borrowing a

[24] Ibid
[25] K. Walentin, "Quantifying the macroeconomic effects of large-scale asset purchases" in Den Haan (2016)
[26] See Footnote 1

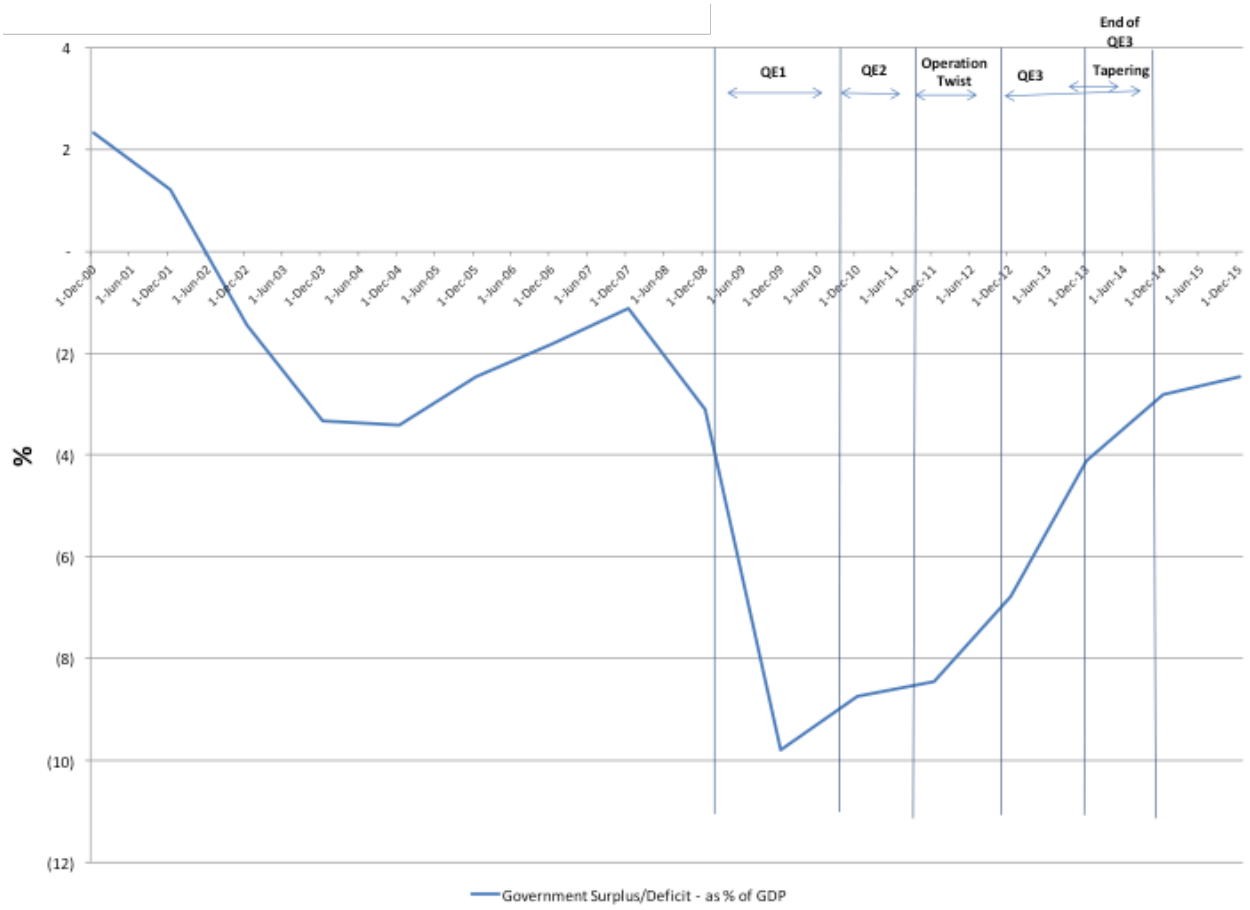
substantial amount of its debt for free, raising the question of “financial repression” (see 6.2.2) and related potential distortions by QE of the true costs of government spending. Overall however, more fiscal space gives more room for public spending which, in times of crisis such as the Great Recession, is usually needed (at least temporarily) to prevent the economy from sinking.

- **Lower funding costs:** cheaper funding costs are expected to incent the federal government—as well as states and cities—to increase public spending for capital and infrastructure projects, healthcare, education and other social programs.

3.3.2. Observed Outcomes

QE therefore increased fiscal space both on the revenue and cost side, and together with a rapid political response, most likely made it easier and more politically acceptable (and marketable to opposing stakeholders) for the government to pass programs such as the Troubled Asset Relief Program (TARP) and the American Recovery and Reinvestment Act (ARRA) which made up the bulk of the fiscal stimulus in 2008/9. As such, the fiscal deficit increased from an annual average of 1.5% from 2000 to 2008 to an average of 8.4% in the 4 subsequent years (with a peak at almost 10% in 2009).

Figure 20: U.S. Fiscal Deficit



Source: Congressional Budget Office, Authors' Computations

On the whole, without the fiscal stimulus, which was in part supported by QE, Blinder and Zandi (2015) find that in 2010, U.S. real GDP would have been 3.5% lower than its actual level, the unemployment rate would have peaked at almost 11% (or 2.4 million fewer jobs), the Great Recession would have lasted much longer and key macroeconomic data would have only been catching up with actual levels around 2014-2015.

However, there are several caveats to the potential benefits QE might have in terms of increased government spending:

- **Mandatory spending:** Around 55% of the U.S. budget is destined to be spent on mandatory outlays, *i.e.* those expenditures (most of which are related to Social Security) which are based on law rather than the actual budgeting process. As such, QE's potential role in increasing discretionary spending (which makes up about 35% of the budget—the remainder being used to pay interest on government debt) is constrained by the space granted to mandatory outlays;
- **A high share of discretionary spending goes to National Defense:** over 50% (and more in the 1980s) of discretionary spending has been devoted to national defense for the past 20 years, meaning that the scope for increased spending in areas such as infrastructure or education is further limited;

- **Political gridlock:** in spite of the substantial fiscal stimulus of 2008/9, the consensus from both our literature review and interviews is that more long-term investment in capital, infrastructure or education projects should have been made. Unfortunately, each of these areas for investment are politically divisive and didn't see high enough of a boost because of the U.S. political gridlock;
- **Debt sustainability:** QE may stimulate spending and increase the budget deficit, but this leads to an increase in debt ratios which over time can become too high for debt to be sustainable. While this may not be the case in the U.S. yet, the U.S. debt-to-GDP ratio increased from less than 65% in 2007 to more than 100% in 2015. As such, any further fiscal stimulus which might have been supported by QE could have raised concerns about debt sustainability

The data show that government spending increased in 2008, 2009 and 2010 but at a modest 2.3% annual average, with most of the efforts coming from the federal government while state and local authorities barely increased spending. Starting in 2011, public spending actually shrank by an annual 1.6%. Interestingly, both defense and non-defense related items saw an increase in public spending, with a slightly faster pace for the former (5.9% vs. 5.7% annual average) between 2008 and 2010. Public expenses in transportation, healthcare, and—to an even greater extent—education, grew at higher than usual levels during the same period, but contracted thereafter. Given that each account for only 5 to 10% of discretionary spending, any increase in public spending would have to have been much more substantial to massively impact overall government spending. In fact, two elements stand out when we look at fiscal policies while the different rounds of QE were implemented:

- While a number of states and cities took advantage of low interest rates to bring forward new investments, most actually proved cautious and used low rates to refinance loans or increase short-term operational spending rather than new spending. This is illustrated in Figure 59.
- Fiscal stimulus turned to austerity in 2011 at a time when unemployment was still far from its natural rate. In line with other research, Blinder and Zandi (2015) argue the temporary stimulus should have lasted longer (in their view, until unemployment was less than 1 percentage point above its natural rate) and, as such, was ended much too early.

3.4. Net Exports

3.4.1. Expected Results And Transmission Mechanisms

De facto, QE should have an impact on net exports thanks to the exchange rate channel: lower interest rates in the U.S. imply a nominal depreciation of the U.S. Dollar which, with low inflation, should lead to a real depreciation and in turn boost exports, reduce imports, and lead to imported inflation. This theory is however subject to several caveats:

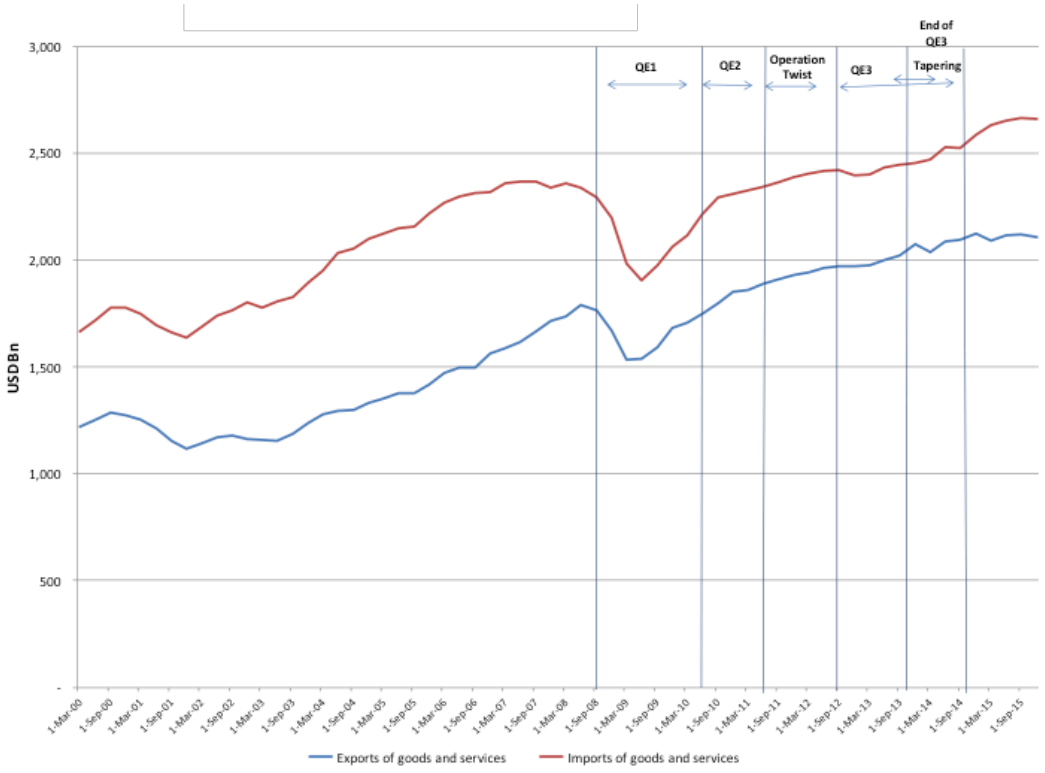
- U.S. monetary policy impacts the U.S. dollar via the Exchange Rate channel when all else is held constant; to the extent other countries adopt similar monetary policies (which could lead to some currency wars) to stimulate their own exports, the impact of monetary policy on the dollar will be much weaker than expected
- A large share of global trade is done in dollars and foreign exporters invoice U.S. importers in dollars; as such, a real dollar depreciation has no effect on imports

- Structural changes in the global value chain weaken the impact of the dollar depreciation on exports: when several parts of a given product come from every corner of the world, the finished product, even if sold by U.S. exporters, will lose a part of its “dollar” value
- Structural changes in Global trends such as the Great Recession or the recent global slowdown in demand from Emerging Markets will affect U.S. trade sometimes much more than changes in the dollar on the Exchange rate market

3.4.2. Observed Outcomes

On that basis, as mentioned in the financial section of this report, while the dollar index weakened after QE1 and QE2, it strengthened after QE3 as the ECB and BoJ were implementing their own QE programs. At the same time, it is clear from the chart below that while QE1 was implemented, both exports and imports substantially decreased, reflecting a global slowdown in the wake of the financial crisis which propagated from the U.S. to the rest of the world—which supports our argument above that global structural trends, rather than monetary policies, have a larger impact on the trade balance.

Figure 21: U.S. Trade Balance



Source: Bureau of Economic Analysis, Authors’ Computations

All in all, the trade deficit declined by about 45% (to $410 billion) between 2007 and 2010, but widened by 14% in 2011 alone as QE2 was implemented. During the Great Recession, imports contracted more than exports. Although after the global slowdown in 2008/9 both exports and imports resumed their upward trend, the trade deficit remained steady around its crisis level of $450 billion. Indeed, the increase in net imports of most goods was offset by the increase in net exports of services and by a substantial decline in

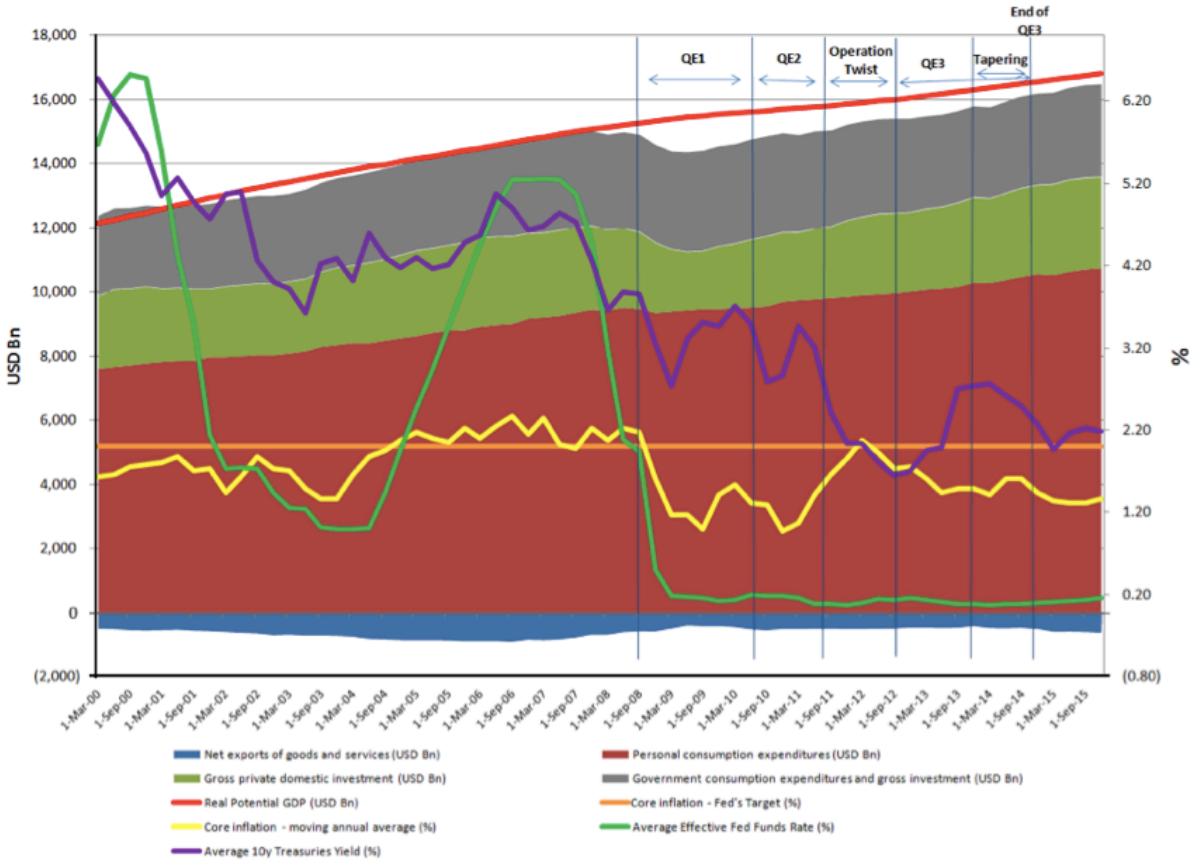
net imports of oil in the wake of the shale oil boom in the U.S. in the late 2000s. It is therefore difficult to argue that QE had any substantial impact on net exports given the multitude of confounding factors which are likely to have impacted such component of U.S. GDP with much more potency.

3.5. Putting Things Together

3.5.1. Mixed to Positive Impact of QE on Aggregate Demand and Inflation

Having looked at the four main elements of aggregate demand, we now have a better overall picture of what happened since the onset of the crisis: as illustrated by the graph below, we observe that (i) consumption was rather resilient and remained the engine of the U.S. economy (accounting for over ⅔ of GDP) through the crisis (ii) investment suffered the most but slowly recovered while (iii) fiscal stimulus was lower than what was likely required (iv) the trade deficit declined, but the impact of QE on Net Exports is questionable. As a result, U.S. GDP has been steadily recovering at more than 2% p.a since 2009, narrowing the output gap closer to pre-crisis levels. Nevertheless, core inflation (one of the Fed's two key objectives) has been almost consistently below the 2% target.

Figure 22: Main Macroeconomic Indicators



Source: Bureau of Economic Analysis, Authors' Computations

While quantifying the actual effects of QE on GDP is challenging, several studies have attempted to do so with varying results—summarized in the table below:

Figure 23: QE Macroeconomic Effects: a Summary

Impacted Variable	Programme				
	QE1	QE2	QE3	QE1+QE2	Q1+QE2 +QE3
GDP (bp)					
Chen, Curdia, Ferrero (2011)		+40			
Fuhrer & Olivei (2011)		+60 to +90			
Chung et al (2012)				+300	
Baumeister & Benati (2014)	+90				
Weale & Wieladek (2014)	+72				
Inflation (bp)					
Chen, Curdia, Ferrero (2011)		+5			
Chung et al (2012)				+100	
Baumeister & Benati (2014)	+100				
Weale & Wieladek (2014)	+76				
Engen et al. (2015)					+50
Unemployment (bp)					
Fuhrer & Olivei (2011)		-30 to -40			
Chung et al (2012)				-150	
Wu and Xia (2014)					-13
Baumeister & Benati (2014)	-75				
Engen et al. (2015)					-120

Source: Authors, based on the works cited in the table

Most of these studies find rather positive effects on the real economy from one or several rounds of QE. For instance, Chung et al. (2012) found that QE1 and 2 may have raised GDP by almost 3 percentage points and created 2 million jobs while Fuhrer and Olivier (2011) estimated that QE2 alone increased GDP by close to 1 percentage point and created 700,000 jobs. But others (Chen et al, 2011; Wu and Xia, 2014) find much more moderate effects. In fact, one study (Yi, 2014) suggests that for QE to have any real impact on the real economy, asset purchases need to be even larger (more than 50% of GDP) and last for several years. According to some of the economists interviewed as part of our research, the very first round of QE was effective to unfreeze financial markets, but there is little evidence that QE or any other type of monetary policy actually change anything about the business cycle. Although subject to shocks, the economy, by nature, is driven by trends and shifts in behavior and confidence (the "animal spirits" dear to Keynes) and as such, fiscal or monetary policies are only accommodating, not determining. Taken to an extreme, this line of thought may be associated with the concept of the "Phoenix Miracle" (Calvo et al., 2006), a phenomenon whereby output "rises from its ashes" outside the formal credit market, further suggesting the potentially limited impact of QE in restoring aggregate demand.[27]

[27] Note that the concept of the "Phoenix Miracle" is associated with emerging markets only, and is itself subject to criticism in T. Mayer, M. Biggs and A. Pick, "The myth of the 'Phoenix Miracle'," *VOX CEPR's Policy Portal*, May 2010, http://voxeu.org/article/myth-phoenix-miracle

Overall however, one can reasonably argue that QE had at least some positive effects on aggregate demand and inflation. At the same time, QE may have contributed to the fall in unemployment—but to what extent did QE really impact the labor market? The following section attempts to answer that question.

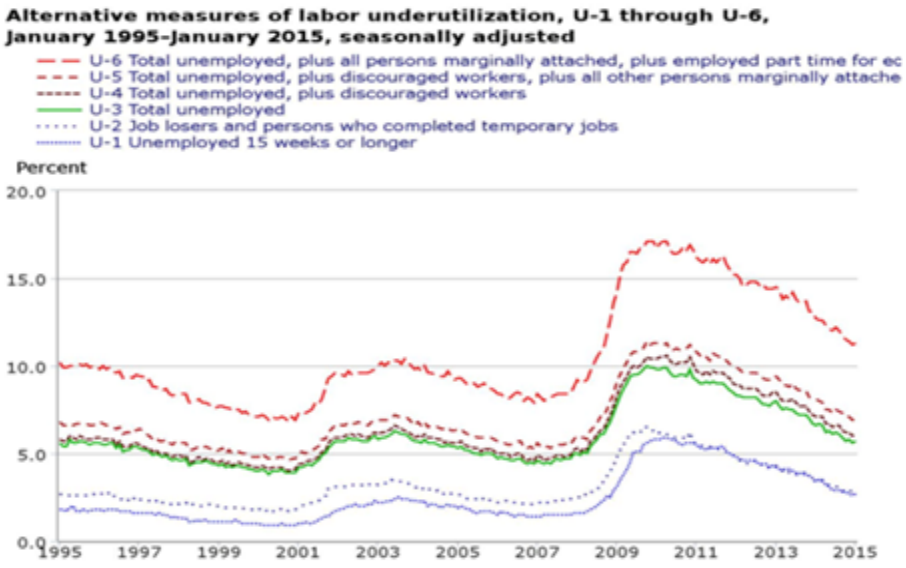
3.5.2. Mixed Recovery in the Labor Market: Any QE Effect?

(i) **Unemployment**

In theory, QE should have an effect on unemployment through the work of firms and corporations. With unconventional monetary policy, money becomes an "inexpensive asset", and with low interest rates companies have an increased ability to borrow money and grow their businesses. This expansion should create new jobs and reduce unemployment.

As employment is a lagging economic indicator, it takes longer to recover in comparison with other variables. To analyze the effect of the QE on employment, we reviewed the changes in both the U-3 and U-6 unemployment rates.

Figure 24: Various Measures of Unemployment



Source: U.S. Bureau of Labor Statistics

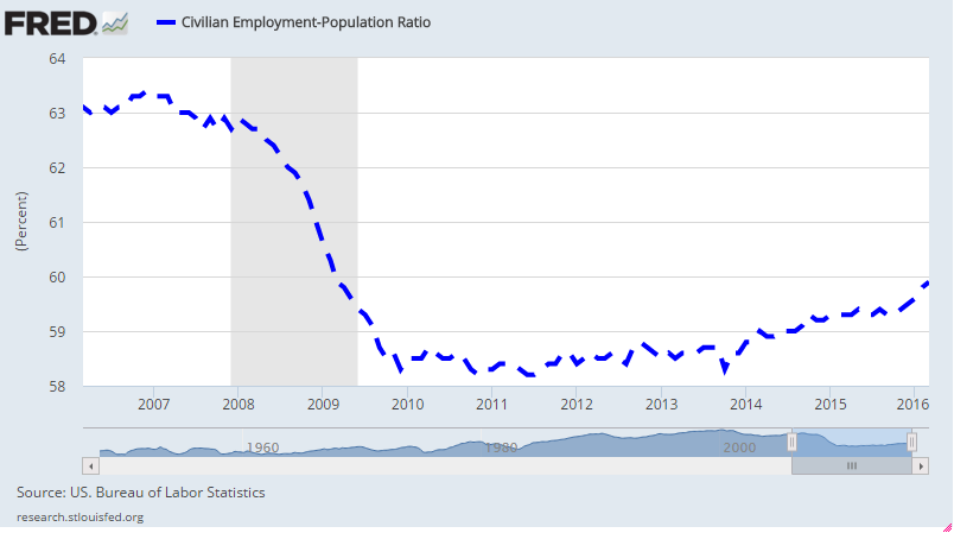
According to the data, the official unemployment rate (U-3) level declined from 10% at the peak of the recession in 2010 to 5% in March 2016. Similarly, the U-6 measure (which includes part-time and discouraged/marginally attached workers) reached 9.8 % in March 2016, down from a peak of 17%, a reflection that overall, the economy has seen a substantial progress in adding jobs[28]. As employment levels recover from the deepest recession since the Great Depression, the private sector added 12.8

[28] N. Irwin, "Quantitative Easing Is Ending. Here's What It Did, in Charts." *The New York Times*. October 2014. http://www.nytimes.com/2014/10/30/upshot/quantitative-easing-is-about-to-end-heres-what-it-did-in-seven-charts.html?_r=0

million private-sector jobs over “64 straight months of job growth, the longest streak of private-sector job creation on record. The unemployment rate is down to 5%, a seven-year low”[29]. The goal to reach a 6.5 % unemployment rate that was set as a benchmark by the Fed has been achieved with the headline unemployment rate currently resting at about 5%.

However, the unemployment rate does not always provide the clearest picture of the labor market. The employment-to-population ratio, an indicator of the number of people with a job to the total number of eligible workers, suggests that the initial rounds of QE did not have as major an effect as the Fed would have liked although the ratio started to improve steadily beginning in 2014[30].

Figure 25: Employment-to-Population Ratio



Source: U.S. Bureau of Labor Statistics, Federal Reserve Bank of St. Louis

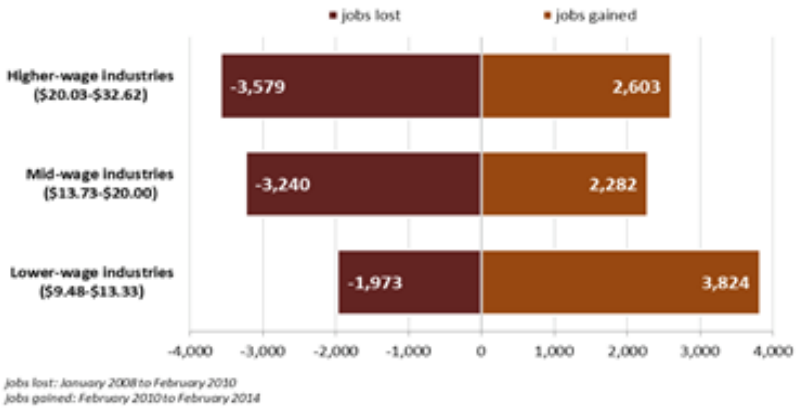
At the same time, part of the fall in unemployment rate could be explained by the decrease in the labor force participation rate. To be sure, the participation rate decline “predates the Great Recession, due to several structural changes that also include aging of the workforce.”[31] In 2015, the participation rate was equal to 62.6%, its lowest level since October 1977 (see Figure 62). The Current Population Survey provides three main reasons for the participation rate decline: retirement, disability, and “more people in school—with a discouraged worker falling into any of those categories.” Out of the three, it would seem that the primary reason has to do with the retirement, as more people tend to retire during a recession.[32] Given the structural nature of the change in participation rate, there appears little that QE could directly do to influence this dimension of the labor market, but in stimulating growth and helping job creation, QE contributed to the drop in unemployment rates as well as an uptick in participation rate. In March 2016,

[29] E. Jacobs, "The Declining Labor Force Participation Rate: Causes, Consequences, and the Path Forward - Equitable Growth." *Washington Center for Equitable Growth*, July 2015
[30] S. McCourt, "Quantitative Easing", *Meketa Investment Group*, September 2013
[31] See Footnote 27
[32] A. Schrager, “Why Labor Force Participation is still so low,” *Bloomberg*, Januray 2015, http://www.bloomberg.com/news/articles/2015-01-19/why-labor-force-participation-is-still-so-low

the participation rate increased to 63%, showing a return to the job market by those previously discouraged in yet another positive sign of economic recovery.[33]

In analyzing the effects of QE on the labor market, it is worth distinguishing between two periods: (i) during the labor market downturn (January 2008-February 2010), "employment losses occurred throughout the economy, but were concentrated in mid-wage and higher-wage industries while (ii) during the recovery (February 2010 to February 2014), employment gains have been concentrated in lower-wage industries."[34] This is illustrated by Figure 26 below:

Figure 26: Net Change in Private Sector Employment (in thousands)



Source: National Employment Law Project 2014

The above findings therefore raise the question of which sectors benefited the most from the recovery. If QE supported the job recovery, it is worth stressing that most of the new positions "created were low-paying jobs in the service sector, like the restaurant and hospitality industry, and not the high-paying manufacturing, mining and construction jobs that the Fed was hoping for. The number of people giving up and no longer looking for jobs exploded to a historic record, artificially bringing the unemployment rate down."[35] The distribution of job losses and their following creation have also been skewed. "Higher-wage industries—like accounting and legal work—shed 3.6 million positions during the recession and have added only 2.6 million positions during the recovery. But lower-wage industries lost two million jobs, then added 3.8 million."[36]

(ii) **Wages**

While QE might have supported job recovery, it is also important to analyze the evolution of nominal and real wages in the aftermath of the Great Recession. While real wage stagnation predates the crisis, it would seem that wage growth has been very slow during the recovery. This trend is consistent with the

[33] A. Kiersz, "The Labor Force Participation Rate Falls to a 38-year Low", *Business Insider*, July 2015, http://www.businessinsider.com/labor-force-participation-rate-falls-to-38-year-low-2015-7

[34] "Tracking the low-wage recovery: industry employment & wages," *National Employment Law Project*, April 2014, http://www.nelp.org/publication/tracking-the-low-wage-recovery-industry-employment-wages/

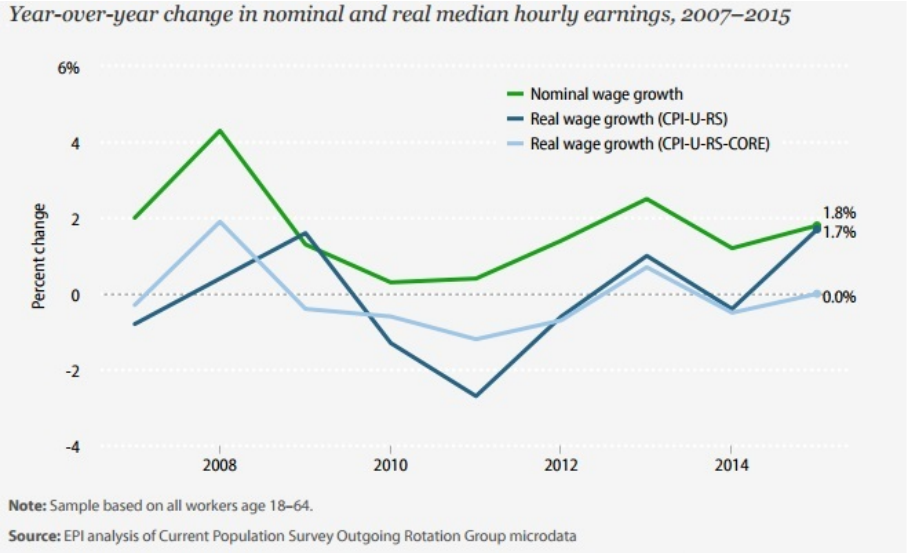
[35] E. Moy, "A Half Cheer for Quantative Easing", *Newsmax Finance*, April 2015, http://www.newsmax.com/t/finance/article/552765

[36] A. Lowrey, "Recovery Has Created Far More Low-Wage Jobs Than Better-Paid Ones", *The New York Times*, April 2014. http://www.nytimes.com/2014/04/28/business/economy/recovery-has-created-far-more-low-wage-jobs-than-better-paid-ones.html?_r=0.

above data showing that most of the job recovery is in low-wage positions which may suggest that QE might have been insufficient to boost wages and might in fact have knock-on effects on income distribution (a point which we detail further in our social analysis section). In recent years, there has been downward pressure on wages as employers have been unable or unwilling to offer considerable wage growth to attract workers they need despite the economic recovery.[37] "In the last few months, nominal wage growth appears to be picking up slightly, but remains significantly below levels consistent with the Fed's 2% target and likely trends in potential productivity."[38]

The growth in real wages has been concentrated at the top of the wage distribution, with little to no change between middle and bottom groups for the last 16 years, which shows that wage inequality continues its 35-year rise trend.[39] In 2015, real wages grew 2.1 % while nominal wage growth was equal to 2.2%. While this level of wage growth might seem positive, real wage growth is artificially inflated by a drop in inflation (inflation fell from 1.6% in 2014 to 0.1 % in 2015) and nominal wage growth of this level remains "below a level where workers would reap the benefits of economic growth."[40]

Figure 27: Wage Growth



Source: Economic Policy Institute

In fact, there are two reasons why low inflation should not be considered as a driver of real wages and living standards. First of all, low inflation could be explained by a large decline in certain goods, mostly gas and oil, which are volatile by nature. Secondly, lower levels of inflation could be dampening the rise in nominal (and therefore real) wages.[41]

While the debate over the actual impact of QE on the labor market remains unsettled, the consensus is positive, with Bivens (2015) noting that "as bad and unequal as wage growth was since the onset of the

[37] E. Gould, "Wage Inequality Continued Its 35-year Rise in 2015", *Economic Policy Institute*, March 2016
[38] Ibid.
[39] Ibid.
[40] Ibid.
[41] Ibid.

Great Recession, it would have been even slower and less equal had the Fed not pursued its easy money policies i.e., compared to a counterfactual of no change in fiscal policy in response to a recession, monetary stimulus reduces inequality significantly."[42]

3.5.3. QE and the Real Economy: Unintended Consequences

Overall, while QE stimulated GDP and potentially inflation and employment, it may have produced at least two unintended consequences:

- Negative distributional effects: with limited growth in real wages, especially at the bottom of the distribution, and recovery in asset prices disproportionately in favor of the wealthy, it may be argued that QE increased social inequalities;
- Increased attention and scrutiny on the Fed: its unconventional monetary policies have drawn heightened attention to the functioning and policies of the Fed which has sometimes been accused of a lack of transparency and/or of monetizing the government deficit;

The following two sections will explore these issues in more depth, starting with the social impact of QE.

[42] J. Bivens, "Gauging the Impact of the Fed on inequality during the Great Recession," *Brookings Institution*, June 2015

4. SOCIAL IMPACT ANALYSIS

The Fed's monetary policy objectives—"to promote effectively the goals of maximum employment, stable prices and moderate long-term interest rates"—directly relate to the social well-being of the nation, but these objectives were directly challenged by the recession and global financial crisis.[43] The collapse of the housing market led to the erosion of home values, systemic risk in the banking and financial sectors severely curtailed lending and financing opportunities, and a recessionary environment impaired confidence in both consumers and firms leading to high rates of unemployment. Proponents of QE point to the great social costs that would have ensued if, having exhausted its conventional monetary policy instrument, the Fed had not taken further action and employed unconventional monetary policy to stimulate aggregate demand, repair and mitigate risk in the broken markets, and support economic recovery and jobs.[44] Critics of QE argue that any benefits were outweighed by the inherently regressive effects of any expansionary monetary policy targeting economic recovery. In the context of existing inequality and particularly given the means by which QE operates (expanding bank balance sheets), there is a general view that "a policy which generates a robust and sustained recovery will benefit those at the top more than those at the bottom."[45]

In this section, we evaluate these two points of view as we attempt to determine whether social inequality on the whole was exacerbated by the Fed's implementation of QE. We begin with a brief consideration of inequality in America, explore theoretical considerations on how QE can affect social outcomes, conduct a review of the small but growing literature specific to the subject, and finish with our own conjectures on the matter.

4.1. Assessing Inequality

Inequality is familiar ground both to sociologists, for whom equality of opportunity is a central concern, and to economists, who define inequality in terms of the distribution of income, wealth, and consumption (Cowell, 2011; and Piketty, 2014). In this study, we consider inequality using the economic framework. We do not ignore the importance of inequality of opportunity but take the view expressed by Fed Chairwoman Janet Yellen that opportunity follows from "access to economic resources" and that "inequality of outcomes can exacerbate inequality of opportunity."[46]

While consumption, income, and wealth are interrelated, each has different implications for social welfare. Inequality of wealth communicates the extent to which "the lottery of birth becomes an increasingly important determinant of living standards."[47] Income inequality is widely cited as data is readily available and can be observed not only between households but also over the course of a single individual's lifetime[48]. This facilitates consideration of both cross-household and intergenerational inequality.[49]

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[43] "The Federal Reserve's Dual Mandate," *Federal Reserve Bank of Chicago*, May 2016, https://www.chicagofed.org/publications/speeches/our-dual-mandate

[44] "Troubled Asset Relief Program : Treasury's Framework for Deciding to Extend TARP Was Sufficient, But Could Be Strengthened for Future Decisions," United States Government Accountability Office, June 2010 https://fraser.stlouisfed.org/scribd/?title_id=5049&filepath=/docs/historical/fct/gao_report_tarp_20100630.pdf#scribd-open

[45] C. Giles, "Debate rages on quantitative easing's effect on inequality," *Financial Times*, October 2014, http://www.ft.com/intl/cms/s/0/c630d922-586f-11e4-942f-00144feab7de.html,

[46] J. Yellen, "Perspectives on Inequality and Opportunity from the Survey of Consumer Finances." *Speech held At the Conference on Economic Opportunity and Inequality, Federal Reserve Bank of Boston, Boston, Massachusetts* October 17, 2014.

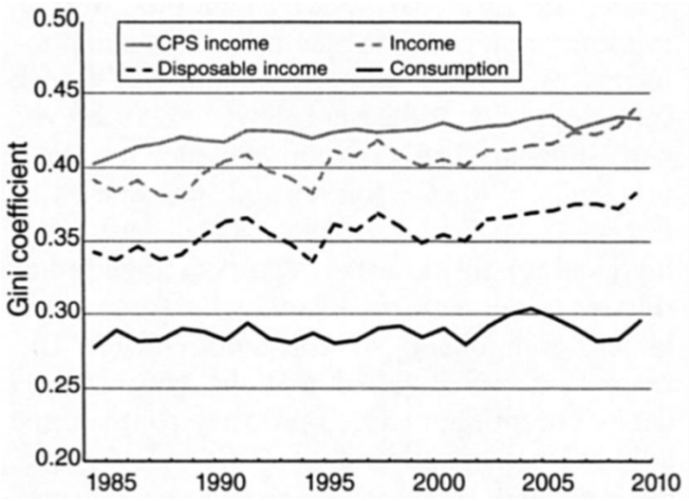
[47] O. Attanasio, E. Hurst and L. Pistaferri, "The evolution of income, consumption, and leisure inequality in the U.S., 1980-2010," *National Bureau of Economic Research*, April 2012

[48] According to the theory of consumption smoothing, an individual making little early in her career finances consumption until her peak earning years, after which, in the latter phase of her life, she spends down her accrued wealth.

However, many consider consumption inequality to be the best representation of social welfare. This is because consumption expresses a household's actual ability to attain a certain standard of living via the purchase of a minimal "basket" of goods and services to support that style of living.[50] While consumption itself is a function of both wealth and income, research shows that changes in income and consumption inequality have mirrored each other in the past few decades.[51] [52]

Since the early 2000s, measures of income and wealth in the United States have exhibited the largest disparities, with the majority of wealth and shares of income concentrated in the top strata of the population.[53]

Figure 27: Gini Coefficient Evaluations of Inequality in the United States (1985-2010)



Source: Consumer Expenditure Surveys, Fisher et al. (2013)

4.2. Trends in Inequality

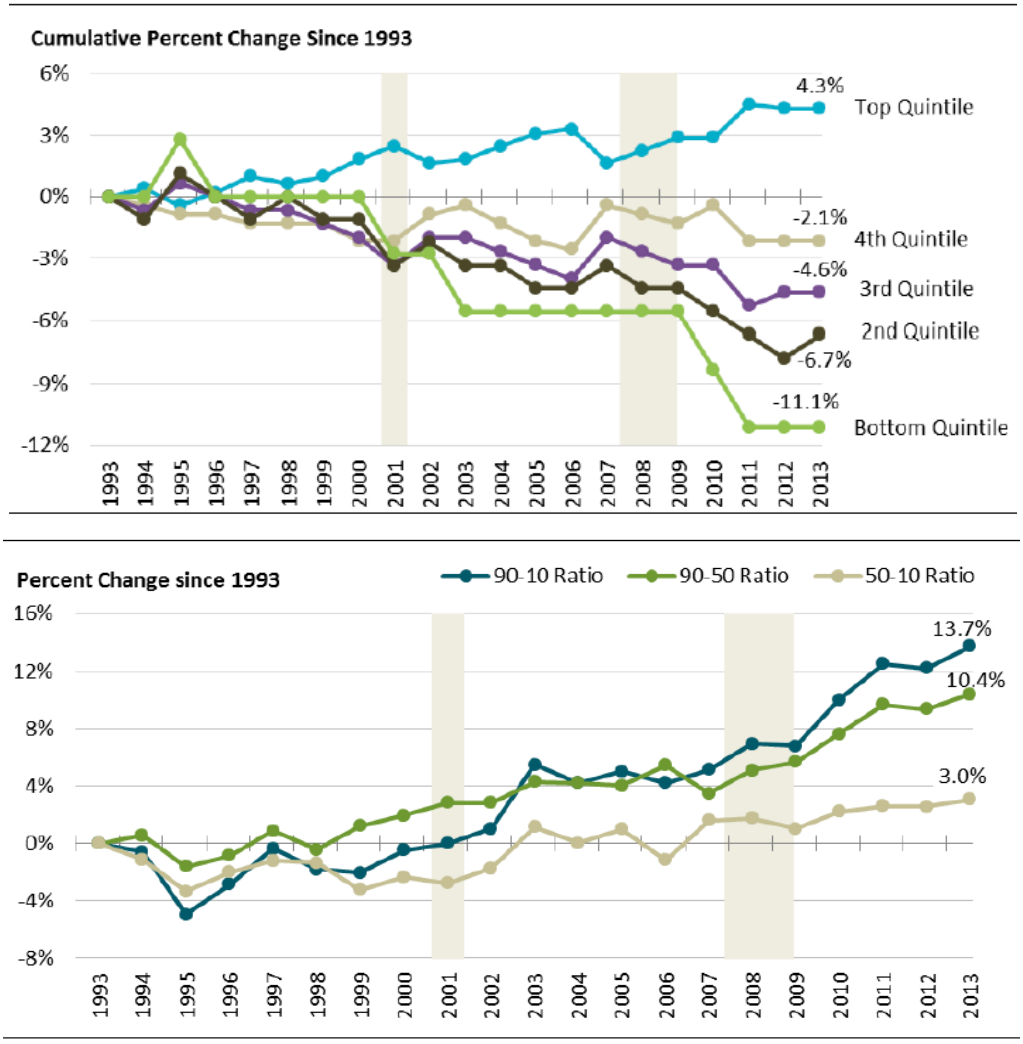
4.2.1. Income Inequality

Income inequality in the United States has persisted since 1993, and has grown at an increasing rate since 2000.[54] As of 1993, "mean income among the top quintile [has been] at least twice as large as the mean income in the fourth quintile," with dispersions in the shares of household income held by each quintile increasing over the entire time period. The lowest quintile (earning the least) experienced an 11.1% fall in income share since 1993, while the top-most quintile has seen a steady increase in its share of income since 2000.[55] A comparison of income ratios between the 90th-10th (top-to-bottom of the income distribution), 90th-50th (top-to-middle), and 50th-10th (top-to-bottom) percentiles further highlights

[49] D. DeSilver "*The Many Ways to Measure Economic Inequality*", *Pew Research Center*, May 2015. http://www.pewresearch.org/fact-tank/2015/09/22/the-many-ways-to-measure-economic-inequality/
[50] Ibid.
[51] Ibid.
[52] M. Aguiar and Mark Bils, "Has consumption inequality mirrored income inequality?," *National Bureau of Economic Research*, February 2011.
[53] See Footnote 47
[54] S. Donovan, "A Guide to Describing the Income Distribution." *Congressional Research Service*, February 2015
[55] Ibid.

the increasing inequality. While "all ratios increased between 1993 and 2013, indicating that the income groups are moving farther apart from each other," the 90-10 ratio showed the greatest increase "from 10.6 to 12.1 (or approximately a 14% increase)."[56]

Figure 28: (a) Trends in Income Inequality
Cumulative Change in Quintile Shares of Total Income Since 1993 (*top*) and Cumulative Percentage Change in income Ratios, 1993-2013 (*bottom*)

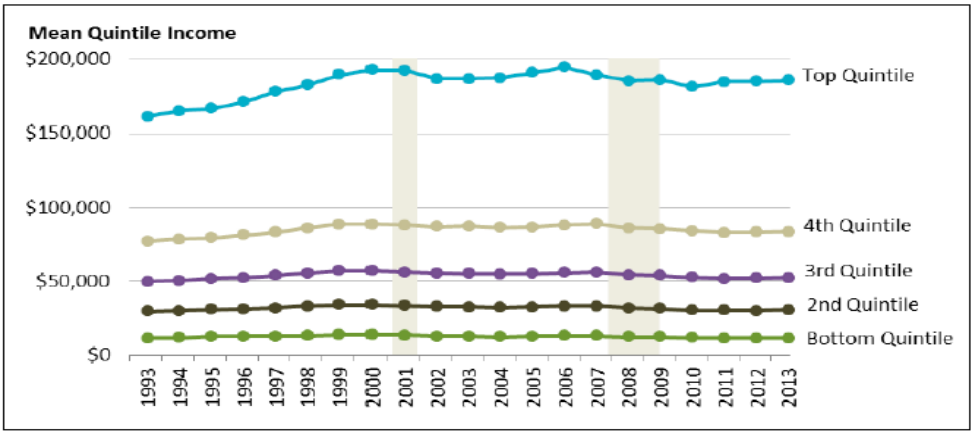


Source: Donovan (2015)

While growth in the mean income of all quintiles either declined or remained constant between 2007-2008 (the period coinciding with the Great Recession), only the top-most quintile recovered some of that loss in the period from 2011 onward.[57]

[56] Ibid.
[57] Ibid.

Figure 29: **(b)** Trends in Income Inequality—**Mean Quintile Income (Pre-Tax Cash Income Received by Households in 2013 CPI-U-RS dollars**)



Source: Donovan (2015)

4.2.2. Wealth Inequality

Desilver (2015) notes that "wealth inequality tends to be much higher than either income or consumption inequality, but it also tends to not vary as much over time."[58] Despite that, New York University economist Edward Wolff found significant increases in shares of wealth held by the top 5% of households from 1962 to 2013. The share of wealth held by the top 1% rose from 33.4% in 1962 to 36.7% in 2013, while the holdings of the next-wealthiest 4% of households rose from 21.2% in 1962 to 28.2% in 2013.[59] By contrast, the wealth share of the bottom 40% did not grow and instead fluctuated between 1.5% of growth and -0.9% of loss from 1962 to 2013. Together, these corroborate Pew Research Center research that found "that the wealth gap between upper-income people and the rest of America was the widest on record in 2013"—with only those in the upper income brackets seeing wealth gains in the post-recession period.[60]

Figure 30: Trends in Wealth Inequality

Only Upper-Income Families Have Made Wealth Gains in Recent Decades

Median household net worth by income, 2013 dollars

	ALL FAMILIES	LOWER INCOME	MIDDLE INCOME	UPPER INCOME
2013	$81,400	$9,300	$96,500	$639,400
2010	82,300	10,500	96,500	595,300
2007	135,700	18,000	158,400	718,000
2001	114,100	19,100	134,200	590,300
1992	80,800	13,800	94,100	338,500
1983	76,600	11,400	94,300	318,100

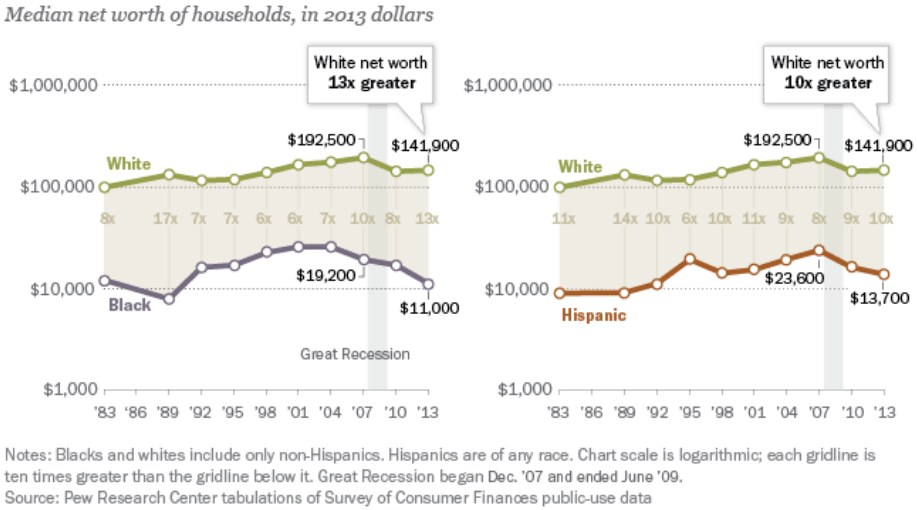
Source: PEW Research Center

[58] See Footnote 47
[59] Ibid.
[60] Ibid.

4.2.3. Wealth and Racial/Ethnic Inequality

Further analysis from the Pew Research Center finds that wealth inequality has also widened along racial and ethnic lines, with the median wealth of white households at 13 times that of black households in 2013—as compared to eight times the wealth in 2010.[61] This may be related to the disparate abilities of households to benefit from the recovery of asset prices. "White households are much more likely than minority households to own stocks directly or indirectly through retirement accounts" and decreases in asset ownership from 2010-2013 "tended to be proportionally greater among minority households" (as homeownership rates among minority households "decreased from 50.6% in 2010 to 47.4% in 2013").[62] This adds another dimension to the question of QE and social inequality.

Figure 31: Growth of Racial/Ethnic Wealth Gaps Since the Great Recession



Source: PEW Research Center

4.2.4. Debt and Consumption Across America

In addition to the more traditional measures of consumption discussed in the Real Economy portion of this paper, a consideration of debt patterns can shed light on consumption inequality. Ratcliffe et al. (2014) characterize debt and access to credit as a critical "stabilizing force" for households and communities as both support the financing of essential purchases, houses, and education. Ratcliffe et al. (2014) make use of 2013 TransUnion credit data encompassing mortgage debt and "non-mortgage debt" (vehicle loans, education loans, credit card debt, and debt in collections—which can include unpaid medical and utility bills)—to examine the spatial distribution of debt in America in the post-QE recovery.

While QE undoubtedly help to restore home values and financing opportunities, the extent of the recovery varied across the nation. The authors find high concentrations of mortgage debt both along the west and east coasts as well as in the Mountain states. In the "affluent, high-cost [coastal] markets," that metric

[61] R. Kochhar and R. Fry, "Wealth Inequality Has Widened along Racial, Ethnic Lines since End of Great Recession." *Pew Research Center*, December 2014, http://www.pewresearch.org/fact-tank/2014/12/12/racial-wealth-gaps-great-recession/
[62] Ibid.

alone is not a signal of financial distress, as “debt is actually fairly low relative to home prices” in those regions. However, the debt is a concern in the middle of the country, where there are high levels of “mortgage debt relative to home values”—likely due to weaker economic recovery resulting in “lower growth in housing values relative to mortgage amounts and differences in foreclosures and strategic defaults” in those regions. Finally, the study finds signs of great “financial stress” in “the lower-income and less populous” central South. In that region, levels of mortgage debt relative to income are low, and the ratio of “nonmortgage debt” relative to income is the highest in the nation. Additionally, there is a higher reliance on “alternative nonbank loans” (e.g. payday loans and pawnshop loans) in that region (see Figure 64).

4.3. Transmission Mechanisms

4.3.1. The Conventional Channels

Given this underlying setting of inequality, a key consideration for this paper is whether the chosen path that Fed policy took to stimulate aggregate demand produced undesirable social impacts as well. The table below summarizes five primary mechanisms—widely cited by the literature—through which conventional expansionary monetary policy influences outcomes related to social welfare. Each mechanism has the potential to amplify inequality, cutting across the population in different ways, resulting in different groups of winners and losers. The table below focuses solely on the winners and losers from a theoretical expansionary monetary policy shock, such as that generated by QE.

Figure 32: Five Key Transmissions Identified from a Literature Review of QE and Its Social Effects

Channel	Mechanism	Impact of Expansionary Monetary Policy	
		Winners	Losers
Savings Redistribution	Low interest rates benefit new borrowers, those paying debt service; harms savers with all assets in a money market account; harms certain financial intermediaries (banks, maturity transformations). De facto greater household disposable income for debtors and less for lenders. [63]	New borrowers (young), debtors (floating rate/can refinance), recent graduates (borrowers paying debt service and/or invested in long-term bonds)	Insurance companies, pension funds, Social Security fund, retirees on fixed Incomes
Financial Segmentation[64]	Proximity to financial markets	Agents interacting more directly with central banks (financial intermediaries)	More "distant" agents (those holding fewer financial assets); those outside the financial sector
Income Composition Channel	Expansionary monetary policy "exert[s] upward pressure on the prices of financial assets"—and "stocks are disproportionately held by the wealthy."[65] [66] Further, "if expansionary policy raises profits by more than wages, wealth will tend to be reallocated toward the already wealthy."[67]	Households with financial assets (wealthy)	Households with no financial assets (non-wealthy)
Wage Heterogeneity	Households who rely predominantly on labor income are less protected from job loss in a recession	Low- and middle-income, young[68], less-skilled benefit relatively more from the reduced unemployment	High-income, skilled benefit less (though it doesn't necessarily entail a loss)
Portfolio Composition[69]	***A concern for "unwinding:"*** Inflation (especially unanticipated inflation) erodes the value of cash.	(Wealthier) households holding nonmonetary assets	(Low and very low-income) households holding mostly cash

[63] C.N. Nwafor, "Monetary policy, inequality and financial markets.", *University of Glasgow*, 2015.
[64] See Coibion et al. (2012) and White (2012)
[65] K. Bernoth, P.J. König, B. Beckers, and C. Forti Grazzini, "Quantitative Easing–What Are the Side Effects on Income and Wealth Distribution." *DIW Berlin*, 2015
[66] B. Bernanke, "Monetary policy and inequality.", *Brookings Institute*, June 2015
[67] See Coibion et al. (2012)
[68] M. Elsby, B. Hobijn and A. Şahin, "The decline of the U.S. labor share." *Brookings Papers on Economic Activity 2013*, no. 2 (2013): 1-63.
[69] See Den Haan (2016)

4.3.2. Transmission Mechanisms Impaired by the Context

In this section, we acknowledge that the unique setting of the Great Recession of 2008 may have impaired the functioning of a key transmission mechanism: the restoration of the housing market via the savings redistribution channel.

U.S., middle-class households predominantly hold their wealth in real estate. The recovery in housing prices and home values brought about by QE thus theoretically would have benefitted the middle-class more than other segments of the population compressing the wealth distribution.[70] However the ability of households to benefit from the recovery was uneven. Beraja et al. (2016) note that areas where home prices declined the most during the recession were unable to benefit from the lower interest rates: "[It is relatively more] expensive for borrowers with little home equity to refinance, areas where home prices declined the most had relatively fewer homeowners who were able to refinance and benefit from the lower rates... These regions were also the same locations that had suffered large increases in unemployment." Cohan (2014) complained that "home mortgages and small business loans are harder to get than ever. If you're GE or KKR, getting a loan from a bank is no problem; if you want to buy a new house in Peoria, good luck to you."[71] Thus, the beneficial impact of QE on the underlying context of the housing markets was realized unequally across regions in the United States impairing the ability of this channel to mitigate inequality.[72]

4.4. Literature Review and Interview Findings

Given the complexity of the subject, and the existence of numerous potential confounding factors, a robust econometric assessment of QE's social impact was beyond the scope of this paper. For this reason, we relied on the growing academic literature to inform our conjectures on the role of QE in amplifying social inequality. In our review, we found considerable variation in researchers' approaches to the question, focus, statistical modeling techniques, and assumptions of the counterfactual of what would have happened in the absence of QE. The studies are summarized below and loosely grouped by focus.

4.4.1. Quantitative Easing Exacerbated Inequality in the United States

Many studies considered the question of whether using the inherently redistributive tool of QE to promote the equalizing effects of employment and mortgage refinancing generated greater social benefits than costs. Many, including Montecino and Epstein (2015), have concluded that the poor and middle classes were not *disadvantaged* in the short-term, but that the equalizing effects of restored employment and housing values were not strong enough and were "swamped by the disequalizing effects of equity price appreciations" that benefitted the wealthy.

[70] G. Claeys, Z. Darvas, A. Leandro and T. Walsh. "The effects of ultra-loose monetary policies on inequality." *Bruegel Policy Contribution*, June 2015

[71] W. Cohan, "How Quantitative Easing Contributed to the Nation's Inequality Problem." *The New York Times*, October 2014.

[72] See Beraja et al. (2015)

Figure 33a: Literature Review Pointing to Increased Inequality as a Result of QE

Study	Data/Model	Findings
Pew Charitable Trusts. "Household Expenditures and Income." *Chartbook*. 2016.	BLS Consumer Expenditure Survey (1996 to 2014)	"As the recovery began, median household expenditures returned to pre-crisis levels, but median household income continued to contract."
Montecino and Epstein. "The Political Economy of QE and the Fed: Who Gained, Who Lost and Why Did it End?" 2015.	CRISP stock returns data Model: Event-style regressions	"QE probably did increase inequality, as measured, for example, by the 99/10 percentile ratio, largely because of the large impact of equity price increases on income inequality, and the relatively small impacts of employment generation and mortgage refinancing on reducing inequality."
Montecino, Juan Antonio and Gerald Epstein. "Did Quantitative Easing Increase Income Inequality?" 2015.	Survey of Consumer Finances (SCF) Model: Recentered influence function (RIF) regressions	"While employment changes and mortgage refinancing were equalizing, these impacts were nonetheless swamped by the large dis-equalizing effects of equity price appreciations. Reductions in returns to short term assets added further to dis-equalizing processes between the periods. Bond price appreciations, surprisingly, had little distributional impact." A paradox: loose and tight monetary policy are both likely to be dis-equalizing
Stiglitz, Joseph. "Fed Policy, Inequality & Quality of Opportunity." 2015.	N/A	"Monetary policy has asymmetric effects: what workers lose in the downturn they do not seem to make up in the recovery…. Given the importance of inequality in our society, the Fed needs to pay attention to these effects."
Beraja, Martin, Andreas Fuster, Erik Hurst, and Joseph Vavra. "Regional Heterogeneity and Monetary Policy." 2015.	Home Mortgage data, Census data (ACS), Bureau of Labor Statistics data, McDash (CRISM), MBA Refinance Index, Auto purchases data	Differences in the value of collateral likely did exacerbate consumption inequality.

Brookings Institute. "Did the Fed's Quantitative Easing Make Inequality Worse?" The Brookings Institution. Ed. David Wessel. Washington, D.C., 2015.	N/A	"If three quarters of our fellow citizens get 96 percent of their labor from labor income it strikes me we ought not be dismissive in saying everybody wins."
Sommellier, Estelle and Mark Price. "The Increasingly Unequal States of America: Income Inequality by State, 1917 to 2012." 2015.	State-level IRS tax data (2006-2012), SOI tax data, Piketty and Saez (2012)	"Although the Great Recession reduced the incomes of the top 1 percent, their income growth once again outpaced the growth of incomes among the bottom 99 percent starting in 2010."
Ledoit, Olivier. "The redistributive effects of monetary policy." *University of Zurich Department of Economics Working Paper 44* (2011).	Purely theoretical, modeling an exchange economy consisting of agents in close or distant proximity to a central bank.	"When a central bank increases the money supply, it must inject the money somewhere in the economy. We demonstrate that the agent closest to the location where money is injected is better off, and the one furthest is worse off."
Yellen, Janet L. "Perspectives on Inequality and Opportunity from the Survey of Consumer Finances." Conference on Economic Opportunity and Inequality. Boston: Federal Reserve Bank of Boston, 2014.	Survey of Consumer Finances (SCF)	"Wage growth and the healing of the labor market have been slow, and the increase in home prices has not fully restored the housing wealth lost by the large majority of households for which it is their primary asset."
Spitznagel, Mark. "How the Fed Favors the 1%." *The Wall Street Journal*. 19 April 2012.	N/A	"The Fed is transferring immense wealth from the middle class to the most affluent, from the least privileged to the most privileged."

4.4.2. Quantitative Easing Did Not Exacerbate Inequality

Other studies focus less on the appreciation in stock prices and place greater weight on the economic recovery that was stimulated by QE. These studies find that QE mitigated the dangers of a prolonged recession, particularly in the area of unemployment, which had harmed low-income, low-wealth groups to a disproportionate extent. These authors took the view that, although wages might be stagnant and the quality of jobs might be low, reducing the number of people with no income at all is an effective way of containing income inequality and, by extension, mitigating consumption inequality. Because of this, the net effect of QE was essentially equalizing—or at least neutral.[73] Interestingly, a greater number of these studies were published in 2014 or earlier, as compared to the studies that found that QE did exacerbate inequality.

[73] See Bullard (2014)

Figure 33b: Literature Review Refuting that QE Increased Inequality

Study	Data/Model	Findings
Bernanke, Ben. "Monetary policy and inequality." 1 June 2015. *Ben Bernanke's Blog.* 2016	N/A	"While it is true both that easy monetary policy raises stock prices and that stocks are disproportionately held by the wealthy, it does not follow that, overall, the Fed's recent monetary policies have disadvantaged the poor and middle class relative to the rich."
Bivens, Josh. "Gauging the Impact of the Fed on Inequality During the Great Recession." 2015.	Piketty and Saez (1998, updated), CBO estimates (2010), Estimates from Zandi (2010) and Engen et al. (2014)	To the extent that the Fed pushed the economy closer to full employment, it reduced inequality. Critics of the Fed ignore the crucial "compared to what" question.
Bullard, James. *Income Inequality and Monetary Policy: A Framework with Answers to Three Questions.* New York: C. Peter McColough Series on International Economics, 2014.	N/A	No medium-term implications for the U.S. income or wealth distribution—it is only as good or bad as it was before the crisis.
Gornemann, Nils, Keith Kuester & Makoto Nakajima. "Doves for the Rich, Hawks for the Poor? Distributional Consequences of Monetary Policy." 2014.	Dynamic stochastic general equilibrium model (DSGE)	"Countercyclical monetary policy is welfare improving since it helps reduce labor market volatility."
Meyer, Bruce D. & James X. Sullivan. "Consumption and Income Inequality and the Great Recession." 2013.	Census data (CPS, 2001-2012), BLS Current Employment Statistics data (2000-2011)	This study takes the view that consumption is the more appropriate measure "if one is concerned with inequality in well-being," and finds that consumption inequality fell between 2005-2011—implying that QE did not exacerbate inequality along this dimension.
Coibion, Olivier, Yuriy Gorodnichenko, Lorenz Kueng,and John Silvia. "Innocent Bystanders? Monetary Policy and Inequality in the U.S." 2012.	Quarterly U.S. CEX Survey data (1980-2008) **Note:** This study focuses on the pre-recession period.	"Monetary policy shocks appear to account for very little of the variation in income, earnings and expenditure inequality until the mid-1990, [after which] monetary policy shocks can account... for the decline in income and earnings inequality lasting into 2008 while monetary policy shocks were distinctly expansionary."

4.4.3. Findings from Japan

Of the advanced economies that have lately resorted to QE, Japan has had the longest experience with the unconventional monetary tool in the form of its credit easing programs. As a result, researchers have sufficient empirical data to assess the social implications of credit easing. Saiki (2014) finds that income inequality increased between 2008 and 2013 as a result of higher asset prices. Saiki goes on to recommend that any unconventional monetary policy effort be complemented by "tax and structural reforms which offset the impact of UMP." These findings are informative, but may not necessarily be generalizable to the United States, as Japan's economic, political, and social settings are quite different.

Figure 34: QE and Inequality: Evidence from Japan

Study	Data/Model	Findings
Saiki, Ayako, and Jon Frost. "Does unconventional monetary policy affect inequality? Evidence from Japan." *Applied Economics* 46, no. 36 (2014): 4445-4454.	Japanese Household Survey Data (2008-2013) Model: Vector Auto Regression (VAR)	Credit easing increased income inequality via higher asset prices since the BoJ started Phase II of UMP in 2008 Q3. Policy recommendation: "Consider complementary tax and structural reforms which offset the impact of UMP."

4.4.4. Long-run Attitudinal and Behavioral Effects

The literature also includes speculative thoughts on other social effects which might result from prolonging the low interest rate environment that is characteristic of situations where an unconventional monetary policy like QE was warranted. Much of the focus is placed on alterations of "rational" behavior as the environment changes consumers' incentives and systematically impair consumers' confidence and certainty. For example, prolonged low interest rates make low-risk savings via instruments like money market savings accounts and life insurance policies relatively unattractive—effectively discouraging personal savings behavior. Such an environment also encourages indebtedness, which places more households and consumers in positions of dependence on their creditors.

Other long-run concerns relate to the erosion of consumer and investor confidence and impaired ability to form expectations. The use of discretionary monetary policy can lead to a situation where prices will follow those policy choices rather than market outcomes or accurate valuations of companies. For consumers, merely observing the continuation of unconventional monetary policy—whether accompanied by forward guidance announcements or not—sends a signal that continued caution is warranted. Together, these behavioral effects can counter the desired goal of expansionary monetary policy to stimulate aggregate demand in a recessionary environment.

A last major concern for social welfare is a consideration of the "medium-term." While monetary policy may be stabilizing in the short-run, and neutral in the long-run, its consequences in the medium-term can be costly. Claudio Borio (head of the Bank for International Settlements) and his team assert that

maintaining low interests rates in hopes of stimulating weak recovery may not in fact reflect "the current weakness," but instead "may in part have contributed to it by fuelling costly financial booms and busts and delaying adjustment."[74] The slow adjustment in the medium-term is bleak—"the result is too much debt, too little growth and too low interest rates."—and reflects the diminishing power of unconventional monetary policy tools.[75]

Figure 35: Views on the Long-Term Implications of Ultra-Low Interest Rate Environments and Prolonged Use of Discretionary Unconventional Monetary Policy

Theoretical Effect	Description
Prolonged low interest rates	"Low real interest rates frustrate the purposes of institutions like savings account, life insurance policies or investment funds." There is no longer any incentive to be a "cautious, prudent saver" via "traditional low risk forms of savings."[76] [77]
Prolonged low interest rates consumer sovereignty:	"Individuals that are highly indebted lose independence. They are increasingly dependent on the goodwill of their creditors; on credit conditions and the possibility of rolling-over their debts." (White, 2015)[78]
Discretionary monetary policy impairs formation of accurate expectations	Prices will become dependent on policy making alone—"expectations on the course of unconventional monetary policies"—not on the profitability of companies.[79]
Prolonged unconventional monetary policies increase uncertainty	Respect for the central bank "would increase the likelihood that the public would believe that the central bank had identified problems that they themselves had not foreseen," resulting in more cautious consumption.[80]
Monetary policy is not neutral in the long run	"(Monetary policy) is not neutral over medium- to long-term horizons precisely because it contributes to financial booms and busts, which give rise to long-lasting, if not permanent, economic costs."[81]

[74] Claudio Borio, "BIS Annual Report 2015 - Media Briefing" (speech, Basel, Switzerland, June 28, 2015), Bank for International Settlements, http://www.bis.org/publ/arpdf/ar2015e_tcintro.htm.
[75] Ibid.
[76] See White (2012)
[77] Bagus, Philipp. "The ZIRP Trap: Why low interest rates are a tax on recovery.", *Institute for Research in Economic and Fiscal Issues*, 2015
[78] See Footnote 74
[79] Ibid.
[80] Ibid.
[81] See Borio et al. (2015).

4.5. QE and Inequality: Conclusion and Further Considerations

QE more than likely mitigated income inequality in the U.S. but just as likely exacerbated wealth inequality over same period. Consumption inequality also likely increased. Furthermore, the asymmetrical efficacy of monetary policy at the ZLB presents a policy paradox: "Given the current structure of the economy and monetary policy strategies, both loose and tight monetary policy are likely to be dis-equalizing."[82] Thus, monetary policy is ill-equipped to address problems of regressive redistribution. Nevertheless, the Fed should continue to study the question of how consumption inequality relates to wealth and income inequality.

On the whole however, little can be said to have been definitively resolved when it comes to QE and its social impacts. Our research highlights a number of points that are worthy of further study and that warrant attention from policy-makers. First, as alluded to in the summary table above, an interesting paradox has been identified in the debate over the efficacy and appropriateness of QE. It is no surprise that the Fed has been the target of much criticism since 2008. Central banks have especially large bullseyes on their backs during periods of economic turmoil. Traditionally, however, political conservatives have tended to be inflation hawks advocating tight monetary policy while those who lean to the left are more generally associated with advocacy for keeping rates low to facilitate economic growth. To be sure, in the QE period, the Fed has been vociferously criticized by both camps, but surprisingly its most strident critics come from the political left who seem to argue that the unusually accommodative monetary policy in place since 2008 has created undue hardship on the most needy while at the same time criticizing the Fed for initiating a normalizing policy in December 2015.

Such logical inconsistency is troubling unless we posit that there is a fundamental asymmetry to the way that monetary policy operates on the modern economy. Some economists postulate that this indeed may be the case. According to this theory, "monetary policy is more effective in reducing output than in expanding production."[83] At the ZLB, monetary policy may be especially constrained. The Fed, in its frequent calls for fiscal action to complement its loose monetary policy since the crisis, does not seem to disagree.

An open question touched on by various authors is whether or not monetary policy should even consider questions related to inequality. In the view of Bernanke, the concerns, however valid, are beyond the scope of the central banker's mandate. Current Chair Yellen seems to be somewhat less dogmatic on the subject while other commentators call for a general re-thinking of the whole matter of what should concern the Fed[84]. To the extent inequality has been a cause rather than a result of structural changes in the economy, central banks will undoubtedly need to incorporate it into their reaction functions. While this last point is far from resolved, the willingness of monetary policymakers to even consider such questions is evidence that these economic disparities are all-too real and are not solely the province of "Occupy Wall Street" protestors. Distributional concerns inevitably have strong political underpinnings to them; thus, the final section of our report examines the political impacts of QE.

[82] See Montecino and Epstein (2015)
[83] J. Stiglitz, "Fed Policy, Inequality & Equality of Opportunity", *Roosevelt Institute*, August 2015
[84] Borio, for example, recommends revisiting several bedrocks of conventional economic wisdom including the view that monetary policy is neutral in the long-run. Given its direct impact on asset markets, monetary policy may be far from neutral if the bursting of asset bubbles produces economic instability in the decades that follow.

5.
6. POLITICAL IMPACT ANALYSIS

The Federal Reserve System's transformation over the past century into a powerful, independent financial regulator and macroeconomic-focused organ of national monetary policy hides the Fed's inherent dependence upon political support for its policy decisions. Inherently, by both statute and abstraction, the Fed is an institution defined by political paradox.

Born of post-recession political fervor in 1913, the Federal Reserve System remains an inherently political institution, arguably by the design of its original creators. Accountable to Congress and the American public, administratively commingled with member financial institutions, and charged with apolitically setting national monetary policy irrespective of implicit socio-political consequences, the Fed remains a political institution by virtue of its responsibility of exercising externally politicized public authority—not due to inherent partisan decision-making, which remains anathema to the Fed's statutory mandate[85].

However, such features of design have inherently contributed to historical accusations against the Fed regarding issues of regulatory capture, electoral favoritism, political deal-brokering, and even economic conspiracy. In the aftermath of the Great Recession—the worst financial crisis in U.S. history in eighty years—the dynamics of the nation's central bank and contemporary American politics have contributed to an unprecedented public reevaluation of the Fed's goals, governance, and accountability. Above all, the extended utilization of unconventional monetary policy in the form of QE has greatly contributed to a tense and evolving relationship between the public, Congress, and the Fed.

In this final section of the paper, we examine the political impacts of this evolving relationship, driven by the implications of the Fed's QE program. We begin with an examination of the politicization of the Fed itself, inclusive of the changing nature of the Fed's relationship with the executive and legislative branches, the implications of this relationship on the Fed's long-term credibility, and the significance of such on an evolving demarcation between monetary and fiscal policy. Next, we examine the socio-political effects the QE program has had upon domestic politics in the United States since its introduction in late 2008, identifying four transmission mechanisms—two primary and two secondary—which most accurately define this context.

6.1. Politicization of the Fed

As a statutory creation and instrument of government, the Fed is accountable to all three branches of government for its monetary policy and regulatory actions. Congress, as the sole authority with the power to rewrite the Federal Reserve Act, remains the most proximate audience for Fed policymakers. The Presidency, with the power to appoint the Chair of the Board of Governors of the Fed, wields comparative, albeit diminished influence. The judiciary, while removed from a direct role of accountability, remains a safeguard of last resort. Above all, however, is the origin of the power of the three branches of government itself—the American public—to whom the Fed is ultimately accountable, by virtue of the constitutional power vested in the electorate.

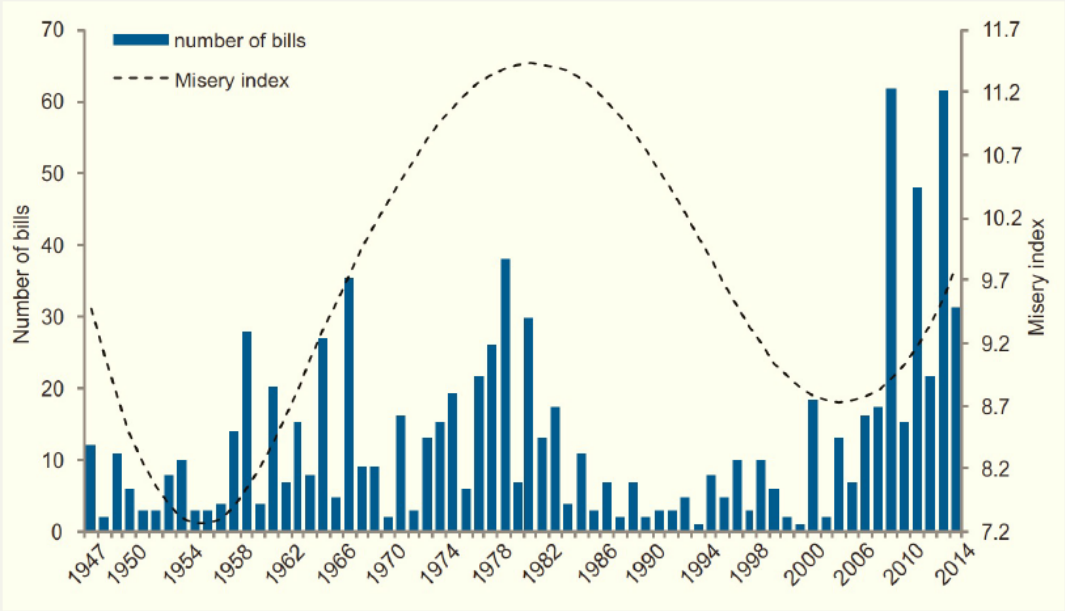
By design, the Fed is intended to operate as an apolitical agency of government. Independence and non-partisanship is necessary in order to overcome the short-term perspective of elected officials, whose personal politics may interfere with national monetary policy. Since the advent of the Great Recession and the introduction of the Fed's QE, this independence has faced an unprecedented assortment of new challenges.

[85] M. Labonte, "Federal Reserve: Legislation in the 114th Congress." December 2015.

6.1.1. The Evolving Relationship Between Congress and the Fed

Congressional attention to the Fed has the potential to affect monetary policy. Historically, national legislative focus on the Fed has increased during periods of increased economic uncertainty and decreased during periods of economic growth. The Great Recession proved to be a continuation of this trend, with Congress introducing an unprecedented quantity of legislation affecting the structure and transparency of the Fed. This contemporary Congressional attention to the Fed remains driven by both the severity of the Great Recession's economic and financial impacts and the increased political polarization of modern U.S. politics.

Figure 36: Congressional Attention to the Federal Reserve, 1947-2014[86]



Source: Center for Economic and Policy Research

Per Figure 36, a spike in Congressional attention to the Fed is evident beginning with the advent of the Great Recession in 2007 followed by an exponential increase in the constraining bias of legislation introduced following the advent of QE 1 in 2008. Unlike prior historical periods of economic uncertainty, an overwhelming majority of legislation introduced between the period of 2007-2014 sought to negatively constrain the power of the Fed[87]. Political party affiliation with regard to legislation introduced was without bias as both Democrats and Republicans introduced a similar amount of legislation seeking to alter the Fed's structure, governance, and policies.

Accompanying this spike in Congressional attention and the constraining bias of legislation was an increase in political rhetoric criticizing the Fed and its unconventional monetary policies. Elected officials took unprecedented liberties to publicly criticize the Fed's policies and mandates often for political gain. During the period leading up to the 2016 Presidential Election campaign, the nation's central bank featured prominently as a topic of discussion in both camps of political party.

[86] See Binder and Spindel (2016)
[87] Ibid.

As a consequence of this increase in negative political and Congressional attention toward the Fed, we determine that both the short and long-term credibility of the nation's central bank has become damaged, potentially hindering the ability of the nation's central bank to correct economic imbalances with unconventional monetary policy in the future.

6.1.2. An Increasingly Politicized Presidential Appointment Process

In addition to Congress, the President of the United States maintains the ability to directly influence the policies of the Fed, and thus national monetary policy, by appointing the Chair of the Federal Reserve's Board of Governors. Confirmation by the U.S. Senate is necessary in order to confirm the President's appointment albeit historically this process has remained both uncontroversial and without politicization.

However, since the introduction of QE, this tradition has become increasingly complicated and politicized. Immediately following the unanimous confirmation of Ben Bernanke in 2006, the appointment process surrounding the Chair of the Board of Governors began to evolve into a heated and politically controversial exercise that threatens to undermine the effectiveness of the nation's central bank by jeopardizing its independence and the qualifications of its leadership.

Figure 37: Confirmation Votes, Federal Reserve Chair

Nominee	Year	Votes
Paul Volcker	1979	98-0
Paul Volcker	1983	84-16
Alan Greenspan	1987	91-2
Alan Greenspan	1992	Uncontested (Voice Vote)
Alan Greenspan	1996	91-7
Alan Greenspan	2000	89-4
Alan Greenspan	2004	Uncontested (Voice Vote)
Ben Bernanke	2006	Uncontested (Voice Vote)
Ben Bernanke	2010	70-30
Janet Yellen	2014	56-26

Source: Brookings Institution[88]

As Figure 37 indicates, the advent of the Great Recession and the Fed's response correlates strongly with an increase in controversy surrounding the second and final appointment of Ben Bernanke as Chair of the Board of Governors. Between 2006 and 2010, Chairman Bernanke lost 30% of his Senate confirmation votes, a decline that paralleled a precipitous drop in his public approval ratings.

A few months prior to the vacating of his position as Chairman in 2014, a heavily politicized battle over his successor began. The two leading nominees—economist Larry Summers and Federal Reserve Bank of

[88] D. Kohn, "Federal Reserve Independence in the Aftermath of the Financial Crisis: Should We Be Worried." *Hutchins Center on Fiscal & Monetary Policy. Brookings Institution*, January 2016.

San Francisco President Janet Yellen—were subject to an unprecedented battle between divided political camps at the highest levels of government.[89] In particular, Summers' nomination was heavily politicized and criticized by opponents due to both indirect and direct factors. Summers' nomination indirectly suffered from disrepute regarding his controversial departure as President of Harvard University and perceptively, his lack of inherent diversity as a male, Caucasian candidate. Maybe more directly, Summers' was criticized by opponents of his nomination due to his prior support for the repeal of key provisions of the Glass-Steagall Act and deregulating the derivatives markets—a move widely perceived as a contributing factor to the Great Recession—his professional inexperience with regard to central banking, and his support for raising interest rates and ending QE earlier than his presumed competitor.[90] During the nomination process itself, financial markets appeared to fluctuate in tune with the likelihood that one nominee would be confirmed over the other.[91]

Ultimately, congressional politicization ended the confirmation process, with Democratic members of the Senate Banking Committee uniting to oppose the Summers nomination. Without the support of key Senators from his own party, President Obama was unable to confirm his desired nominee resulting in the withdrawal of Summers' candidacy for the position. This ended the politicized nomination process, with Janet Yellen ultimately replacing Summers as the President's nominee although Yellen was confirmed by the Senate with only six votes in excess of a simple majority—the fewest number of favorable votes for a Federal Reserve Chairman in modern history.

Moving forward, the politicization of the nomination and confirmation process for the position of Chair of the Fed serves only to further weaken the independence of the Fed and potentially politicize the qualifications of its appointed leadership.

6.1.3. A Merging of Monetary and Fiscal Policy

By design and intent, monetary and fiscal policy in the United States are supposed to remain separate, distinct domains of the Fed and Congress, respectively. However, since the beginning of QE, this distinction has become blurred resulting in significant overlap with potentially troubling repercussions.

While Congress possesses the sole power to amend the Federal Reserve Act as well as the sole power to appropriate government revenue, the Fed possesses the ability to affect domestic fiscal policy via its monetary policy actions. With its powers of seigniorage and the ability to set domestic interest rates, the Fed possesses the power to influence both the federal budget and the federal deficit influencing the magnitude of monetary remittances to the U.S. Treasury and the cost of the national debt. By law, the Fed is required to remit profits earned through seigniorage to the U.S. Treasury as well as any profits earned through asset purchases, which are deposited directly into the general fund of the federal government. This additional revenue provides surplus income to the federal government at no cost, subsidizing operating and capital expenditures.

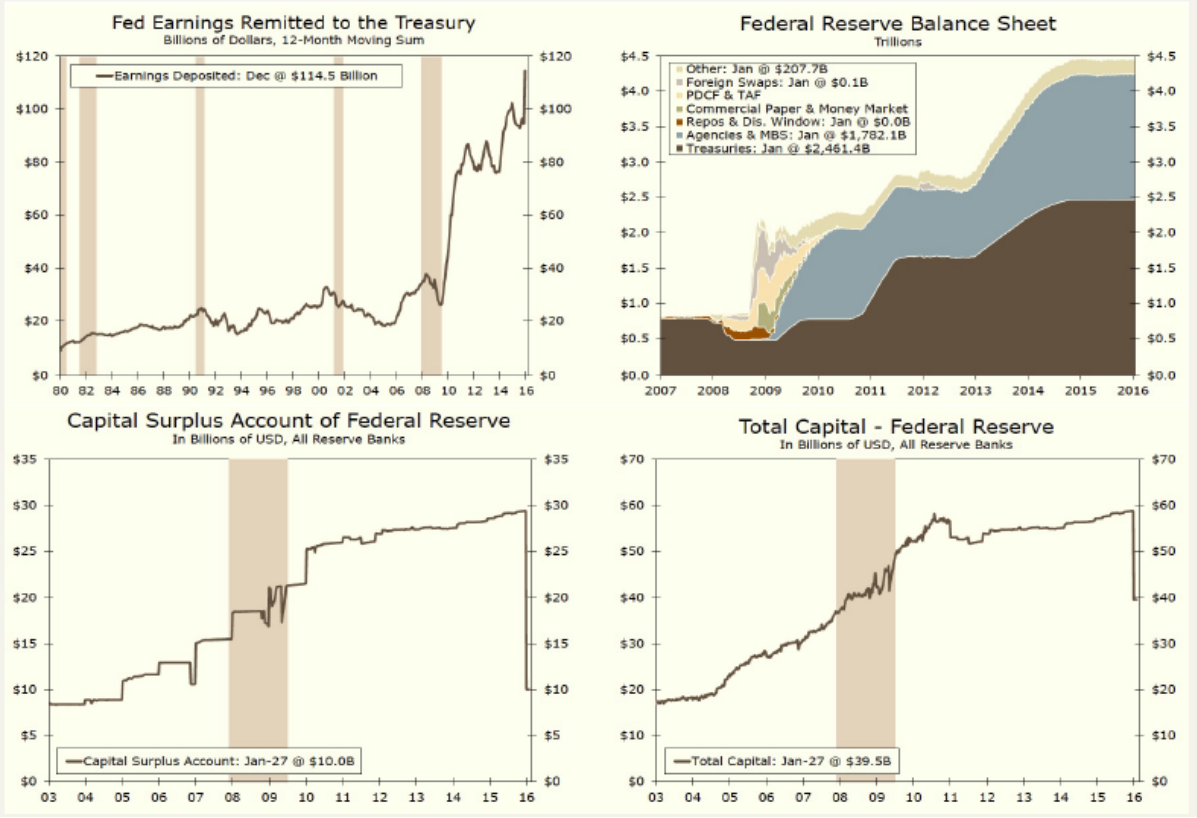
Historically, surplus capital remitted to the general fund of the federal government by the Fed has remained uncontroversial. However, as discussed in 4.3.1, the unprecedented size and scale of the LSAPs has led to unusually large profits being earned by the Fed. Between the start of the QE program in

[89] J. Stiglitz. "Why Janet Yellen, Not Larry Summers, Should Lead the Fed." *The New York Times*, September 2013
[90] B.Appelbaum. "As Summers's Odds Rise, Stimulus Easing Is Seen." *The New York Times,* September 2013
[91] F. Salmon, "The bond market's fear of Summers." *Reuters*, August 2013.

2008 and the beginning of 2016, the Fed remitted over $500 billion to the U.S. Treasury, with approximately $100 billion remitted per year after 2012.[92]

Unsurprisingly, Congress has utilized this money heavily for fiscal policy use, even going so far as to amend the Federal Reserve Act in late 2015 in order to permanently reduce the amount of capital the Fed may maintain in its surplus account.[93] Congress's primary intent with this action was to appropriate funds in the Fed's surplus in order to pay for a politically controversial transportation-funding bill—the FAST Act. In doing so, Congress drained the surplus fund of the Fed by capping the maximum amount that may be held in its surplus account, which serves as a "rainy day fund" for the Fed in the event of a "liquidity event." While in theory the Fed possesses limitless money due to its powers of seignorage, this capping of this surplus account has served to both politicize monetary policy and damage the Fed's credibility of independence.

Figure 38: Politicization of Fiscal and Monetary Policies[94]



Source: Wells Fargo

Part of this occurrence is a function of increased political polarization at the federal level. Heightened congressional gridlock during the Great Recession period has prevented and continues to prevent the enactment of both traditional and emergency fiscal policy to assist the economy. In lieu of the instrument

[92] D. Baker, "The Budgetary Implications of Higher Federal Reserve Board Interest Rates." *Center for Economic and Policy Research,* March 2015
[93] See Silvia et al. (2016)
[94] Ibid.

of fiscal policy, profits earned through the seignorage powers of the Fed's have begun to transcend the domain of monetary policy and supplant traditional fiscal policy.

This interaction between monetary and fiscal policy has negative implications for both the Fed and Congressional policymakers.

6.1.4. Social Feedback Loops: the Cause and Effect of the Fed Policy

In response to QE, a number of social movements advocating reform of both the causes and effects of monetary policy have emerged.

Pressuring the Fed through protest and open demonstration, these organizations—such as the "Fed Up" campaign—have successfully targeted the Fed with concerns over monetary policy and its effects on socioeconomic matters, racial disparities, and unemployment. By politicizing monetary policies, the "Fed Up" campaign has successfully established a rapport with the Fed, pressuring the Fed to establish an advisory council on socioeconomic issues affecting low and middle income Americans.[95] The establishment of this new "Community Advisory Council" has proven to be a watershed movement in the Fed's receptiveness to politically driven demands of the American public, formalizing an outlet for leaders to relay their perspective on a variety of issues to Fed policy makers.

Overall, however, this further politicization of the Fed by national social movements - such as the "Fed Up" campaign—may serve to both enhance and damage the Fed's credibility and independence in the long run.

6.2. The Effects of Unconventional Monetary Policy on U.S. Domestic Politics

In assessing the effect of QE on US domestic politics, we identified four transmission mechanisms: two primary (1) portfolio rebalance and (2) interest rates; and two secondary (3) media market and (4) domestic fiscal policy.

6.2.1. Portfolio Rebalance Channel

QE lowers interest rates, flattens the bond yield curves and increases asset prices. In doing so, owners of stock market equities stand to gain from a boost to the portfolio rebalance channel. During the period of the three phases of quantitative easing, assets such as equities saw an increase in value as a result of QE, with the wealth of investors equally increasing. Similarly, investors in insurance and pension funds search for higher yields and tend to rebalance their portfolios into riskier assets. This portfolio rebalance channel by institutional investors in turn affects retail investors who can see their wealth and purchasing power affected by QE. This can then further shape political opinions, especially if QE's actual rebalancing effects are also channeled by the media.

QE policy has fanned criticism toward Fed due to its controversial nature as a monetary policy. Many economists state that QE blurs the line between monetary and fiscal policy. In Professor Charles Calomiris's view, it was essentially the fiscal elements of QE that had been effective in saving the U.S. economy. The consequence of such ambiguity is that Fed's monetary policy entails redistribution. Fed suddenly entered a politically fraught position of choosing economic winners and losers.

[95] B. Appelbaum. "Face to Face With the Fed, Workers Ask for More Help." *The New York Times.* November 2014.

(i) The Political Impact of the Domestic Media Market

It is said that people will start to believe anything if it is repeated often enough. In the modern era, the media plays a pivotal role. Media coverage on economic policy can produce either negative or positive effect which in turn changes individuals' attitude toward the subject as well as to people and organizations associated with it.

QE is a buzzword that has been frequently mentioned in the media since the program was launched by the Fed in 2008. It has been extensively written about, commented on, and discussed by journalists, commentators, and policy-makers alike. As part of the interviews conducted for this paper, many of those with whom we spoke pointed to mass media as a main source for them to receive information about QE and its implications for their everyday lives.

We identify media information as a secondary transmission mechanism of QE policy which generates political impact on the majority of Americans through shaping their opinions and attitudes. In order to understand what kind of political information media reports convey, we conducted a media content analysis and a sentiment measurement. A Python program was used to collect all media articles and social media posts that mentioned "quantitative easing" from the beginning of the QE policy until the tapering period. Google Search Engine and Facebook are two primary channels that we relied on to search for articles. Due to technological limitations, the program only captures text and some YouTube videos. We largely ignored images, pictures, infographics, and most other videos and audios that also serve the goal of informing and educating the public about QE.

Even though the media coverage on QE was quite broad, a poll conducted by FiveThirtyEight indicates there is a very limited understanding about the policy among the general public.[97] A founder of a New York-based start-up non-profit organization said she was unaware of the Fed policy. The survey also found that respondents had difficulty distinguishing between the Federal Reserve and the rest of the Federal Government.

However, for those familiar with QE who consume media information, what exactly have they been reading and how that has this translated into people's opinions and attitudes toward QE, Fed and the American government? Our media content analysis and sentiment measurement of almost 47,000 pieces of media coverage between 2008 and 2013 return the following results:

- Almost 95% of news articles conveyed negative information about QE with half of pieces consisting of criticisms and attacks on the Fed, former President Ben Bernanke, or the larger U.S. government;
- Media attention to QE during the first round was modest but picked up significantly from the second round on;
- There was a deficiency of informative media articles explaining QE policy in detail; at least 80% of pieces were opinionated with only 5% offering substantive analysis.
- The Economist, the Financial Times and the New York Times are the top three mainstream media organizations that wrote about QE frequently. Particularly, op-ed articles by Paul Krugman, who has a recurring column in the New York Times, had a large readership. Krugman's opinions on QE are deemed to be important to shape the public perception about QE and the Fed.

[97] A. Flowers and H. Enten, "The Fed Has Never Been More Polarizing," *FiveThirtyEight*, February 2015, http://fivethirtyeight.com/datalab/the-fed-has-never-been-more-polarizing/

- There are also several personal blogs of economists talking about QE, but their articles are more analytical and less opinionated.

The following is a breakdown of the number of articles and the key focus and sentiment of the coverage during different phases of QE:

Figure 39: Media Analysis—Key Data

Stage	Time	Frequency	Top 3 Representative Keywords	Sentiment
QE1	12/08-03/10	6,193	Inflation; Government Debt monetization; Dollar value and currency war	Negative and pessimistic
QE2	11/10-06/11	11,646	Ineffectiveness; Wealth and inequality; currency war	Negative and pessimistic
QE3	09/12-10/14	28,930	Inequality; Fed transparency; Dollars	Negative and pessimistic

During the first round of QE policy, media coverage was relatively modest compared with the two following rounds of program. The most shared article is a story published on by Michael Snyder in 2010, attracting 903 views. Snyder called the QE policy a "Ponzi Scheme," reasoning that "the Federal Reserve has been gobbling up the tsunami of U.S. government debt that has been created over the past year"[98]. There were also many articles discussing federal government debt monetization via QE without really saving the economy. Inflation was another frequently mentioned topic associated with QE, as many people believe the functionality of QE is analogous to the central bank's printing money and thereby creating inflationary pressures. Such concerns have been largely mitigated by the fact that the U.S. is still experiencing very low inflation over the past two years. Lastly, the exit of policy was widely discussed at the beginning of QE with many people arguing the U.S. economy would experience turmoil when the Fed started to shrink its ballooning balance sheet.

Entering the second round, media coverage on QE picked up dramatically. Many mainstream media outlets, such as CNN, *The Wall Street Journal* and *Forbes*, started participating in the discussion of QE. Most articles were still negative and pessimistic about QE policy while the target had shifted to then-Chairman Bernanke who at that time came to the press to defend the effectiveness of the policy. A large number of articles discussed the redistributional effect of QE which was seen as exacerbating inequalities by "impoverishing 80% of the population and channeling a large share of the national income to the wealthy class" in this country.[99] At the same time, some economists had drawn a distinction between QE1 and QE2, arguing that the second iteration was completely unnecessary and useless. As the discussion went deeper, many people also reflected on the international impact of the policy claiming that the U.S. was responsible for the rising commodities prices witnessed during that period.

[98] M. Snyder, "Ponzi Scheme: The Federal Reserve Bought Approximately 80 Percent Of U.S. Treasury Securities Issued In 2009," *The Economic Collapse*, January 2010, http://theeconomiccollapseblog.com/archives/ponzi-scheme-the-federal-reserve-bought-approximately-80-percent-of-u-s-treasury-securities-issued-in-2009

[99] Andrew Flowers and Harry Enten. "The Fed Has Never Been More Polarizing." FiveThirtyEight Blog. Feb. 24, 2015. http://fivethirtyeight.com/datalab/the-fed-has-never-been-more-polarizing/

As the third round of QE was implemented, further criticisms appeared. During the second round of QE, people had already been skeptical about the effectiveness of this policy and doubted whether another round was needed. So when the Fed announced QE 3, they were quite surprised. Similarly, media coverage at that time centered on all the topics previously mentioned, including “inflation” “inequality” “hyperinflation” “debt monetization” and “exit concern.”

6.2.2. The Interest Rate Channel

Interest rates represent another underlying transmission channel of QE that generates great impact on American domestic politics through its direct effect on lowering public borrowing costs and increasing the availability of credit and household wealth.

In an extremely low interest rate environment, the government is expected to have lower funding and borrowing costs, alleviating pressure from debt service and allowing more investment and infrastructure plans to be pushed forward. Government at the federal, state and local levels should all have benefitted from making fewer transfers and collecting more tax revenues as a result of the low interest rate environment created by QE policy.

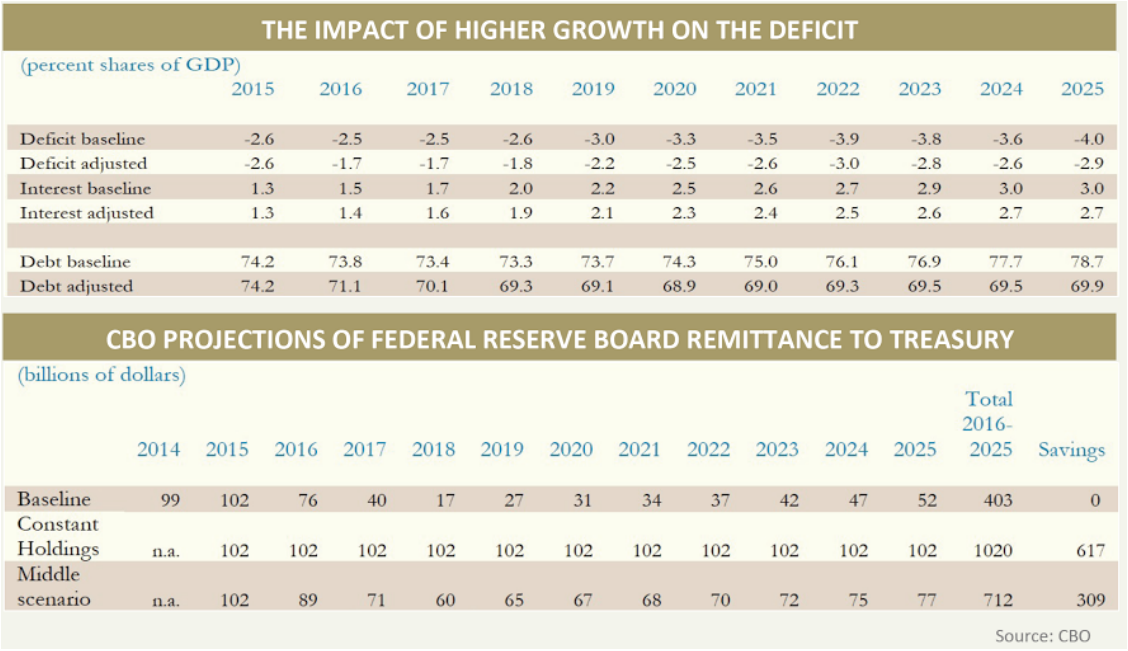
Academic studies also indicate that low interest rates affect the allocation of government budgeting. For instance, the federal budget can benefit from the interest payments that the Fed refunds from the Treasury bonds and mortgage-backed securities it holds as part of QE program. It is estimated that if the Fed were to hold enough bonds so that the amount of interest it refunded to the Treasury Department each year remained at 2015 levels, the cumulative budget savings over the 10-year horizon would be $617 billion.[100] As lower interest rates are also expected to help ease the unemployment pressure and improve economic growth, government’s budget allocation towards social transfers like the unemployment insurance, for instance, should also have decreased. On the state and local level, the government could save 25% of annual payments for unemployment insurance if the unemployment rate remains at 4% from the 5.4% baseline, according to academic research.[101]

(i) **Fiscal Policy**

Fiscal policy, as a secondary transmission channel under the interest rate mechanism, has benefitted from the low interest rate environment engineered by the QE program. As explained earlier, low interest rates ease the payment of debts owed by American government, thereby lowering its budget deficit. The following chart shows the different budget projections based on different baseline interest rates:

[100] See footnote 90
[101] Ibid.

Figure 40: Impact of Fed Policy on Federal Budgets



THE IMPACT OF HIGHER GROWTH ON THE DEFICIT

(percent shares of GDP)

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Deficit baseline	-2.6	-2.5	-2.5	-2.6	-3.0	-3.3	-3.5	-3.9	-3.8	-3.6	-4.0
Deficit adjusted	-2.6	-1.7	-1.7	-1.8	-2.2	-2.5	-2.6	-3.0	-2.8	-2.6	-2.9
Interest baseline	1.3	1.5	1.7	2.0	2.2	2.5	2.6	2.7	2.9	3.0	3.0
Interest adjusted	1.3	1.4	1.6	1.9	2.1	2.3	2.4	2.5	2.6	2.7	2.7
Debt baseline	74.2	73.8	73.4	73.3	73.7	74.3	75.0	76.1	76.9	77.7	78.7
Debt adjusted	74.2	71.1	70.1	69.3	69.1	68.9	69.0	69.3	69.5	69.5	69.9

CBO PROJECTIONS OF FEDERAL RESERVE BOARD REMITTANCE TO TREASURY

(billions of dollars)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total 2016-2025	Savings
Baseline	99	102	76	40	17	27	31	34	37	42	47	52	403	0
Constant Holdings	n.a.	102	102	102	102	102	102	102	102	102	102	102	1020	617
Middle scenario	n.a.	102	89	71	60	65	67	68	70	72	75	77	712	309

Source: CBO

Source: Congressional Budget Office

Figure 40 shows how different interest rates have had significantly different impacts on the government deficit.

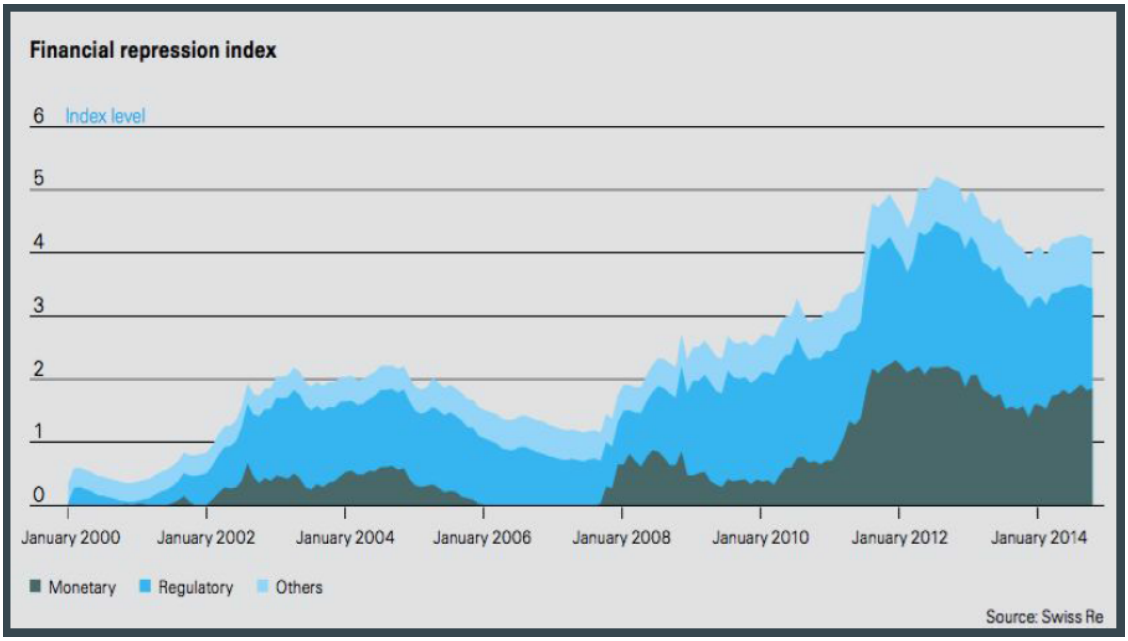
Interest rates may additionally change Fed policies in ways that affect the budget deficit. After covering its operating expenses and paying dividends to member banks, the Federal Reserve refunds the rest of its earnings to the Treasury Department. During the pre-QE period, such refunds were relatively small; but since QE policy was implemented, the Fed largely expanded its balance sheets. Now, remittances to the Federal Reserve average approximately $100 billion per year.[102] The vast majority of American media and even some conservative academic critics view the way QE policy changes the government's fiscal policy as outright debt monetization, characterizing it as a means to finance the government's large deficit by printing money. On the one hand, the large-scale purchases of Treasury securities by the Fed in the secondary market did greatly push up the demand for and prices of Treasury securities. It led to a drop in government debt interest rate, therefore allowing the government to borrow at an artificially low rate. The Fed essentially provided free insurance on investment in government bonds against capital losses from falling prices and rising interest rates. At the same time, the annual refund of operating profits to the Treasury, amounting to $ 565.3 billion during 2009-15, made the interest on that portion of government

[102] Dorfman, Jeffrey. (2014), "The Federal Reserve is Enabling Obama and Congress' Out of Control Spending". Forbes, retrieved from http://www.forbes.com/sites/jeffreydorfman/2014/03/06/the-federal-reserve-is-enabling-obama-and-congress-out-of-control-spending/#77c7e8af4025.

debt held by the Fed effectively a zero rate—representing a saving on net interest payment debt of around $ 65 billion per year.[103]

The practice links to the concept of "financial repression," referring to policies that help a government to direct funds to itself in order to finance debt and lower funding costs. A research conducted by the reinsurance company Swiss Re shows that financial repression is currently high on a historical basis.

Figure 41: Financial Repression Index



Source: Swiss Re

[103] Based on authors' calculation and data from Federal Reserve Economic Data and TreasuryDirect.

7. CONCLUSION AND TOPICS FOR FURTHER CONSIDERATION

7.1. QE in the United States: A Mixed Success

The Fed designed its unconventional monetary policy of large-scale asset purchases to employ financial markets as a conduit for stimulating domestic aggregate demand in the real economy. If the proximate objective of QE was to lower long-term rates through a reduction of the term risk premia, then the consensus concludes that it reached its target.[104] However, as our study indicates, the dramatic increase in the Fed balance sheet seems to have engineered only a modest reduction in long-term rates, calling into question the efficiency of the program.[105] Furthermore, successive rounds of QE produced clearly diminishing returns, which likely prompted the suspension of the policy in 2014. And, while QE may have contributed to stabilizing financial markets in the short-term, it also may have laid the ground for a future destabilizing asset bubble.

Despite ending QE and initiating lift-off with a hike in the FFR and IOER in December 2015, the Fed remains a long way from exiting these policies. For the foreseeable future, the Fed will own a balance sheet that is absolutely enormous by historical standards. As Josh Bivens of the Economic Policy Institute quips, "QE is not Q.E.D," and it is for this reason, that it is far too soon to declare that the program has succeeded in its ultimate mandate. Federal Reserve Bank of Boston President Eric Rosengren agrees that, "while measuring the reduction in rates is one way to capture the impact of the program, the real goal is to have a significant impact on economic variables more generally."[106] As our research revealed, although the U.S. economy has witnessed a dramatic reduction in headline unemployment, national economic output remains below potential, and recovery has not been strong nor confidence-inducing. Seven years after the NBER declared the Great Recession to be over, the Fed's policy rate remains below 1%—as clear an indication as any that even after all this time, the U.S. economy remains quite vulnerable.

If the benefits of QE appear mixed, what of the costs? Our paper has gone beyond the traditional economic literature to consider the optimization of Fed policy in the broadest terms possible. As described above, little has been definitively resolved when it comes to QE and its social and political impacts. On the social side, we have seen the equalizing effects of restored home prices and job growth were overwhelmed by growth in wealth inequality due to equity price appreciations. On the political side, we saw diminished political support for the central banking system, weakening of the Fed's credibility, and an alteration in the underlying distinction between monetary and fiscal policy in the U.S.

Our research also highlights a number of points that are worthy of further study and that warrant attention from policymakers. First, as alluded to in the literature review provided in Figure 33, an interesting paradox has been identified in the debate over the efficacy and appropriateness of QE: "What is striking in the current debate is this: in all the historical cases mentioned earlier, it is high interest rates and restrictive monetary policy that are indicted as transferring income from the poor to the rich, whereas in the current period, the accusation is that it is low interest rates and expansionary monetary policy that is making inequality worse. Can both of these claims be true? Are there special factors that characterize the U.S. economy now that generate results the opposite of those historically claimed?...Given the current

[104] See Gagnon (2016) "The nearly unanimous conclusion is that QE lowers bond yields significantly, even when focus is limited to the portfolio balance effect and not the other channels."
[105] FRB of Boston President Rosengren acknowledged "roughly a 20 to 25 basis point reduction in long-term rates associated with a purchase of $500 billion in long-term assets." See Rosengren (2015).
[106] Ibid

structure of the economy and monetary policy strategies, both loose and tight monetary policy are likely to be dis-equalizing."[107]

Such logical inconsistency is troubling unless we subscribe to the view that there is a fundamental asymmetry in the way that monetary policy operates on the modern economy or at least the economy at the ZLB. According to this theory, "monetary policy is more effective in reducing output than in expanding production."[108] Therefore, at the ZLB, monetary policy may be especially constrained.

At the ZLB, monetary policy may also entail significant risks. The Federal Reserve Bank of Chicago counts several potential costs associated with "alternative monetary policy" including:[109]

1. Inflation risk due to enormous reserves generated through LSAPs
2. Mark-to-market risks on the Fed balance sheet due to eventual rate hikes
3. Distortionary effects in financial markets due to protracted low-rate environment and the Fed's role as "market maker of last resort"

The Fed has never asserted that monetary policy alone would be sufficient to regenerate the U.S. economy and has made frequent calls for fiscal action to complement its loose monetary policy since the crisis began. Yet at the same time, the Fed appears forced to walk a tightrope since any acknowledgement that monetary policy is essentially "out of ammunition" risks panicking financial markets who have become accustomed to central banks being the only game in town.[110]

The OECD in its 2015 assessment of "The Conduct of Monetary Policy in the Future" offers a thought-provoking guide to the challenges which lie ahead: "Additional QE programmes are likely to have diminishing effects on long-term interest rates when prices of securities are already elevated. Moreover, marginal changes in low interest rates may fail to stimulate demand, but they can instead lead to increasing risk-taking as investors intensify the search for yield. Ultimately, ensuing asset price booms may jeopardise financial stability (Rajan, 2013). Low interest rates may also inhibit resource allocation, with negative implications for future growth, by reducing incentives to restructure financial and non-financial corporates (Goodhart and Ashworth, 2012). They may also encourage non-financial corporations to buy back their shares instead of financing investment in productive capacities (Stein, 2012). Protracted QE programmes may result in the dominant position of the central bank in specific security markets, distorting price signals and market discipline. A low-interest rate environment may also discourage governments from undertaking necessary fiscal and structural reforms (Berganza et al., 2014) Long-lasting QE may increase wealth inequality as capital gains will disproportionally accrue to few wealthy households with large financial assets. Consequently, wealth effects could fail to boost consumption as wealthy households have a low propensity to consume."[111]

To the above list, we add a number of other concerns raised over the course of this project.

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[107] See Montecino and Epstein (2015)
[108] See Stiglitz (2015)
[109] C. Evans, J. Fisher, F. Gourio and S. Krane, "Risk Management for Monetary Policy Near the Zero Lower Bound", *Brookings Institution*, March 2015
[110] As but one example, see recent address by Chair Yellen, "One must be careful, however, not to overstate the asymmetries affecting monetary policy at the moment. Even if the federal funds rate were to return to near zero, the FOMC would still have considerable scope to provide additional accommodation." J. Yellen, "The Outlook, Uncertainty and Monetary Policy," speech held at the Economic Club of New York, New York, March 2016
[111] See Inaba et al. (2015)

7.2. Other Concerns Moving Forward

7.2.1. International Spillover Effects and International Coordination

Periodically, the FOMC has cited the conditions of global markets as one input for their policy making calculus. The IMF and others identify not only spillover effects but "spillback" effects for which the Fed must adjust. To the extent that "1/3 of variation in stock market returns and currency movement in advanced economies can be traced to spillovers from emerging markets," the Fed cannot afford to take a myopic view. [113] As Professor Richard Clarida pointed out to us in an interview, "What happens in Beijing or Brasilia is as important as what happens in Washington." Since emerging markets also suffered massive capital outflow as the Fed pondered a rate hiking cycle, increased global coordination to prevent "beggar-thy-neighbor" policies and zero-sum gains in trade will be needed.

7.2.2. Impact on Pensions and Insurance

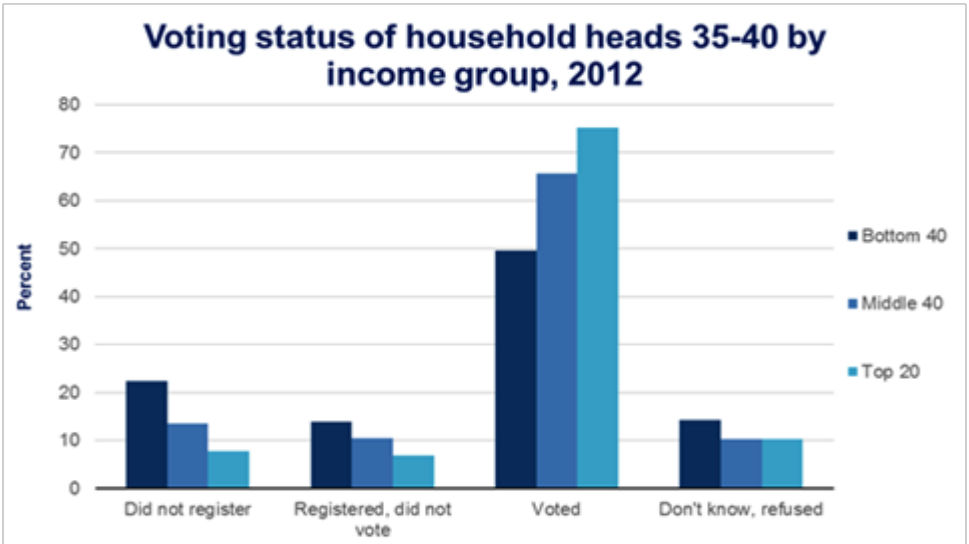
Liability-driven investors like pension funds and insurance companies have been made especially vulnerable as a result of Fed policies. While all investors have return objectives, what distinguishes those who are liability-driven is the contractual nature of their obligations. In an idealized world, these investors would want to hedge their actuarially-predicted liabilities with a duration-matched asset portfolio. In reality, only those pensions which are fully funded or those insurance companies with no profit objective can afford to do so. The rest—the overwhelming majority of liability-driven investors—have been forced to reach for yield to achieve their required rates of return. In the current environment, that may entail taking potentially unsuitable risks. To compound the problem, the liabilities for which these institutions are on the hook grow rapidly when discounted by ultra-low interest rates. Furthermore, the secular migration of plan sponsors away from defined-benefit pensions (plans which guarantee a certain level of income security for retirees) and toward defined-contribution formats has shifted the burden of funding retirement from companies onto a middle class that seems poorly equipped to bear it. Similarly, if insurance is fundamentally "a middle-class product" as one expert asserts, then continued economic pressure on the middle class has dire implications for the insurance industry.

[113] See Footnote 11

7.2.3. Should the Fed's Mandate be Refined?

An open question considered by various authors is whether or not monetary policy should even consider questions related to inequality. In an election year, such questions are especially charged given the capacity for the wealthy to influence political debate.[114]

Figure 42: Socio-**E**conomic Status and Votes



Source: Brookings Institution

In the view of Bernanke, concerns regarding inequality, however valid, are beyond the scope of the central banker's mandate. Current Chair Yellen seems to be somewhat less dogmatic on the subject while other commentators call for a general re-thinking of the whole matter of what should concern the Fed.[115] For example, renewed calls for the adoption of a rules-based approach to monetary policymaking challenge a central bank that has been perceived as being excessively interventionist. Likewise, campaigns to "rein in the Fed", as described in our above political review, remain ever-popular from both sides of the political aisle.

7.2.4. Was There an Alternative to QE?

It is a truism that monetary policy is a necessary but insufficient component of effective economic policy. Virtually every individual that we spoke to during our fieldwork cited "more fiscal policy" as the correct alternative prescription. In addition to this, closer coordination between the Fed and other government agencies might be needed in critical times such as the Great Recession, as was sometimes done in the past.[116] Furthermore, while QE, to the extent that it targeted MBS and Agency debt, appears to have been effective in stemming the housing crisis, this channel remained constrained due to impaired collateral in

[114] As Inglehart argues, "The extent to which inequality increases or decreases, in other words, is ultimately a political question." R. Inglehart "Inequality and Modernization: Why Equality Is Likely to Make a Comeback." *Foreign Affairs*, January 2016
[115] See footnote 82 and Claudio Borio "Revisiting three intellectual pillars of monetary policy received." Luncheon address, Cato Institute (2015)
[116] See Footnote 6

segments of the population that could have benefited most from mortgage refinancing. One industry veteran believes that federal programs like the Home Affordable Refinance Program "did not seem to be as effective as advertised," a point which numerous academic studies corroborate.

Many others we spoke to seem to share the view of Federal Reserve Board member Esther George: "*Thinking that it's either the Fed or the federal government that will fix this economy is probably overselling that. Have there been opportunities? Yes. Had we worked more in concert, might we have gotten a different outcome? Perhaps. But at the end of the day we should not overcompensate for what we see fiscal authorities doing, nor do I think they can step in and provide all the answers. As we begin to adjust policy in line with where this economy is growing, that gives us the best chance of letting the market price where it should be making investments and thinking about how to allocate capital. The Fed can't be counterstructural. We can be countercyclical in trying to push against an economic downturn, but there are many other aspects of our economy.*"[117]

That said, the Fed remains the principal institutional player as it proceeds towards a path of normalization. Many financial market participants remain anxious with regard to how that exit will unfold.

7.2.5. Risks of Unwinding

Perhaps the riskiest component of the Fed's unconventional monetary policies lies ahead. Thus far, the Fed has moved exceedingly cautiously in 2016 and has already retreated from a previously stated plan for four rate hikes this year. While the Fed has taken pains to communicate its planned exit strategy (as early as 2009 by Bernanke in testimony before Congress), the exact timing of its unwind remains state-dependent and thus tentative. In any event, the Fed's March 2016 *Summary of Economic Projections* plots policy rates of only 3% out into 2018. In other words, it will likely be many years before monetary policy reverts to anything that would historically be considered normal.

Given that assumption, and given that the current economic recovery is currently the third longest on record, what would the Fed do in the event of a recession before it reaches the exit? Earlier this year, the Brookings Institution convened a panel of experts to debate that very question. To the challenge "Are We Ready for the Next Recession?" panelists speculated over tools (many as yet untried) which potentially remain in the central bank toolkit including negative interest rates, raising the inflation target above 2%, explicitly target output, or so-called "helicopter money" (putting money directly in the hands of the citizens). Negative interest rate policy is an alternative currently experimented in Japan and Europe but its efficacy is questioned by the market as seen by the subsequent rise in both the Yen and the Euro. "Helicopter money" is in theory supposed to raise inflation and reduce inequalities by directly bypassing the credit conduit, but this idea, sometimes deemed "outlandish" is still subject to much debate and has never been experimented.[118]

[117] B. Appelbaum, "Interview With a Fed Dissident: The Sole Vote to Raise Interest Rates.", *The New York Times*, April 2016, http://www.nytimes.com/2016/04/07/upshot/q-and-a-with-esther-george-a-fed-dissident-but-a-modest-one.html

[118] A. Kaletsky, "Central Banking's Final Frontier?," *Project Syndicate*, May 2016, https://www.project-syndicate.org/onpoint/central-bankings-final-frontier-by-anatole-kaletsky-2016-05

7.3. Closing Remarks

Unconventional monetary policy in the United States likely did contribute to modest, positive effects on short-term recovery in the post-recession period. QE helped restore much-needed stability in the financial markets in the short-term, but may have set the stage for another asset bubble in the future. The real economy did benefit from QE to a certain extent, with some recovery of consumption, investment, and employment, but the effects were not as large in magnitude—or as unambiguously positive—as policy makers and citizens initially hoped. On the social side, the effects of restored employment and functioning of the housing markets were equalizing, but overshadowed by the disequalizing effects of equity price appreciation.

While the country as a whole is likely better off than it would have been in the absence of quantitative easing, the ambiguity and apparent small scale of the program's positive effects have prolonged lingering uncertainty in the wake of the recession. These doubts have been echoed and amplified both in social and news media coverage, as well as in the devolution of attitudes regarding the credibility of the Fed, confidence in the central banking system, and the distinction between fiscal and monetary policy.

However, it is our belief that the politicized rhetoric around the subject presents a bleaker assessment of quantitative easing in the United States than the less "newsworthy," but more realistic, truth that the Federal Reserve made the best use of the last tool that was structurally and practically available in the post-recession, zero lower bound context. And, to the extent that it can balance pragmatism, transparency, and the need to allay citizens' concerns and restore its credibility, the Fed will remain sufficiently able to navigate the prospect of unwinding and the challenge of continuing to operate in a limited monetary policy space.

8. APPENDIX A: LIST OF INTERVIEWEES

Anonymous	Former Deputy Director, Office of Management and Budget, New York City Government
Anonymous	Senior economist at a major international bank
Anonymous	Senior economist at the Conference Board
Anonymous	Source from a research foundation
Anonymous	Trader at Citibank
Anonymous	Strategist at Brown Brothers Harriman
Anonymous	Banker at a community bank
Anonymous	Economist (1) at AIG
Anonymous	Economist (2) at AIG
Berg, Jaymin	Former Director, Financial Institutions Group at Fitch Ratings
Brown, John	Small business owner
Calomiris, Charles	Henry Kaufman Professor of Financial Institutions at Columbia Business School
Calvo, Guilermo	Professor of Economics at the School of International and Public Affairs, Columbia University
Chobanian, Bill	General Manager, Dealer Relations at automotiveMastermind LLC
Clarida, Richard	C. Lowell Harriss Professor of Economics at the School of International and Public Affairs, Columbia University
Colucci, Betsy	Director at BlackRock Investment Management Company
Currier, Erin	Project Director at the Pew Charitable Trusts
Feldmann, John	Senior Fellow at the Center for Financial Stability

Hsu, Jukay	Founder of Coalition for Queens (C4Q)
Hunt, Ben	Chief Risk Officer at Salient Partners
Jaffer, Burhan	Head of Corporate Finance—Mergers, Acquistions and Investment at Infosys
Lai, Richard	8.1. Co-founder of Talanton Partners
Lake, Walter	Senior Research Associate at the Pew Charitable Trusts.
Liu, John	Former New York City Comptroller
Mishkin, Frederic	Alfred Lerner Professor of Banking and Financial Institutions at the Graduate School of Business, Columbia University
Mosser, Patricia	Senior Research Scholar at School of International and Public Affairs, Columbia University
Naidu, Suresh	Assistant Professor of Economics at School of International and Public Affairs, Columbia University
Rachlin, Andy	Managing Director, Lending and Investment at The Reinvestment Fund
Stiglitz, Joseph	University Professor at Columbia University; Nobel laureate in economics
Tibbetts, Tammy	CEO of She's the First
Tilloeva, Hammida	Real Estate Agent at City Habitats
Valiaveeden, David	Managing Partner at Domain Real Estate Partners

9. APPENDIX B: INTERVIEW TAKEAWAYS (BY INDUSTRY)

INDUSTRY	KEY TAKEAWAYS
FINANCE	
Foreign central banks	• Evolution of feeling during QE: Lending was relatively flat during QE; definitely had sense that there were diminishing marginal returns of QE; • Thoughts on QE continuing overseas while the United States unwind: Domestic banks would not care as they do not do much international trade;
Banking	• Bond liquidity and fees have dried up on the sell-side due to regulatory constraint on capital; • QE led to negative profitability for banks, as spread between deposits and loans shrank; Banks make money when interest rates are higher. Now, 25 basis points but net interest margins are lower than ever.
Community development financial institutions	• In immediate aftermath, TRF stood virtually alone in lending to this segment, but that didn't last long; big banks are required by law under the Community Reinvestment Act to do it least some lending in the geographies where they do business to the "underserved" and they returned by the end of 2009-2010 and have become even more active players in the years since. Hard to say whether this is directly attributable to QE but that certainly seems reasonable. • "Rate compression" has definitely been a big challenge since they do conventional maturity transformation. Big banks can source financing cheaper and term structure is so flat that the persistent low rate environment has impaired margins.
Insurance	• Fed advocates Core PCE when looking to be dovish and Core CPI when hawkish; delayed ZIRP till Congress passed TARP; • With smaller middle class, insurance products are harder to sell and low rates also made liabilities more on paper and asset returns low given the "buy and hold" mentality on mostly bond portfolios.
Pensions	• Markets have become "hooked on forward guidance" which is the latest tool that the Fed has resorted to after ZIRP and LSAPs; • This is a form of the "common knowledge game"; i.e. "you know that I know that you know" that this is artificial. • Humans have an incurable compulsion to ascribe a "narrative" to what has been a series of ad hoc experiments. Rather than a coherent strategy of portfolio balance channel and forward guidance, the Fed tries ZIRP until it doesn't work, LSAPs until they stop working, FG until…negative rates are next because the global economy has moved beyond the positive sum "cooperation game" to the "zero sum" game of competition. "Domestic policy always trumps international economics."

Community banks	• Small banks received the equivalent of TARP but their lending standards were restrained, leading to B2B and C2C lending innovation
Hedge funds	• Foreign participation of treasuries has upended stability of U.S. debt; • Fed should be a moral enterprise and think about distributive effects.
Asset management	• QE benefitted people's investment in real estate; • Disagreed with the statement that QE policy per se contributed to the social inequality by only making the wealthy people richer. It is corporate and bank greed that exacerbate the inequality; • Wage stagnation due to low inflation, and no direct link between QE and wage stagnation; • Regulation in banking industry tempered the impact of QE; • Banking and Financial services client benefited from the restoration of confidence and liquidity via QE and therefore bounced back.
Fintech	• Would be comfortable with greater political coordination (like Australia) • Not overly optimistic about QE, but considered it the best option at the time • Would have created startup no matter what; Actually, discouraging climate is encouraging (less competition; remaining companies must be extra thoughtful, better) • Personal consumption did not change as a result of QE • Thinks that QE was not unfair. That "main street" had a big hand in creating the problems during the recession.
GOVERNMENT	• *See Appendix C*
TECHNOLOGY	• "Capital is relatively cheap" • Venture Capital climate is affected by public markets. • "Monetary policy is removed from my daily life.. most people don't think about it, or if it has an effect, they don't correlate or pinpoint it with anything specific."
ACADEMICS	• Thoughts on fiscal policy and QE: fiscal policy didn't follow through, especially in elementary school education; The issue with fiscal spending is about long-term sustainability and at the same time, the messy political system (no politician/political constituency thinks about the long-term). High tax rates won't work as rich can always circumvent; • Thoughts on effectiveness of QE: • Extremely effective in the immediate aftermath of the crisis, to stop the fire and quite effective in the short-mid term on the real economy (most studies do indeed find evidence of a 50-100bps drop in long-term interest rates) - much lower impact after QE1; • Thoughts on QE and social inequality:

	• Regarding consumption as the preferred measure of inequality, completely disagree. Sometimes economists seem to adopt a default position based on an academic model and forget that it "may not be the right model. I mean, who knows what goes in the utility function?". The tendency to assume a lifecycle model is an example of the "fetishization" of principles—which may or may not be valid. If you are at all concerned about the impact of the top echelons on inequality than consumption is clearly not the way to go. Outsized wealth enables the 1% to consume things like "political influence" that will never be captured in the SCF; • Another dimension that could be interesting would be related to inequality and health. The top reason for declaring personal bankruptcy is medical emergency. Could QE policies have somehow mitigated this? Perhaps more beneficial terms on loans taken out to finance emergency healthcare.
REAL ESTATE	• Since 2008, banks have not been involved in financing the housing market. This opened up a niche for specialist intermediaries. But, without banks in this market, how can monetary policy operate? Not only have banks exited here, but there has been a general retrenchment of risk-based finance. There is virtually no credit market for home-builders. 65% of homebuilders struggle to get financing; • Hovnanian, a large national housing developer, was 50% levered going into 2008 and even now teeters on the brink of bankruptcy. One initiative that definitely helped the cause was the changing of tax code to extend "loss lookbacks." Hovnanian benefited from "huge tax refunds" to the tune of ≈ $200 mm; • Mortgage modification programs that were offered did not seem to be as effective as advertised; • What's really different about the 2007-8 crisis is the absence of a Resolution Trust Corporation which means that a big part of this market was never really fixed and thus is just plodding along. There is no RTC because creating one "very likely would have brought down one of the big banks"; • Many real estate professionals had left this business in 2008. But since housing market is boosting very fast, more and more of them are coming back to business. Largest NYC real estate websites (Streeteasy, Zillow group) and companies (NRT which includes Corcoran, Citi Habitats, Coldwell Banker) and REBNY reports show that NYC's sales market is doing very well. Neighborhoods that used to be not so desirable now becoming trendy (example: Bushwick, Washington Heights, Inwood). Less popular neighborhoods Bay Ridge, Bensonhurst, Windsor Terrace are becoming very popular and prices for rental and sales are increasing significantly. *Example*: Average rent for a 1 Bedroom in a walkup prewar building in Bay Ridge was $1200-1300 in 2014. Now same apartments are getting rented in 2-3 weeks for $1600 and up. Prices for sales listings has gone up to 12-15% since 2014.

AUTOMOTIVE INDUSTRY	• Right after the collapse in September 2008: no long-term (3-5y) funding available, only very short-term or very high-risk premium for the limited long-term available. Things improved as around Q3 2009 which seems to be directly attributable to QE; • Then recovery over the next 3-4 years, since 2012 there have been record high leasing numbers, every car manufacturer is both able to take more leasing (which is risky) and secure more long-term borrowing and now sell more; • In the last 18 months (even after QE stopped): there's a substantial return of a number of opportunities.
NONPROFIT SECTOR	• Non-profits have been operating on reserves as funding decreased during the recession, but work had to continue despite the difficulties; • Funding comes from individuals, government and other foundations. Post-recession, funding first decreased considerably before returning to normal levels; • Some non-profits benefited from the recession. Examples include the ones which directly helped poor people as government and individuals were eager to help; • Our difficulties were not too lengthy, because we have support of celebrities and their contributions helped; • Things began to stabilize in 2010, we are operating fully now. Expanded the funding opportunities and receive a large number of grants.
NON-ACADEMIC ECONOMISTS	• "Monetary policy is a blunt instrument, with long delays and [is] not very effective". Along the same line QE has no direct effect on the real economy; • QE was needed to unfreeze the credit/financial market, which in turn can have effects on the real economy, but only secondary/indirect effects; • What needs to be understood is that consumers (whether jobless or not, with homes underwater or not), businesses (cost-cutting) and government (federal, state/local) are all retrenching. Overall, people are simply more cautious in all areas, so there's a lack of demand in general and hence lack of demand for loans. So flooding the market with more potential loan supply isn't necessarily helping; • Given that the effectiveness of monetary policy is limited, need more fiscal policy, but apart from TARP, not much done because of political gridlock. There's also the question of debt sustainability (but note that the opposite policy, Austerity, is never a growth policy (neither for the economy nor for businesses as whole)); • So overall, we have (i) businesses cautious about investing, even with extremely low interest rates, because the rate of return is simply too low (ii) consumers caution about spending even during bargain seasons, although we're seeing house and car purchases pick up. But changes are unlikely to come from politicians, and at one point (not in 2016 though), bold moves will probably come from businesses or individuals and the

	government will simply try to accommodate the restoration in aggregate demand; • Unemployment and low wage growth: wouldn't go as far as saying that most jobs created are low-skilled, low wage. There are still 5m unfilled positions today so we can expect to see U-3 decline to maybe 4.5% by the end of 2016. At what point will there be higher pressures on wages? Today, it's difficult to find good quality candidates, but because of the general cautious environment, businesses are reluctant to increase wages - but soon enough, candidates will put more pressure and wages will increase.

10. APPENDIX 3: INTERVIEWS OF INTEREST

10.1. Interview with Professor Joseph Stiglitz

Interview Date: March 29th, 2016, 3:00-3:45pm

On the bank credit channel (including the mortgage refinance channel):

- Small and medium banks were broken and did not receive bailouts.
- IOER was a "crazy idea."
- Mortgage rates only declined 50bps for a 1% drop in long-term rates because “the big banks didn't pass along savings.”
- QE could not work without fixing the bank credit channel—which should have meant fixing the community lenders *and* SME banks in addition to the large Wall Street banks. Only the “big banks” were bailed out, but the failure of the small banking sector also represents systemic risk.
- If the Fed had worked to improve the functioning of the credit channel, then QE would have had a beneficial effect on the real interest rate that led to more in people’s pockets (if not more investment as well).

On the FX channel:

- The exchange rate effect—in comparison to devaluation—might be the most important international impact. This channel increased the risk of global instability (“not that the Fed cares.”) Some of the results of QE are due to luck: "Trichet was incredibly stupid" in raising rates in 2011 in EU, and the Fed should not have raised rates in 2015.
- The global effects of QE may also affect the political economy. Already, we see evidence of a departure from the free market (e.g. Brazil has implemented capital controls).

On the Fed:

- In its messaging, the Fed has been "coherently incoherent." Some arguments explaining QE are based on the premise of "markets are both rational,” while others presume that markets and agents have become irrational.
- The Fed has claimed to be targeting not a wealth channel, but an increase in consumer spending from that population segment (despite its lower marginal propensity to consume). This de facto "trickle-down" monetary policy is "not a democratic way to do things."

Assessing QE:

- The relative effectiveness of the various rounds of QE must be considered both in terms of their magnitude and the amount of uncertainty addressed in each round.
- QE was ineffective, exacerbated inequality, and caused instability.
- QE contributed to the increase in stock market prices, which benefitted the rich and hurt retirees and average citizens.
- Job creation has been artificial. Low interest rates have prompted a substitution of capital for labor. We see some job improvement now, with no wage growth, and face the prospect of fewer jobs in the future.
- Lower rates have not prompted consumption, but instead have increased saving as liabilities are fixed and the macroeconomic environment is too uncertain.

QE and the current election cycle:

- People feel they can’t trust the government. The idea that bankers got off scot-free—and with additional millions—is pervasive. “They want the crazy guy.”
- Americans have identified that something is wrong with the system, so they don’t want to elect someone from the system (and that’s Hillary, and even Ted Cruz to a certain extent). “[Trump is] certainly not part of the conventional system.”

10.1.1. Interview with Professor Charles Calomiris

Interview Date: April 11th, 2016, 4:00-4:45pm

10.2. Short-term effects of QE:
Fed purchases of long-term treasuries and MBS are a form of fiscal policy because those purchases incur risks of future loss if the securities fall in value. If QE had any positive impact on increasing economic activities, it was due to this fiscal part.

Banks did not increase lending after QE but accumulated them as "excess" reserves due to interest payment by the Fed on excess reserves to banks. Regulatory tightening of capital and liquidity requirements also made banks reluctant to lend.

QE withdrew collateral from the market that otherwise would support repo contracting. Repo is important in funding lending and other financial transactions both within and outside the banking system in U.S.

10.3. Long-term effects of QE:
The unwinding of QE will cause a drop in risky asset prices (which currently overvalued due to QE) and a reversal of international financial flows. How severe the price declines will be is unclear for the moment.

Potential medium to long-term inflationary consequences as a result of the Fed's balance sheet expansion, which forces the Fed to shrink balance sheet. But doing that has political risk, fed will be insolvent and contributes to the federal government deficit. So Fed has rejected this option recently, but intends to increase the interest rate on reserves and expand reverse repo. But there is high uncertainty whether they will work.

QE does not necessarily represent a monetary policy under financial repression, because it is hard to prove if you do not have federal government spending model. (Calomiris recognizes that some economists hold such views).

10.4. Interview with Former New York City Comptroller John Liu

Interview Date: April 13th, 2016

Yes, QE has had an effect on federal, state and local government fiscal policy. In NYC, capital budgeting decisions were altered. Due to the low interest rate environment, NYC consciously decided to “pull” capital budgeting projects forward in time, benefiting in multiple ways:

(1) Advanced projects that would otherwise be delayed
(2) Putting New Yorkers to work (labor)
(3) Injecting money in to the economy.

Additionally, the City took the low-interest rate environment opportunity to essentially “refinance” large portions of its debt. Notably, this included a large amount of bond refunding, saving the city millions of dollars in future debt expenses.

Pension funds definitely benefited from QE as a result of higher stock returns and “pumped up” bonds (inverse relationship between yield and price increased value of NYC assets)

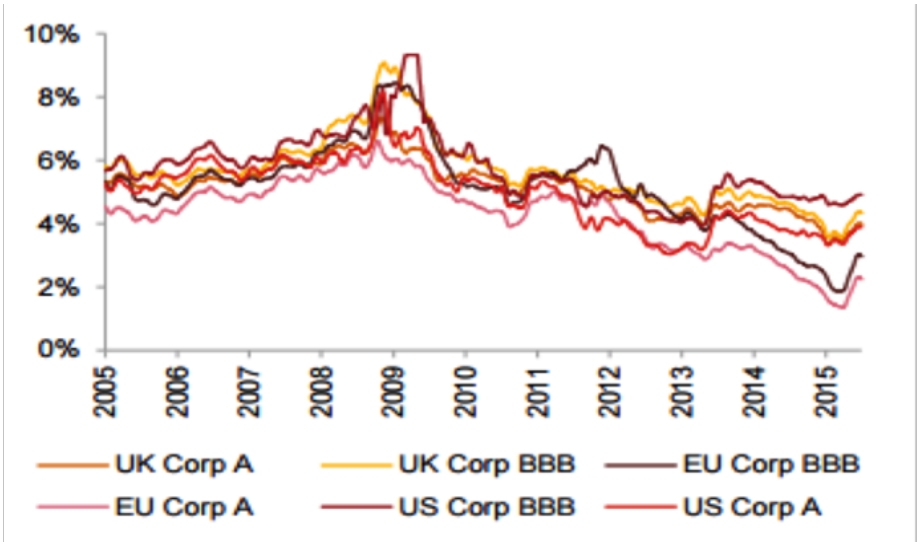
In the long term, NYC’s pension funds were collectively not excessively affected by interest rate movements, as they are projected to balance out. However, short-term interest rate movements definitely increased the stock portfolio and thus pension fund values, mostly because of a 2:1 stock:bond allocation.

Fixed-income retirees complained about low-interest rates (presumably from monetary policy) keeping their COLAs low, etc. However, these gripes were more vocal than serious, as NYC seniors weathered the recession relatively well, as a whole. CPI measures real cost of living and the cost of living wasn’t going up in most places.

11. APPENDIX D: SUPPLEMENTARY FIGURES

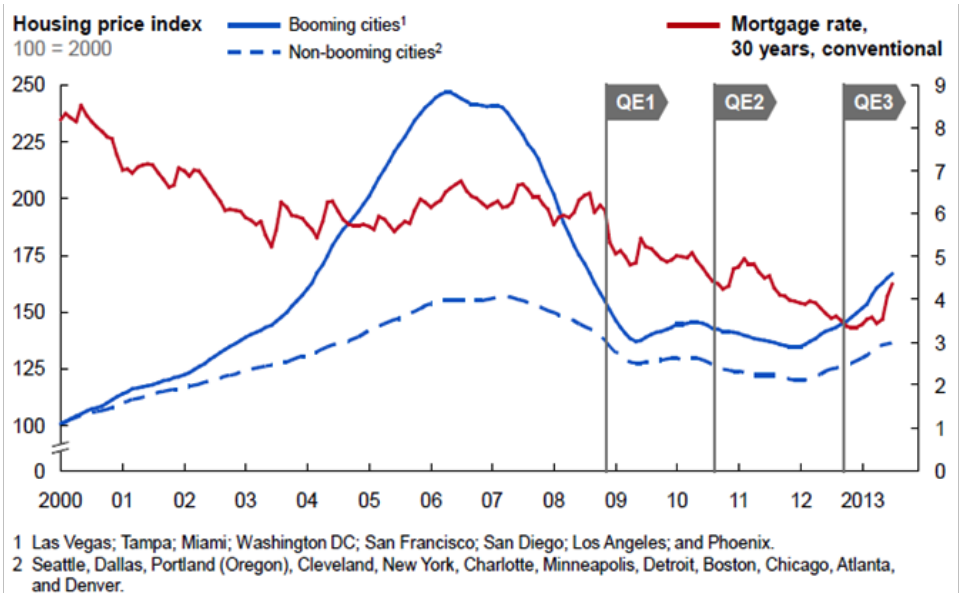
11.1. Financial Markets Figures

Figure 43: Global Yields on 10-y Corporate Bonds**, 22-Day Moving Average**



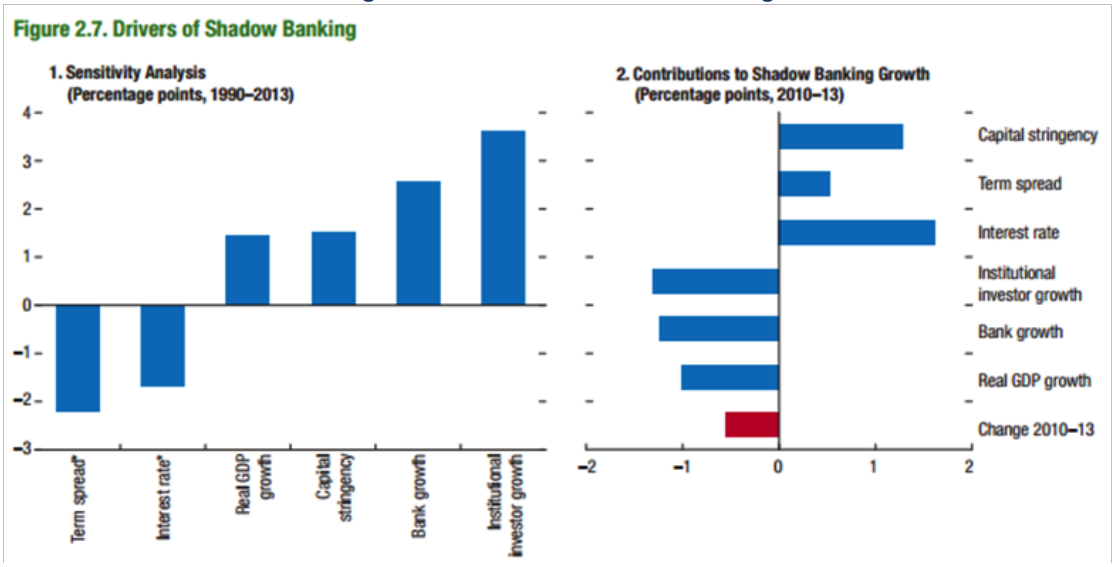
Source: Thomson Reuters

Figure 44: Mortgage Rates and Housing Prices



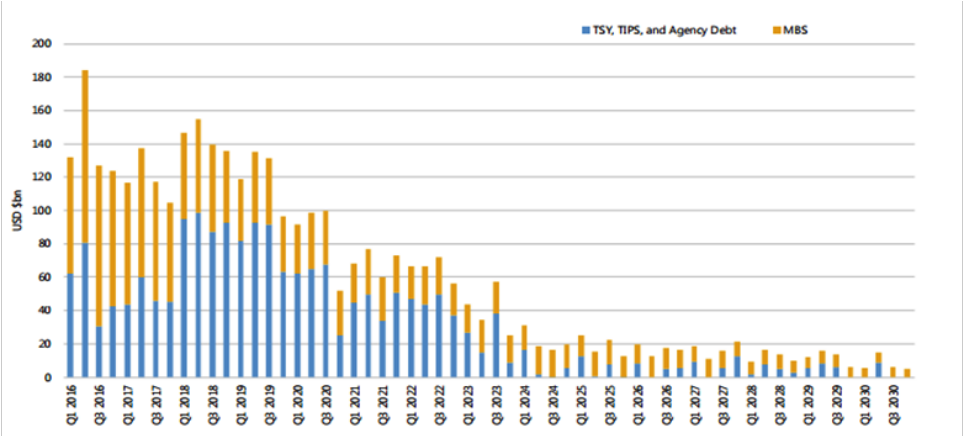
Source: Standard & Poor's, Federal Reserve, McKinsey Global Institute Analysis

Figure 45: Drivers of Shadow Banking



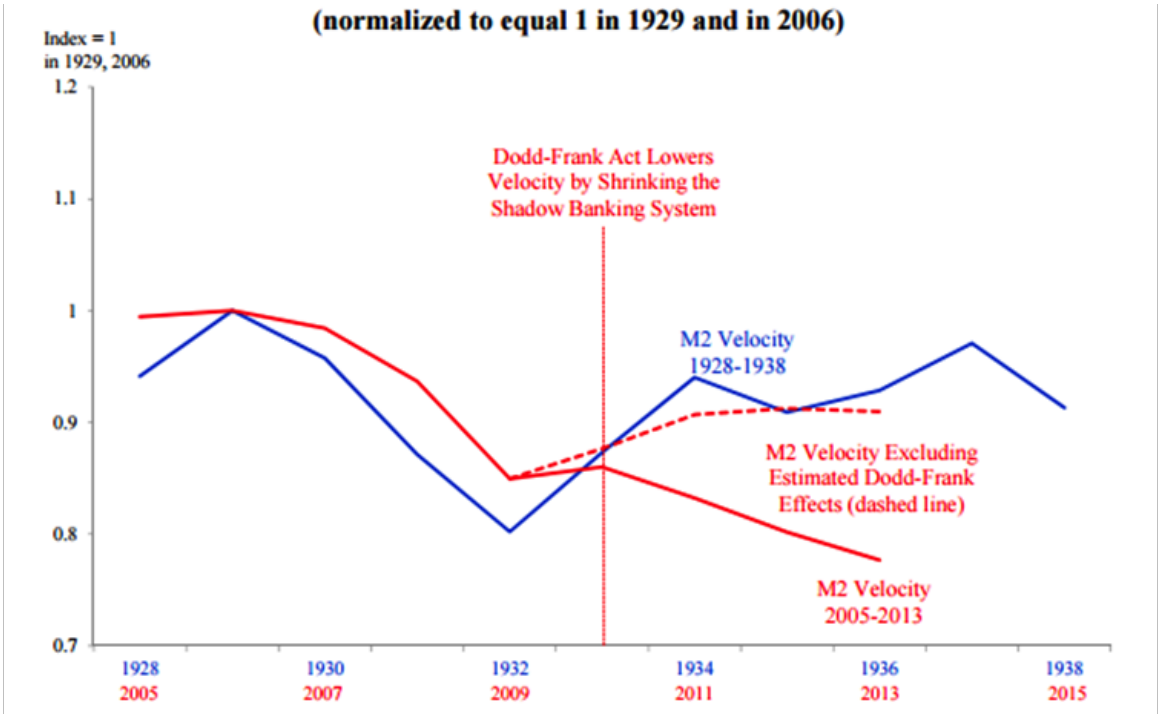
Source: IMF

Figure 46: Maturity Profile of the Fed's Balance Sheet Through 2030



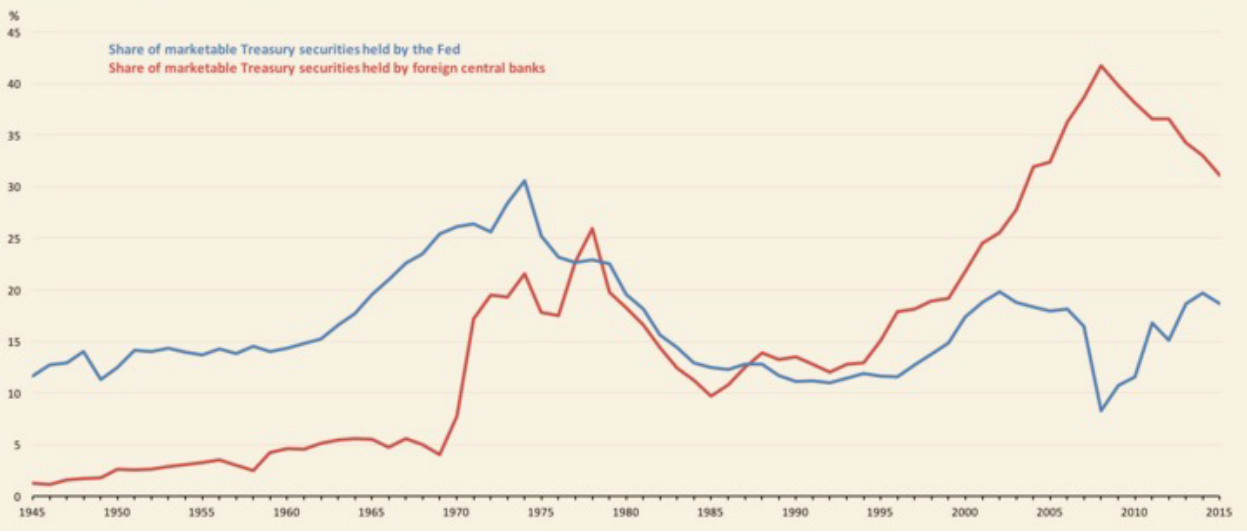
Source: Federal Reserve Bank of New York, PIMCO

Figure 47: M2 Velocity—Comparing 2 Major Crises



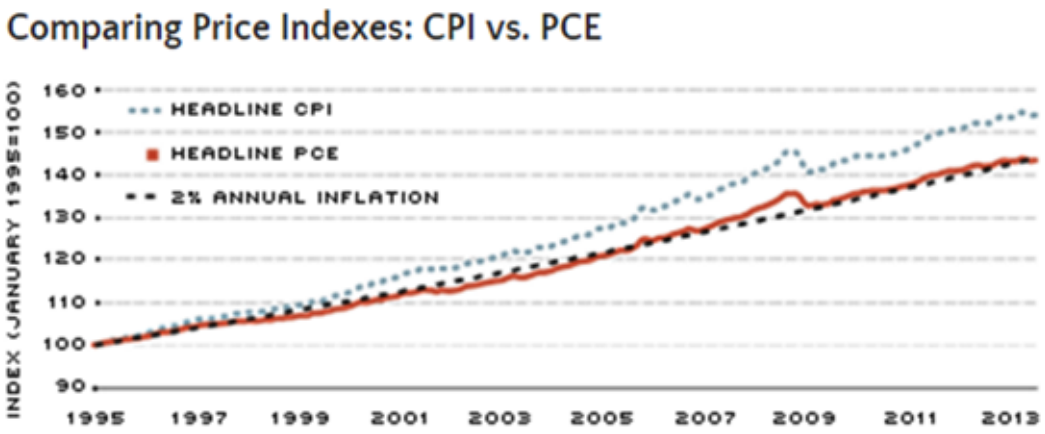
Source: Anderson et al. (2015)

Figure 48: Official Holdings of U.S. Treasuries, 1945-2015



Source: Board of Governors of the Federal Reserve, U.S. Department of Treasury

Figure 49: Various Measures of Inflation

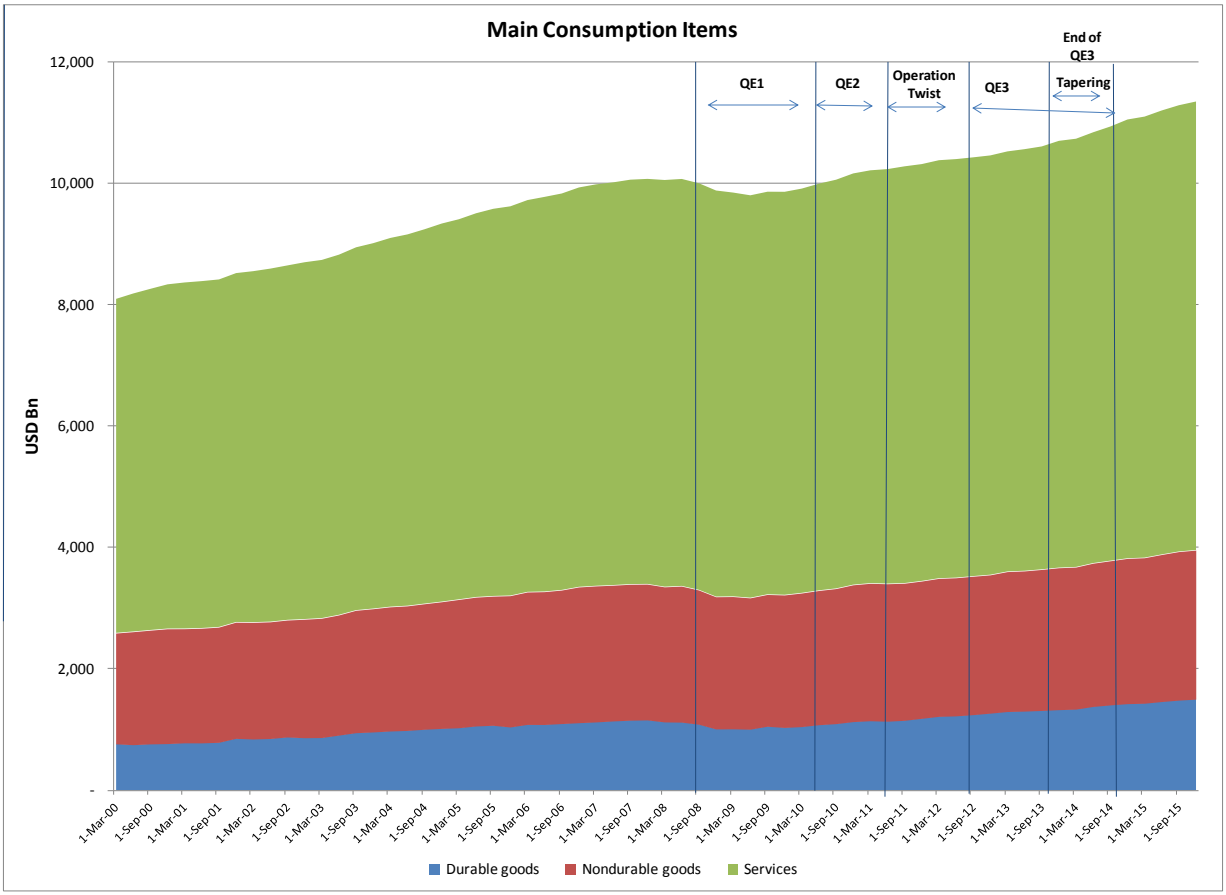


Source: Federal Reserve Bank of St. Louis

11.2. Real Economy Figures

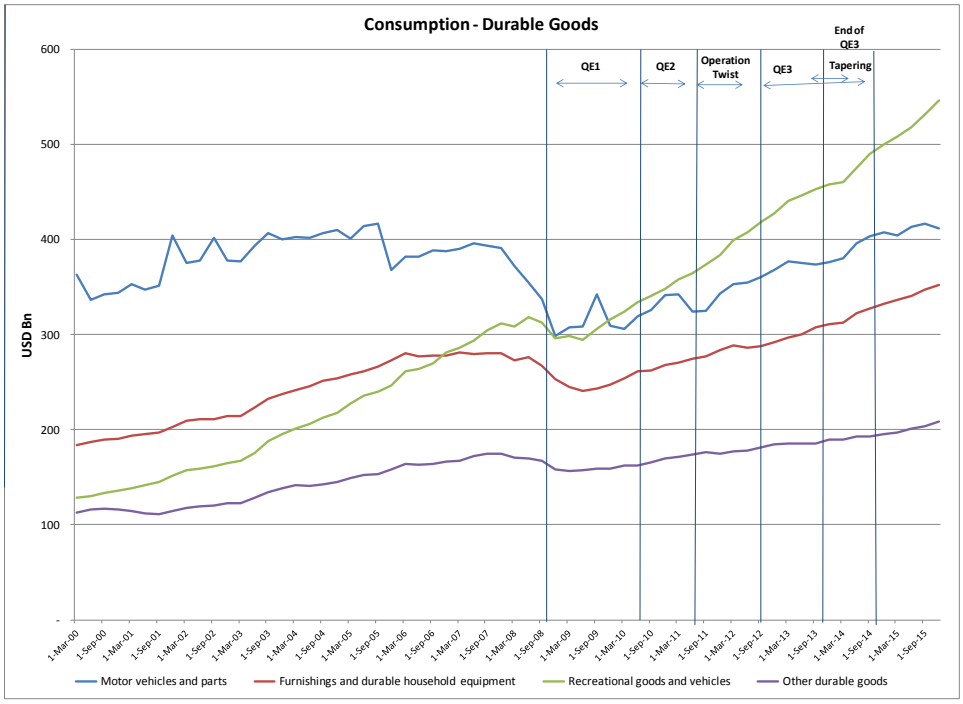
11.2.1. Consumption

Figure 50: Main Consumption Items



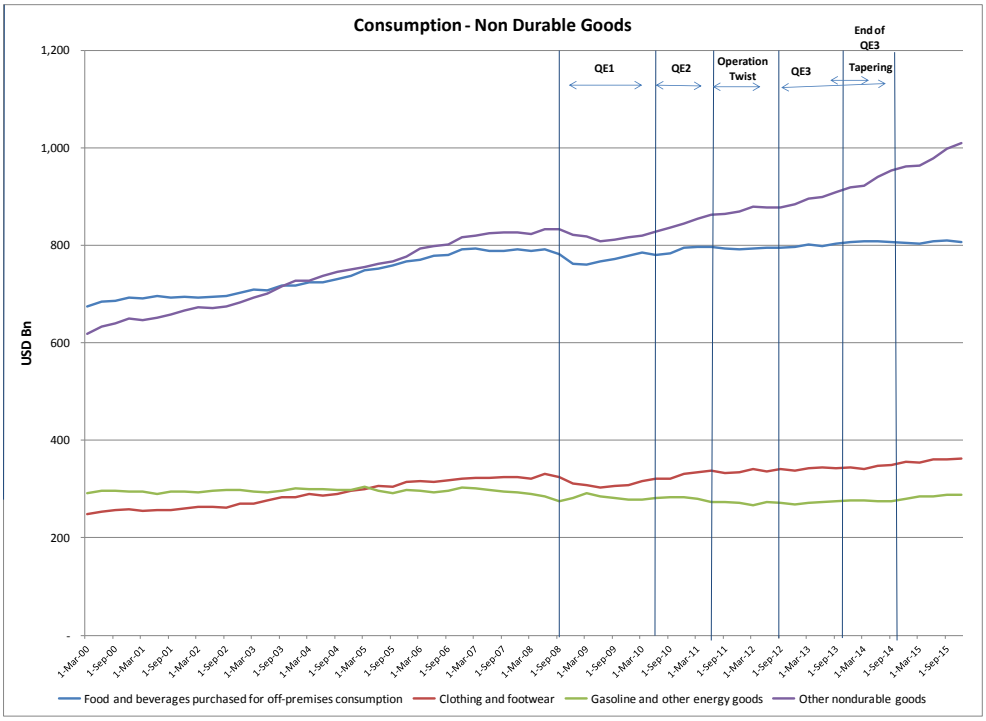
Source: Bureau of Economic Analysis, Authors' Computations

Figure 51: Consumption—Durable Goods



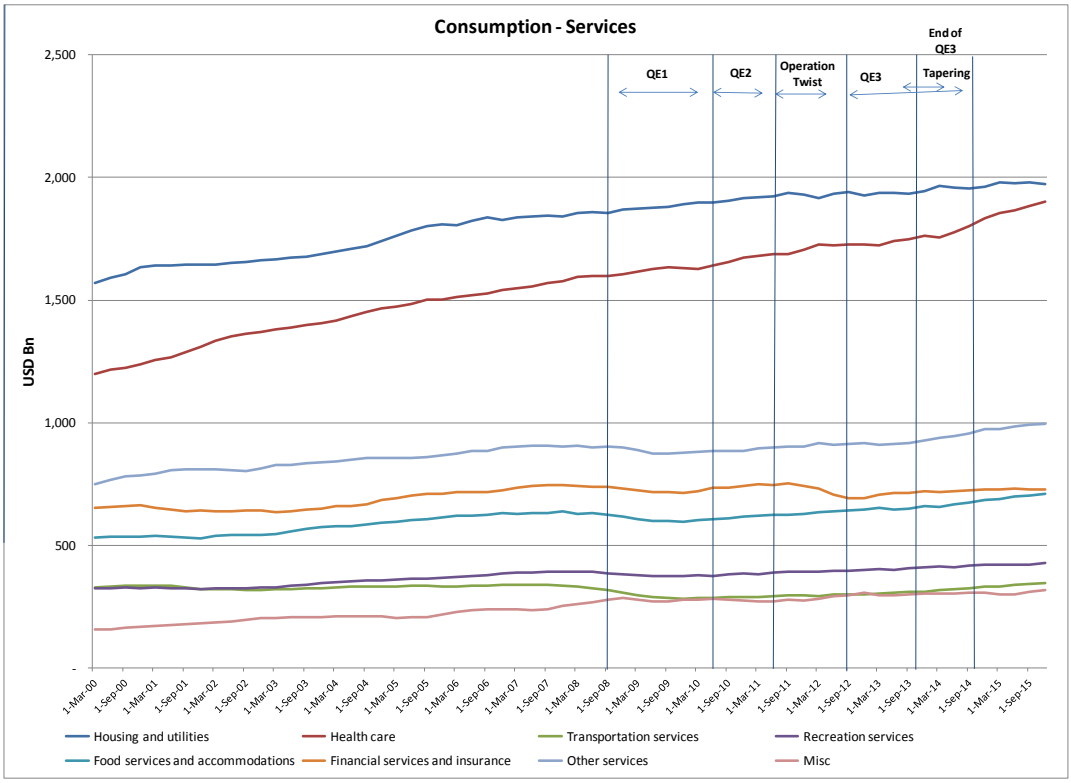
Source: Bureau of Economic Analysis, Authors' Computations

Figure 52: Consumption—Non Durable Goods



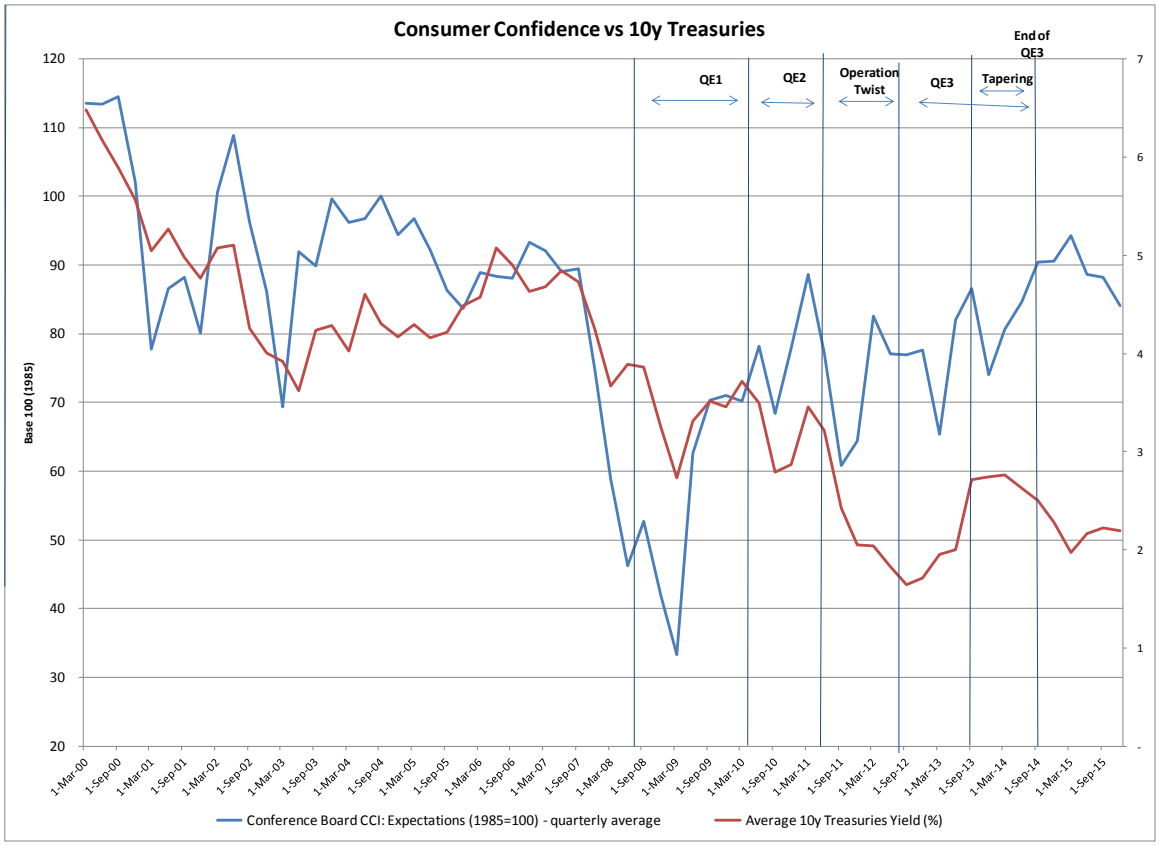
Source: Bureau of Economic Analysis, Authors' Computations

Figure 53: Consumption—Services



Source: Bureau of Economic Analysis, Authors' Computations

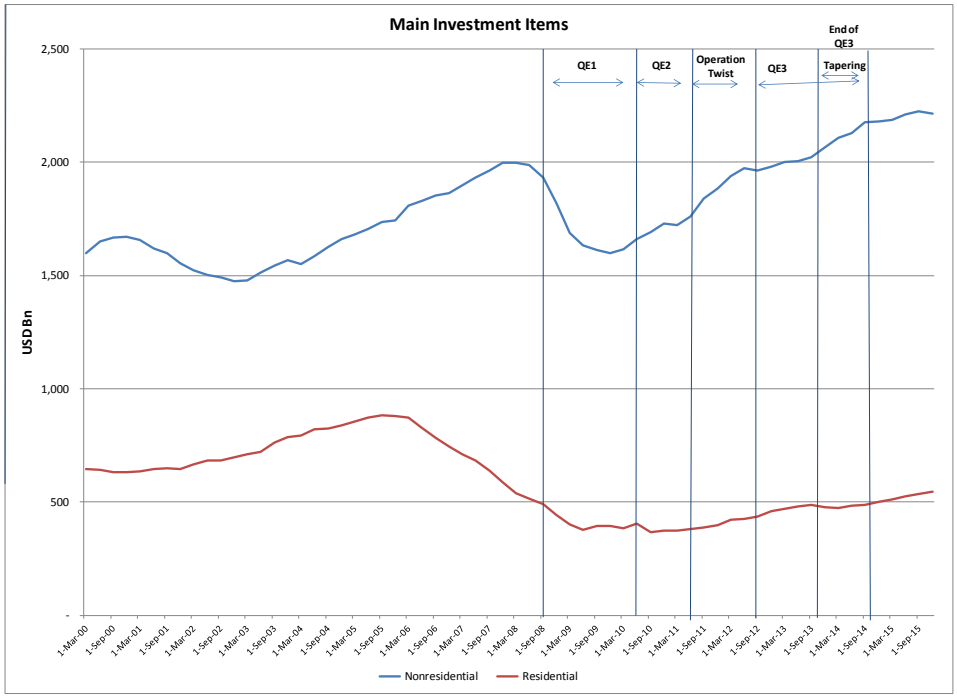
Figure 54: Consumer Confidence



Source: The Conference Board, Federal Reserve, Authors' Computations

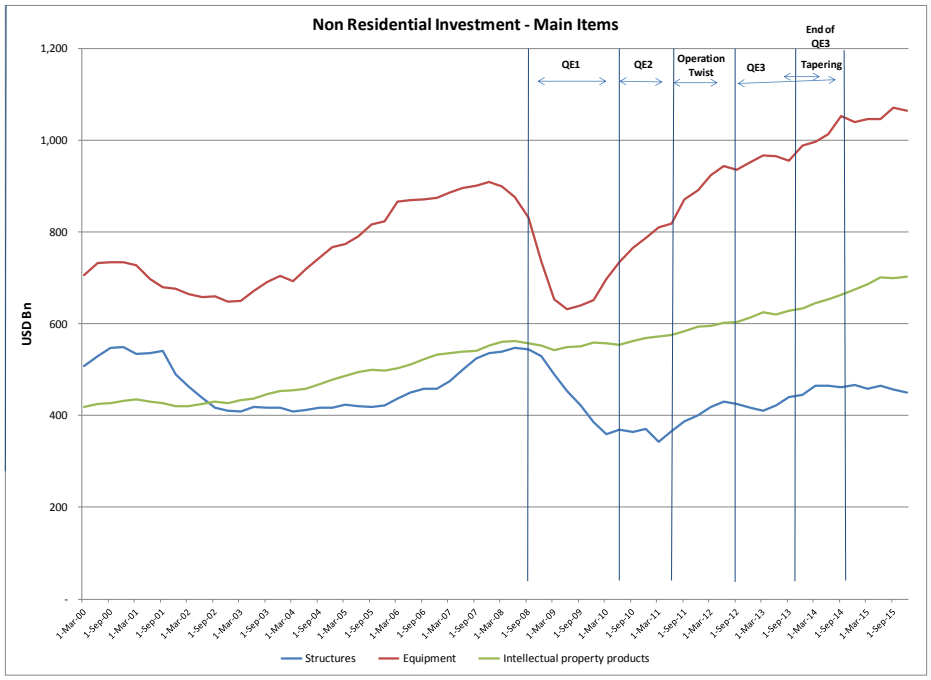
11.2.2. Investment

Figure 55: Investment—Main Items



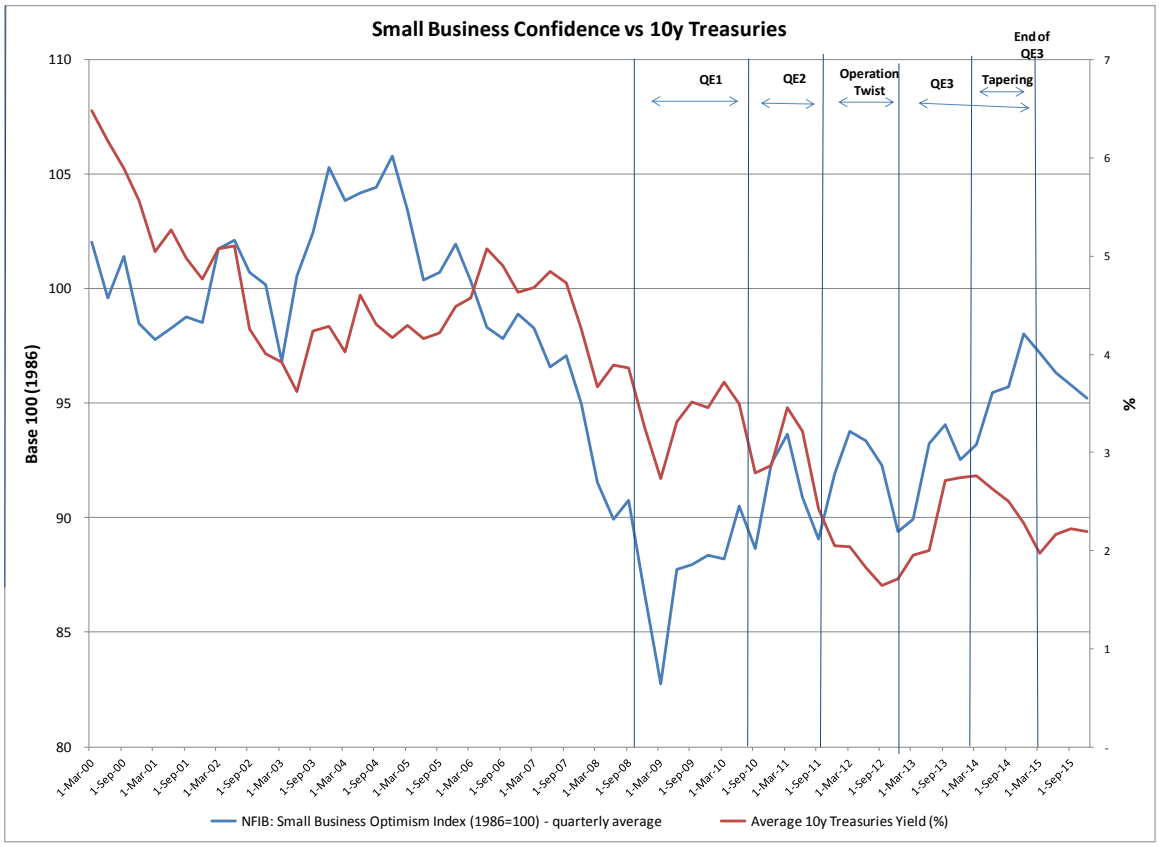
Source: Bureau of Economic Analysis, Authors' Computations

Figure 56: Non-Residential Investment—Main Items



Source: Bureau of Economic Analysis, Authors' Computations

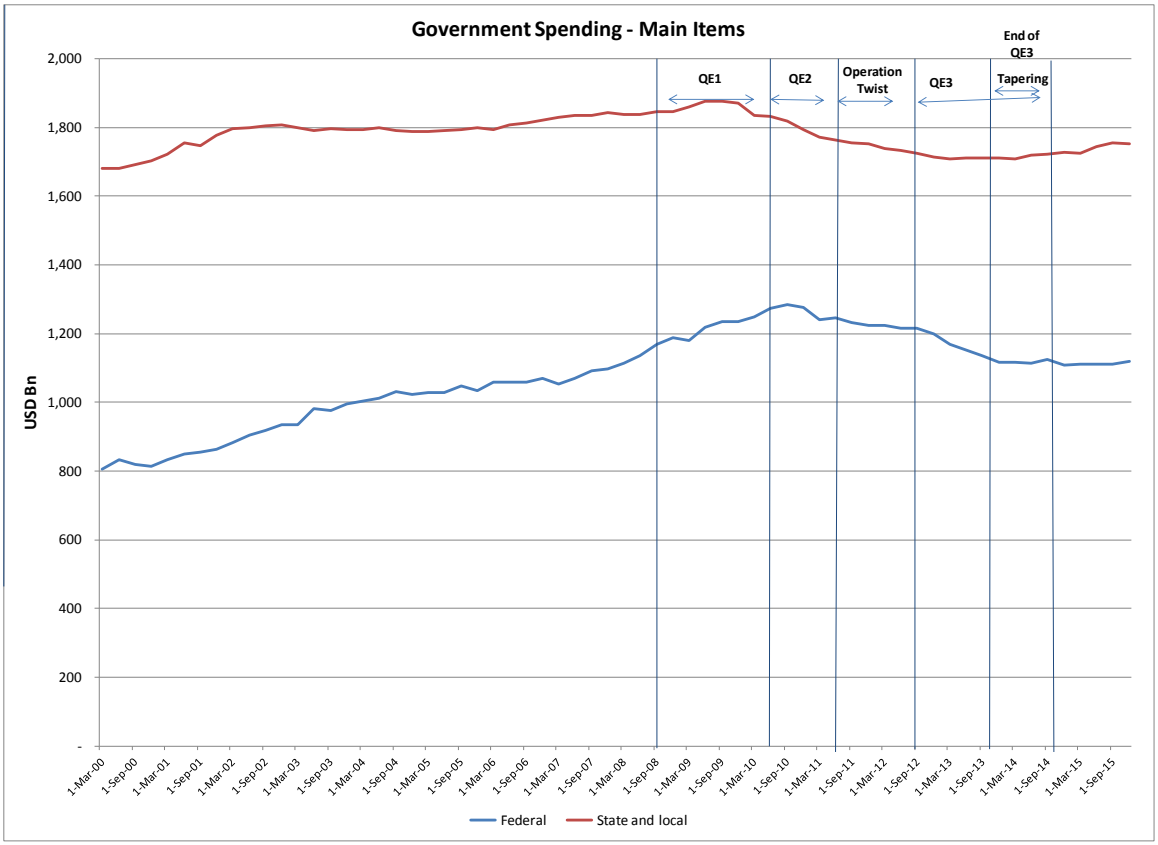
Figure 57: Small Business Confidence



Source: National Federation of Independent Business, Federal Reserve, Authors' Computations

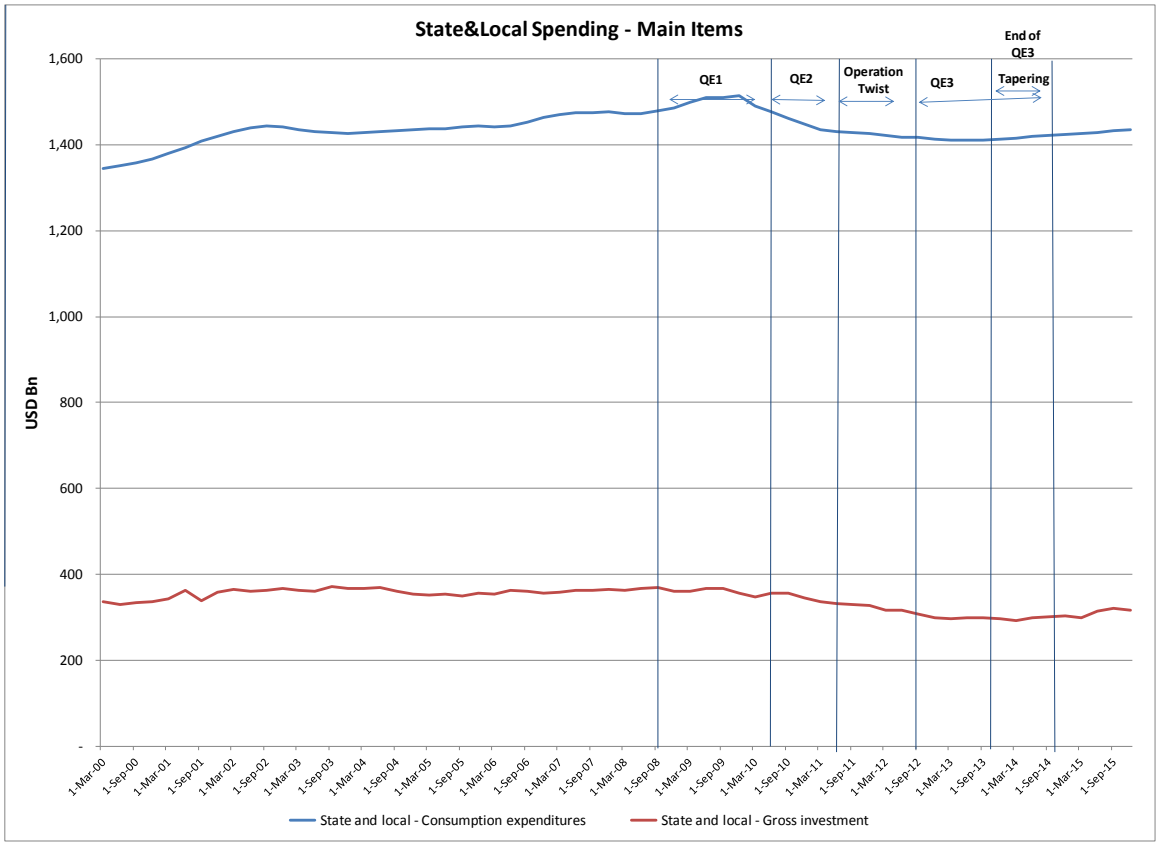
11.2.3. Government Spending

Figure 58: Government Spending—Main Items



Source: Bureau of Economic Analysis, Authors' Computations

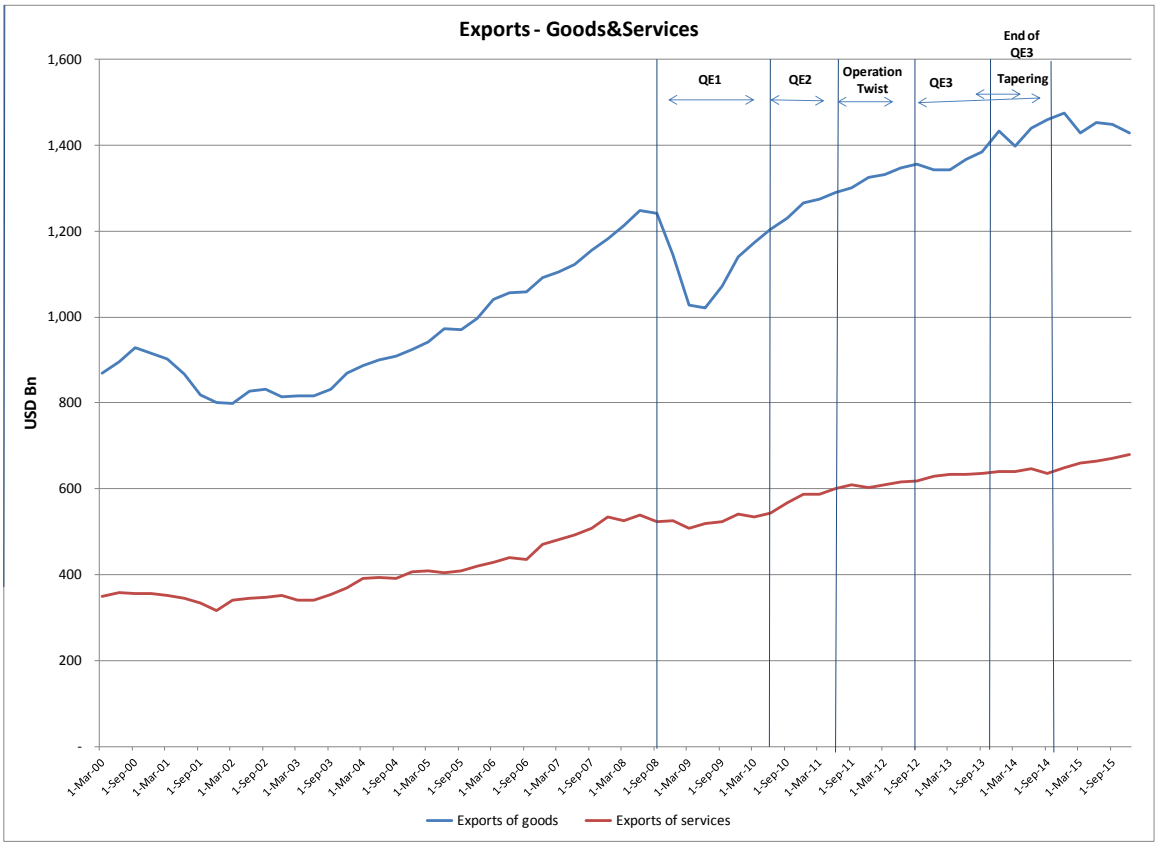
Figure 59: State and Local Public Spending—Consumption vs. New Investment



Source: Bureau of Economic Analysis, Authors' Computations

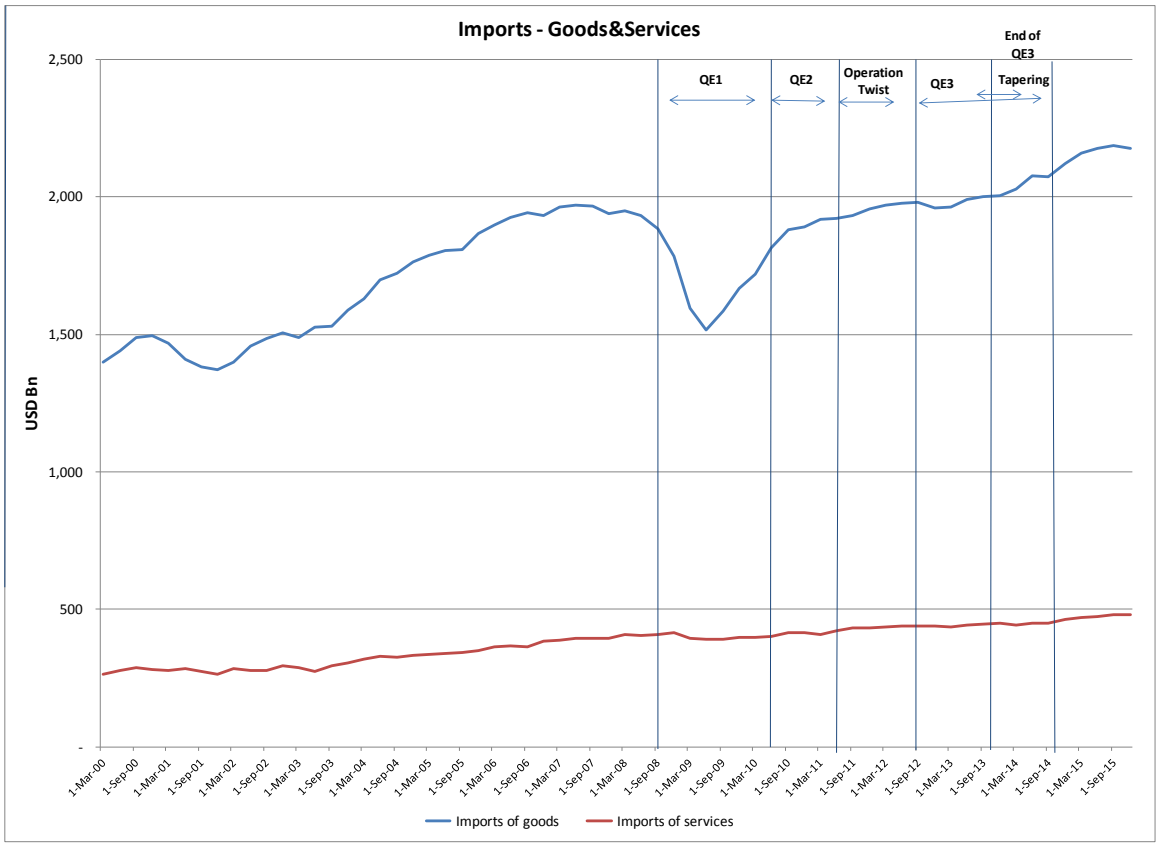
11.2.4. Net Exports

Figure 60: Exports—Goods and Services



Source: Bureau of Economic Analysis, Authors' Computations

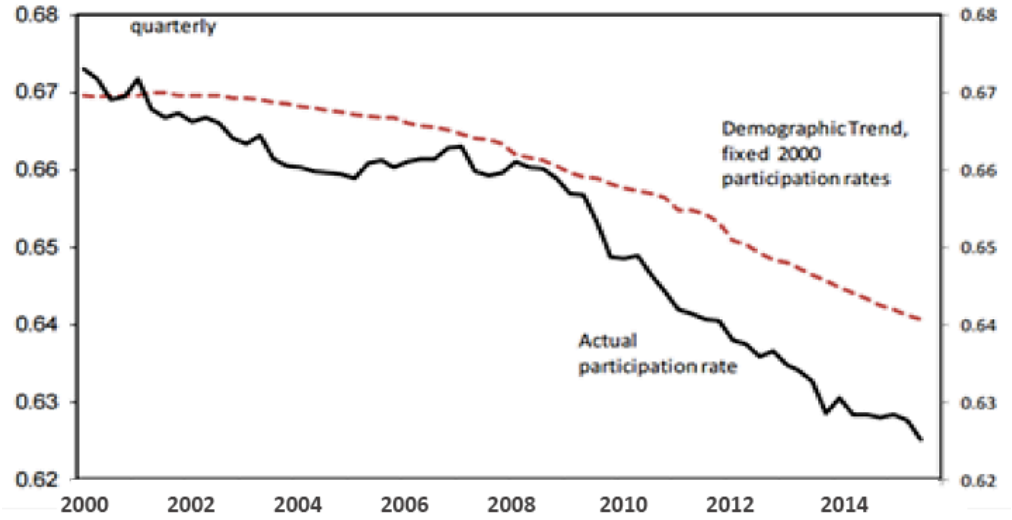
Figure 61: Imports—Goods and Services



Source: Bureau of Economic Analysis, Authors' Computations

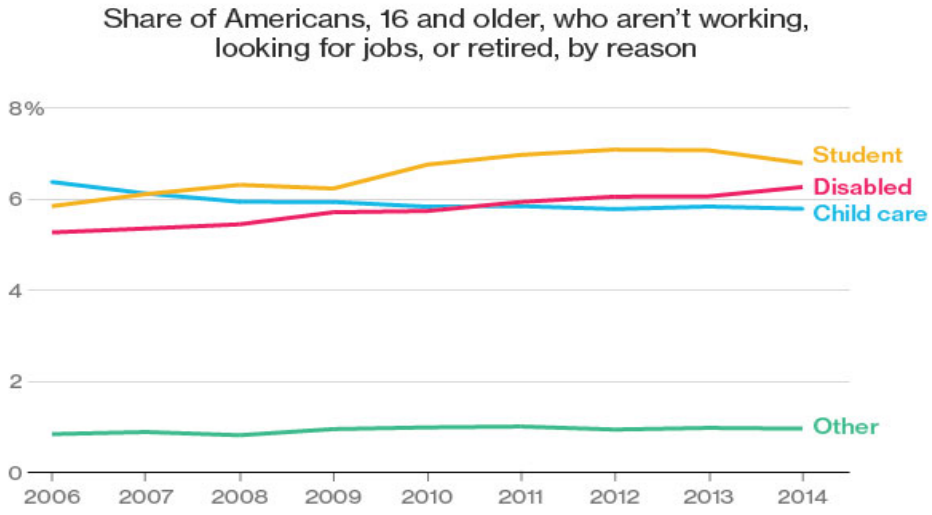
11.2.5. The Labor Market

Figure 62: Labor Force Participation, Actual and Demographically-Adjusted, 2000-2015 (a)



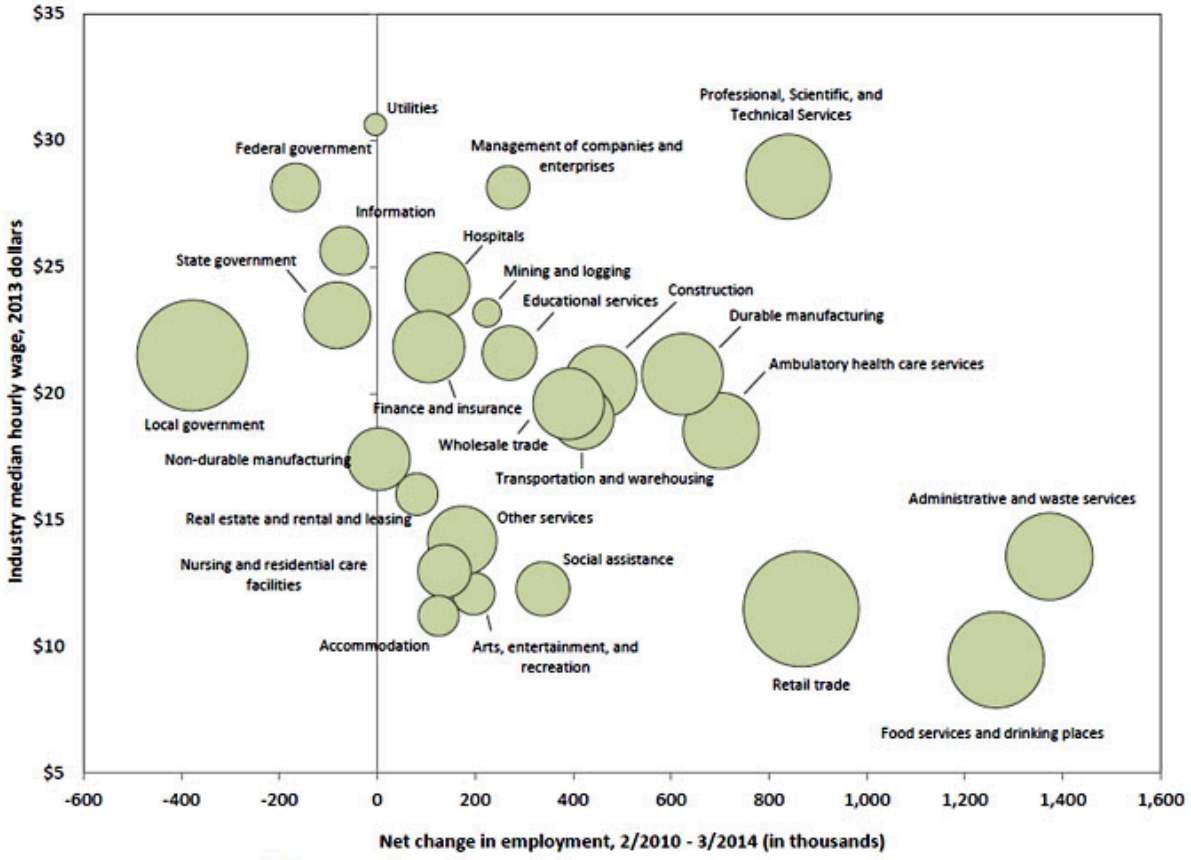
Source: Brookings Institution (2015)

Figure 62: Labor Force Participation (b)



Source: Bloomberg (2015)

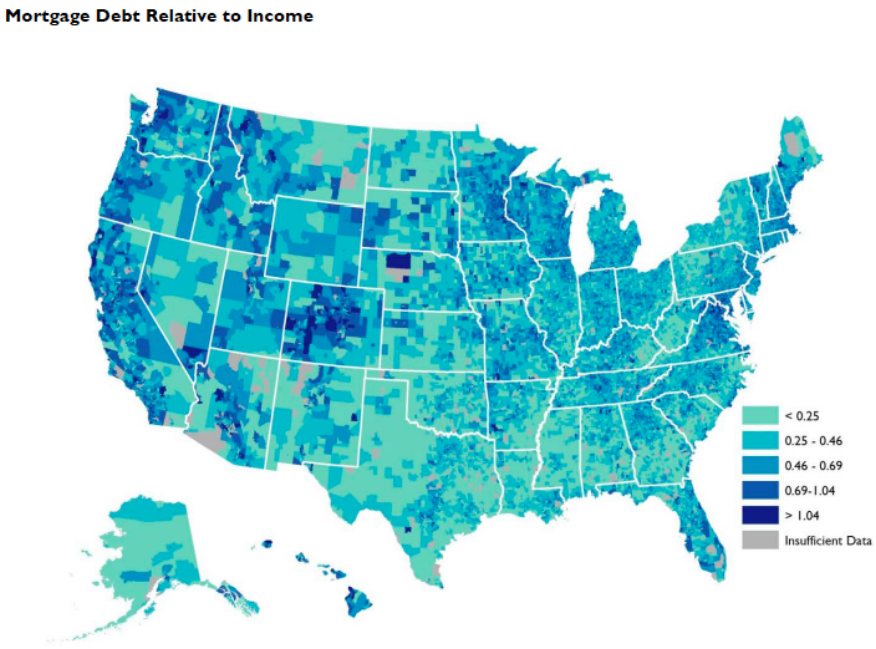
Figure 63: Net Employment Change by Industry, 2010–2014



Source: National Employment Law Project (2014)

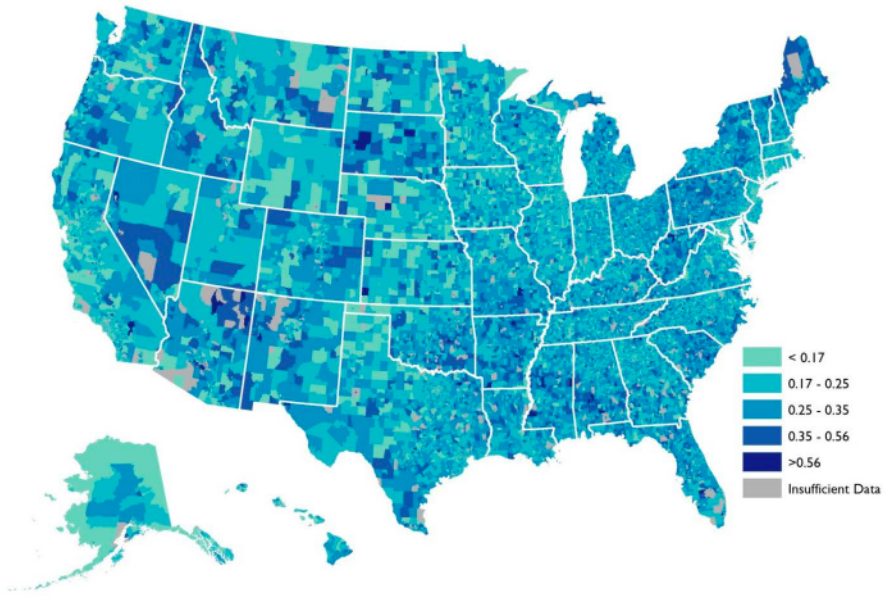
11.3. Social Impact Figures

Figure 64: Geographic Inequality



Sources: Mortgage debt from authors' calculations based on September 2013 TransUnion data. Household income data from 2008–12 American Community Survey.
Notes: Data are displayed at the census tract level and represent average census tract mortgage debt divided by average census tract household income. Census tracts with fewer than 10 observations in our sample are identified as having insufficient data.

Non-Mortgage Debt Relative to Income



Sources: Non-mortgage debt from authors' calculations based on September 2013 TransUnion data. Household income data from 2008–12 American Community Survey.
Notes: Data are displayed at the census tract level and represent average census tract non-mortgage debt divided by average census tract household income. Census tracts with fewer than 10 observations in our sample are identified as having insufficient data.

Source: Ratcliffe (2014)

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