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Challenges Confronting Central Bankers Today

Part 2 of the Changing Politics
of Central Banking Series

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Preface

The failure of many central banks to anticipate the 2008 global financial crisis has led to dramatic changes in both their policies and the tools they use, including new forms of lending, new regional collaborations, and experiments such as negative interest rates. It has raised a raft of questions about the independence of central banks and central bankers. It has also tested many theories previously taken for granted and requires a new multi-disciplinary approach. Cornell University's Meridian 180, the Global Finance Initiative, and the Mario Einaudi Center for International Studies have initiated a new project to develop an innovative field of interdisciplinary scholarship around the politics of central banking and to bring different forms of expertise to the discussion of complex technical issues.

With support from the [Tobin Project](http://tobinproject.org/) (<http://tobinproject.org/>) and under the leadership of Professor Annelise Riles (Jack Clarke Professor of Far East Legal Studies, Cornell Law School; Professor, Department of Anthropology, Cornell University), the project includes a literature review of the state of knowledge on the politics of central banking in different social science disciplines. The resulting papers which focus on sociology, political science, economics, and law, are published as part of this International Studies Working Paper Series.

Based on a nation-wide call for applicants in multiple disciplines, four graduate students - Megan Doherty Bea (Cornell University), Adam Hayes (University of Wisconsin), Erin Lockwood (Northwestern University) and Marcelo Prates (Duke University) - received one-year fellowships to describe the achievements and methodological advantages of their disciplines related to the politics of central banking, as well as to identify blind spots and limitations. In addition to Professor Riles, the students were mentored during the year by the following faculty:

- Douglas Holmes, Professor of Anthropology, Binghamton University
- Ravi Kanbur, T.H Lee Professor of World Affairs, International Professor of Applied Economics and Management; Professor of Economics, Cornell University
- Peter Katzenstein, Walter S. Carpenter, Jr. Professor of International Studies, Department of Government, Cornell University
- Jonathan Kirshner, Stephen and Barbara Friedman Professor of International Political Economy, Department of Government, Cornell University
- Hirokazu Miyazaki, Director, Mario Einaudi Center for International Studies, John S. Knight Professor of International Studies; Professor, Department of Anthropology, Cornell University

The four graduate students' papers were presented and discussed during an international and interdisciplinary conference on [Changing Politics of Central Banking](http://einaudi.cornell.edu) (<http://einaudi.cornell.edu>). The conference, hosted at Cornell University on April 18 and 19, 2016, brought together current and former high-ranking central bank officials from Asia, Europe, the United States, and New Zealand as well as economists, political scientists, anthropologists, sociologists, and legal scholars. It initiated a conversation between social scientists and policy-makers about the building blocks and parameters for a new intellectual architecture for understanding what central banks do as an empirical matter, and what they should do as a normative matter.

Challenges Confronting Central Bankers Today

Part 2 of the Changing Politics of Central Banking Series

Adam Hayes, University of Wisconsin-Madison*

Abstract

The role of central banks in today's global economy cannot be understated. These institutions hold great influence over important pieces of the economic engine, which in turn impact financial flows, access to credit, prices and global trade. Since the financial crisis of 2008-2009, the influence of central bank policymakers has only grown greater. Unprecedented actions and emergency measures have been taken to stabilize what otherwise could have been a global economic depression to rival the 1930's. This paper reviews five questions that today's central bankers face: whether to adhere to a rules-based monetary policy; if central banks should step into stabilize markets (e.g. QE); the importance of inflation targeting; the role of central bank independence; and the use of negative interest rates. Each of these issues is presented with arguments both in favor and against, empirical evidence to their effectiveness, as well as their possible unintended consequences and interconnectedness.

About the Author

Adam Hayes, CFA is a Ph.D. candidate in economic sociology at the University of Wisconsin-Madison. His research interests land at the intersection of society, economics, and technology, as well as the role of finance and risk in a social context. Most recently, he has written a number of research papers on Bitcoin, cryptocurrency valuation, and blockchain technology. Adam has over 15 years Wall Street experience in the derivatives markets and in private wealth management. He received his bachelor's degree from Cornell University and holds an MA in economics from the New School for Social Research in New York, NY. Adam is also an instructor for the University of Nicosia's MSc program in digital currencies.

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* This paper was presented and discussed during an international and interdisciplinary conference on the Changing Politics of Central Banking (<http://einaudi.cornell.edu/news/cornell-conference-aims-bring-new-voices-central-banking-debate>) at Cornell University on April 18 and 19, 2016. The author was mentored by Ravi Kanbur, T.H Lee Professor of World Affairs, International Professor of Applied Economics and Management, Professor of Economics, Cornell University.

Introduction

The importance of central banks in today's global economy cannot be understated. These institutions hold great influence over important pieces of the economic engine, which in turn impact financial flows, access to credit, price levels and global trade. Since the financial crisis of 2008-2009, the influence of central bank policymakers has only grown greater. Since then, unprecedented actions and emergency measures have been taken to stabilize what otherwise could have been a global economic depression to rival the 1930's. The question remains if it was effective.

The role of the central bank has been evolving. Yet, the institutions we see today still have some resemblance to the Amsterdamsche Wisselbank and to the Bank of England, the very earliest of central banks. These organizations were established to serve as the government's banker, and so became the sole issuer and regulator of a nation's money. By implementing monetary policy, central banks exert their power at a macroeconomic level, and today generally follow their primary mandates of price stability and sustainable growth. Yet, central bankers have shifted the conceptual basis of monetary affairs away from straightforward directives and standards such as gold-backing or fixed exchange rates, and toward a complex relationship with the public, rooted in signals, sentiments, and expectations (Holmes, 2009).

Now, more than ever, it is prudent to reflect on some of the key economic challenges that confront today's central bankers, and to objectively evaluate many sides of these debates. For, there is still a lack of clarity and consistency on many issues that policymakers must contend with on a regular basis. This paper will examine some of these issues and present support for each side of the argument, showing how different outcomes can result depending on which way the levers of economic policy are pulled.

First, I will consider whether central banks ought to follow a rigid set of rules and standards. Second, the issue of quantitative easing and price stabilization will be addressed. Next, the issue of inflation targeting or employment targeting in achieving monetary policy goals. Then, the complicated issue of central bank independence will be surveyed. Finally, the new practice of a negative interest rate policy (NIRP) will be evaluated. The goal is to put these issues into perspective given the growing influence of the world's central banks since the Great Recession, and to help frame policy decisions going forward. Some these challenges have been confronting monetary authorities for decades (to follow rules, bank independence), and others are a uniquely contemporary set of issues that are largely untested over the long-run (quantitative easing, negative interest rates).

Central bankers tend to label themselves as objective, rational "economic man," and claim to leave their politics and social pressures at the door when entering the board room. While this statement may be a question of debate in and of itself, the truth is that even when approaching questions of economics impartially, the outcomes that result from central bank behavior often has some political ramifications. For the purpose of this paper, I will follow the assumption that politics is removed from the personal decision-making process of individual central bankers, but I will attempt to allude to the political and social consequences which may arise depending on the decisions ultimately rendered.

Should Central Banks Follow the Rules?

“Heck, there are no rules here - we're trying to accomplish something.”

– Thomas Edison

Central bankers have great influence in using interest rates as a tool to accomplish their goals. Modern economies are intrinsically linked to interest rate levels, which affect everything from consumer spending and corporate investment to government debt levels and net exports. The ‘risk-free’ interest rate set by a central bank serves as the foundation upon which all other lending rates are built, and therefore it effectively dictates the cost of borrowing for all. In other words, interest rates help determine the ‘price’ of money (Woodford & Walsh, 2005).

High interest rate levels tend to discourage economic growth: when interest rates are high, loans become more costly and consumers will, in turn, buy less on credit. Some individual borrowers will be unable to service the higher cash flows needed to obtain a mortgage on a property that they could otherwise afford in a lower interest rate environment. Corporations may not issue bonds if they are uncertain that revenues generated from projects undertaken can sufficiently cover interest obligations, and thus risk default. Interest rates affect all financial markets in some way; equity, fixed income, derivatives, forex, and commodity markets are all highly dependent on this key figure.

Despite its significance, central bankers typically have quite a bit of discretion over how to set interest rates. Problems tend to arise when the uncertainty surrounding these decisions on rates causes volatility in financial markets (Deshmukh et al., 1983). If market participants incorrectly judge how and when interest rates will change, or if the central bank surprises the market by changing rates contrary to expectations, the potential for damaging market fluctuations could increase. Empirical research has shown that too much tinkering with interest rates can indeed produce undesirable economic outcomes (Kydland & Prescott, 1977). A mandate to follow a strict set of rules regarding interest rate setting would serve to reduce this sort of uncertainty.

In the United States, House Republicans have introduced a number bills that would require the Federal Reserve to follow a ‘rule.’ Recently, Congressman Jeb Hensarling (2014), who heads up the committee on finance which oversees the Federal Reserve, voiced concerns over the amount of leeway that exists in setting rates and the unanticipated consequences it can cause; he has urged central bankers to instead follow a simple set of explicit rules. On the campaign trail, Republican presidential candidate Ted Cruz has expressed his desire to implement an explicit monetary policy rule in a number of presidential debates in 2015 and 2016.

Some policy think-tanks have also voiced favor for rules-based monetary policy. In February 2015, the Heritage Foundation commented that a monetary policy rule will “greatly improve transparency and predictability,” a belief echoed loudly and frequently at the November 2015 monetary policy conference hosted by the Cato Institute.¹

¹ <http://www.heritage.org/research/reports/2015/02/why-congress-should-institute-rules-based-monetary-policy>,
<http://www.cato.org/research/banking/rl-monetary-policy.html>

Researchers (e.g. Taylor & Williams, 2010) agree that simple rules-based decision-making is a robust method of implementing monetary policy, and present evidence that historical experience has shown a set of simple rules works well in the real world. Their studies show that relative macroeconomic performance has been better when central bank decisions were described by rules, and assert that such rules are not undermined by financial crises.

From a political perspective, a rules-based approach would allow policymakers to evaluate the bank's consistency with overt monetary policy or to other relevant legislation (Walsh, 2015). According to Walsh, this style may be contrasted with a looser "goals-based" approach, such as inflation targeting, whereby central bankers are evaluated on how well policy objectives are met, leaving much room for flexibility and creativity in achieving those goals.

There is established economic theory that can provide for a systematic, rules-based approach to setting interest rates, and would potentially remove much of the volatility implied by a freer goals-based approach. The Taylor Rule, for example, is the most widely cited. It informs central bankers how and when they should change nominal short-term interest rates in response to changes in inflation and GDP output (Clarida, et al., 1998). One often used version of the Rule is:

$$i_t = \pi_t + r_t^* + \alpha(\pi_t - \pi_t^*) + \beta(y_t - y_t^*) \quad (1)$$

In this equation, i_t represents the target short-term rate (e.g. the federal funds rate in the U.S.), π_t is the rate of inflation as measured by the GDP deflator, π_t^* is the target rate of inflation, r_t^* is the assumed equilibrium real interest rate (or neutral rate), y_t is the change in real GDP, and y_t^* is the change in potential GDP output, as determined by a linear trend. Taylor proposed that the sensitivities of each term (α) should be 0.50 (Orphanides & Wiland, 2008). Thus, given some readily observed macroeconomic data and a set of assumptions, the interest rate should be fixed accordingly to a specific number.

In layman's terms, this rule states that the target interest rate should rise if the economy gets too 'overheated' or if inflation surpasses the central bank's established target; it falls if inflation falls below the target or if the economy's potential output drops below its measured output.

Other rules-based doctrines have been proposed. Monetarist economist Milton Friedman (1987) proposed the so-called "Friedman Rule," whereby the central bank should establish a fixed, linear constant rate of growth for the money stock, and maintain that growth rate no matter what emerged from the state of the economy. Such a rule does have some advantages: it is easy for the public to understand and anticipate; the rate of inflation cannot take off toward plus (or minus) infinity; and interest rates are free to fluctuate in the market in response to changing conditions (Taylor, 1999). Such a rigid rule, however, crucially ignores feedback from the real economy and does not have the nimbleness to adjust and smooth out the effects of macroeconomic changes or to respond to a crisis.

McCallum (1988) and Meltzer (1969) have augmented the constant growth rate formula with quantity-based rules that yield a changing growth rate of the monetary base using economic indicators. The McCallum Rule has been proposed as an alternative to the Taylor Rule, and has been shown to perform better during periods of crisis (Benchimol & Fourçans, 2012).

The McCallum Rule can be expressed as follows to give a target for the monetary base in the next quarter:

$$m_{t+1} = m_t - \Delta v^*_{t-16} + 1.5(\Delta p_D + \Delta q^*) - 0.5\Delta x_{t-1} \quad (2)$$

Where: m_t is the natural logarithm of M0 at time t (in quarters);² Δv^*_{t-16} is the average quarterly change in the velocity of M0 over a four-year period; Δp_D is the targeted rate of inflation expressed as the natural logarithm of the quarterly change in the price level; Δq^* is the long-run average quarterly increase in the natural logarithm of the real GDP; and Δx_{t-1} is the quarterly change in the natural logarithm of the nominal GDP from time $t-1$ to t . The lagged change in the velocity of money (Δv^*_{t-16}) is included to reflect long-lasting, permanent changes in the demand for the monetary base that occur because of technological developments or regulatory changes, and is not intended to reflect cyclical conditions (McCallum, 2000).

There are, of course, concerns with rules-based approaches. The Taylor Rule relies crucially on accurate assumptions of hard to measure inputs regarding potential GDP growth, or how much of an output gap exists. Though the guiding principles of the Taylor Rule may appear quite prudent in theory, they are far from simple in practice. In fact, it is almost impossible to accurately compute the two pieces of key economic data *ex ante* — inflation and potential output — that this formula is dependent upon. Many of today’s economists continue to dispute how the so-called output gap should be calculated. The amount of slack in an economy is subject to lags in the data and can be obscured by things such as part time workers, or observing levels of unemployment without consideration for changes in labor force participation. Currently in the United States, for instance, there are arguably too many people employed in the service sector and too few people employed in manufacturing. Under a free market for labor without interference, the situation would ideally sort itself out as the excess employees in the services industry made their way into manufacturing jobs. Under the Taylor Rule, however, the structure of production is perceived to be always in perfect equilibrium. Rather than letting the labor market correct itself, the rule might serve to further distort the market by using the central bank’s inflationary powers to generate activity in the “wrong” places.

Making matters more complicated, when an input for use in the Taylor Rule finally is agreed upon, it is often changed several times going forward. For example, in 1976, the output gap was calculated to be 14 percent of GDP.³ By the 1990s, that estimate for the same piece of data was revised downward to 5 percent of GDP. As another example, the headline unemployment rate in the United States stood at 5.5% in May of 2015. At the same time, however, the labor force participation rate for that period was telling a much more negative story at just 62.6%, a 38-year low.⁴ Estimates for any of the inputs can indeed vary greatly, and some degree of subjectivity is often required to come to a consensus.

If a rules approach were to take full control of central bank decisions, there would likely need to be an emergency override apparatus or “kill switch.” Monetary rules are not conducive to real-time feedback loops or allow themselves to change and adapt to sudden crises, such as what occurred in 2008, and which may be happening again in early 2016. Still, its proponents argue

² M0 refers to the monetary base, which only considers liquid or near-liquid assets such as cash and cash equivalents

³ U.S. Federal Reserve data

⁴ U.S. Bureau of Labor Statistics

that holding fast to a rule could have prevented bankers from overreacting to the most recent financial crisis (Taylor, 2009). Having rules in place can prevent central bankers from falling victim to human fallibility, prevent second guessing, and keep away any political pressure to artificially inflate an economy.

Interestingly, it appears that the outcomes of central bank decision-making end up following what rules would predict anyhow, so having the flexibility to deviate in order to react quickly to changing situations should not be a practical hindrance. Orphanides & Wieland (2008) find that, indeed, a systematic rule-of-thumb response described by the Taylor Rule predominantly explains how the Federal Reserve Open Market Committee's (FOMC) decision-making has been characterized historically. Even if the individual decision makers or committees formulating their policy responses deny that they are following any such heuristic, the outcomes (incidentally or not) show otherwise. If only market participants could be relieved of some of the uncertainty associated with bankers' flexibility of judgment, market volatility could be reduced and macroeconomic stability improved.

Should Central Banks Stabilize Asset Prices?

“One of the funny things about the stock market is that every time one person buys, another sells, and both think they are astute.”

-William Feather

After the stock market crash of 2008 and the ensuing Great Recession, a theoretical challenge to monetary policy became reality in the United States and throughout the Eurozone. Proposed by John Maynard Keynes in the 1920's, a 'liquidity trap' would arise when target interest rates are set so low that people cease investment altogether and instead hoard their money. This, in turn, would cause interest rates to remain low as the demand for loans falls, and prices decline even further, towards a dangerous deflationary spiral.

Typically, a central bank can step in to halt deflation by enacting expansionary policy tools, however, if interest rates are already very low, there is the technical constraint bounded by a zero per cent minimum nominal rate.⁵

A central bank can also relax reserve limits in the fractional reserve banking system, freeing more money into the greater economy. In periods of financial crisis, however, this move could have the potential to decrease the stability of the banking system's balance sheet rather than shore it up, increasing systemic risk.

Alternatively, the central bank could engage in open market operations whereby it purchases government securities in the public market in exchange for newly 'printed' money. Yet, in periods of crisis government securities tend to become bid up due to their perceived safety, which greatly limits their effectiveness as a policy tool. As evidence of this, the U.S. dollar rose more than 12% versus a basket of foreign currencies from 2008 to 2009.

⁵ See the section on negative interest rates below for an exception to this constraint.

After traditional methods have been tried and failed, the central bank is left with little choice but to engage in unconventional monetary policy in order to dig the economy out of the liquidity trap. In November of 2008, the Federal Reserve initiated its first round of quantitative easing (QE1) by purchasing mortgage backed securities (MBS) – categorically not a government security. The aim was to prop up the asset values of ‘toxic’ instruments in order to prevent a collapse of the financial system, which had massive exposure to what it thought were high quality securities. Rated ‘A’ or similar by debt ratings agencies, investment banks and buy-side institutions alike found their balance sheets laden with MBS, which became virtually worthless paper after the housing market collapsed and the financial markets crashed.

While unprecedented in the United States, the purchase of non-government securities by a central bank had been previously tested by the Bank of Japan (BoJ) in the early 2000’s (Spiegel, 2006). Facing its own liquidity trap and persistent deflationary pressures, the BoJ began buying excess government securities - effectively paying an implied negative interest rate on Japanese sovereign debt. When this failed to stoke inflation, the BoJ began to purchase asset-backed securities, commercial paper, and eventually outright shares of stock in Japanese corporations. Ultimately, the effectiveness of Japan’s QE on stimulating the real economy was less than hoped for. The Japanese economy has entered its fifth recessionary period since 2008 and is experiencing a bear equity market, despite the renewed QE efforts of ‘Abenomics.’

What is remarkable is that prior to enacting its first round quantitative easing in 2001, the Bank of Japan had repeatedly dismissed the effectiveness of such measures and rejected its usefulness in practice (Fujiki, et al., 2001). The ‘lost decade’ that Japan endured, despite repeated attempts to prop up asset prices, may not then be entirely surprising.

The U.S. Federal Reserve Bank also did not stop at one round of quantitative easing. When \$2.1 trillion worth of MBS purchases failed to keep asset prices aloft, QE2 was rolled out in November of 2010. And in December 2012, the Fed debuted QE3. To put all of this into perspective, in 2007, prior to the crisis, the Federal Reserve System held approximately \$750 billion worth of Treasury securities on its balance sheet and virtually no privately issued assets (Joyce & Scott, 2012). By August, 2015, that number had swelled to nearly \$2.5 trillion.⁶ Today, the Fed still maintains more than \$1.7 trillion of mortgage securities on its books.

Fed Chairman at the time, Ben Bernanke (2009), recognized that the Great Depression of 1929, was such a severe economic downturn because the central bank had failed to act to stabilize prices when it could have. According to many, the crisis of 2008-2009 would almost certainly have been deeper and more painful had it not been for quantitative easing, as well as the fiscal policy introduced by the Troubled Asset Relief Program, or TARP, allowing the U.S. Treasury itself to purchase securitized assets as well as publicly traded equity.

According to a 2009 report by the IMF, quantitative easing greatly reduced systemic risk which would have otherwise crippled markets as well as restored investor confidence. Feldstein (2011) has found evidence that QE2 was largely responsible for the bull stock market of 2010 in the United States, and the Federal Reserve’s own internal analysis has shown that its large-scale asset purchases had played a “significant role in supporting economic activity” (Stein, 2012).

⁶ http://www.federalreserve.gov/monetarypolicy/files/quarterly_balance_sheet_developments_report_201508.pdf

However, others including former Federal Reserve Chairman Alan Greenspan have been critical, saying the quantitative easing had done very little for the real economy. The experience of Japan and the United States brings to the forefront the question of whether or not central banks should act to support asset prices, and what effect, if any, it has on stimulating economic growth, and is especially relevant presently as renewed QE efforts are contemplated.

If market participants know that the central bank can, and indeed will, step in to prop up asset markets in times of crisis, it can present a great moral hazard (Mishkin, 2010). Referred to as the ‘Greenspan/Bernanke put,’ investors and financial institutions alike began to rely on central bank interventions as the single stabilizing force in many markets (De Nicolo, et al., 2010).⁷ The rationale is that even if economic fundamentals point to a slow recovery and persistent low inflation for the real economy, a rational actor should still eagerly purchase assets knowing that they ought to get in before the central bank operates to bid prices progressively higher. The result can be excessive risk taking fueled by the assumption that the central bank will do everything in its power to step in and prevent a collapse in prices.

The irony is that markets in this situation tend to respond positively to negative economic data; because if the economy remains subdued the central bank will more likely keep the QE turned on. Traditional market analysis is suddenly flipped on its head as poor unemployment figures encourage asset purchases ahead of the central bank, and at the same time positive economic surprises cause markets to fall as investors fear an end to the QE, or worse, an increase in interest rates above its near- zero percent floor. This last issue has been of increasing importance through the second half of 2015 as the Janet Yellen-led Fed contemplated its first interest rate increase in more than nine years. While investors initially celebrated the rate hike decision, the S&P 500 did subsequently fall nearly 15% before recovering.⁸

It can be useful to look at historical economic data, now more than seven years on from QE1 to see what impact asset stabilization has had on the U.S. economy.

For one, quantitative easing certainly affected asset prices positively. The U.S. broad stock markets enjoyed six consecutive years of bull markets, with returns matching changes to the size of the Fed’s balance sheet (Appendix:Figure 1).⁹ Ten-year and thirty-year U.S. government bond yields similarly appear to have moved in line with asset purchases: yields widened as the Fed’s balance sheet expanded and have narrowed as the Fed’s balance sheet has stopped growing. For corporate bonds, spreads over Treasuries narrowed as the Fed was expanding its balance sheet and have since widened substantially as the Fed’s balance sheet has stopped expanding into the second half of 2015. (Appendix:Figures 2 through 5).

⁷ It has also been referred to by a lesser extent now as the “Yellen put.”

⁸ As of April, 2016.

⁹ Figures appear in the appendix. Data for figures are compiled from The Federal Reserve of St. Louis (FRED) and Zerohedge.com.

Do these inflated asset prices relate to fundamentals? Looking at a widely used indicator, the Shiller P/E ratio for the S&P 500, there have only been two times in history when stocks have been more expensive than today: in 2000 before the dot-com bubble burst and in 1929, before 'Black Tuesday' which ushered in the Great Depression.¹⁰

While asset prices have enjoyed a boost from QE, many aspects of the real economy seem to have been entirely unaffected. Consumer confidence, industrial production, business capital expenditures and job openings all bear no significant correlation to changes in the size of Fed's balance sheet (Appendix:Figures 6 through 9). More to the point, economic output, as measured by changes to nominal GDP, appear to have very little relationship at all with quantitative easing (Appendix:Figure 10).

One of the big warnings regarding quantitative easing, initially, was that it could lead to runaway inflation as an unintended consequence. An interesting result, years after the fact, is that core inflation has remained historically low by nearly all accounts. As Figure 11 in the appendix shows, the M0 monetary base in the United States jumped sharply following quantitative easing. One would reasonably expect that in an economy awash with so much new cash, inflation would rear its ugly head. The United States, however, functions under a fractional reserve banking system whereby bank lending multiplies the M0 monetary base through various credit and lending facilities. Figure 12 in the appendix, which shows the broader M2 money supply over the same period, and which accounts for the effects of fractional reserve banking and credit, does not show the marked spike that occurs in the M0.

Where did all the M0 money go if it wasn't multiplied through the financial system? The answer is that banks and financial institutions hoarded this new money in order to reinforce their own balance sheets and regain profitability. Banks still have bad loans and toxic assets on their balance sheets today as a result of the housing bubble burst and its aftershocks, and the extra cash on hand has made their financial picture look a whole lot better for investors and for regulators. As the economy has recovered and the Fed has begun tapering its interventions, the money being held by banks is being returned to the Fed slowly in the form of interest payments on the debts purchased during QE rather than being extended as credit to borrowers.

Currently, the European Central Bank (ECB) has followed the tradition of asset stabilization and has initiated its own program of quantitative easing, while the Bank of Japan, too, has stubbornly returned to the practice. Even the Peoples Bank of China (PBoC), in an effort to deter its own burgeoning financial crisis, has devalued the yuan and taken to buying large amounts of shares outright in the Chinese stock markets. According to a report by Goldman Sachs, in August of 2015 alone, the PBoC purchased 1.5 trillion yuan, or nearly \$236 billion, worth of equities to avert a stock market collapse.¹¹

¹⁰ The Shiller Price-Earnings ratio is based on average inflation-adjusted earnings from the previous 10 years, known also as the Cyclically Adjusted PE Ratio, or PE 10. It is named after economist Robert J. Shiller who proposed such an approach in his 2000 book, *Irrational Exuberance*.

¹¹ <http://www.bloomberg.com/news/articles/2015-09-08/china-s-stock-rescue-tab-surges-to-236-billion-goldman-says>

The politics of asset stabilization and quantitative easing rests on two important questions: first, are such efforts legal in the first place, i.e. interfering with free markets; and second does it open the door for central banks to claim ‘emergency powers’ to gain undue control over monetary policy.

The first question has come to a head in the Eurozone. When the European Central Bank (ECB) for the first time began a QE program in 2014, Germany’s constitutional court said the bond-buying program infringed on the powers of individual nations and was a violation of the EU constitution.¹² The ECB has gone ahead with its self-described ‘outright monetary transactions’ (OMT) nevertheless.

The second point is a bit more complex, and touches on questions of roles of government, political power, and liberty. Economically, however, emergency powers have created central banks that are now major creditors of national governments, and thus could potentially exert undue control over the purse strings of those governments.

QE seems to be a fixture of monetary policy presently, and so questions regarding its effectiveness and the potential for unanticipated consequences are paramount. Perhaps a more important question, however, is: what happens when all the asset buying stops?

Should Central Banks Adhere to Inflation Targeting? Should they Target Employment? (Or something else?)

“I do not think it is an exaggeration to say history is largely a history of inflation, usually inflations engineered by governments for the gain of governments.”

- Friedrich August von Hayek

There is an inherent contradiction between reducing unemployment and lowering inflation at the same time; low unemployment tends to increase inflation and vice versa. The economist A. William Phillips famously described this relationship in what is now known as the Phillips Curve (1958), comparing wages to unemployment, and later making the link between inflation and unemployment. The logic is straightforward: as unemployment increases and more and more people find themselves out of work, they will have less money to spend on consumption and demand will fall, lowering prices. At the same time, these unemployed workers may be more apt to return to work at a lower pay just to improve their standard of living above poverty, lowering wage levels.

In the 1970s, however, the conventional Phillips curve relationship broke down as the economies of the developed world experienced both high levels of inflation and unemployment, or ‘stagflation.’ An adjustment was made to fix the Phillips curve by considering changes in the rate of inflation with changes in the rate of unemployment, rather than comparing absolute values.

¹²

http://www.bundesverfassungsgericht.de/SharedDocs/Entscheidungen/EN/2014/03/rs20140318_2bvr139012en.html

Still, empirical analysis of historical data makes it clear that while there is a likely association between unemployment and inflation, the relationship is far from simple. One study performed by the Federal Reserve Bank of Atlanta finds that there are no less than five periods in the modern era described by five different, distinct Phillips curves (Chang, 1997).

Today, central banks rely on modified and augmented versions of a Phillips curve that take in to account expectations, as well as short-run versus long-run effects. The modern long-run Phillips curve often implies some non-inflationary rate of unemployment, or NAIRU. Also called the “natural rate” of unemployment, NAIRU is the level that central banks often aim for when they seek ‘full employment’ (Staiger, et al., 1997). Rather than full employment being zero per cent unemployment, the actual natural rate in the United States has been estimated to be somewhere between 5.2% and 5.5%.¹³ Of course, precise estimates differ depending on methodology and varying assumptions, but this is approximately the level at the Federal Reserve looks at in order to satisfy its mandate of full employment. If unemployment approaches, or falls below the estimated NAIRU, the central bank may be encouraged to tighten economic policy.

A problem arises in that NAIRU itself is a moving target, which can change over time and across geography. While the imputed natural level of unemployment today stands at around 5%, it was closer to 6% from the 1970s-1990s.

Economists such as Galbraith (1997), Stiglitz (1997), and Blanchard (1996) have all voiced concerns and critiques the use of NAIRU, claiming it has little theoretical footing and even less practical value in use. If true, targeting full employment could be a vain pursuit with a high probability for unintended consequences (Galbraith, 1997).

Targeting full employment, nevertheless, is beneficial for politicians who seek the votes of happy salaried constituents. To have full employment translates for some as increased economic stability and social security for the working class. Yet, full employment induced politically, and not achieved via the workings of the market, can lead to a welfare state with decreased productivity of the workforce as people are artificially put to work doing unnecessary jobs, as determined by the market (Leibfried, 1993).

With all the issues that employment targeting presents, many central banks have turned to the other axis of the Phillips curve: inflation targeting. First proposed in theory following World War I, it wasn’t until the year 1990 that the Reserve Bank of New Zealand pioneered inflation targeting as a mandate in practice. Followed by Chile, who was experiencing two-digit inflation numbers year after year, Canada and Israel also began inflation targeting in 1991. By 2010, twenty-eight nations adhered to this method (Roger, 2010). (See Table 1 in the Appendix).

The basic premise of inflation targeting is to tighten or loosen monetary policy as inflation creeps above or below its established target. Increasing interest rates should combat inflation and reducing rates should encourage it.

¹³ <https://research.stlouisfed.org/fred2/series/NROU>

Proponents put forth that inflation targeting solves some inconsistencies with employment targeting and at the same time reduces uncertainty for investors, which can calm markets. Amira, et al. (2013) have conducted an econometric analysis to study the effects of inflation targeting and have found evidence that such a practice is correlated with higher economic growth, although it seemed to have no effect on economic stability.

A specified numerical target makes central banks accountable for their performance, and the Reserve Bank of New Zealand, especially, has strict rules governing officials not to miss the mark. Of course, this once again opens up the question as to whether or not a central bank ought to follow a strict set of rules in the first place.

Inflation targeting, while increasingly accepted as a useful policy tool, has its own shortcomings. First, the preferred measures of inflation, typically some sort of consumer price index (CPI), based on the cost to buy a set basket of goods, is not always an accurate gauge of inflation. The Austrian economist Ludwig von Mises commented that all inflation indexes “are at best rather crude and inaccurate illustrations of changes which have occurred” (1949). The composition of the basket of goods in the CPI is not always a true representation of what people are currently buying, and so it must be updated and adjusted, with the most recent changes to the American CPI composition coming just several months ago.¹⁴

Even if inflation could accurately and consistently be measured, by focusing solely on price levels, changes to real economic output and employment effects caused by monetary policy moves are largely ignored. Quiggin (2012) has become a sharp critic of inflation targeting and argues that this policy could be responsible, in part, for creating speculative asset bubbles. He points out that the housing bubble in the United States prior to the Great Recession was fueled to a certain extent by interest rates which were kept too low, and that they were held too low because the general inflation target had not been met. Meanwhile central bankers were seemingly blind to the problem stirring in the real estate market, caused by cheap borrowing.

Disappointingly perhaps, many central banks have kept their interest rates at historic lows for prolonged periods of time, since the stock market crash of 2008 - and still inflation has barely budged. In fact, many parts of the European economy have experienced deflation as recently as 2014 and throughout 2015. According to the European statistics bureau, Eurostat, aggregate Eurozone inflation was recorded at negative 0.50% in January of 2015. Does this mean that interest rates should stubbornly stay near zero until observed inflation ticks up?

The same unintended consequences associated with quantitative easing may present themselves if interest rates are held artificially low. During the same period that Eurozone price levels fell by 0.50%, the value of the EuroStoxx 50 Index, a stock market benchmark of the largest companies in Europe, rose 6.87%.¹⁵ The point is that Quiggin’s fears that inflation targeting can lead to asset bubbles may be manifesting itself presently in global capital markets as it did in housing markets a decade ago.

¹⁴ <http://www.forbes.com/sites/mikepatton/2015/01/29/consumer-price-index-undergoes-most-significant-change-in-25-years/>

¹⁵ Source: Reuters

A larger theoretical question to raise is, what is an appropriate level of inflation to target in the first place. The U.S. Federal Reserve has signaled that a 2% inflation target is used in its decision making.¹⁶ Table 1 in the appendix shows that the majority of other central banks who target inflation have also set objectives of around 2-3%. Why this particular number? According to the Federal Reserve the explanation is:

*“The Federal Open Market Committee (FOMC) judges that inflation at the rate of 2 percent ... is most consistent over the longer run with the Federal Reserve's mandate for price stability and maximum employment. Over time, a higher inflation rate would reduce the public's ability to make accurate longer-term economic and financial decisions. On the other hand, a lower inflation rate would be associated with an elevated probability of falling into deflation, which means prices and perhaps wages, on average, are falling--a phenomenon associated with very weak economic conditions. Having at least a small level of inflation makes it less likely that the economy will experience harmful deflation if economic conditions weaken. The FOMC implements monetary policy to help maintain an inflation rate of 2 percent over the medium term.”*¹⁷

Other central banks have expressed similar reasoning. The Fed's logic is certainly valid in that it would like to prevent deflation while also avoiding runaway inflation, both of which could be damaging to an economy. But why is 2% the right amount to be moderate? The 2% figure seems fairly arbitrary to some, yet it has become more or less a mantra that the 2% figure is correct, and it is rarely questioned by academics or journalists. If this target is correct, it should be fairly easy to achieve such a goal over a reasonable period of time. Thus far in the United States annual inflation has fallen short of its 2% target for more than 40 consecutive months.¹⁸ Perhaps if the inflation target were higher, say 4 or 5%, then monetary policy – as expansionary as it seems right now – would have to be even more expansionary. And, since inflation has not moved much in the past years, perhaps it should be.

“I don't see anything magical about targeting 2% inflation,” former Fed Chairman Ben Bernanke remarked at a 2014 panel sponsored by the IMF. According to its critics, this particular figure seems to have been created out of simple pragmatism and not of sound and comprehensive economic theory. Yet it persists.

Batini & Nelson (2001) have suggested a dynamic approach to setting inflation targets that rely on feedback from previous periods, with a medium-term focus. Such a system could self-adjust to systematic shocks or to changes in economic regimes over time. Such an approach could mitigate issues of time-inconsistency that tend to arise with inflation targeting. Time-inconsistency describes situations “where, with the passing of time, policies that were determined to be optimal yesterday are no longer perceived to be optimal today, and are not implemented” (Dennis, 2003).

¹⁶ The U.S. Federal Reserve Bank has the unfortunate task of adhering to a double mandate of price stability and full employment

¹⁷ http://www.federalreserve.gov/faqs/economy_14400.htm

¹⁸ <http://www.dallasfed.org/research/pce/>

Kydland and Prescott (1977) showed that given a dual mandate to tame inflation and achieve full employment, time-inconsistency could lead to excessively high inflation since the labor market is assumed to negotiate wages based on expected inflation rather than what exists today.

Due to these issues, some have called for a complete abandonment of inflation targeting, calling it a failed experiment. As an alternative to targeting either inflation or employment unequivocally, economists have proposed a third option: that central banks instead target nominal income by looking at nominal GDP or gross domestic income (GDI) (Notably, Bean 1987, Quiggin 2012, McCallum 1999, and Jenson 2002). Such a mechanism would allow for the transparency and accountability granted by targeting a specific level, but also link together and balance the effects of price levels and wages – or, of inflation and unemployment.

Although no central banks explicitly utilize this method at present, its relevance has increased since 2008. In the minutes released from the September, 2010 Federal Reserve meeting, the topic of nominal income targeting came up for discussion.¹⁹ In 2011, an article published in U.K.-based newspaper The Telegraph suggested that the Bank of England may already be targeting nominal income in Britain, however those claims have been unsubstantiated officially.²⁰ Based on current trends, however, it would not be surprising to see at least some central banks begin to overtly use this metric, at least as an auxiliary method.

Abandoning inflation targeting, or even raising established inflation targets, is politically unpopular, so there is apt to be some pushback from policymakers. Political candidates often run on platforms explicitly promising to keep inflation in check. After all, high inflation is bad for employment. It erodes purchasing power and lowers real wages. At the same time, a government internally may seek high inflation, as it will ease the burden of servicing its debts over time, or “inflate its way” out of debt.

The question of inflation versus employment crucially has consequences favoring either debtor or creditor, employer or employee, and saver or investor. Milton Friedman is quoted as saying “inflation is always and everywhere a monetary phenomenon.” Jonathan Kirschner, professor of political economy at Cornell University, has put a suitable twist on Friedman’s quote observing that “inflation is always and everywhere a political phenomenon.”

Should Central Banks Always Remain Independent?

“The principle that a central bank, charged with controlling inflation, should be independent from the government is unassailable. It may also be true that it’s easier for the central bank to guard its independence from political pressure when it mainly holds government securities.”

- Janet Yellen

The debate over central bank independence is a large and complex one, and it is covered in various ways in the other papers presented. There are many definitions of what being independent

¹⁹ <http://www.federalreserve.gov/newsevents/press/monetary/fomcminutes20100921.pdf>

²⁰ <http://blogs.telegraph.co.uk/finance/jeremywarner/100011568/bank-comes-close-to-admitting-its-targeting-nominal-gdp-growth/>

means in theory and in practice, and there exist many degrees of partial independence that can be taken. The shift to modern central bank independence coincided with the adoption of inflation targeting as the primary monetary focus, and with setting interest rates the preferred policy tool (Quiggin, 2009). With the promise that these policy tools would lead to greater economic stability and prosperity, governments were discouraged from engaging in active fiscal policy to instead focus on more political issues such as international trade agreements, domestic policy, and balancing the budget. According to this logic, explicit monetary policy should be wholly carried out by independent experts in the field of macroeconomics.

The idea of an independent central bank, however, is not entirely modern. One of the founding fathers of modern economics, David Ricardo (1849) accused the Bank of England, which was already over a hundred years old at the time, of bending to the whims of the throne. Ricardo proposed that a central bank be independent from political pressure in three important ways: with the power to create money separated from the power to decide how to spend it; with preventing a central bank from financing the State's budget; and with external accountability for its decision-making. Drawing on Ricardo, article 130 of the Maastricht Treaty of 1992 established the current basis for central bank independence for Europe, and has been copied in practice by much of the developed world (Lastra, 2012).

Being free from the power and influence of the executive or legislative branches does have its virtues. A government may seek a policy of high inflation in order to achieve monetary financing of deficits. Such a policy has often been the harbinger of collapse for national economies, from Argentina and Zimbabwe to Weimar Germany and Hungary (Minsky, 2015). The incentives for paying off debt with inflation is enticing. If a government owes a million dollars a day in fixed interest payments to creditors, it would be much easier if that nominal one million dollars were simply made to represent a lot less purchasing power. Inflation causes the value of a currency to drop, and that would be an attractive fix for out-of-control government obligations. An independent central bank would not be swayed by the size of a national debt and may not agree with the attractiveness of devaluing the currency through inflation. An autonomous monetary authority with a mandate for a stable inflation target serves as a safety mechanism.

Elected officials often face incentives to favor policies that promote short-run gains in output and employment. Voters are likely to remember a recent period of economic growth rather than consider the damaging long-run inflation it could bring in the future. A central bank needs to be willing and able to make unpopular decisions and take actions that a politician could not.

Even with all its virtues, the role of central bank independence should be questioned. The 2008 crisis left the public confused as to what policy actions were to be taken, and by whom. The federal government initiated its own set of emergency measures as the central bank began loosening its monetary policy. A lack of coordination between fiscal policy, which is determined by politicians, and monetary policy, which is not, can be dangerous. Even if fiscal and monetary policy goals are aligned, coordinating the precise timing and scope of action is very difficult to accomplish (Quiggin, 2009). A large-scale bailout of the financial sector - of companies "too big to fail" - by the central government's treasury along with a massive liquidity injection program carried out by the central bank could end up a failure if the combined execution is clumsy. Looking back at the 2008 crisis, the data show that smaller countries with non-independent

central banks were able to devalue their currencies and actually have a much quicker recovery than those regions with an independent central bank with a moderate inflation target (Schick, 2013). Israel, Switzerland, Iceland and Sweden all bounced back much more quickly than the United States, Japan or the Eurozone.

Another issue regarding central bank independence today is that increasingly, sophisticated financial engineering techniques are being deployed by central banks that require an expert level of knowledge. Quantitative easing and other unconventional monetary policy tools are quite new and untested; having a central bank staffed with experts is a valuable asset. However, the government has little way to check on and regulate the financial wizardry being performed by monetary authorities. As Quiggin (2009) puts it, "... as with war, financial innovation is too important, and too dangerous, to be left to finance experts."

Today, the world's central banks are more powerful than ever before. Central banks own enormous amounts of sovereign debt, meaning that they are fundamentally at odds with state governments regarding inflation. As a debtor, a government welcomes inflation. As a creditor, a central bank would seek to keep inflation low. Creditors also can exert power over debtors in that they can dictate the terms of future obligations. Worse, creditors can decide to stop buying up government debt if their terms are not met. Of course the power dynamic between creditor and debtor is bilateral in many ways, and depends on the size and context of the borrowing.

Negative Interest Rates

"It's not the situation, but whether we react negative or respond positive to the situation that is important."

— Zig Ziglar

On May 5, 2010, something interesting happened in the Swiss sovereign debt market, but nobody seemed to pay much notice. The financial world was distracted by the unfolding Greek crisis (on this date three people were killed during austerity protests in Athens).²¹ Meanwhile in Zurich, the market price on 3-month bonds issued by the government of Switzerland was bid up so high that the implied yield on this debt was negative 0.10%. With the stability of the Eurozone in question, a flight to safety drove many investors to purchase short-term Swiss government bonds, seen as a haven while the ECB scrambled to put out fires in Cyprus, Portugal, Italy, Ireland, Greece and Spain. Soon enough, the 'anomaly' was corrected by the market and Swiss bond yields hovered just above zero percent for the next few years – until January, 2015 when the Swiss National Bank adopted a negative interest rate policy (-0.25%), charging a fee on bank deposits above a certain threshold.

The Swiss decision was a defensive reaction to the continued stream of capital coming into the small country as a refuge from the euro, and the Swiss Franc was enjoying a surge in value to the detriment of Swiss exporters. The Danish National Bank had enacted a similar negative interest policy in 2012 in order to stave off currency pressures and disincentivize the hoarding of Krøner by foreign investors.

²¹ <http://news.bbc.co.uk/2/hi/8661385.stm>

The Danes and the Swiss found themselves in a similar situation: they were small, open economies who did not share the common regional euro currency, and needed a way to manage their currencies during a stagnating recovery that surrounded them. Currently, the overnight rate in Denmark is -0.65% and in Switzerland -0.75%. Sweden, which found itself in a similar situation also followed suit with negative rates in 2015.

These examples are special cases where the rationale for the interest rate target was to primarily exert control over a domestic currency while facing foreign exchange challenges. To set negative nominal interest rates an explicit monetary policy tool is a much more remarkable experiment.²²

In a report issued by the Federal Reserve in January 2013, the Central Bank asserted its position that “[i]n unusual times, negative nominal and real yields are not unusual. Both often reflect investors' flight to safety. The existence of negative yields, however, provides no support for the argument that central banks should consider negative policy rates as a monetary policy tool.” (Anderson & Liu).²³ As recently as 2013, the use of negative interest rates was meant to be for currency, and not for economic, stabilization.

Negative interest rates have been a curiosity to theorists and practitioners alike. Many theoretical approaches to interest rates have precluded their use, in favor of a strict zero-bound (Merton 1974, Cox et al. 1985, Duffie & Kan 1996). The logic is straightforward in that an investor would simply prefer to hold on to cash (which carries an implicit 0% rate) rather than buy a fixed asset where they would have to pay the borrower in the interim before receiving back their principal. A depositor would not rationally consent to being charged to keep their money in an account.

Some academics, meanwhile, proposed that removing the zero-bound could act as a stimulus to jolt an economy out of a liquidity trap (Cecchetti 1987, Buiter & Panigirtzoglou 2003, Fleming & Garbade 2004, Buiter 2009). In this case, deflationary pressures persist despite the use of quantitative easing efforts and other expansionary policies. In order to incentivize the financial sector to lend and to invest, the central bank would charge a fee (in the form of a negative interest rate) on hoarded cash reserves. A rational actor would choose to put that money to work rather than guarantee a loss.

In 2014, the European Central Bank adopted a negative interest rate policy for this reason. While the United States was able to sustain a recovery from the Great Recession, albeit a sluggish one, Europe languished. In part this was due to problems in the periphery of the Eurozone, as repeated sovereign bailouts failed to take hold and deflationary pressures persisted. A negative interest rate was part of ECB president Mario Draghi's multi-pronged attempt to avoid deflation and boost lending. By the end of 2015, about a third of the debt issued by Eurozone governments had negative yields.²⁴

²² ‘Real’ interest rates can, and have been negative if inflation exceeds the nominal interest rate

²³ Emphasis is my own

²⁴ Eurostat

In 2016, the Bank of Japan surprised many by enacting its own negative interest rate policy, and some speculate that the U.S. Federal Reserve Bank may reverse course on its recent interest rate hike and regress to negative rates. Fed Chairwoman Janet Yellen has gone on the record stating that the possibility in the United States is not out of the question: "If circumstances were to change potentially anything, including negative interest rates, would be on the table."²⁵

Negative interest rate policies may be perceived by some as a sign of desperation, that even QE and asset stabilization have been ineffective at jumpstarting the economy. Desperation or not, negative interest rates in practice is untested territory that may yield a number of unanticipated consequences. Negative rates within the financial system should have a similar effect as quantitative easing, at least in that the central bank will pay commercial banks to lend to them. For example, if the interest rate is negative one percent, for every \$1 trillion that the central bank lends out, they would owe in theory an additional \$10 billion in interest to the borrowing banks.

On the other hand, when a commercial bank keeps its excess reserves held with the central bank it must pay interest on those sums, effectively causing the central bank to destroy some of the money it has just issued. Depending on net deposits with the central bank, this could actually constitute a restrictive monetary policy by net removing money from the economy.

Negative rates as they are currently implemented only directly impact certain institutional depositors and only for sums which exceed certain reserve limits, however the banking sector is likely unable to pass these costs on to their customers who would rather stuff cash under the mattress than pay for its safekeeping. If a commercial bank can borrow from the central bank at -2% and then lend to a borrower at -1%, the bank could still profit from the spread. But the banking sector depends critically on deposits to make up their capital requirements, thus they would have a powerful disincentive against charging customers to keep deposits, cutting down on bank profitability.

Making matters more complicated, if individuals believe that they will have to pay negative rates, they are more likely to withdraw large sums of cash to hold on to themselves, limiting the amount of loanable funds available for lenders and even causing the risk of a bank run – where a bank literally doesn't have enough cash on hand to satisfy the demand for current withdrawals. At the same time, people would prefer cash in lieu of holding bonds that carry a negative interest rate, further increasing the demand for physical money. Even in a deflationary environment where the decrease in price levels exceeded the negative rate on a bond, cash would be preferable.

Pinkowitz & Williamson (2002) put forward that holding on to large sums of physical cash is both risky and costly from a logistical point of view. Having a lot of physical money increases the likelihood of robbery, and transporting and transacting with it can be cumbersome. Security measures such as safes or security guards as well as armored transport would need to be a consideration for significant sums. Knowing this, a rational actor may be willing to pay a small negative interest rate on stored cash up until the point where rates go so negative as to cancel those implied costs.

²⁵ FOMC minutes from December 2015

Interestingly, in 2016 the ECB announced that it would be abandoning the €500 banknote, saying that the move is meant to prevent money laundering and halt terrorist financing. In a statement, ECB official Benoît Coeuré noted that “authorities increasingly suspect that they (€500 notes) are being used for illegal purposes, an argument that we can no longer ignore.” Similarly, in a 2016 op-ed for the Washington Post economist Larry Summers advocated the removal of the \$100 bill from circulation.²⁶

While combatting financial crimes is a noble pursuit, some have questioned why the sudden push now to remove high-denomination banknotes from the economy. Money laundering in one form or another has existed for thousands of years and will likely circumvent these moves as well (Madinger, 2011). Incidentally, taking high-denomination bills out of circulation will also make it more difficult for individual depositors to withdraw large sums of money, a potential symptom of negative rates. Any way to encourage depositors to keep their money within the banking system helps a negative interest rate policy from being undermined.

In the United States, money market mutual funds hold nearly \$3 trillion in assets.²⁷ This class of investment, which holds short-term debt instruments, seeks to maintain a stable net asset value of \$1 per share and is generally considered an almost riskless asset (Kacperczyk, & Schnabl, 2013). The importance of the money market cannot be understated. It is a key component to the commercial paper market and the ‘shadow banking’ system of non-bank financial intermediaries (Noeth & Sengupta, 2011).

On September 15, 2008, Lehman Brothers declared bankruptcy. On September 17, 2008, a number of money market funds ‘broke the buck’ and traded for less than \$1, which triggered a wave of panic, causing outflows of nearly \$200 billion in a twenty-four hour period.²⁸ Viewed as an immediate and systemic threat to the financial sector, the U.S. Treasury set up a bailout mechanism in the Exchange Stabilization Fund that restored the one dollar value for money market funds.

If short-term debt instruments carry with them negative interest rates, it will be a challenge for money market funds to maintain a value of \$1 without taking extraordinary measures such as investing in riskier, longer-term assets. It is worth noting that European money market funds, which hold approximately €1 trillion, have so far adapted to negative rates mandated by the ECB. Some European money funds now employ ‘reverse stock splits’ whereby outstanding shares in the fund are progressively reduced to reflect the negative yield.²⁹ Some European funds have also applied explicit customer charges as a result of negative yields for the first time.

If interest rates were to stay sufficiently negative for a prolonged period of time, it may change the payments behavior of firms and individuals in an effort to avoid the charge they would have to pay on deposits. Firms typically prolong paying for expenses as long as possible so that they

²⁶ <https://www.washingtonpost.com/news/wonk/wp/2016/02/16/its-time-to-kill-the-100-bill/>

²⁷ https://www.ici.org/research/stats/mmf/mm_02_18_16

²⁸ <http://www.bloomberg.com/news/articles/2014-09-12/blackrock-moves-to-protect-liquidity-fund-value-after-ecb-cuts>

²⁹ <http://www.bloomberg.com/news/articles/2014-09-12/blackrock-moves-to-protect-liquidity-fund-value-after-ecb-cuts>

can earn compound interest on their cash. They may instead seek accounts payable and stay away from receivables, paying invoices immediately as they come up, or even in advance. In a game of ‘hot potato’ companies may seek to push their cash down the supply chain as quickly as possible. Companies may even seek to hold on to extra levels of inventory as a store of value in lieu of cash revenues.

Businesses might be incentivized to pre-pay or even overpay their corporate taxes and claim them back subsequently, changing the dynamics of government revenue collection and effectively transferring the interest charge to the tax authority (Saeli et al. 2015). In fact there is evidence that this may already be happening: the Swiss canton of Zug has been urging its businesses and citizenry to delay tax payments as long as possible amidst a wave of prepayments.³⁰

As for individuals, people may opt for pre-paid debit cards or gift cards as an alternative store of value, and those receiving checks may wait until the very last possible date to deposit those monies. People may even sign certified checks to themselves and keep them in a safety deposit box until needed. Even if negative rates do not directly impact consumers, the signals sent by the central bank may cause the general population to behave as if it does affect them. Despite the fact that Japan’s NIRP only applies to excess reserves in the financial sector, the demand for physical safes in order to store cash surged to record levels in February 2016.³¹

Where to Go From Here

“How wonderful that we have met with a paradox. Now we have some hope of making progress.”

— Niels Bohr

When taken individually, these challenges facing central bankers have no clear-cut resolution, with logical arguments and empirical evidence seeming to back many sides to varying degree. The complexity for central bankers is compounded by the fact that these issues are interrelated, and a perceived solution to one problem may have a contradictory outcome for another. When the linkages are examined, inconsistencies and logical paradoxes begin to exist.

There is an inherent contradiction that appears in the interplay of rules-following with bank independence. A central bank policy that calls for following a strict set of rules, such as the Taylor rule, protects itself from impulsiveness that may arise from a crisis situation, or from outside influence of politicians or corporate lobby. This, of course, is often viewed as a positive attribute, and especially comes in to play when the public lacks trust in politicians. Following a rule presumes independence from outside influence, yet at the same time central bankers lack the independence to make bold decisions if they have to follow one. Unexpected events often require discretion, such as the implementation of quantitative easing and asset price stabilization that fall outside the bounds of such rules.

³⁰ http://www.swissinfo.ch/eng/different-deadlines_swiss-taxman-says-delay-payments-to-beat-negative-interest-rates/41888668

³¹ <http://www.wsj.com/articles/japanese-seeking-a-place-to-stash-cash-start-snapping-up-safes-1456136223>

Inflation targeting may be viewed as a rule as well. Rather than being a methodological rule based on an objective function to maximize an outcome, the implication is that anything within reason can be undertaken in order to achieve that target. This includes the use of unconventional monetary policy tools. Inflation targeting, in fact, is one of the primary reasons that central banks will resort to such measures since interest rate setting is bounded by zero to the downside; if strict methodological rules were followed, inflation targeting would fail. Inflation targeting and quantitative easing are thus intrinsically linked.

In order to succeed with such extraordinary measures as QE, negative interest rates, or direct asset purchases, a central bank cannot be constrained by external policymakers who second guess their actions. In other words, independence is also crucial for the question of should central banks stabilize asset prices. But, to be truly independent a bank must follow rules or else fall victim to outside influence or human fallibility from within. And, the circuitous logic begins again.

Perhaps the narrow fields of finance and economics are insufficient to reconcile the difficulties in central banking decisions, and especially as it relates to their interconnectedness. The social sciences collectively should be enlisted to throw their hat into the ring. Adam Posen (1993) has remarked that “an empirically supported explanation of the association between central bank independence and low inflation can only be arrived at through a proper understanding of politics.” The fields of sociology, anthropology, and psychology may also be necessary to synthesize viable and acceptable solutions.

Quantitative easing and negative interest rate policies have been shown to produce a wealth effect – even if it is temporary – that benefits those who hold assets and leaves behind those who do not (Bernoth, 2015). Typically, the working and middle class hold little or no financial or hard assets, and thus do not enjoy any gains produced in their prices. This could lead to an unintended increase in wealth inequality, an important issue at the forefront of social and political science.

What is clear is that the world’s central banks must address these questions. We are experiencing an unprecedented era of persistently low interest rates and rampant quantitative easing - and with sustained economic growth still a long way off. Deflationary pressures continue to plague Europe and elsewhere, while asset markets remain volatile. Central bankers may need to come up with newer and more creative ways to act, as it seems that the status quo has not produced the results they’ve been looking for. That, or return to the very basics.

Conclusion

The decisions facing central bankers today are complicated, and in many ways unprecedented. Economic debates facing policymakers do not have straightforward answers either. There is a catch-22 in that the potential for social and political fallout exists from approaching monetary policy any which way, and often times negative outcomes will be created regardless of which decision is made.

This paper has examined four pertinent issues that affect decision making today from an economic take, while also framing them from a political perspective. It also points out logical fallacies involved when these matters are viewed as interconnected.

While there are no clear answers for how these issues should or will be resolved, it is certain that as central banking becomes more influential, these issues will become more important. It is also certain that new issues are likely to arise in the future which will only add layers of complexity to an already complex undertaking.

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Appendix

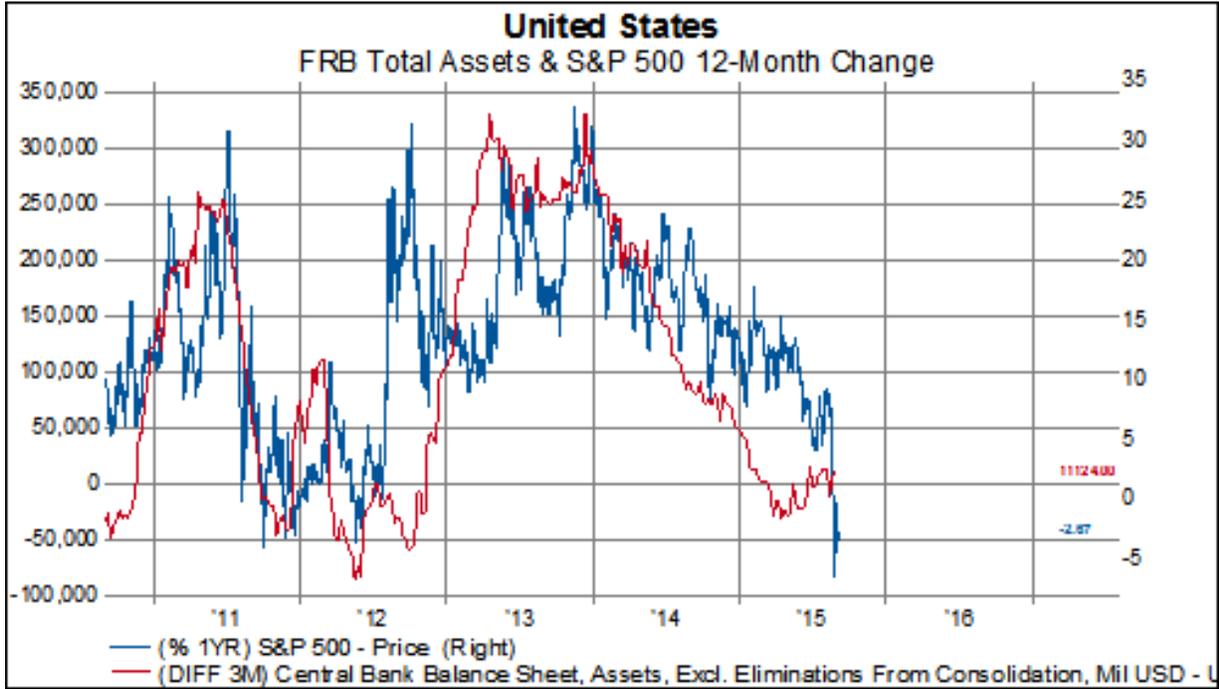


Figure 1: Change in Fed Balance Sheet vs S&P 500 price

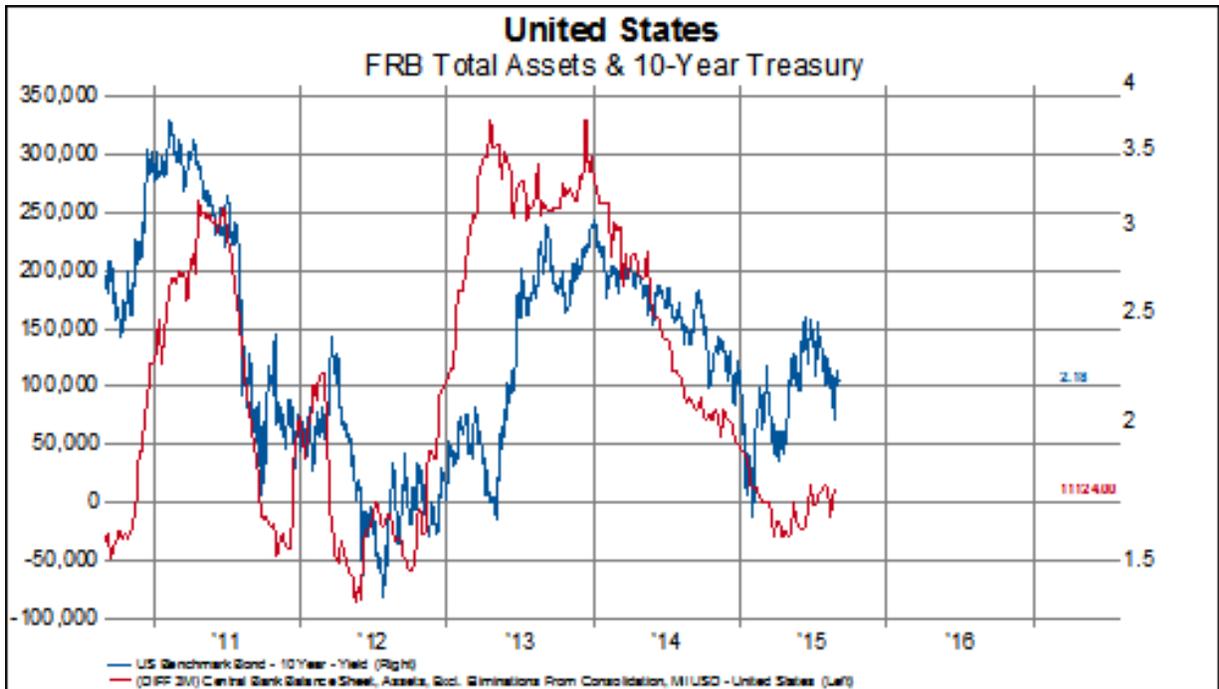


Figure 2: Change in Fed Balance Sheet vs 10-year US Treasury yield

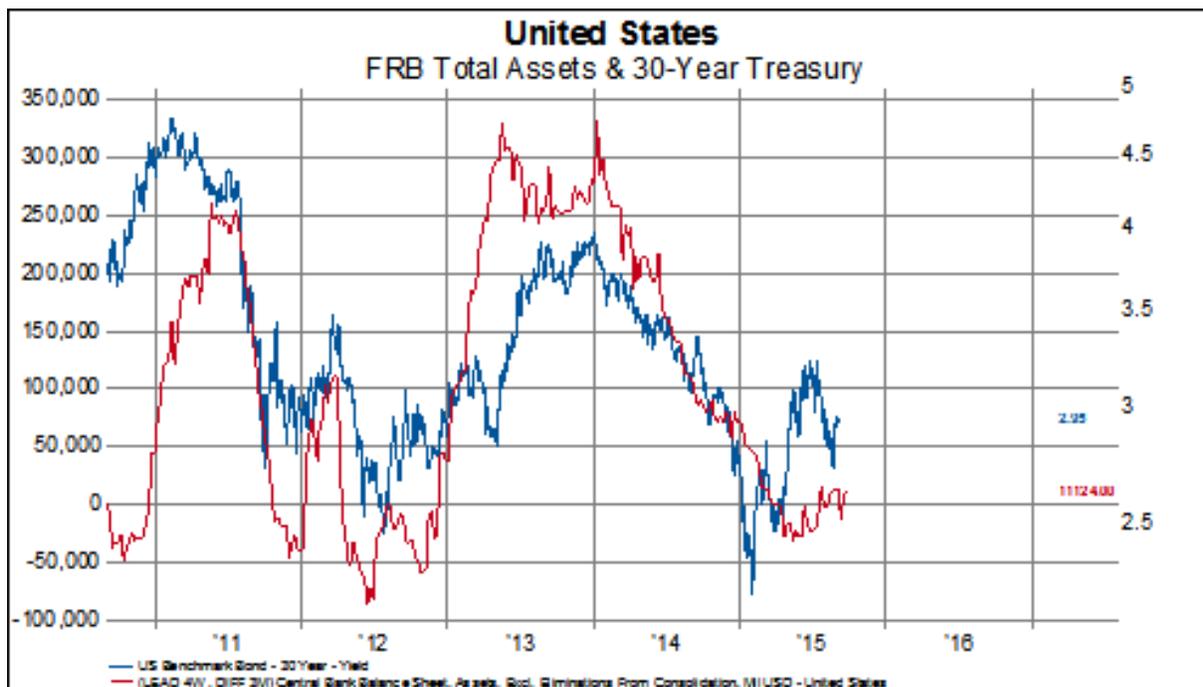


Figure 3: Change in Fed Balance Sheet vs 30-year US Treasury yield

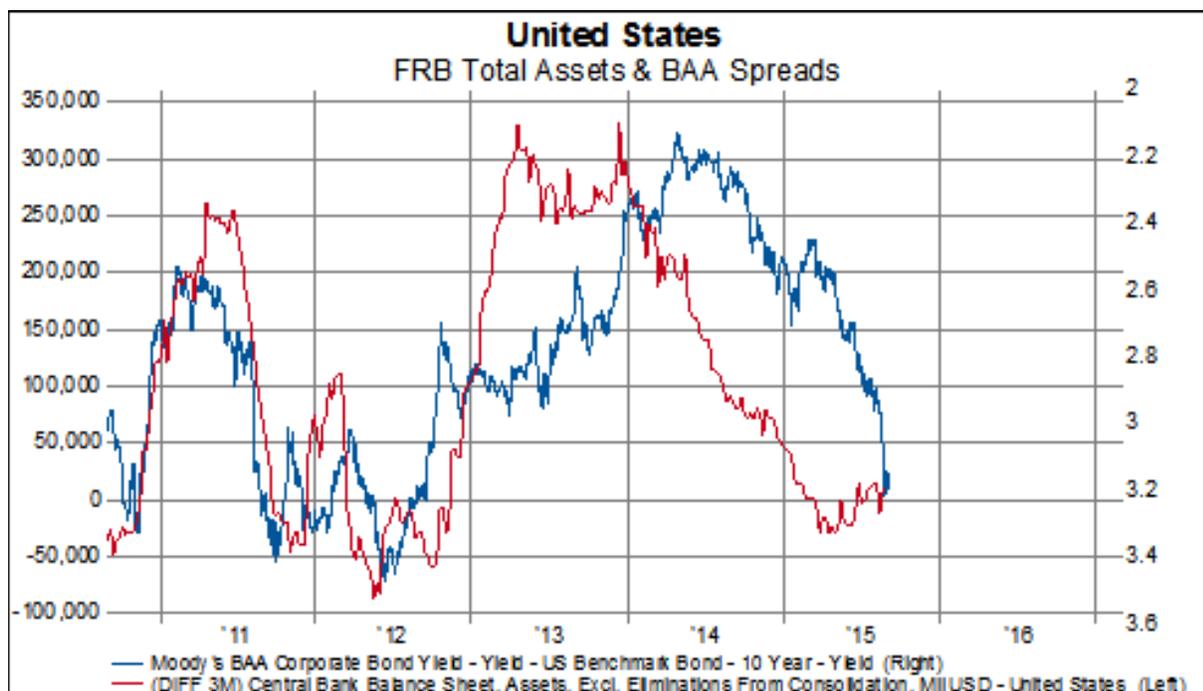


Figure 4: Change in Fed Balance Sheet vs Spread of BAA-rated corporate bonds over Treasuries

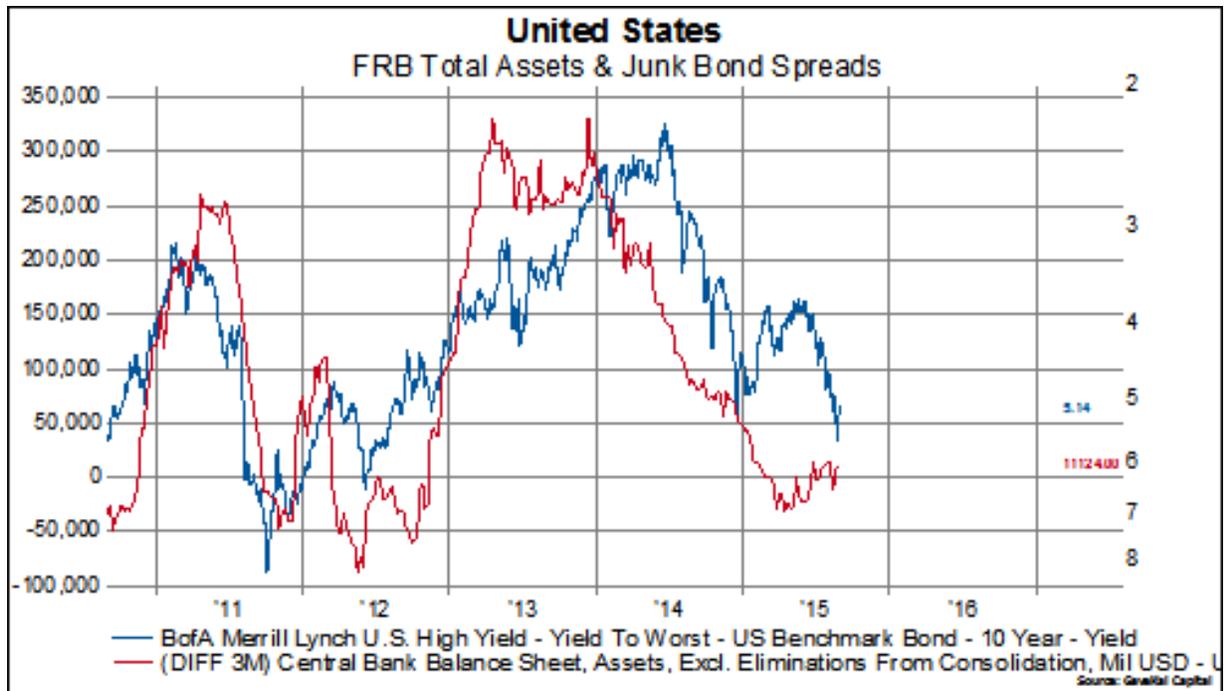


Figure 5: Change in Fed Balance Sheet vs Spread of Non-Investment grade corporate bonds over Treasuries

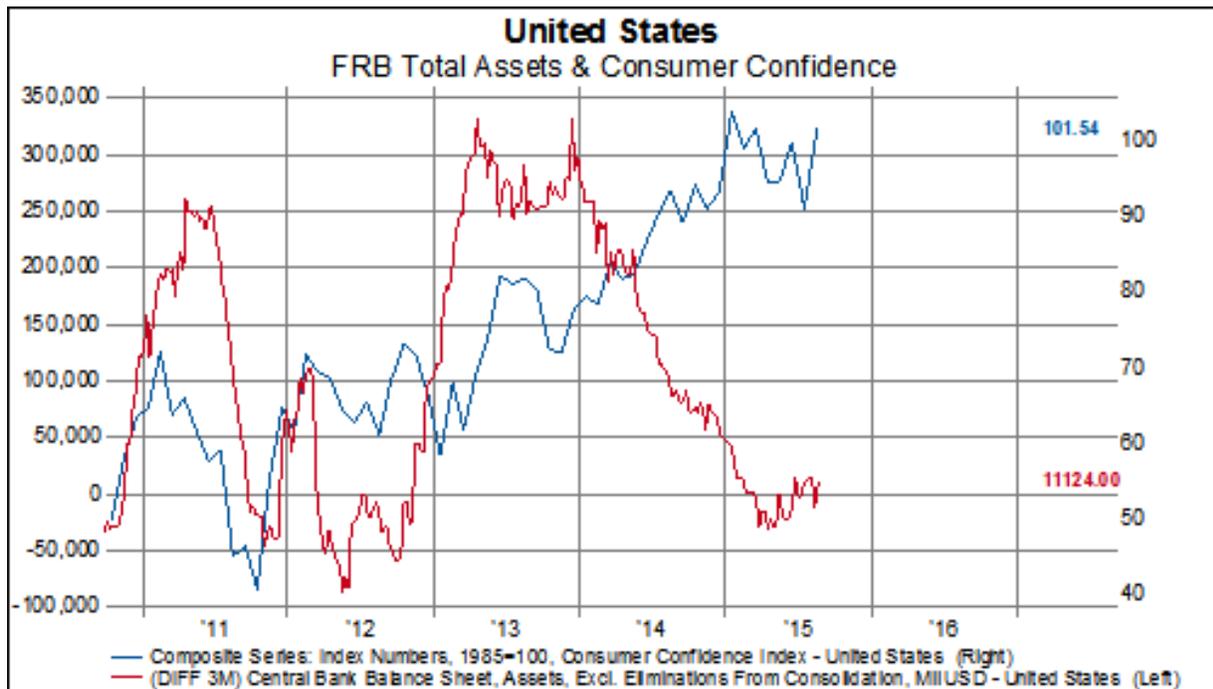


Figure 6 : Change in Fed Balance Sheet vs Consumer Confidence

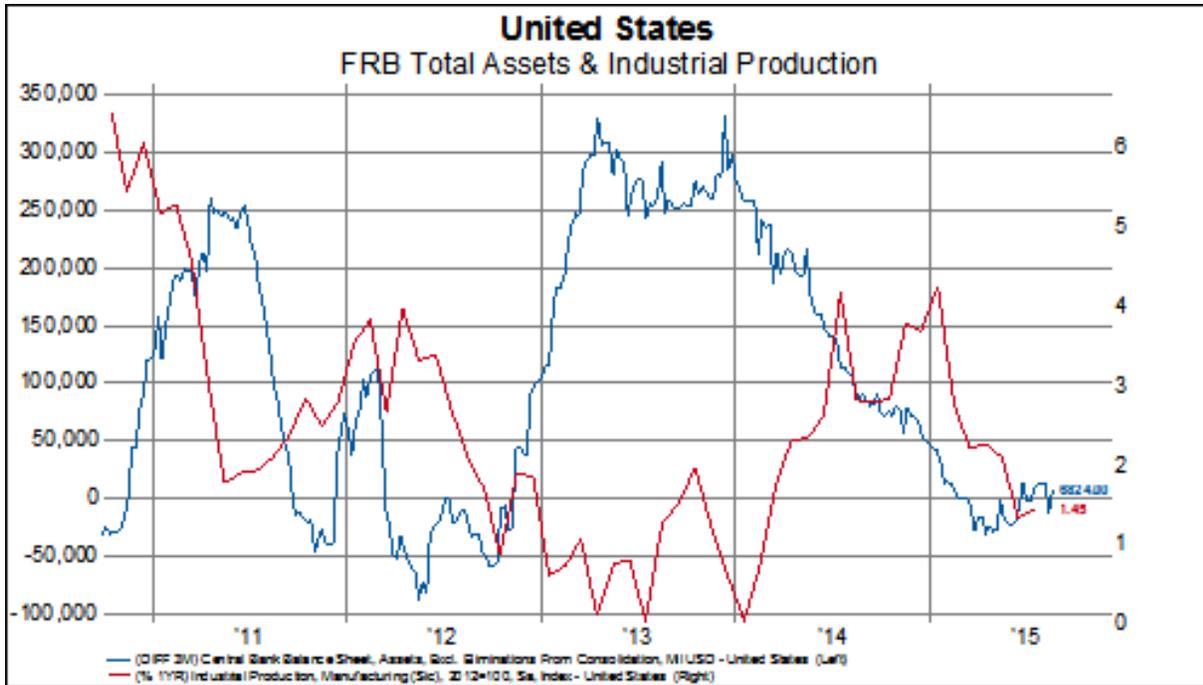


Figure 7: Change in Fed Balance Sheet vs Industrial Production

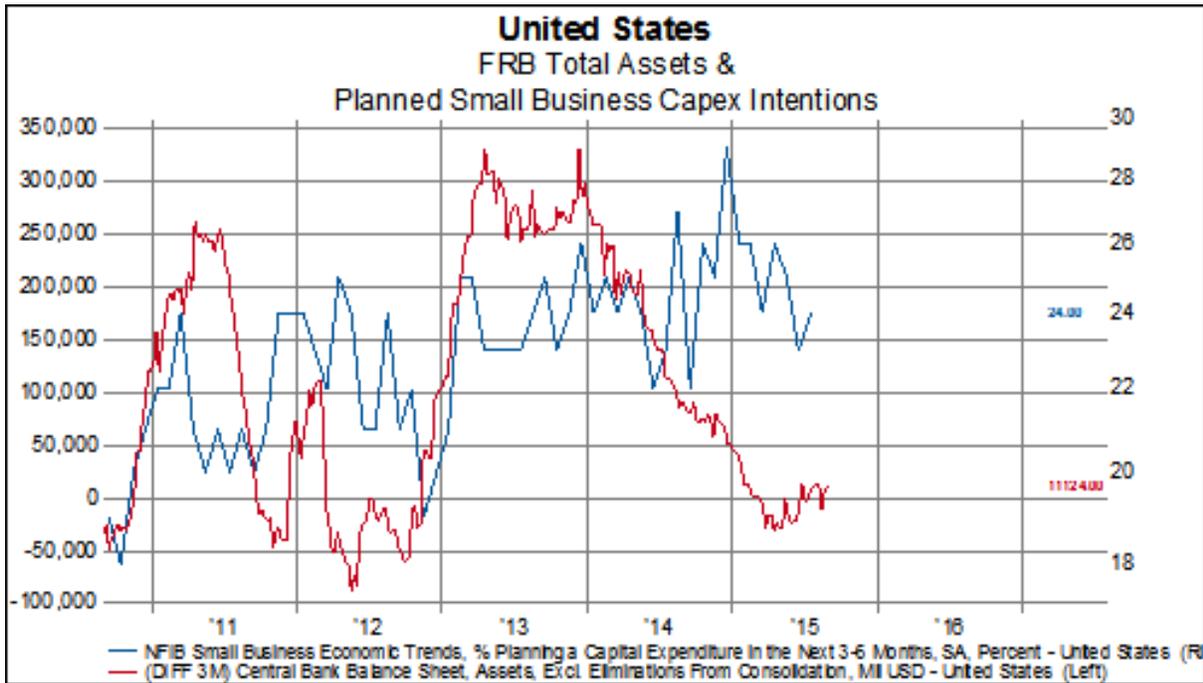


Figure 8: Change in Fed Balance Sheet vs planned CAPEX

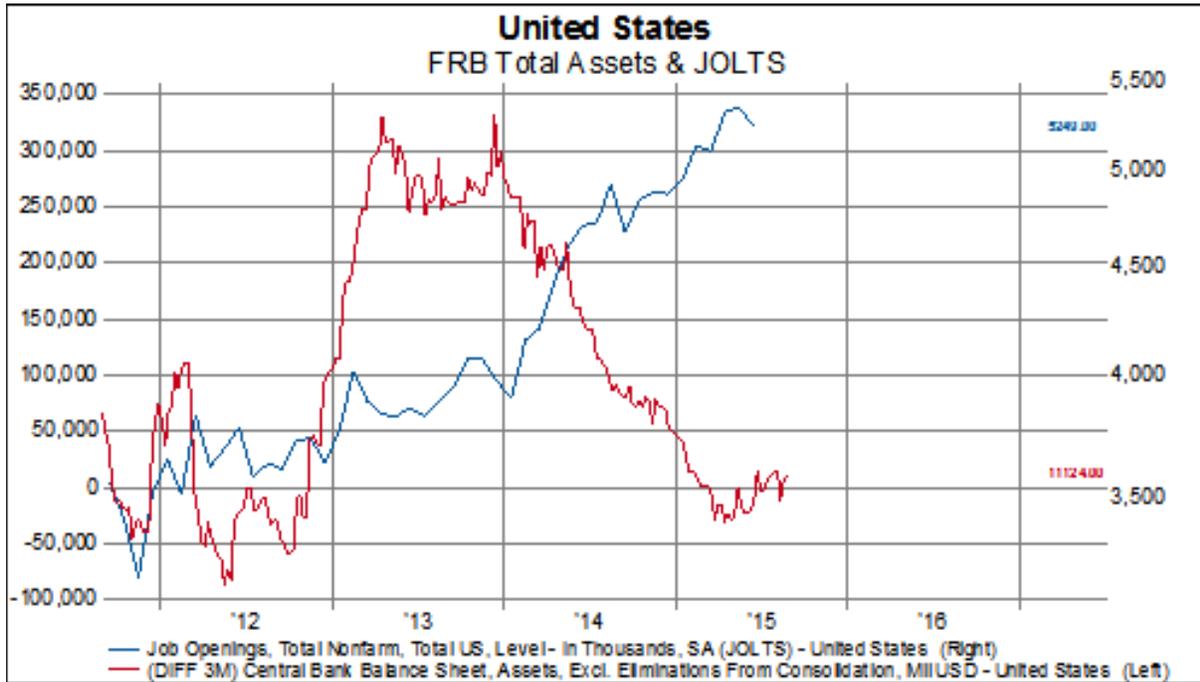


Figure 9: Change in Fed Balance Sheet vs JOLTS Job Openings

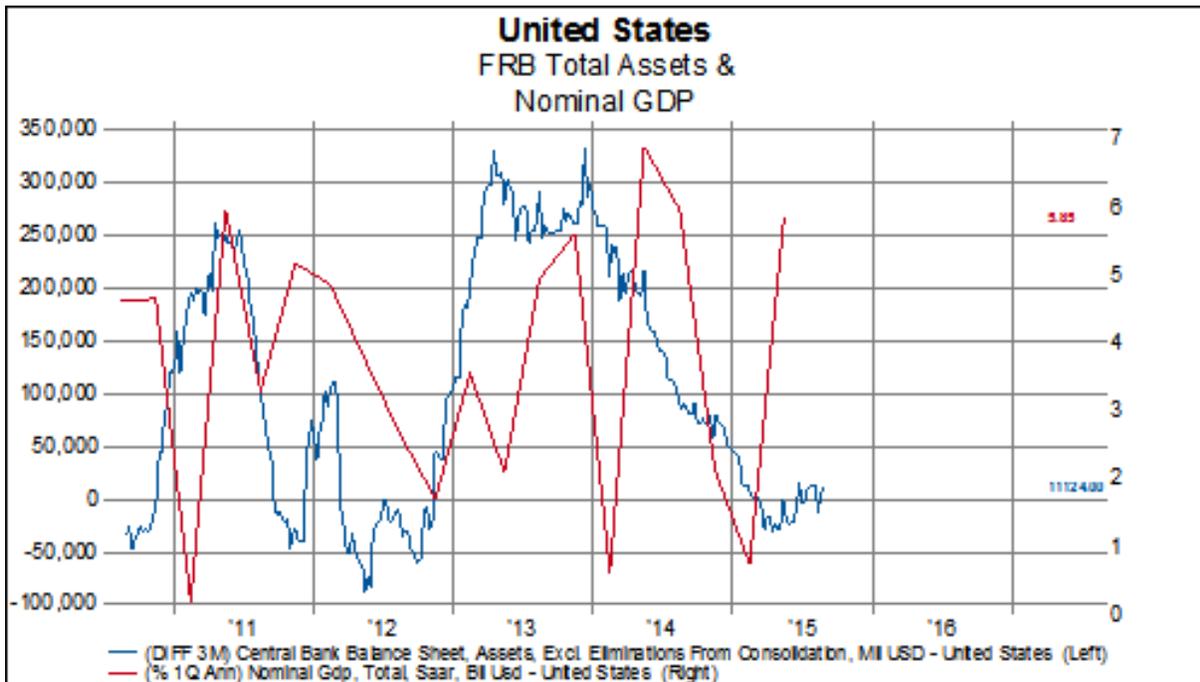


Figure 10: Change in Fed Balance Sheet vs Nominal GDP

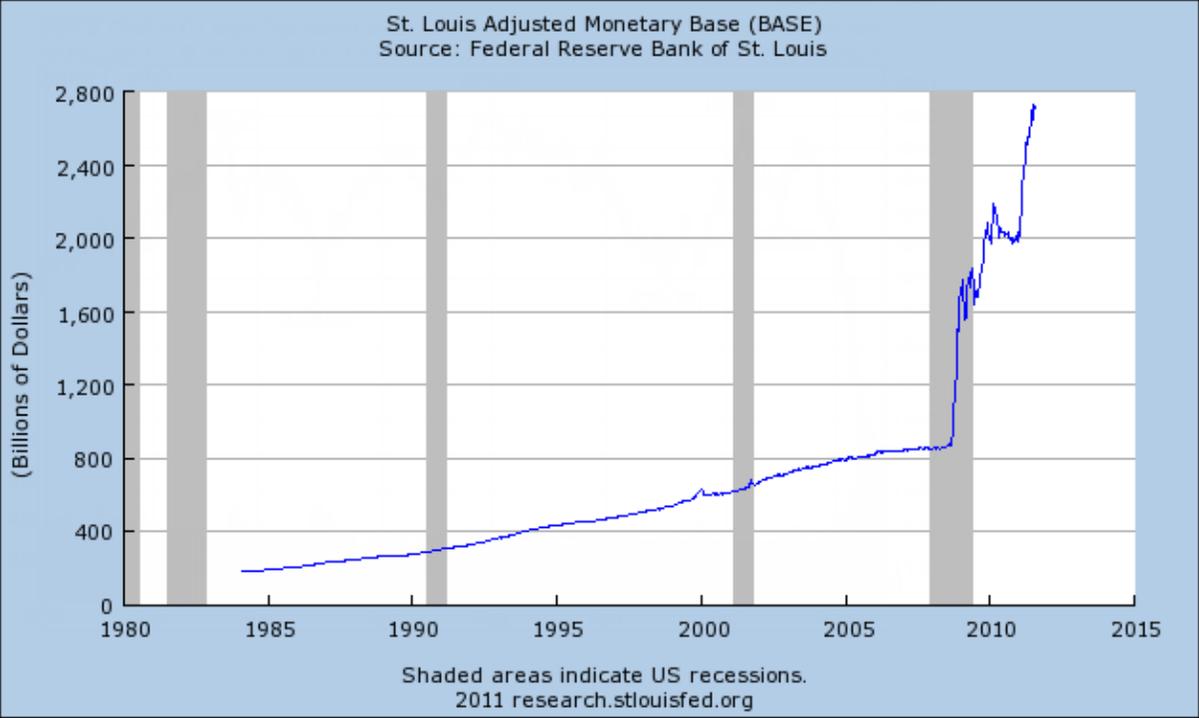


Figure 11: US M0 Money Supply

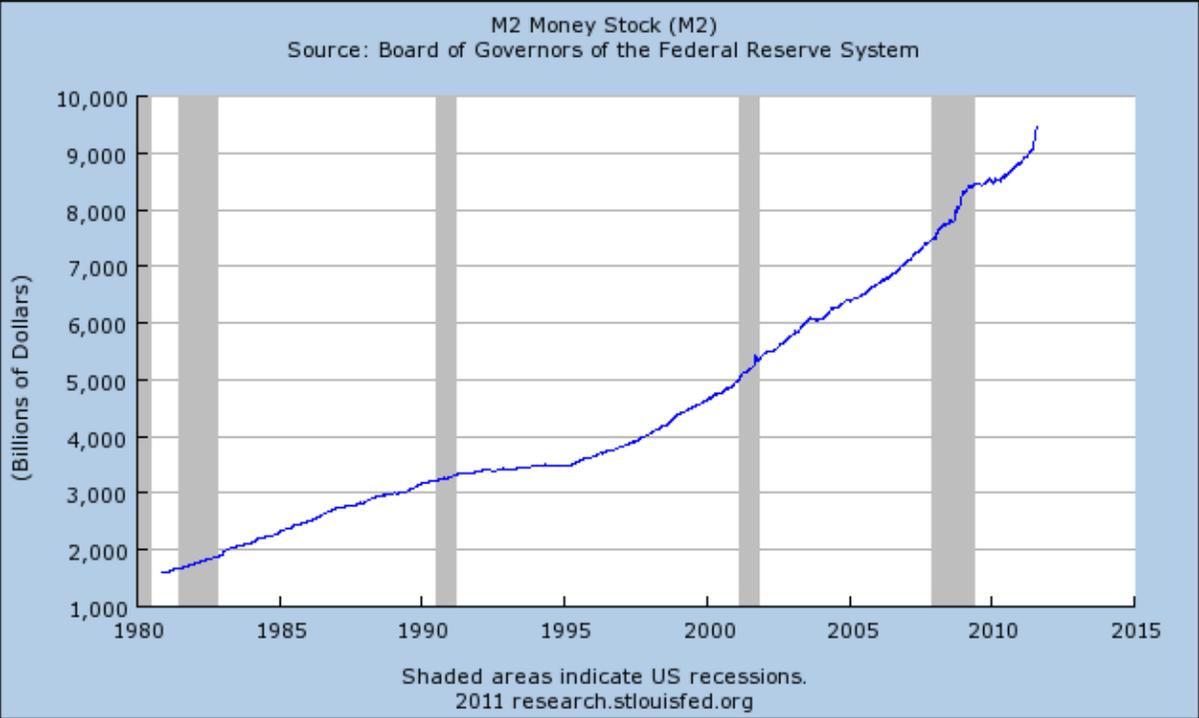


Figure 12: US M2 Money Supply

Tables

There are 28 countries that use inflation targeting, fixing the consumer price index as their monetary policy goal. Three other countries—Finland, the Slovak Republic, and Spain—adopted inflation targeting but abandoned it when they began to use the euro as their currency.

Country	Inflation targeting adoption date	Inflation rate at adoption date (%)	2010 end-of-year inflation (%)	Target inflation rate (%)
New Zealand	1990	3.3	4.03	3-Jan
Canada	1991	6.9	2.23	2 +/- 1
United Kingdom	1992	4	3.39	2
Australia	1993	2	2.65	3-Feb
Sweden	1993	1.8	2.1	2
Czech Republic	1997	6.8	2	3 +/- 1
Israel	1997	8.1	2.62	2 +/- 1
Poland	1998	10.6	3.1	2.5 +/- 1
Brazil	1999	3.3	5.91	4.5 +/- 1
Chile	1999	3.2	2.97	3 +/- 1
Colombia	1999	9.3	3.17	4-Feb
South Africa	2000	2.6	3.5	6-Mar
Thailand	2000	0.8	3.05	0.5 - 3
Hungary	2001	10.8	4.2	3 +/- 1
Mexico	2001	9	4.4	3 +/- 1
Iceland	2001	4.1	2.37	2.5 +/- 1.5
Korea, Republic of	2001	2.9	3.51	3 +/- 1
Norway	2001	3.6	2.76	2.5 +/- 1
Peru	2002	-0.10	2.08	2 +/- 1
Philippines	2002	4.5	3	4 +/- 1
Guatemala	2005	9.2	5.39	5 +/- 1
Indonesia	2005	7.4	6.96	5 +/- 1
Romania	2005	9.3	8	3 +/- 1
Serbia	2006	10.8	10.29	8-Apr
Turkey	2006	7.7	6.4	5.5 +/- 2
Armenia	2006	5.2	9.35	4.5 +/- 1.5
Ghana	2007	10.5	8.58	8.5 +/- 2
Albania	2009	3.7	3.4	3 +/- 1

Sources: Roger, 2010; and the IMF.

Table 1. Countries who employ inflation targeting and their targets