

*Central Bank Liquidity Swaps of the Financial Crisis: An Analysis of Long-Term
Financial Instability*

A Thesis in Economics

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Abstract

This thesis sheds light on the often-overlooked Federal Reserve (Fed) policy measure, central bank liquidity swap lines, which were implemented during the financial crisis. The thesis provides an overarching and detailed analysis of how and why the liquidity swaps were used. Although the liquidity swaps were initially established as an emergency measure, the primary focus of my thesis is on their impacts as a normal part of American monetary policy. In my analysis of the liquidity swaps, I establish the critique that the swaps extended over a long time horizon and uncapped in amount, could create an issue of moral hazard on a global scale. Using the Financial Instability Hypothesis (FIH) of economist Hyman Minsky, I explain how such a scenario is likely to occur. The FIH also aids in explaining current relations throughout the global financial system, to which, the liquidity swaps are of great importance. A brief summary of Minsky's place within the realm of economic thought is established to provide context on the importance of his theories and their relation to my critique of the liquidity swaps. Finally, I provide analysis of Federal Open Market Committee (FOMC) meeting minutes from three key dates pertaining to the liquidity swaps.

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1. Introduction

Has the monetary policy of the Federal Reserve (Fed) since the Great Recession of 2008-2009 added instability to the financial system? This thesis provides a narrative and analysis of the unorthodox liquidity swap lines that the Fed has implemented during the last decade. While the swap lines worked incredibly well as an emergency provision by the Fed, this thesis examines the potentially adverse long-term effects of their normalization. Economist Hyman Minsky, whose work on financial instability provides insights into the behavior and mechanisms of financial markets that mainstream economic theory has lacked, is a strong influence throughout this paper. Minsky's ideas are particularly useful in the context of this paper as his theories provide reasoning behind the financial crisis when traditional economic thought failed, and his theories also provide context for how the liquidity swaps could increase financial fragility. In this paper I make the case that there is much evidence in economic theory and recent research to suggest that some of the easy monetary policy measures of the last decade could have unintended consequences. William White of the Dallas Federal Reserve District bank compares the short-term benefits of easy monetary policy to its possible long-term drawbacks. He particularly mentions its limited capacity to induce growth and stability if it is the primary instrument being used to do so. I believe there are unexplored consequences regarding the long-term fallout from the Recession, and that the roots of those consequences may be found in monetary policy and prevailing economic thought leading up to, during, and after the crisis.

2. The Federal Reserve and Liquidity Swap Lines

Arguably the most unorthodox, and perhaps unpublicized, monetary policy tool used by the Federal Reserve during the financial crisis was the liquidity swap agreements with foreign central banks. Swap agreements had existed prior to the Great Recession, but were seldom used and were designed to help stabilize foreign exchange rates during the era of the Bretton Woods system of the 1950s and 1960s. The financial crisis evolved so rapidly that the Fed had very little time to develop new solutions to manage it. This chapter focuses on the liquidity swaps between the Fed and various European central banks. I will explore why central bank liquidity swap lines were used, how they operated and how they were able to mitigate the crisis, and their current role in the global financial system.

2.1 Why were liquidity swaps used?

From 1962 to 1971, the Fed established swap lines with 14 central banks (Bordo et al, 2014, p. 5). Under what became known as the Bretton Woods system, the swap lines helped establish the dollar as the de facto global currency. The participating nations agreed to peg their respective currency values to within a given percentage range to that of the dollar. To establish global confidence in the dollar, the US, although having previously abandoned the gold standard, decided to value the dollar at \$35 per ounce of gold (Bordo et al, 2014, p.4). The first swap lines, established in 1962 preceded by half a decade the existence and growth of a balance of payments deficit by the US, which threatened the dollar's global standing. To ensure that there was not a flight to gold, the Fed set up swap lines to exchange dollars held by foreign central banks, for their

own currency (Bordo et al, 2014, p. 6). Although during the Great Recession, liquidity swaps were reengaged due to the dollar's global strength, rather than its weakness, they were similarly used as a stabilizing force on an international scale.

Much of the funding provided to non-US banks in the run up to the recession was denominated in US currency. This funding was provided through US-based money market funds. This created an additional financing risk for the European banks that invested in the US housing market. On top of the already significant maturity mismatch between their long-term assets and the short-term liabilities that banks relied on for their funding, these foreign banks were also heavily reliant on inflows of USD to keep funding their dollar assets. The National Bureau of Economic Research (NBER) notes that before 2008, over \$8 trillion in US dollars existed on the balance sheets of British, EU, and Swiss banks (Goldberg et al, 2010, p. 4). As global confidence in all financial intermediaries shrunk, the global supply of dollars to Europe shrunk with it. The holding of dollars by the Bank of England (BoE) and the European Central banks were negligible compared to the funding needs of the banks under their jurisdiction.

Although unexpected, the Fed's extensions of the liquidity swap lines were inevitable given the nature of the crisis. In 2002 the largest outstanding claims on US borrowers, \$1.054 trillion, originated from loans made by European banks (Tooze, 2018, p. 78). Five years later in 2007 they had more than doubled to \$2.633 trillion. In contrast, the next largest outstanding claims were from the Asian Pacific markets to Europe, which stood at \$1.744 trillion (Tooze, 2018, p. 78). This was all made possible through the enormous expansion of bank balance sheets in 2008, particularly in Europe, where the liabilities of

Irish, British, and Swiss banks amounted to roughly 700%, 500%, and 450% of their respective GDP. In the US that amount sat just under 100% of GDP (Tooze 2018, 111).

Interbank funding conditions can be measured by the LIBOR-OIS spread. This spread is the difference in basis points (bps) (hundredths of a percent), between two interest rates. LIBOR is the average rate that banks charge one another for short-term unsecured loans. The OIS is effectively the rate set by a country's central bank, for the US that would be the Fed Funds rate. The LIBOR-OIS rate is typically understood as a general benchmark for the risk assumed within interbank lending markets. As the spread increases, risk is perceived as higher. Thus, it may serve as a proxy indicator of the overall health of the financial system. A recent Brookings Institute paper depicts the changes in LIBOR-OIS spread over the course of the financial crisis (Sheets et al, 2018, p. 4). In July 2007, the 3-month LIBOR-OIS spread was less than 10 bps. By September of 2007 the spread had jumped to almost 100 bps (Sheets et al, 2018, p. 4). In October of 2008, less than a month after Lehman's failure, the LIBOR-OIS spread jumped to a little over 350 bps (Sheets et al, 2018, p. 4). The Fed became concerned with these increases, believing that European banks were likely looking for funding from US dollar markets. A massive increase in federal funds borrowing by European banks led to extreme volatility in the Federal Funds rate (Sheets et al, 2018, p. 5). The Fed realized that it had to intervene in order to maintain its target Fed Funds rate.

In early December of 2007, the first central banks to draw on liquidity swap lines from the Fed were the European Central Bank (ECB), which received \$20 billion, and the Swiss National Bank (SNB), which got \$4 billion (Sheets et al, 2018, p. 5). This was

done in tandem with the establishment of the Term Auction Facility (TAF), a mechanism established by the Fed to auction loans from its discount window (Sheets et al, 2018, p. 5). They were initially used by domestic commercial banks but were subsequently expanded by the Federal Open Market Committee (FOMC) to include the foreign central banks. The foreign central banks in turn used the funding to provide dollar liquidity to their commercial banks (Bordo et al, 2014, p. 21). Ben Bernanke's memoir of the financial crisis and his time as chairman of the Fed, explains that the goal of TAF was to slow down the mass selloff of (Collateralized Debt Obligations) CDOs and (Mortgage Backed Securities) MBS that were exacerbating a decline in asset prices (Bernanke, 2015, p. 186). Lehman's failure on September 15th, 2008 prompted the Fed to extend swap lines to the Bank of Canada (BoC), the BoE, and the Bank of Japan (BoJ) on September 18th, the central banks of Australia, Denmark, Norway, and Sweden on September 24th, and the Central Bank of New Zealand on October 28th (Sheets et al, 2018, p. 6). The Fed then further signaled its commitment to supplying international liquidity when on October 13th and 14th it announced that the caps on the liquidity swap lines would be removed (Sheets et al, 2018, p. 6) – in principle offering unlimited dollar liquidity to foreign central banks. In October of 2013, the Fed announced that it had decided to keep five of the liquidity swap lines – with the BoC, BoE, ECB, BoJ, and SNB – in place, making them a permanent fixture of American monetary policy (Broz, 2015, p. 324). Despite the primarily transatlantic swap arrangements, the financial crisis was global in every sense of the word. The central banks of four notable emerging markets, Brazil, Korea, Mexico, and Singapore, were also

granted swap lines with the Fed in October of 2008. Each of them was allotted \$30 billion via swap agreements (Sheets et al, 2018, p. 7).

2.2 How do liquidity swaps operate?

To implement its monetary policy and meet its objectives, the Fed continuously adjusts its balance sheet and thus the balance sheets of the commercial banks. The Fed's swap agreements implied similar adjustments. The Fed offered a fixed amount of dollars for an equivalent amount of foreign currency to a foreign central bank at the prevailing market exchange rate. The transactions were then reversed after an agreed upon period (Sheets et al, 2018, p. 8). The foreign central bank paid interest of 100 bps above the prevailing OIS rate to the Fed (Sheets et al, 2018, p. 9). Once a foreign central bank acquired the dollars from the Fed, it loaned them to institutions under its jurisdiction as it saw fit. However, the Fed added precautionary restrictions on its swap lines with the central banks of emerging market economies (Sheets et al, 2018, p. 10). These central banks were required to offer their dollar loans to the commercial banks under their jurisdiction only upon receiving good collateral in return (Bordo et al, 2014, p. 22). Although the Fed took unprecedented and unorthodox policy actions during the Great Recession, it did so in a fashion that seemed similar to its normal operating procedures. The liquidity swaps lines were executed in much the same way that the Fed targets the Fed Funds rate. Although the Fed's liquidity swaps with its central bank counterparties were not designed to affect any particular interest rate changes, it executed them in ways similar to how it targets the Fed Funds rate.

The Fed sets the Fed Funds target rate by adjusting its balance sheet and the balance sheets of the institutions in the banking sector via its open market purchases and sales of US Treasury Securities (Cecchetti and Schoenholtz, 2015, p. 453). To decrease the Fed Funds rate, the Fed buys securities from banks, thus putting an equivalent amount of Fed reserves (credit) onto bank balance sheets. Conversely the Fed increases the Federal funds rate by selling securities to banks and other financial institutions, which are ultimately paid for with bank reserves. (Cecchetti and Schoenholtz, 2015, p. 453).

As the US housing boom inflated throughout the mid-2000s, the Fed slowly raised the target Fed Funds rate, taking reserves out of the banking system. Then, as the U.S. economic outlook weakened and the housing bubble deflated in 2007, the Fed began to cut its target Fed Funds rate. It flooded bank balance sheets with reserves for the next two years. However, this normal form of monetary policy proved inadequate to stem a mushrooming crisis in the U.S. financial system. The Fed was forced to resort to less orthodox measures to provide additional liquidity to financial markets and to stimulate a failing economy.

The swap agreements with foreign central banks were done on an enormous scale, and their implementation seemed immensely convoluted and complex, especially as they occurred across multiple continents. Explaining their basic mechanics of how these swap agreements were established, engaged, and closed is essential for understanding the debate debates they fostered. During a liquidity swap with a foreign central bank, the Fed exchanges dollar reserves for a specific amount of that bank's foreign currency reserves, at the current market exchange rate (Fed Reserve Board, accessed 1/10/19). The dollars

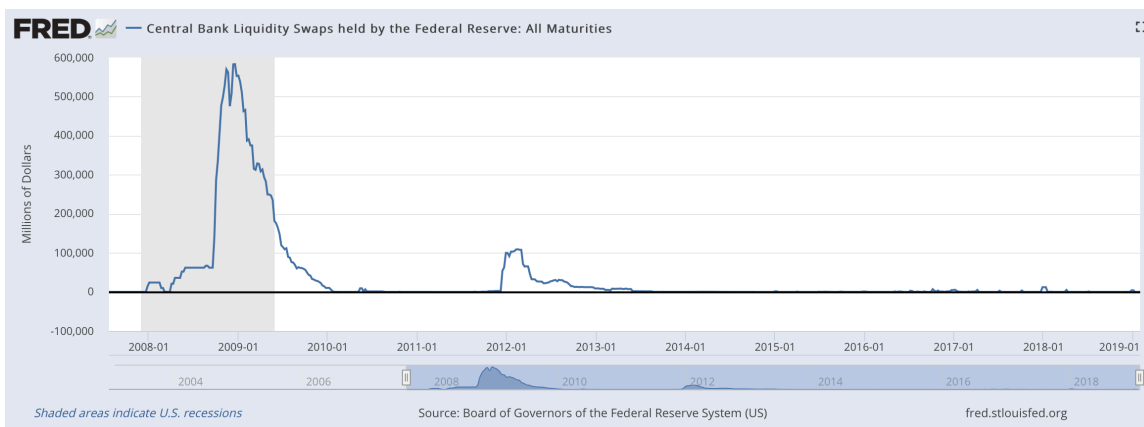
that the Fed lends are placed in the foreign central bank's account at the New York Fed, and the foreign currency that the Fed receives is placed in the Fed's account at the foreign central bank (Fed Reserve Board, accessed 1/10/19). The foreign currency received by the Fed, is treated as an asset on its balance sheet, and the dollars lent to the central bank counterparty are treated as a liability on the Fed's balance sheet. The converse is true on the foreign central bank's balance sheet. The foreign central bank may then lend to any financial institution under its national jurisdiction, and the specified dollar amount is transferred from the foreign central bank's account at the New York Fed to the foreign financial institution (Fed Reserve Board, accessed 1/10/19). To close out the currency swap, the Fed and foreign central bank agree to exchange their respective currencies back to one another on a specified date at the foreign exchange rate of the initial swap. These swap agreements may be extended for as short of a term as overnight or for as long as three months. The foreign central bank then pays interest on the dollars that it borrows from the Fed (Fed Reserve Board, accessed 1/10/19).

2.3 Were the liquidity swaps successful?

The far-reaching effects of the financial crisis prompted the Fed to initiate policy liquidity swaps that were just as geographically expansive. Although the financial crisis originated in the US, it rapidly spread via the global interconnections of its financial system with the rest of the world. The Fed swiftly implemented its liquidity swap lines with fourteen central banks. Data provided by the Fed suggests that the world's economy responded well to the increased dollar liquidity it provided by the Fed. In May 2008, there were roughly \$60 billion in outstanding swaps. Only a few months later, after the

collapse of Lehman Brothers, the number of outstanding swaps skyrocketed to nearly \$600 billion (Sheets et al, 2018, p. 7). At their peak they accounted for roughly 25% of the Fed's total assets on its balance sheet (Bordo et al, 2014, p. 25). This receptivity by market participants from financial centers in both advanced and emerging economies points to their success. The ECB, BoE, and BoJ took the bulk of the dollar swaps offered by the Fed between December 1, 2007, and February 1, 2010 (Broz, 2015, p. 330). The ECB, BoE, and BoJ took \$170.93 billion, \$96.31 billion, and \$50.17 billion, respectively (Broz, 2015, p. 330). Having stemmed the worst of the global financial crisis, the amount of outstanding swaps fell to under \$100 billion by July of 2009, and were almost completely unused by January of 2010 (FRED₁, Figure 1).

(Figure 1: Central Bank Liquidity Swaps Held by the Federal Reserve: All Maturities, Source: FRED₁)



2.4 The liquidity swaps today

The significance of the Fed's decision to maintain the status of its liquidity swap lines with the BoC, BoE, BoJ, ECB, and SNB after 2013 should not be understated. They had never previously been used in such a capacity, or on such a scale. After some debate,

voting members of the FOMC decided to make it a permanent staple of its international monetary policy toolkit. While the lines have been minimally used since 2013, the Fed believes that there are valid reasons to keep them in place.

During the European sovereign debt crisis in 2012, over \$100 billion were drawn from the Fed's swap lines. In 2016 about \$1 billion were drawn, and in January of 2018 another \$12 billion were drawn (FRBNY₁). Since September 2018, there has not been a weekly drawing of less than \$50 million (FRBNY₁). While these recent numbers are a small percentage of the volume of swaps that took place between 2008 and 2009, it is a signifier that the Fed now uses this tool as a regular part of its normal monetary policy.

Notably, the Fed did not voluntarily release data on its liquidity swaps until it was prompted to do so in 2011 by a lawsuit brought by Bloomberg News. In his memoir, Bernanke hardly mentions the liquidity swaps. This is surprising, as throughout *The Courage to Act* Bernanke consistently argues for making the Fed more transparent. His decision to leave out a detailed account of these swaps is likely due to the political controversy that he knew would result from it. The “audit the Fed” campaign, led by Tea Party members of the US Congress, highlighted the scrutiny that the Fed came under during the Great Recession. Generally, critics on the Democrat side of the aisle accused monetary policy makers of doing too little, while those on the Republican side saw the Fed as overstepping its policy mandate.

The Federal Reserve Transparency Act of 2012 was Congressional Representative Ron Paul's attempt to reduce the Fed's authority and autonomy (Broz, 2015, p. 339). Lawrence Broz's study of the Congressional vote on the “Audit the Fed” bill found that

the opponents of Paul's bill, including many Democrats, were likely influenced by contributions from banking lobbyists. Broz argues that the Fed's decision to use international liquidity swap lines was in part due to the political cover it thought it would receive from Democrats and many Republicans that have traditionally defended the Fed's autonomy. This new concern with the Fed's autonomy is no small issue. Congress is the Fed's sole overseer, setting the central bank's guidelines and parameters. Thus, that a near majority of politicians in the House of Representatives questioned the Fed's actions in real time during a financial crisis was historically significant.

Lawrence Broz argues that the Fed's decisions to extend swaps to specific emerging market central banks were driven primarily by its desire to support the American financial system. His study shows that the Fed's decisions were related to US "bank exposure" to the respective economy (Broz, 2015, p. 335). There is nothing wrong with this per se, as the Fed is the American central bank, and thus looks after American economic and financial interests first and foremost. But as will be explained later in this paper, FOMC members had conflicting opinions as to the implementation of these swap lines.

3. An Intro to Minsky, The Role of the Fed, & Main Issues of the Crisis

This chapter provides an historical account, contextual framework, and rationale for using Hyman Minsky's ideas to understand the measures taken by the Fed in reigning in the financial crisis and the policies it has followed since. It examines Minsky's critique of the ideas that implicitly underlay the actions taken by the Fed during the last decade.

3.1 Hyman Minsky and his most important theories

John Maynard Keynes' *The General Theory of Employment, Interest, and Money*, published in 1936, inspired much of Hyman Minsky's work. The 1936 book has shaped almost every school of economic thought since its publication. Prior to its publication, the dominant macroeconomic doctrines of Adam Smith and David Ricardo assumed that markets were inherently self-stabilizing. Keynes, in contrast, argued that if left unchecked, free markets tended to succumb to the rise and fall of business cycles. Keynes forever changed the discipline of economics in the wake of the Great Depression. His economics was predicated on the concept of an aggregate demand-driven economy, recessions being the consequences of collapsing aggregate demand (Jahan, et. al., 2014, p. 53). Keynes argued that government interventions, especially counter-cyclical policies, were required to moderate these fluctuations. The influence of Keynes was so impactful, that after him, the field of economics was essentially split between supporters of and in opponents of his work. Notably however, even within each camp, there remain differences in theory and policy preferences.

One version of Keynesian economics emerged to dominate the discipline throughout the 1950s and 1960s. It merged aspects of the old classical school with some of Keynes' ideas, and came to be known as the "Neoclassical-Keynesian synthesis." It argued that, in the long run, free and competitive markets were efficient allocators of society's resources and would attain a full employment equilibrium state. But it also argued that non-competitive markets would yield suboptimal outcomes and that even competitive markets would take some time to yield full employment. Thus, its proponents argued that

government regulation, intervention and active fiscal policies could improve the efficiency and enhance the stability of market systems, but they also believed that once back at equilibrium, economies have a tendency to remain at full employment and stable prices until the next unforeseen shock. They agreed with Keynes that capitalist economies could be subject to recessionary and expansionary periods, but they also believed this was due to external shocks to the economy and that markets would normally self-correct. Prominent academic economists of the time, such as Paul Samuelson, James Tobin and Robert Solow, advanced and popularized this view and came to dominate the economic policies of the Kennedy, Johnson, and even the Nixon and Carter administrations into the 1970s.

In the decades during the rise of the Neoclassical-Keynesian synthesis, a minority of the profession, led by Milton Friedman at the University of Chicago, developed the “Monetarist” school of thought. The Monetarist school was in many ways a return to Classical thinking. Like Classicists before them, Monetarists believed that unfettered free markets produced the most desirable outcomes, as government intervention like activist fiscal policies, caused more harm than good, and was primarily focused on maintaining stable price levels (Palley et al, 2012, p. 2). During the stagflation of the 1970s, Monetarism was followed by the development of a self-named “New Classical” school of thought, which largely based its theoretical foundations on assumptions of individual rationality in the marketplace, widely accessible market information, and perfect competition (Biol, 2015, p. 575), and further believed that government stabilization policies, no matter how well intentioned, would destabilize the economy. Throughout the

mid-1970s, oil shocks rocked the US and global economy, and governments appeared unable to deal with the resulting inflation and unemployment. As a result, Keynesian ideas and policies were called into question (Birol, 2015, p. 575). Monetarist and New Classical economics would come to heavily influence the economic policies of the 1980s and onwards, leading to policies aimed at balanced government budgets and fixed or stable monetary policy rules. Its proponents argued that activist fiscal policy was ineffective, and that central banks should be given the role of managing the macro-economy.

In the late 1980s and 1990s another school of thought, the “New Keynesians,” attempted to bridge the apparent disconnect with the older Neoclassical-Keynesian synthesis by developing a more micro-centric focus to its version of Keynes’ work (Birol, 2015, p. 576). It rejected some of the “pure classical” assumptions of the New Classical theorists, i.e., perfectly competitive markets, widely available information and perfectly rational behavior. Its advocates based their analysis of the macro-economy on the existence of imperfectly competitive markets, information asymmetries, and bounded rationality. The New Keynesians argued that public authorities could improve the functioning of the economic system, but macroeconomic stabilization policies should still be left to the central bank.

During this debate within the macroeconomics discipline, several economists also inspired by Keynes, became the self-labeled “Post-Keynesians,” and argued that the criticisms of Keynesian economics between the 1970s and 1990s were unfounded. They rejected the claim that Keynesian economics could not explain the oil shocks and

stagflation of the 1970s (Palley et al, 2012, p. 2). Since the financial crisis, Post-Keynesian, and other Keynesian adherents have tried to expand their influence within the profession and policy community, arguing that both New Keynesian and New Classical thinking cannot account for the structure and functioning of the modern economy. In the “Statement of Co-Editors” of the *Review of Keynesian Economics*’ Inaugural edition, a journal devoted to publishing their work, Yale graduate and Keynesian economist Thomas Palley defines the objective of the newly formed journal in the following manner, “... there is a proliferation of journals, but that proliferation is essentially within one intellectual paradigm.” (Palley et al, 2012, p. 1) Palley and his peers cite the need for a change in the mainstream of economic thought following what in their opinion is the failure of the economics profession to foresee and explain the Great Recession of a decade ago. Palley suggests that radical shifts in the structure of economic thought and policy tend to occur after major financial disruptions. However, this has not occurred since the recent financial crisis. Perhaps Palley hopes that the *Review of Keynesian Economics* is a small beginning in a larger shift (Palley et al, 2012, p. 3).

Although the economists that make up the Post-Keynesian school differ on various theoretical issues and policy views, they think of themselves as the truest adherents of Keynes. They are inspired, in particular, by a version of Keynesian thought developed by Hyman Minsky. Minsky referred to his own economic view as financial Keynesianism, “... a label he preferred over Post Keynesian because it emphasized the financial nature of the capitalist economy he analyzed,” (Wray, 2011. P.1). Minsky rejected Monetarist views on the business cycle and on its theory of money, and was

critical of the assumption of rational behavior. In particular he saw a need for theory to, "... [Take] banking seriously as a profit-seeking activity" (Minsky, 1992, p. 6). He believed that the supply of money was endogenously created by the financial system rather than exogenously created by a central bank.

Hyman Minsky's ideas about business cycles were incorporated in his Financial Instability Hypothesis (FIH). His FIH proposed an early version of what came to be labeled as "irrational exuberance," arguing that financial markets tend to exacerbate business cycle fluctuations. He noted that as inflation reinforces inflation, and debt-deflation reinforces debt-deflation via interactions between the real economy and the financial system. The FIH provides a critique of the Efficient Market Hypothesis, a mathematical model that portrays and predicts aggregated behavior of market participants (Birol, 2015, p. 576). Finally, Minsky and all Post-Keynesian economists argue that a capitalist economy requires collective oversight, management, and intervention by the government, particularly via fiscal policies, as they see central banks as having limited capacity on their own to manage business cycles. Thus, Minsky and other Post-Keynesians emphasize that capitalist economies require collective oversight and management, and often intervention by the government, particularly via fiscal channels of the government rather than monetary channels of the central bank.

Perhaps the most seminal of Hyman Minsky's work was *Stabilizing an Unstable Economy*, published in 1986. Minsky developed his significant ideas just as the turmoil in financial markets was beginning in the mid-1970s and early 1980s. Noting that the monetarist and new classical economists who were increasingly prominent at the

time, were arguing that monetary and fiscal policies were, de-facto, or as practiced, destabilizing, Minsky retorted that their ideas had not been fully tested (Minsky, 2008, p. 113). Minsky believed that their models could not provide a comprehensive understanding of true market dynamics and functioning of a modern monetary system. While he noted that economic theory was a lens through which to view and analyze the economy, in their hands is served as a blinder, causing them to miss its essential elements (Minsky, 2008, p. 109). A large portion of the premise of this paper revolves around not only what the Fed did, but also why it did what it did and the theories and assumptions behind those motives. Minsky also believed that the assumptions underlying many Neoclassical-Keynesian models, including the IS-LM model, could not properly account for the functioning of modern financial markets. Minsky viewed the economy in terms of the items on the balance sheets of different market participants, for example a bank loan appearing as a bank asset and a borrower's liability, and the deposit created by the loan appearing as the borrower's asset and a bank liability. As a part of this approach, he viewed public sector debts – the consequence of government deficits – as the counterpart to private sector assets – the consequence of private sector saving. In this vein Minsky believed that government deficits, incurred during recessions, could enhance the overall health of the economy, if they supported gross profits and thus saving by the private sector (Minsky, 2008, p. 43).

Minsky's work attempted to fill a void the dominant economic theory of the time, theory that rejected the idea that financial crises are endogenous to a capitalist economic development and supported the notion that crises are solely the consequence of outside

exogenous shocks. He argued that capitalist economies do not have a natural tendency to gravitate towards and to stay in full employment and stable price equilibrium. Rather, he concluded that full employment and stable inflation are just transitory states between different business cycles, which are natural phenomena in capitalism, a consequence of the innate characteristics of markets. A tenet of the FIH is that stability in financial markets induces instability. The very economic conditions that price and output stability create, in time, generate forces that sway the economy away from equilibrium.

Minsky's and the Post-Keynesians' most fundamental critique of the other contemporary schools of economic thought (Monetarism, New Classicism, Neoclassical-Keynesianism, and New Keynesianism) regards their views of money and monetary relations in capital economies. Keynes argued that the most important flaw in the classical theories that preceded his, was the idea that "money is a veil" for real economic relations. He rejected the notion that money's primary function is as a determinant of prices, and that it does not have an affect on consumption or GDP (Minsky, 1980, p. 506). The Post-Keynesian followers of Minsky have called the current iteration of the classical view, shared by all other schools of thought, the "veil of finance." This veil of finance hides the true role of finance within the broader economy. Post-Keynesians contend that financial markets do not simply supplement or facilitate the operations of the real economy, but that in actuality they play a most pivotal role. Minsky wrote, "Once financial considerations are integrated into the investment decision, it is evident that capitalism as we know it is endogenously unstable... Instability becomes normal rather than abnormal." (Minsky, 1980, p. 515), in

other words, there are inherent characteristics of markets that make them prone to instability. He argued that if the central bank is to properly serve its primary function of stabilizing the economy it cannot follow an economic ideology that ignores key money relations in the economy.

3.2 Why Minsky provides an important theoretical lens

Although Minsky died in 1996, many of his ideas are particularly useful for understanding the crisis of 2007-2009. He was ahead of his contemporaries both in academia and in policymaking, particularly regarding his Financial Instability Hypothesis, which explained how different levels of debt drastically influence systemic behavior and the validation of debt via investment. There are times when the liability commitments of a swath of firms (interest payments and principle repayments) exceed their net income inflows, a financial crisis occurs. Prominent economists and business journalists have recently dubbed this the “Minsky Moment”.

Even Janet Yellen, Bernanke’s successor as Fed Chair, said in a 2010 speech, “To understand what went wrong [with the financial crisis], I refer you to Hyman Minsky’s path-breaking work on speculative financial booms and busts” (Yellen, 2010, p. 3), highlighting his view that prolonged periods of stability born of regulatory reforms and policies addressing a prior crisis, tend to create conditions for a future financial crisis.

Many people had not heard of Hyman Minsky or his ideas until the housing bubble burst on 2007. When most mainstream theories failed to foresee the crisis and could not provide an adequate explanation for how and why it occurred, Minsky’s name began to appear in newspapers and among circles of policymakers began to refer to his

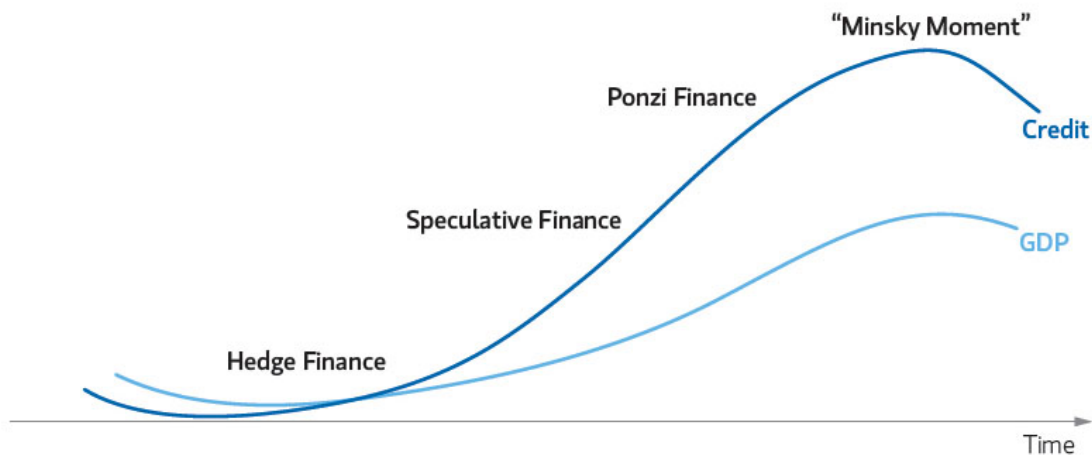
ideas. In 2016, the editors of *The Economist* magazine admitted that their publication had only mentioned his name once before the crisis, but that his name appeared in more than 30 articles or more since 2007 (The Economist, 2016). The term “Minsky Moment,” also appeared in numerous recent economic and financial newspaper articles. Paul McCulley, a managing director at PIMCO coined the term, as well as the “shadow banking system” in 2009 (McCulley, 2009). But what exactly did he mean by the “Minsky Moment?”

In the FIH, Minsky outlined three stages of firm financing over the course of a credit cycle – Hedge, Speculative, and Ponzi financing. Hedge financed firms can cover both their principal and interest payments as they come due; it is the most stable of the three levels of debt financing. Speculative financed firms are only able to cover their interest payments, but not their principal repayments. However, Ponzi financed firms are unable to pay their principal repayments and interest payments, and become entirely reliant upon further borrowing, or the selling of their assets in order to stay afloat (Minsky, 1992, p. 7). The “Minsky Moment” occurs at the tipping point of Ponzi financing. When inflows from their assets are no longer able to cover any of the debt payments as they come due. Ponzi financed firms will usually liquidate their holdings to survive. By this time, most of their lenders have called in their loans, and the firm’s asset prices have declined significantly. This occurred on an enormous scale beginning in 2007 and 2008. Minsky insists that the FIH validates the following statements, “... business cycles of history are compounded out of (i) the internal dynamics of capitalist economies, and (ii) the system of interventions and regulations that are designed to keep the economy operating within reasonable bounds” (Minsky, 1992, p. 8). Therefore, crises are not the product of an

exogenous shock to the system, but a product of “internal dynamics,” the resulting transition over time from more stable, to less stable financing structures; something that the liquidity swaps may play a role in as a long-term variable.

(Figure 2: “Minsky Cycle,” Source: Economic Sociology and Political Economy)

Stylized “Minsky Cycle”



McCulley (2009) warns that he sees Minsky’s FIH as having relevance beyond the financing structures of firms. He writes, “This pro-cyclical tendency applies to central banks and policy makers as well; it is hard for me to avoid the conclusion that too much success in stabilizing goods and services inflation, while conducting an asymmetric reaction function to asset price inflation and deflation, is a dangerous strategy.” Certain monetary policies of the Fed over the last decade, specifically the liquidity swaps and to some extent the prevailing Fed funds rate risk incentivizing a higher level of risk-taking in firm financing positions.

3.3 What is the traditional role of the Federal Reserve?

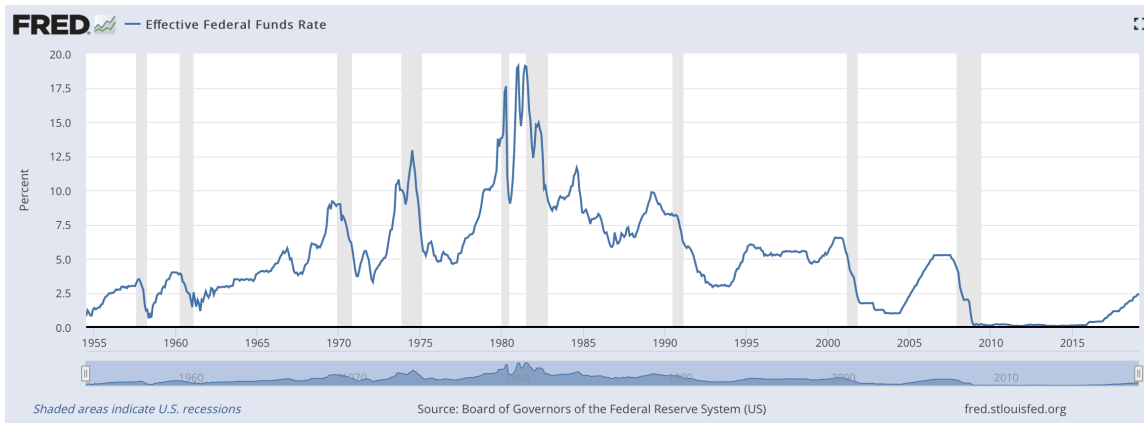
Before the Federal Reserve was established in 1913, the development of central banking in the US had a long and complicated history. The First and Second Banks of the US, established in the early 19th century, were structured and functioned as a mix between private and public institutions (Bernanke, 2015). Distrust and ideological differences between politicians and elites about the concentration of financial power led to their demise (Bernanke, 2015). Alexander Hamilton supported, and Thomas Jefferson and James Madison strongly opposed the existence of a powerful central bank. The latter two led a movement that eventually resulted in the disbandment of the First Bank in 1811 (Bernanke, 2015). The famous bank war between Andrew Jackson and Nicholas Biddle led to the fall of the Second Bank in 1836. The US subsequently operated without a formal central bank from then to the establishment of the Federal Reserve in 1913.

The Panic of 1907 was the catalyst that prompted the establishment of the Fed. It became clear in the ensuing years that the country could not rely on the goodwill and ability of a large private bank to save the economy, as JP Morgan and Company did in helping to halt the crisis. The Panic of 1907 was avoidable, or at least the resulting bank run might have been stopped if the Fed had been around to serve as the banking system's lender of last resort. The following recovery led to legislation signed by President Woodrow Wilson that created the Fed. It became an important regulator of America's commercial bank system, and the system's lender of last resort. Although the Fed's monetary powers were decentralized at first, the Roosevelt administration consolidated

the institution and its Federal Open Market Committee (FOMC) during the Great Depression. Thereafter, the FOMC began to formally conduct monetary policy.

The modern FOMC's primary responsibilities include buying and selling government securities to effect short-term interest rates and setting monetary policy. In 1977, Congress voted and approved a dual mandate for the Fed: 1) maintaining a low and stable inflation and 2) a low unemployment rate (Bernanke, 2015). The law prohibits the Fed from choosing its own policy goals, but it allows it to choose how to go about achieving these goals.

Previous Chairs of the Fed have used its traditional tools in different ways. Although the policies of each Fed Chair can vary, Bernanke, Fed Chair from 2006 to 2014, describes two types of central bankers – inflation hawks who tend to be very cautious in their policy making, taking advance action to prevent rising inflation, and inflation doves, who are more concerned with the level of unemployment and are more adverse to immediate interest rate increases (Bernanke, 2015). In his memoir of his time as Chair of the Fed, Bernanke describes himself as an inflation hawk (Bernanke, 2015). Paul Volcker has become infamous in the lore of Fed Chairs as the ultimate inflation hawk, notably raising the effective federal funds rate to 19.10% to successfully combat the high inflation of the late 1970s and early 1980s, but that consequently triggered a major recession as a result (FRED₃, Figure 3).

(Figure 3: Effective Federal Funds Rate, Source: FRED₃)

Alan Greenspan, Volcker’s successor, became well known for his often-repeated tactic of lowering the federal funds rate to lessen the strain on major American financial firms at times when major stock indices fell. This practice was called the “Greenspan Put” (Bernanke, 2015), which had the effect of creating a floor to many of the major publicly listed stocks. However, the traditional role of the Fed and the goal of every one of its Chairs have been to provide a source of stability to the nation’s economy. How the Fed goes about doing so, as set forth in the 1977 Act, is up to the central bank. During financial crises, however, it can often be hard to determine the economic impacts of Fed actions ten years down the line, when the Fed’s immediate goal is to prevent financial collapse. However, that does not mean that economists, financial analysts, or central bankers should discount future consequences of Fed actions, especially if they create the potential for further problems down the line.

3.4 Macroeconomic effects of the crisis

(Figure 4: Unorthodox Fed Policy Measures and Macro Events)

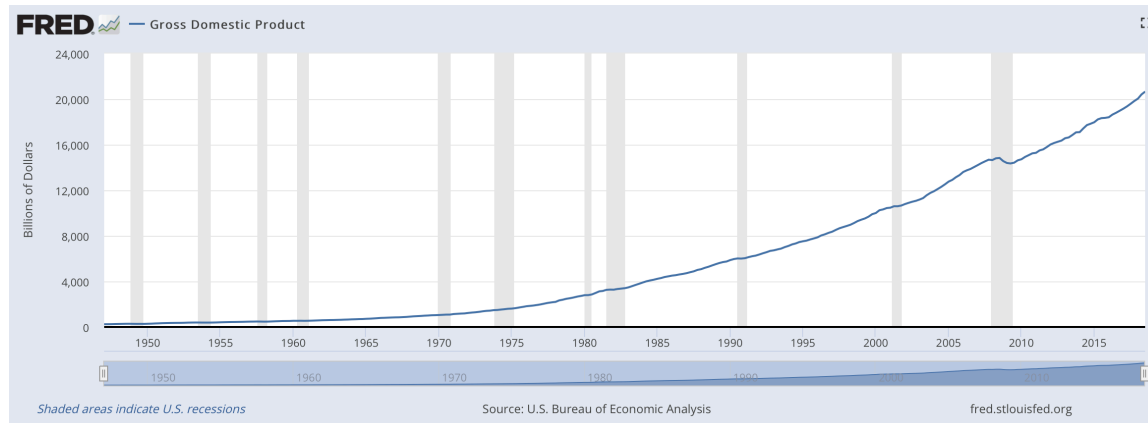
Date of Policy Measure	Catalyst	Unorthodox Fed Policy Measure	Reasoning	Effective Fed Funds Rate	S&P500	Unemployment Rate
12/12/2007	CDO Market Troubles	Term Auction Facility (TAF)	Liquidity to depository institutions.	4.24%	1,486.59	5.0%
12/12/2007	Liquidity Struggles in International Markets	Initial Liquidity Swaps	Provide international dollar liquidity.	4.24%	1,486.59	5.0%
9/17/2008	Lehman Brothers Failure (9/15/2008)	Uncapped Liquidity Swaps	Provide international dollar liquidity.	1.81%	1,156.39	6.1%
11/25/2008	Lehman Brothers Failure, & AIG Troubles	Term Asset-Backed Securities Loan Facility (TALF)	Incentivize consumer lending.	0.39%	857.39	6.8%
11/25/2008	AIG Struggles, Fannie Mae & Freddie Mac Troubles	Quantitative Easing (QE 1)	Increase liquidity via the money supply & derivative purchases.	0.39%	857.39	6.8%
11/3/2010	Domestic and Global Macro Troubles	QE 2	Increase liquidity via the money supply & lower longer-term rates.	0.19%	1,197.96	9.8%
9/13/2012	Domestic and Global Macro Troubles	QE 3	Increase liquidity via the money supply & lower longer-term rates.	0.14%	1,459.99	7.8%

The financial crisis had numerous effects on North America and Europe via the developments and complex relationships between the financial markets and institutions of the US, Britain, and the Eurozone. I provide the timeline above as context of major developments during and after the financial crisis, however, it also illustrates that the liquidity swaps, extended during the worst turmoil, staved off an even worse international disaster. The financial instruments that played a key role in the failure of global markets were heavily exchanged in trans-Atlantic financial flows. As a result, households and firms on both sides of the Atlantic that were extremely shaken by the collapse of markets.

(Figure 5: U.S. Civilian unemployment Rate, Source: FRED₂)



Unemployment in the US rose from 4.4% to 10% between 2007 and 2009 (FRED₂, Figure 5). The US also experienced a decline in its GDP by 8.2% during the fourth quarter of 2008 (FRED₄, Figure 6). As economic prospects dwindled in the US, employers cut jobs and reigned in their investment spending. With consumer confidence shaken by job insecurity and the failure of two of the nations most prominent investment banks, consumer spending collapsed, as did business profits.

(Figure 6: Gross Domestic Product, Source FRED₄)

The structure of US financial markets was transformed before and after the financial crisis. Shadow banking – financing by nonbank institutions such as investment banks, hedge funds, and structured investment vehicles – became a normal part of the financial system (McCulley, 2009). It grew during the housing bubble and matched the size of the traditional banking system. Its securitization business became a significant source of profit for financial intermediaries, as the ratio between speculative financial investment and productive real investment skyrocketed. While these trends were not individually nor inherently damaging to the US economy, they were all interconnected. Under the monetary and financial conditions of the past decade, they posed and currently pose serious challenges to America’s long-term economic growth and stability. Ignoring these challenges is akin to kicking the proverbial can down the road and waiting for the next crash. The reform and change that needed to occur post-recovery has either not happened or has been relatively limited in scope, leaving in place fragile structures that have the potential to threaten the future of the economy and financial system.

3.5 How has the Federal Reserve's role changed since the crisis?

Although The Fed's unorthodox actions were highly publicized at the time for their sheer size and the inventive ways with which they were implemented. The Fed faced an unprecedented level of political and public scrutiny for the huge amounts of credit it made available to the to the financial system. In some instances, for example in its new and expansive use of liquidity swap lines with foreign central banks, its actions received less scrutiny. Through these liquidity swap lines, the Fed became in effect the lender of last resort to the global financial system. Not only was this a consequence of the global nature of the financial crisis, but the Fed also extended the swap lines indefinitely as of 2013.

While the Fed still abides by its dual mandate and acts as the lender of last resort to American institutions, it now concerns itself with the global financial system. In his working paper for the Federal Reserve Bank of Dallas, William White calls the state of the current monetary regime ultra-easy monetary policy (White, 2012, p. 6). But dollars may now flow outside of the US to financial institutions in foreign nations via their respective central bank as the Fed acts as a global and domestic lender of last resort. That reality is objectively neither cause for dismay nor celebration. It does however require analysis. Policy makers must understand the impacts that this change in American monetary policy will have on the global financial system.

Some observers of the Fed during the height of the financial crisis were especially critical of the disconnect between its actions and the premises of mainstream economic thought that permeate most of the world's financial institutions and central banks. Chief

among these critics is economic historian Adam Tooze. Tooze notes that the takeover of Bear Stearns by J.P. Morgan in March of 2008, made possible by the Fed and Treasury interventions, triggered an end to the prevailing consensus among mainstream economists, monetary policymakers, and politicians, a consensus that had reigned since the beginning of Greenspan's tenure as Fed chair. That consensus held that markets, especially financial markets, were best left to operate on their own under minimal intervention and regulation.

Minsky's FIH rejected this view. Minsky argued that unregulated markets with minimal government supervision led financial and nonfinancial firms to take on balance sheet positions that in time created conditions of financial and economic fragility. Minsky's intellectual framework suggests that the Bear Stearns episode, regarding the scale of the bank's failure and the aggressive response by federal authorities, illustrated the failure of the intellectual and policy consensus of the last 30 years.

Bear Stearns set a precedent that was soon superseded by the size and scale of the failure and rescue of AIG, the largest insurance firm in the world. The free market ideology of the previous decades could not easily be espoused while billions of dollars were spent to rescue the free market system. It could be argued that the recent historic bull-run in the stock market has been made possible by the successful bailout of the global financial system during the financial crisis and it is only a matter of time before a new Minsky moment occurs.

4. Federal Reserve FOMC Minutes, Policy, & Analysis

This chapter details and analyzes the minutes of the discussions between members of the Federal Open Market Committee during critical moments in the crisis. It concludes by considering the potential long run consequences of the Fed's liquidity swap lines, arguably the most unorthodox and controversial policy the Fed undertook during the crisis.

4.1 FOMC statements and their meaning

The public statements and minutes of the Federal Open Market Committee (FOMC) offer a crucial glimpse into the thinking that informs American monetary policy. While the Chairperson of the Fed presides over these meetings, the 12 FOMC members make policy decisions after much discussion and debate. Ben Bernanke, Fed Chairman during the crisis, inspired relatively open-minded discussions at the meetings he ran and thus the FOMC minutes are particularly useful for understanding the rationale behind the decisions the Fed made at the time.

Liquidity Swaps were first discussed at great length by the FOMC in a conference call, on December 6, 2007. There had been discussions at earlier FOMC meetings about proposed swap agreements, but not before December's meeting did the members come to a near unanimous agreement to use them (FOMC Transcript, 12/6/07). Chairman Bernanke began his argument in favor of implementing "swap facilities" with foreign central banks by outlining how the proposed swap lines would benefit American financial markets. He noted: "There is a problem with dollar funding in Europe. There is a shortage of dollars there early in the day, which often leads the [Fed] funds rate to open

high. It creates problems for our monetary policy implementation. It creates problems in other markets, like the foreign exchange swap market,” (FOMC Transcript, 12/6/07, p. 13). Some members of the FOMC feared extending this swap agreement indefinitely with certain banks. There were also concerns voiced that keeping the swap lines temporary would stigmatize financial institutions and perhaps prevent them from borrowing (FOMC Transcript, 12/6/07, p. 14). Bernanke suggested that the Fed would market the program as a temporary measure, made permanent only if the economic outlook significantly worsened (FOMC Transcript, 12/6/07, p. 15).

Members of the Fed who were present during the conference call asked about the reasoning behind extending liquidity swaps to central banks like the ECB, if those central banks already had substantial reserves of US dollars. On December 6, 2007, the ECB had roughly \$200 billion in dollar reserves (FOMC Transcript, 12/6/07, p. 18). The ECB eventually borrowed \$170.93 billion via the swap lines (Broz, 2015, p. 330). One FOMC member responded that initiating the swap lines with the ECB and other central banks, the Fed would receive information regarding their future monetary policy, and thus the Fed would be able to more accurately predict their effects on US markets via a “cooperative arrangement,” (FOMC Transcript, 12/6/07, p. 18).

In one of the most interesting parts of the conference call, Bernanke referenced the legal basis upon which the Fed could justify the swaps: “I would note also that, if we do this, we will be doing it essentially under an emergency provision that allows us to change Regulation A without public comment,” (FOMC Transcript, 12/6/07, p. 15), thus he explained that this action would not be possible under the Fed’s normal guidelines.

Regulation A defines the extension of credit by the Fed to banks. Bernanke suggested that because the Fed would use it as an emergency operation, that at least for the time being, it had to be regarded as a temporary program unless market circumstances changed (FOMC Transcript, 12/6/07). However, as it currently stands, the swap agreements with the BoC, BoE, BoJ, ECB, and SNB are permanent fixtures of American monetary policy, a policy tool that was originally installed via emergency measures without public comment or Congressional approval.

However, on the subject of rescuing Wall Street banks, the Fed appears to have been much more concerned with the legality and precedent of their actions than with liquidity swaps. This is most obviously illustrated by the decision to not provide liquidity support to Lehman Brothers as it teetered on the brink of bankruptcy. A few months earlier, the Fed had decided to provide similar support to Bear Stearns, a smaller investment bank, and that support eventually led to the purchase of Bear Stearns by J. P. Morgan Chase.

Economist Laurence Ball has scrutinized these two decisions by the Fed. Ball dismisses the Fed's justification oft repeated by Bernanke and Timothy Geithner, then head of the New York Fed. The Fed's lending powers were expanded during the financial crisis so that it could lend to financial institutions that normally would not be protected by the Fed, like investment banks and insurance companies. Yet Bernanke and Geithner argued that the Fed lacked the legal authority to provide liquidity to Lehman, as the bank lacked adequate quality collateral for a loan of the size needed to save the bank. The Fed would go on to aid firms even further removed than Lehman from their traditional

jurisdiction, such as the American Insurance Group (AIG). Ball insists that the real reasons that the Fed decided against saving Lehman were due to issues of politics, public opinion, and questions of moral hazard. Upon examining Lehman's financials, Ball concluded that it had sufficient safe collateral for a loan of the size that it needed, and thus the Fed indeed had the legal authority to extend the life-saving liquidity support. He notes that the Fed did not seriously examine Lehman's books, especially after then Treasury Secretary, Henry Paulson, facing political pressure from the right wing of the Republican Party, went beyond his legal authority and pressured the Fed to deny a loan to Lehman.

The Fed's liquidity swaps were even more extraordinary, as the legal precedent for them was more questionable. The dollar funding that they provided was passed on to foreign financial institutions outside of the jurisdiction of the Fed. The loans resulting from the swaps were made at the discretion of the foreign central banks. What is odd is that the Fed does not seem to have been concerned with the legal issue or moral hazard of becoming the global lender of last resort, while it did for one American bank.

According to Ball, the Fed decided to let Lehman go because Paulson did not want to be known as, "Mr. Bailout," (Ball, 2016, p. 14). However, on September 16, 2008, the day after Lehman filed for bankruptcy, the FOMC held a meeting to discuss the dramatically worsening market conditions. Lehman was not even mentioned until the bottom of the second page of the meeting's transcript, even as the majority of the turmoil discussed was a direct result of Lehman's filing. After his brief introduction, Chairman Bernanke stated that he would like to vote on the extension of further swap agreements,

“... I would like to put to the table a request for authorization for swap lines. I prefer not to put a limit on it, so I know I’ve got my own bazooka here,” (FOMC Transcript, 9/16/08, p. 3). William Dudley noted that equity markets worldwide were down more than 4% from two days earlier, but the real concern of the Fed was the inability of foreign banks to acquire funding via dollar liquidity (FOMC Transcript, 9/16/08, p. 4).

Throughout the first few pages of the transcript, FOMC members voiced concern about the inability of global money markets to function normally (FOMC Transcript, 9/16/08). This was of great concern as many financial institutions relied on funding from money markets to maintain long-term asset positions on their balance sheets. The instruments that traded in the money markets were of very short maturities, and normally very liquid by nature. They included US Treasury bills, commercial paper, repos, and other similar instruments. The failing of this market meant that some of the safest instruments within the financial system were presumed by traders to carry excessive risk, not because the instruments themselves were risky, but because the firms that normally traded with one another on a daily basis had very little confidence in the solvency of their counterparties.

Lehman’s failure immediately affected money markets. While introducing the major developments since the weekend at the September 16, 2008 FOMC meeting, William Dudley emphasized that Goldman Sachs was reporting increased risk and thus had a need for more liquidity, and Morgan Stanley had experienced a fall in its funding. He explained the situation as the following, “... [a] Not insignificant, pulling back of counterparties,” (FOMC Transcript, 9/16/08, p. 4). He described the impact that the

Lehman failure was having on money markets, specifically that financial institutions which dealt heavily in money markets did not tend to have strong capital resources, which would otherwise serve as liquidity buffers. He noted that the Reserve Fund, a mutual fund heavily invested in the money markets, had suffered bad losses the night before, and that money markets would continue to be a possible spot of “contagion.” He went on to emphasize that the failure of AIG would rapidly depress money market conditions (FOMC Transcript, 9/16/08, p. 5).

During the October 2013 FOMC meeting, the voting members approved a motion that made the temporary swaps with the BoC, BoE, BoJ, ECB, and SNB a permanent part of the Fed’s monetary policy (FOMC Transcript, 10/30/13, p. 15). However, there was skepticism from a few members that the normalization of the swaps might set an unwarranted precedent, “[the Fed would] be facilitating yet another expansion of central bank backstop lending commitments, and I don’t think that’s the best path to financial stability.” (FOMC Transcript, 10/30/13, p. 13).

4.2 Potential sources of worry with the swap lines

At first glance, it may be difficult to realize how the liquidity swap lines, established by the Fed during the financial crisis, can create systemic concerns in the current economic environment. Furthermore, equity markets surged during the last decade since the financial crisis, the S&P 500 has almost tripled in value, and corporate earnings for the most part keep beating analyst expectations, causing the market to repeatedly rally despite multiple corrections in early 2018. This lack of concern is due to focus on the short-term. When concentrating on emergency liquidity measures, or any

emergency financial policy for that matter, the tendency is to worry about the survival of a given firm, or in the case of 2008, the entire financial system, with less regard for the longer term consequences of policy actions. Much of the debate surrounding the apparent success of monetary policy during the crisis has been centered on whether an immediate catastrophe was avoided. Success is understood as preventing the failure of financial markets in the short term. While the Fed had very little bandwidth during the most intense periods of the crisis to allocate its personnel and resources to worry about how a given emergency policy may have impacts once the crisis is over, that does not mean that it should be ignored after. While Bernanke was still the Chair of the Fed, he put in place an inflation target for the central bank of 2%. Former Chairman Paul Volcker finds this target unnecessary, “‘I puzzle at the rationale’ ... he believed the policy was driven by years of deflation. ‘And we haven’t had any deflation in this country for 90 years!’” (Sorkin, 2018). Like Volcker is hinting at, the 2% inflation target, like the normalization of the liquidity swaps, are done through concerns about the financial system, realized during the crisis. However, normalizing short-term fixes should not be the long-term solution. That may only institutionalize the larger issues at hand. The critique I have of the swaps is not of their initial use as a short-term emergency facility; in that regard they were a creative solution to a pressing problem. It is in their normalization where I draw these concerns.

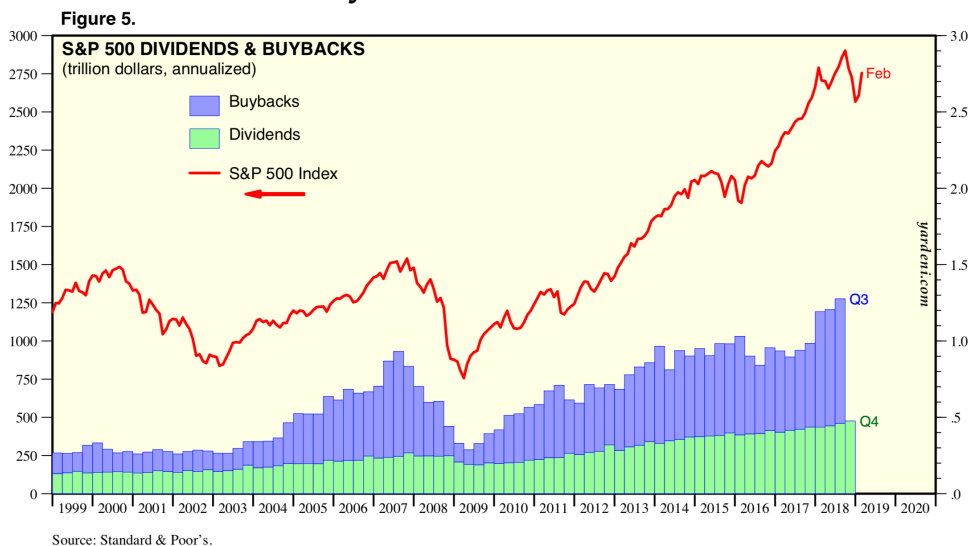
The economic environment in which the Fed has operated plays an extremely important role. The primary piece of financial reform after the financial crisis was the Dodd Frank Act. The Volcker Rule, a major component of the Dodd Frank Act, is aimed

at limiting the amount of proprietary trading of securities, derivatives and commodity futures or options that banks may do on their own account, as well as limiting their ownership or acquisition of certain hedge funds and structured investment vehicles. However, the Dodd Frank Act, and the Volcker Rule in particular, have been under increasing attack by industry lobbyists and the politicians they support (Sorkin, 2018).

The extension of the swap lines beginning in the December of 2007 through to the end of the financial crisis, were meant to act as a liquidity backstop to the flow of dollars out of the financial system. As described in the second chapter of this paper, the Fed’s swap line program was immensely successful. The Fed decided to keep this backstop in place indefinitely at unrestricted amounts with designated central banks. A tool used during the worst global financial crisis, being kept in place during “normal” economic times is unlikely to have zero effect on financial markets and investor behavior. It was not discontinued in full, as some of the Fed’s other Great Recession era programs were.

(Figure 7: S&P 500 Dividends & Buybacks, Source: Yardeni Research)

Buybacks & Dividends



White (2012) is critical of the ultra-easy monetary policy maintained after the recession, noting that there is not much evidence that it has boosted real investment. It has instead spurred asset purchases, as firms have used retained earnings or have borrowed funds at low interest rates to buy back their equity shares. Data collected by Yardeni Research (Figure 7) helps to illustrate the point that certain financial conditions lead to higher levels of share buybacks and dividends, money which economists like White and Lazonick believe would be put to better use in the long run towards areas such as research and development. Lazonick (2014) expands on this idea, pointing out flaws in the traditional arguments for share buybacks. Lazonick (2014) is critical of the idea that firms buy their own shares when they believe they are undervalued. Instead, Lazonick notes, "... over the past two decades, major US companies have tended to do buybacks in bull markets and cut back on them, often sharply, in bear markets," (Lazonick, 2014, p. 11). Firms often do this as a way of increasing returns for shareholders in the short run, the largest of which are often executives. This is done at the expense of expanding firm capacity and technological innovations, as it is seen as risky from the viewpoint of the firm and likely only to yield a profit in the long run. White describes a scenario in which the short-term focus of "larger payouts for both salaries and dividends," often hurt not only fixed capital investment, but also the financial sustainability of the firm. Furthermore, he argues further that ultra-easy monetary policy creates "malinvestments in the real economy," that it inhibits the stability of financial markets, as well as impedes the ability of central banks to follow price stability policies (White, 2012, p. 13). White warns that central banks in the future should be more active in preventing credit booms

and more accommodative in responding to downturns; while he notes that the policies have cleared room for fiscal action for positive change – most likely referring to infrastructure spending, and other government programs –, he concludes that if such action does not occur, then the easy monetary policies could be regressive – a missed opportunity allowing for firms to take on more risk.

4.3 Fed policy and the global financial system

As the global economy has become increasingly interconnected, national economies, financial systems, and central bank policies are more interdependent. Many economists believe that while the Fed is primarily interested in the well-being of the American economy, its recent policy actions to fight a global crisis has had unintended consequences that have gone unaddressed in major policy circles. Rey notes that one of the implications of this relates to the “policy trilemma” confronting government and central bank authorities in open economies and financial systems. Policy makers cannot simultaneously control their domestic interest rates, fix their currency exchanges rates, and allow free capital flows in and out of their financial systems. They can only choose to do two of the three. Indeed, Rey argues that the globalization of production and finance of the last two decades has transformed the “trilemma” into a “dilemma.” Nations must choose between controlling their monetary policy and managing their balance of payments (Rey, 2015, p. 1).

Rey (2015), like Tooze (2018), believes that gross capital flows are not only tremendously important in modern economies, but that they also are a weathervane of future economic performance. Rey (2015, p. 2) argues that the modern global financial

system is centered around the US, and American developments and monetary policies affect the rest of the world. The extent and magnitude to which the liquidity swap lines were used during the financial crisis supports Rey's view. Rey finds that US monetary policy has statistically and economically significant impacts on global market volatility (as measured by the VIX index), on the leverage ratios of domestic and foreign banks, and on international capital flows. Rey subsequently concludes that the Fed monetary policy has a significant impact on the larger global financial system, "... one important determinant of the global financial cycle is monetary policy in the centre country, ... [affecting] leverage of global banks, credit flows, and credit growth in the international financial system," (Rey, 2015, p. 17).

Admati and Hellwig (2018) address another important issue that emerged with the global financial crisis and the responses to it by the world's financial regulators, both national and international. They discuss the consequences of the increasing levels of leverage among the core institutions of the global financial system in the runup to the financial crisis. They dispute the claim of some bankers and bank lobbyists that "equity is expensive" and that mandates that raise minimum capital requirements seriously reduce bank lending. Admati and Hellwig suggest that increasing equity requirements for banks would decrease the likelihood that fire sales would take place during a financial panic as banks would have a larger pool of stable funding to lean on, and thus possibly decrease the need for government intervention. Additionally, they write that depositor insurance, while a positive benefit for the public, makes depositors more complacent about how banks fund their activities. Therefore, deposit insurance needs to be complemented by

increased capital and liquidity requirements and increased regulation and monitoring. (Admati and Hellwig, 2018, p. 12).

Admati and Hellwig further argue that the international regulatory reform embedded in Basel III, which was passed after the financial crisis, does not adequately protect the global financial system from another crisis. They complain that banks' are still permitted to rely on their own risk assessment models to determine whether or not they meet their mandated equity levels, that financial institutions rely too heavily on short-term debt financing for their long-term assets, and that growing currency mismatches between liabilities and assets for governments and private firms may increase the risk of defaults during crises (Admati and Hellwig, 2018, p. 15).

Viewed together, the Rey and Admati-Hellwig outline serious challenges and interrelated challenges that can be framed within Minsky's FIH. As the center country in the current financial system, the US may unintentionally export economic and financial crises throughout the world, regardless of the existence of flexible exchange rate buffers. Admati and Hellwig (2018) provide substantial evidence that the current regulatory environment is no better today than it was in 2008. Combined with these arguments, any monetary policy reactions of the Fed to a financial crisis will continue to impact the broader global financial system. While intended to strengthen US financial markets, the Fed's loose monetary policy over the past decade has undoubtedly influenced global market behavior as well. Furthermore, the continuation of the liquidity swap lines by the Fed with specific central banks, has guaranteed that the Fed will step into stabilize the US and global financial systems in a future crisis.

Hyman Minsky believed that in capitalist economies over long periods of time, increasingly fragile financing conditions inevitably develop. The liquidity swaps set up by the Fed were intended to alleviate dollar liquidity pressures throughout global markets during a time of stress. Although the Fed has given little indication as to how, or when, or to what extent it would extend these lines in the future, given that they have been made permanent, they are likely to be used en masse to deal with any crisis as severe as the last one, or any crisis directly linked to American financial markets or to the financial markets of close political allies.

Now that the Fed has established swap agreements of indefinite length and of an open-ended scale, the assumption is that it will step in again if it deems it necessary. Perhaps because the structure is already in place it will be less hesitant to do so. If the Fed is going to take on the role of the lender of last resort to some of the world's largest financial institutions during a dollar shortage, then it makes sense that US authorities should have some say over global financial rules and regulations. Regulation in any industry, particularly in finance, should not be too flexible or too punitive. However, an increasingly global financial system that is characterized by increasing volatility, leverage, and innovation, will likely experience increasing volatility and periods of crisis. Minsky would have argued that the indefinite extension of the swap agreements has the unintended effect of engendering short-term memory loss. He postulated that market participants take on greater financial risk during optimistic periods of economic growth. Their actions fuel the growth of credit and debt until that underlying process can no longer be sustained. The swap agreements will not cause the next big financial crisis by

themselves, but rather invite ever-increasing risk taking by global financial institutions than would otherwise occur. That should cause concern given the experience of the last decade, where both financial regulations and mainstream economic thinking have been slow to change.

An examination of a recent empirical study of Minsky's FIH by Davis et al (2017) is helpful in connecting Minsky's ideas to the recent financial crisis and policymakers response to it. It is the first paper to attempt to quantify the existence of the three stages of debt financing that Minsky laid out. The authors examined nonfinancial corporate firms from 1970 to 2014 to assess the progression of their balance sheets, as they evolved from relatively safe to relatively risky organizations during prolonged periods of financial stability. Categorizing the firms in their sample as Hedge, Speculative, and Ponzi financed firms; they traced the proportion in each category over time. They found that the market share of Ponzi financed firms grew from 10.8% to 31.6%, while the market share of Speculative financed firms fell from 72.3% to 45.5% between 1970 and 2014 (Davis et al, 2017, p. 9). They noted that most of the change in Ponzi financing was an increase in this financing position by smaller firms.

The authors were careful to distinguish what they labeled as a "long Minskyan wave" from a normal business cycle. They characterized the former as resulting in long-term changes in the financial structures of firms. Their differentiation is important because they believe that while attitudes and policies tend to change over the course of a business cycle, policy makers and market observers may not notice changes in the finance structure of firms that takes place over multiple business cycles. Indeed, Minsky

suggested in some of his own work that the prevalence of his theories might only be relevant over longer periods of time than is covered by a normal business cycle (Davis et al, 2015, p. 27).

Minskyan waves account for longer periods of time and are characterized by structural changes that are not accounted for in mainstream economics and policies. To be sure the policies of the Fed over the last decade have been successful at addressing the collapse of the global financial system and the dramatic business cycle downturn of 2008-2009. However, taking a longer-term view, beyond the current business cycle, the indefinite and unlimited extension of the Fed's liquidity swap lines to globally significant foreign central banks, has essentially created a backstop for global liquidity and could have varying affects. Minsky's main proposition in the FIH is that stability in the realm of financial markets has the innate tendency to create instability. A combination of spreading irrational exuberance, inflating asset prices, increasing excessive leverage, policy reforms to address a previous crisis, and a policy framework beholden to the EMH establish the conditions for future financial collapse. Perhaps the establishment of permanent Fed liquidity swap lines is one such example of a part of this list of factors.

The Fed did not want to guarantee the solvency of firms that deliberately implemented poor business decisions that brought them to the edge of bankruptcy, but it may be the case that its institutionalization of permanent and open-ended liquidity swap lines has exacerbated the problem of moral hazard. They may well have the effect of producing the same kind of pre-crisis behavior that occurred in the 2000s, or perhaps entrench them even further. Taken in context with McCulley's (2009) reasoning of the

FIH applying to monetary policy as well as debt financing, Rey's (2015) paper, and the premise of this thesis, then the liquidity swaps have a very real chance of exporting laissez faire policies across the global financial system due to potential situations of moral hazard arising from the indefinite and unlimited swap agreements.

The Fed has kicked the proverbial can down the road, and may not have solved the underlying issues of the previous crisis. Bernanke, while expressing his frustration with needing to repeatedly lower the federal funds rate to ease market conditions, likened the Fed's actions to feeding a beast that only wants more food once it gets a taste of it (Bernanke, 2015, p. 200). The situation regarding liquidity swaps may be no different. Minsky argued that there needed to be a change in the financial sector in order to stabilize it over a sustained period. He proposed numerous ideas, from the reintroduction of combined commercial and investment banks on a local level, to a government job guarantee program. He firmly believed in the development of regulatory and compliance structures which one that evolved with the continual changes in financial markets and financial instruments. The Fed's liquidity swaps run the risk of promoting stagnation in the long run. They do not solve the problem of increased instability due to securitization and "too interconnected to fail" institutions, but rather they are a product of a regulatory system that has not sufficiently changed to deal with the current structure of the global system.

While the swap agreements worked extraordinarily well as an emergency facility, the concern raised in this paper is the long-term impacts that could arise from their normalization. In the October 2013 FOMC meeting, proponents of the swaps'

normalization argued that if they remained as a temporary measure, if the swaps were needed en masse again, their extension would signal a negative view of the markets by the Fed (FOMC Transcript, 10/30/13, p. 12). However, as data on activity of the swap lines is public, that could also act as a negative signal to markets. I believe that maintaining the swaps lines as temporary emergency facilities would have been the best course of action.

The recent performance of US equity markets highlights their interrelationship with US monetary policy. The Fed, having announced that it would decrease the size of its balance sheet, which had grown massively in its battle against the Great Recession, coupled with the increase in its Fed Funds target rate, engendered fear and volatility in the financial sector over the last year. The New York Times noted that the late January decision by the Fed to temporarily halt its rate increases marked a turnabout point in Fed policy towards an increasingly dovish stance. Quoting Allianz chief economic advisor Mohamed El-Erian, “If you believe that the market is signaling something about the economy that the Fed has not yet understood, then it’s not a bad thing...If, however, you believe that the market has gotten used to having the Fed as its rich uncle, then this is a bad thing,” (Appelbaum, 2019).

The preceding papers and data are highly suggestive of the idea that while the last ten years have seemed to experience a great reversal of financial conditions from the crisis, that the underlying stability of financial markets may in fact not be as stable as it is assumed to be. While the liquidity swaps in question throughout this paper may not cause significant harm to the stability of the financial system on their own, it is their potential to

increase the level of risk taking throughout the global financial system, even if it is just at a marginally higher level, by creating an uncapped backstop of dollars to foreign markets that is of concern.

4.4 Conclusion

The traditional channels of monetary policy were put to the test during the financial crisis and ultimately the Fed had to resort to a number of unorthodox policy measures to regain control over the domestic and international economies. The central bank liquidity swaps, and to some extent the period of low interest rates, have become institutionalized over the last decade. While it is evident that the policy measures worked in the face of the immediate threat of the global financial collapse, the conversation on how these policies could have a long-term impact is only just beginning. There will undoubtedly be more data available in the coming years on liquidity swap activity, and one area where future research on this topic could focus is on international lending and risk aversion with relation to the swaps. The presence of these swap agreements will not cause the next big financial crisis by themselves, but rather invite ever increasing risk taking by global financial institutions to a slightly higher degree than would otherwise occur. It escalates the risk of increasingly risky financial positions taken on a global scale during a period of hedge financing. That should be somewhat troubling given the experience of the last decade, where both regulatory reform and a shift in mainstream economic thinking have been slow to change.

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