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Dealing with financial fragility in the 21st century: Prudential and monetary policy after the crisis

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Abstract

This paper adds to the literature on US prudential and monetary policy, which have changed drastically in response to the Global Financial Crisis of 2007-2009. The subprime crisis that originated in the United States and went on to affect the rest of the world has revealed a number of loopholes in the regulatory framework that made the financial system in the US, as well as in other countries, vulnerable to shocks. That situation called for immediate action from the Federal Reserve, the European Central Bank and other central banks that had struggled to reverse a massive seizure of liquidity in financial markets. Policy makers have also recognized a need for a much more extensive incorporation of systemic perspectives into their regulatory frameworks. This paper analyses the sources of systemic risk in the context of the recent financial crisis and discusses the changes in macroprudential and microprudential policy in the United States. In addition, the paper compares and contrasts the Fed's extension of conventional monetary policy with other unconventional monetary policy approaches. Policy recommendations to minimize the financial system's vulnerability to shocks are offered.

Keywords:

Financial crisis, Macroprudential and microprudential policy, Monetary policy, Central Bank, Evolution of regulatory framework.

JEL classification: E52, E58, G01.

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Lidiando con la fragilidad financiera en el siglo XXI: **Las políticas monetaria y prudencial después de la crisis**

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Resumen

Este artículo se suma a la literatura sobre la política prudencial y la política monetaria en Estados Unidos, que ha evolucionado dramáticamente en respuesta a la Crisis Financiera Global de 2007-2009. La crisis de las subprimes, que se originó en Estados Unidos y que se extendió al resto del mundo, ha revelado una serie de lagunas en el marco regulador que convierten al sistema financiero estadounidense, así como al de otros países, en un sistema financiero vulnerable a shocks. Dicha crisis exigió acciones inmediatas por parte de la Reserva Federal, el Banco Central Europeo y otros bancos centrales para revertir la crisis generalizada de liquidez en los mercados financieros. Los decisores políticos también han reconocido la necesidad de dar un mayor protagonismo a las perspectivas sistémicas en sus marcos regulatorios. Este artículo analiza las fuentes de riesgo sistémico en el contexto de la reciente crisis financiera, así como discute los cambios en la política macroprudencial y microprudencial en Estados Unidos. Además, el artículo compara y contrasta la extensión de la política monetaria convencional llevada a cabo por la Reserva Federal con los enfoques no convencionales de política monetaria. Se ofrecen también algunas recomendaciones de política para minimizar la probabilidad de vulnerabilidad del sistema financiero ante futuros shocks.

Palabras clave:

Crisis financiera, política macroprudencial y microprudencial, política monetaria, Banco Central, evolución del marco regulador.

1. Introduction

This paper adds to the literature on US prudential and monetary policies, which have changed drastically in response to the Global Financial crisis of 2007-2009. The subprime crisis that originated in the world's largest economy and resulted in a massive seizure of liquidity in financial markets worldwide has revealed a number of loopholes in the regulatory framework that made the financial system in the US, as well as in other countries, vulnerable to shocks. This situation therefore called for immediate action from the Federal Reserve (Fed), the European Central Bank (ECB) and other central banks in affected countries. These actions extended the existing tools of monetary policy and created the need for unconventional approaches. Policy makers have also recognized a need for a much more extensive incorporation of systemic perspectives into their regulatory frameworks. This paper discusses the reasons behind the recent changes in macroprudential and microprudential policy in the US and analyses the response of the Fed to the most severe financial shock and economic upheaval since the Great Depression of the 1930s. The discussion offered in this paper provides insight into the sources of systemic risk in the context of the recent crisis. We also draw comparisons with the European Central Bank's monetary policy and prudential policy.

This topic is important because US and EU policy makers have been seeking to reduce their banks' exposure to systemic risk and minimize their financial systems' potential vulnerability to shocks. US central banking and monetary policy in the 20th century and the beginning of the 21st century has often been driven by the need to respond to economic and financial crises. The Fed has consistently been reactive rather than proactive in this regard, meaning that the central authorities have always been one step behind the actual shock. The very existence of the Federal Reserve System can be attributed to a large number of bank runs in the beginning of the 20th century that often resulted in financial panics. The Fed's regulatory policies have often vacillated between periods of relatively unregulated banking and financial activity and periods of tighter controls and supervision. As a result, the US financial system lacked properly designed prudential and monetary policies on the eve of the financial crisis.

This paper explores the reactionary nature of US regulatory monetary policy. We also compare macroprudential and microprudential policy objectives, tools, and their impact. The paper is organized as follows. Section 2 defines financial fragility and briefly discusses its sources and trends in the US in the 20th and 21st centuries. It traces the evolution of central banking and monetary policy in response to the five financial crises that have had the greatest impact on the US economy since the panic of 1907, and also compares the Fed's recent crisis response to that of the European Central Bank. Section 3 identifies macroprudential and microprudential policies and explains the difference between them. The last section offers ideas on how to prevent future crises.

2. Financial fragility and institutional and policy response

2.1. Alternating periods of regulation and deregulation in the 20th century

Although the US has historically placed a special emphasis on free enterprise and competitive markets, in comparison with other industries, the financial industry has been much more tightly regulated and closely supervised. This is because financial fragility is built into the capitalist financial system (Minsky 1982) and because "shocks to one part of the financial system lead to shocks elsewhere, in turn impinging on the stability of the real economy" (Bordo *et al.*, 1998, p. 31). A financial system in a capitalist economy is inherently unstable as a result of three fundamental characteristics. First, the system suffers from structural fragility since long-term (often illiquid) assets are funded mostly by short-term, much more liquid liabilities. This makes banks more susceptible to bank runs (when a large number of depositors attempt to withdraw their money simultaneously). Second, the financial system is exposed to different types of risk because of asymmetric information problems. Finally, banks and other financial institutions have incentives to take excessive risks in the search for ever greater profits (agency problem).

Perhaps the first economist to recognize the dangers of the increasing fragility of the US financial system over time was the American Hyman Minsky. In his seminal book *Can "It" Happen Again?* (1982), he stressed three factors that lead to financial fragility: "profit opportunities open to financial innovators within a given set of institutions and rules; a drive to innovate financing practices by profit-seeking households, businesses and bankers; and legislative and administrative interventions by governments and central bankers" (p. 197). To make the financial system more robust, he called for more stringent regulation and supervision. In fact, in the last chapter of *Stabilizing an Unstable Economy* (1986), Minsky suggested a larger role for the Federal Reserve as a regulatory agency. The timing, however, was wrong. The US was entering the period of reduced macroeconomic volatility, or as the former Chairman of the Fed, Ben Bernanke termed it (while still being a Governor), "The Great Moderation." In addition, Alan Greenspan, who became the Chairman of the Fed in 1987 was an enthusiastic advocate of free markets. Minsky's call for more regulation and larger role of the Central Bank was largely ignored.

The US regulatory framework and monetary policy, in fact, have been shaped more as a response to economic circumstances than in light of academic research, and thus may have lacked the tools necessary to proactively mitigate the risks and minimize the likelihood of systemic failure. The financial panic of 1907 led to the Federal Reserve Act of 1913 that created the Central Bank. The Great Depression of the 1930s led to the Glass-Steagall Act of 1933 that limited banks to "traditional banking" only. The Garn-St. Germain Act of 1982 was implemented as a response to the difficulties that thrift institutions had been experiencing since the end of the 1970s. These alternating periods of stringency and deregulation were reflective of bouts of fragility and stability in the financial system.

The globalization of the 1990s introduced further changes into the US financial system. The Washington Consensus appeared to prevail as liberalization of financial markets and economic integration following the collapse of the Soviet bloc stimulated financial development and economic growth. US financial intermediaries found new markets, while the demand for US financial assets increased. These changes were accompanied by a series of deregulatory acts in the US. In 1994, Congress passed the Riegle-Neal Act, which repealed the provision of the McFadden Act that prohibited interstate branching. This allowed banks to diversify geographically and lower their operating costs and loan losses (Cecchetti, 2008). The Gramm-Leach-Bliley Act of 1999 repealed the Glass-Steagall Act's separation between commercial banking and investment banking, leading to a drastic increase in the average size of banking institutions and apparently generating economies of scale and scope. Toward the end of the 20th century, globalization increased the need for international banking and opening up borders for financial flows. The result was the internationalization of the US banking and financial industry, with 35 large US banks establishing some type of foreign operation by 2005 (Cecchetti, 2008).

At the same time, however, financial liberalization and integration promoted greater dependency on exports and financial capital inflows, making economies more interconnected and thus more vulnerable to external shocks. Increased trade links and foreign capital flows between Asia, Europe and the Americas due to globalization and a spell of deregulation in both the US and the European Union, increased systemic risk and exposed global financial markets to a possibility of contagion. The impacts of the East Asian crisis of 1997-1998 and the Russian crisis of 1998 were pronounced yet short-lived, and did not result in significant changes to the regulatory frameworks in advanced economies.

By the end of the 1990s, economists and politicians were becoming increasingly concerned about financial stability. Some recognized that "making markets work requires more than just low inflation"; it requires a policy framework that promotes competitive markets while at the same time regulating and supervising the financial system (Stiglitz, 1998, p.11). Some began to link the stability of key institutions and key markets, and to emphasize the link between financial fundamentals and the real economy (Crockett, 1997). The Washington Consensus that stressed interest rate liberalization, trade liberalization, privatization and deregulation of markets came under attack from within (Williamson, 1997). Nevertheless, strong economic growth during the 1990s, an increase in wealth due to globalization and a growing financial sector all helped diminish market participants' concern about systemic risk and the risk that widespread disruption of financial markets and institutions could hold for the real economy.

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Table 1. Major financial crises in the US in the 20th century

Financial crisis	Institutional and market failures	Institutional/Policy response
Panic of 1907	October 15: stocks start to tumble. October 22: The start of the bank run on the Knickerbocker Trust Company. October 24: J. P. Morgan convinces a number of bankers to provide a total of $23 million to ensure the continuing operation of the New York Stock Exchange; some regional stock exchanges are closed.	May 30, 1908: The Aldrich-Vreeland Emergency Currency Act makes $500 million in emergency currency available to certain national banks by allowing them to issue circulating notes. The Federal Reserve Act of 1913 is passed, creating the Fed (to be implemented in 1914).
1929 Wall Street crash	September 1929: stocks rally. October 28 and 29: Dow Jones loses 25 percent of its value. 1930: Bank runs in agricultural states. 1,350 bank failures. Between 1929 and 1933, nearly 11,000 banks fail. February 1933: struggling inland banks pull $706m from New York lenders.	March 1933: 2,000 banks are closed permanently. 6,000 of the remaining 14,000 banks get a $1 bn boost. 1933 Glass-Steagall Act is passed to separate investment banking from traditional banking. The Fed is given new powers to regulate banks whose customers use credit for investment. January 1, 1934: FDIC is established to protect customer deposits (up to $2,500).
1980s Savings and loans associations crisis	1983: it is estimated that it would cost roughly $25 bn to pay off the insured depositors of failed institutions. The FSLIC (thrifts' insurance fund) has reserves of only $6 bn. Between 1986 and 1995, 1,043 out of the 3,234 S&L associations fail.	1980: Deregulation and Monetary Control Act requires all depository institutions to hold reserves at the Fed in order to maintain monetary policy control in light of the mass exodus of banks from Federal Reserve membership. 1989: Financial Institutions Reform, Recovery and Enforcement Act implements a number of industry reforms. The Federal Home Loan Bank Board is abolished, as is the bankrupt FSLIC. Congress creates the Office of Thrift Supervision to regulate S&L and places thrifts' insurance under the FDIC. Resolution Trust Corporation (RTC) is established and funded to resolve issues with the remaining troubled S&Ls. 1991: The Federal Deposit Insurance Corporation Improvement Act.
1987 Black Monday	Mid-October: investor confidence drops as reports regarding a larger-than-expected trade deficit lower the value of the dollar. October 14: a number of markets incur large daily losses. October 16: trading ends with sell-offs. October 19: fear and panic causes stock sales to outnumber purchases.	Unlike many prior financial crises, the stock market losses are not followed by an economic recession nor a banking crisis. In the spring of 1988, the Fed, more concerned about inflationary pressure, begins to raise the funds rate from the 6 to 7 percent range, reaching nearly 10 percent in March 1989.

SOURCES: WORLD ECONOMIC OUTLOOK, 1998; BERNHARDT, 2013; CECCHETTI, 2008; GARCIA, 2013; ROBINSON, 2013.

Table 1 summarizes the major financial crises that took place in the US during the 20th century. Literature on financial crises is often inconsistent in terms of a chronology of crisis events. This is because the very definition of a crisis is often imprecise (Romer and Romer, 2015). Reinhart and Rogoff, in their seminal book *This*

Time is Different (2009), cite as examples "bank runs that lead to the closure, merging, or takeover by the public sector of one or more financial institutions" (systemic banking crisis) or "large-scale government assistance of an important financial institution" (financial distress) (p. 11). They state, however, that these criteria may not be perfect as they could lead to crises being dated earlier or later than when they actually occurred. This paper focuses on five specific financial crises which are widely referenced by scholars. These crises have a number of distinct attributes, such as falling asset prices, distressed banks, and a formidable backstop of available credit bankruptcies (Kaminsky and Reinhart, 1999; Bordo *et al.*, 2001; Reinhart and Rogoff, 2009). Table 1 also presents the key events in the evolution of the institutional supervisory framework related to financial markets and institutions. The dates indicate a lag between each crisis and the corresponding institutional response. It took Congress six years to create the Fed following the Panic of 1907. It took four years to introduce the Federal Deposit Insurance Corporation (FDIC), following the Stock Market Crash of 1929. The reforms, which aimed to help struggling thrift institutions, came too late to rescue the savings and loan (S&L) industry. The 1987 crisis did not have a spillover effect on the real economy. The Fed, more concerned.

2.2. The financial crisis of 2007-2009

"The Great Moderation", which began in the mid-1980s and lasted through the mid-2000s, was characterized by greater economic stability, impressive economic growth and low inflation, fuelling an extended financial boom. Excess savings pushed down interest rates and drove up asset prices, and created asset bubbles in equities, housing and credit. In search of ever greater profits, financial institutions explored innovative techniques and designed new instruments. Complex mortgage-based securities designed to reduce risk encouraged investors to pile into the American housing market, fuelling the mortgage-backed securities bubble – a twin bubble that became a source of financial instability in the 21st century. From 1992 onwards, due to the aggressive use of housing policy to broadly raise living standards and aggressive securitization of loans by GSEs, such as Federal Home Loan Mortgage Corporation (Freddie Mac) and Federal National Mortgage Association (Fannie Mae), financial innovation took place in a largely deregulated financial environment. Mortgage-backed securities, collaterized mortgage obligations and other complex derivative instruments were removed from banks' balance sheets and incorporated into Special Purpose Entities (SPEs), such as Structured Investment Vehicles, which were informationally opaque to investors. Investors were therefore unable to price these securities appropriately and consequently lacked the ability to assess the risk associated with holding them. This fundamental mispricing in the financial market were exacerbated by the government's failure to control the underwriting standards in the mortgage markets, the rating agencies' AAA ratings of these complex and opaque derivatives, and overly easy monetary policy. This state of "irrational exuberance," combined with insufficient attention paid to the stability of the financial system as a whole, resulted in "an excessive increase in risk aversion, lack of trust and confidence in counterparties, and a massive seizure of liquidity in financial markets" (Acharya and Richardson, 2012).

In February 2007, the Federal Home Loan Mortgage Corporation (Freddie Mac) made a public announcement that it would no longer add subprime mortgages to its balance sheet. In April the same year, New Century Financial Corporation, a major subprime mortgage lender, filed for bankruptcy. By mid-2007, the number of subprime mortgage defaults had risen sharply, and this would eventually trigger a full-blown financial crisis; however, the first signs of the crisis went largely unnoticed, with the Federal Reserve still targeting the federal funds interest rate above 5 percent well until the FOMC meeting of September 18 (Federal Reserve Bank of St. Louis). In December 2007, in response to diminished liquidity in interbank funding markets, the Federal Reserve Board introduced a Term Auction Facility (TAF), auctioning term funds to depository institutions. At the same time, swap lines with the ECB and the Swiss National Bank (SNB) were established, to alleviate mounting pressure on the US dollar in international markets. In January 2008, the federal funds rate target was lowered to 3 percent.

Yet the cycle of contagion was hard to stop. In spring 2008, a number of large financial institutions were either on the verge of collapse or in a precarious situation, requiring immediate attention from regulators (see Table 2). In March 2008, a Fed loan facilitated JPMorgan Chase's takeover of the failing broker-dealer, Bear Stearns. The Federal Reserve Board also announced the creation of the Term Securities Lending Facility (TSLF), which could lend up to \$200 billion of Treasury securities for 28-day terms against federal agency debt, federal agency residential mortgage-backed securities (MBS), non-agency AAA private label residential MBS, and other securities (The Financial Crisis: Timeline). At the same time, swap lines with major foreign central banks were dramatically increased. In October 2008, the Fed intervened to prevent the failure of the nation's largest insurance company, AIG. As President Bush was signing the Economic Stimulus Act of 2008, the Fed was introducing Large Scale Asset Purchases (LSAPs), under which it purchased commercial paper, asset-backed securities and other private assets exposed to credit risk. In August 2010, the FED implemented further asset purchases through open market operations, buying \$30 billion of short-term Treasury Notes between August and September. In November 2010, a second wave of 'quantitative easing' was announced, increasing the Fed's holdings of Treasuries to \$1.6 trillion (The Financial Crisis: Timeline).

Table 2. **Financial crisis timeline and the Fed's response**

Date	GDP[1]	Institutional failure	Fed response
April 2007	1.7%	New Century Financial Corporation files for bankruptcy.	
July 2007	2.3%	Countrywide Financial Corporation warns of "difficult conditions". Bear Stearns liquidates two hedge funds.	
August 2007	2.3%	American Home Mortgage Investment Corporation files for bankruptcy. Countrywide Financial Corporation's investment rating is downgraded to BBB+ by Fitch Ratings.	The Fed lowers the primary credit rate to 5.75 percent (50bp) and increases the maximum primary credit borrowing term to 30 days, renewable by the borrower.
September 2007	2.3%		The Fed cuts the target FFR to 4.75 percent (50bp) and reduces the primary credit rate to 5.25 percent (50bp).
October 2007	1.9%		The Fed cuts the target FFR to 4.50 percent (25bp) and reduces the primary credit rate to 5.00 percent (25bp).
December 2007	1.9%		The Fed cuts the target FFR to 4.25 percent (25bp) and reduces the primary credit rate to 4.75 percent (25bp). Term Auction Facility (TAF) is announced. The FOMC authorizes temporary reciprocal swap lines with the ECB and the SNB for up to 6 months.
January 2008	1.1%		The Fed cuts the target FFR to 3.50 percent (75bps) and reduces the primary credit rate to 4.00 percent (75bps). At the end of January, the Fed cuts the target FFR to 3.00 percent.
March 2008	1.1%		TAF auctions are extended for at least 6 months. Term Securities Lending Facility (TSLF) is announced. The FOMC increases its swap lines with the ECB and the SNB through September 30, 2008.
September 2008	-0.3%	Fannie Mae and Freddie Mac are placed in conservatorship. Lehman Brothers filed for bankruptcy. Acquisition of Merrill Lynch by Bank of America is announced. AIG receives emergency liquidity assistance from the Fed. Washington Mutual Bank is closed by regulators. Reserve Primary Fund "broke the buck" leading to $300 bn in money market redemptions in a week.	
October 2008	-2.8%	Acquisition of Wachovia by Wells Fargo is announced.	
November 2008	-2.8%		The Fed Board announces the purchase of direct obligations of housing related government-sponsored enterprises (GSEs) and MBS backed by the GSEs.
February 2009	-3.5%		The Fed Board, Federal Deposit Insurance Corporation, Office of the Comptroller of the Currency and Office of Thrift Supervision announce that they will conduct forward-looking economic assessments or "stress tests" of eligible US bank holding companies (BHCs) with assets exceeding $100 bn.

[1] GDP is reported here as the quarterly percentage change from the previous year.

March 2009	-3.5%	FOMC increases the size of the Fed's balance sheet by purchasing up to an additional $750 bn of agency MBSs.
July 2010	3.1%	President Barack Obama signs the Dodd-Frank Wall Street Reform and Consumer Protection Act.
August 2010	3.1%	The FOMC agrees to keep the Federal Reserve's holdings of securities constant at their current level by reinvesting principal payments from agency debt and agency MBSs in longer-term Treasury securities.
January 2011	1.9%	The Financial Crisis Inquiry Commission releases its final report on the causes of the financial and economic crisis in the US.

SOURCE: THE FEDERAL RESERVE BANK OF ST. LOUIS.

2.3. Global policy response to the crisis

By the end of 2008, financial contagion had spread around the world. All European economies except Poland experienced negative economic growth rates. The crisis also affected emerging markets. Credit flows dried up, causing major financial institutions to withdraw funds from their subsidiaries. Global trade declined, pushing down the demand for imports, which resulted in lower output. It was clear that there was a need for a global response. On October 10, 2008, G7 countries agreed to work together to stabilize global financial markets and institutions. Their major goals were to prevent the failure of systemically important financial institutions, ensure financial institutions' access to funding and capital, and normalize credit markets.

To address liquidity shortages, the ECB lowered interest rates, hitting the near Zero-Lower Bound (ZLB) in 2014 (the Fed reached the ZLB in 2009). In 2009, to stabilize the market for short-term securities and thus help resolve banks' refinancing problems, the ECB introduced the Covered Bond Purchase Program (CBPP) under which the Eurosystem purchased an aggregate volume of €60 billion in covered bonds over a one-year period. In November 2011, the ECB Governing Council launched a second Covered Bond Purchase Programme (CBPP2) for a total amount of €40 billion. The third CBPP (CBPP3) was rolled out in the second half of October 2014, with a term of two years. The aim of this programme was to improve the transmission of monetary policy and return inflation rates to levels closer to 2% (Covered Bond Purchase Programme).

In addition to the CBPP and the Asset-Backed Securities Purchase Programme (ABSPP) that was also adopted in conjunction with CBPP3, the ECB implemented the Enhanced Credit Support Programme, under which it extended the list of assets which could serve as eligible collateral for refinancing operations. It also set up additional longer-term refinancing operations for financial institutions and switched from variable rate tender to fixed-rate full allotment tender procedure in all refinancing operations. This new framework helped to ensure the proper functioning of the credit mechanism in the euro area. In May 2010, markets panicked about a possible Greek insolvency. The ECB Council started buying Greek bonds in the secondary markets in order to reduce financial pressures and give euro area governments time to finalize the European rescue fund. The European Financial Stabilization Mechanism (EFSM), founded by the EU member states in 2010 in response to the financial and sovereign debt crisis, became an additional source of funding for the EU Commission. The EFSM allowed the European Commission, on behalf of the EU, to raise up to €60 billion in capital markets for lending (under strict conditions) to EU member states facing exceptional circumstances beyond their control (Olivares-Caminal, 2011).

The Eurosystem also provided banks with funds for a longer period of time than is the case under normal refinancing operations. In the early years following the launch of the Economic and Monetary Union, the Eurosystem conducted three-month Longer-Term Refinancing Operations (LTROs) once a month in the form of a standard tender. As the financial and sovereign debt crisis developed, these traditional LTROs were joined by Eurosystem operations with terms of one year and longer. Two high-volume three-year LTROs which the Eurosystem carried out in late 2011 and early 2012 attracted a great deal of attention. Colloquially, ECB President Mario Draghi dubbed these high-volume operations "Big Berthas" (González-Páramo, 2011).

3. A call for prudential policy

So what did the central authorities do to relieve the effects of the financial crisis? First, they expanded and extended the use of traditional monetary policy tools. Quantitative easing that reduced the available supply of Treasury securities through the Fed purchases, increased the prices of Treasuries and thus pushed down their yields. Lower long-term rates helped stimulate the economy (see Table 2). The central authorities also created new monetary policy tools and targets. A prime example includes changes in FOMC communications, based on the idea that greater communication enhances transparency (public awareness of what happens at the central bank) and accountability (responsibility of central bank in a democratic society). This leads to more efficient monetary policy as expectations of future policy rates are enhanced, promoting a return to more normal financial conditions. Another important change introduced by central bankers was increased global central bank cooperation and the increased use of foreign currency swaps with foreign central banks, which enabled them to meet their dollar funding needs.

Perhaps the most important institutional and policy responses that were undertaken both by the Federal Reserve in the US and the European Central Bank in Europe were those related to changes in supervision. These changes were crucial because they specifically targeted the root of the problem: the lack of regulation that intensified financial instability. As Vitor Constancio, the Vice-President of the ECB said at the Financial Stability Conference in October 2015, "Without the effective use of macro-prudential policy, advanced economies would face instability, asset bubbles and further financial crises. It is more crucial to pre-empt financial cycle booms than to adopt a passive policy of just "mopping-up" with liquidity provision in the aftermath of crises because we have learned how disastrous they can be" (Constancio, 2015).

There is a lot of confusion regarding the two types of bank supervision. Microprudential supervision targets structural fragility and problems created by asymmetric information. It involves the regulation and supervision of individual financial institutions and BHCs with the ultimate objective of protecting consumers from fluctuations in the business cycle. Some examples of such measures include internal audits, senior management oversight, internal reports and deposit insurance. The entire focus of microprudential supervision, in fact, can be summarized according to the CAMELS framework: Capital adequacy, Asset quality of bank balance sheets, Management depth and experience, Earnings, Liquidity and Sensitivity to risk. Macroprudential supervision targets agency problems and systemic risk and thus is aimed at ensuring the stability of the financial system as a whole. Its ultimate goal is to prevent GDP loss by "protecting the cycle from the banks". Some macroprudential tools are balance sheet buffers (central bank asset purchases, central bank capital support and liquidity requirements), reserve requirements and credit card lending limits. Table 3 summarizes the objectives, tools and impacts of both types of supervision.

Table 3. **Macroprudential and microprudential policies**

	Macroprudential policy	**Microprudential policy**
Definition	Regulation and supervision aimed at ensuring the stability of the financial system as a whole.	Regulation and supervision of individual financial institutions and BHCs.
Ultimate objective	Preventing GDP loss.	Protecting consumers (investors/depositors).
View of macroeconomy	Endogenous (macroeconomic variables are treated as internal factors).	Exogenous (macroeconomic variables are treated as external factors).
Direction of effects	Impact ON macroeconomy and financial system. "Protect the cycle from the banks".	Impact FROM macroeconomy and financial system. "Protect the banks from the cycle".
Analysis	Aggregates (correlations and linkages).	Idiosyncratic (firm-specific).
Tools	Communication (financial stability reviews, macro stress tests). Balance sheet buffers (central bank asset purchases, central bank capital support, liquidity requirements). Reserve requirements. Credit card lending limits. State-promoted lending and regulation of foreign currency lending.	Internal Audit. Senior management oversight. Risk controls and governance. Internal data and reports. Deposit insurance.

SOURCE: PARTIALLY DRAWN FROM MAHONEY'S (2013) PRESENTATION AT THE FED OF NY.

The global response to the 2007-2009 Financial Crisis and the Great Recession that followed included three key initiatives, each with microprudential and macroprudential aspects. First, there were changes in capital adequacy requirements associated with the evaluation of many aspects of the BHCs' capital planning practices. This includes capital planning, risk measurement and management, and the transition toward Basel III as it becomes part of the US regulatory infrastructure. The second initiative was Basel III (agreed to in December 2010 and scheduled to be implemented by 2019), which is based on several principles: an international response to global financial crises (capital and liquidity standards for internationally active banks); greater focus on systemically important banks that generate externalities (additional loss-absorbing capacity for Systemically Important Financial Institutions (SIFIs) – surcharge of up to 2.5% of risk-weighted assets (RWA); new minimum common equity standard of 4.5% of RWA); and a countercyclical buffer of 2.5% of RWA based on national circumstances in order to restrain booms. Finally, the Consumer Protection and Wall Street Recovery Act, or Dodd-Frank Act (DFA), which was passed into law in July 2010, became the central US response to the global financial crisis. It introduced a broad range of new initiatives that focus on financial stability and capital standards for BHCs. According to this act, large BHCs (>$50bn) and nonbank financial institutions designated as systemically important (SIFIs) shall face "more stringent" prudential standards and are subject to stress tests. The DFA also established the Financial Stability Oversight Council (FSOC) to identify SIFIs based on leverage, source of credit, size and scope. Finally, the DFA gave the Fed executive power to limit mergers, restrict products and terminate activities of financial institutions if there is "a grave threat to financial stability".

4. Conclusions and the road ahead

Lack of regulation and supervision in the 1990s and the beginning of the 2000s, coupled with innovation in financial markets, lead to the creation of exotic and illiquid financial instruments which were hard to value. This resulted in a fundamental mispricing in capital markets and exacerbated financial fragility. The Federal Reserve and the European Central Bank took on a larger burden of regulating and overseeing financial institutions that were desperate for help. Congress created the Wall Street Reform and Consumer Protection Act (Dodd-Frank), which, among many other things, established an umbrella of regulations overseen by the Financial Stability Oversight Council (FSOC). The objective of the FSOC is to monitor and supervise systemically important financial institutions, which are subject to high capital and liquidity requirements in addition to stress tests. At the same time, the Fed now has to work more closely with the Treasury and other institutions, may jeopardize the political independence of the Central Bank. Global efforts to reduce the possibility of financial contagion are further complicated by ambiguous lines of authority which may inhibit standardization and international cooperation. The process of establishing uniform regulatory practices throughout Europe is incomplete because the ECB does not play a role in such processes. This is partially due to the fact that the ECB does not have an explicit regulatory mandate in its charter. Although Basel III represents an attempt to create convergence on a global scale, there are massive loopholes in terms of what constitutes acceptable banking practices on a country-to-country basis.

The Fed was widely criticized for its actions prior to and during the financial crisis, and its actions still remain subject to doubt. Though this criticism sometimes stems from mistrust and concerns about the effectiveness and efficacy of the monetary policy in general, some of it is related specifically to the actions taken by the Fed during the recent crisis. It used political and legal manoeuvring to introduce many of the operations discussed in this paper, and the creation of Special Purpose Vehicles (SPVs) such as Maiden Lane and LSAPs, which purchased commercial paper, asset-backed securities and other private assets, were construed by many as going beyond the Fed's given authority. Under Section 13 (3) of the Federal Reserve Act, the Fed, at the time of the crisis, was permitted to extend emergency loans to "individuals, partnerships, and corporations in unusual and exigent circumstances". This power was subject to the approval of the Board of Governors; the extended loan had to be "secured to the satisfaction of the Federal Reserve bank". Maiden Lane and LSAPs both aimed to reduce the number of toxic assets in the market. The Federal Reserve did not make these purchases directly, but rather manoeuvred around the laws and created new vehicles. Ben Bernanke, in his recent book, provides a detailed description of the ad hoc policy actions and political hurdles that the Fed had to face in order to prevent a systemic collapse (Bernanke 2015). These ad hoc policies reflect the lack of crisis resolution tools.

The results of the crisis revealed the many weaknesses within the US financial system, some of which can be attributed to the nature of capitalist finance. Dodd-Frank has addressed some of those weaknesses and reinstated the regulatory framework into the financial industry. The establishment of the FSOC and designation of SIFIs is meant to reduce excessive risk taking and decrease the likelihood of a widespread financial crisis in the future. However, central authorities must realize that Minsky's "financial fragility" is a permanent feature of the capitalist system and thus any sort of what Alan Greenspan termed as "irrational exuberance" must be viewed with caution. Underestimating the extent to which this is true leads to limited regulatory policies that often end up being backward-looking, as evidenced by 20th and 21st century history.

While much progress has been made since the crisis, policy makers and market participants need to take an even more system-wide perspective in their efforts to monitor and minimize the risk and uncertainty that are inherent features of the capitalist financial system. This means adopting macroprudential and microprudential policies that directly address market failures and externalities. Crisis management plans therefore need to be integrated into the financial system as a whole, instead of being improvised after the fact. A record should be kept of policies that proved effective, along with specific guidelines for their implementation, in order to build up a ready arsenal of crisis resolution tools and thus minimize potential political deliberations and delays.

It is also important that the Federal Reserve's power as the lender of last resort (LLR) is restored and enhanced. A provision of Dodd-Frank limits the LLR function targeted at specific institutions in order to prevent a Bear Stearns or AIG "bail-out". However, this LLR function has proven vital in the latest financial crisis. Analysis by Eric Posner of the Chicago Law School illustrates the need for the Federal Reserve to be an authority with full LLR power. Among other financial system regulators (FDIC and the Treasury), the Fed is most influential and least politically swayed, which allows it to be an effective LLR in case of emergency. The Central Bank should have the authority and federal support to provide emergency lending and liquidity lines to those financial institutions that have greater connections with the rest of the financial system and the real economy. An independent and powerful central bank would be better able to calm financial panic and stabilize an unstable economy.

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"In order to prevent or mitigate risks to the financial stability of the United States that could arise from the material financial distress or failure, or ongoing activities of large, interconnected financial institutions, the Board of Governors... shall establish prudential standards."

Dodd-Frank Act, Section 165

References

- Acharya, V., Pagano, M. and Volpin, P. (2013). *Seeking Alpha: Excess Risk Taking and Competition for Managerial Talent*, NBER Working Papers from National Bureau of Economic Research, No 18891.doi:10.3386/w18891.
- Bernanke, B. (2015). *The Courage to Act*. WW Norton, New York.
- Bernhardt, D. and Eckblad, M. (2013). Black Monday: The Stock Market Crash of 1987. Federal Reserve History. [Web page]. Retrieved from http://www.federalreservehistory.org/Events/DetailView/48
- Bordo, M.D., Mizrach, B. and Schwartz A.J. (1998). Real versus Pseudo- International Systemic Risk: Some Lessons from History, **1**(1), pp. 31-58.
- Bordo, M., Eichengreen, B., Klingebiel, D., Martínez- Peria, M. and Rose A.K. (2001). Is the Crisis Problem Growing More Severe?, *Economic Policy*, **16**(32), pp. 53-82
- Cecchetti, S.G. (2008). Crisis and Responses: The Federal Reserve in the Early Stages of the Financial Crisis, *Journal of Economic Perspectives*, **23**, pp 51-75.
- Constancio, V. (2015). Financial stability risks, monetary policy and the need for macro-prudential policy, Warwick Economics Summit, London, UK.
- Covered Bond Purchase Programme (2016). Deutsche Bundesbank Eurosystem online glossary. Retrieved from https://www.bundesbank.de/Redaktion/EN/Glossareintraege/
- Crockett, A. (1997). Why Is Financial Stability a Goal of Public Policy?, *Economic Review*, issue Q IV, pp. 5-22 Retrieved from https://www.kansascityfed.org/PUBLICAT/EconRev/pdf/4q97croc.pdf
- García, G. (2013). Garn-St Germain Depository Institutions Act of 1982, Federal Reserve History. Retrieved from http://www.federalreservehistory.org/Events/DetailView/45
- González-Páramo, J.M. (2011). The ECB's monetary policy during the crisis. Speech presented at Tenth Economic Policy Conference in Spain, Málaga.
- Kaminsky, G.L. and Reinhart C.M. (1996). The Twin Crises: The Causes of Banking and Balance-of-Payments Problems, American Economic Review, **89**(3), pp. 373-500.
- Longer-term refinancing operation (2016). In Deutsche Bundesbank Eurosystem online glossary. Retrieved from https://www.bundesbank.de/Redaktion/EN/Glossareintraege/
- Mahoney J.M. (2013). '*The Federal Reserve in the 21st Century: The Role of Prudential Supervision.*' Presentation at the Fed of NY, March 5.
- Minsky, H.P. (1982). *Can "it" happen again?: Essays on instability and finance*, M.E. Sharpe, Armonk, NY.
- Minsky, H.P. (1986). *Stabilizing an Unstable Economy*, Yale University Press, New York.
- Olivares-Caminal, R. (2011). The EU Architecture to Avert a Sovereign Debt Crisis, OECD Journal: Financial Market Trends. Vol. 2011 No. 2.
- Posner, E.A. (2016). What Legal Authority Does the Fed Need During a Financial Crisis?, The Chicago Booth Review. Retrieved from http://faculty.chicagobooth.edu/workshops/macro/

- Reinhart, C.M. and Rogoff, K.S. (2009). *This time is different: Eight centuries of financial folly*, Princeton University Press, Princeton.
- Robinson, K.J. (2013). Depository Institutions Deregulation and Monetary Control Act of 1980. Federal Reserve History. [Web page]. Retrieved from http://www.federalreservehistory.org/Events/DetailView/43
- Romer, C. and Romer, D. (2015). New Evidence on the Impact of Financial Crises in Advanced Countries, NBER WP No. 21021, National Bureau of Economic Research. doi:10.3386/w21021
- Stiglitz, J.E. (1998). *More instruments and broader goals: Moving toward the post Washington consensus*, UNU/WIDER, Helsinki, Finland.
- The Federal Reserve Bank of St. Louis. The Financial Crisis: Timeline. (2016). Retrieved from https://research.stlouisfed.org/
- Williamson, J.G. (1997). Globalization and Inequality, Past and Present, *The World Bank Research Observer*, **12**(2), pp. 117-135
- World Economic Outlook (1998). The Asian Crisis: Causes and Cures. *Finance and Development* IMF, **35(**2), pp. 82-106.