

(Nov 2, 2018)

# RESPONDING to the GLOBAL FINANCIAL CRISIS What We Did and Why We Did It

## Evidence on Outcomes

Nellie Liang, Margaret M. McConnell\*, Phillip Swagel<sup>1</sup>

*\*Note: The views expressed in this chapter are strictly those of the authors and do not necessarily reflect the views of the Federal Reserve Bank of New York or the Federal Reserve System.*

---

<sup>1</sup> During the financial crisis, Nellie Liang was Associate Director, Research and Statistics, Federal Reserve Board; Margaret M. McConnell was Deputy Chief of Staff for Policy, Federal Reserve Bank of New York; and Phillip Swagel was Assistant Secretary for Economic Policy, Department of Treasury.



## Introduction: Assessing Outcomes

From 2007 to 2009, the U.S. government faced extraordinary threats to the functioning of the financial system and the health of the economy. In response to these threats, the government took a series of steps—many unprecedented and hence untested in terms of their efficacy—to support economic activity and employment and to maintain the financial system’s ability to provide essential services to the real economy.

This chapter summarizes the policy actions undertaken in response to the crisis and reviews the evidence on the outcomes of those actions. While the causes and manifestations of the next financial crisis will almost surely differ from those experienced in the United States at the end of the last decade, financial crises do have certain features in common. The purpose of this review is to inform the actions of decision-makers in future financial crises.

Given the wide range of policy actions taken during the crisis, and the variety of institutional authorities and objectives that shaped those actions, this chapter employs a simple organizing framework to explore the evidence. We sort policy actions into two broad categories. The first category—*macro policies*—includes actions designed to stimulate economic activity and spending. The second—*systemic policies*—includes actions designed to maintain the functioning of the financial system. The framework also identifies three phases of the crisis, each corresponding to an escalation in the nature and breadth of the concerns facing decision-makers in real time about conditions in the economy and financial system.

The complexity of the crisis, and of the broader economic and financial environment in which the crisis unfolded, makes it extremely difficult—even with the benefit of hindsight—to identify clear cause-and-effect relationships between individual policy actions and observable outcomes. Moreover, much of what we now know about the outcomes we know *only* with the benefit of hindsight. This leaves our assessment of actions and outcomes vulnerable to hindsight bias—i.e., the tendency to understate the degree of ambiguity and uncertainty that decision-makers faced in the moment, and to overstate the degree to which events were predictable in advance—and outcome bias—i.e., the tendency to treat decisions that yielded favorable outcomes as having been good (or appropriate) decisions and decisions that yielded unfavorable outcomes as having been bad or inappropriate.

These important challenges notwithstanding, our review suggests that the actions taken by the government prevented what might otherwise have been a second Great Depression. In fact, the evidence suggests that the U.S. recession was shorter and less steep, and the recovery more rapid, than might have been expected based on historical banking crises.

Nonetheless, the recession was severe and had lasting effects on the U.S. economy and on society. The unemployment rate rose to 10 percent and millions lost their homes to foreclosure. Household net worth fell sharply. The recovery was lackluster, with the possibility of a decline in the growth of potential output compounding the harmful impact of the cyclical downturn. Contributing to the severity of economic outcomes may have been the fact that many of the extraordinary policy actions were undertaken only

when conditions had eroded to the point at which financial markets and institutions were either experiencing, or were extremely vulnerable to, runs, contagion and panic. Indeed, it was not until the enactment of the Emergency Economic Stabilization Act (EESA) on October 3, 2008, that policymakers had the ability to take many of the systemic actions that would ultimately prove most consequential in restoring confidence in the capital adequacy of U.S. financial institutions.

Still, the timing of actions also was influenced by other factors, including policymakers' understanding of the situation as it was evolving in real time, and their concerns about moral hazard, political backlash or even the possibility of creating panic with their actions. It is beyond the scope of this exercise to assess the appropriateness of the timing of actions from the perspective of these real-time considerations. And we cannot provide much insight into whether other actions would have yielded better outcomes. Nonetheless, we believe that the fact that policymakers did not have the ability to undertake vital systemic actions until the fall of 2008 likely limited the range of more favorable economic outcomes that were achievable even with the subsequent extraordinary policy actions. This conclusion will be discussed further in the last section of this chapter.

The chapter is structured as follows. Section I provides an overview of U.S. macroeconomic performance and compares this to evidence from research on economic outcomes associated with earlier episodes of severe financial crises. Section II elaborates on the simple organizing framework introduced above and undertakes a more detailed exploration of the evidence on outcomes using that framework. Section III concludes with a discussion of the lessons that can be learned from the evidence on outcomes associated with the U.S. response to the crisis.

## **I. Setting the Stage: The U.S. Recession and Recovery**

The global financial crisis included a major recession in the United States that lasted from December 2007 to June 2009, with significant and evolving threats to financial system functioning. While the downturn was mild in the first half of 2008—indeed, real GDP growth was positive in the second quarter— activity then plunged in the fall of 2008. (See **Figure 1.**) Real GDP declined by 4 percent from peak to trough, and the unemployment rate more than doubled, from 4.4 percent in May 2007 to 10 percent in October 2009. Most other advanced economies also had recessions around this time, including several that were deeper than in the United States, such as in the United Kingdom, where real GDP declined by 5 percent.

Real GDP in the United States recovered to its pre-recession peak in 13 quarters. Ten years after the crisis, real GDP is 15 percent higher than the previous peak, slightly higher than in some other advanced economies, like Germany, the United Kingdom and France. On a per capita basis, U.S. real GDP did not recover until almost six years later, still a better performance than other advanced economies achieved, except for Germany.

Even so, the Great Recession was steeper and longer than any other post-WWII U.S. recession. (See **Figure 2**.) GDP per capita, unemployment and bank credit growth were worse than in the 1990 recession following the S&L crisis, and the outcomes in both periods were worse than in the other post-WWII recessions in which there were no significant financial sector disruptions. The experience of the Great Depression is also shown in Figure 2, with a very large and prolonged decline in GDP and a steep rise in unemployment for four years as a reminder of a truly disastrous outcome, and as a possible counterfactual to the recent period. Of course, comparing recessions and recoveries across time does not control for all sorts of differences—the initial conditions of the financial sector, the pre-crisis trajectory of potential output growth and the like—that might account for differences in outcomes.

An important challenge in evaluating the recovery in output after the crisis is that there appears to have been a decline in potential growth of U.S. output around the time of the crisis. There is no consensus on the cause of the decline. It is possible that it reflected forces already in place before the crisis, namely a sharp decline in productivity growth beginning in 2004 after a period of high growth from 1995 to 2003, combined with a decades-long downward trend in labor force participation. Fernald et al (2017) adjust for these two factors and conclude that the more sluggish potential growth rate was in place before the crisis. Their adjustments imply that real GDP per capita returned to its pre-crisis potential in 2016 and that the disappointing economic performance since the crisis does not reflect the impact of actions taken during the crisis and after it. Others argue that the financial crisis or subsequent policies may have led to a decline in potential output, mostly due to lower investment. For example, there were fewer business startups with high investment return opportunities following the crisis (Siemer, 2014). This reduction in capital formation may have led to lower aggregate productivity growth because of the shift in the distribution of the capital stock away from high-return firms (Khan and Thomas, 2013), suggesting the financial crisis and responses are causal factors.<sup>2</sup>

Nevertheless, studies of historical episodes of banking crises indicate that the U.S. economy performed better than might have been expected given the depth of financial sector problems. Reinhart and Rogoff (2014) examine 100 systemic banking crises from 1850 to 2009, of which 63 were in advanced economies and 37 in emerging market economies. They show for advanced economies that the average peak-to-trough decline in real per capita output was 9.6 percent, with a duration of 2.9 years, and that the average time for GDP per capita to recover to its pre-recession peak was 7.3 years. U.S. performance was better on all these dimensions: real GDP per capita declined 5.5 percent over six quarters and recovered to its previous peak in less than six years.

Jorda, Schularick and Taylor (2013) and Romer and Romer (2017) control for the depth of financial stress when evaluating the recovery, and find U.S. performance was better than their models would predict. Jorda, Schularick and Taylor (2013) provide an interpretation of the post-crisis recovery based on the amount of excess credit in the run-

---

<sup>2</sup> Studies of cross-country performance document the phenomenon that recessions, especially those associated with banking crises, lead to a downward shift in the path for potential output (Cerra and Saxena, 2008, 2017). Blanchard, Cerutti and Summers (2015) evaluate growth in the expansion relative to a trend line that removes the two years just ahead of the business cycle peak and adjust for rapid credit growth. They document that 83 percent of financial recessions are associated with a sustained negative output gap, of which one-third show a growing output gap.

up to the business cycle peak, drawing on a sample of 154 recessions, of which 35 were financial recessions, in 14 advanced economies since 1870. They find that U.S. real GDP per capita surpassed the expected recovery by more than 2 percent five years after the year-end 2007 peak.

Romer and Romer (2017) develop an index of credit stress based on narratives prepared by OECD analysts that focus on disruptions to credit supply (rather than on financial firm stresses), for a sample of 24 OECD countries from 1967 to 2012. The credit stress index for the United States reached the most extreme level for the entire sample in the second half of 2008, but then fell relatively rapidly compared with other countries, hitting zero in the first half of 2011. They attribute the rapid decline in stress to the large and comprehensive set of macro and systemic policy responses taken by U.S. authorities to offset the shock to the financial system. They also use local projections estimation methods to predict real GDP growth based on previous growth and the stress index and show that the United States performed as expected within two years, and notably above expectations within four years.<sup>3</sup> In contrast, Romer and Romer document large negative errors for Iceland, Italy, Greece, Portugal and Spain, even after accounting for the subsequent buildup in stress in 2011 following the emergence of problems in Greece. These errors were sizable, close to negative 10 percent for Italy, Portugal and Spain, and 30 percent for Greece, implying that the recoveries in these countries was worse than would have been expected from the historical experience.

Thus, our assessment is that while the macroeconomic costs were very high in absolute terms, the U.S. economy overall performed well relative to historical and contemporary benchmarks. Research that accounts for whether the financial sector was in distress, the amount of excess credit or the size and duration of the financial shock indicate the U.S. recovery was in line with or better than expectations. This does not take away from the reality that the crisis caused severe hardship for millions of Americans. But the outcomes were better than would have been expected from the experience with previous financial crises, implying that the U.S. policy responses made a difference.

## **II. A Simple Framework for Organizing Evidence on Outcomes**

Our organizing framework characterizes the policy actions that were taken in response to the evolving crisis as either “macro” policies or “systemic” policies, and recognizes that while the ultimate objective of both types of policies is to keep actual economic growth as close to potential as possible, the proximate objectives of the two types of policies differ. In addition, the desired outcomes associated with either macro or systemic policy actions can vary as conditions in the environment and concerns about potential future conditions evolve over time.

---

<sup>3</sup> They show that increases in financial distress are quite costly to real GDP growth, with a shock of half of what occurred in the U.S. from 2007 to 2010 (the average size shock in that period across the sample) leading to a decline of about 6 percent from the previous peak at about 3.5 years.

## *Distinguishing Between Different Types of Policy Actions*

“Macro” policies—essentially countercyclical monetary and fiscal policies—are intended to support economic activity and spending. Thus, the proximate objective of macro policies is to increase the *quantity* of economic activity as a way to minimize output and employment gaps. Fiscal policy includes increased government spending or tax cuts that boost private consumption or investment. Monetary policy works through reducing the cost of credit, by boosting wealth and thereby spending and by stimulating net exports through the exchange rate channel.

In the case of “systemic” policies, the proximate objective is the *functioning* of the financial system—the system’s ability to provide credit, payment and risk transfer services to the real economy. Systemic policies are not themselves intended to generate new economic activity or spending. Instead, they are designed to restore the condition of the financial system such that it can provide the financial intermediation services necessary for an economy to grow at potential. The U.S. government deployed a variety of systemic policies in the crisis—provision of liquidity by the Fed secured by collateral, capital injections into financial firms, debt guarantees, resolution of failing firms and support for mortgage modifications.<sup>4</sup>

Systemic and macro policies are complements rather than substitutes, in the sense that systemic policies are designed to mitigate a “supply” shock from the financial sector—which serves as a critical intermediary between saving and investment and between credit and economic growth—that would disrupt growth and employment. Recent research has found strong links between the functioning of the financial system and real economic activity, beyond the traditional effect of asset prices and lending through the balance sheet channel. Bernanke (2018) shows that investor panic in the funding and securitization markets led to sharper declines in GDP, employment and other broad economic outcomes through disrupting the supply of credit. Gertler and Gilchrist (2018) show that the household balance sheet channel is important for regional variation in employment, but banking distress is central to overall employment. Financial disruptions affect particular markets as well; for example, strains in the asset-backed commercial paper (ABCP) market reduced funding available to nonbank auto lenders that provide financing for a large share of auto purchases, and there were fewer auto sales in areas in which nonbank lenders were especially important (Benmelech, Meisenzahl and Ramcharan, 2017).

Because the proximate objectives of the two types of policies differ, we identify different outcome measures for each. For macro policies, we look at real GDP, unemployment and growth of bank credit for households and businesses. For systemic policies, we focus on Libor-overnight indexed swap (OIS) spreads, credit default swap (CDS) premiums for large financial firms and mortgage spreads. The Libor-OIS spread captures prices of short-term funds for financial firms, which reflect liquidity stresses and can often provide early indications of concerns about insolvency problems; CDS premiums reflect the risks to debt holders and market perceptions of the potential for

---

<sup>4</sup> Mortgage modifications are sometimes viewed as structural policies (Andritzky, 2014), but we group them with systemic policies as they work to allow households to reduce debt service and benefit more directly from lower interest rates or higher house prices brought about by macro policies.

insolvency of financial firms over longer horizons; and agency mortgage-backed securities (MBS)-to-Treasury spreads reflect strains in the mortgage market.<sup>5</sup>

### *Capturing the Real-Time Evolution of Conditions and Concerns*

We now know a lot more than we did at the time about how bad the crisis would eventually become. While repeating the Great Depression was possible from the start, such a scenario seemed remote until it became clear that the financial system was “on the brink of the abyss” in the late summer and early fall of 2008. In other words, when signs of financial stresses began emerging in 2007 after house prices had started to decline and many mortgage brokers failed, there clearly were indications of an impending housing adjustment and concerns that it would present a headwind for the broad economy. A severe recession, however, was generally not seen by policymakers in 2007 as being highly probable, and similarly through much of the first three quarters of 2008.

The evolution of the Federal Reserve’s staff (Greenbook) forecasts is illustrative. **Figure 3** shows the forecast for real GDP provided to the Federal Open Market Committee (FOMC) in August 2007 and selected subsequent forecasts through June 2010. While strains in funding markets illustrated by the wider Libor-OIS spread prompted the Fed to encourage banks to use the discount window in August 2007 and then to cut the discount rate the following week, there was little sign of stress in the forecast for real GDP, which showed continued moderate growth. Indeed, Fed staff did not forecast a recession until March 2008 after Bear Stearns collapsed, and even then only a shallow recession. The Congressional Budget Office (CBO) forecast released the first week of September 2008, just before the failure of Lehman and ensuing events, likewise did not see the collapse of activity. A more notable but still mild recession was in the Fed staff forecast starting from October 2008 after the panic had taken hold, but not until the actual plunge in economic activity in late 2008 did the forecast show an unusually severe recession.

Similarly, the Libor-OIS spread rose substantially from less than 10 basis points in June 2007 to close to 100 basis points by September 2007 after investor runs on ABCP and on repurchase agreements (repos) backed by mortgage securities (see Covitz, Liang and Suarez, 2013, and Gorton and Metrick, 2012). But few market participants or policymakers would have assigned a high likelihood to the Libor-OIS spread spiking to more than 350 basis points and a shutdown in key funding markets such as commercial paper a year later. CDS premiums for large financial firms also were rising, but the initial stress was primarily in the investment banks (Bear Stearns, Lehman Brothers, Merrill Lynch) and depository institutions seen as relatively more exposed to real estate risk (Countrywide, Washington Mutual), suggesting the stresses remained mainly related to housing. Even the International Monetary Fund (IMF), which estimated headline losses of \$2.7 trillion for the financial sector in April 2009, had more modest estimates of \$945 billion in losses one year earlier, in April 2008. In its report, the IMF emphasized at that time that appropriate policies involved encouraging financial firms to raise private capital and increase transparency about their risks, and that authorities should minimize the use of public resources and avoid undermining market discipline.

---

<sup>5</sup> Agency MBS are mortgage-backed securities issued and guaranteed by Fannie Mae and Freddie Mac.

To evaluate outcomes associated with the macro and systemic policies, we have broken the crisis down into three phases: Phase I: August 2007 to March 2008; Phase II: March 2008 to mid-September 2008; and Phase III: mid-September 2008 to December 2009.

**Figure 4** shows the total amount of government commitments for the systemic policy responses by the three phases, and monthly real GDP growth and employment growth. Government commitments began rising in the fall of 2007, escalated dramatically after panic took hold at the beginning of Phase III, but then moderated substantially in mid-to-late 2009 as financial market functioning began to be restored. In addition, event dates for key systemic policies are marked against daily Libor-OIS spreads, CDS premiums and agency MBS spreads and are shown in **Figures 5, 6** and **7**. Although there are significant announcement effects for some policies, the impact of any particular policy is difficult to disentangle because of a substantial degree of interaction among them, especially after policymakers were showing a “whatever it takes” attitude to prevent the financial system and economy from collapsing.

## Phase I: August 2007 to March 2008: Challenging but Manageable

### *Summary*

Conditions in Phase I were generally viewed in real time as being characterized by economic weakness led by an adjustment in housing, exacerbated and spread by increasing incidence and severity of strains in financial markets, as many mortgage lenders failed and a few larger financial institutions heavily exposed to mortgages faced difficulties. Policy actions in this phase were consistent with the view that the drag from the financial sector would lead to a weak economy but not pose a significant risk of sparking a systemic crisis.

Macro policy actions consisted of traditional fiscal and monetary measures to support growth and credit in the face of an economic slowdown. Systemic policy actions took the form of extensions of the discount window to provide term funding rather than only overnight, and to provide liquidity through auctions to help reduce the stigma associated with use of the discount window. The desired outcomes were to restore financial system functioning to support financial intermediation—that is, to limit the reduction in credit from financial market strains—and to address the increasing housing problem.

### *Details*

Macro policies consisted of both monetary and fiscal actions. The Fed cut interest rates from 5.25 percent before September 18, 2007, to 3 percent by January 30, 2008. The cut of 75 basis points in early January 2008 was notable both for its larger-than-normal size and for being done outside of a regularly scheduled FOMC meeting.



Fiscal stimulus was put in place with the Economic Stimulus Act (ESA) enacted in January 2008, which provided for about \$100 billion of tax rebate checks to be sent to households in mid-2008 (mostly May to August) along with some investment incentives. The policy discussion at the time was for fiscal stimulus to be “temporary, targeted, timely”—that is, to focus narrowly on supporting near-term activity. This call is likewise consistent with the widespread belief in late 2007 and early 2008 that the slowdown would be temporary. The targeting of the tax rebate checks focused especially on lower-income families who were viewed as having relatively high marginal propensities to consume. The 2008 stimulus appears to have offset headwinds from higher energy prices and the housing sector adjustment. Research suggests it had a positive impact on consumption and GDP (Parker, Souleles, Johnson and McClelland (2013), and Broda and Parker (2014)), though Ramey (2018) sees the estimated impact as overstated.

In terms of systemic policy responses, the Fed effectively extended its discount window liquidity in new ways. After cutting the discount rate from 100 to 50 basis points above the federal funds rate in August 2007 to encourage greater use, the Fed launched the Term Auction Facility (TAF) in December 2007. TAF was meant to provide longer-term funding for depository institutions through an auction mechanism with delayed receipt of funds that would help to circumvent the stigma of the discount window. (See **Figure 5**.) Research such as by McAndrews, Sarkar and Wang (2017) has found that TAF achieved its aim of reducing liquidity strains in the interbank market, with statistically significant downward shifts of the Libor-OIS spread associated with TAF.

The Fed established currency (FX) swap lines with other central banks, starting in December 2007 with the European Central Bank (ECB) and the National Bank of Switzerland, expanded the lines in March 2008 and again in the fall. These lines effectively provided discount window funding to banks in other countries in need of U.S. dollars—the Fed lent on a collateralized basis to counterpart central banks, which in turn provided dollar liquidity to foreign banks. Research such as Baba and Packer (2009) found that the swap lines ameliorated foreign exchange dislocations that manifested as wider interest rate spreads between loans to European banks and U.S. Treasury securities. These strains reflected doubts about the safety of European banks that made U.S. institutions less willing to lend to those in Europe.

TAF and FX swap lines were targeted at addressing particular financial market stresses affecting banks. These were both successful in reducing interest rate spreads for targeted classes of institutions, and Libor-OIS spreads fell. This impact in turn would be expected to contribute to a positive impact for monetary policy by improving the transmission mechanism of lower interest rates to the economy.

Announced write-downs of assets by the largest financial firms for the second half of 2007 had already reached \$100 billion, with about half at nonbank financial firms (securities firms such as Merrill Lynch) and half at commercial banks (Citigroup and banks specializing in mortgages). While some firms raised substantial new capital in late 2007 and early 2008, CDS premiums for investment banks and Citigroup rose notably, and were considerably higher than those for other large commercial banks still viewed to be more insulated from problem mortgages.

In addition, officials from the Treasury, banking agencies and other agencies including Housing and Urban Development (HUD) worked with banks and mortgage servicers to encourage mortgage modifications through the Hope Now coalition. A main effort in the early stage of the crisis was to persuade lenders to freeze interest rate resets for 1.8 million subprime borrowers who had taken out loans that would adjust after a two- and three-year initial period with a low teaser rate.

Phase I policy actions provided liquidity and moderate macro support, but financial conditions were deteriorating and the economy was slowing. Financial firms had not raised enough capital to provide investors assurance that they could absorb losses related to housing.

## Phase II: March 2008 to Mid-September 2008: Broader Uncertainty, Deeper Concerns

### *Summary*

We date Phase II as starting with the use of the Fed's emergency authority around the collapse of Bear Stearns in mid-March 2008. Conditions in this phase were characterized by growing concern about a continued deterioration in housing and the economy and by increasing uncertainty about the size and incidence of losses on mortgage-related assets, implicating a wider range of both U.S. and European financial institutions. During this phase, market participants and policymakers alike recognized the possibility of a negative feedback loop in which a weaker financial system and slower growth could feed on each other and precipitate a broad-based contraction in credit supply and materially harm growth. Policies undertaken in this phase included the Federal Reserve invoking its emergency authorities under section 13(3) of the Federal Reserve Act (FRA) for the first time since the Great Depression, and actions taken to prevent destabilizing failures at key financial institutions such as Fannie Mae and Freddie Mac.

### *Details*

We know in hindsight that the economy by early 2008 was in recession, but the first-quarter downturn was shallow and second-quarter growth was positive, so signals of economic strength at the time were mixed. Macro policies during this period involved 75 basis points of additional easing of monetary policy right after the collapse of Bear Stearns and then another cut, of 25 basis points, at the end of April. The fed funds rate was then unchanged until October, with some policymakers expressing concerns over the prospect of higher inflation after oil prices rose. The fiscal stimulus enacted in January 2008 took hold with the payment of tax rebates in the middle of the year. As noted above, most forecasts at the time saw only a mild downturn later in 2008.

In contrast, there was a significant escalation of systemic policies. Within a window of a week surrounding the collapse of Bear Stearns, the Fed used its emergency authorities to introduce new broad-based liquidity facilities for broker-dealers and funding to facilitate the acquisition of Bear Stearns to prevent a destabilizing failure. Reflecting the continued strains in funding markets, the Fed introduced the Term

Securities Lending Facility (TSLF) to allow primary dealers to exchange illiquid assets for Treasury securities to improve their access to liquidity. This was followed a week later with the Primary Dealer Credit Facility (PDCF), in which the Fed lent to primary dealers against collateral accepted in the tri-party repo market. That form of lending allowed the central bank to provide liquidity support for firms that might be facing strains like Bear Stearns experienced because investors perceived them to have similar funding models and asset holdings.

CDS premiums for large financial firms fell notably (see **Figure 6**), as the PDCF was widely seen by market participants as providing a respite from funding pressures, even for the two weakest of the remaining investment banks, Lehman Brothers and Merrill Lynch. Fleming, Hrungrung and Keane (2010) find that the PDCF was effective in reducing financial strains, with a significant narrowing of repurchase agreement (repo) spreads, between Treasury collateral and less liquid collateral such as MBS. Another outcome of the PDCF was that the Fed required borrowers to provide information on their financial positions as a condition of access; the Fed had not had regular access to such information before because it was not a regulator for the dealers that were not parts of bank holding companies.

Using authority granted by Congress in the Housing and Economic Recovery Act of 2008, the renamed and reconstituted regulator, the Federal Housing Finance Agency, placed Fannie Mae and Freddie Mac into conservatorship in early September. The Treasury made an initial pledge of \$200 billion of taxpayer capital when the two government-sponsored enterprises (GSEs) were taken into conservatorship, a pledge that was later increased to \$400 billion. The conservatorship led to a sharp decrease in agency MBS-to-Treasury spreads. (See **Figure 7**.) The actions with the two GSEs can be seen as working to ensure that mortgage financing would remain available to creditworthy borrowers throughout the crisis even while many other parts of the mortgage market experienced serious strains (with Fed actions to purchase MBS later in the year then reducing mortgage interest rates).

While the policy actions taken during Phase II were effective at alleviating certain areas of acute strain, the broader environment continued to deteriorate. CDS premiums moved higher, as investors remained especially concerned about insufficient capital at investment banks, as well as at commercial banks and large bank-holding companies with substantial mortgage exposures. GDP and employment growth turned negative. The continued decline of the economy meant expected losses at financial firms were also continuing to increase.

### Phase III: Mid-September 2008 to December 2009: Panic

#### *Summary*

The third phase of the crisis—the start of which we mark by the bankruptcy of Lehman Brothers on September 15, 2008—was characterized by conditions of panic and contagion across a wide range of financial markets, a broad loss of confidence in the adequacy of capital held by many types of financial institutions, a sharp economic

contraction and deepening concerns that a collapse in financial system functioning would lead to a depression. While the threat of widespread contagion and loss of confidence in financial institutions had been present during the earlier phases of the crisis, the realization of this threat in the wake of Lehman’s failure ultimately led to the creation of the Troubled Assets Relief Program (TARP) under EESA, enacted on October 3. TARP added a critical systemic element to the policymakers’ toolkit—notably the ability to purchase assets from financial institutions. This additional tool not only provided a mechanism for directly addressing concerns about the capital adequacy of these institutions—it also created a powerful complement to the FDIC’s authority to guarantee liabilities. The use of these two tools, along with a range of other systemic policy actions during this phase, was aimed at alleviating fire sale dynamics, preventing or minimizing contagion from both wholesale and retail funding runs and restoring investor and creditor confidence in the capital adequacy of financial institutions.

The macro actions taken during this phase included the Fed initiating its first round of quantitative easing, the provision of assistance to two large car companies and the enactment of the American Recovery and Reinvestment Act (ARRA).

## *Details*

Although Lehman was universally regarded as the weakest of the investment banks and market participants had been significantly reducing their exposure to the firm since Bear Stearns’ failure in March, its bankruptcy filing set off events that were much more disruptive than expected by policymakers. In the aftermath, many new responses were launched in a coordinated effort by government agencies:

- The Fed significantly expanded liquidity facilities and lending by providing liquidity to new types of firms—such as insurance companies, in the case of AIG—to new central bank counterparties through the currency swap lines, and to new markets. These included the commercial paper market, with the Asset-Backed Commercial Paper Money Market Fund Liquidity Facility (AMLF) and the Commercial Paper Funding Facility (CPFF), and later the asset-backed securities markets, with the Term Asset-Backed Securities Loan Facility (TALF).
- The Treasury guaranteed money market mutual fund shares under the Temporary Guarantee Program for Money Market Funds, using the exchange stabilization fund.
- The FDIC guaranteed bank senior debt and noninterest-bearing transaction accounts through the Temporary Liquidity Guarantee Program (TLGP), which the FDIC put in place after the complementary tool of TARP capital became available.
- While a few weakened financial institutions either raised private capital on their own (Goldman Sachs and Morgan Stanley) or were acquired by firms that seemed stronger (the acquisition of Merrill Lynch by Bank of America),

the Treasury also injected \$205 billion into 707 financial institutions across 48 states, starting with capital injections in the nine largest financial institutions on October 13, 2008, Columbus Day.

The economy weakened sharply with the financial market panic—the problems on Wall Street now resounded on Main Street, with GDP declining by 8.4 percent at an annual rate in the fourth quarter. The weaker economy and housing market meant further uncertainty about the size and scope of losses in the financial system, with measures of stress remaining elevated well after the initial panic in money markets and commercial paper markets sparked by Lehman’s failure had subsided.

More responses had to be taken. In the wake of the Lehman failure, the government implemented an insurance program to prevent a destabilizing failure of Citigroup, with the Treasury (using TARP), the FDIC (invoking its systemic risk exemption authority) and the Fed coming together to provide a ring-fenced guarantee for troubled mortgage assets spun-off into a separate subsidiary. And the Fed turned to asset purchases of agency debt and agency MBS (QE1) in November 2008 and lowered the federal funds rate to zero in December. Yields on agency MBS fell substantially on QE1 as the spread to Treasury yields narrowed and continued to decline, providing support to the mortgage market and house prices.

While these measures helped to stabilize the financial system, the economy remained weak, with GDP declining by 4.4 percent at an annual rate in the first quarter of 2009 and still modestly negative in the second quarter. Financial strains widened again in February and March as market participants grew concerned about what seemed like a lack of clarity regarding the Financial Stability Plan announced by the new administration on February 10, 2009, a core element of which was the unprecedented execution of a stress test on a cross-section of major U.S. financial institutions.

The strains during this period stemmed both from generalized uncertainty about the condition of financial institutions as well as speculation from official quarters suggesting that the government might seek to nationalize some large banks. The release of the supervisory stress test results in May 2009 provided a credible statement of expected losses at the largest U.S. banks, and required banks to raise capital rather than to shrink assets in order to promote lending and led to substantial private-sector capital flowing into the financial sector. TALF and the Public-Private Investment Program (PPIP) helped to restart the securitization markets with a combination of private and government capital, working to boost asset prices. The recession ended in June 2009; GDP growth (monthly year-over-year) turned positive in the third quarter of that year.

Expansionary fiscal policy in Phase III included assistance to two large car companies in late 2008 and then enactment of the American Recovery and Reinvestment Act, on February 17, 2009. ARRA provided \$712 billion in net new spending for the economy through the end of 2012, with the fiscal stimulus as measured by the CBO peaking in 2010 at 2.7 percent of GDP. The fiscal stimulus phased down rapidly, however, giving way to a fiscal drag on GDP as early as 2011. Research surveyed by Ramey (2018) finds that the fiscal stimulus was effective in supporting output, even while concluding that many of the research papers to date overstate the fiscal multiplier. Fiscal policy was expected to be especially effective with monetary policy at the zero

lower bound, but Ramey (2018) sees the evidence for this in the post-crisis research literature as tentative rather than conclusive.

Discerning the impacts of particular Phase III policy actions is particularly challenging because of the number of actions that were taken as well as the significant degree of interaction among them. Still, research has evaluated the outcomes of some of the responses by evaluating differences in prices or issuance of securities that were eligible and ineligible for the programs.

For example, Duygan-Bump et al (2013) find that ABCP eligible for the AMLF had lower spreads than similar securities that were not eligible, and that money market funds (MMFs) with larger amounts of eligible securities had lower outflows than other MMFs. Adrian, Kimbrough and Marchioni (2011) find that spreads on eligible CP and ABCP declined sharply relative to ineligible paper, and the maturity of new CP increased notably from overnight, adding to stability. Baba, McCauley and Ramaswamy (2009) document that central bank swap lines were available to replace the substantial dollar funding to non-U.S. banks previously provided by money market funds, and Allen and Moessner (2010) show that foreign-exchange risk indicators, such as covered interest differentials and cross-currency basis swap spreads, narrowed substantially. Aizenman and Pasricha (2010) document that the CDS spreads of the emerging market countries that received the swap arrangements fell, and by more than the CDS of other emerging market countries, suggesting perhaps that the announcement of the swap lines supported a general boost to confidence across all emerging markets.

Combined, the AMLF, CPFF, money market fund guarantee and currency swap lines worked to reduce significant pressures in money markets by stabilizing money market fund assets, reducing the costs for nonfinancial companies to issue CP and the costs for non-U.S. banks to access dollar funding. In addition, Adrian, Burke and McAndrews (2009) show that the PDCF eased funding strains faced by primary dealers, when, following Lehman's failure counterparties began demanding higher haircuts on repo and less risky collateral. Del Negro, Eggertsson, Ferrero and Kiyotaki (2017) argue that liquidity facilities that exchanged liquid paper for illiquid private paper in the third phase of the crisis (TAF, TSLF, PDCF and currency swap lines) played a key role in supporting GDP. Without the extraordinary liquidity facilities, the authors predict that the decline in GDP would have been around 30 percent larger than it was during the crisis and the decline in inflation even larger.

TALF had a positive effect on ABS markets, which rebounded from near-zero issuance in the months following the Lehman failure. TALF led to declines in spreads in ABS markets by improving liquidity (Ashcraft et al, 2012), including for certain legacy commercial mortgage-backed securities (CMBS) that were eligible for the TALF program (Ashcraft, Garleanu and Pederson, 2011). Campbell, Covitz, Nelson and Pence (2011) show that TALF lowered interest rate spreads for categories of asset-backed securities but had little impact on the pricing of securities funded by the program, suggesting that TALF improved investor sentiment regarding securitizations in general.

The Columbus Day action to inject capital into the nine largest financial institutions and to guarantee bank debt led to a significant decline in Libor-OIS and CDS premiums. Veronesi and Zingales (2010) find a positive net impact on the economy from the TARP

capital injections and the FDIC debt guarantee. Assessing the ex-ante cost of the insurance and the impact on banks, they find that these actions together resulted in a benefit to the economy of about \$84 billion to \$107 billion, calculated as the net of the increased value of banks of \$131 billion and an ex-ante cost to taxpayers of \$25 billion to \$47 billion, where the cost reflects the riskiness of the guarantee provided by the government.

The announcement of the stress test results in May 2009 had similar effects on these broad indicators, reducing the Libor-OIS spreads and CDS premiums that had increased again starting in February 2009. Studies of the effects of the announcement of the results suggest the stress tests provided information to investors, with banks that had identified capital gaps having more negative abnormal stock returns after accounting for the gaps the market had expected (Morgan, Peristian and Savino, 2014). By the end of 2009, these firms (with the exception of GMAC) had repaid their TARP capital, largely by issuing new common equity to private investors. Combined, they raised about \$120 billion of new equity in 2009 following the stress tests to increase their risk-weighted ratios by more than 3 percent.

In addition to capital at the largest institutions, government capital was made available to other depository institutions to promote lending through the Capital Purchase Program (CPP), and 707 firms participated, drawing a total of \$205 billion. Calomiris and Kahn (2015) find that the program was effective, even while asserting that the appearance of political interventions into application approvals tainted the program. Berger and Roman (2017) and Li (2013) compare outcomes in areas where banks received more TARP funds against markets where fewer or no banks received TARP support. They find that TARP capital led to increased bank lending, stronger bank balance sheets, increased job creation and lower business and personal bankruptcies. On average, they find that banks employed about one-third of TARP funds for new loans.

Other research suggests that bank credit growth in the United States, while still weak coming out of the crisis even when it turned positive in late 2010, recovered relatively quickly compared with the experiences of other financial crises. It seems likely that the aggressive responses to inject capital and guarantee liabilities once the panic hit likely contributed to credit growth, and that credit growth in turn supported more rapid GDP growth. Abiad, Dell’Ariccia and Li (2011) study “creditless” recoveries, when the growth in real bank credit is still negative in the first three years following a recession. For a sample of 49 countries with 388 recoveries from 1970 to 2004, they document that 1 in 5 recoveries are creditless, and that these recoveries are weaker, with average output growth of 4.5 percent per year, compared with about 6.3 percent in recoveries in which credit rebounded. They find that most creditless recoveries are associated with an impaired banking sector, consistent with the view that the lower growth reflected impaired provision of credit rather than weak demand for credit. This evidence suggests that efforts to quickly recapitalize the banking system to restore credit were important to the recovery.

Actions to help homeowners were initiated early on a modest scale but escalated as the crisis intensified. Mortgage delinquencies were rising as problems spread from subprime borrowers to other borrowers as the economy weakened and house prices continued to fall. A broad set of initiatives discussed in Chapter [X] aimed to stabilize and improve housing markets, seeking to reduce the number of foreclosures while

reducing financial market strains and supporting the overall economy. The actions taken were especially notable starting in 2009 using money through the TARP, with \$32.6 billion in TARP expenditures on programs to reduce foreclosures and related housing initiatives.

As noted in Chapter [X], the efforts from 2009 on together led to 8.2 million mortgage modifications, 9.5 million loans being refinanced, and 5.3 million other mortgage assistance actions. According to a HUD report, mortgage modifications from the Home Affordable Modification Program (HAMP) reduced principal by approximately \$24.5 billion, and saved borrowers approximately \$55 billion in mortgage payments.<sup>6</sup> Another 3.4 million households were helped by Federal Housing Administration (FHA) modifications. In addition, lower interest rates and looser underwriting criteria led to Fannie Mae and Freddie Mac refinancing 26 million loans from April 2009 to December 2016. These included 3.4 million refinancings of high loan-to-value mortgages under the Home Affordable Refinance Program (HARP), and another 4 million streamlined refinancings outside of HARP. While millions of families nonetheless faced foreclosure, the housing-related programs together contributed to the housing market and macroeconomic recovery.

Research suggests that these programs were beneficial. Agarwal et al (2017) estimate that through 2012, HAMP induced an additional 1 million permanent modifications than otherwise would have taken place and reduced the number of foreclosures by 600,000. Some other studies estimate that refinancing under HARP roughly halved the probability of default (see e.g., Karamon, Mcmanus and Zhu (2017) and a separate paper on Crisis-era Housing Programs for more details). In addition, a broader set of policies—including lowering the fed funds rate to zero, purchasing agency MBS and putting Fannie Mae and Freddie Mac into conservatorship—also contributed importantly to reduce defaults and foreclosures. Moreover, Fed purchases of agency MBS resulted in significant refinancings and lower interest expenses (di Maggio, Kermani and Palmer, 2016).

These studies on the effects of modifications cannot inform us about whether more aggressive programs would have been more effective. But the mortgage modifications policy responses, combined with broader policy responses to reduce mortgage rates and support the mortgage market, were more effective and consequential than commonly thought, and together contributed to the housing market and macroeconomic recovery.

Looking at the broader range of outcomes, Blinder and Zandi (2010) estimate the economic impacts of the government's responses to the financial panic and recession and conclude that the effects probably averted what could have been a second Great Depression. They use a large-scale macro model to simulate the effects of the government's total policy response and estimate that the effects on real GDP, jobs saved and inflation were substantial. They report that without the policies, the peak to trough decline in real GDP through 2010 would have been about 11.5 percent, compared with an actual decline of 4 percent, an enormous difference. They also attribute the bulk of the effects to financial policies, which include the full array of actions from monetary policy

---

<sup>6</sup> HUD December 2016 Scorecard, The Obama Administration's Efforts to Stabilize the Housing Market and Help American Homeowners.



to TARP, but find that fiscal policies also were important, and that the two types of policies reinforced one another.

The aggressive actions taken following Lehman’s failure—which escalated from liquidity measures to broad debt guarantees and the injection of capital to financial institutions—broke the escalating panic. CDS premiums for the two remaining investment banks fell sharply after the capital injections, though they remained elevated. The Fed’s purchase of agency MBS and agency debt in November 2008 led to sharp declines in agency MBS spreads and CDS premiums. Additional policies announced in February 2009 to improve transparency about the health of individual financial firms with the stress tests and to restart securitization markets contributed to the continued improvement. GDP growth turned positive in the second half of 2009, marking the end of the recession, and employment growth started to turn up by the end of 2009. Indicators of stress in the financial sector were much improved, though house prices continued to decline through early 2012. The decline in bank credit slowed, and positive growth returned in mid-2010. Only two investment banks survived as stand-alone entities, and they had become bank holding companies. The banking industry as a whole was raising private capital again, much of it in the form of common equity.

Finally, there are a few outcome measures that sit outside our framework but are nonetheless important to understanding the impact of the actions taken during the crisis. The first such measure is the cost to taxpayers of the systemic actions that were taken with TARP. We do not view whether the government made money on TARP investments as a reasonable measure of whether the systemic actions were successful, but instead believe that success is better measured by whether the financial system and the economy recovered as a result of the actions. That said, despite a popular view to the contrary, the TARP money invested in financial firms during the crisis was more than repaid, with the government earning \$29.5 billion from its commitments of \$269.6 billion to financial firms and the credit market programs.

The second measure is the impact of extraordinary systemic actions on risk-taking behavior and expectations of future public support on the part of financial-sector entities—i.e. moral hazard. We consider the moral hazard issue through the admittedly narrow lens of whether banks or their investors are generally behaving as if banks will get bailed out again. We think the balance of evidence leans toward not.

The post-crisis regulatory regime is substantially stricter, with tougher capital and liquidity regulations, living wills, and a new resolution authority for financial firms if bankruptcy is not viable. Banks are now also required to fund themselves with a layer of debt that is meant to absorb losses in the event of bankruptcy or resolution. This regime is meant to ensure that shareholders and unsecured bondholders, not taxpayers, would bear losses in the event of failure. In addition, in evaluating the post-crisis regulatory regime, including the greater limits on the Fed’s authority as lender of last resort, credit ratings agencies no longer ascribe increased safety to bank bonds from an implicit too-big-to-fail subsidy.

Still, some studies have interpreted the fact that CDS premiums and market betas for the largest banks are higher now than they were just before the crisis as evidence that banks now are riskier and more vulnerable to shocks (Sarin and Summer, 2016).

However, given the degree to which investors were likely underpricing risk in the years leading up to the crisis, other studies argue that simple comparisons of CDS premiums and market betas are difficult to interpret as evidence of changes in actual risk-taking behavior. Disentangling risk from risk-taking behavior is the subject of active research (see e.g., Atkeson, et al, 2018).

The final outcome measure we consider is the degree to which the policy actions taken during the crisis affected the level of the public’s trust in governmental authorities and institutions. Research since the financial crisis suggests that some amount of increased distrust and dissatisfaction with authorities may be virtually inevitable in these circumstances. Within the United States, states and localities with deeper recessions experienced larger increases in political polarization (Mian, Sufi and Trebbi, 2014). Based on cross-country experience of 20 advanced economies and more than 800 general elections since the late 1880s, policy uncertainty increases and extremist political parties gain voting shares following financial crises, but not normal recessions (Funke, Schularick and Trebesch, 2016).

The sentiment outcomes associated with the policy actions undertaken during this crisis seem consistent with these findings. The slogan “where’s my bailout?” succinctly conveyed the sentiment of many in late 2008 who felt unease at seeing government support go to banks that had been so deeply involved in the crisis through their lending and securitization, among other activities. Evidence from polls taken in the years after the crisis demonstrates the generally negative sentiment that surrounded many of the actions taken in response to the crisis. The negative sentiment surrounding these actions has likely contributed to what has been identified as a longer-term erosion of trust in government and a diminished belief in government fairness.<sup>7</sup>

More generally, it is likely that because of the way they are implemented, systemic policy actions are particularly vulnerable to the perception that they are being taken to support specific firms or groups of firms, rather than to support economic activity and employment, let alone ordinary individuals. There were indeed programs targeted directly to homeowners, with \$32.6 billion of TARP funding spent on efforts to avoid foreclosures and related housing initiatives, but the number of families receiving assistance did not peak until 2012 and 2013, years after policy efforts to stabilize large banks, and the time lag contributed to a sense of unfairness. And even then, many people who were not behind on their mortgages felt disquiet at the idea of taxpayer money for foreclosure relief going to those who, for example, might have bought a bigger house than they could afford.

---

<sup>7</sup> For example, see <http://www.people-press.org/2012/02/23/section-1-recent-economic-policies-keystone-pipeline/#tarp-negative>, <http://www.people-press.org/2013/09/12/five-years-after-market-crash-u-s-economy-seen-as-no-more-secure/#winners-losers>, and <http://www.people-press.org/2015/11/23/1-trust-in-government-1958-2015/>.

### III. Lessons Learned

The review conducted in this chapter suggests that the policy actions taken by the U.S. government over the course of the crisis served to prevent what might otherwise have been a second Great Depression. Research on individual policy actions taken provide evidence that many were effective in that they moved key indicators—such as risk spreads, credit, output and employment—in the desired direction. However, even though the economy performed better than might be expected based on benchmarks from previous financial crises, the actions were not able to prevent a severe recession and a weak recovery.

As the crisis escalated, the response of the U.S. authorities also escalated from a set of relatively traditional macro and systemic policies to a more powerful mix of extraordinary measures. On the systemic front, a number of combined actions were crucial to breaking the panic and restoring financial system functioning. These actions included injecting government capital into private financial firms, issuing government guarantees on the debt of private financial firms, and conducting supervisory stress tests on large banking organizations in the presence of a government capital backstop. But many of the extraordinary actions were undertaken and only possible after conditions in the financial system had eroded significantly and TARP was made available, at which point the groundwork for a deeper and more protracted economic downturn had already been laid.

We do not mean to suggest that the timing of the extraordinary measures was inappropriate when viewed from the perspective of decision-makers' real-time understanding and constraints. Nor do we mean to suggest that other policies might not have yielded better outcomes. Instead, we have in mind the following hypothetical: the same set of policy actions, had they been taken before the panic conditions of Phase III had set in, likely would have generated better economic outcomes than those that actually occurred during this period. To be sure, this is not just a hypothetical but a counterfactual in the sense that policymakers did not have the legal authority to take important actions such as capital investments in banks until after the panic had started and EESA was enacted.<sup>8</sup> And there were many other factors influencing decision-making in real time, including uncertainty, and concerns about potential consequences such as moral hazard, signaling of information and political ramifications. But this hypothetical serves to highlight one key point: waiting until conditions have eroded sufficiently as to clearly warrant extraordinary actions will almost inevitably generate a cost in terms of foregone economic growth owing to the reduction in financial sector functioning during the period of stress.

---

<sup>8</sup> For example, there was no legal authority to make capital investments in financial institutions until enactment of the Emergency Economic Stabilization Act of 2008 on October 3, 2008, and even then the regulators could not force banking firms to accept capital if they met their minimum regulatory capital requirements and other standards. In addition, there was no legal authority to resolve nonbank financial institutions outside of bankruptcy such as by imposing debt-for-equity swaps or otherwise imposing losses on creditors. This authority was made available only in 2010 in the Dodd-Frank financial regulatory reform legislation. See Swagel (2009) and Swagel (2015) for discussions of legal and other constraints on policymaking during the crisis.

The implications of this and other insights coming out of this review for crisis responses are outlined below for consideration by decision-makers in future financial crises.

Financial crises are damaging to growth and employment. We draw eight lessons for future crisis fighters to help to reduce their economic costs:

**LESSON 1: A strong regulatory and supervisory structure is necessary to reduce the expected costs of a crisis on the real economy.**

The U.S. regulatory and supervisory structure was weak and not well-matched to the risks in the financial system, which had grown rapidly outside of commercial banks prior to the crisis. It also did not have a viable bankruptcy or resolution process that would allow large and complex financial firms to fail in an orderly way that would minimize damage to the economy. The regulatory and supervisory structure needs to be kept up-to-date with changes in the financial system, and to be made more resilient to a wider range of shocks.

**LESSON 2: A strong regulatory and supervisory structure is not a substitute for strong crisis management capabilities.**

While a more stringent regime is now in place in the United States and in many other jurisdictions, no regime, no matter how well designed, will be able to prevent a financial crisis from occurring ever again. By reflecting on the lessons from the responses to past crises, governments will be better prepared to respond more effectively when faced with the next crisis.

**LESSON 3: Prepare (at least) for what is likely.**

Understand that the causes and manifestations of future crises will likely differ from those of this crisis but prepare for a few conditions that are likely to be present in any financial crisis. These include sudden and sustained reductions in liquidity in financial markets, widespread loss of confidence in the adequacy of financial institution capital even if the institutions comply with regulatory standards, and the potential for abrupt failures of financial entities that could seriously disrupt credit and growth. Authorities should practice responses to manifestations of these common types of conditions.

**LESSON 4: Prepare to be surprised.**

Recognize the limits of real-time information and inherent ambiguity and unpredictability associated with navigating effectively in crisis situations. Organizations should develop the capacity for rapid innovation, experimentation and learning.

**LESSON 5: Communicate before, during and after periods of financial crisis.**

Communicate with the public on an ongoing basis about the role that the financial system plays in the economy and the principles that will guide policy actions in a crisis. Communication alone cannot deliver concrete outcomes in terms of economic performance or financial system functioning, but it can help to increase the public's understanding of the rationale for the types of policy actions taken in a crisis.

**LESSON 6: There will always be forces that push against early intervention.**

Accept that there will always be a variety of forces—including uncertainty, valid concerns about triggering unintended consequences and gaps in legal authority—that will come together to favor inaction over action until conditions become sufficiently dire. In other words, many of the actions we judge in hindsight as having come too late will have been seen by many decision-makers in real time as having come precisely when, and not before, conditions warranted.

**LESSON 7: “Late” intervention limits the potential for good outcomes.**

Recognize that once conditions become sufficiently extreme or dire, even good decisions and well-executed actions may not yield “good” outcomes, particularly on the macro front, because the extreme conditions themselves have often already laid the groundwork for a deeper economic downturn. One of the hallmarks of decision-making in a financial crisis may be that even the best decisions are likely to yield outcomes that would be viewed as weak or lackluster during normal times.

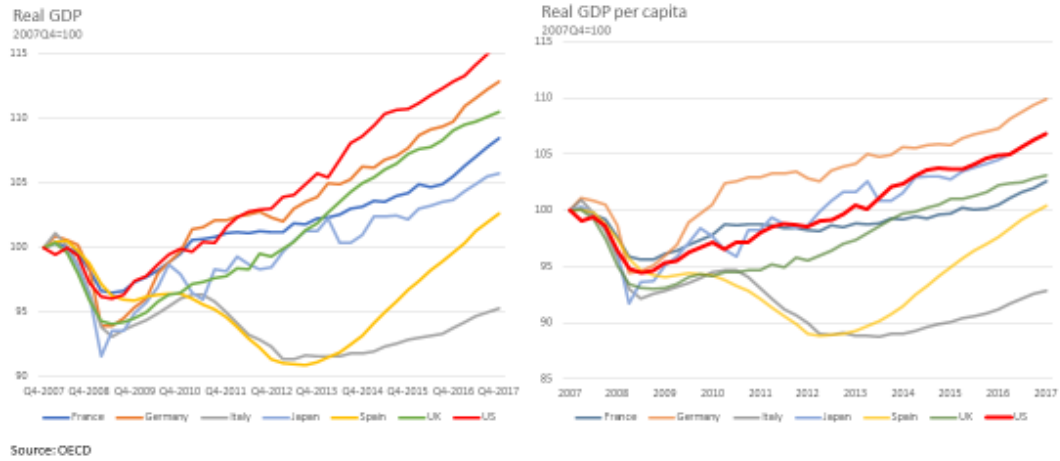
**LESSON 8: “Late” intervention may raise rather than lower the potential for unintended consequences.**

Recognize that once conditions have eroded sufficiently, the range of policy options shrinks. Late intervention may necessitate more extreme actions and more substantial deviation from the public’s expectations. These actions may also engender in the public a greater sense of unfairness.

# Figures

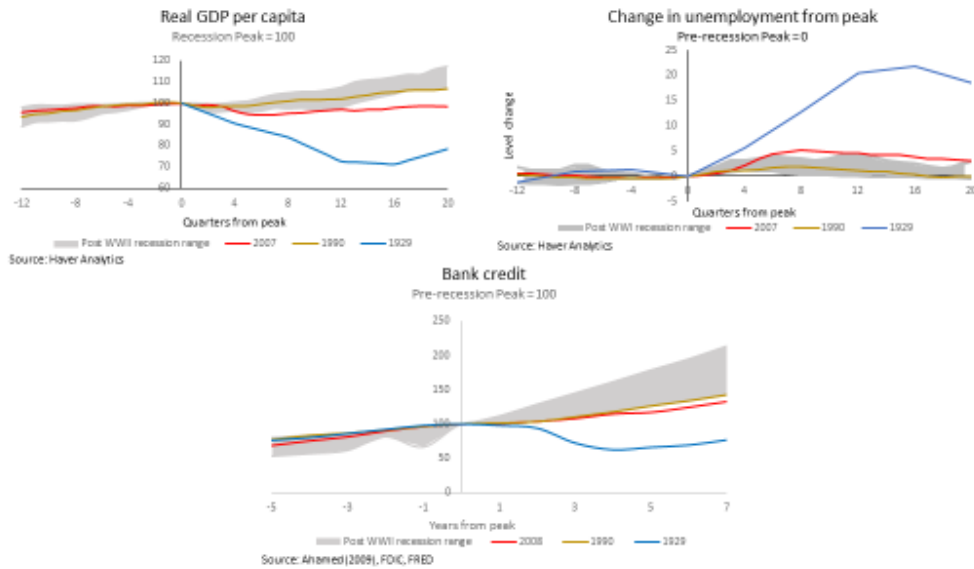
**Figure 1**

## Global Financial Crisis -- GDP 10 years later



**Figure 2**

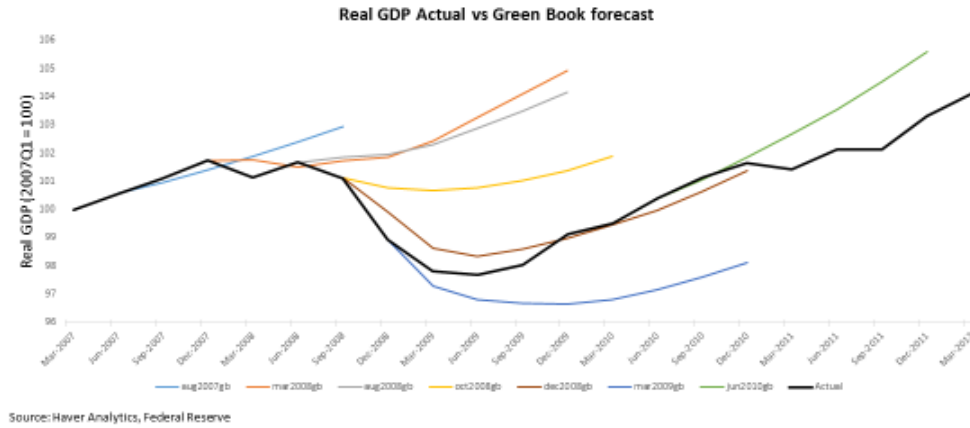
## US economy – GDP per capita, Unemployment, Bank credit



**Figure 3**

Possible GDP outcomes based on forecasts

Real GDP compared to Fed Greenbook forecasts, Aug 2007 to Jun 2010



**Figure 4**

Government commitments for systemic policies, GDP, employment, and bank credit

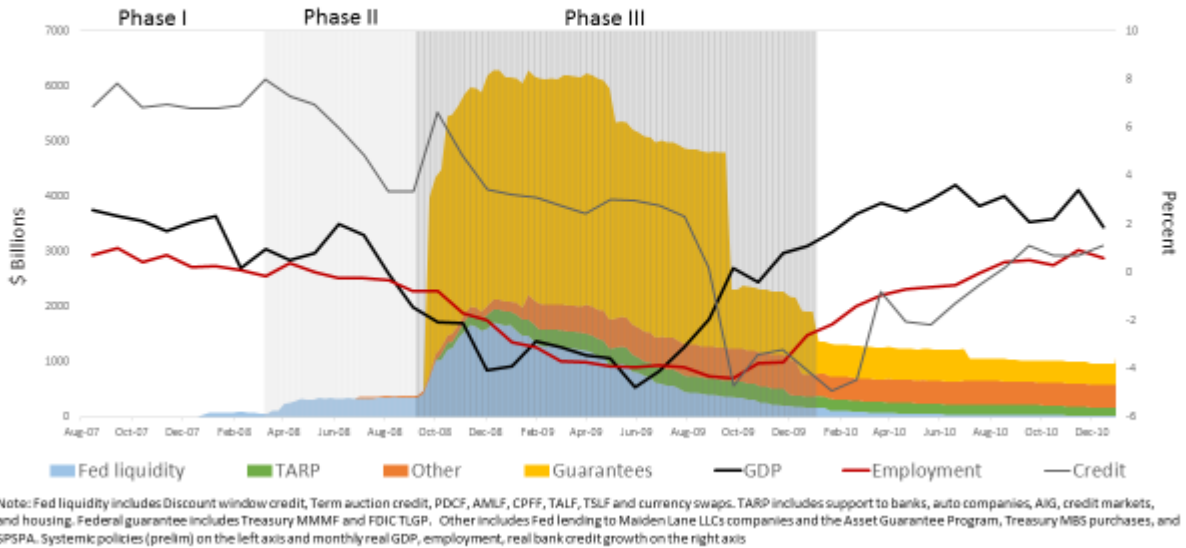


Figure 5

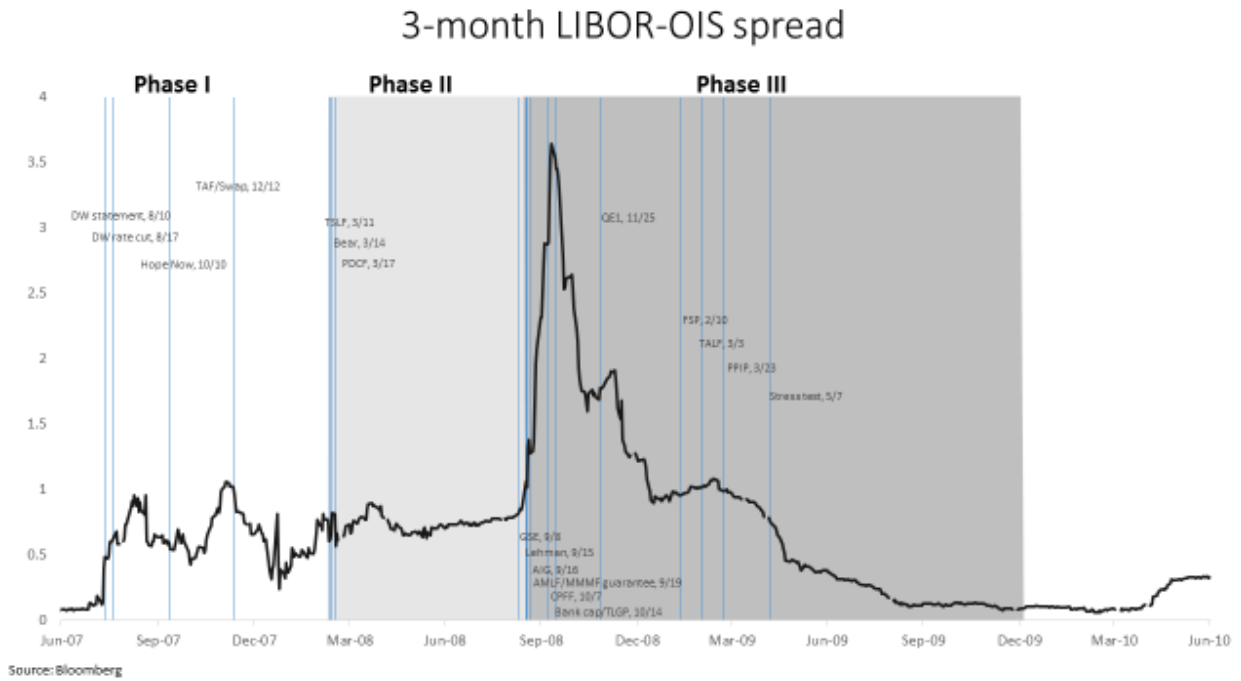


Figure 6

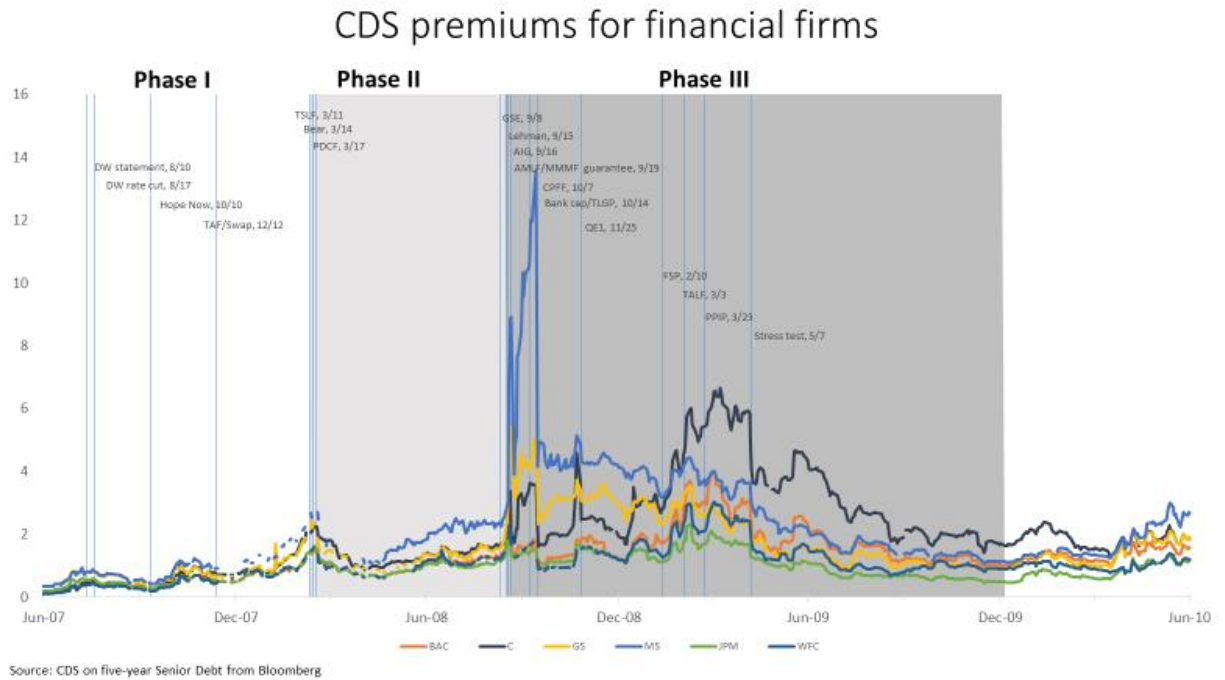
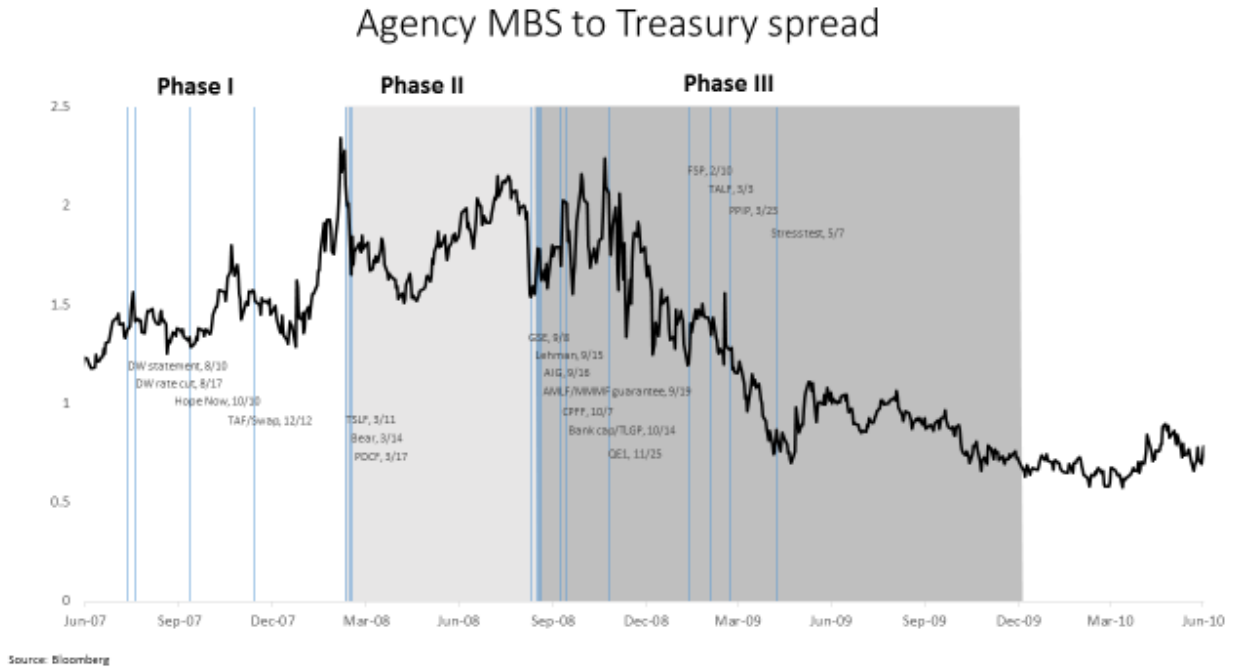




Figure 7



## References

- Abiad, Abdul, Giovanni Dell’Ariccia and Bin Li. “Creditless Recoveries,” *IMF Working Paper: Creditless Recoveries* 11.58 (2011).
- Adrian, Tobias, Christopher R. Burke and James J. McAndrews. “The Federal Reserve’s Primary Dealer Credit Facility,” *Current Issues in Economics and Finance* 15. Aug (2009).
- Adrian, Tobias, Karin Kimbrough and Dina Marchioni. “The Federal Reserve’s Commercial Paper Funding Facility,” *Federal Reserve Bank of New York Economic Policy Review* (2011): 25.
- Agarwal, Sumit, Gene Amromin, Itzhak Ben-David, Souphala Chomsisengphet, Tomasz Piskorski and Amit Seru (2017). “Policy Intervention in Debt Renegotiation: Evidence from the Home Affordable Modification Program,” *Journal of Political Economy*, Vol. 125, 3, June.
- Aizenman, Joshua and Gurnain Pasricha (2010). “Selective Swap Arrangements and the Global Financial Crisis: Analysis and Interpretation,” *International Review of Economics and Finance*, Vol. 19, 3, pp. 353-365.
- Andritzky, Jochen (2014). “Resolving Residential Mortgage Distress: Time to Modify?” IMF working paper WP/14/226, December.
- Allen, William and Richhild Mossner (2010). “Central Bank Cooperation and International Liquidity in the Financial Crisis of 2008-09,” *BIS Working Papers*, No. 310, May.
- Ashcraft, Adam, Nicolae Garleanu and Lasse Heje Pedersen. “Two monetary tools: Interest rates and haircuts,” *NBER Macroeconomics Annual* 25.1 (2011): pp. 143-180.
- Ashcraft, Adam B., Allan M. Malz and Zoltan Pozsar. “The Federal Reserve’s Term Asset-Backed Securities Loan Facility,” *Economic Policy Review* Nov (2012): pp. 29-66.
- Atkeson, Andrew G., Adrien d’Avernas, Andrea L. Eisfeldt and Pierre-Olivier Weill. “Government Guarantees and the Valuation of American Banks,” *NBER Macroeconomics Annual*, Vol. 33.
- Baba, Naohiko, Robert N. McCauley and Srichander Ramaswamy. 2009. “US dollar money market funds and non-US banks,” *BIS Quarterly Review* (Mar.): pp. 65-81.
- Baba, Naohiko and Frank Packer. “From turmoil to crisis: dislocations in the FX swap market before and after the failure of Lehman Brothers,” *Journal of International Money and Finance* 28.8 (2009): pp. 1350-1374.
- Benmelech, Efraim, Ralf Meisenzahl and Rodney Ramcharan (2017). “The Real Effects of Liquidity during the Financial Crisis: Evidence from Automobiles,” *The Quarterly Journal of Economics*, Vol. 132, 1, pp. 317-365.
- Berger, Allen N. and Raluca Roman. 2017. “Did Saving Wall Street Really Save Main Street? The Real Effects of TARP on Local Economic Conditions,” *Journal of*

- Financial and Quantitative Analysis 52, No. 5: pp. 1827-67 and Li, Lei. “TARP funds distribution and bank loan supply,” 2013. *Journal of Banking and Finance* 37, No. 12 (Dec.): pp. 4777-4792.
- Bernanke, Ben. 2018. “The Real Effects of Disrupted Credit: Evidence from the Global Financial Crisis,” BPEA, September.
- Blanchard, Olivier, Eugenio Cerutti and Larry Summers (2015). “Inflation and Activity – Two Explorations and their Monetary Policy Implications,” IMF Working Paper, 15/230.
- Blinder, Alan and Mark Zandi (2010). “How the Great Recession was brought to an End,” Moody’s Corporation.
- Broda, Christian and Jonathan A. Parker. “The economic stimulus payments of 2008 and the aggregate demand for consumption,” *Journal of Monetary Economics* 68 (2014): S20-S36.
- Calomiris, Charles W. and Urooj Khan. “An assessment of TARP assistance to financial institutions,” *Journal of Economic Perspectives* 29.2 (2015): pp. 53-80.
- Campbell, Sean, Daniel Covitz, William Nelson and Karen Pence. 2011. “Securitization Markets and Central Banking: An Evaluation of the Term Asset Backed Securities Loan Facility,” *Journal of Monetary Economics* 58, No. 5 (July): pp. 518-531.
- Cerra, Valerie and Sweta Saxena (2008). “Growth Dynamics: The Myth of Economic Recovery,” *American Economic Review*, Vol. 98, 1, March, pp. 439-457.
- Cerra, Valerie and Sweta Saxena (2017). “Booms, Crises, and Recoveries: A New Paradigm of the Business Cycle and its Policy Implications,” IMF Working Paper, 17/250, November.
- Claessens, Stijn, M. Ayhan Kose and Marco Terrones, (2013), “The Global Financial Crisis: How Similar? How Different? How Costly?” in *Financial Crises: Causes, Consequences, and Policy Responses*, editors Claessens, Stijn, M. Ayhan Kose, Luc Laeven, Fabian Valencia, International Monetary Fund.
- Covitz, Daniel, Nellie Liang and Gustavo Suarez (2013). “The Evolution of a Financial Crisis: Collapse of the Asset-Backed Commercial Paper Market,” *Journal of Finance*, Vol. 68, No. 3 (June), pp. 815-848.
- Del Negro, Marco, Gauti Eggertsson, Andrea Ferrero and Nobuhiro Kiyotaki. 2017. “The Great Escape? A Quantitative Evaluation of the Fed’s Liquidity Facilities,” *American Economic Review*, Vol. 107(3), pp. 824-857, March.
- Di Maggio, Amir Kermani and Christopher Palmer (2016). “How Quantitative Easing Works: Evidence on the Refinancing Channel,” MIT Sloan Working Paper, December.
- Duygan-Bump, Burcu, Patrick Parkinson, Eric Rosengren, Gustavo A. Suarez and Paul Willen. 2013. “How Effective Were the Federal Reserve Emergency Liquidity Facilities? Evidence from the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility,” *Journal of Finance* 68, No. 2(Apr.): pp. 715-737.

- Fernald, John, Robert Hall, James Stock and Mark Watson (2017). “The Disappointing Recovery of Output after 2009.” *Brookings Papers on Economic Activity*, Spring.
- Funke, Manuel, Moritz Schularick and Christoph Trebesch. “Going to extremes: Politics after financial crises, 1870–2014,” *European Economic Review* 88 (2016): pp. 227-260.
- Fleming, Michael J., Warren B. Hrungrung and Frank M. Keane. “Repo market effects of the term securities lending facility.” *American Economic Review* 100.2 (2010): pp. 591-596.
- Gertler, Mark and Simon Gilchrist (2018), “What Happened: Financial Factors in the Great Recession,” *Journal of Economic Perspectives*, Vol. 32, No. 3, Summer, pp. 3-30.
- Gorton, Gary and Andrew Metrick (2012). “Securitized Banking and the Run on Repo,” *Journal of Financial Economics*, Vol. 104, 3, June, pp. 425-451.
- Jorda, Oscar, Moritz Schularick and Alan Taylor (2013). “When Credit Bites Back,” *Journal of Money, Credit, and Banking*, Vol. 45, 2, Dec, pp. 3-28.
- Karamon, Kadiri, Douglas McManus and Jun Zhu (2017). “Refinance and Mortgage Default: A Regression Discontinuity Analysis of HARP’s Impact on Default Rates,” *The Journal of Real Estate Finance and Economics*, Vol. 55, 4, November, pp. 457-475.
- Khan, Aubhik and Julia Thomas (2013). “Credit Shocks and Aggregate Fluctuations in an Economy with Production Heterogeneity,” *Journal of Political Economy*, Vol. 121, 6, Dec.
- Kenneth N. Kuttner, 2018. “[Outside the Box: Unconventional Monetary Policy in the Great Recession and Beyond](#),” [Department of Economics Working Papers](#) 2018-04, Department of Economics, Williams College.
- Li, Lei. “TARP funds distribution and bank loan supply.” *Journal of Banking & Finance* 37.12 (2013): pp. 4777-4792.
- McAndrews, James, Asani Sarkar and Zhenyu Wang. 2017. “The effect of the term auction facility on the London interbank offered rate.” *Journal of Banking and Finance* 83 (Oct.): pp. 135-152. <https://doi.org/10.1016/j.jbankfin.2016.12.011>.
- Mian, Atif, Amir Sufi and Francesco Trebbi. “Resolving debt overhang: political constraints in the aftermath of financial crises,” *American Economic Journal: Macroeconomics* 6.2 (2014): pp. 1-28.
- Morgan, Donald P., Stavros Peristiani and Vanessa Savino. “The information value of the stress test,” *Journal of Money, Credit and Banking* 46.7 (2014): 1479-1500.
- Parker, Jonathan A., Nicholas S. Souleles, David S. Johnson and Robert McClelland. “Consumer spending and the economic stimulus payments of 2008.” *American Economic Review* 103.6 (2013): pp. 2530-2553.

- Ramey, Valerie A. (2018). “Ten Years after the Financial Crisis: What Have We Learned from the Renaissance in Fiscal Research?” Prepared for the NBER Conference, “Global Financial Crisis @10.” July 3, 2018.
- Reinhart, Carmen and Kenneth Rogoff (2009), “The Aftermath of Financial Crises,” *American Economic Review*, Vol. 99, No. 2, May, 466-472.
- Reinhart, Carmen M. and Kenneth S. Rogoff. “Recovery from financial crises: Evidence from 100 episodes,” *American Economic Review* 104.5 (2014): pp. 50-55.
- Romer, Christina and David Romer (2017). “New Evidence on the Aftermath of Financial Crises in Advanced Countries,” *American Economic Review*, Vol. 107, 10, October, pp. 3072-3118.
- Sarin, Natasha and Lawrence Summers (2016). “Have Big Banks Gotten Safer?” *Brookings Papers on Economic Activity*, September.
- Siemer, Michael (2014). “Firm Entry and Employment Dynamics in the Great Recession,” FEDS 2014-56, Federal Reserve Board, Washington, DC.
- Swagel, Phillip, 2009. “The Financial Crisis: An Inside View,” *Brookings Papers on Economic Activity*, Spring 2009.
- Swagel, Phillip (2015). “Legal, Political, and Institutional Constraints on the Financial Crisis Policy Response,” *Journal of Economic Perspectives*, Vol. 29, No. 2, Spring, pp. 107-122.
- Veronesi, Pietro and Luigi Zingales. 2010. “Paulson’s Gift,” *Journal of Financial Economics*, Vol. 97(3), pp. 339-368, September.

####