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US Shadow Financial Regulatory Committee Financial Crisis in the US and Beyond

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1.0 Introduction and Summary

The 2007-2009 financial crises that started in the summer of 2007 had its origins in the US housing policies, the subprime mortgage market in particular, and the end of the real estate bubble in the US. Housing prices had started to decline in mid-2006 and into 2007 just about the time that issuance of highly leveraged securities by large financial institutions began to accelerate. The crisis was quickly transmitted to other financial sectors and throughout the rest of the world, in part because of the important role that foreign banks and their subsidiaries played in the US mortgage backed securities market. The crisis and post-recession period has been accompanied by extraordinary policy innovations by the federal government, the

Treasury and the Federal Reserve as they attempted to respond to what was initially perceived and treated as a liquidity crisis but which subsequently proved to be a solvency crisis.

The Federal Reserve cut its target federal funds rate and has maintained it at a range of 0-.25 percent since December of 2008 in an attempt to stem the crisis and thereafter stimulate the economy. It also instituted a series of liquidity support programs designed to re-direct short term finds to primary dealers, then to support particular markets like the asset-backed commercial paper market, mutual funds and the mortgage market. It created a special purpose vehicle to subsidize the acquisition of Bear Stearns by JP Morgan Chase in March 2008. Finally it embarked upon a policy of quantitative easing as a substitute for its inability to lower interest rates further because of the problem known as the “zero bound” to nominal interest rates.

The Congress passed emergency stimulus legislation that attempted to use fiscal policy to stimulate the economy and job creation. The US Treasury created a series of programs to effectively guarantee the debts of Fannie Mae and Freddie Mac in the late summer of 2008, and to recapitalize large financial and non-financial institutions in the fall and winter of 2008 through the Temporary Asset Repurchase Program (TARP).

Financial markets have suffered significant pressures in the past, such as the 1987 crisis, the Long Term Capital Management crisis, and most recently the “dot com” bust in equity valuations that resulted in the loss of more than \$5 trillion in wealth. But those problems were not transmitted to other financial markets or to the real economy to any significant degree, largely because the dot com bubble was financed mainly in equity markets and did not involve US or other financial institutions taking significant risk through additional leverage that proved fatal when stock prices declined.

Careful consideration of the causes, consequences and policy responses suggest that various factors contributed to the severity of the 2007-08 crisis, and experts disagree about the weights to attach

to each in explaining what is now regarded as the most significant economic contraction since the Great Depression. The effectiveness of the various policy responses remains a matter of controversy, too, but one fact is not in dispute: the bailouts and subsidies involved in supporting large financial and non-financial institutions alike have reduced wealth and transferred resources from taxpayers to creditors, and in some cases, to the stockholders and management of those troubled intuitions. The problems, and arguably some of the policy responses, may have unintentionally created an adverse feedback from the financial to the real sector of the economy. This paper attempts to provide greater clarity about the main causes of the crisis, the early signs of problems that were brewing, what measures US policy makers took in response to the crisis and its aftermath, and what lessons have been learned.

2.0 Origins of the Subprime Crisis

The 2007-09 financial crisis originated in the US financial system and then spread through much of the developed world. As is well known, the crisis centered on losses from subprime mortgage origination and securitization, and its effects were greatly magnified by excessive leverage in many large financial institutions. That is not to say that the US was unique in its high-risk, high-leverage binge in the years running up to the crisis (2002 to 2007). Many other countries (including, notably, the UK, Iceland, Spain, Ireland, and Hungary) also suffered from their over-exposure to risk during that period. But without the uniquely large subprime mortgage shock in the United States, the global financial crisis and its severe macro-economic consequences for the world would have been much milder and shorter.

Why focus on subprime shocks, when US and global banks ultimately are facing losses on virtually all kinds of loans? The answer is that the losses on other categories of assets were smaller and came later in the cycle, and thus reflected the large shocks that originated in subprime lending.

In other words, the crisis developed not just from a world-wide asset

price bubble, or a US asset price bubble; it was first and foremost (although not exclusively) the product of a US subprime credit-driven housing bubble. Furthermore, all parties were not equally exposed to subprime losses (or to losses more generally, as shown in Figure 1), and any attempt to come to grips with the causes of the subprime crisis that does not explain this cross-sectional variation is incomplete. Some of the largest banks -- JP Morgan Chase, Bank of America, Deutsche Bank, Goldman Sachs, Morgan Stanley, Barclays, and Credit Suisse -- had relatively small exposures to subprime, at least before some of them acquired institutions that had large exposures of this kind. Indeed, some of these institutions benefited in some ways from the crisis, either because they were able to buy competitors at low cost (e.g., JP Morgan's acquisitions of WAMU and Bear Stearns), or because their competitors disappeared. In contrast, for the financial firms with large subprime exposures at the outset the crisis was an utter disaster that forced them either (1) to be placed in bankruptcy or conservatorship (Fannie, Freddie, and Lehman), (2) to be acquired by private firms (Bear, Merrill), or (3) to receive heavy assistance from governments to survive as independent firms (AIG, Citibank, and UBS).

The stories about the origins of the subprime shock that are being told are not all the same, and some popular stories overstate their case or require qualification. For example, some critics point to allegedly obvious incentive problems inherent in the "originate and distribute model" that led to the failure of securitization as an intermediation technology. The main criticism has been that securitization permitted the sponsors of the securities to have too little skin in the game. Two facts require a dose of caution before accepting that explanation.

First, sponsors actually retained large amounts of the subprime debts that they issued (and have the losses to show it), although some sponsors thought they were shedding their risks by putting them into ostensibly "off-balance sheet" entities ("Structured investment vehicles" or "SIVs" that certain banks had to put back on their balance sheets when losses became evident).

Second, it is important to understand that securitization, *per se*, did not fail. Securities backed by credit card loans, an alternative product to subprime MBS for consumer-finance based securitized debts, have operated reasonably well for three decades. Credit card-based securities continued to be issued until September 2008, when all financial transactions shrank dramatically, but these securities have since recovered along with other financial flows in recent months. Likewise, securities backed by prime mortgages have not evidenced anything like the losses that have shown up in the more avant-garde securities backed by subprime mortgage loans.

Others point to rating agencies as the culprits for the crisis. There is merit to the view that rating agencies grossly underestimated subprime risk, but here again, there was not uniformity in rating agencies' behavior. Research for over a decade has noted that ratings of securitized debts tend to be inflated relative to corporate debts, so there is evidence of a general inflation of ratings for securitized products. But during the financial crisis, the severe errors in rating methodology that produced grossly overstated ratings were specific to subprime-related securities.

When searching for explanations for these and other facts about the origins of the US subprime crisis, something else should be kept in mind. This was a financial institutions crisis, involving severe losses and insolvencies for commercial banks, investment banks, and to a lesser extent insurance companies, not just a financial crisis broadly defined. The history of financial institutions crises – that is, financial collapses in which financial intermediaries are severely exposed to loss – provides helpful guidance of where to look for explanations. Macroeconomic factors, including monetary policy laxity, are generally associated with financial booms and busts, but these macroeconomic considerations are not sufficient by themselves to produce crises centered on financial institutions, especially banks).

Banking crises – defined as moments of unusually large numbers of bank insolvencies, perhaps but not necessarily of large banks in particular, or times of banking panic – typically result from a combination of favorable macroeconomic circumstances (e.g., loose

monetary policy) alongside severe microeconomic distortions, often relating to government subsidization of risk. Banking episodes of this nature have been rare historically, but have become common worldwide over the past three decades (Calomiris 2009a). Furthermore, in the US and elsewhere, high and pro-cyclical bank leveraging – a key source of bank vulnerability to asset price bubbles – is also a recent phenomenon (Schularick and Taylor 2009). These and other factors point to structural changes in banking systems – especially related to safety net policies that protect banks – which have weakened or removed market discipline and distorted banks' incentives toward risk taking around the world that wound up playing major roles in the crisis (Barth et al. 2006).

In coming to grips with the origins of the current global financial crisis, this section will: (1) describe the microeconomic distortions in incentives toward risk; (2) explain the particular origins of subprime-related risk taking in the US and its timing; (3) discuss why some, but not all, large financial firms had taken on large subprime risks; and (4) explain the breakdown in the ratings process for subprime-related securitized debts, but not other debts.

2.1 It Wasn't Just Bad Luck

The default risk on subprime mortgages was substantially underestimated in the market during the subprime boom of 2000-2007. One starting point for explaining the origins of the subprime crisis is to ask whether the large losses and huge underestimation of risk that occurred in the pricing of subprime-related securities was the result of identifiable and predictable errors, or alternatively, just bad luck. Recent academic studies describe in detail the faulty assumptions that underlay the massive securitization of subprime mortgages and related collateralized debt obligations (CDOs, which were complicated securities that were constructed from other securities, mainly those backed by subprime mortgages). It can be difficult to establish the “before the fact” (or *ex ante*) unreasonableness of any assumptions. Nevertheless, in the case of subprime securitizations, it is not so difficult. Some facts known to everyone in advance of the subprime collapse were simply put aside in the modeling of risk by

numerous parties.

In retrospect, the two most important errors of subprime risk modeling were: (1) the assumption that house prices would not fall, an especially important assumption, given that subprime mortgage-backed securities (MBS) was much more sensitive to house price assumptions than normal MBS, as discussed further below, and (2) the assumption that ignoring “soft” information and allowing lending with little or no borrower documentation (“no-docs” or “low-docs” mortgages) based entirely on Fair Isaac Co. (FICO) credit scores would not result in significant adverse selection in the pool of no-docs and low-docs mortgages. In short, the models wrongly assumed that a mortgage with, say, a 600 FICO score and with proper documentation of employment was roughly as good as a mortgage with a 600 FICO score with no documentation. According to recent research by Rajan, Seru and Vig (2011) each of those two modeling errors was of roughly equal importance in generating the massive deterioration in subprime mortgage portfolios. Without those assumptions there would have been no subprime debt crisis. And yet, those assumptions were obviously unreasonable on an *ex ante*, not just *ex post*, basis during the subprime boom.

What was the basis for assuming that house prices would never fall? The subprime mortgage was a relatively new product, which grew from humble beginnings in the early 1990s. By 2003, Wallison (2011, p. 65) shows that there were already hundreds of billions of dollars in subprime mortgages outstanding, especially in the portfolios of Fannie Mae and Freddie Mac. Underwriting quality deteriorated over time for subprime and Alt-A loans, especially after 2003. Total originations took off, more than doubling in 2004 and peaking in 2006 and early 2007. Subprime risk models based their stress tests, including their house price stress tests, on a short period of “look-back.” For some variables in the models (say, interest rates) that may have been a reasonable practice, given the short track record of the product, but it was not reasonable to base projections of the possible paths of housing prices only on ten years of retrospective data. Doing so meant that modelers relied on the experience of housing prices during a single recession -- the 2001 downturn -- to

gauge the potential downside for the housing market. The 2001 recession was also unique from the standpoint of the housing cycle since it was the only recession in US history in which housing price growth was sharply positive. Other prior recessions show a very different pattern. Wouldn't it have been more reasonable to assume during the 2003-2007 period that the next recession might see a flattening or a decline in housing prices, which was the rule rather than the exception?

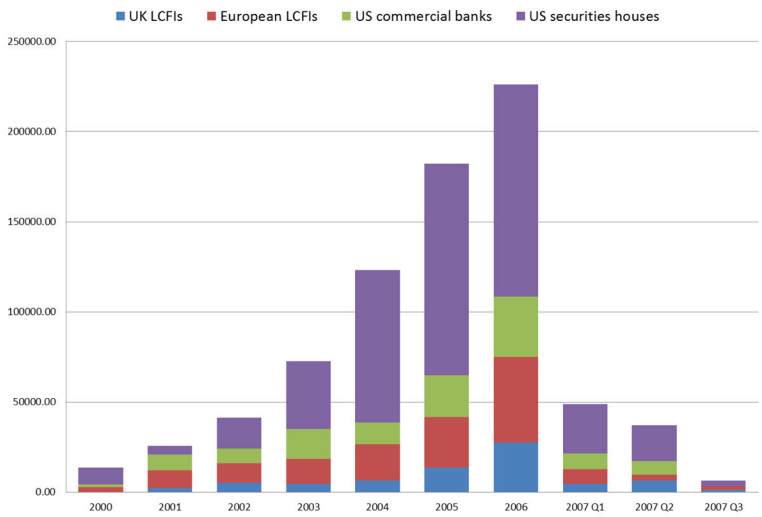
Indeed, some well-placed risk managers worried that the US was overdue for a housing price decline, partly because of the extremely positive performance of the 1990s and early 2000s. David Andrukonis, a risk manager at Freddie Mac, recognized in his April 5, 2004 letter to a superior that the reliance of underwriters on house price appreciation to "bail out" subprime lenders was based on a false extrapolation of the past into the future: "We are less likely to get the house price appreciation we've had in the past 10 years to bail this program out if there's a hole in it" (Calomiris 2008). There were economists, notably Robert Shiller (2000) of Yale and Raghuram Rajan (2005) of the University of Chicago, who warned the wider public of a housing bubble in the making.

The assumption that no-docs mortgages would have the same risk as well-documented mortgages with similar FICO scores also defied economic logic and the experience of the mortgage market with no-docs products in the 1980s. Mr. Andrukonis weighed in – as did several other risk managers at Freddie Mac – to discourage his superiors from entering this product area in 2004. He reminded them that "in 1990 we called this product 'dangerous' and eliminated it from the marketplace." The warnings did not work, and top management specifically referred to their political mandate to grow subprime credit in rebuffing the objections of their risk managers.

Freddie Mac was not alone in its enthusiasm for subprime products. Many financial institutions piled in and as a result the growth in subprime originations from 2004 to 2007 was meteoric (See Figure 1), and was accompanied by a significant deterioration in borrower quality due to the growth in no-docs and low-docs mortgages. The

heavy weight of no-doc mortgages in subprime portfolios after 2004 nonetheless largely reflected the decisions of Fannie Mae and Freddie Mac (the government-sponsored entities that dominated the mortgage market) to make massive purchases of no-doc subprime MBS in mid-2004. These decisions were made over the strong objections of their risk managers who pointed to large adverse-selection consequences from doing so (Calomiris 2008). Those objections not only were based on the experience they had with no-docs mortgages in the 1980s but also using simple economic theory, the consequences of no-doc lending were predictable. If a mortgage lender hangs out a shingle saying that he will ask no questions but the FICO score, then it will attract (“adversely select”) people who know that their FICO scores are about to deteriorate. The three primary reasons for consumer defaults are the loss of a job, a severe health problem, and divorce.

Figure 1. Issuance of Subprime Mortgage Backed Securities (\$ billions)



Source: Bank of England, Financial Stability Report 2007

All of those three events are known to the borrowers long before their consequences show up in the FICO score; only by doing proper due diligence can a lender detect these problems well in advance of their impact on that score. Banks that do not behave prudently will predictably “adversely select” lower quality borrowers. Even more remarkably, subprime originations for late 2006 and early 2007 con-

tinued at peak levels despite mounting evidence beginning in mid-2006 that housing prices were flattening (which had predictably disastrous consequences for subprime portfolios), and evidence of unprecedented performance problems beginning to occur in existing portfolios, which were discussed openly by the ratings agencies.

Josef Ackerman, the CEO of Deutsche Bank, said in a speech given at the European Central Bank in December 2008 that his bank fled the subprime market in mid-2006 in reaction to these obvious signals of problems. Professor Gary Gorton of Yale, in his oral comments at the August 2008 Kansas City Federal Reserve Bank's Jackson Hole Conference described the continuing high-volume of originations in 2006 and 2007 by Merrill, UBS, and Citibank in light of the obvious problems brewing in the housing market as "shocking." Gorton (2008) emphasized that the core assumption on which subprime lending had been based was the permanent appreciation of home prices. By the middle of 2006, that assumption was being disproven, and no one – least of all the rating agencies – seemed to care.

The rating agencies did notice the problem, they just did not react to it very well – a failure that reflected the conflicted incentives of the agencies (as discussed further below in Section 2.4.1)¹. According to Fitch's extremely negative discussion of subprime prospects in December 2006, the environment became increasingly negative after the first quarter of 2006, as indicated by the fact that "the number of sub-prime downgrades in the period between July and October 2006 was the greatest of any four-month period in Fitch's history for that sector" (up to that point). Fitch correctly predicted that "the sensitivity of sub-prime performance to the rate of HPA [home price appreciation] and the large number of borrowers facing scheduled payment increases in 2007 should continue to put negative pressure on the sector. Fitch expects delinquencies to rise by at least an additional 50% from current levels throughout the next year and for the general ratings environment to be negative, as the number of downgrades is expected to outnumber the number of upgrades." Nevertheless, in the midst of all this negative news, subprime mort-

¹ Technically, the ratings agencies are not "agencies" at all, in the sense that they did not represent any private party or were governmental bodies. We use the term here because it is the colloquial term for them.

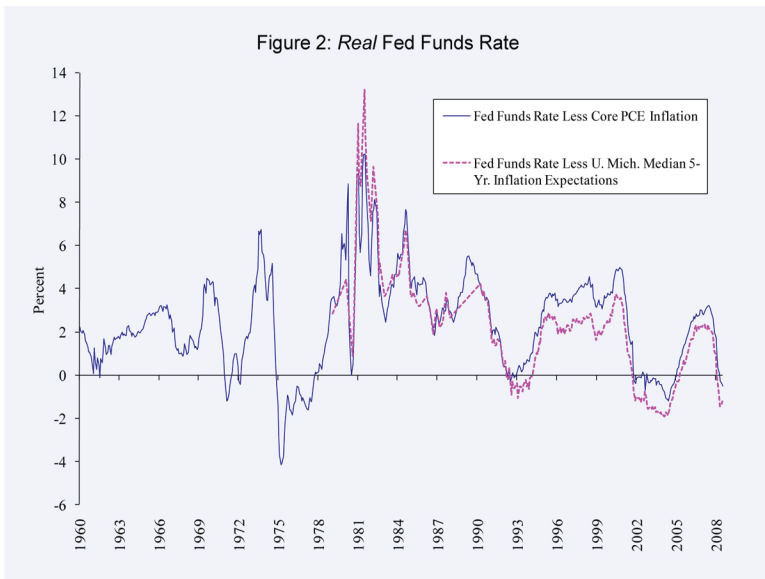
gage originations continued at a feverish in pace, and not until the middle of 2007 were these serious problems reflected in significant (albeit still inadequate) changes in modeling assumptions by the ratings agencies.

The predictable risk-taking mistakes of financial managers were not the result of random mass insanity; rather, they reflected a policy environment that strongly encouraged financial managers to underestimate risk in the subprime mortgage market and a prudential regulatory system that did not provide an effective check on those excesses. Four categories of error were especially instrumental in producing the crisis and we discuss them in turn.

2.2 Error 1: Monetary Policy and Global Imbalances

Lax Fed monetary policy, especially from 2002 through 2005, promoted easy credit and kept interest rates very low for a protracted period. As already noted, the history of banking crises teaches us that, while monetary ease by itself is not a sufficient condition for generating a banking crisis, it is frequently a significant contributor aggravating bad decision making (Bordo and Haubrich 2009, Calomiris 2009b, and Bekaert et al. 2011) show that reductions in the fed funds rate target in particular are associated with a substantial narrowing of risk premia in markets.

As Figure 2 shows, the history of postwar monetary policy has seen only two episodes in which the real fed funds rate remained negative for several consecutive years; those periods are the high-inflation episode of 1975-1978 (which was reversed by the anti-inflation rate hikes of 1979-1982) and the accommodative policy environment of 2002-2005. Figure 2 also shows that the Federal Reserve deviated sharply from pursuing policies consistent with the “Taylor Rule” (an equation used by monetary economists to describe the historical relationship between fed funds rates set by the Fed and contemporaneous unemployment and inflation) in setting interest rates during the 2002-2005 period. Fed funds rates remained substantially and persistently below the levels that would have been consistent with past behavior described by the Taylor Rule.



Not only were short-term real rates held at persistent historic lows, but because of the peculiarities in the market for medium- and long-term US Treasuries due to global imbalances and Asian demands for debt, the Treasury yield curve was virtually flat from 2002 to 2005, meaning that extremely low interest rates prevailed across all maturities. Accommodative monetary policy and a flat yield curve made credit easily available to support expansion in the housing market at abnormally low interest rates, which encouraged overpricing of houses, while also stimulating demand for higher interest-bearing, seemingly safe securities, like the first “tranche” of MBS backed by subprime mortgages.

To be fair, however, the Fed was operating in a more complicated environment. Had it tried to choke off housing, which was the main driver for the recovery and the main beneficiary of multiple and general public policies outlined in the following section, likely would have resulted in substantial Congressional pushback and possible measures that would have compromised the independence of the Fed itself.

2.3 Error 2: Subsidization of Mortgage Risk

Numerous government policies specifically promoted or subsidized subprime mortgage-related risk taking by financial institutions (Calomiris 2009b). Those policies included (a) HUD mandates on the portfolio composition of mortgages purchased by the government-sponsored enterprises (GSEs), Fannie Mae and Freddie Mac to promote “affordable housing,” which required the GSEs to meet quotas for proportions of assets invested in loans to low-income borrowers, minorities, and borrowers living in “underserved” locations; (b) lending subsidies via the Federal Home Loan Bank System to its member institutions that promoted high mortgage leverage and risk; (c) FHA subsidization of high mortgage leverage (nearly zero down payments) and high borrower default risk; (d) government and GSE mortgage foreclosure mitigation protocols that were developed in the late 1990s and early 2000s to reduce the costs to borrowers of failing to meet debt service requirements on mortgages, which encouraged risky mortgage borrowing by forcing originators to renegotiate delinquencies rather than foreclose (these new protocols were associated with a substantial reduction from the mid-1990s to the early 2000s in the probability of foreclosure occurring conditional on 90-day delinquency); and (e) almost unbelievably, 2006 legislation that prohibited so called “notching,” which encouraged rating agencies to relax their standards for measuring risk in subprime securitizations, and sent a continuing strong signal to markets that government remained committed to using its powers to promote continuing optimism about the mortgage market.

All of these government policies contributed to the underestimation of subprime risk, but the politicization of Fannie Mae and Freddie Mac and the actions of members of Congress and the Clinton and Bush Administrations in particular which encouraged reckless lending by the GSEs in the name of affordable housing were among the most damaging microeconomic policy actions that later contributed to the financial crisis.

In order for Fannie and Freddie to maintain their implicit (now explicit) government guarantees on their debts, which contributed

substantially to their profitability, they believed (with good cause) that they had to meet mandated portfolio targets for low-income borrowers and under-served locations set for them by HUD. At the behest of Congress and both Administrations, HUD raised these targets over time, requiring the two housing GSEs to ramp up their investments in risky subprime mortgages and guarantees of mortgage securities backed by such loans (Wallison 2011 and Pinto 2011). Unfortunately, because the number of creditworthy subprime borrowers did not grow as fast as HUD's GSE mandates, the only way for the GSEs to meet their quotas was to debase their underwriting standards, especially by accepting undocumented subprime loans with high loan-to-value ratios.

Absent the involvement of Fannie and Freddie in aggressive subprime and Alt-A mortgage buying beginning in 1997, it is likely that the total magnitude of toxic mortgages originated would have been substantially reduced, although the precise counterfactual is difficult to specify. Nevertheless, it is reasonable to assume that Fannie and Freddie crowded in market participation more than they crowded it out. The removal by Fannie and Freddie of caps on their no-doc and low-doc lending, and the entry into no-doc mortgages in an aggressive way in 2004, facilitated the doubling of subprime and Alt-A originations in that year, and continuing increases from 2004 to 2006.

In mid-2006, when housing price weakness led others like Goldman Sachs and Deutsche Bank to pull back, Fannie and Freddie – as their HUD quotas required – continued to purchase subprime and Alt-A securities well into 2007. The GSEs' involvement likely contributed to the willingness of Citibank, UBS, and Merrill Lynch to continue originating subprime securities long after the flattening of house prices. Also, Fannie and Freddie had demonstrated little interest in monitoring compliance by originators with representations and warranties (which they had systematically ignored), and they seemed to offer originators a blank check – a reliable put option if problems arose. The reliability of that put option was enhanced by Fannie and Freddie's accounting practices (now the subject of an SEC suit), which understated the size of the aggregate amount of their sub-

prime exposures. By September 2008, however, market participants were aware of the spiking rates of delinquency in mislabeled “prime” mortgages, and only then did Fannie and Freddie’s likely insolvency become apparent.

2.4 Error 3: Prudential Regulatory Failure

Prudential regulation of commercial banks by the government has proven to be ineffective in preventing massive risk taking by protected banks with insufficient buffers of capital to absorb their losses. That failure is reflected in (a) fundamental problems in measuring bank risk resulting from regulators’ ill-considered reliance on credit rating agencies assessments and internal bank models to measure risk, and (b) the too-big-to-fail problem (Stern and Feldman 2004), which makes it difficult to credibly enforce effective discipline on large, complex financial institutions (like Citibank, Bear Stearns, AIG, and Lehman) even if regulators detect that those institutions have suffered large losses and that they have accumulated imprudently large risks.

The risk measurement problem has been the primary failure of banking regulation, and a subject of constant academic regulatory criticism for decades. Bank regulators utilize various means to assess risk, depending on the size of the bank. Under the simplest version of regulatory measurement of bank risk, subprime mortgages should have had a 100% risk weight, but in the case of securitizations guaranteed by Freddie and Fannie, that weight was only 29%. The more complex measurement of subprime risk (applicable to larger US banks) relies on the opinions of ratings agencies or the internal assessments of banks, and unsurprisingly, neither of those assessments is independent of bank management.

2.4.1 Subprime Ratings Inflation and the Regulatory Reliance on Ratings

Rating agencies, understandably are supposed to cater to buy-side market participants (i.e., banks, pensions, mutual fund companies, and insurance companies that maintained subprime-related asset ex-

posures), but when their ratings are used for regulatory purposes, buy-side participants also reward rating agencies for underestimating risk, since that helps the buy-side clients avoid regulation. Likewise, it is widely believed that one major problem with rating agency grade inflation of securitized debts, in particular, is that sellers of these debts (sponsors of securitizations) are the ones who pay for ratings rather than the buyers. Yet this view, too, fails to recognize that the buyers of the debts also want inflated ratings because of the regulatory benefits they receive from those inflated ratings.

Moreover, rating agencies had no incentive to construct realistic models or respond realistically to bad news relating to subprime instruments for a simple reason: their buy-side clients did not want them to. Institutional investors managing the portfolios of pensions, mutual fund companies, insurance companies and banks continued to buy subprime-related securitization debt instruments well into 2007. Even the financial institutions, both domestic and international, that sponsored these instruments (and presumably had the clearest understanding of their toxic content) continued to retain large amounts of the risk associated with the subprime MBS and CDO securitizations they packaged, through purchases of their own subprime-related debts and credit enhancements for subprime conduits. Were the bankers who created these securitizations and retained large exposures for their banks related to them, and other sophisticated institutional investors who bought subprime-related securities, aware of the flawed assumptions regarding housing prices and no-docs mortgages that underlay the financial engineering of subprime MBS by ratings agencies? These assumptions were widely publicized as part of the process of selling the securities. Did they object? Apparently not.

Why did bank investors create these risks for themselves and other institutions, and why did sophisticated institutional investors buy these overpriced securities? The obvious answer is that asset managers were placing someone else's money at risk, and earning huge salaries, bonuses and management fees for being willing to pretend that these were reasonable investments. For financial institutions originating and holding such positions, managers were able to point to low regu-

latory capital risk charges as supportive of the low default risk on these securities. Rating agencies also gave legitimacy to this pretense, and were paid to do so. Even savvy investors or originators may have reasoned that other competing banks and asset managers were behaving similarly, and that they would be able to blame the collapse (when it inevitably came) on a surprising shock. The script would be clear, and would give plausible deniability to all involved. “Who knew? We all thought that the model gave the right loss assumption! That was what the rating agencies used.” Plausible deniability was a device for allowing asset managers to participate in the feeding frenzy at little risk of losing customers (precisely because so many participated). Because asset managers could point to market-based data, and ratings at the time as confirming the prudence of their actions on a forward looking basis, they were likely to bear little cost from investor losses.

In short, the regulatory reliance on ratings magnified a preexisting agency problem on the buy side of the securitized debt market. Rating agencies and asset managers were willing accomplices and the latter invested too heavily in risky assets because of an incentive conflict or “agency problem,” in part because regulators relied on the agencies’ ratings. If asset managers had informed their clients of the truth – that the supply of good investments in risky assets has been outstripped by the flood of financial savings, and that consequently, the risk-reward tradeoff did not warrant further investment in risky assets – then asset managers would have been required to return money to clients rather than invest in risky assets. Presumably the money would then have ended up in bank deposit accounts or other low-risk (and low-fee generating) investments. Returning the money to investors under these circumstances would have made investors better off (given the poor return to bearing risk), but it would have made asset managers worse off since their fees grew in proportion to the amount of funds invested in risky assets.

To what extent is it plausible to argue against this view by pointing to the novelty of securitization products (subprime MBS, CDOs, etc.), which may have made investors and rating agencies unable to gauge risk properly in advance of the crisis? As noted, data and logic

available prior to the crisis showed that key assumptions regarding the possible path of home prices and the adverse-selection consequences of no-docs mortgages were unrealistic. Furthermore, the novelty of a securitization product, in and of itself, should be an indicator of a need to adjust estimates of risk upward. Experience suggests that rating agencies frequently have underestimated the risks of new products and only adapted their behavior after major credit or fraud events occur, which shows that their risk measures and controls for new products tend to be inadequate. Experience prior to the subprime collapse (in credit card securitization, in delinquent consumer account receivable securitization, and in other areas) in particular has shown that the learning curve related to underestimation of risk can be steep. Decades of experience with steep learning curves in new securitization products indicates yet another reason that properly incentivized institutional investors should have been cautious about the new, fast growing markets in subprime mortgages and CDOs.

Indeed, it is particularly revealing to contrast the measurement of subprime risk with the measurement of risk in the much older credit card securitization business. In credit card securitization, even during the subprime crisis, market participants paid close attention to the identities of originators, to their performance in the past, to the composition of portfolios, and to how compositions changed over time, and originators were rewarded with greater leverage tolerances for “seasoned” receivables with good track records. In contrast, until the middle of 2007, the ratings of subprime portfolios (based largely on the unrealistic expected loss assumptions) seem to have been extremely insensitive to changes in borrower quality, product type (which is correlated with unobservable aspects of borrower quality), or the state of the housing market. And there was dramatic new entry into subprime origination in 2004-2006 by fly-by-night originators, yet these new entrants offering new, riskier products to new customers seem to have been able to raise funds under more or less the same low loss assumptions as old originators who offered older, lower-risk products. The principles learned over twenty years in the credit card securitization business were thrown out the window when rating subprime-related securitizations.

This account of the origins of the crisis does not place the blame for the mispricing of risk exclusively on securitization sponsors (the sell side) or on rating agencies. After all, sponsors were only supplying what asset managers of their own institutions or outside buyers were demanding, fueled by the Fed's low interest rate policy and Asian money, which encouraged buyers to seek out seemingly safe, higher paying assets. And the rating agencies were also doing what the investors wanted – going through the mechanical process of engineering conduit debt structures, and rating them, based on transparently rosy assumptions. Rating agencies were not deceiving sophisticated institutional investors about the risks of the products they were rating; rather they were transparently understating risk and inflating the grading scale of their debt ratings for securitized products so that institutional investors (who are constrained by various regulations to invest in debts rated highly by nationally recognized statistical ratings organizations, or NRSROs) would be able to invest as they liked without being bound by the constraints of regulation or the best interests of their clients.

Many observers wrongly attribute rating agencies' behavior solely to the fact that sponsors, rather than investors, paid for the ratings. But as noted above, if sophisticated institutional investors had not wanted the models to be mis-specified and the ratings to be inflated, then the ratings agencies would not have built such faulty models and would not have generated such inflated ratings. Regulatory reliance on ratings encouraged ratings inflation and model misspecification of subprime-related securitized debts. Ratings inflation therefore would have occurred even if the buy side had paid for ratings.

2.4.2 Too Big To Fail

The too-big-to-fail problem relates to the lack of credible regulatory discipline for large, complex financial institutions. For them, the prospect of failure is considered so potentially disruptive to the financial system that regulators have an incentive to avoid intervention. The incentives that favor "forbearance" and/or explicit government assistance *ex post* can make it hard for regulators to ensure compliance *ex ante*. The too-big-to-fail problem magnifies the so-

called “moral-hazard” problem of the government safety net: banks that expect to be protected by deposit insurance, Fed lending, and Treasury-Fed bailouts, and that believe that they are beyond discipline, will tend to take on excessive risk, since taxpayers share the costs of that excessive risk on the downside.

The moral hazard of the too-big-to-fail problem was clearly visible in the behavior of the large investment banks in 2008. After Bear Stearns was rescued by a Treasury-Fed bailout in March, Lehman, Merrill Lynch, Morgan-Stanley and Goldman Sachs all sat on their hands for six months awaiting further positive developments (notably, an improvement in the market environment or a handout from the federal government). In particular, Lehman did little to raise capital or shore up its position not only because management thought financial conditions would improve, but also because its chief executive officer thought that the government would never let it fail (Sorkin, 2009). But when conditions deteriorated and the anticipated bailout failed to materialize for Lehman in September 2008 – showing that there were limits to Treasury-Fed generosity – the other major investment banks immediately either became acquired or transformed themselves into commercial bank holding companies to signal to markets that they would have increased access to Fed and government support.

2.5 Error 4: Large Bank Insensitivity to Market Signals

Distorted incentive problems played a key role in the financial crisis. In particular, the breakdown in risk controls can be directly traced to incentive problems. The crisis demonstrated that despite the large literature and attention paid to ways to structure compensations schemes so as to make them sensitive to market signals, these mechanisms all proved ineffective in limiting undue risk taking.

It is interesting that for a long period of time, the partnership was the dominant form in investment banking. Partners had substantial portions of their wealth at risk, but as institutions grew, incorporation was encouraged by the need to raise capital help finance the huge scale that industry has assumed meant that internally generated funds were insufficient to fund large mergers and leveraged invest-

ment vehicles. Investment banks abandoned the partnership form in the 1980s and early 1990s and formed limited liability corporations as a means of raising more capital (and also enabling partners to liquefy their ownership interests in their institutions, Cumming and Eisenbeis (2009).

The corporate form freed investment banks from barriers to raising capital. However, for some activities like trading and securities issuance, the opportunity for high returns, the tradability of securities that they issued and sponsored, the ability to take on huge leverage and the difficulties of assessing risk positions created perverse incentives. When accompanied by a long economic boom period, these factors combined to enable financial institutions to take on more leverage and risk in the pursuit of high returns, and ultimately large personal compensation packages for management. It was not unusual for financial institutions – both banks and investment banks alike – to target returns on equity in the high teens and mid-twenties, well above historical norms.

Government regulations contributed to the perverse incentives. For example, limiting who can buy stock in commercial banks has fragmented ownership and made institutions less sensitive to the interest of shareholders, which contributed to the buy-side agency problems within banks that led to large subprime risks. Hedge funds and private equity funds have traditionally been barred from controlling bank holding companies. Pension funds, mutual funds and insurance companies are limited by regulations to only own small stakes in any public firm, including banks. By limiting the concentration of ownership of banks, these regulations collectively immunized managers of large banks from challenges by sophisticated shareholders that could have reined in their risk-taking.

Lack of sensitivity to market risk monitoring allowed bank management to pursue investments that were unprofitable for stockholders in the long run, but that were very profitable to middle managers who ran those portfolios in the short run, given the short time horizons of managerial compensation systems. When such discipline is absent managers are able to profit from risk-taking to benefit them-

selves at the expense of stockholders. An asset bubble (like the subprime bubble of 2003-2007) offers an ideal opportunity for this kind of behavior. If senior managers establish compensation systems that reward subordinates based on total assets managed or total revenues collected, without regard to risk or future potential loss, then subordinates are incentivized to expand portfolios rapidly during a bubble without regard to risk.

Few academic studies attempt to explain the dramatic differences in performance, compensation and other incentive arrangements within the financial services industry, or even recognize that they exist. One particularly interesting exception is Ellul and Yerramilli (2010), who show that differences in ex ante risk and ex post losses were predictable across bank holding companies on the basis of the relative strength of the institutional commitment to risk management. As a proxy for that commitment, they employ the ratio of the compensation paid to the chief risk officer relative to the compensation paid to the chief executive officer. Banks with a high ratio suffered less risk ex ante and less loss ex post.

In other words, failures in the internal organizational rules of the game that bank CEOs established were crucial contributors to the crisis. The question remains, however, why some banks chose to invest more in risk management than others. The existence of government subsidies for affordable housing and government guarantees can explain why Fannie Mae and Freddie Mac absorbed half of subprime mortgage risk, but cannot explain why Citibank and JP Morgan Chase made such different choices leading up to the crisis. Thus far, empirical research has not delivered a convincing explanation for these differences.

2.5.1 What About Deregulation?

This review of the four areas in which government policy contributed to the financial crisis has made no mention of deregulation – specifically the Gramm-Leach-Bliley Act of 1999 (GLB) which removed the remaining barriers to common ownership of investment and commercial banks. Many observers nevertheless have claimed that

“deregulation” caused the crisis. But involvement by banks and investment banks in subprime mortgages and mortgage securitization was in no way affected by the deregulation of the last two decades. Indeed, investment banks without significant commercial bank operations, and vice versa, each aggressively participated in the origination and securitization of subprime mortgages. GLB had nothing to do with this activity. In fact, deregulation cushioned the financial system’s adjustment to the subprime shock when it was fully manifested by making banks more diversified and by allowing troubled investment banks to become stabilized by becoming, or being acquired by, commercial banks (Calomiris 2009b).

2.5.2 The Size of the Shock vs. the Size of the Crisis

The severity, duration, and spread of the subprime crisis were disproportional to the actual losses directly related to subprime securities. Why did subprime losses cause such widespread havoc throughout global financial markets? The answer to that question revolves around a chain of causation from insolvency concerns about banks, producing funding problems for those banks (and others), which ultimately led to a perceived liquidity crisis that adversely affected the pricing of all assets.

The impacts of financial losses are magnified when the distribution of loss is hard to ascertain. This “asymmetric-information” problem produces a widespread scramble for liquidity throughout the financial system when it is under stress, which causes suppliers of credit to refuse to roll over debts, and causes interest rates on risky securities and loans to rise dramatically, reflecting not only the fundamental credit risk in the system, but also the illiquidity of the markets. This race for liquidity magnifies losses and the risk of financial failure far beyond what otherwise would have occurred if it were easy to identify exactly who suffered from the fundamental exogenous shocks giving rise to the crisis.

Gorton (2008) argues that the complexity of subprime-related securitizations contributed greatly to the inability of the markets to identify the distribution of loss in the system, once the crisis began.

That alleged inability reflected the complex design of the distribution of cash flows in the various securitizations, the multiple layers (or tranches) of securities, and the sensitivity of the portfolios that contained these instruments to uncertain changes in housing prices. Securities backed by subprime mortgages were especially vulnerable to the decline in housing prices because the payouts on these securities were predicated on scenarios that only envisioned rising housing prices. This only made it more difficult reliably to project payouts in a declining housing price environment.

Schwarz (2010) devises an innovative means of distinguishing between the exogenous effects of fundamental loss expectations and the endogenous effects of the scramble for liquidity in explaining the widening of credit spreads during the crisis. Liquidity risk is captured by market factors unrelated to default risk (e.g., spreads on sovereign bonds of different liquidity), and credit risk is captured by differences between banks in the rates they paid in the interbank market (abstracting from changes in the average interest rate, and therefore, from the common effect of liquidity risk). She finds that roughly two-thirds of the widening of credit spreads was attributable to liquidity risk.

2.6 Summary and Conclusion

Loose monetary policy and global imbalances can explain the timing of the housing market boom, but like other severe banking crises historically, microeconomic government policies that distorted the risk taking decisions of financial institutions were crucial necessary conditions for causing the subprime mortgage crisis. The microeconomic policy errors enumerated above that caused the subprime crisis relate to the fundamental design of the financial system – housing finance policy, prudential regulatory policy, and corporate agency problems at large banks – all of which been the subjects of substantial academic research prior to the financial crisis.

3.0 Government and Federal Reserve Responses to the Crisis¹

There were three distinct phases of the financial crisis and each elicited its own response on the part of the Federal Reserve in the United States in its attempt to deal with the associated problems. The first phase or “liquidity phase” dates from early August of 2007 until the first week in September 2008. The press reported that markets had frozen up, banks could no longer fund themselves in the overnight markets and interbank market spreads had widened significantly. The second phase or “solvency phase” began in early September of 2008 with the failures of Lehman Brothers and AIG and the government takeovers of Freddie Mac and Fannie Mae. Market spreads again widened and problems began to spread to broader segments of the mortgage market and money market mutual funds threatened to break the buck. Finally, the third phase began in mid-December of 2008 when the FOMC changed how it administered its Federal Funds rate target from using a single interest rate to targeting a range for the funds rate between 0 and .25%. This last period ushered in a time of unconventional monetary policy that involved significant expansion of the Federal Reserve’s balance sheet. For purposes of this paper, we will focus primarily on the first two of these three phases.

3.1 Phase I – Liquidity Problems and Frozen Markets

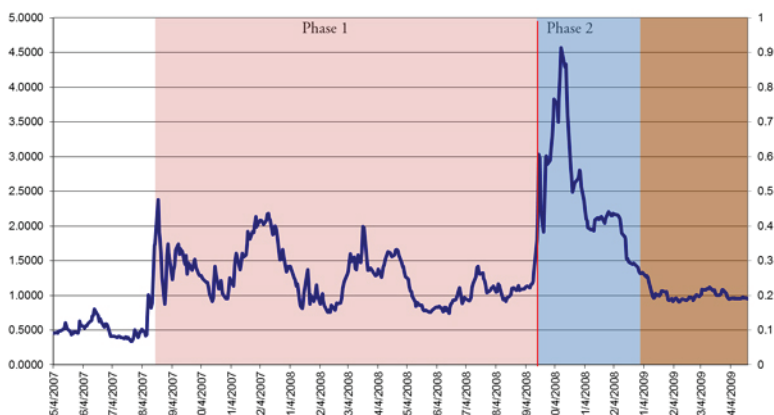
The financial crisis began rather slowly in May of 2007, but then erupted in August of 2007. Increased credit spreads in the interbank lending markets jumped significantly, especially in the LIBOR (London Interbank Offer Rate, which was the rate for international bank funding), Federal Funds and asset-backed commercial paper markets.

The claim was that these markets had frozen up and that financial institutions could no longer fund themselves in the short-term markets. The problems institutions had in funding themselves were reflected in the “TED” spread shown in Figure 3. The TED spread represents the difference between the 3 month London Interbank Borrowing Rate (LIBOR) and the three month Treasury bill rate.

¹ This section draws heavily upon Eisenbeis(2008, 2009, 2011).

The figure shows that the typical spread prior to its spiking averaged about 25 basis points through April of 2007. It then jumped to an average of about 50 basis points in May 2007. This doubling of spreads provided some of the first clues as to the impending liquidity concerns. Liquidity problems accelerated in August when the spread jumped to 1% on August 10th, then to 1.3% on August 15 before peaking at 2.375% on August 20th, as shown by the vertical red line in the figure.

Figure 3. TED Spread - 3 Month LIBOR less 3 Month Treasury Bill Rate - July 2007-April 2009



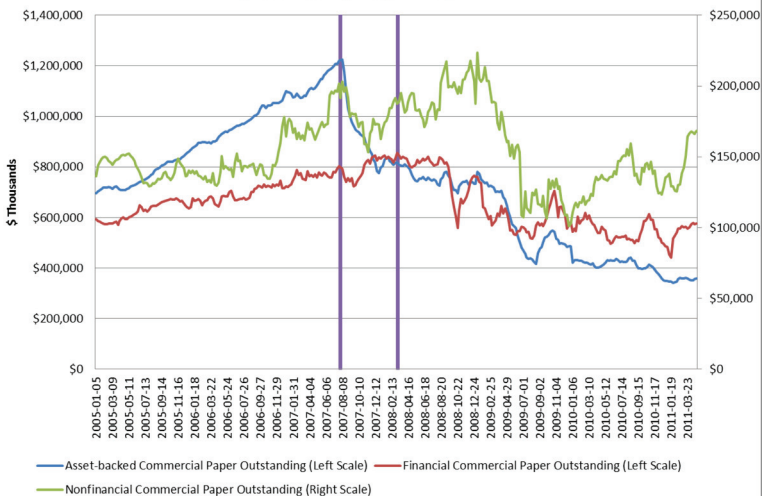
Much of the interbank funding that was going on was related to the ballooning mortgage market and the “originate to distribute” model for mortgages – both prime and sub-prime. Both mortgage originators and securitizers borrowed short term and relied upon extreme leverage to warehouse temporarily both new mortgages and newly packaged mortgage-backed securities until they could be sold to investors. In some instances, institutions like AIG, employed leverage combined with short term borrowing to finance their holdings of longer term mortgage-backed securities.

The issuance of mortgage-backed securities and in particular, securities that were backed by sub-prime loans didn't peak until 2007, even though the US housing market had begun to decline in late 2005 and into 2006. Figure 1 showed earlier that the issuance of

Residential Mortgage-Backed Securities (RMBS) backed by sub-prime loans in 2004 far exceeded what it was in 2002 and accelerated further in 2005 and into 2006, which is about the time that the US mortgage market had begun its decline. Most importantly, the figure shows that among the principal players in this market were US investment banks and foreign institutions, namely from the UK and Europe, which also helps to explain why the mortgage crisis was quickly transmitted to those areas and not to Canada, Japan or other parts of the world.

Particularly hard hit was the asset-backed commercial paper market where much of the sub-prime mortgage-backed securities were financed. Figure 4 compares the financing in the asset-backed commercial paper markets with that of the financial and non-financial paper markets. Growth in the asset-backed segment of the market accelerated in 2005 and mirrored the jump in sub-prime RMBS, far exceeding the growth of both financial and non-financial paper. The asset-backed market peaked in the first week of August 2007 and then abruptly declined, leveling off in by the end of the first quarter of 2011. The peak corresponds to the spike in the TED spread shown in Figure 3.

Figure 4. Weekly Outstanding Volume of Asset-Backed, Financial and Non-Financial Commercial Paper (Seasonally Adjusted)



Interestingly, the financial commercial paper segment didn't peak until August 2008, just before the Lehman Brothers failure and related events, while rates for non-financial paper didn't peak until even later in January of 2009. So, initially the crisis was concentrated only in the mortgage paper market, though it was the largest segment of the overall short-term debt segment at that time.

The Federal Reserve viewed the widening of interest rate spreads and the freezing up of the commercial paper market to large complex financial institutions as a classic liquidity crisis affecting individual institutions. It responded first, as Bagehot would have, by lending freely at the discount window, and by instituting several related special programs to redirect funds to those individual institutions most in need between August 2007 and March of 2008. The principal borrowers were primary dealers that the Federal Reserve's Open Market Desk dealt with directly on a day to day basis.

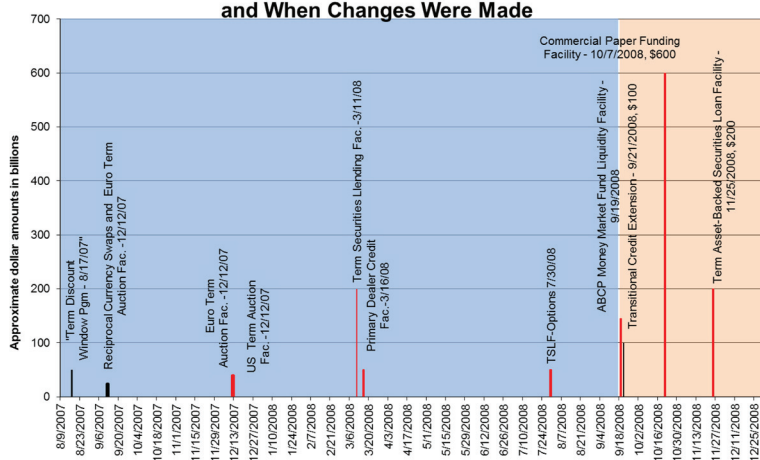
Specifically, on August 17, 2007 the Fed expanded the ability of banks to borrow at the discount window from overnight to as long as 90 days through its Term Discount Window Facility. The Fed intended to lend freely through its primary discount window facility, but in fact very little lending was channeled in this manner. Volumes were quite low throughout the fall of 2007, reaching \$2.9 billion on September 12. But they then tapered off significantly, and didn't expand again until early December 2007.

On December 12, 2007 the Fed created the Term Auction Facility (TAF) which enabled banks to bid for discount window funds at auctions held approximately every two weeks for either 28 days or 84 days. That program got off to a rather modest start; loan volume averaged between \$20 and \$ 60 billion from December 2007 to March of 2008.

Also that March, the Fed broadened eligible participants in its emergency lending programs to include primary dealers that weren't banks. For example, on March 11, 2008 the Fed created the Term Securities Lending Program (TSLF). This program expanded the Fed's securities lending program to include all of the primary deal-

ers, permitting them to borrow securities from the System Open Market Account (SOMA) in an overnight program for as long as 28 consecutive days. The dealers could then repo (sell and then repurchase) those securities out as collateral for overnight funds as a source of liquidity, thereby avoiding to have to liquidate securities at fire sale prices. Again, however, relatively modest use was made of the program. The maximum outstanding during the early period was slightly over \$100 billion spread among several users, both domestic and foreign. A few days later on March 16, the Fed established its Primary Dealer Credit Facility (PDCF) which permitted all primary dealers - meaning non-bank primary dealers - to borrow from the Fed on the full range of collateral permitted under the tri-party repo system. Figure 5 show the timeline of this and other programs that the Fed put in place.

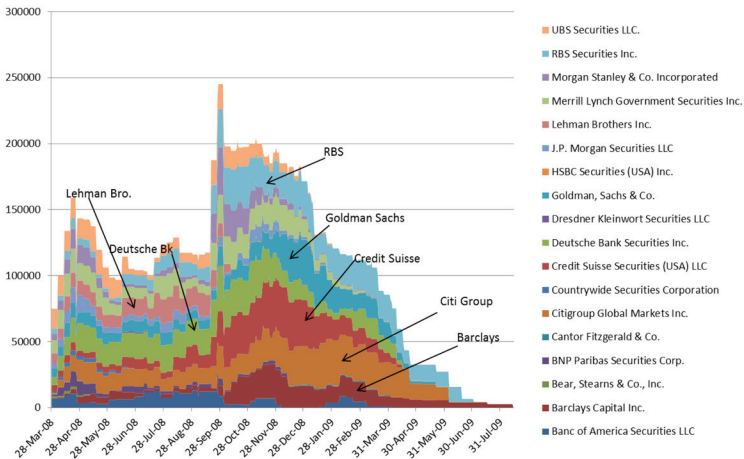
Figure 5. Timeline of Key Federal Reserve Liquidity Innovations and When Changes Were Made



All of these initiatives affected the composition of the Federal Reserve's balance sheet and, except for the Term Securities Lending Facility, which was an off balance sheet program, increased the amount of recorded reserves available to the banking system. The Fed offset the increase in bank reserves by reducing its holdings of government securities from nearly \$800 billion to about \$475 billion by August of 2008.

But the largest impact upon the banking system reserves came from the TSLF. Under that program Fed employed an auction process enabling successful bidders to borrow securities over night for as long as 28 days. Each morning the securities were taken back into the Fed's portfolio so the program was off balance sheet and didn't reflect an increase of bank reserves on the Fed's books because of the way the record keeping was done. The effect of the TSLF was to reallocate bank reserves to the primary dealers that would otherwise had been available to smaller banks or holders of Fed funds to support lending and asset acquisition. Figure 6 shows not only the daily outstanding volumes but also details which institutions were the beneficiaries of the program.

Figure 6. Daily Outstanding Lending Under the Term Securities Lending Facility by Borrower



The Federal Reserve's treatment of the rise in spreads in the short term money markets as a liquidity problem for particular institutions continued until the problems in Lehman Brothers, AIG, Freddie Mac and Fannie Mae in the fall of 2008 made it clear that something more fundamental was at work.

3.2 Phase II - The Solvency Problem

Numerous events occurred early in 2007 signaling that the widening spreads were evidence of much more severe difficulties in many

foreign and domestic money center participants than simply a temporary liquidity squeeze. These events, especially those involving institutions with heavy commitments to the mortgage market, were significant warning signs of major trouble. For example, HSBC fired its head of its US mortgage lending business in February 2007 due to large losses. Bear Stearns suffered big subprime mortgage losses in two of its hedge funds in June of 2007 and was obviously the dominant user of the Primary Dealer Credit Facility. Furthermore, Bear reported its first ever quarterly loss in December of 2007, which was more than two months after the initial jump in spreads earlier that fall. Countrywide avoided failure by being acquired by Bank of America in January of 2008 (an acquisition that later contributed to severe financial problems at Bank of America as large portions of its loans soured or, became the subject of litigation relating to allegations of improper representations and warranties when those loans were sold and packaged into securities).

Meanwhile, mortgage-related losses kept cropping up in numerous large financial institutions. Particularly hard hit were those institutions that relied upon leverage and short term funding to support longer term asset holdings. The risks associated with those positions gradually were reflected in larger money market spreads where those positions were being financed.

Figure 3 clearly shows the decline in spreads in the days following the Fed's efforts to supply liquidity (from August of 2007 through the first two quarters of 2008) that proved to be only temporary and had a relatively minor overall impact on spreads. Indeed, spreads proved to be volatile and even rose to about 200 basis points on two separate occasions. One of those events was associated with the revelation of the precarious financial condition of Bear Stearns in the lead up to its government-assisted rescue in March.

Figure 3 also shows that the so-called liquidity spike in the TED spread in August of 2007 was minor compared to the jump that occurred in early September 2008 when, in a few short days, a series of unprecedented events shook the financial world. Freddie Mac and Fannie Mae were placed in government conservatorship (Septem-

ber 7, 2008). Lehman Brothers declared bankruptcy about a week later (September 15, 2008). The Federal Reserve Bank of New York was quickly authorized on September 16th to lend \$ 85 billion to American International Group (AIG). Treasury established a special guarantee program for money market mutual funds to prevent them from “breaking-the-buck.” The Fed initiated a series of currency swap arrangements with foreign central banks to provide dollar liquidity in foreign markets. The Fed and Treasury announced initiatives to provide credit facilities to backstop the mortgage-backed securities market which had been so dependent upon the asset-backed commercial paper market. And finally, virtually all remaining US investment banks were permitted to convert to bank holding companies. The TED spread peaked at over 450 basis points on about October 10. It seems clear now that this particular jump was suggesting the existence of major solvency concerns about many of the primary dealers and other large foreign financial institutions in Europe and the UK.

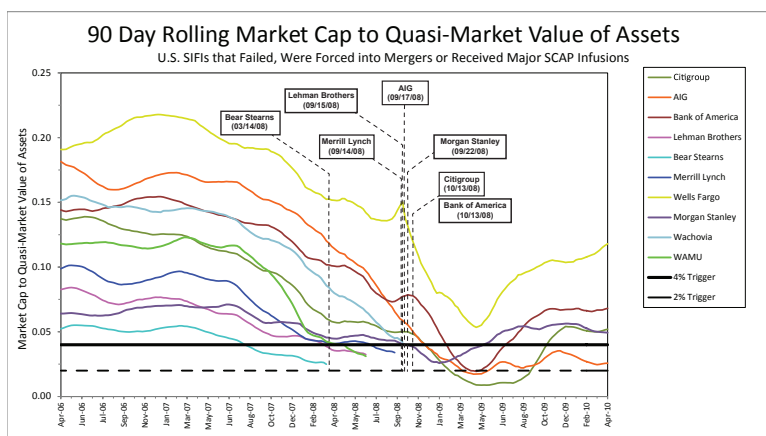
As the result of the various problems that surfaced in September 2008, the Treasury and the Federal Reserve finally recognized the dangerously large solvency challenges in many large financial institutions. This led both agencies to take the unprecedented step of asking Congress for \$700 billion in taxpayer funds to create the Troubled Asset Relief Program (TARP). The initial aim of TARP was to stabilize the financial system by buying troubled assets.

After an initial false start, Congress passed the Emergency Economic Stabilization Act of 2008 on October 3, 2008 which granted this authority to Treasury. However, instead of purchasing assets, Treasury quickly changed course within a few days and the allocated funds were used to inject capital into the nation’s largest financial institutions through its Capital Purchase Program as well as into others on an as needed basis. The banking agencies also initiated so-called stress tests to bolster public confidence in the nation’s largest institutions that had raised the needed equity to cover losses and that passed the tests. Indeed, losses at those institutions large enough to justify market skepticism were reflected in the spreads. From the third quarter of 2007 thorough the second quarter of 2009 the twenty five largest

US banking organizations reported significant losses of over \$1 trillion that clearly validated market concerns about their deteriorating financial condition.

Perhaps the most remarkable fact about the reactions of policy makers to the crisis was the failure to force banks and investment banks to recapitalize themselves sufficiently between October 2007 and September 2008, or before the crisis was full-blown. Although global financial institutions did raise roughly \$450 billion in capital during this period, this was not enough to offset the declines in market perceptions of bank equity. As Figure 7 shows, all the large US financial institutions that ultimately were bailed out saw continuous decline in their market equity ratio (the ratio of the value of their equity capital relative to their assets) over many months prior to the crisis of September 2008. Given the desire to avoid dilution, financial institutions chose to allow their equity ratios to plummet over time. Regulators and Treasury officials could have demanded that these regulated institutions raise more capital, but they did not, almost certainly because they did not recognize or were unwilling to admit the gravity of the problem. This is perhaps the most obvious and most significant policy failure during the crisis.

Figure 7 - Calomiris - Herring chart on institutions equity that were bailed out.



In response to the events of September 2008 and afterwards, the Federal Reserve's strategy changed. Prior to that date, the Fed had

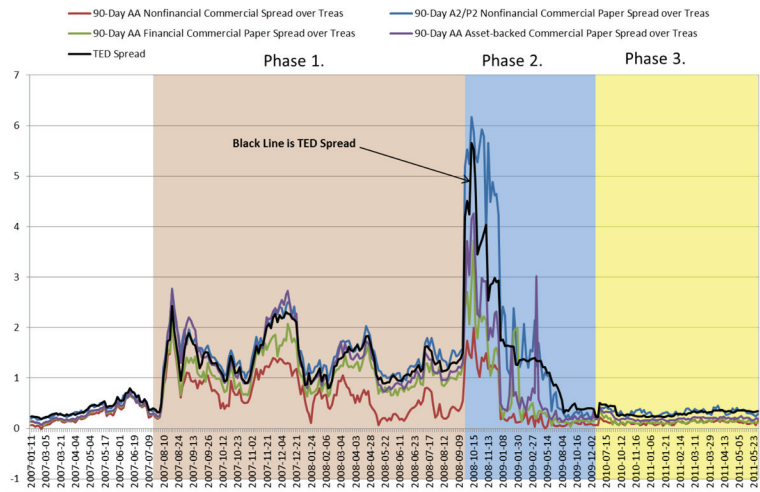
treated the liquidity problems as being idiosyncratic and confined to selected large financial institutions. After September 2008, the Fed began to address a deficiency in general market liquidity. Policy shifted from channeling liquidity to the major primary dealers while offsetting those efforts with assets sales from its portfolio to one of significant monetary expansion. The Fed initiated foreign currency swaps with other foreign central banks that then provided dollars in international money markets that were starved for dollar liquidity and believed to be totally dysfunctional.

As a result, the Federal Reserve's balance sheet expanded from about \$1.1 trillion in September of 2008 to slightly more than \$2.4 trillion (when one includes the impact of the off balance sheet securities lending program) at year-end. In addition to the currency swap program, the Fed initiated three other programs to inject liquidity into the system: the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF, put in place September 19, 2008), the Commercial Paper Funding Facility (CPFF, put in place on December 7, 2008) and the Term Auction Facility (TAF). These three programs accounted for the bulk of the expansion of the Fed's portfolio.

The combination of the various Treasury and Federal Reserve actions during the Solvency Phase II of the crisis helped bring the TED spread (see Figure 3) down promptly, stabilizing it at about 100 basis points in the spring of 2009. The TED spread drifted lower throughout the rest of the year. Spreads in other markets, such as the commercial paper market, the Euro dollar market, and T-bills exhibited similar declines. See, for example, Figure 8 which shows commercial paper spreads compared with the TED spread.

TED spreads as well as those in the commercial paper market and Euro dollar market continued to decline throughout the rest of the year. The return of spreads to near pre-crisis levels was regarded as a policy success. The stabilization of financial markets meant that the policy focus turned to attempts to stimulate the real economy and to revitalize the US housing market.

Figure 8. 3 Month Commercial Paper Rates Spread Over 3 Month Treasuries



3.3 Phase III – Policies to Stimulate the Real Economy and Stabilize Housing

The Federal Reserve attempted to stimulate economic growth and employment throughout the crisis with a series of 10 downward adjustments in its target federal funds rate from 5.25% in September 2007 to a range of from 0 to .25% in mid-December, 2008. When it became clear that the crisis-driven declines in the target fed funds rate weren't sufficient and that further downward movement was not possible because nominal rates can't go below the zero (the so-called "zero bound problem"), the Fed embarked upon what is now known as QE1, or "quantitative easing" by reversing its sales of government securities and adding to its holdings of longer term Treasuries. It also began purchasing housing related agency mortgage-backed securities in the second week of 2009 from Freddie, Fannie and Ginnie Mae. The Federal Reserve's holdings of longer term Treasuries expanded from a low of \$ 475 billion in March of 2009 to \$777 billion in March of 2010.

QE 1 was followed by QE 2 in November 2010 when the Fed declared it would add an additional \$600 billion in longer term Trea-

suries to its portfolio at a monthly pace of about \$75 billion and ending in June of 2011. In October, 2011, the Fed announced its intention to engage in what has become known as “operation twist.” It will sell short term treasuries from its portfolio and purchase about \$400 billion in longer term treasuries by June of 2012. It will also reinvest maturing agency and mortgage related assets in new housing related assets. Finally, there remain significant questions about the condition of many major financial institutions both in the US and Europe. In particular, as this writing (November, 2011), Europe is experiencing a fiscal and sovereign debt problem that shows little signs of being resolved.

4.0 The New Regime

As with all legislative responses to financial crises, the Dodd-Frank Wall Street Reform and Consumer Protection Act (“Dodd-Frank”) was enacted with the stated objective of ensuring that something like the financial crisis of 2007-08 would “never” happen again. More realistically, the goal of the Act, or any piece of similar financial legislation, should be to reduce the likelihood and severity of future financial crises. However, the legislation was rushed and in many instances failed to address critical issues that contributed most importantly to the crisis. In particular, the legislation failed to solve the problems that were associated with Freddie Mac and Fannie Mae and housing policies more generally. We will outline our own views on this central question in the next section.

Here we concentrate on briefly summarizing the main provisions in an act that ran well over 2,000 pages. As with other types of legislation, even with as much detail as was written into this statute, the Dodd-Frank Act still required more than 240 rulemakings by numerous federal financial regulatory agencies to carry out the statute’s many mandates. At this writing, only some of these rulemakings are completed; most are in various stages of the proposal process and await final determinations over coming months. Many have been delayed and have missed the statutory deadlines incorporated in the Act.

It is likely that some of the regulatory reforms mandated by Dodd-Frank – such as those relating to capital standards for banks and changes in executive compensation of financial institution executives and other employees – would have been carried out even if the Act had not passed. Others clearly required legislative authorization. Where possible, we indicate the current status (as of early November, 2011) of the relevant rulemakings.

4.1 Dodd-Frank: An Overview

The policy debate after the great financial crisis of 2007-08 largely centered on two broad but very different views of the crisis and how to prevent its reoccurrence, which divided almost exactly along party lines in Congress but also was reflected in academic and popular discussions of what happened.

The Republican view was that market-based regulation of finance did not fail, but was hugely distorted by government, in at least two major respects. Policy makers in both parties took home ownership too far, largely by requiring Fannie Mae and Freddie Mac to purchase ever larger amounts of mortgages extended to increasingly unqualified borrowers. In addition, critics (not just Republicans) aimed their fire at the Federal Reserve for maintaining excessively loose monetary policy, which fueled the demand for housing and created a bubble that eventually popped. The low interest policy also encouraged investors to search for yield, which they found in a new form of mortgage-backed securities CDOs backed by subprime loans that were given safe ratings (unwisely) by the ratings agencies. On the Republican view, the fixes for the future lie in withdrawing or significantly cutting back housing mandates and subsidies, coupled with monetary policies that avoid the creation of future bubbles, not with more regulation and supervision by the same regulators who (they agree here with the Democratic view discussed next) failed so badly in the run-up to the crisis.

In contrast, Democrats broadly believed the crisis was due to a combination of failed market discipline (by shareholders, debt holders, management and ratings agencies), coupled with a massive failure

in offsetting government regulation of financial institutions, principally banks but also the “shadow banking system” of non-bank mortgage originators, investment banks, money market funds, and insurer-hedge funds (AIG). Dodd-Frank was enacted with entirely Democratic votes in both houses of Congress and was designed, in principle, to respond to these failures by directing various federal financial regulatory agencies to write a comprehensive set of new rules to prevent all actors in the system from again taking such huge risks. As mentioned previously, the Act did not reform the housing GSEs, or their Congressionally-mandated affordable housing mandates, which fueled the demand for securities backed by subprime mortgages, and thus for those mortgages themselves.

4.1.1 Dodd-Frank Specifics

The Dodd-Frank Act has numerous provisions. We have put them into the following categories, which roughly track the major perceived causes and implications of the crisis:

- those aimed at improving consumer protection and curbing in inappropriate subprime mortgage lending or similar products;
- those designed to reduce leverage by specific financial institutions and the financial system as a whole, thereby reducing “systemic risk”;
- provisions aimed at reducing the tendency of governments to protect otherwise uninsured creditors of “too big to fail” (TBTF) financial institutions, including derivatives dealers in certain situations (the “swaps pushout” or “Lincoln rule”);
- miscellaneous provisions added to the bill ostensibly to reduce the likelihood of future crises or to address other matters (the “Volcker rule” against proprietary trading by depository institutions); and various other new rules unrelated to prudential goals (such as the “Durbin amendment” limiting the fees that issuers of debit cards can charge merchants and new rules to encourage the hiring of women and minorities at financial institutions). Dodd-Frank contains too many provisions to be summarized adequately here.

Our discussion covers the major categories of reforms and highlights their primary stated objectives. These provisions are summarized in the following table, and discussed in more detail in the following sections.

Main Provisions of Dodd-Frank and Their Primary Aims

Provision of Dodd-Frank	Primary Aims of Provision		
	Prudential	Consumer Protection / Subprime	Reducing TBTF
Creation of CFPB		X	
Elimination of regulatory use of ratings	X		
Chinese walls for rating agencies			X
Legal liabilities for rating agencies			X
Skin-in-game requirements for mortgage securitizers		X	X
Regulation of compensation	X		
Increase in bank capital	X		X
Creation of FSOC to regulate SIFIs and Macroprudential risks	X		X
New resolution authorities	X		X
Living wills	X		X
Encourage exchange trading of derivatives			X
“Swaps pushout” rule	X		
Volcker rule	X		X
Durbin amendment		X	

4.1.2 Consumer Protection and Curbing Subprime Lending (or Similar Products)

Four different components of Dodd-Frank are designed, at least in part, to limit subprime lending and other financial products unsuitable for consumers.

First, the Act embodies the view that at least some significant portion of subprime loans would not been taken out by the borrowers had they known more about the key terms, and by implication, if the

multiple disclosures required under federal and state laws had been simpler. To address these problems, the Act creates a new Consumer Financial Protection Bureau to establish new protections for consumer financial products (other than investment from investment products already regulated under the securities laws) and enforce all existing consumer financial protections under various existing laws (consolidating responsibilities in this area formerly held by other federal financial regulators, principally banking regulators). The CFBP does not have the authority to preempt state consumer rules, but is expected to coordinate its enforcement activities with those of state banking and consumer protection offices. The structure of the CFBP is highly unusual in two respects: it is lodged within the Federal Reserve System, but given a budget that draws on the Fed, which neither the Fed nor the Congress can change. As of this writing, Congress has not confirmed the Administration's nominee for the first director of the Bureau, Richard Cordray. Republicans are insisting that confirmation be tied to changes in both of these unusual structural features, by making the Bureau into a multi-member Commission and subjecting its spending to the normal Congressional appropriations process.

Second, the Act contains several reforms aimed at reforming the ratings of securities, including eliminating their use in the regulatory process. This is a difficult challenge because the regulatory use of ratings is so pervasive; so long as this reliance persists the rating agencies will continue to have undesirable incentives to hand out unduly optimistic assessments.

Nonetheless, the Act has several features that have the potential for mitigating the ratings inflation problem. Specifically, the SEC is directed to issue rules requiring the agencies to establish "Chinese walls" between their ratings employees and those engaged in marketing the agencies' services; new rules requiring the agencies to be more transparent about the methods and data underlying their ratings; and perhaps most important, a charge to all federal financial regulators to remove existing mandates that ratings be used in any way to ensure the safety and soundness of the institutions under their watch. The Act also authorizes suits against the agencies for reckless

ratings. If this provision survives constitutional challenge, it should induce the agencies to be more careful with their ratings in the future (though it also may cause them to be excessively cautious also).

Bank regulators, however, are struggling with how to replace the regulatory use of ratings when overseeing the health of banks (most obviously, this provision of the Act also conflicts with the latest revisions of the Basel capital standards, which retain a role for ratings in computing minimum required bank capital).

Third, the Act addresses another widespread complaint about factors that led up to the crisis, the ability of subprime loan originators and securitizers to sell the loans or the securities without apparently retaining any “skin in the game.” To the extent this occurred, and it is a more controversial question with respect to securitizers than originators, the ability to quickly get out of mortgage positions undermined incentives for due diligence. The Act attempts to solve this problem by requiring securitizers of certain asset-backed securities, principally those backed by mortgages where the borrowers have made down-payments of less than 20 percent of the value of the property, to retain at least a 5% “unhedged” position in those securities. The hedging requirement can be simple to implement where a specific loan is backed by a very specific hedge, such as a loan-specific credit default swap (essentially “insurance” in case the borrower cannot pay). But defining what is a permissible hedge is much more difficult in the more usual case where a financial institution broadly diversifies its assets and liabilities, making it no longer possible to identify a specific hedge against a specific loan.

Fourth, Dodd-Frank seeks to end the short-term bonus culture in lending institutions and in the securitization process that rewarded loan originators and packagers of securities on the volumes of business they originated or sold, regardless of how the loans or securities later performed. To do this, the Act requires federal banking regulators to issue rules encouraging the use of compensation arrangements that limit excessive risk-taking. In fact, even prior to the Act’s passage, the agencies had required (in June 2010) bank employees (not just executives) to be paid according to their long-run perfor-

mance, which as a practical matter, meant greater use of long-term bonuses and restricted stock. Many banks had been moving in this direction shortly after the crisis, in anticipation of the new rules and in response to media and shareholder pressure.

4.1.3 Reducing Leverage and Systemic Risk

The permitted growth in leverage by both commercial and investment banks in the run-up to the crisis is widely understood to have magnified the impact of the subprime lending losses. The Act has several provisions aimed at correcting this problem.

The first requirement is for bank regulators to increase capital standards for individual banks, a step that would have occurred even without the Act because of the prominent role played by the Basel committee in setting internationally comparable bank capital standards and the immediate recognition by members of the Committee after the crisis to increase those standards. In contrast to the near decade it took for the Committee to agree on the second revision to the standards, the Committee issued its third revision, post-crisis, in just about two years.

The new capital rules are about as complicated as those they replaced, and readers can learn the details elsewhere. The key point is this: once they are fully phased in by 2019, the standards will raise minimum bank capital-to-asset ratios by three times relative to the standards they replaced. The new international standards also continue to rely on ratings by the ratings agencies to help put different assets into different “risk buckets” against which differing amounts of capital are to be required. As we have indicated earlier, this practice was a contributing factor in the run-up to the crisis, and is also inconsistent with the ratings reforms in Dodd-Frank under US law, discussed shortly.

Although a main purpose of the new standards, as well as the earlier ones, is to level the “capital playing field” of banks in different countries, in fact it is already clear at this writing that they are not likely to do any such thing, at least for some significant period of

time. On the one hand, the large US banks which have the clearest obligations to abide by the international standards have generally already met the new standards, with the possible exception of Bank of America, and depending on how severe the losses US banks may incur on account of the suit filed against them by the Federal Housing Finance Administration (the GSEs' regulator) for violating certain representations and warranties in the asset-backed securities they sold to Fannie Mae and Freddie Mac. In contrast, it is widely understood by market participants, and by early November even implicitly acknowledged by European officials as part of their efforts in resolving the Eurozone currency and financial crises, that many European banks with significant sovereign debt exposures to troubled European governments are likely to be significantly undercapitalized, even judged by the phased-in Basel rules, and may even require capital injections from their governments.

A second significant source of difference in the effective capital standards between the Basel member countries is that so far the Committee has reached no agreement on the specific amount of additional capital (or liquidity) required of "systemically important" banks. At this writing, it looks like the Basel Committee, backed by the G-20, instead will authorize a range of 1-2.5% of additional capital for large banks.

Speaking of systemic risk, Dodd-Frank creates a new body – the Financial Stability Oversight Council (FSOC) – with the clear duty to monitor systemic risk and to take advance measures to minimize it. In effect, this means two things. First, the FSOC is charged with identifying "systemically important financial (non-bank) institutions" (SIFIs), based on such criteria as their size and degree of interconnection with other financial institutions and the financial system more broadly. Banking organizations (including holding companies) with assets of \$50 billion or more are automatically defined by the statute as SIFIs. Once it identifies these institutions (which as of this writing the international Financial Stability Board has done but the FSOC has not), the FSOC is charged with implementing a stiffened system of regulating these institutions to prevent their future downfall, requiring among other things, higher capital and liquidity stan-

dards than for non-SIFIs, and a more intense system of supervision. None of these “plus” factors have been spelled out as of this writing. Second, the FSOC is charged with the more difficult – some would say impossible – job of identifying asset price “bubbles” that, if and when they “popped,” could cause systemic risk, and then to take preventive action, such as by raising capital/liquidity requirements for SIFIs or down-payment or margin requirement for real estate and stock lending, respectively (as illustrations) during these “bubble periods.” Although the academic literature has not yet provided clear guidance of whether bubbles can be accurately forecast without significant “false positives” (false indications of a bubble that is not truly the case), it is conceivable that forecasting techniques will improve in the future. In the meantime, it is an open question – and an issue of risk tolerance – as to whether a process such as the one created by Dodd-Frank for identifying and doing something to slow the growth of future asset bubbles will be worth the potential cost in slower growth caused by premature, unjustified measures to restrain asset price bubbles.

The FSOC also has an unwieldy structure which could hinder its effectiveness and mission. The FSOC is made up of representatives of all federal financial regulatory agencies plus representatives of state banking and insurance regulators (some of which can’t vote), agencies that not only may be tempted to protect their turf in times in crisis but also could have very different views about either the presence of systemic risk or what to do about it. While having multiple perspectives has its benefits, it can also slow reaction times in times of crisis, even with the best analytical resources available to the committee (from the Fed’s ample research staff and the new Office of Financial Research housed within the Treasury Department).

Dodd-Frank also mandated the study of new ideas for structuring capital requirements- in particular, the potential use of contingent capital (debt that automatically becomes equity if the bank’s capital falls below some pre-defined trigger) as part of the regulatory toolkit. Numerous academic commentators (Flannery 2009 and Calomiris and Herring 2011) have noted the potential advantages and limitations of contingent capital requirements both from the perspective

of risk control and efficiency. Once the mandated studies by the Fed and others have been completed they may be considered by Congress.

4.1.4 Addressing TBTF

In addition to the financial crisis itself, one of the most unpopular features of the various rescue efforts aimed at minimizing its damage were the government-sanctioned bailouts of the creditors of a number of large non-bank financial institutions (such as AIG, Fannie Mae and Freddie Mac), as well as the subordinated debt holders of large banking organizations. Dodd-Frank contains multiple provisions that its proponents claimed were designed to reduce this “too big to fail” (TBTF) problem in the future. Opponents, however, have questioned the effectiveness of those provisions, and the regulatory implementation of the new resolution process that will emerge from the legislation remains to be fully fleshed out (and won’t be fully known until the new resolution process is actually tested).

First, the Act creates a bank-like resolution process for any troubled non-bank (not just one designated a SIFI by the FSOC) that expressly prevents any creditor (other than derivatives counterparties) from receiving more than they would in bankruptcy. Under the new process, the Treasury Secretary, with approval of 2/3 of the members of the Federal Reserve Board and 2/3 of the directors of the FDIC, has the authority to appoint the FDIC as the receiver for any troubled non-bank financial institution (not just those deemed by the FSOC to be systemically important). Among other things, the deciding authorities must determine that undertaking such action “would avoid or mitigate serious adverse effects on the financial stability or economic conditions of the United States.” Unless the board of the troubled entity consents, the Treasury Secretary must gain approval, under an expedited process, for the receivership from the federal district court in the District of Columbia.

Dodd-Frank also gives the FDIC the authority to provide a wide variety of temporary or up-front financial assistance to a troubled systemically important financial institutions (SIFI) in order to ease

its resolution, and if necessary to borrow from the Treasury, but unsecured creditors still can receive no more than they have a right to under liquidation, while management must be removed. The Secretary of the Treasury can establish a resolution fund to pay for any borrowings the FDIC might need, financed by assessments on large banks and systemically important financial institutions. But the Fed is prohibited under the act from using its lender of last resort authority under Section 13(3) of the Federal Reserve Act to bail out any specific institutions or their creditors. In combination, these provisions are designed to prevent any taxpayer bailouts of individual institutions in the future. Critics, however, point out that the Act institutionalizes bailouts, and requires surviving banks (and, therefore, their customers and stockholders) to be taxed to fund any assistance provided by government to the creditors of insolvent institutions under the new resolution procedure. As just noted, whether the Act will work as designed to limit, or alternatively, expand, the TBTF problem will not be known until the process is tested in a future crisis.

Second, Dodd-Frank anticipates future financial troubles by requiring all systemically important financial institutions to have resolution plans or “living wills” that enable a receiver or trustee to dismantle or liquidate them at least cost. This provision is especially important to provide a guide to resolving large, complex financial organizations with hundreds, if not thousands, of subsidiaries and affiliates, often domiciled in different countries. The FDIC approved its living will rule in September, 2011, but no rule in this area can become final until the Federal Reserve Board also acts.

Although the presence of a living will cannot eliminate all creditor disputes over priority in claims, the mere act of having such a document prepared, and signed off on regularly by both the board of the holding company or top-level legal entity in charge of the organization, but also by the appropriate regulators, should help to focus attention on legal structures that clearly delineate creditor priority. Simply having to go through the exercise could help reduce the costs of resolving the institution in the event of failure.

The living will provisions also give the regulators the “nuclear op-

tion” of forcing the organization to divest certain operations or even break up entirely if the resolution plan is not deemed satisfactory. Although it is highly unlikely regulators would ever take such a step, the mere threat of doing it gives them powerful leverage to force large, highly interconnected entities either to reduce their complexity (often constructed for tax reasons) or at least to provide clearer guidance to a future receiver or trustee in bankruptcy.

Third, Dodd-Frank attempts to reduce the likelihood of future AIG-like bailouts by pushing financial derivatives previously traded off exchanges (over the counter or “OTC”) onto more organized trading platforms and through central clearinghouses. The opaque nature of the credit default swap (CDS) market in particular, and the fact that such instruments were “cleared” bilaterally solely between the two parties involved (buyer and seller), were among the features identified by the Treasury and the Fed to justify their bail out of the creditors of AIG, whose derivatives subsidiary could not honor the hundreds of billions of dollars of CDS commitments it had made after Lehman Brothers was permitted to fail in September, 2008. The authorities feared that creditor or counter-party losses from an AIG failure could have caused financial havoc.

In principle, the clearinghouse mandate for standardized derivatives in Dodd-Frank, coupled with requirements that trades be conducted on more transparent exchange-like venues (“swaps execution facilities” or SEFs under the Act), should make an AIG-like episode – a derivatives counter-party with huge obligations it cannot honor – less likely in the future. In addition, the CFTC is charged under the Act with making sure that the clearinghouses set adequate capital requirements for clearing members, and margin or collateral requirements for trading parties, whether or not their instruments are sufficiently standardized to be cleared centrally. The Commission also is charged with setting rules for how the SEFs will operate, specifically the extent to which derivatives bids (offers to buy) and asks (offers to sell) can or must be posted electronically on some type of platform or can continue to be relayed over the telephone between the parties (as is the case now), and how transactions will be reported (hopefully more frequently than is now the case).

Last, Dodd-Frank was amended with provisions advanced by former Senator Lincoln known as the “swaps pushout” requirements. These provisions deny Federal Reserve loans to support a “swap entity,” or any organization, including a bank, that “regularly enters into swaps with counterparties as an ordinary course of business for its own account.” Like the customer exception in the Volcker rule (discussed below), the Lincoln rule exempts banks entering swaps entered into in connection with loans to customers, or if banks limit their swaps activities to hedging.

Regulators may have difficulty over time enforcing a strict line between customer or hedging related swaps transactions and all others the Lincoln rule is meant to cover. These difficulties are likely to surface most pointedly during a financial crisis when the Fed is trying to decide whether it can extend a loan to a troubled bank that, like many of banks, engages in swap transactions. The Fed takes a political risk if it construes the Lincoln prohibition too liberally, but an economic risk to the financial system if it construes the prohibition too strictly.

4.1.6 Other Provisions

Like much legislation that makes its way through Congress, Dodd-Frank had Christmas tree elements to it, too – namely provisions that had little or nothing to do with rectifying the causes of the crisis that preceded it, but nonetheless were politically useful in one manner or another in attracting support for the overall bill and for punishing the large banks – which were at the center of the financial storm. The so-called “Volcker rule” and the “Durbin amendment” are two such provisions.

The Volcker rule, named after the former Fed Chairman, prohibits any bank or thrift institution, or a bank or thrift holding company, from engaging in “proprietary trading.” Some of the largest banks divested themselves of their internal hedge funds or proprietary trading desks even before Dodd-Frank was enacted, or quickly thereafter. However, among the key details of the rules that remain to be ironed out in regulation is how regulators will interpret the exception

written into the rule for customer trades. Drawing a sharp line between permissible hedging of customer transactions and conducting trades for the banks' own accounts, however, is not easy to do and fraught with potential negative unintended consequences. Depending on how strictly regulators enforce this distinction, the Volcker rule could significantly diminish liquidity in the trading of financial instruments, imposing a social cost on the markets that could outweigh any benefits of risk reduction it is meant to accomplish, or push substantial amounts of financial intermediation overseas. In any event, given the lack of evidence that bank proprietary trading (much of which centered on the trading of stocks, bonds, and currencies) played a significant role in causing the crisis, the best that can be said for the Volcker rule is that proprietary trading arguably is not the kind of activity that should be supported or subsidized by deposit insurance and that prohibiting it could contribute to preventing a future crisis. Even that argument, however, does not necessarily explain why the Volcker rule should be applied to affiliates of insured banks that are not financed by deposits. To the extent that such trading has been profitable for banks, denying them the ability to pursue it could thus detract from their safety and soundness.

The Durbin amendment requires the Federal Reserve to limit the interchange fees paid by merchants to banks, under various criteria, but with the unmistakable direction that the fees be lowered relative to their pre-Dodd-Frank average of 44 cents per transaction. In late 2010, the Fed proposed a limit of 12 cents, which it later increased to 21 cents in early 2011. Consistent with the Act, the final limit exempts banks with assets under \$10 billion, but it is not clear how many merchants will channel their debit transactions through higher cost networks, although the Durbin Amendment also gives merchants the ability to permit customers to direct which types of payments (cash, credit cards, debit cards) and networks to use. At this writing, some banks have already reacted to the lower debit card transactional limits by limiting debit reward programs, by charging customers monthly fees for using their debit cards, or raising other bank fees, all in an effort to counter the loss in revenue from the transactional limit.

4.2 Nothing about the Housing GSEs (Fannie/Freddie)

The most important omission in Dodd-Frank is its failure to address one of the recognized causes of the subprime lending explosion, namely the increased purchases of securities backed by subprime loans by the two housing GSEs, Fannie Mae and Freddie Mac. The GSEs did this in response to higher “affordable housing limits” set by Congress and perhaps also in an effort to boost earnings by taking on higher yielding securities in their portfolios. Both GSEs collapsed and were put into government-run conservatorship in September, 2008, and remain there. At this writing, the federal government has poured roughly \$150 billion dollars into maintaining the GSEs operations, which since the crisis have accounted for the majority of the purchases of all mortgages extended in the United States.

It is widely understood why Dodd-Frank contained no provisions dealing with Fannie/Freddie: at the time, there was no consensus even with the Democratic members of Congress, let alone between members from both parties, about what to do with them. The lack of consensus continues to this day. At this writing, the two main competing ideas are to phase out the two entities over some gradual period (most likely by lowering the “conforming limit” of mortgages the GSEs can purchase or guarantee), or to explicitly make them government entities subject to stricter safety and soundness oversight. If the latter route is chosen, the regulatory dynamics are likely to be similar to those for banks: initial tough scrutiny by regulators who would have the political freedom to act that way during some post-crisis “honeymoon period,” followed by a tendency to relax their guard if and when the economy, and especially the housing market, recovers.

5.0 Lessons Learned

This review of the financial crisis and agency and legislative responses have suggested many lessons for how to deal with future crises. These include problems that were associated with monetary policies and public pursuit of possibly unobtainable housing goals to problems associated with regulation and supervision of financial institutions.

The following sections contain a high level list and brief description of each of these lessons.

5.1 Housing Subsidy Policies: The unintended consequences of even well-meaning government policies can be costly to taxpayers, especially when hidden from view.

At the root of the financial crisis was a collapse of the US housing market and the policies intended to increase home ownership that encouraged excessive leverage by homeowners (who took on mortgages and financial commitments with low or no down payments and teaser rates) and incentivized lax underwriting standards by lenders and securitizers. All parties acted on the assumption that housing prices would continue to increase and that there was very little risk of a downturn in prices and this assumption was also incorporated in the pricing and risk models that were employed. Much of this profligate behavior was driven by the implicit government support enjoyed by Fannie Mae and Freddie Mac, whose subsidy costs were hidden for decades from the public but when they were forced into public view – when both housing enterprises had to be rescued by the federal government – proved to be hugely costly for taxpayers.

5.2 Easy monetary policies kept interest rates below equilibrium for a long period of time and caused asset price inflation and fueled unreasonable expectations and proved to have costly consequences for taxpayers.

Easy monetary policies in the early 2000s that kept interest rates low and were designed to help the economy gain traction coming out of the 2000-2001 recession had a significant and ultimately highly detrimental side effect: the fueling of the housing price bubble. When that bubble burst, the costs proved to be enormous. The unanswered question going forward is how to prevent future such asset price bubbles, especially those facilitated by leverage, before they get out of hand. In particular, is monetary policy too blunt an instrument, or are more finely tuned policies available that can be reliably implemented without too much error? Regardless of the answers to these questions, the Fed must be sensitive in the future to asset price effects of its monetary policies.

5.3. Regulatory and supervisor weaknesses and flawed risk monitoring systems resulted in imperfect and lax prudential regulation.

The financial crisis exposed many weaknesses in both the supervisory process and in the information necessary to measure adequately institutions' risk exposures. Perhaps the most important lesson was that the so-called measures of capital and capital adequacy were woefully deficient and didn't capture the true financial condition of institutions. Moreover, risk-based capital standards, in particular, did not control institution risk taking nor did the risk weights truly reflect the default characteristics of the assets held by many of the nation's largest banks. In fact, the evidence showed that markets did a much better job of pricing the deteriorating conditions of these assets than did the supervisors.

Furthermore, despite claims that financial institutions only suddenly experienced liquidity problems, funding problems actually developed over a period of time alongside mounting market perceptions of losses. The crisis exposed the fact that policy makers' incentives and actions differed from what the law (FDICIA of 1991) required, namely prompt correction action to require weakening banks to bolster their capital positions, shed assets, or both. The result was regulatory forbearance even as reported bank equity ratios declined from March 2007 to September 2008.

Perhaps equally important was the fact that the system for supervising and monitoring the condition of investment banks was essentially not operative. When it came to the non-bank primary dealers, the Federal Reserve was not aware of the true (deteriorating) condition of these institutions.

5.4. Regulation can be easily circumvented as evidenced by the growth of off balance sheet activities and special purpose vehicles.

Financial institutions used special purpose vehicles, especially to expand their mortgage lending, securitization and derivatives activities, as a principal means to lower their capital requirements and increase

leverage. Regulators viewed these special purpose vehicles as bankruptcy remote and thereby accommodated the capital avoidance. These vehicles, which levered thin layers of capital with very short-term commercial paper that funded longer-lived mortgage securities and related assets, were exposed to runs when difficulties in the mortgage market became apparent in 2007. Credible reforms must address incentives of banks to avoid effective regulation and of supervisors, regulators and politicians to forebear. The problems of risk measurement, capital budgeting *ex ante* that is commensurate with risk, as well as the maintenance of capital in the face of losses are not just technical problems, but rather are mainly incentive problems. Solutions must address incentives.

5.5. Compensation policies failed to restrain risk taking.

Compensation schemes failed to align the interests of financial institution managements with those of their shareholders and encouraged excessive risk taking in the interest of generating short term profits at the expense of adverse longer run consequences. This behavior was especially manifest with respect to subprime mortgage loans and securitizations, where too many parties were paid commissions on volumes of loans made or securities manufactured and sold rather than on how the mortgages or securities actually performed.

5.6. Emergency lending programs that are well-designed should be self-liquidating and transparent.

Once the crisis began to unfold, the Federal Reserve embarked upon a series of emergency lending programs aimed at stemming what at first was believed to be a pure liquidity problem (see also Lesson 5.10 below). Many of these initiatives were targeted at the primary dealers of government securities while others were directed towards supporting financial markets more generally. Of the two types of programs, both ostensibly achieved their short-run purposes in that markets and spreads calmed down once the programs had been put in place. However, it did appear that the programs that were structured and priced in such a way as to be self-liquidating were less controversial and probably resulted in smaller subsidies than the other

programs. What was lacking, however, were adequate disclosures of the nature of the support provided and which institutions and companies received the benefits of that support. Only after litigation did the Federal Reserve reluctantly provide information that would allow at least a partial post mortem on the programs. Those efforts are still on-going.

This experience with crisis emergency lending suggests that work needs to be done to refine the structure of these programs and conduct of the discount window facilities on a contingency basis. Those plans should be completed and be made publicly available so that in future crisis mechanisms can be pulled off the shelf and implemented as needed rather than inventing programs with uncertain prospects for success as a crisis is unfolding.

5.7. The crisis revealed weaknesses in the ability of regulators to resolve troubled financial institutions – especially bank holding companies and investment banking institutions.

The failures of large, complex institutions exposed weaknesses in the resolution regime for troubled financial institutions, especially bank holding companies and non-bank financial enterprises. The lack of forward planning was one problem, but also the complexity of the institutions and informational problems concerning the inter-relationships and counter party risk exposures on a real time basis made closure (as opposed to subsidized acquisitions and mergers) more difficult. In the case of Bank of America, for example, the risks it acquired through its acquisition of Countrywide and Merrill Lynch revealed limitations in the acquiring bank's ability to do due diligence in a timely manner during a crisis. Some of these problems have been addressed in the Dodd-Frank legislation, notably through requirements to establish "living wills," but how well these provisions will work cannot be known until they are tested in a future crisis.

5.8. The crisis exposed glaring problems in existing processes and legal structures for resolving troubled large complex global financial institutions like Lehman Brothers and AIG

The failures of Lehman and AIG exposed the difficulties of resolving complex institutions quickly, and in an orderly fashion, with cross-border activities conducted through affiliates and subsidiaries chartered in other countries with different resolution regimes. US authorities have no ability to close or wind up the foreign subsidiaries of a US chartered institution. As a result, the problems with fund transfers between the head office and the London subsidiary of Lehman brothers continue to plague the resolution and settlement of claims. In contrast, the bailout of AIG avoided those problems but resulted in substantial taxpayer exposure. None of the legislative responses have dealt with the need to deal with cross-border failures. Colleges of regulators and international coordination bodies have focused on the issues, but the problem is far from being resolved.

5.9. The regulatory and governmental responses to the crisis have only served to reinforce the perceptions that too-big-to-fail is still in place, Dodd-Frank notwithstanding.

While one of the stated purposes for passing the Dodd-Frank legislation was to limit “too-big-to-fail” and the moral hazard that can accompany bailouts of the creditors (and possibly stakeholders in) large financial institutions, the injection of capital into both troubled and other institutions has helped to reinforce the public and market perceptions that no large US financial institution will be permitted to fail. The largest US institutions are now fewer in number and larger than they were prior to the crisis, and this has done little to reduce the perception that “too-big-to-fail” continues as US policy. This perception, meanwhile, fuels the fear that such institutions will take on additional risks that expose US taxpayers to future bailouts, much as Fannie and Freddie already have done.

5.10 The crisis revealed the importance of being able to promptly distinguish between liquidity and solvency problems. The key problem was not liquidity but excessive leverage and solvency problems in major US and foreign financial institutions.

The Federal Reserve’s initial response to the crisis reflected its belief that it reflected only a temporary liquidity problem, to which the

Fed responded by broadening access to its discount window while providing liquidity to the primary dealers with whom the Fed and US Treasury regularly dealt. While spreads between the inter-bank lending rate and the rate on US Treasury debt did decline thereafter, the events in the fall of 2008 exposed the fact that many financial institutions in fact were severely troubled and arguably insolvent. This suggests that there were significant informational and deficiencies in the monitoring and prudential supervision of such firms.

7.11 The crisis exposed structural weaknesses in the primary dealer system and tri-party repo market. Consideration should be given to alternative arrangements such as those employed by the European Central Bank.

Arguably, the dependence of the Federal Reserve on a small group of large complex financial institutions to conduct monetary policy and to collect and disseminate securities throughout the financial system created the need to provide unusual financial support to those institutions once weaknesses in their financial condition were exposed. Additionally, the critically important tri-party repo market's dependence upon just two large complex financial institutions to operate the infrastructure and provide large amounts of intra-day credit suggests that the structure of that market enhanced the interconnectedness among financial institutions in ways that increased systemic risk in the system.

Looking ahead, the Fed should consider alternative arrangements for buying and selling the securities it uses to manage the money supply. One such arrangement is used by the European Central Bank which conducts its monetary policy auctions with over 500 different counter parties.

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