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Working Paper

Central banking for financial stability: Some lessons from the recent instability in the United States and euro area

ADB Working Paper, No. 379

Provided in Cooperation with:

Asian Development Bank Institute (ADBI), Tokyo

Suggested Citation: Wall, Larry D. (2012) : Central banking for financial stability: Some lessons from the recent instability in the United States and euro area, ADB Working Paper, No. 379, Asian Development Bank Institute (ADBI), Tokyo

This Version is available at:

<https://hdl.handle.net/10419/101170>

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ADBI Working Paper Series

Central Banking for Financial Stability: Some Lessons from the Recent Instability in the United States and Euro Area

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No. 379
August 2012

Asian Development Bank Institute

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The author thanks for helpful comments: Tokuo Iwaisako and participants at a conference on “Achieving Financial Stability—Lessons from the Euro Area Crisis for Macroeconomic and Financial Stability” hosted by the Asian Development Bank Institute (ADBI) and the Policy Research Institute (PRI) of the Japan Ministry of Finance. This paper originally appeared in the Japan Ministry of Finance *Public Policy Review*, August 2012.

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Suggested citation:

Wall, L. D. 2012. Central Banking for Financial Stability: Some Lessons from the Recent Instability in the United States and Euro Area. ADBI Working Paper 379. Tokyo: Asian Development Bank Institute. Available: <http://www.adbi.org/working-paper/2012/08/31/5224.central.banking.financial.stability/>

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Abstract

Central banks have had an important role in maintaining financial stability through their lender of last resort role. As lender of last resort, the central bank is given enormous power which is normally tempered by a variety of limits. In the most recent crises in both the United States and euro area, the Federal Reserve and European Central Bank (ECB) have come under enormous pressure to take lender of last resort actions that exceed these normal bounds. This paper reviews the experience of these two central banks and draws some implications for future policy.

JEL Classification: E5, E58, G28

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1. INTRODUCTION

Central banks have had an important role in maintaining financial stability through their lender of last resort role. As lender of last resort, the central bank not only creates high powered money but also directs the funds to specific, generally higher risk borrowers. Given this potentially enormous power, lender of last resort operations are normally subject to a variety of limits. In the most recent crises in both the United States (US) and euro area, the Federal Reserve and European Central Bank (ECB) have come under enormous pressure to take lender of last resort actions that exceed these normal bounds. In responding to these crises, the actions of the ECB and Federal Reserve have been praised as saving the financial system by some analysts. But others have pointed to the normal limits on central bank actions, and condemned the violations as exacerbating the situation by delaying the ultimate resolution of the problems, fostering moral hazard, and inappropriately exposing taxpayers to substantial risk.¹

This paper reviews the developments in the euro area and the US from the perspective of a financial economist that specializes in financial intermediation issues. My purpose in reviewing the events is to draw lessons on the future conduct of central banks and other safety net authorities. The paper begins with a review of the traditional limits on central bank's acting as lender of last resort. Then it reviews the experience of the US and euro area starting with the weaknesses that led to their respective crises and continuing with the measures to restore financial stability. Finally, the paper ends with a discussion of what lessons we should take from their experience.

2. TRADITIONAL LIMITS ON CENTRAL BANK BEHAVIOR

Central banks' important role in supporting financial stability arises from their unique ability to create virtually unlimited liquidity and the power as lender of last resort to direct that flow of liquidity to specific financial institutions. The combination of these powers empowers central banks to satisfy temporary spikes in private liquidity demand before they morph into widespread insolvency. However, these liquidity creation and lender of last resort tools are enormously powerful giving a lender of last resort the ability to risk taxpayer funds and to directly allocate resources to specific sectors of the economy, actions normally associated with the fiscal authority.

Historically the use of this enormous lender of last resort power was constrained both by the statutes authorizing the central bank and a variety of soft constraints. Lenders of last resort

¹ For example, see Humphrey (2010) and Wilson (2012).

typically seek to lend only to: (a) solvent banks on (b) good collateral at (c) a penalty rate relative to normal market rates.² All three of these constraints exist for sound reasons.

The requirement that the lender of last resort lend only to solvent banks limits the ability of the lender of last resort to reallocate resources. If the lender of last resort lends to insolvent firms it will effectively rearrange the priority of claimant payments. Short-term creditors of the insolvent firm may receive payment from the proceeds of lender of last resort lending, while the collateralization of the lender of last resort's loans has the effect of reducing the priority of longer term claims. Lender of last resort lending to insolvent firms also facilitates the economically inefficient continued operation of "zombies". The investment decisions of the zombies are distorted by debt overhang problems, which bias investment decisions in favor rolling over loans to the zombie's insolvent borrowers and also bias investment towards higher risk and return assets than would be optimal. Further, the assets of the zombie are more likely to remain under the control of the managers whose decisions led to the insolvency. Finally, by reducing the expected ex post cost of insolvency to banks, lender of last resort lending to zombies encourages healthy banks to take more risk ex ante.

The constraint that the lender of last resort could lend only against good collateral protects the central bank from losses, losses which would ultimately be borne by the fiscal authority in the form of reduced seigniorage. Moreover the constraint that the central bank lends only against good collateral reinforces the requirement that it lend only to solvent banks by limiting the extent to which it can lend to insolvent banks.

Finally, lender of last resort lending at a penalty rate provides an incentive for healthy banks to manage their liquidity without the need for central bank lending. It also provides an incentive for banks that do obtain funds from the lender of last resort to return to market funding as expeditiously as possible.

These constraints are necessarily somewhat weakened during a financial panic when there are elevated demands in the market for liquidity.³ The value of almost all illiquid assets is falling during a financial panic in part because the assets are illiquid. However, financial panics typically arise because of the arrival of information suggesting that the expected future cash

² This approach is similar to what Bordo (1990: 20) calls the classical view of the lender of last resort function from Thornton (1802) and Bagehot (1873). The classical view held that lender of last resorts (LLRs) should follow four principles during a financial panic: (1) "lend, but at a penalty rate," (2) "make clear the LLR's willingness to lend freely," (3) "accommodate anyone with good collateral (valued at pre-panic prices)" and (4) "prevent illiquid but solvent banks from failing." Contemporary non-crisis lending follows the classical approach for panic lending except that loans are typically restricted to commercial banks.

³ Another reason why the lender of last resort may lend short term to an insolvent institution is that sometimes the seemingly disadvantaged creditors benefited from short-term lender of last resort lending. For example, Federal Reserve sometimes extended loans to illiquid banks to give the Federal Deposit Insurance Corporation additional time to prepare to resolve it (that is time to put the bank into administrative bankruptcy process).

flow from many financial assets has significantly decreased. This creates a problem for the lender of last resort in determining the extent to which fundamental values have fallen versus the extent to which liquidity premiums have risen. Thus, if a central bank is to be an effective lender of last resort during a crisis, it will likely have to lend based on reasonable estimates that the banks and collateral will be good after the crisis subsides.⁴

Bordo (1990) discusses the argument that illiquidity typically arises because of concerns about a bank's solvency and concludes that the appropriate lender of last resort policy is to lend to insolvent banks. The argument is that lending to insolvent banks is beneficial in that it allows borrowers to retain their relationship with the banker, avoiding the fixed costs of recreating the relationship with another bank. However, even if one agrees that the lender of last resort should lend to insolvent banks during a crisis, this can do no more than stabilize the situation as the lender of last resort cannot supply the equity capital needed to restore the bank to solvency. Moreover, the continued operation of insolvent banks creates perverse investment incentives for solvent and insolvent banks as discussed above. Thus, an appeal to lend to an insolvent bank to maintain its customer relationships can be viewed more as an appeal to provide time for the fiscal authorities to recapitalize the bank or the resolution authorities to transfer the relationships to a solvent bank.⁵

3. THE FINANCIAL CRISIS IN THE UNITED STATES

The US had taken some measures long before the crisis intended to reduce the need for lender of last resort intervention and limit the lender of last resort's ability to fund undercapitalized banks. However, the crisis that began in 2007 highlighted a number of flaws in the US system. These flaws combined with limitations in the fiscal authorities' power left the Federal Reserve with a choice between allowing the potentially disorderly failure of some major financial firms or stretching the limits on traditional lender of last resort actions.

US policymakers were alerted to the need to strengthen crisis management tools in the 1980s as the large banks had large market value losses due to the least developed country (LDC) debt crisis and a large fraction of the savings and loan industry became insolvent. The savings industry required a taxpayer funded bailout in 1989.⁶ Shortly thereafter, some private analysts forecast the need for a similar bailout of the commercial banking industry. The US Congress did not want to provide another bailout and responded with the Federal Deposit Insurance

⁴ Another viewpoint on the merits of lender of last resort operations comes from Goodfriend and King (1988) who argue that all the CB need do during a panic is provide liquidity through open market operations. Those banks that were experiencing liquidity problems could borrow from other banks.

⁵ Kirkegaard (2011) describes the philosophy behind such activity as "The central bank comes out with its monetary guns blazing and then sits back and prays that the politicians do the right thing."

⁶ The legislation authorizing the support is the Financial Institutions Reform, Recovery, & Enforcement Act of 1989.

Corporation Improvement Act (FDICIA) of 1991. Key provisions in the FDICIA include: (1) prompt corrective action (PCA) which requires supervisory action as a bank's capital adequacy measures decline including resolution while accounting capital is still positive, (2) expanded Federal Deposit Insurance Corporation (FDIC) bank resolution powers to reduce the risk of contagious spillover, (3) limits on interbank credit, (4) authorization of binding netting agreements on over-the-counter derivatives and (5) limits on Federal Reserve lending to financially distressed banks (Wall, 1993).

But the provisions of FDICIA proved inadequate. The following subsection provides a brief review of the major events during the crisis. The second subsection considers some of the flaws that led to the crisis.

3.1 The Events

The US crisis began in the residential housing market when home price appreciation slowed and borrowers started defaulting. The residential mortgage underwriting standards in the US deteriorated in the early and mid-2000s as products originally designed for small niches of unusual borrowers were made widely available. The expanded availability of credit combined with interest rates that were low by recent standards helped drive home prices higher (Bernanke 2010). However, so long as home prices continued to rise, credit losses to even the weakest borrowers remained low encouraging lenders to further lower their underwriting standards.⁷

Problems emerged in late 2005–06 as home price appreciation slowed and then began to fall. Defaults on sub-prime and Alt-A loans started climbing in 2006 in some of the states that had previously seen the most appreciation.⁸ Rising default rates significantly impacted financial markets starting late in the summer of 2007 as the market for some mortgage backed securities became illiquid and investors started reducing their exposure to the more exposed financial institutions (Gorton 2009).

A large US investment bank, Bear Stearns, became the first major financial firm in the US to lose market confidence and become illiquid in March 2008. As an investment bank, Bear Stearns operated under SEC prudential supervision, which included capital adequacy requirements which were much weaker than those imposed on commercial banks. As such, Bear Stearns was in a weak position to absorb losses from the imploding residential real estate

⁷ Gerardi et al. (2008) document that deteriorating underwriting standards played only a modest role in the large increase in defaults for the 2005 and 2006 vintages that suffered very high losses. They argue that lenders' expectations of continuing high home price appreciation was a more likely explanation. Brueckner, Calem, and Nakamura (2012) develop a model consistent with Gerardi et al.'s analysis and provide supporting empirical evidence.

⁸ See Mayer, Pence, and Sherlund (2009).

market. When it became clear that Bear Stearns could not survive without assistance, the US authorities had a choice: (a) allow Bear Stearns to file for bankruptcy under laws that do not take account of the special nature of financial firms, or (b) provide assistance to facilitate the takeover of Bear Stearns by J.P. Morgan Chase.⁹ The US authorities determined that they could not confidently predict the outcome of a bankruptcy filing on key financial markets. Thus, the decision was made that it would be preferable to have an assisted takeover. However, the only entity that could provide the required immediate assistance was the Federal Reserve. The US Treasury required Congressional authorization and the Federal Deposit Insurance Corporation (FDIC) could not assist as Bear Stearns was not a commercial bank. The Federal Reserve had the power to lend to individuals, partnerships and corporations under “unusual and exigent” circumstances. The Federal Reserve used this authority to establish a special purpose vehicle that purchased \$30 billion of Bear Stearns assets. The special purpose vehicle was funded by \$1 billion of capital from J.P. Morgan Chase and a \$29 billion loan from the Federal Reserve which was backed solely by the assets in the special purpose vehicle.¹⁰

The assisted takeover of Bear Stearns temporarily calmed markets but other large investment banks had also seen their thin capital levels depleted by on-going mortgage related losses. The US Secretary of the Treasury, Hank Paulson, had strongly encouraged the weakest of these large investment banks, Lehman Brothers, to issue new capital or be acquired by a stronger firm. Lehman refused several takeover offers, however, in part encouraged by the belief that the support provided to Bear Stearns implicitly committed the government to provide aid to Lehman.¹¹

However, before Lehman collapsed, the two large government sponsored enterprises that specialized in the securitization of residential mortgages, Fannie Mae and Freddie Mac, became distressed.¹² The two housing government sponsored enterprises also had low capital adequacy ratios and held substantial quantities of subprime mortgage backed securities. In order to prevent these two firms from failing, Congress passed the Housing and Economic Recovery Act of 2008 to allow Treasury to provide support and to give the newly created Federal Housing Finance Agency the power to put the two government sponsored enterprises into conservatorship or receivership. In order to allow their continued operation, the two government sponsored enterprises were put into conservatorship and agreed to sell preferred stock to the US Treasury in early September 2008.

⁹ See Bernanke (2008b) for a discussion of the events leading up to Bear Stearns distress and its support.

¹⁰ The transaction supporting the acquisition of Bear Stearns is summarized at <http://www.newyorkfed.org/markets/maidenlane.html#tabs-2> (accessed 4 March 2012).

¹¹ See Sorkin (2009), especially Sorkin (2009: 82) on Paulson encouraging Lehman to raise capital. Sorkin (2009: 116, 205) also gives examples of Lehman demanding an above market price for its stock.

¹² See Frame (2009) and chapter 5 of Acharya et al. (2011) for a discussion of the events around the placement of the two government sponsored enterprises into conservatorship.

In the wake of Lehman's refusal to strengthen its financial condition, the markets eventually lost confidence in the investment bank. In October 2007, Lehman became illiquid and was forced to seek protection from the bankruptcy court. The Federal Reserve did not think that Lehman had sufficient collateral to obtain a loan large enough to cover its ongoing run (Financial Crisis Inquiry Commission 2011: 340).¹³ However, Lehman's failure proved to be a shock to the markets in two related respects. First, the markets were uncertain about the US government's policies towards large distressed financial firms, first supporting Bear Stearns and then allowing the large Lehman Brothers to fail. This caused a sudden reassessment of the prospects of all large US financial firms under increased uncertainty about government policy (Meltzer 2009). The result was a sharp decrease in the liquidity of other large financial firms. Second, the failure of Lehman triggered the failure of Reserve Money Fund which had been heavily invested in Lehman's commercial paper.¹⁴ The failure of Reserve Money Fund caused investors to reassess and withdraw from other money funds. The resulting shrinkage caused a sharp drop in funds available to other borrowers in the commercial paper market.

Shortly before Lehman's failure, the authorities became aware of the immediate risk that American International Group (AIG) could also fail.¹⁵ While American International Group's main operations were related to traditional insurance products, the firm also used its high rating to provide substantial amounts of credit guarantees. Given the distress in financial markets after Lehman's failure the US authorities determined that American International Group should be assisted. Once again, neither the US Treasury nor the Federal Deposit Insurance Corporation could provide assistance. The only feasible option was for the Federal Reserve to create special purpose vehicles similar to that used to assist the Bear Stearns takeover.

After American International Group, Secretary Paulson appealed to Congress to give him the authority to provide support to distressed asset markets and financial firms. While Paulson's proposal was initially rejected, Congress soon approved the Emergency Economic Stabilization Act of 2008 which authorized the Troubled Asset Relief Program (TARP).¹⁶ The implementation of capital support through TARP and a related stress test conducted on the largest banks helped to restore market confidence in the banks. Thereafter, the Federal Reserve created a number of emergency liquidity facilities to support commercial and

¹³ See also Hilsenrath, Solomon, and Paletta (2008) for a discussion of the events around the time of Lehman's failure.

¹⁴ See Acharya (2011) for a brief summary of the cause of Prime Reserve Fund's failure and its impact.

¹⁵ See Langley Solomon and Karnitschnig (2008) for a summary of the events shortly around the time of American International Group's collapse.

¹⁶ The US Department of Treasury, Office of Financial Stability (2011) issued a Third Year Anniversary report on TARP.

investment banks, money market funds and the commercial paper market.¹⁷ These facilities go beyond traditional lender of last resort actions in that many were explicitly targeted at nonbank firms. However, they were designed to provide only short-term liquidity support, with the pricing mechanisms designed to discourage the use of these facilities as financial markets returned to normal.

3.2 Public Policy Limitations

The public policy weaknesses that led to the crisis may be divided into two categories: areas where the lack of authority prevented timely and effective responses; and those where authority existed but was not adequately exercised due to conflicting goals. Most of the public policy weaknesses that led to the crisis were ones where the available authority was not adequately employed due to conflicting goals. In contrast, the weaknesses in public policy during the crisis tend to be due to inadequate authority.

3.2.1 Conflicting goals

Central banks and other financial supervisory agencies are almost always assigned responsibility for multiple goals and sometimes these goals have inconsistent implications for policy (Wall and Eisenbeis 2000). In these cases, the agencies must determine which are their most important goals and select the policies appropriate for that goal (or goals). For example, while central banks virtually always have an explicit goal of price stability (somehow defined), this is almost always accompanied with an implicit or explicit goal of economic growth and stability. A key part of every central bank's decision process is determining how to balance these two goals.

In the case of the housing finance market, federal supervisory agencies had some power to require higher underwriting standards, slow the growth in residential property prices, and enforce higher prudential standards at financial firms that ultimately became distressed or failed. However, these agencies had other goals with conflicting policy implications that took higher priority. Moreover, agencies may be reluctant to take costly action in pursuit of one goal if doing so would weaken political support for the agency pursuing its higher priority goals.

The Federal Reserve was assigned responsibility for writing a variety of residential mortgage finance regulations which could have been used to strengthen underwriting standards. This assignment, however, came as a part of the central bank's consumer protection mandate, which is not ordinarily regarded a core central bank function. Moreover, no federal agency was tasked with examining financial markets in general or the mortgage market in particular for signs of widespread weaknesses that could lead to financial instability. Thus, while reports of

¹⁷ More information about the Federal Reserve's various credit and liquidity programs may be found at <http://www.federalreserve.gov/monetarypolicy/bst.htm> (accessed 30 April 2012).

problems did reach then Federal Reserve Chairman Alan Greenspan, he did not view the Federal Reserve as the appropriate agency to deal with the problems (Andrews 2007).

Another method of slowing the growth in housing prices is interest rate policy. While low nominal mortgage rates contributed to the rise in residential real estate prices, the size of that contribution and the extent to which the Federal Reserve's low overnight target rates in the early 2000s contributed to the low rates is the subject of an ongoing debate. Regardless of one's views about the extent to which accommodative policy facilitated the early growth of housing prices, the Federal Reserve had the unquestioned power to slow or reverse the growth in housing prices by raising short-term rates until the increases had the desired impact on housing prices. The Federal Reserve's dual mandate, however, is for maximum employment and stable prices for goods and services. The Fed does not have an explicit mandate to target asset prices. One could justify "bubble popping" policies on the grounds that asset price bubbles ultimately have a substantially adverse impact on employment and price inflation. However, one must first determine that a "bubble" exists and then determine that the long run benefits of popping the perceived bubble exceed the immediate adverse impacts on employment and possibly inflation. Given the difficulty in identifying bubbles and the likely costs of popping them with monetary policy, then Chairman Greenspan argued that it would be lower cost to deal with the consequences of a bubble after it breaks than to use monetary policy to pop it at an earlier stage.¹⁸

Along with pre-crisis goal conflicts that limited supervisory action in residential mortgage markets, there were also conflicts that inhibited prudential supervision of important financial intermediaries. The five major US investment banks took the US Securities and Exchange Commission (SEC) as their consolidated prudential supervisor after the adoption of European Union (EU) policies requiring consolidated prudential supervision of financial institutions. However, the SEC has long viewed its primary mission as investor protection via disclosure regulation and it was rather new to consolidated prudential supervision.¹⁹ Moreover, the SEC adopted Basel II capital adequacy requirements which imposed much lower capital requirements on highly rated mortgage securities than the requirements imposed by the US commercial bank supervisors. Arguably this weak supervision contributed to the collapse of two big investment banks (Bear Stearns and Lehman Brothers) and a hasty takeover of a third investment bank (Merrill Lynch which was acquired by Bank of America).

Another area of weakness was the prudential supervision of the large government sponsored enterprises that specialized in residential mortgages, Fannie Mae and Freddie Mac. Prior to the crisis, prudential supervision of Fannie and Freddie was conducted by the Office of Federal

¹⁸ See Blinder and Reis (2005: 66–72) for a discussion of Greenspan's views and Roubini (2006) for an argument as to why central banks should burst bubbles.

¹⁹ See the Securities and Exchange Commission, Office of Inspector General (2008) for an analysis of the weaknesses in the Securities and Exchange Commission's consolidated supervision of investment banking groups.

Housing Enterprise Oversight. The biggest goal conflict that inhibited Office of Federal Housing Enterprise Oversight appears to have been with many in Congress who wanted prudential supervision but placed an even higher priority on the government sponsored enterprises reducing the cost of mortgage finance. Congress mandated weak capital requirements and its control over Office of Federal Housing Enterprise Oversight's budget served to weaken the agency's prudential supervision.²⁰

3.2.2 Limited power

The Treasury and federal supervisory agencies were also less effective because of limits on their power or incomplete mandate. Central banks typically are active in financial markets and take some note of the markets operations, including the clearing and settlement of financial markets transactions. The Federal Reserve did not have a direct mandate to supervise the prudential operations of US over-the-counter (OTC) markets. However, the Federal Reserve did use its supervisory power over commercial banking groups to correct problems that it observed in the market place. Thus, the Federal Reserve along with other G-10 central banks worked to reduce the risk settlement failure in the foreign exchange market, ultimately leading to the creation of CLS Bank to reduce risk.²¹ Similarly, the Federal Reserve cooperated with other domestic and foreign supervisors to address processing backlogs in credit default confirmations.²² However, unresolved potential weaknesses existed in the tri-party repo market at the time of Bear Stearns collapse which contributed significantly to the decision to assist its purchase.²³ Further, American International Group's role as a major writer of credit guarantees was not adequately appreciated by many prudential supervisors until shortly before its collapse.

The most substantial weakness in authority, however, proved to be the lack of an appropriate mechanism to recapitalize or resolve systemically important large nonbank financial firms.²⁴ The FDIC's resolution authority is limited to insured banks and does not even extend to nonbank members of the insured bank's group. The only legally authorized mechanism to resolve a failing nonbank financial firm was through the bankruptcy courts using legislation that was not designed to deal with systemic financial concerns. As a result, US officials proved

²⁰ See Morgenson and Rosner (2011) for a discussion of the political environment that enabled Fannie Mae and Freddie Mac to take large risks in the residential mortgage market.

²¹ See Lindley (2008) for a discussion of foreign exchange settlement risk and CLS Bank.

²² See Ledrut and Upper (2007:86-90) for a discussion of the backlog in credit default swap confirmations.

²³ See Financial Crisis Inquiry Commission (2010: 290–291).

²⁴ Bernanke (2009) points to the lack of such a resolution mechanism as the reason for the Federal Reserve providing support for Bear Stearns takeover and the continuing operation of American International Group.

reluctant to let large sensitive groups be put into bankruptcy, and their concerns are supported by at least some of the consequences of Lehman's failure.²⁵

Resolution authority was provided shortly before it was needed in the case of Fannie Mae and Freddie Mac.²⁶ However, no fiscal authority was provided for other nonbank financial firms until the Troubled Asset Relief Program nor was an alternative resolution mechanism for systemically important financial institutions (SIFIs) adopted until the passage of the Dodd-Frank Act in 2010. Notably, nothing was done to address the weaknesses revealed by Bear Stearns collapse until after the failure of Lehman and the collapse of American International Group despite widespread concerns about weaknesses at Lehman and other important financial intermediaries.

The lack of corrective legislation between Bear and Lehman is likely due to several difficulties. First, the US constitution, US legislative tradition, and the US political system reflect more of a concern about the consequences of hastily passing bad legislation than it does the occasional benefits of rapidly passing needed legislation.²⁷ This structure strengthens the hand of those that would oppose legislation. In the case of weak financial firms, legislation to address their problems would likely crystallize the losses and force some parties to bear those costs. Shareholders and creditors would stand to lose control rights and future cash flow if new legislation facilitated the resolution of critically undercapitalized financial firms through administrative or judicial bankruptcy. However, most voters would object to taxpayer funds being used to bail out the insolvent firm. In these circumstances, legislators may prefer to wait until either the distressed firms heal themselves (with or without lender of last resort assistance) or a crisis forces legislative action.

Moreover, the problems with legislating during stressful periods go further in that any legislative action during the crisis both serves as a signal of policymakers' concern about the health of the financial system and risks changing the rules of the game for market participants. For example, if legislation had been proposed after Bear Stearns collapse several bad outcomes were possible. Congress could have refused to pass any new legislation, in which market participants would have observed that policymakers were concerned about the health of the financial system but no action was going to be taken. Alternatively, Congress could have passed legislation facilitating the resolution of a failing systemically important financial institution but that would have encouraged runs on those banks thought most vulnerable to failure. Finally, Congress could have passed a bill providing for the recapitalization of failing

²⁵ An example of one of the consequences is the slow, messy resolution of Lehman's operations in London.

²⁶ The two government sponsored enterprises were not subject to judicial bankruptcy nor did their supervisor have the power to place them in administrative receivership.

²⁷ The constitution provides that both Houses of Congress must approve all legislation. US legislative tradition allows a minority of senators to block action. Finally, political party discipline in the US is weak as the national parties have no ability to remove senators or representatives that are supported by their state or district.

firms which would have discouraged runs on insolvent firms but at the cost of further entrenching those firms' management.

4. THE EURO AREA

The euro area represents an attempt to achieve an ever closer union through two daring leaps, doing what was politically feasible first and hoping the remaining essential steps would follow. Ideally the remaining steps would happen before a crisis, but if not, the hope was that at least the crisis would provide the impetus to bring about closer union.

The first of these leaps is the attempt to develop a single market for financial services by liberalizing entry rules. Most of the EU is a bank dominated market. Hence the development of a single market for financial services implies the development of pan-EU banks, which in practical terms meant bank consolidation. The consolidation of the banking sector was facilitated in 1992 by the adoption of the single passport which allowed banks authorized by one EU member to provide services in all other EU member states (Chrystal and Coughlin 1992). Further, the single passport allowed an EU bank to provide any service authorized in its home market in any host EU markets in which it operated. Along with facilitating the consolidation of the banks, these changes also encouraged individual member states to liberalize their financial services rules. The single passport, however, represented a bold leap in that it was not accompanied by moves to create a pan-EU prudential supervisory agency, deposit insurer or a pan-EU bank resolution mechanism. Instead the EU retained these functions at the national level subject to harmonization of minimum standards in some key areas including capital adequacy and deposit insurance. Additionally, EU level committees were intended to facilitate cooperation among national supervisors.

The second and even bigger leap was the creation of a currency union and the ECB. The euro area is so large and diverse that it is unlikely all of its members will be at the same stage in the business cycle and benefit from the same monetary policy (Feldstein 2011). This is an important difficulty for the operation of a common central bank, but it is not insurmountable. The US is also large and diverse yet functions with a single currency. The difference is that the US has a federal government with a large budget that automatically transfers income from faster growing regions to economically weaker regions. The US also has a national deposit insurance system which spreads the cost of regional bank failures across the country. Finally, the US also has a history of greater worker mobility, with workers in most social strata being prepared to move to areas with better job prospects. In contrast, the central budget for the EU is tiny relative to its member states' national budgets, deposit insurance is provided at the national level and worker mobility appears to be concentrated in the better educated, higher earning strata. Finally, the various states in the US long ago learned that political sub-units in a currency union must not run large, persistent deficits and most state constitutions require a balanced budget. The member states of the EU demonstrated some understanding of the

importance of limiting fiscal deficits when they set the terms for joining the euro and approved the Growth and Stability Pact. However, the Growth and Stability Pact did not prove very effective in practice.

The final chapter has not yet been written on the euro area. The current crisis may yet provide the impetus for the euro area members, or at least most of the members, to take the remaining essential steps for a lasting currency union with a single market for financial services. But such an outcome is not assured, and in any case the road there is proving to be very rough. The following subsections review the weaknesses that led to the current sovereign debt problems in several peripheral countries and consider the difficulties facing euro area policymakers.

4.1 The Events

The ECB confronted two crises. The first arose largely from euro area banks exposure to developments in the US. Acharya and Schnabl (2010) point to flaws in regulation that encouraged banks in many countries, including many euro area countries, to create conduits that purchased highly rated mortgage backed securities that was invested in lower quality US mortgages. These conduits then relied rather heavily on obtaining short-term US dollar funding in the asset backed commercial paper market. As investors withdrew from the asset backed commercial paper market due concern about the underlying mortgage backed securities, the sponsoring banks faced a funding crunch as they tried to obtain alternative sources of financing. The crisis in US dollar funding started in the summer of 2007 and peaked shortly after the failure of Lehman.

The second crisis that emerged took the form of distressed markets for the sovereign debt of several euro area countries, commonly referred to as the “peripheral” countries—especially Greece, Ireland, Portugal, Spain and Italy. The underlying causes of these sovereign debt crises largely go back to decisions made prior to 2007 but the seriousness of the problems did not become apparent until after the failure of Lehman.

Greece had been running large current account and fiscal deficits prior to the crisis.²⁸ However, it was able to finance these deficits at low spreads to other euro area sovereign debt, due largely to a combination of the Greek government providing misleading information about the level and growth rate of its sovereign debt and by investors’ expectations that no euro area Member State would be allowed to default. Investor concerns increased dramatically, however, in October 2009 when an incoming government revised the government budget deficit estimate for 2009 from 6.7% of gross domestic product (GDP) to 12.7% of GDP. As the magnitude of Greece’s fiscal deficit and outstanding debt became apparent, the country faced increasingly difficult terms in accessing the market. Indeed, further work was done on Greece’s public debt and estimates of the 2009 year end debt increased to 115.1% of GDP by

²⁸ This paragraph draws from Nelson, Belkin and Mix (2010) and Stein (2011).

May 2010. On 2 May 2010 the Greek government reached an agreement with the International Monetary Fund (IMF) and the European Commission under which the government would be provided loans of 110 billion euros in return for agreeing to make a variety of changes in fiscal policy and to adopt a package of measures intended to enhance the competitiveness of the Greek economy.²⁹ The ECB agreed to provide technical assistance to Greece along the International Monetary Fund and European Commission in implementing the program. The package proved insufficient to restore Greece's finances, however, and another package was approved on 21 July 2011.³⁰ That plan called for additional aid to Greece and for the private sector to agree to "voluntarily" reduce its claims on Greece. The July 2011 plan has since undergone some modification, including the addition of collective action clauses that permit the Greek government to force some bondholders to accept lower payments. The revised plan was approved in March 2012.³¹

At almost the same time as Greece's problems were first recognized, Ireland took measures that were ultimately to play a major role in its debt crisis. That Ireland has had a crisis is in some respects a surprise as the country had a strong fiscal position, with low sovereign debt and government surpluses. Further, the country was sometimes called the "Celtic Tiger" in recognition of the country's strong international competitive position.³² However, Ireland also had a major property boom prior to the crisis that in some respects exceeded that of the US. The global shock to financial markets resulting from Lehman's failure combined with a collapse in the Irish property market resulted in funding strains for Irish banks that had been major lenders in the real estate market. The Irish government responding to runs on their banks by guaranteeing all deposits and senior debt in September 2008. This was followed by the nationalization of Anglo Irish Bank in January 2009, the investment in preference shares in two large Irish retail banks in early 2009 and the establishment of an agency to purchase non-performing development loans in November 2009. These capital injections and asset purchases caused a large increase in Irish government expenditures. At the same time, the government's tax revenue declined because the country's pre-crisis tax structure depended heavily on a sales tax receipts from new construction. In part because of concerns about Ireland, the euro area Member States created the European Financial Stability Fund on 9 May 2010 to provide loans to euro area countries experiencing financial difficulty.³³ On November

²⁹ The announced the agreement with a press release International Monetary Fund (2010a) and a staff agreement on the report, International Monetary Fund (2010b). The staff report also discusses the conditions that led to the agreement.

³⁰ The EU leaders' statement is available at <http://www.foxbusiness.com/markets/2011/07/21/read-eu-leaders-full-statement-on-greek-bailout/> (accessed 3 March 2012).

³¹ See Dalton and Thomas (2012).

³² See European Commission, Economic and Financial Affairs (2012).

³³ Information about the European Financial Stability Facility may be obtained at <http://www.efsf.europa.eu/about/index.htm> (accessed 3 March 2012).

2010, The Irish Government announced that it had agreed to an 85 billion euros package of loans from the European Financial Stability Facility (EFSF), the European Financial Stability Mechanism (EFSM), the International Monetary Fund, and the governments of the United Kingdom (UK) Sweden and Denmark.³⁴

Portugal's pre-crisis sovereign debt to GDP ratio was above the Maastricht limits but well below those of Greece and Italy.³⁵ However, Portugal had a combination of high private debt levels and weak competitiveness that raised investor concerns about the country's long run ability to manage its debt level (Gros 2011). As a result, Portugal sought official assistance. On 17 May 2011 the International Monetary Fund agreed to provide a loan of 26 billion euros and the EU agreed to provide loans worth 52 billion euros through the European Financial Stability Mechanism and European Financial Stability Facility. In return the government of Portugal agreed to meet certain conditions.

Like Ireland, Spain had a low sovereign debt to GDP ratio of 36.2% before the crisis and its debt to GDP ratio declined every year from 2000 to 2007.³⁶ Spain's problems relate more to domestic imbalances combined with the consequences of the international financial crisis.³⁷ Prior to the crisis, Spain experienced a real estate boom that boosted economic growth and taxes. The global downturn caused a large budget deficit partly due to automatic increases in spending and decreases in revenue, but partly also due to the government adopting a fiscal stimulus package (De la Dehesa 2011). At first the financial sector reported that it remained strong even after the real estate downturn. However, investors were not convinced by these reports, and they were particularly concerned about unrecognized losses in the country's savings banks (the cajas).³⁸ Although the spread on Spanish sovereign bonds over German bonds has significantly increased, Spain has not sought official assistance, unlike Greece, Ireland, and Portugal. However, the country has reportedly benefited from two ECB programs discussed in the following subsection: the Securities Markets Programme and the Longer-Term Refinancing Operation (LTRO).³⁹

Italy has long had a high ratio of sovereign debt to GDP, however that ratio had been relatively stable prior to the crisis and has not seen a dramatic increase since the crisis. Italy's debt burden appeared manageable so long as investors priced the debt as if it had a sufficiently low

³⁴ The announcement from the Irish government may be found at <http://www.finance.gov.ie/viewdoc.asp?DocID=6600> (accessed 3 March 2012).

³⁵ Banco de Portugal (2011) reports that Portugal's debt to GDP level first exceeded the Maastricht Treaty limits in the third quarter of 2005 but the charts show that the debt level was below 70% in 2007.

³⁶ See Spain Ministry of Economics and Finance (2011).

³⁷ See Estrada, Jimeno, and Malo de Molina (2009).

³⁸ See The Economist (2011).

³⁹ See Lumholtz (2011) for a discussion of the effect of the Securities Markets Programme on the Spanish sovereign debt market and Forelle (2012) for a discussion of the effect of the LTRO.

risk of default (Cline 2011). Once the credit markets started pricing in a sufficiently high risk of default, there was a jump in the implied combinations of primary budget surplus and economic growth needed to maintain a constant debt to GDP ratio to levels which were arguably not sustainable (Roubini 2011). Like Spain, Italy has not sought official assistance but has reportedly benefited from the ECB's Securities Markets Programme and LTRO.⁴⁰

4.2 Pre-crisis Limitations on ECB actions

The brief recap above suggests that many of the sovereign debt problems could have been reduced if the member states had followed more conservative fiscal policies, adopted tighter banking regulations and implemented reforms to improve their competitiveness. However, the ECB does not and did not have any direct power over its member states fiscal policy or the combination of policies they implement to support competitiveness and economic growth. Nor was the ECB empowered to provide grants to distressed countries or purchase equity in distressed banks. The ECB could only indirectly influence fiscal policy by conducting research and giving presentations on appropriate fiscal policy and on policies to enhance competitiveness. In particular, the ECB emphasized the importance of honoring the Growth and Stability Pact, which prescribed a limit on annual fiscal deficits of 3% of GDP.⁴¹ However, authority for enforcing the Growth and Stability Pact fell to the Council of Economics and Finance Ministers (Ecofin).

As the monetary policy authority, the ECB had the potential to use monetary policy to stop or reverse the rapid appreciation of real estate prices in Ireland and Spain. However, the ECB's mandate is for maintaining stable prices for goods and services across the euro area and not for limiting asset price appreciation in a few member states. Further, the situation in Spain and Ireland was very different from the ECB's largest member states: France, Germany, and Italy where the harmonized index of consumer prices was growing at a 1.8% annual rate. Thus, implementing a monetary policy targeted at Spain and Ireland could have caused the ECB to deviate from appropriate policy for the euro area as a whole (Estrada, Jimeno, and Malo de Molina, 2009).

The ECB did not, however, have any tools other than monetary policy to address rapid asset price growth. Nor did the ECB have any other micro or macroprudential tools other than its ability to research and comment on the execution of these tools by its member states. The various member states took individual and collective measures to enhance microprudential regulation. Most famously, the Bank of Spain instituted dynamic loan loss provisioning which required banks to establish higher provisions during good times and gave Spain's banks a somewhat greater ability to absorb losses at the start of the crisis (Saurina 2009). The EU did

⁴⁰ See Lumholtz (2011) for a discussion of the effect of the Securities Markets Programme on the Italian sovereign debt market and Forelle (2012) for a discussion of the effect of the LTRO.

⁴¹ For example, see González-Páramo (2005)

form the Committee of European Bank Supervisors with the ECB as a non-voting member to contribute to implementation of EU directives, and convergence of supervisory practices and to promote co-operation among supervisors.⁴² However, operational control of prudential supervision remained a national responsibility; the ECB could only seek to influence national supervisors.

4.3 ECB and Prudential Supervisory Actions during the Crisis

While the ECB had neither the appropriate tools to prevent a crisis nor the tools to provide solvency support once the crises began, it could employ its power as lender of last resort once the crisis started. The ECB used this power from the start of the first wave of crises in August 2007 by allowing banks to obtain the full amount of liquidity they needed on an overnight basis on a collateralized basis and at the prevailing refinancing rate.⁴³ The ECB also conducted supplementary financing operations with longer maturities and “front-loaded” reserves in the first half of maintenance periods.

After the failure of Lehman, the Eurosystem adopted several measures to provide funds to banks experiencing liquidity stresses including: (a) allocating the full amount requested by each bank at the main financing rate against eligible collateral, (b) the list of eligible collateral was expanded, and (c) additional longer term lending facilities (longer-term refinancing operation or LTRO) with maturities of up to six months and later one year were opened. Further, the ECB opened swap lines with the Federal Reserve to obtain dollars that were lent to euro area banks and also opened swap lines with selected non-euro area European central banks to supply them with euros. Market conditions gradually improved and in December 2009, the Governing Council of the ECB announced that the non-standard measures would be gradually phased out.

The second wave of crisis started 2010 with large increases in some sovereign debt spreads relative to German bunds. Euro area governments responded with the announcement of a package of measures in May 2010, including the EFSF. Also in May, the ECB announced the Securities Markets Programme through which the ECB would seek to restore depth and liquidity to “dysfunctional market segments” and restore the monetary transmission mechanism throughout the euro area. The ECB also reintroduced some of its earlier non-standard procedures including the fixed-rate with full allotment tender procedure, the LRTTO and dollar loan facilities obtained through swap lines from the Federal Reserve. Subsequently, the ECB has conducted two three-year LTRO with allotted amounts of 489.2 billion euros in the December allotment and 529.5 billion euros for the LTRO with a settlement date in March

⁴² The Committee of European Bank Supervisors charter may be found at the <http://www.eba.europa.eu/Aboutus/Legal-texts/Archive/CEBS-Charter.aspx> (accessed 1 March 2012). Committee of European Bank Supervisors was succeeded by the European Banking Authority (EBA) in 2011.

⁴³ This discussion of the ECB’s response through 7 September 2010 is taken from European Central Bank (2010).

2012.⁴⁴ The Governing Council also approved national eligibility criteria for collateral and approved temporary acceptance of additional credit claims as collateral.

While the ECB could limit the extent to which liquidity problems caused bank failures, it could not directly address solvency problems in the banking system. National authorities took responsibility for several distressed banks including two German banks in 2007, IKB and Landesbank Sachsen and several larger banks in 2008–09 including Fortis, Dexia, Hypo Real Estate and Commerzbank.

National supervisors also conducted stress tests to evaluate the remaining bank's capital adequacy. However, the first test, conducted in the summer of 2010, were criticized on a variety of grounds—most especially its failure to include larger sovereign debt losses in the analysis.⁴⁵ The second stress test in the summer of 2011 was praised for its disclosure of individual bank exposures but was also criticized the grounds that its findings that only 8 banks failed the test and these banks only needed to raise a total of 2.5 billion euros greatly underestimated the capital shortfall.⁴⁶ Despite having passed the second stress test, Dexia Bank required a rescue package from Belgium, France and Luxembourg in October 2011.⁴⁷

Onado and Resti (2011) point out that part of the reason why the US stress tests were relatively more successful is that they not only found that the banks needed to raise significant capital but also provided a clear mandate to the banks to either quickly raise new capital or accept the injection of capital from the government. Perhaps in recognition of these differences and in light of the ongoing weakness in the markets for peripheral country bonds, the European Council (2011) agreed in October 2011 to tougher capital requirements to be implemented by 30 June 2012.⁴⁸

⁴⁴ See ECB Open Market Operations at <http://www.ecb.int/mopo/implement/omo/html/index.en.html> (accessed 30 April 2012).

⁴⁵ See Committee of European Banking Supervisors (2010) for a summary of the results of the 2010 EU wide stress tests and Blundell-Wignall and Slovik (2010) for a critique of the 2010 tests' treatment of sovereign debt exposure.

⁴⁶ See European Banking Authority (2011) for a summary of the results. In contrast Slater and Jones (2011) report two investment banks analysts estimated that 40 billion to 80 billion euros in new capital, and Bloomberg Editors, (2011) reported that earlier in the year Standard and Poors estimated the banks would need 250 billion euros. Onado and Resti (2011) do not disagree that the tests were too mild, but argue that the disclosure of bank exposures were a "great step forward."

⁴⁷ See de Groen (2011) for a discussion of why Dexia failed shortly after passing the European Banking Authority's stress test.

⁴⁸ Those requirements are that banks should be required to meet a higher capital target of 9% of the "highest" quality capital after accounting for market valuation of sovereign exposures. The European Banking Authority's recommendation for implementing the agreement may be found at <http://www.eba.europa.eu/capitalexercise/2011/2011-EU-Capital-Exercise.aspx> (accessed 23 April 2012).

4.4 Policy Limitations

The resolution of the euro area problems is complicated by conflicting goals and limited powers.

4.4.1 Conflicting Goals

One of major problems in addressing the sovereign debt crises in the euro area is that conflicting goals among the decision makers. The discussion of the US illustrated that such conflicts can arise even when all of the agents are ultimately accountable to the same principal (in the US either Congress or the voters). Yet the problems in the euro area are even more severe because the key decision makers are at the national level (especially the heads of government or state) and each of these is accountable to the voters in their home country. The government in each country determines its own fiscal policy with limited regard to its impact on the rest of the euro area. Similarly, the supervisors in each country pursue domestic goals with limited regard to their impact on the rest of the euro area. Then when a crisis arises in a country, the primary source of support will come from other euro area governments; governments that must persuade their voters of the merits of helping another country.

Moreover, the nature of the single currency project creates conflicts between those steps that might help the most distressed borrowers and the welfare of the remaining euro area countries. An important part of the purpose of the creation of the euro is to bind its Member States financial system into an integrated whole that is more efficient than previous system consisting of a patchwork of separate national financial systems supported by international wholesale financial markets. Yet, some proposals for addressing the debt burden and competitiveness issues in one country may impose substantial damage on the integrating financial markets in the rest of the euro area.

One example of a plan that helps one Member State but at a cost to the overall financial system is that of imposing losses on the distressed sovereign's creditors. If a Member State has more sovereign debt than its taxpayers will service, a way of addressing the problem is to reduce the promised payments such as Greece is currently seeking to do. On one level, this seems reasonable. If each country had its own currency, the country could reduce the real value of its debt by running higher inflation rates, thereby reducing the real value of its payments. Euro area states surrendered this option when they joined the euro but the substitute of reducing nominal payments on existing debt can serve the same purpose. Moreover, while doing so is adverse to creditors it will have the effect of instilling greater market discipline in the future.

However, if one Member State in the euro area can restructure its debt and reduce payments then market participants will rationally conjecture that other Member States can and, at some time in the future, some likely will restructure their debt. Thus, part of the price of letting one

Member State restructure its debt is that the other Member States will pay a higher credit risk premium.

Another example of a plan that may help one Member State but at a cost to the overall financial system is that of a country exiting the euro area. Some have encouraged Greece to leave the euro area and return to using the drachma as a way of remedying the country's lack of international competitiveness. The reason behind this suggestion is that country could get a boost to its competitiveness if it reduced the real cost of its domestically produced inputs (especially labor). One option for reducing the cost of domestic inputs is via domestic deflation. Yet doing so would immediately increase the real value of its outstanding nominal debt. The other option for reducing the cost domestic inputs is for the country to exit the euro area, adopt a new currency and then deliberately cause its currency to depreciate. However, even assuming advocates of this policy are right about the competitiveness benefits for one country, the exit of one country from the euro area would likely impose very large costs on some other euro area countries. The problem arises because the switch to a domestic currency will almost surely include the redenomination of local bank deposits into the new currency. The holders of these deposits will then suffer a drop in the real value of their deposits as the domestic currency depreciates relative to other currencies (and likely also a domestic inflation increases). Thus, holders of the deposits would have an incentive to try to move their funds out of their country before it leaves the euro.⁴⁹ Again, if one country leaves that increases depositors concerns that other countries may leave. The result is that rather than one euro being worth one euro everywhere in the euro area, a euro deposit, for example, in Portugal may be viewed by almost all depositors as less valuable than a euro deposit, for example, in Germany.

Thus, the decision by a Member State to restructure its debt or exit the euro area can potentially have very different impacts on that State versus the remainder of the euro area. The final decision, however, rests with the Member State which receives all of the benefits but bears only part of the cost.

4.4.2 Limited power

The only euro area body with significant financial resources and that is accountable to the entire euro area is the ECB. Yet as a central bank, the ECB is already given enormous power for which it is only indirectly accountable to the voters in the euro area. Moreover, the ECB's enormous powers are nevertheless limited in their ability to fix a sovereign debt crisis.

The ECB can provide liquidity through its lender of last resort operations distressed banks. The ECB can also provide liquidity to distressed sovereign bond markets through its Securities Markets Programmes and through LTRO operations where the bank borrowers can use the proceeds to acquire distressed sovereign debt. However, this liquidity comes in the form of loans which must ultimately be repaid. The loans can provide the bank or country with valuable

⁴⁹ Indeed, bank deposits in some of the weakest countries have declined during the crisis (Glover 2012).

time to enhance its reputation with private creditors and its ability to repay.⁵⁰ However, ECB loans can solve the problem only in those rare cases of a pure liquidity crisis where borrower has the ability to service the loan. Otherwise, ECB actions can only provide time to implement a solution to the distress; ECB loans that must be repaid are not a complete solution to insolvency.

Further, access to loans somewhat reduces the pressure on the borrower to improve its conditions. Bank borrowers may delay recognizing losses and obtaining new capital if the new capital is associated with governance changes or is perceived to be costly. Additionally, national bank supervisors are given the option of allowing zombie banks to continue in operation. Sovereign borrowers may take more time to impose politically painful cuts to expenditures, increases in taxes, and the removal of barriers that shelter inefficient parts of their economy.

Another problem created by the provision of ECB liquidity, is that the ECB's obtains a privileged position relative to private lenders. The ECB requires that its loans to banks be collateralized with the result that other bank creditors will take larger losses if the bank fails. The ECB's Securities Markets Programme does not give it *de jure* preference to other bondholders. However, the ECB's recently swapped Greek bonds it purchased in the market and that would be subject to losses if Greece restructures its debt for new bonds that are not subject to taking losses. This swap is consistent with the ECB's role as the monetary authority in the euro area that does not supply fiscal support to Member States. However, the swap also has the effect of requiring larger private sector losses for any given amount of debt reduction for the sovereign borrower.

Finally, ECB support of distressed borrowers signals other banks and sovereigns that they too are likely to benefit from ECB should they become distressed in the future. The result of somewhat lowering the cost of becoming distressed is that other banks and sovereigns are likely to take more risk than they would absent the potential for a bailout.

5. POLICY IMPLICATIONS

The US and euro area experience have a number of similarities. The most important of these is that during a financial crisis the central bank will come under tremendous pressure to provide liquidity to illiquid borrowers, including borrowers that appear to be insolvent. The lender of last resort function of the central bank is to provide loans to banks that would be solvent so long as their assets are not marked to fire sale prices. However, in a crisis the

⁵⁰ The loan to a country consists of buying its bonds. ECB not authorized to finance governments, but Securities Markets Programme targeted at the bonds of distressed countries can have the effect of financing the government.

lender of last resort will come under intense pressure to lend even to entities that would be unambiguously insolvent in most reasonable scenarios.

But the structure of the political system can also exert pressure that is even more difficult to resist. Many political systems are incapable of responding to fast moving markets in a timely manner—with the US and euro area political structure especially good examples of political systems that were not designed for timely responses to financial market moves. In situations where the market is moving faster than the political system, the political authorities can credibly tell the central bank that either the central bank provides lender of last resort funds or the borrower will fail—perhaps in a messy bankruptcy which could lead to systemic financial problems. If the failing borrower is insolvent but central bank finds the systemic problems case plausible, the central bank will face a dilemma: (1) Let the potential borrower fail with potentially severely adverse implications for the economy and the central banks independence, or (2) lend to an insolvent entity, with both the short-term resource misallocation problems and the longer term moral hazard problems. Moreover, these moral hazard problems arise not just for other borrowers but also for the political authorities who may avoid taking politically painful steps in the run-up to a future crisis because they believe the central bank will lend to insolvent borrowers again.

5.1 Important Pre-Crisis Actions

Given the high costs of financial crises, including their adverse impact on central banks, the most important steps are those taken before a crisis arises. Among the necessary actions to be taken prior to a crisis are those of making sure that the financial infrastructure does not propagate shocks through the financial system and enhancing the resiliency of the financial system through micro- and macro-prudential supervision. However, financial crises have occurred throughout time in a wide variety of settings and we should be modest about our ability to prevent future crisis. The recent experience of the US and the euro area is that it is very difficult during a crisis to obtain legal authorization for new tools and to develop a good plan for their use. Thus, the time to adopt and refine crisis management tools is long before one arises.

In one respect central banks were partially successful in their pre-crisis actions, that of addressing weaknesses in the financial infrastructure. The pre-crisis actions of the central banks and prudential supervisors in reducing Herstatt risk in the foreign exchange market and documentation backlogs in the credit default swap markets likely kept the crisis from being even worse than it was. However, the pressure to bailout Bear Stearns due to concern about the tri-party repo market shows that more work remains in this area.

Microprudential and macroprudential policies have an important role to play in making the financial system resistant to adverse shocks. Microprudential supervision has long existed and these supervisors have long a well developed agenda for strengthening financial firms, such as

the Basel III agenda which addresses some of the deficiencies discussed above in the Basel II requirements. Macroprudential supervision is in some respects newer and less developed. Macroprudential supervision should consist of more than simply stricter microprudential supervision of systemically important financial institutions (SIFIs). Wall (2009) argues, macroprudential supervision must also seek to understand and keep pace with major financial markets. He points out that a careful review of developments in the US mortgage market prior to the crisis would have turned up a number of unsafe and unsound practices. The crisis that started in 2007 would likely have not been so severe if these practices had been addressed earlier. The authorities may also have been able to act more effectively during the crisis had they better understood some key market developments.

Arguably another appropriate step is to use macroprudential and possibly also monetary policy to stop seemingly unwarranted asset price appreciation. While Greenspan's claims about the low cost of cleaning up after a popped bubble have proven wrong, his concerns with the difficulty of identifying bubbles and the costs of popping them remain. In any case, the central bank should be mindful of price trends in asset markets.

Along with actions to reduce the likelihood and severity of a financial crisis, pre-crisis actions should include the preparation of crisis management tools. One such critical set of tools are those needed to resolve failing financial firms without causing further financial instability. One of these tools will be the development of rapid, efficient mechanisms for resolving insolvent firms, such as the use of contingent capital to automatically recapitalize distressed SIFIs or the development of effective administrative or judicial bankruptcy systems to resolve failed SIFIs. When feasible, resolution through administrative or judicial bankruptcy is in many ways the best approach for handling a distressed systemically important financial institution.⁵¹ Another of these tools may be the provision of some fiscal resources, perhaps along the lines of deposit insurance, to further facilitate the resolution of failing firms.

Along with obtaining the necessary tools, the authorities should also regularly stress test their plans for managing a financial crisis by conducting mock exercises. Such stress tests are likely to help the authorities identify gaps in their plans and to be better prepared during a crisis. This is not to say that the stress tests will identify all of the potential problems, almost surely some major weaknesses in the crises management plans will not be identified until after the crisis starts. But such exercises should reduce the number of surprises and may facilitate better working relationships among the different sets of authorities that could prove helpful during a crisis.

⁵¹ However, as noted by Wall (2010) the as yet unresolved problems of resolving the cross-border operations of international groups and the problems of simultaneously resolving multiple SIFIs precludes full reliance on failure resolution at this time.

5.2 Central Bank's Role in Preparation

The central bank has broad responsibilities both in normal and crises periods. Thus, it must play a role in the preparations for the crisis. At a minimum, the central bank should be involved in the pre-crisis preparations in at least three ways. First, the central bank should have a seat at the table where micro- and macroprudential policies are being developed. The central bank should be in a position to advocate for policies that reduce the likelihood of a crisis and provide more efficient mechanisms for addressing any crisis that does emerge. Second, the central bank must be an active participant in mock exercises to test the authorities' crisis resolution plans. Third, the central bank should have its own sources of information, ideally including the independent ability to inspect major financial institutions and markets. While one might naively hope that different government agencies would freely share information with each other, the reality is that information flows are inhibited because different agencies are assigned different sets of goals and have different priorities among those goals. The central bank needs to have a clear picture of the financial system in order to effectively contribute to the development of micro- and macroprudential policies and in order to efficiently execute its lender of last resort responsibility during crises.

The more difficult questions relate to how big of a role the central bank should have in micro- and macroprudential supervision and whether it should be given fiscal powers to resolve failing firms—for example, by making the deposit insurer part of the central bank. Given that the central bank will have some involvement in the planning for all of these activities; it is tempting to simply give the central bank complete responsibility. While that may be appropriate in smaller countries with limited human and financial resources, there are at least two good reasons why the central bank should not be given all prudential and resolution powers.

First, the central bank is given enormous economic power and it will face some political pressure even in the best of times. Appropriate prudential policies, especially macroprudential policies directed at threats to financial stability from risky market practices or perceived bubbles may work to further undermine central bank political independence. That is, by the time a market practice or perceived asset price bubble threatens financial stability, they are almost surely providing substantial economic benefits to some parts of society. If a central bank acts solely on its own authority to correct the emerging threat to stability, the adversely impacted parts of society are likely to use their political clout to counter the central bank's actions and perhaps even central bank independence.

Second, central banks are already assigned a variety of public policy goals that will not always have consistent implications for policy. If the central bank is assigned final decision making power over macroprudential regulation, it may be tempted to use its supervisory powers to further its monetary policy goals. Or it may feel political pressure to unduly adjust its monetary policy decisions to mitigate financial instability arising from deficiencies in its macroprudential supervision.

5.3 Central Bank during a Crisis

The central bank acting has a clear responsibility during a crisis to act as a lender of last resort. Ideally this responsibility can be met by supplying additional liquidity through its normal mechanisms. However, if normal mechanisms are not sufficient, the lender of last resort must be willing to lend to clearly solvent banks to the full extent of their good collateral. Given the difficulty of asset valuation, the lender of last resort typically must be prepared to lend to banks that will plausibly be solvent after the liquidity crisis based on collateral that will plausibly be good after the crisis. These loans may prevent the sale of assets at fire sale prices and the forced closure of institutions that could otherwise survive. More importantly, these actions also limit the extent to which temporary financial concerns may have a long lasting impact on the real economy.

The difficulty during a crisis is whether the central bank should lend to financial institutions that are likely to remain insolvent after the crisis, potentially on the basis of assets that are likely to be worth less than the value of the loan after the crisis. Such loans cannot solve the underlying problem of insolvency, at best the loans can only buy time for the other authorities to recapitalize or resolve the failing firm. Moreover, such loans carry clear costs to society in the form of the continued operation of zombie banks, and the encouragement of greater risk taking on the part of the still solvent financial firms. Nevertheless, if pre-crisis preparations turn out to be inadequate during a crisis, the central bank may nevertheless face a choice of risking a disorderly failure or lending to an insolvent firm based on inadequate collateral.

One possible answer is that the central bank should adopt a “just say no” policy of refusing all such requests. The advantage of a “just say no” policy *ex ante* is that it provides stronger incentives for banks to operate prudently and the political authorities to develop adequate crisis resolution tools. The problem with “just say no” is that it is not time consistent. When a financial crisis arrives, the central bank will weigh the short run risk to the economy and its political position of allowing a systemic crisis against the longer run costs of allowing zombie banks and creating more moral hazard. Given the high cost of systemic crises on the real economy, central banks have chosen to provide support in the past and very likely will in the future.

An alternative to the central bank adopting a time inconsistent policy is that of imposing stricter *ex ante* limits on lender of last resort operations. Ideally, the effect of stricter limits would be the same as a credible “just say no” policy on banks and the political authorities. In practice, limits on lender of last resort operations have benefits but also have costs. The requirement that the lender of last resort may only provide collateralized loans places credible and substantial limits on the central banks’ ability to conduct fiscal operations. However, as Samuel Johnson once remarked (Boswell 1791): “Depend upon it, sir, when a man knows he is to be hanged in a fortnight, it concentrates his mind wonderfully.” Faced with the imminent risk of a systemic crisis, central banks and the political authorities can demonstrate great

ingenuity. The Federal Reserve's loans to commercial banks were limited by FDICIA, but the Act did not explicitly prohibit the Federal Reserve from creating and lending to an special purpose vehicle. The ECB is not allowed to finance governments.⁵² However, after the ECB announced its three year LTRO, French President Sarkozy said that banks should be encouraged to borrow from the ECB and use the proceeds to buy euro area sovereign debt—what some in the market call the Sarkozy trade.⁵³ While spread between sovereign debt yields and the cost of the LTRO in the Sarkozy trade may help recapitalize some banks, this approach is arguably an inefficient and risky substitute for direct ECB financing of governments.

Thus, I am left with the unsatisfying recommendation that lender of last resort operations should be subject to ex ante limits both to restrict their use during non-crisis periods and impose some limits on what is done during a crisis. However, we should not be overly optimistic about the effects of such limits on the ex ante behavior of political authorities, nor on the outcomes during a crisis.

6. CONCLUSION

Central banks acting as lenders of last resort are given enormous power to take quasi-fiscal actions which may be very costly. As a result their lender of last resort actions are normally limited by a variety of constraints, including that of lending only to solvent borrowers on good collateral at a rate above normal market rates. These constraints are necessarily weakened during liquidity crisis as lenders cannot easily distinguish between high credit risk premiums and high liquidity premiums. Nevertheless, even in these cases there are costs to lending to borrowers that would not be plausibly solvent absent liquidity premiums or lending on collateral that would clearly be inadequate even absent liquidity premiums.

Prior to the crisis, both the euro area and the US were constrained in their ability to deal with emerging problems by a combination of inadequate authority and goal conflicts among those with some authority. Both central banks were confronted with severe financial distress in situations where inadequate resolutions mechanisms existed and the fiscal authorities could not respond promptly to emerging problems. The result was that both the Federal Reserve and ECB were forced to choose between risking disorderly failures or taking actions at or beyond the outer limits of good lender of last resort behavior.

The experience of the Federal Reserve and the ECB provide strong evidence in support of the importance of minimizing financial instability risk before a crisis emerges. The policy actions include: (a) indentifying and fixing weaknesses in financial infrastructure, (b) providing effective microprudential supervision, (c) using macroprudential supervision to identify and address

⁵² The ECB lists this restriction at <http://www.ecb.int/mopo/eaec/fiscal/html/index.en.html> (accessed 23 April 2012).

⁵³ See Carrel (2012).

systemic risks arising from rapidly growing and large financial markets, (d) developing crisis resolution tools and (e) stress testing those tools.

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