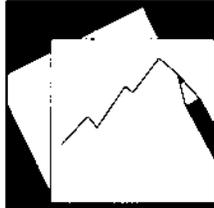


# Working Paper

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# IMF Working Paper

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## Lessons and Policy Implications from the Global Financial Crisis

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Deniz Igan, and Luc Laeven*

**IMF Working Paper**

Research Department

**Lessons and Policy Implications from the Global Financial Crisis**

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**Abstract**

**This Working Paper should not be reported as representing the views of the IMF.**

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The ongoing global financial crisis is rooted in a combination of factors common to previous financial crises and some new factors. The crisis has brought to light a number of deficiencies in financial regulation and architecture, particularly in the treatment of systemically important financial institutions, the assessments of systemic risks and vulnerabilities, and the resolution of financial institutions. The global nature of the financial crisis has made clear that financially integrated markets, while offering many benefits, can also pose significant risks, with large real economic consequences. Deep reforms are therefore needed to the international financial architecture to safeguard the stability of an increasingly financially integrated world.

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Contents	Page
I. Introduction .....	<a href="#">3</a>
II. Causes of the Crisis .....	<a href="#">4</a>
A. Commonalities with Previous Crises .....	<a href="#">4</a>
B. New Dimensions of the Crisis.....	<a href="#">7</a>
III. The Evolution of the Crisis .....	<a href="#">11</a>
A. The Channels and Mechanisms of the Crisis .....	<a href="#">11</a>
B. Government Interventions to Resolve the Crisis.....	<a href="#">13</a>
C. Crisis Resolution Going Forward and the Path to Economic Recovery .....	<a href="#">16</a>
IV. Lessons for Macroeconomic Policy and Financial Reforms .....	<a href="#">17</a>
A. Macroeconomic Policy Lessons.....	<a href="#">17</a>
B. Redesigning Prudential Regulation and Supervision .....	<a href="#">19</a>
C. Reform of the International Financial Architecture .....	<a href="#">26</a>
V. Conclusion .....	<a href="#">28</a>
Table	
1. Support for Financial and Other Sectors and Upfront Financing Need.....	<a href="#">30</a>
Figures	
1. Familiar Factors: Asset Price Bubbles.....	<a href="#">31</a>
2. Familiar Factors: Credit Booms.....	<a href="#">31</a>
3. Subprime Mortgage Credit Boom.....	<a href="#">32</a>
4. Credit Booms and Crises.....	<a href="#">32</a>
5. Credit Booms and Lending Standards.....	<a href="#">33</a>
6. Global Housing Boom in 2000s.....	<a href="#">33</a>
7. Credit Booms and Capital Flows.....	<a href="#">34</a>
8. New Dimensions: Securitization.....	<a href="#">34</a>
9. New Dimensions: Increasing Financial Integration.....	<a href="#">35</a>
10. New Dimensions: Cross-Border Banking.....	<a href="#">35</a>
11. New Dimensions: Financial System Leverage.....	<a href="#">36</a>
12. New Dimensions: Household Leverage.....	<a href="#">36</a>
13. Spread of the Global Financial Crisis .....	<a href="#">37</a>
References.....	<a href="#">38</a>

## I. INTRODUCTION

During the current global financial crisis, failures have surfaced in macroeconomic policies and the regulation and supervision of banks and non-banking institutions. It is now clear that agencies involved in regulation, supervision, and crisis management did not always have clear mandates and tools commensurate with these mandates, and that there was a lack of international consistency and coherence of policies. The global financial crisis has also led to a reconsideration of the benefits and costs of open financial markets, leading to calls for a reassessment of the global financial architecture.

This paper draws lessons from the recent financial crisis for reforming financial systems, including lessons for macroeconomic policy, financial regulation, and the global financial architecture. To properly diagnosis the problem, the paper starts with a review of the causes of the current global financial crisis, drawing on historical perspectives and discussing especially its international dimensions. It highlights the multiple causes of the crisis, with a mixture of many elements common to other financial crises and some new elements. It reviews the many channels and mechanisms through which the financial crisis propagated and spread globally. And it shows how the ongoing global crisis is leaving a considerable legacy of government interventions and macroeconomic consequences, especially in advanced countries, which will condition future actions and reforms.

The paper then identifies principles and policy actions for redesigning prudential regulation and financial architecture in light of the current and past financial crises, with special emphasis on international dimensions. The financial crisis has brought to light many weak elements in national financial architectures, particularly regarding the treatment of systemic banks and other financial institutions; the assessments of risks and vulnerabilities; and the resolution frameworks for financial institutions and claims. The global nature of the financial crisis has furthermore made clear that financially integrated markets have benefits, but also risks, with large real economic consequences. The crisis highlights that the international financial architecture is still far from institutionally matching the closely-integrated financial systems. Surveillance, information sharing, crisis management, and liquidity support are all areas in which much progress is needed. The paper summarizes current thinking on what reforms can best address these issues.

The paper continues as follows. Section 2 reviews the causes of the current global financial crisis, showing that this crisis has several commonalities but also stark differences with prior crises. Section 3 analyzes the evolution of the crisis, including the different stages of crisis containment and its evolution so far, and reviews the main government interventions to restore confidence in financial systems. Section 4 provides lessons for macroeconomic policy, financial regulation and supervision, and reform of the international financial architecture. Section 5 concludes with a number of areas of current debate and areas where more research would be useful to help guide policymakers.

## II. CAUSES OF THE CRISIS

This section reviews the causes of the current global financial crisis. It will highlight multiple causes of the crisis, with a mixture of elements common to other financial crises and some new elements.<sup>2</sup>

The severe financial crisis that has gripped the global economy reflects a remarkable confluence of factors. Some are very reminiscent of past bouts of financial turmoil, but others are new (and surprising). This section identifies both what is common and what is different between the current crisis and the previous ones. While ranking the relative contributions of the various sources for the crisis is not without controversy, together they help explain the current episode's considerable scale and scope, and the inability of various policy actions to get sufficiently ahead of the crisis.<sup>3</sup> We then review in Section 3 the channels and mechanisms through which the financial crisis propagated and spread to other countries and asset markets. We also illustrate how the crisis has left a considerable legacy of government interventions and macroeconomic consequences, which will condition future actions and reforms. These two sections complement existing analyses of the origins and evolution of the crisis, including Rogoff and Reinhart (2008), Calomiris (2009), Gorton (2009), FSA (2009: the Turner Review), as well as work done at the IMF (see reference list).

### A. Commonalities with Previous Crises

The crisis had four features in common with other crises: 1) asset price increases that turned out to be unsustainable; 2) credit booms that led to excessive debt burdens; 3) build-up of marginal loans and systemic risk; and 4) the failure of regulation and supervision to keep up with and get ahead of the crisis when it erupted.

#### Asset Price Bubbles

House prices sharply increased in the U.S. and other markets prior to the current crisis (Figure 1). Moreover, the patterns of asset prices in this episode are reminiscent of those in other major financial crises episodes. The overall size of the U.S. housing boom and its dynamics—including rising house prices in excess of 30 percent in the five years preceding the crisis and peaking six quarters prior to the beginning of the crisis—is remarkably similar to house prices developments in the previous (Big 5) banking crises in advanced economies

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<sup>2</sup> Some of these issues were raised over the 2006-09 periods in various issues of the IMF Global Financial Stability Reports and World Economic Outlooks, as well as in publications of the BIS.

<sup>3</sup> While we do not take a stance on the relative importance of these old and new factors—in part as many of them are very closely related, by focusing on these factors we do abstract from other causes, such as monetary policy e.g. (the build-up of risks has been attributed to the low interest rates in the U.S.) and global imbalances. These two aspects have been extensively analyzed by many others and mentioned as important “causes” of or at least contributing factors to the financial crisis. In our view, and as our cross-country based analysis will show, there are, however, too many differences in both monetary policy and position as regards to global imbalances, yet too many commonalities (in terms of being subject to a financial crisis or at least severe financial stress), to make a strong argument for these two “causes” being among the top causes.

(Finland, 1991; Japan, 1992; Norway, 1987; Sweden, 1991; and Spain, 1977), as observed by Rogoff and Reinhart (2008).

Such sharp increases in house prices were also common to other countries hard-hit by the crisis and were associated with rapid growth in credit aggregates (Figure 2). House prices rose rapidly in many countries now caught in the financial turmoil, including the U.K. and Iceland. These housing booms were generally fueled by fast rising credit resulting in sharply increased household leverage.

### **Credit Booms**

The prolonged U.S. credit expansion in the run-up to the crisis is similar to other episodes, except that it was concentrated in one segment, namely, the subprime mortgage market (Figure 3). Sustained episodes of rapid credit growth generally coincide with large cyclical fluctuations in economic activity—with real output, consumption, and investment rising above trend during the build up phase of credit booms and falling below trend in the unwinding phase (Mendoza and Terrones, 2008; Claessens, Kose and Terrones, 2008). In the upswing, the current account tends to deteriorate, often accompanied by a surge in private capital inflows. Increases in house prices and the real exchange rate often accompany such credit booms.

While aggregate credit growth in the U.S. was less pronounced than in previous episodes, reflecting slower corporate credit expansion, household debt increased sharply (IMF, 2008). Household indebtedness rose rapidly after 2000, driven largely by outstanding mortgages, with historically low interest rates and financial innovation contributing. And in spite of low interest rates, debt service relative to disposable income reached a historical high. The increased leverage left households vulnerable to a decline in house prices, a tightening in credit conditions and a slowdown in economic activity. Similar patterns existed in several current crisis countries.

As in other crises, the fast expansion of credit seems to have played a role in the current crisis, or in at least in aggravating the consequences of the crisis in the U.S., and a number of other advanced countries and emerging markets. While historically only a minority of credit booms ends up in a financial crisis, the probability of a crisis increases with a boom (Figure 4; Dell’Ariccia, Barajas and Levchenko, 2009). Furthermore, the larger the size and duration of a boom episode, the greater the likelihood that it results in a crisis. The mechanisms linking credit booms to crises include increases in leverage of borrowers (and lenders) and a decline in lending standards. In the U.S. episode, both channels were at work as shown by the higher delinquency rates in those metropolitan areas with high loan origination (Figure 5; Dell’Ariccia, Igan and Laeven, 2008).

This pattern extended to various extents to other countries caught in the current storm (Figure 6). In the run-up to the crisis, credit aggregates grew very fast in the U.K., Spain, Iceland, and several Eastern European countries. As in the U.S., these credit expansions often fueled real estate booms. Increased international financial integration helped these patterns

along. For many countries, a clear relationship existed between credit growth and capital inflows (Figure 7).

### **Marginal Loans and Systemic Risk**

The boom in household credit was associated with the creation of marginal assets whose viability relied on continued favorable macroeconomic conditions. In the U.S. (and to some extent the U.K.) a large portion of the mortgage expansion consisted of loans extended to subprime borrowers with limited credit and employment histories. Debt servicing and repayment were, hence, vulnerable to economic downturns and changes in credit and monetary conditions. This maximized default correlations across loans, generating portfolios highly exposed to declines in house prices— confirmed ex-post through the large non-performing loans when house prices declined.

Elsewhere, a similar pattern led to large portions of domestic credit denominated in foreign currency. Large foreign currency exposures in the corporate and financial sectors had been a common feature in the Asian crisis. In the current crisis, in several eastern European economies large portions of domestic credit (including to households) are denominated in foreign currency (euros, Swiss francs, and yen).<sup>4</sup> While lower interest rates relative to those on loans denominated in local currency increased affordability, borrowers' ability to service loans and creditworthiness depended on continued exchange rate stability. As with U.S. subprime loans, this meant high default risk correlations across loans and systemic exposure to macroeconomic shocks.

On the back of buoyant housing and corporate financing markets, derivative markets in many forms expanded greatly. Favorable conditions spurred the emergence of large-scale derivative markets, such as mortgage-backed securities and collateralized debt obligations with payoffs that depended in complex ways on underlying asset prices. The pricing of these instruments was often based on a continuation of increasing house prices that facilitated the refinancing of underlying mortgages. The corporate credit default swap market also expanded dramatically on the back of favorable spreads and low volatility.

### **Regulation and supervision**

Past crises often followed expansions triggered by financial liberalization not accompanied by necessary regulatory reforms and supervisory enhancements (e.g., Laeven and Valencia, 2008a). Imbalances often resulted from badly sequenced regulatory reforms. Poorly developed domestic financial systems were often unable to intermediate large capital inflows in the wake of capital account liberalizations. Poorly designed financial reforms and deficient supervision often led to currency and maturity mismatches and to large and concentrated credit risks.

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<sup>4</sup> Árvai et al. (2009).

In this crisis, although perhaps in more subtle forms, regulatory approaches to and prudential oversight of financial innovation were insufficient as well. As in the past, but this time in advanced countries, finance companies, merchant banks, investment banks and off-balance sheet vehicles of commercial banks operated—to varying degrees—outside banking regulations. But as this “shadow banking system” provided increasingly important avenues for intermediation, it grew without adequate oversight and led to systemic risks. Regulators also underestimated the conflict of interests and information problems associated with the originate-to-distribute model. Not only did this harm consumers of financial services, but it also created the potential for chain reactions leading to systemic risk.

As happened often before, the focus of authorities remained primarily on the liquidity and insolvency of individual institutions, rather than on the resilience of the financial system as a whole. This meant an underestimation of the probability and costs of systemic risk. At the international level, insufficient coordination among regulators and supervisors and the absence of clear procedures for the resolution of global financial institutions hindered efforts to prevent and contain the impact and transmission of the crisis.

## **B. New Dimensions of the Crisis**

New dimensions played important roles in the severity and global scale of the crisis—particularly, with respect to its transmission and amplification—that included surprising disruptions and breakdowns of several markets in the fall of 2008. Four key aspects were new: 1) the widespread use of complex and opaque financial instruments; 2) the increased interconnectedness among financial markets, nationally and internationally, with the U.S. at the core; 3) the high degree of leverage of financial institutions; and 4) the central role of the household sector.

### **Increased Opaqueness**

Securitization and innovative (but complex) financial instruments were a critical element of the funding of the credit expansion in the U.S. Securitization—a long standing technique for prime loans conforming to the underwriting standards of Government Sponsored Agencies (GSEs)—changed in scope in the last decade, with more than 70 percent of non-conforming mortgages in the U.S. being securitized by 2007, up from less than 35 percent in 2000 (Figure 8).<sup>5</sup> Other assets were increasingly packaged as well and cash-flow streams from securities were further separated and tranced into other securities (CDOs, etc.).

In part by being inadequately regulated, the increased recourse to securitization and the expansion of the originate-and-distribute model exacerbated agency problems. The progressive expansion of more opaque and complex securities and the increasing delinking between borrowers and lenders worsened agency problems. Risk assignments became increasingly unclear and incentives for due diligence worsened, leading to insufficient monitoring by loan originators and an emphasis on boosting volumes to generate fees. The

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<sup>5</sup> Ashcraft and Schuermann (2008), Gorton (2008) and Brunnermeier (2009).

distribution model led to widespread reliance on ratings for the pricing of credit risks, with investors often unable or unwilling to themselves fully assess underlying values and risks. With deficiencies in the rating process, this led to inflated and less informative risk ratings and masked the extent of risk exposure in certain institutions, such as insurance companies, that are perceived to be more prudent than others.

Increased balance-sheet opaqueness and reliance on wholesale funding increased the degree of systemic fragility. Once U.S. house prices began to decline and defaults began to rise (affecting the expected value of the assets underlying MBS and CDOs), the complexity of instruments undermined price discovery and led to market illiquidity and a freeze in the securitization activity. The increased opaqueness of balance sheets (including due to the widespread recourse to off-balance sheet instruments) made it difficult to separate healthy from unhealthy institutions. The resulting adverse selection problems contributed to the freezing of the interbank markets and forced further sales of securities to raise funds. The increased centrality and systemic importance in many countries of highly leveraged, under-regulated intermediaries relying on wholesale and short-term funding exacerbated problems.

### **Financial Integration and Interconnectedness**

Financial integration has increased dramatically over the past decade, especially among advanced economies. Capital account openness and financial market reforms have led to massive increases in cross-border gross positions, especially among OECD countries (Figure 9). There has also been an increasing presence of foreign intermediaries in several banking systems (including in many emerging markets). As a result, international risk sharing, competition and efficiency have increased, but so has the risk of transmitting financial shocks across borders.

Increasing interconnectedness of financial institutions and markets (Figure 10) and more highly correlated financial risks intensified cross-border spillovers early on through many channels—including liquidity pressures, global sell-off in equities (particularly, financial stocks), and depletion of bank capital. MBS and other U.S. originated instruments were widely held by institutions not only in the U.S. but also in other advanced economies and by the official sector in several emerging markets. Through these direct exposures and associated funding problems, spillovers quickly surfaced among European banks, including Germany (IKB, July 2007) and France (BNP Paribas' money market fund, August 2007). As troubled intermediaries hit by losses and scrambling for liquidity were forced to sell other assets and cut lending, the crisis gradually spread to other markets and institutions through “common lender effects.” Emerging markets—especially those who had heavily relied on external financing, and paradoxically those with more liquid markets—were affected through capital account and bank funding pressures.

The sheer size of the U.S. financial market and its central role as investment destination contributed to the spreading of the crisis.<sup>6</sup> Any shock to the U.S. financial markets and economy is bound to have global effects. U.S. financial assets represented about 31 percent of global financial assets and the U.S. dollar share in reserve currency assets is about 62 percent. In recent years especially, U.S. financial assets were perceived to offer the combination of safety and liquidity attractive for private and public investors alike. More generally, since the U.S. is a large economy, it greatly affects global developments.

The increased connections and simultaneous build-up of systemic risks across multiple countries made the management of shocks more complex, especially in light of institutional deficiencies in many countries—including the inability to resolve quickly large, cross-border financial institutions, and led to a rapid spreading of turmoil globally. The crisis was also the spark that triggered the unwinding of imbalances in other countries. Benign financial and macroeconomic conditions—notably, low interest rates and narrower risk spreads—had prevailed on a global basis and, alongside this, booms had taken place in many economies. Housing market vulnerabilities came home to roost in several countries, notably Europe. In the U.K., with a similar housing boom as in the U.S., mortgage lenders came under intense pressure—beginning in fall 2007 with a bank run on Northern Rock, which had been heavily reliant on interbank markets—rather than deposits—for funding. Large pressures hit Iceland, Hungary and the Baltic countries where imbalances were more pronounced.

### **The Role of Leverage**

The build-up of an unusually high degree of leverage of financial institutions and borrowers contributed to the propagation of shocks. Leverage increased sharply in the financial sector, directly at commercial banks in Europe, and through the shadow banking system and the rising share of investment banks and non-deposit-taking institutions in the U.S. (Figure 11). Moreover, the leverage build-up among households especially differed from previous crises. In the run-up to Japan's real estate crisis, for example, while the household debt-to-income ratio increased sharply, measures of households' leverage (the household debt-to-assets ratio) declined, suggesting that Japanese homeowners built equity in their properties as real estate prices soared.

This high leverage limited the system's ability to absorb even small losses and contributed to the rapid decline in confidence and increase in counterparty risk early on in the crisis. Loan-to-income values larger than in the past left households highly exposed to shocks, while at the same time high loan-to-value mortgages allowed even moderate declines in house prices to push many households into negative equity. In the financial sector, high leverage meant that initial liquidity concerns gave quickly way to solvency worries. While initial recapitalizations were relatively large and rapid (including through participation of

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<sup>6</sup> The U.S. being the primary investment destination also points to the role of global imbalances, disorderly unwinding of which was identified as a risk to the world economy as early as 2004. Again, we do not consider this among the top causes given that many surplus countries also experienced financial crises.

sovereign wealth funds), they were limited to only a few banks and increasingly fell short of losses.

As financial institutions incurred large losses and wrote-down illiquid securities, solvency concerns across markets fueled a process of rapid deleveraging and forced asset sales. Mark-to-market rules forced further deleveraging and fire sales. Hedge funds—facing financing constraints and redemption pressures—further fuelled this rapid unwinding process. This led to further asset price declines, prompting distressed asset sales, rising recapitalization needs, and resulting in a further loss of confidence, coming to a near melt down in October 2009.

The build-up in leverage (including rising household indebtedness) was not restricted to advanced economies. In some emerging economies, vulnerabilities related to rising reliance on external financing flows grew. Amid global deleveraging, heightened investor risk aversion, and repatriation of funds, many emerging economies suddenly found foreign funding sources increasingly scarce and were confronted with sudden stops or reversals of capital flows. In addition, emerging market corporations faced much higher borrowing costs, limited opportunity to issue equity, and few alternative sources of financing. While official financing filled some of the gaps, emerging markets had to make rapid adjustments, leading to real economic dislocations.

### **Central Role for Households**

Problems in the household sector have played a more prominent role in this crisis than in previous crises. Most previous episodes of financial distress stemmed from problems in the official sector (e.g., Latin America's debt crisis of the 1980s) or the corporate sector (e.g., the Asian crisis). The origins of the current crisis, however, have much to do with overextended households, in particular through non-traditional mortgage loans and especially in the U.S. (Figure 12). This high household leverage has implications for how the crisis was being transmitted from the financial to the real sector and complicates the resolution mechanisms and policy responses. In the up-turn, the overextension of the households sector translated into various risky assets whose value relied directly or indirectly on ever increasing house prices, a problem worsened by poorly functioning rating agencies. And when the financial turmoil occurred, households were poorly positioned to absorb losses. Through wealth, collateral and confidence effects, they sharply adjusted their consumption patterns.

In the U.S., a vicious cycle of rising foreclosures, falling home values and disappearing securitization markets quickly developed. Vulnerable cohorts of borrowers became increasingly susceptible to rising interest rates and falling home values, and could no longer refinance their mortgages, leading to higher monthly payments, rising delinquencies and default rates. A wave of finance company failures—suddenly no longer able to securitize subprime mortgages—led to a virtual breakdown in mortgage origination and more abrupt adjustment. Adverse feedback loops—of rising foreclosures placing additional downward pressures on house prices—started. With U.S. house prices declining on a national basis for

the first time since the Depression era, many heavily-indebted borrowers confronted with substantial negative home equity faced incentives to “walk away.”

Tightening standards for new mortgages and consumer credit led to a sharp compression in consumer spending that compounded already difficult situations in the real sector. With households’ savings and net assets already at historic lows, financial constraints imposed by financial institutions under stress directly translated into reduced consumer spending, leading to initially localized but gradually spreading cycles of declines in corporate sector profitability, layoffs and increases in unemployment, slowing economies and more foreclosures.

Household balance-sheet vulnerabilities also built up in other advanced economies and several emerging markets. As in the U.S., household debt-to-income ratios also rose sharply in several Western European countries (most notable in the U.K, Spain, and Ireland). In several emerging markets, household credit expanded rapidly as well, leading to sharp increases in leverage and vulnerabilities. As real estate prices declined, this adversely affected the quality of loan portfolios and put financial intermediaries at risk, especially in markets where values had grown rapidly.

The large number of individuals involved, the limited information available, and the social repercussions associated with household debt restructuring complicated and slowed down the policy response. While corporate debt restructuring is costly and painful, there are well-established international best practices for how to confront widespread corporate defaults. In the case of households, moral hazard problems, the sheer number of cases and equity and distribution issues complicate the picture. In the U.S., notwithstanding political support for a relief package for mortgage holders, policy action on this front was slow and erratic, and no effective solution emerged. In Eastern Europe, several countries were confronted with similar problems, but have yet to respond in a systematic manner.

### **III. THE EVOLUTION OF THE CRISIS**

The crisis was the first global financial crisis since the Great Depression. Through several phases, its spread was unprecedented in scope and ferocity, with many transmission channels. It called for large government interventions, which have left many legacies for the future.

#### **A. The Channels and Mechanisms of the Crisis**

As in any financial crisis, there are catalysts, triggers, and amplification mechanisms beyond the underlying causes. The catalyst of the crisis was the overextended U.S. housing and mortgage markets. Trigger was the turnaround in U.S. house prices, in part related to a cycle of monetary policy tightening, with the subprime sector as the main initiator of subsequent turmoil. The crisis was unprecedented, however, in its spillovers. While the crisis emerged in the U.S. subprime, it quickly broadened to the larger housing markets in the U.S., and spilled over into other U.S. financial markets (e.g., other asset-backed securities).

Surprising was the degree and speed of global spillovers, which happened in several phases and through various amplification mechanisms (Figure 13).

The first phase was through direct exposures. This phase was largely limited to banks with direct exposures to the U.S. market and affected a few selected financial markets, sometimes related to liquidity runs (mainly related to excessive funding in wholesale markets). Through direct exposures to subprime related assets, problems quickly surfaced among European banks, including in Germany (IKB, July 2007) and France (BNP Paribas, August 2007). These events triggered interbank and liquidity problems in a number of markets. The U.S. housing market stress also made housing vulnerabilities in several countries apparent, notably in Western Europe, and triggered funding problems in some markets. In the U.K., with a similar housing boom as in the U.S., mortgage lenders came under intense pressure—beginning in the fall of 2007 with a bank run on Northern Rock, which had been relatively more reliant on interbank markets rather than deposits for funds.

In the meantime, in the U.S., prospects of a deeper housing downturn and rising defaults quickly instigated broader financial turmoil. Worse-than-anticipated credit deterioration in U.S. subprime mortgages prompted surprising multiple-notch downgrades by major rating agencies, which have been criticized for being unable to accurately assess risks of complex mortgage-related securities and for being too closely aligned with the issuer. Downgrades led to sharply widening spreads on assets backed securities and liquidity disruptions in interbank and commercial paper markets. Disruptions were amplified by fundamental uncertainty and opacity regarding counterparty risks. As commercial banks decided to absorb (legally separate) vehicles, their balance sheets were strained. Interbank rates spiked and issuances of asset-backed commercial paper (ABCP) contracted sharply.

A second phase of international spillovers was transmitted through asset markets. This happened through liquidity shortages, freezing of credit markets, and stock price declines, as well as foreign exchange fluctuations (U.K. Sterling, Euro, and Swiss Franc). Initial policy responses aimed at addressing liquidity disruptions were large and unprecedented. Major central banks quickly made liquidity available to local commercial banks. While increasingly larger and more flexible—in maturity and especially in scope of collateral accepted, liquidity injections' effectiveness in calming interbank markets proved short-lived. Furthermore, approaches varied among countries, requiring modifications and rounds of international coordination. Currency swaps between major central banks were also needed to mobilize U.S. dollar funding in overseas markets.

In terms of crisis response, as in past events, it proved difficult to get ahead with a fast evolving situation to contain the financial turmoil and reduce the impact on the real economy. Ad-hoc and piecemeal interventions created at times further disruptions and loss of confidence among creditors and investors. The chronology of the crisis shows how events and market developments triggered and conditioned specific subsequent developments and policy responses, which, at least in retrospect, made the crisis more severe.

These unprecedented and numerous efforts were unable to remedy the underlying problems that led to a near complete breakdown in market trust and confidence. Unease over

the viability of institutions, especially with respect to internationally active banks, could not be supplanted by central bank liquidity, which increasingly replaced private transactions. The reliability of credit insurance and the integrity of counterparties, particularly in the massive but unregulated market for credit default swaps also came into question, notably through the weakening positions of ultimate insurers.

The third phase occurred through large solvency concerns following the collapse of Lehman Brothers. In October 2008, solvency concerns affected systemically important global financial institutions, leading to massive sell-offs, risking a financial meltdown. In this phase, liquidity concerns gave way to solvency worries, against the backdrop of highly-leveraged financial systems. The build-up of leverage, especially for U.S. investment banks and European commercial banks, made financial systems vulnerable to a rapidly unwinding cycle of forced deleveraging and rising solvency pressures. As financial institutions incurred large losses and wrote-down illiquid securities, solvency concerns across markets fueled a process of rapid deleveraging and forced asset sales. While initial recapitalizations of banks were relatively large and rapid (including through participation of Sovereign Wealth Funds), they were limited to only a few banks and increasingly fell short of losses. Hedge funds—facing financing constraints and redemption pressures—further fuelled a rapid unwinding process. This led to further asset price declines, prompting distressed asset sales, rising recapitalization needs and resulting in further loss of confidence.

Compounding the problem, recognition of insolvency problems was delayed and resolution frameworks proved haphazard in practice. Deficiencies in resolution frameworks in advanced economies, including lack of scope (e.g., investment banks and insurance corporations not covered), limited coordination (e.g., between deposit insurance and lender of last resort facilities), and slow speed (e.g., due to lack of specific frameworks for bank resolution), allowed problems to intensify. Disappearing market confidence and eroded trust required authorities to intervene in a number of cases, with unprecedented means.

In this phase, global transmission channels were multiple, including through banks and non-bank financial institutions rapidly deleveraging. Despite a coordinated cut in policy rates by major central banks and the extension of guarantees in some countries, market confidence continued to deteriorate, leading to major failures or near-failures. The collapse of Lehman Brothers, with its major interconnections and exposures, shocked market confidence globally. Uncertainties led to deepening turmoil and runs—including on U.S. money market funds, requiring new interventions. Through its substantial exposures in the CDS market, insurance giant AIG nearly collapsed before receiving substantial public rescue funds.

## **B. Government Interventions to Resolve the Crisis**

The crisis has prompted large government interventions, both to restore confidence in the financial system and to contain the fallout of the crisis on the real economy. As asset prices plunged across markets, the risks of cascading institutional failures and financial meltdown prompted actions by authorities across a wide range of advanced countries in mid-October 2008, marking an overdue transition from concerns about liquidity to solvency (not unlike previous crisis episodes) and the need for more rapid and substantial recapitalization. The principal forms of intervention were: (i) liquidity provision through collateralized

lending and other schemes; (ii) support for short-term wholesale funding markets; (iii) (more extensive) guarantees of retail deposits and other liabilities; (iv) purchases or exchanges of non-performing or illiquid assets; and (v) capital injections to banks. Furthermore, monetary and fiscal policy responses became even more accommodative in many countries, but did not stop the decline. Large external financial support from various sources has been necessary for several emerging markets hit by deleveraging.

The amounts involved with these interventions have been very large. On the basis of spent money and commitments by June 2009, advanced countries have been most affected, while most emerging market countries have had less need for capital or other forms of financial sector support (Table 1).<sup>7</sup> Especially liquidity provided and guarantees extended were large, amounting to double digit fractions of GDP on average for the group of advanced countries. Capital support was about 2 percentage points. Asset purchases to date have been somewhat larger, 3.5 percentage points of corresponding GDPs. Besides the large direct fiscal costs, captured by the figures, there have been many contingent costs, hard to quantify, such as the insurance schemes for assets or increased deposit insurance limits. Indeed, past experiences suggest that amounts can increase.

These interventions were necessary but are distortive by nature. The interventions have generally had the desired effects, namely, stabilizing financial systems and regaining some measure of confidence. These measures distort, however, directly—as they support financial institutions in non-market ways, or indirectly—as they can skew and distort resource allocation (see Laeven and Valencia 2008b). A clear example of the (purposely) distortive nature in financial intermediation is the intervention by central banks, notably the U.S. Federal Reserve, in a number of (short-term) markets, either directly (e.g., through the purchases of government bonds), or indirectly (e.g., through the various liquidity facilities which aim to support specific financial markets, such as the commercial paper market). Another example is the provision of a guarantee scheme for money market funds in the U.S. following the large outflows after one fund “broke the buck” (its net asset value fell below one dollar). The guarantee in turn led to deposit outflows at commercial banks, which prompted an increase in deposit insurance coverage.

An example of distortions between financial institutions and the fiscal conditions is the extension of guarantees in the case of Ireland to the largest banks. Prior to the extension of guarantees, the CDS-spreads for the large Irish commercial banks were very high. Post guarantees, bank CDS-spreads declined sharply, while the sovereign spread increased. Measures like these, now numerous in many advanced countries today, distort asset prices and financial flows.

Distortions are not just direct, but also indirect and can last for a long term. The indirect distortions affecting the real sector are more difficult to document, but there are

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<sup>7</sup> See further IMF (2009e). These numbers refer to mid-2009, closely following the height of the crisis, and as such represent more the potential exposures than necessarily the actual costs, which is becoming clearer over time. See also IMF (2009f)

many suggestive examples. In many countries, programs have been put in place to support more lending to SMEs. But also large firms have been targeted for public support. In Japan, for example, in April 2009, parliament passed a law to allow for the recapitalization of (larger) non-financial firms using public funds through preferred share purchase by the (state-owned) Development Bank of Japan. In U.S., France, and Italy, car companies are being (indirectly) supported. In several countries, there were (largely informal) requirements for local lending as part of financial sector support. All of this has, directly and indirectly, affected international competition in various markets, financial and real (i.e., inefficient zombie firms may be created, driving out efficient firms).

Furthermore, the increased direct state-ownership and the large indirect role of the state in the financial sector risk distorting financial intermediation in a deeper and potentially longer-lasting way. The perverse (long-term) consequences of state-owned banks are well-documented and, while in most countries the institutional environment should prevent the worst effects, distorted outcomes may still arise. In addition, there are many other (sometimes unintended) consequences of the interventions. In the U.S., for example, the caps on remuneration affected incentives of those financial institutions supported through public funds, but also of others. These types of rules and more generally, the larger role of the state can affect the quality of financial intermediation.

Distortions extended to the international arena since interventions affected international capital flows and financial intermediation. Liquidity support provided the first manifestation. Actions in the U.S. initially focused on providing domestic support, even though interbank market prices suggested significant dollar funding pressures for European banks and emerging markets. For mature markets, it took several weeks to act on these stresses. And, even after ad-hoc bilateral swap lines between central banks were set up and their scope gradually increased, market prices continued to suggest that problems remained. The response was slower and the amounts provided were more limited in the case of emerging markets. Liquidity shortages were keenly felt by many emerging markets. Large external financial support from various sources has been necessary as emerging markets were hit by deleveraging process, but the real consequences had already been incurred.

Guarantees on deposits and other liabilities issued by individual countries have led to beggar thy neighbor effects as, starting with Ireland, they forced other countries to follow with similar measures. Some advanced countries, especially those closely integrated (such as the EU/EMU) quickly coordinated policies, e.g., adopted uniform deposit guarantee coverage. The rapid spread of guarantees led to further financial turmoil in other markets. Many emerging markets not able to match guarantees suffered from capital outflows as depositors and other creditors sought the safe havens. Distribution of risks sharply changed over time and across circumstances. Furthermore, policy measures aiming to encourage lending often had a bias toward local lending, putting international operations at a disadvantage.

Countries were also quick to “ring-fence” assets in their jurisdictions when cross-border entities showed signs of failing, reflecting the absence of clear burden sharing mechanisms for banks with international operations. Examples of defensive “asset grabs”

were: the decision by U.K. supervisors, fearing an imminent collapse of Icelandic bank branches (who, being under the authority of Icelandic supervisors, did not provide a commitment to fulfill U.K. bank liabilities), to resort to the Anti-Terrorism, Crime and Security Act to ring-fence Icelandic bank assets within the U.K.; and the German initiative to freeze Lehman's assets to assure the availability of cash to satisfy depositors before they could be attached to the parent under U.S. bankruptcy proceedings. Such actions in part also constituted anti-competitive behavior in that they tended to favor local interests.

Few actions were internationally coordinated. Most government interventions to date have been at national levels. Although there were some coordinated actions (e.g., those among Belgium, Netherlands and Luxembourg, and with some involvement of France, to resolve Dexia and Fortis), these largely remained driven by pure national interests (as suggested by the fact that the intervened entities were often broken up along national markets, and in line with support). The main exception was the coordinated (although only after some serious disruptions) provision of liquidity support. And, in the Euro-area, central bank actions are, by design, (nearly) fully coordinated among Eurosystem members.

### **C. Crisis Resolution Going Forward and the Path to Economic Recovery**

The global financial crisis is still evolving. The financial turmoil and the rapid economic slowdowns in advanced countries continue to affect global markets. This has happened through both financial (cross-border banking, hedge funds) and real economic channels. Starting in late 2008 and intensifying in 2009, the drop in demand in major advanced countries affected many markets, with sharp drops in exports in many emerging markets. With recessions and economic slowdown affecting all countries, the scope for export-led growth sharply diminished, depriving especially those countries with large foreign exchange exposures of a potential recover channel. These recessions in turn have had adverse effects on financial sectors around the world, raising non-performing loans and further weakening capital adequacy positions. Cross-border exposures have been large factors behind the weakening of banks in many markets.

Continued turmoil means extraordinary government interventions will continue and the (international) rules of the game will remain in flux. The coverage and scope of interventions and other policy measures will evolve depending on effectiveness and conditions and support amounts will likely increase further. As circumstances evolve, governments will (need to) adjust the rules, such as how to treat shareholders and creditors when restructuring large financial institutions, creating further uncertainty. If political support diminishes, support may become (even) more nationally-oriented and distortions increase further.

Governments also need to plan for exit from the large-scale government intervention packages that have been put in place, but need to do so allowing for a sustainable recovery of economic growth and financial stability. While serious risks remain calling for more interventions, it is also generally agreed that distortions should be removed to return to a sustainable system in line with a new financial architecture. Since interventions distort domestic financial intermediation and international capital flows, as the crisis abates, governments need to plan for exit from guarantees, large deposit insurance, ownership, asset

acquisitions, etc. They have to do this within their fiscal constraints and considering macroeconomic conditions.

These are difficult processes, many unprecedented, especially so in the context of highly integrated financial systems, and requiring all some coordination. It is clear, however, that lack of coordination can create (new) distortions. If the unwinding of interventions is not coordinated internationally, it can aggravate still weak confidence, create new distortions, and potentially be anti-competitive. Especially in the case of the removal of guarantees, governments would do well to coordinate to avoid large capital movements. Yet, while desirable, more coordination will in practice be difficult.

#### **IV. LESSONS FOR MACROECONOMIC POLICY AND FINANCIAL REFORMS**

The crisis has reopened the debate on whether macroeconomic policy should be concerned with asset price booms and increases in leverage. It has highlighted, in abundantly clear ways, the deficiencies in national financial regulation and supervision and shown how the international financial architecture has fallen behind a rapidly integrating international financial system. These are broad reform agendas for the future that we touch upon in this section of the paper.

##### **A. Macroeconomic Policy Lessons**

The crisis has shown that macroeconomists and central bankers knew less than what they thought they did. Looking forward, macroeconomic policy framework should be redesigned to implement the lessons from the crisis. These lessons involve the objective of monetary policy, the nexus of monetary and regulatory policy, and fiscal policy.

The crisis has reopened the debate on what to do regarding asset price booms and increases in leverage.<sup>8</sup> Should monetary policy be concerned with financial markets developments? Should policy be used to dampen booms and prevent build-up of leverage? This seems like the wrong way of approaching the problem. The policy rate is a poor tool to deal with excess leverage, excessive risk taking, or apparent deviations of asset prices from fundamentals. Even if a higher policy rate reduces some excessively high asset price, it is likely to do so at the cost of a larger output gap. Were there no other instrument, the central bank would indeed face a difficult task, and this has led a number of researchers to argue against reacting to perceived asset bubbles and other variables.

But there are other instruments at the policymaker's disposal. To reduce leverage, capital ratios can be increased; to increase liquidity, regulatory liquidity ratios can be introduced, and, if needed, increased; to dampen housing prices, loan-to-value ratios can be decreased; to limit stock price increases, margin requirements can be increased. True, all these instruments can be, to some extent, circumvented. Nevertheless, they are likely to have a more targeted impact than the policy rate on the variables they are trying to affect. In this

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<sup>8</sup> For a more detailed review, see IMF (2009b).

light, it seems better to use the policy rate primarily in response to aggregate activity and inflation, and to use these specific instruments to deal with specific output composition, financing, or asset price issues.

A related issue is the potential conundrum created by the effect of low interest rates on risk taking.<sup>9</sup> If it is indeed the case that low interest rates lead to excessive leverage or to excessive risk taking, should the central bank, as some have suggested, keep the policy rate higher than is implied by a standard interest rule? Again, absent other instruments, the central bank would face a difficult choice, having to accept an average positive output gap in exchange for lower risk taking. If, however, we take into account the presence of the other instruments, which can directly affect leverage or risk taking, then the problem can be better handled through the use of those instruments, rather than through modification of the policy rule. Absent such tools, or the willingness to use such tools, one has to consider whether monetary policy can still play a role.

If one accepts the notion that, together, monetary policy and regulation provide a large set of cyclical tools, this raises the issue of how coordination is achieved between the monetary and the regulatory authorities, or whether the central bank should be in charge of both. The increasing trend towards separation of the two may well have to be reversed. Central banks are an obvious candidate as macroprudential regulators. They are ideally positioned to monitor macroeconomic developments, and in several countries they already regulate the banks. “Communication” debacles during the crisis (for example in the occasion of the bailout of Northern Rock) point to the problems involved in coordinating the actions of two separate agencies. And the potential implication of monetary policy decisions for leverage and risk taking also favor the centralization of macroprudential responsibilities within the central bank. Against this solution, two arguments were given in the past against giving such power to the central bank. The first was that the central bank would take a “softer” stance against inflation, since interest rate hikes may have a detrimental effect on bank balance sheets. The second was that the central bank would have a more complex mandate, and thus be less easily accountable. Both arguments have merit and, at a minimum, imply a need for further transparency if the central bank is given responsibility for regulation. The alternative, i.e., separate monetary and regulatory authorities, seems worse.

The crisis has forced central banks to extend their traditional role of lenders of last resort. They extended their liquidity support to non-deposit-taking institutions and intervened directly (with purchases) or indirectly (through acceptance of the assets as collateral) in a broad range of asset markets. The argument for extending liquidity provision, even in normal times, seems compelling. If liquidity problems come from the disappearance of deep pocket private investors from specific markets, or from the coordination problems of small investors as in the traditional case of bank runs, the state is in a unique position to intervene. Given its nature and its ability to use taxation, it has both a long horizon and very deep pockets. Thus, it can, and indeed should, stand in and replace the private investors.

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<sup>9</sup> See, for instance, Jiménez et al (2007) for the impact of monetary policy on risk taking.

A key lesson from the crisis is the desirability of “fiscal space” to run larger fiscal deficits when needed. Going forward, the required degree of adjustment after the recovery is securely under way will be formidable, in light of the need to reduce debts against the background of aging-related challenges in pensions and health care. More generally, the lesson from the crisis is clearly that target debt levels may need to be lower, or at least the fiscal spaces need to be higher, than those observed before the crisis. The policy implication for the next decade is that, should economic growth recover rapidly, this should be taken as an opportunity to reduce debt/GDP ratios substantially, rather than to finance expenditures increases or tax cuts.

The exception of this crisis confirms the problems with discretionary fiscal measures: They come in too late to fight a standard recession. There is, thus, a strong case for improving the automatic stabilizers. One must distinguish here between truly automatic stabilizers—i.e., those which by their very nature imply a procyclical decrease in transfers or increase in tax revenues—and rules that allow some transfers or taxes to vary conditional on pre-specified triggers based on the state of the economic cycle.

The first type of automatic stabilizers comes from the combination of rigid government expenditures with an approximately unit elasticity of revenues with respect to output, from the existence of social insurance programs (defined-benefit pension systems fall into this category), and from the progressive nature of income taxes. The main ways to increase their macroeconomic effect would be to increase the size of government or (to a lesser extent) to make taxes more progressive or to make social insurance programs more generous. Reforms along these lines, justified or not, should not be motivated by the desire to stabilize the economy.

The second type of automatic stabilizers appears more promising. They do not carry the costs mentioned above and can be applied to tax or expenditure items with large multipliers. On the tax side, one can think of temporary tax policies targeted at low-income households, such as a flat, refundable tax rebate, a percentage reduction in a taxpayer’s liability, or tax policies affecting firms, such as cyclical investment tax credits. On the expenditure side, one can think of temporary transfers targeted at low-income or liquidity-constrained households. These taxes or transfers would presumably be triggered by the crossing of a threshold by a macro variable. The variable which comes most naturally and could work best, GDP, is only available with a delay. The next logical choices are labor market variables, such as employment or unemployment. How to define the relevant threshold, what taxes or transfers to make contingent, are issues that must be worked on.

## **B. Redesigning Prudential Regulation and Supervision**

Regulatory shortcomings have clearly been a key contributory factor to the global financial crisis.<sup>10</sup> The recognition of these regulatory failures is driving the current redesigns

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<sup>10</sup> This draws on work of the Money and Capital Markets Department of the IMF. For more detailed reviews of needed financial architecture reforms, see IMF (2009c), CEPR (2009), NYU (2009), FSA (2009) and UN (2009).

of regulation and supervision systems across a large range of countries. Coordinated by the Financial Stability Board, FSB (previously named the Financial Stability Forum (FSF)), national authorities and standard setters are working to address deficiencies revealed in existing arrangements. This is a broad agenda which will continue for some time.

Actions are generally recognized as required in the five general areas: 1) *Regulatory perimeter*: The regulatory, supervisory, and information perimeter needs to be broadened to ensure that all financial activities that pose systemic risks are adequately captured; 2) *Micro-prudential regulation*: Capital regulation, and liquidity and risk management need not only to reflect individual institutions' risks but also their potential to form systemic risk; 3) *Macro-prudential regulation*: Regulatory approaches that better dampen the procyclicality of financial markets need to be designed; 4) *Information and market discipline*: Information disclosure and corporate governance practices need to improve to enhance market discipline; and 5) *Organization of regulation and supervision*: There is a need for greater coordination within and across countries in both the design of regulation and the monitoring of systemic risk.

The following four key principles are recognized as essential guides to these redesigns. First, the perimeter of regulatory and supervisory arrangements should be drawn to address concerns over systemic risk and be compatible across jurisdictions, institutions, and activities. Financial activities that can create systemic risks ought to be regulated and may require direct supervision, and, even if not regulated, information concerning financial activities and exposures that pose such risks needs to be collected and publicly disseminated.

Second, regulations need to be incentive compatible, across institutions and over time, while balancing possible adverse impacts on innovation and efficiency. This means that regulation should provide incentives to any institution whose distress would have systemic externalities to internalize such costs in its business planning and risk management. Supervisory resources should be increased and allocated to the areas posing greatest systemic risk potential, and supervisory actions should result in prompt intervention whenever excessive risks arise. Supervisory authorities need to proactively identify and address gaps in oversight and information since financial innovation and arbitrage will seek to exploit them.

Third, market discipline and supervision should complement each other. An enhanced disciplinary role of markets requires allowing for the failure of individual institutions. This should occur within the context of a credible resolution framework for banks and non-banks that limits the wider impact of failure and reduces the moral hazard of a too large public safety net. It also requires improved corporate governance and information disclosure.

Fourth, the redesign of financial regulation needs to be aware of and seek to overcome its inherent limitations. Many questions remain on how to best reform the architecture to mitigate systemic risks effectively without imposing too much and inefficient regulation. And many recent rules are still in the process of being implemented. The redesign needs to keep regulatory burdens in mind. At the same time, regulation tends to lag behind financial innovation, and is vulnerable to industry capture and political influence.

Supervisors may lack the mandate, sufficient resources, or necessary independence to effectively contain systemic risk and enforcement may be poor.

### **Regulatory Perimeter**

The potential scope of regulation and supervision needs to be broadened to ensure that all financial activities that pose systemic risks are adequately captured needs.<sup>11</sup> Investors and authorities must be able to better assess and prevent the build-up of systemic risk and address the tendency for activity to shift to unregulated or off-balance sheet entities. This requires a broader perimeter of regulation, especially when institutions become systemically relevant, to enable corrective actions. In addition, robust conduct of business regulation needs to be applied to all institutions whose activities have a substantial role in affecting the flow of credit. At the same time, it should be noted that it is complex to build a new regulatory structure on the distinction of systemically and non-systemically important institutions given that, in the event of a loss in confidence, even small institutions may become systemically relevant. Supervisors should therefore have the mandate and flexibility to extend (and conversely exempt) the perimeter to any segment of the financial system which meets preset criteria. Given the regulatory inconsistencies that could arise by transposing specific supervisory measures for one type of institution to systemically important institutions that do not feature similar activities and risk, it may be more appropriate to focus a broadening of the regulatory perimeter on regulating financial activities instead of institutions per se.

Collection and disclosure of information on systemically important institutions and activities needs to be enhanced.<sup>12</sup> The collection, disclosure and analysis of information need to encompass a much larger set of institutions and activities, from insurance companies to hedge funds and to off-balance sheet entities, and to be of much higher quality and timeliness, than is currently the case. The costs of such information collection, disclosure and analysis are likely to be less than the benefits of enhanced risks analysis of systemically-relevant activities of both banks and non-bank financial institutions. This does not necessarily imply identical rules across all types of institutions, whose risk profiles can differ significantly. It does imply that the systemic consequences of their behavior are covered in such a way that contagion risks resulting from their potential failure is contained. A way of achieving this could be to require that financial transactions be fed through clearing houses with effective safeguards. The key is greater transparency. It is not sufficient for there to be more information to be available, it needs also to be readily interpretable and comparable.

### **Micro-Prudential Regulation**

Capital regulation needs to reflect that liquidity risk can become solvency risk for individual institutions. Many individual banks, despite having fulfilled regulatory capital

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<sup>11</sup> See further Carvajal et al (2009).

<sup>12</sup> See further Barry Johnston et al (2009).

requirements, have demonstrated how vulnerability to liquidity shocks can turn into solvency problems. Even solvent institutions cannot rely on market funding in a sustained period of stress. This warrants adaptation of risk parameters and other provisions in Basel II regulations going forward. In addition, the level and components of Tier 1 capital of banks need to be tightened to ensure true loss-bearing capacity. Given the unavoidable uncertainty about appropriate risk weightings and continuing financial innovation, risk-based capital requirements may need to be supplemented with simple gross measures of leverage.

Capital regulation needs to capture systemic risk more comprehensively. A key lesson from the current crisis is that existing prudential capital requirements do not consider the potential systemic impact of stress at individual financial institutions. Authorities need to act proactively by making financial institutions more resilient to risks and preventing potential negative externalities from failure of large and/or complex institutions. This could be achieved through prudential measures tailored to contain the effects of systemic risk (e.g., capital requirements that take into account size, complexity, or interconnectedness of the institution).

Supervisory oversight of liquidity management practices needs to be given equivalent importance and attention to that of solvency risk. Adherence to sound liquidity management principles should be given equivalent attention by supervisors, management, and markets, as exposures to credit and market risk. Supervisors should carefully monitor business models that rely on the continuous availability of wholesale secured or unsecured funding, and impose higher liquidity requirements on these firms. Regulatory frameworks also need to be strengthened to assess funding liquidity risks of banks that are active across-borders and need access to liquidity in multiple currencies.

Risk management rules need to better capture tail and systemic risks. The Basel framework needs to more effectively capture tail risks, with trading books and off-balance sheet exposures possibly to be treated in the same way as other exposures. Also, capital requirements for and risk management of counterparty credit risk at banks needs to be strengthened and banks need to disclose how exposed they are to actions of peers. Supervisors need to monitor and challenge assumptions used within risk management systems. Current requirements do not adequately reflect the probability that correlations become high, either between positions within an individual financial institution, or among institutions. Tools capable of identifying the potential for market, credit, and liquidity risks to become highly correlated are needed.

Systemic risk from counterparty failure needs to be minimized through the netting and collateral mechanisms of post-trading central counterparty clearing houses. Greater use of capital surcharges for gross exposures in over-the-counter derivatives and payments transactions would encourage trading to move to markets using central counterparty clearing houses and matching systems. As is already underway for credit default swaps, the use of clearing houses for over-the-counter derivative products will reduce system-wide risks of counterparty failure. There is also a need for a transparent, effective and cross-border oversight over such central counterparty clearing houses.

Financial institutions' failure resolution frameworks need to be improved. To reduce moral hazard arising from public support expectations and the risks of disorderly collapse, regulatory authorities need to have the power to close or restructure troubled financial institutions—both banks and non-banks—outside standard bankruptcy processes. This requires robust legal processes for early intervention in and resolution of weak financial institutions, compatible across legal jurisdictions. The use of non-discretionary trigger points for interventions could help mitigate the temptation to forbear, though there is no international consensus on the use of such triggers for supervisory action. Such measures need to be complemented with financial infrastructure more robust to counterparty failures.

Regulated firms should be encouraged to adopt long-term, risk-based compensation structures. Short-term oriented bonuses based on business and trading strategies reliant on leverage and continuous market liquidity have resulted in excessive risk taking by a wide range of institutions. The financial services industry should establish guidelines aligning risk-adjusted returns to compensation and requiring greater disclosure of compensation structures to investors. Supervisors should take a view on such compensation practices as part of their review of bank corporate governance and risk management and be empowered to take appropriate action, including through operational risk charges.

### **Macro-Prudential Regulation**

Current regulatory tools do not dampen the procyclicality of financial markets and the build-up of leverage. Current prudential approaches largely failed to prevent the build-up of systemic risk, speculative bubbles and leverage over a favorable economic cycle. Furthermore, current rules aggravate economic downturns. Existing regulations require banks to hold more capital in downturns, as risk measures increase, while capital is already depleted, forcing banks to cut back on lending, thereby contributing to a worsening of the initial downturn. Regulations need to provide incentives to firms to smooth the impact of macroeconomic shocks. How best to design countercyclical prudential policies that reduce systemic risks, yet cannot easily be circumvented is, however, a relatively new policy area.

Countercyclical capital regulation and loan loss provisioning requirements should be important components of such a framework. This could take the form of altering liquidity, collateral, capital, or loss provisioning requirements when asset prices, loan growth, or leverage diverge substantially from their long-run trends. Building such additional shock absorbers into the Basel II framework could dampen procyclicality. The volatility of property lending may be reduced through countercyclical loan-to-value limits, while stricter requirements could restrain the rapid growth of unhedged foreign currency credit. Designing and implementing such rules will not be easy. If possible, regimes should be non-discretionary, employ several indicators of macroeconomic risks, and act symmetrically on the up- and downswing, while cognizant that markets will set typically higher standards.

Additional regulatory tools may be needed. Policies may target specific sources of risks (e.g., limits on sectoral loan concentration, tighter eligibility and collateral requirements for certain categories of loans, limits on foreign exchange exposure, and maturity mismatch regulations). Policies should also aim at reducing existing distortions and limiting incentives

for excessive borrowing and lending (e.g., eliminating implicit FX guarantees or fiscal incentives for particular types of loans, and public risk awareness campaigns). Other ex-ante measures can make the system better withstand the event of a bust (more intensive surveillance of potential problem banks, and appropriate disclosure requirements of banks' risk management policies).

The limited effectiveness of and potential distortions associated with unilateral policies in a financial integrated world highlight the need for policy coordination. Financial globalization limits the effectiveness of unilateral measures—through efforts to circumvent restrictions, switching activities to off-shore centers and foreign parent banks, or other institutions subject to less scrutiny. The effectiveness of measures can be enhanced (and sometimes depends on) adequate cross-country supervisory cooperation to avoid loopholes, such as switching from domestic lending in foreign currency to direct foreign credit. This cooperation will be increasingly vital as financial systems become more integrated. Coordination among host- and home-country regulators and monetary authorities will also be critical when it comes to liquidity (and solvency) support in case of a bust.

Procedures also need to consider the procyclical tendency of fair value accounting. Fair value accounting ought to remain a core objective as it brings accounting values close to underlying economic values in most circumstances. It can lead, however, to greater volatility in institutions' net capital, especially in times of system-wide stress (due to liquidity premiums and risk appetite moving positively with the macroeconomic cycle). To address this tendency, while retaining the transparency benefits of fair value accounting, authorities could require higher capital and liquidity buffers as fair value accounting is applied to more components of the balance sheet. Guidance on asset valuations in illiquid markets should continue to be improved so as to reduce procyclical behavior. Consideration should also be given to requiring institutions to report valuations both on actual and estimated market value basis, especially given that accounting practices used for valuations can differ from those used for regulatory purposes. Mark-to-market should, however, remain a guiding principle.

### **Information and Market Discipline**

Market discipline has not been sufficiently effective in complementing supervision. Improvement will require enhanced disclosure of information on off-balance sheet commitments, firms' liquidity profiles, and risk exposures and concentrations both within and between financial institutions, much of which has already been set in motion following recent guidance from accounting and supervisory organizations. Pillar 3 of the Basel II framework needs to be further strengthened and implemented in light of inadequacies in existing disclosure requirements. The provision of information to consumers of financial services should also be enhanced where necessary. Design of market disclosure rules, however, should not make firms reluctant to provide information out of competitiveness concerns, and make investors and others willing to use and act on information available. Market discipline will also not be fully effective unless failure resolution frameworks are substantially improved and moral hazard is reduced.

Information on and management of counterparty risk needs to be improved. Supervisors need to be able to identify where counterparty risk concentrations are building up (both domestically and cross-border) in order to take appropriate corrective actions to reduce such correlations. In particular, consistent supervisory information is needed on large exposures (including to unregulated entities) and on concentrations in various types of collateral taken in transactions of secured loans and repurchase agreements.

Conflicts of interests in the production of credit ratings need to be addressed. The diminished credibility of credit ratings can be addressed through changes in the governance of the ratings process, including the separation of agencies' rating activities and their advisory function. Further actions are needed to allow investors to interpret better the outputs of the ratings process. This may include greater requirements for transparency over raters' models assumptions and greater clarity over the meaning of ratings scales, including through reformed scales for structured credit products. The role and use of ratings in regulatory and supervisory frameworks (including Basel II) need to be reviewed.

### **Organization of Regulation and Supervision**

To enhance accountability, consideration should be given to include the mitigation of systemic risk as an explicit goal for central banks and regulators whose mandate includes the pursuit of financial stability. The crisis has shown the importance of central banks in promoting financial stability through prompt emergency liquidity provision and, at times, extraordinary market operations. Supervisors and central banks need to cooperate with each other to obtain and share information necessary for the conduct of monitoring systemic risk. Central banks should have access to all necessary information to assess systemic risks to the macro-economy and the payments system, as well as assess counterparty risks for monetary and emergency liquidity operations. They may also need to be given appropriate influence on the regulation and supervision of systemically important institutions. At the same time, supervisors should have access to information on events in payment and settlements systems or in liquidity provision which are necessary for their role in monitoring systemic risk.

Agencies involved in regulation, supervision, and crisis management need to have clear mandates and tools commensurate with these mandates, especially in the area of safeguarding financial stability. At the national level, the organization of supervision can be improved by developing a clear allocation of responsibilities among and independence and accountability of relevant agencies. Consistent supervision requires sufficient resources, close communication, and a flow of information among all parties responsible for oversight and financial crisis management, including central banks and finance ministries, national and international. The role of the legal framework in ensuring such inter-institutional cooperation is critical and should include mechanisms through which one regulatory agency can effectively share its concerns with another. International cooperation in prudential supervision could be further enhanced through Memoranda of Understanding and by introducing provisions in central bank and banking supervision laws that effectively authorize cross-border cooperation and exchange of information.

More generally, the consistency and coherence of policies need to be enhanced. Shortcomings have surfaced in the regulation and supervision of financial institutions, activities and markets, both in terms of lack of regulation and weak enforcement of existing regulation. Capital and liquidity requirements for similar activities need to be adjusted so as to avoid regulatory arbitrage. All financial activities that pose systemic risks need to be brought within the scope of equivalent prudential regulation. Robust conduct-of-business regulations need to cover all market participants that substantially affect the flow of credit. International consistency of policies, including in offshore centers, is essential to avoid circumvention, requiring an organizational framework that ensures common understanding and mechanisms that ensure adherence to principles adopted.

### **C. Reform of the International Financial Architecture**

Many international financial architecture changes are needed, including regarding surveillance of financial risks and vulnerabilities.<sup>13</sup> The crisis has made clear the enormous costs of not identifying risks early enough. Private market discipline failed in many respects, while public surveillance identified risks at a broad level but did not drill down deep enough to expose the full extent of vulnerabilities or draw specific policy conclusions. Many changes are needed to reduce systemic risks globally. A more effective approach to detect impending dangers to the world economy will require close cooperation among international agencies to bring together the scatter of macro-financial information and expertise, and identify key risks and vulnerabilities. Only by working across organizations—supported by significant information sharing and drilling down—can one hope to “connect the dots” (across financial institutions, markets, and countries), clearly articulate risks, and propose practical remedies.

Obtaining better information will in turn be another essential step. More, and better organized, information is required for markets and policymakers to improve systemic risk assessments. The crisis has underlined the importance of going beyond traditional statistical approaches to obtain timely and higher-frequency real and financial indicators, at least for systemically important countries and financial institutions. This requires enhancing the accessibility and timeliness of existing data, developing new sources, and promoting transparency and disclosure more generally. Data need to cover non-bank financial institutions, such as insurance companies and hedge funds, and housing-related statistics, and allow a better understanding of credit risk transfers. Better information is needed on the financial operations of large non-financial corporations that have significant links in national economies and potentially across borders as well.

An improvement in the assessment of risks also means strengthening macro-financial analysis and work on early warning systems. More analysis is needed on the linkages between financial sector and macroeconomic performance (for instance, on the relationship between monetary policy and financial risk taking). And new and better operational tools need to be developed for macro-financial surveillance. Perhaps most critical is recognizing

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<sup>13</sup> This draws on work of the Strategy and Policy Review Department of the IMF. For a more detailed review of needed financial reforms, see IMF (2009d).

that early warning exercises are less about “calling” crises—whose exact timing and occurrence is nearly impossible to foretell—than about identifying risks and underlying vulnerabilities that may trigger loss in confidence and propagate a crisis, and taking remedial policy actions. But even then, new channels through which identified risks can spread and novel risk manifestations may be missed, especially as financial innovation and integration continue and the complex web of interlinkages grows.

Early warning and surveillance work by multilateral agencies will need to improve and balance voluntary engagement in assessments with mandatory compliance. Multilateral and bilateral assessments could be used more systematically to examine macro-prudential risks and progress in the implementation of multilaterally agreed principles, standards, and actions. It will, however, mean stronger requirements on member regulators and authorities to participate, more streamlined processes, and improved means of dissemination, while recognizing the tension inherent in the function of whistle blower and crisis preventer. More broadly, an overarching challenge in improving early warning will be to convince country authorities to take actions to deal with vulnerabilities, particularly during good times. Change in international financial governance and representations (in both rule making and decision making bodies (Financial Stability Board, Basel Committee on Banking Supervision, International Monetary Fund, etc.) will be needed to make this effective.

Better cross-border crisis management arrangements are also sorely needed. As clearly demonstrated by the failures of Lehman Brothers and some Icelandic banks, countries cannot deal with large, complex, globally active financial institutions on their own, as these institutions affect many markets and countries. A more universal approach is needed. Closer cooperation and greater coordination among regulators and supervisors can help to adequately address market disruptions as they arise and forestall policy measures that have adverse spillovers. An enhanced role for “colleges of supervisors” with specific mandates and accountability will be an important component to achieve the goal of better monitoring and early interventions. At the same time, this will not be sufficient to cover all sources of systemic risks, as risks can come from other sources, including from non-bank financial institutions.

Improvements are also needed in the area of cross-border banking resolution. Clear and binding rules on burden sharing for weak or failed cross-border financial institutions are needed; otherwise it will hard to develop a fail-proof system. The first best—a global financial regulator, matching the current, closely integrated world and well-resourced in terms of staff, powers, budget and financial resources—is unlikely to materialize soon. Other options, each of which could achieve to varying degrees greater global financial stability, are a new charter for internationally active banks, greater harmonization of rules and practices, and enhanced coordination. Each of these second best reforms have their own benefits and costs, which are difficult to rank, especially as they depend on actual implementation and enforcement.

Importantly, improved crisis management will require better international liquidity provision, to both financial institutions and countries, to prevent spillovers from becoming solvency issues. While one can begin with the designs and institutional frameworks for

national lender of last resort facilities, much work is still needed to obtain better facilities for cross-border banks.<sup>14</sup> Many of the obstacles are similar or relate to the same underlying factors hindering ex-post crisis resolution. For liquidity provision at the country level, the approaches are conceptually also well-known and can involve, besides private market solutions (including contingent credit lines and insurance contracts), bilateral or regional swaps among countries, other forms of reserve pooling, and an expanded International Monetary Fund. But between principles and actual practices can be many barriers.

## V. CONCLUSION

The financial crisis has brought a number of weaknesses in macroeconomic policy, financial regulation, and global financial architectures into the open. These include the treatment of systemically important financial institutions; the assessments of systemic risks and vulnerabilities; and the resolution of financial institutions.

The crisis was not primarily triggered by macroeconomic policy. But it has exposed flaws in policy pre-crisis, forced policy makers to explore new policies during the crisis, and forces us to think about the architecture of macroeconomic policy post-crisis. In many ways, the general frame of policy should remain the same. The ultimate goals should be to achieve a stable output gap and stable inflation. But the crisis has made clear that policy makers have to watch many targets, including the composition of output, the behavior of asset prices, and the leverage of different agents. It has also made clear that they have potentially many more instruments at their disposal than they had used pre-crisis. The challenge is to learn how to use these instruments in the best way. The combination of traditional monetary policy and regulation tools, and the design of better automatic stabilizers for fiscal policy, are two promising routes.

The reform agenda is enormous, much remains to be done, and new questions have come up for the design of more stable national and global financial systems. The global nature of the financial crisis has made clear that financially integrated markets, while offering benefits in the long run, pose significant short-term risks, with large real economic consequences, and that reforms are needed to the international financial architecture to safeguard the stability of an increasingly integrated global financial system. Such reforms need to be guided by the right principles rather than being formulated as rushed responses to the public pressure. In particular, the reforms should rely on economic reasoning to identify the market failures and the externalities as well as to devise the best way to solve the incentive problems.

Vested interests in the financial services industry are large in most countries and political lobbying will therefore be a key determinant of the final outcome of this process. Intense efforts by the financial industry to protect these interests can create obstacles to

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<sup>14</sup> See, among others, Schinasi and Teixeira (2006) for a discussion of the complications of establishing a lender of last resort in the EU.

implementation of the necessary reforms.<sup>15</sup> Hence, policymakers should not underestimate the ability of the financial industry to influence the reform process as well as the ability of the markets to find loopholes to get around restrictions and recognize limits on what regulation and supervision can realistically achieve.

While there are many lessons for financial reform going forward, as summarized in this paper, there remain many areas of unknowns where further policy research would be useful. These include such areas as competition policy for a stable financial system, approaches to consumer protection in financial services, and the political economy of financial regulation, financial openness, and financial crises.

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<sup>15</sup> See Igan, Mishra, and Tressel (2009) and Johnson (2009) for a discussion of political economy factors in the run-up to and during the resolution of the current crisis.

**Table 1. Support for Financial and Other Sectors and Upfront Financing Need**  
(As of June 2009; in percent of 2008 GDP) 1/

	Capital Injection	Purchase of Assets and Lending by Treasury 2/	Guarantees 3/	Liquidity Provision and Other Support by Central Bank	Upfront Government Financing 4/
	(A)	(B)	(C)	(D)	(E)
<b>Advanced North America</b>					
Canada	0.0	10.9	13.5	1.5	10.9
United States 5/	5.2	1.3	10.9	8.4	6.7
<b>Advanced Europe</b>					
Austria	5.3	0.0	30.1	...	8.9
Belgium	4.8	0.0	26.4	...	4.8
France 6/	1.4	1.3	16.4	...	1.6
Germany	3.8	0.4	18.0	...	3.7
Greece	2.1	3.3	6.2	...	5.4
Ireland	5.9	0.0	198.1	...	5.9
Italy	0.7	0.0	0.0	...	0.7
Netherlands	3.4	10.3	33.6	...	13.6
Norway 8/	2.0	15.8	0.0	14.7	15.8
Portugal 9/	2.4	0.0	12.0	...	2.4
Spain 10/	0.0	3.9	18.3	...	3.9
Sweden 11/	2.1	4.8	47.5	13.6	5.2
Switzerland	1.1	0.0	0.0	25.5	1.1
United Kingdom 12/	3.9	13.8	49.7	14.4	20.0
European Central Bank	...	...	...	6.4	...
<b>Advanced Asia and Pacific</b>					
Australia	0.0	0.7	8.8	...	0.7
Japan 13/	2.4	21.2	7.3	2.9	0.8
Korea 14/	2.3	5.5	14.5	4.5	0.8
<b>Emerging Economies</b>					
Argentina 15/	0.0	0.9	0.0	4.2	0.9
Brazil 16/	0.0	0.8	0.0	12.5	0.0
China	0.0	0.0	0.0	21.3	0.0
India	0.4	0.0	0.0	9.2	0.4
Indonesia 17/	0.0	0.0	0.1	1.3	0.1
Hungary 18/	1.1	2.4	1.1	15.7	3.5
Poland	0.0	0.0	3.2	5.5	0.0
Russia	1.2	1.2	0.5	14.3	2.3
Saudi Arabia 19/	0.0	1.2	N/A	33.1	1.2
Turkey 20/	0.0	0.3	0.0	3.1	0.0
<b>Average (PPP GDP Weights)</b>					
G-20	2.2	3.5	8.8	9.3	3.6
Advanced Economies	3.4	5.3	14.0	6.9	5.5
In billions of US\$	1,149	1,937	4,646	2,514	1,849
Emerging Economies	0.2	0.3	0.1	13.6	0.4
In billions of US\$	22	38	7	1,605	47

Source: IMF, 2009e; FAD-MCM database on public interventions. See IMF documents, "The State of Public Finances", for details.

1/ Columns A, B, C, and E indicate announced or pledged amounts, and not actual uptake. Column D indicates the actual changes in central bank balance sheets from June 2007 to April 2009. While these changes are mostly related to measures aiming at enhancing market liquidity and providing financial sector support, they may occasionally have other causes, and also may not capture other types of support, including that due to changes in regulatory policies. For the Euro zone countries, see the ECB row. Averages for column D include the Euro zone as a whole.

2/ Column B does not include treasury funds provided in support of central bank operations. These amount to 0.5 percent of GDP in the United States and 12.8 percent of GDP in the United Kingdom.

3/ Excludes deposit insurance provided by deposit insurance agencies.

4/ Includes gross support measures that require upfront government outlays (i.e., excludes recovery from the sale of acquired assets).

5/ Estimated upfront financing need for 2009-10 is US\$960 bn (6.7 percent of GDP), consisting of the allocated amount under TARP (US\$510 bn); treasury purchases of GSE preferred stocks (US\$400 bn); and treasury support for Commercial Paper Funding Facility (US\$50 bn).

6/ Support to the country's strategic companies is recorded under (B); of which €20 bn will be financed by a state-owned bank, Caisse des Dépôts et Consignations, not requiring upfront treasury financing.

7/ Does not include the temporary swap of government securities for assets held by Italian banks undertaken by the Bank of Italy.

8/ Excluding asset accumulation in Sovereign Wealth Funds, the balance sheet expansion during the period was only 4.5 percent of GDP.

9/ A maximum amount of €20 bn (12 percent of GDP) is allocated to both guarantees and capital injection, with the latter not exceeding €4 bn.

10/ Column C includes approved bank debt guarantees up to €100 bn, and another €100 bn that would be extended, if needed.

11/ Some capital injection (SEK50 bn) will be undertaken by the Stabilization Fund.

12/ Estimated upfront financing need is £289 bn (20 percent of GDP), consisting of Bank Recapitalization Fund (£56 bn), Special Liquidity Scheme (£185 bn), and financing for the nationalization of Northern Rock and Bradford & Bingley (£48 bn).

13/ Budget provides JPY 3,900 bn (0.8 percent of GDP) to support capital injection by a special corporation and lending and purchase of commercial paper by policy-based financing institutions.

14/ In 2009, KRW 8 trillion will be provided from the budget to support SMEs.

15/ Staff estimates.

16/ Liquidity support and loan purchase are provided through public banks and deposit insurance fund, entailing no upfront financing.

17/ Small interventions have been recently implemented through the deposit insurance agency that are not yet quantified.

18/ The expansion of the central bank balance sheet reflects mostly the increase in net foreign assets as a result of IMF and EU disbursements in the context of the SBA-supported program. During this period, the increase in central bank domestic assets was limited to 2.3 percent of GDP.

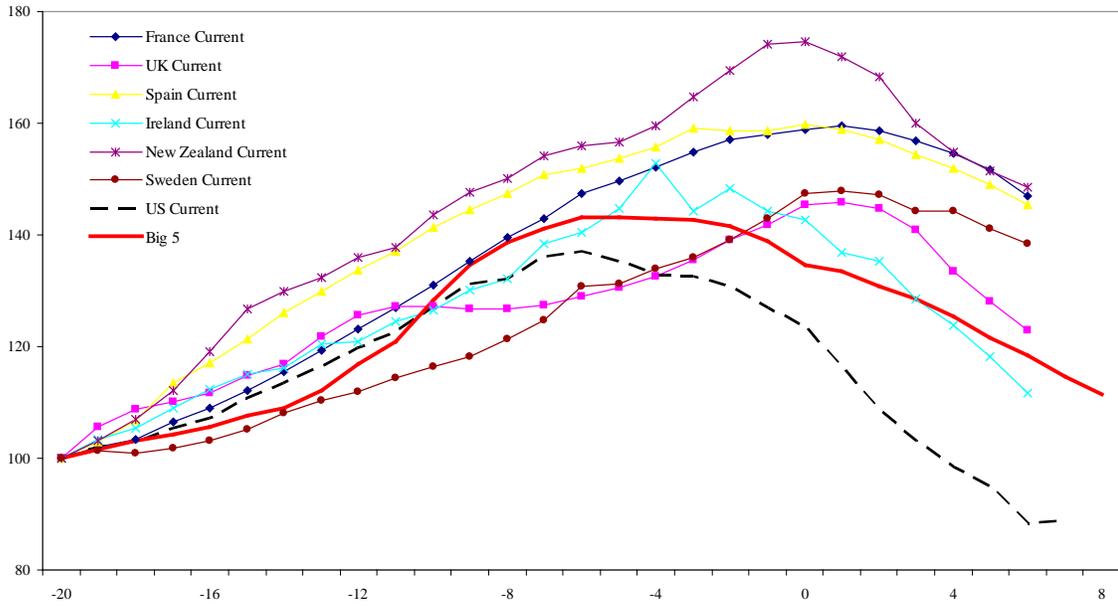
19/ A significant part of the central bank balance sheet expansion is due to a large accumulation of foreign assets during 2008.

20/ Column B shows loans by the SME Industry Development Organization, not requiring direct treasury financing.

Fig

Figure 1. Familiar Factors: Asset Price Bubbles

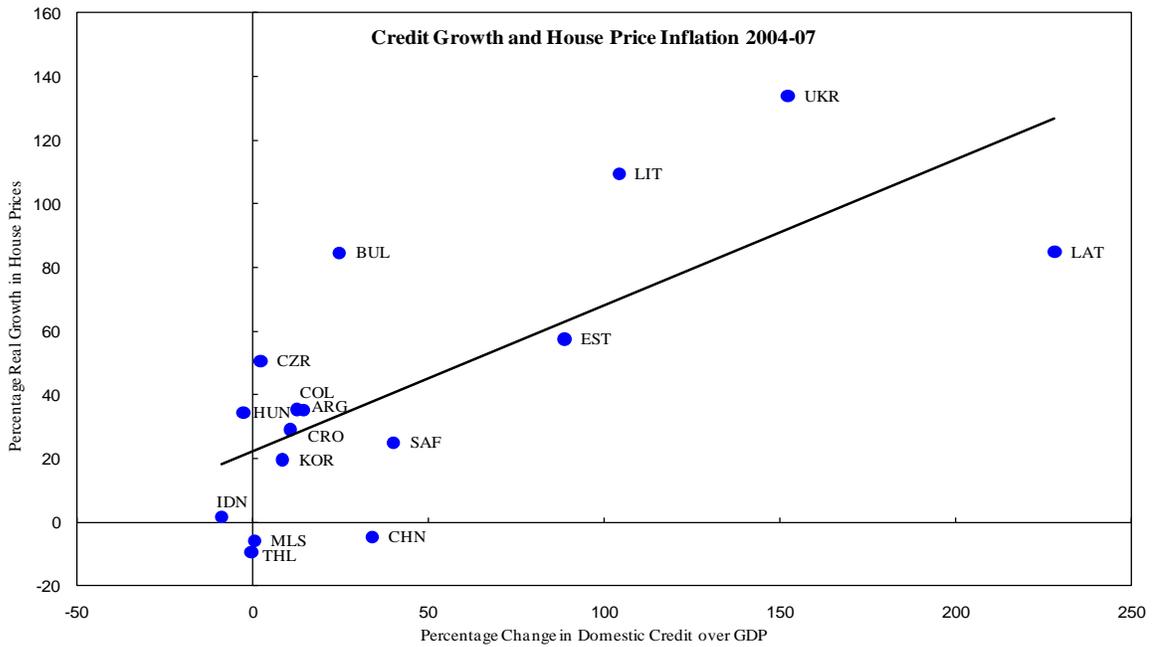
Asset price bubble this time: Sharply rising housing prices preceded the crash, typical of banking crises.



Sources: BIS, OECD, and Haver Analytics.  
 Note: Real house price index is equal to 100 five years prior to the banking crises. Big 5 refers to the average of indices for the five major banking crises (Spain - 1977, Norway - 1987, Finland - 1991, Sweden - 1991, and Japan - 1992). For the current crisis, the beginning date is assumed to be 2007Q3. House price series for the US is the S&P Case-Shiller National Home Price Index.

Figure 2. Familiar Factors: Credit Booms

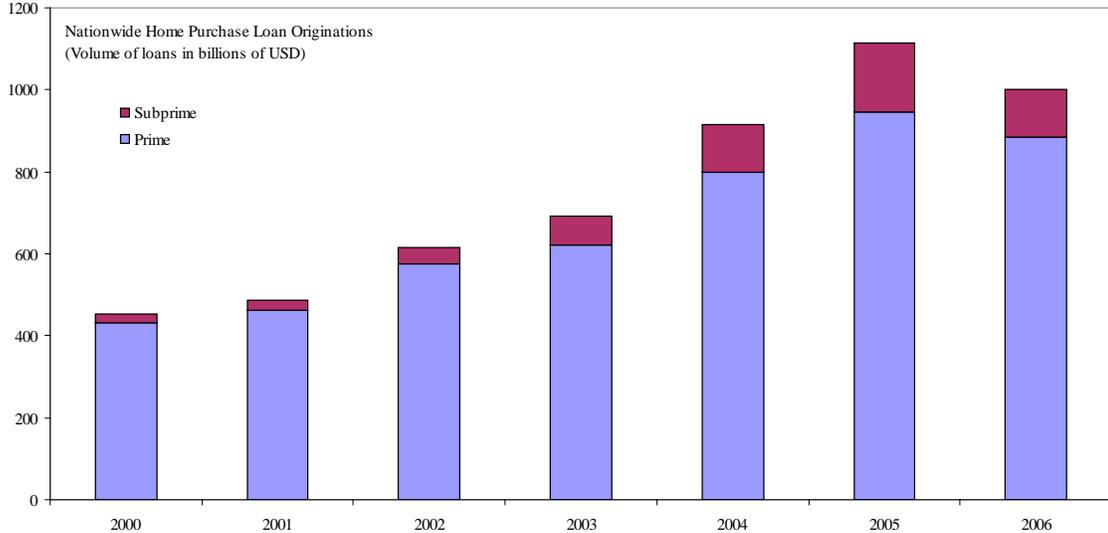
Credit and leverage grew rapidly and fuelled housing price increases.



Source: IMF International Financial Statistics, GlobalProperty Guide.

Figure 3. Subprime Mortgage Credit Boom

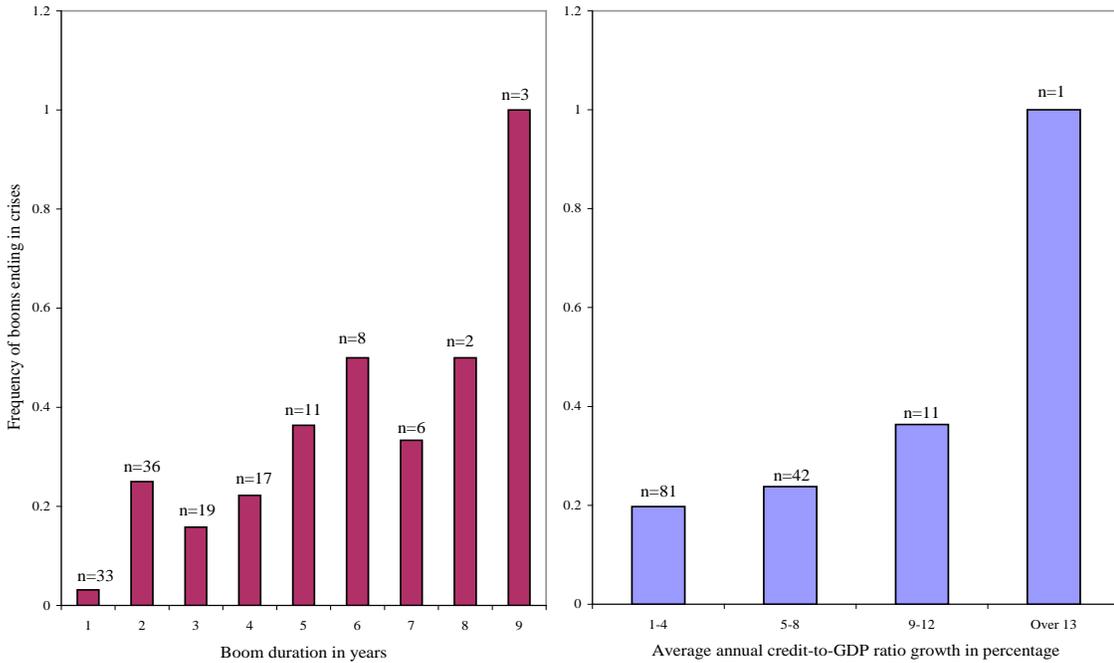
Subprime mortgage market: Loan originations in this segment were less than 5 percent of the total in 2000 but 15 percent in 2005.



Sources: HMDA, IMF staff estimates.

Figure 4. Credit Booms and Crises

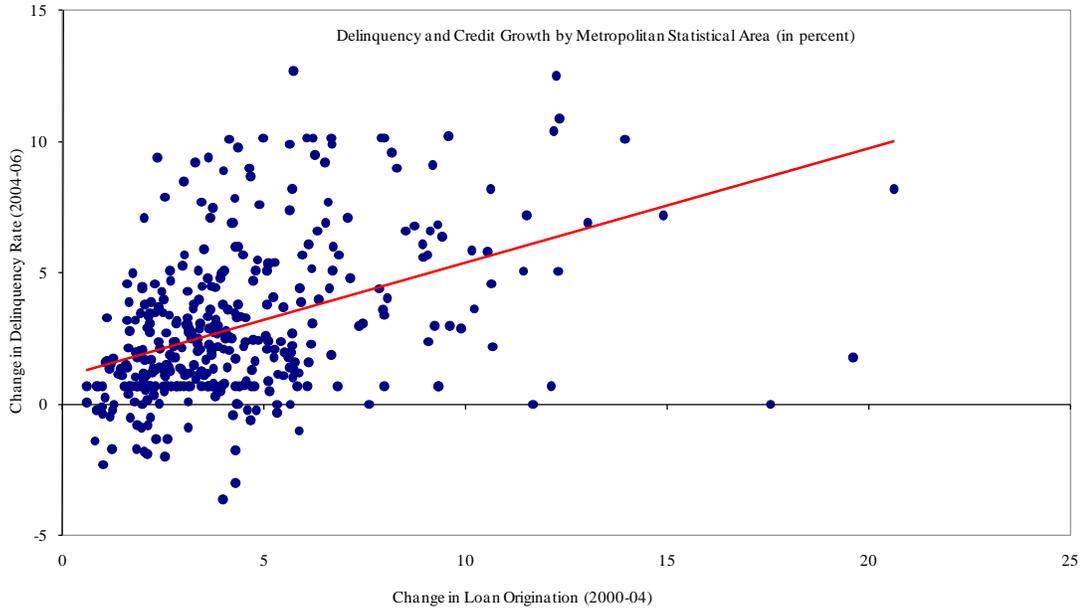
Large and long-lasting credit booms often end up badly.



Sources: IMF *International Financial Statistics* and IMF staff estimates.

Figure 5. Credit Booms and Lending Standards

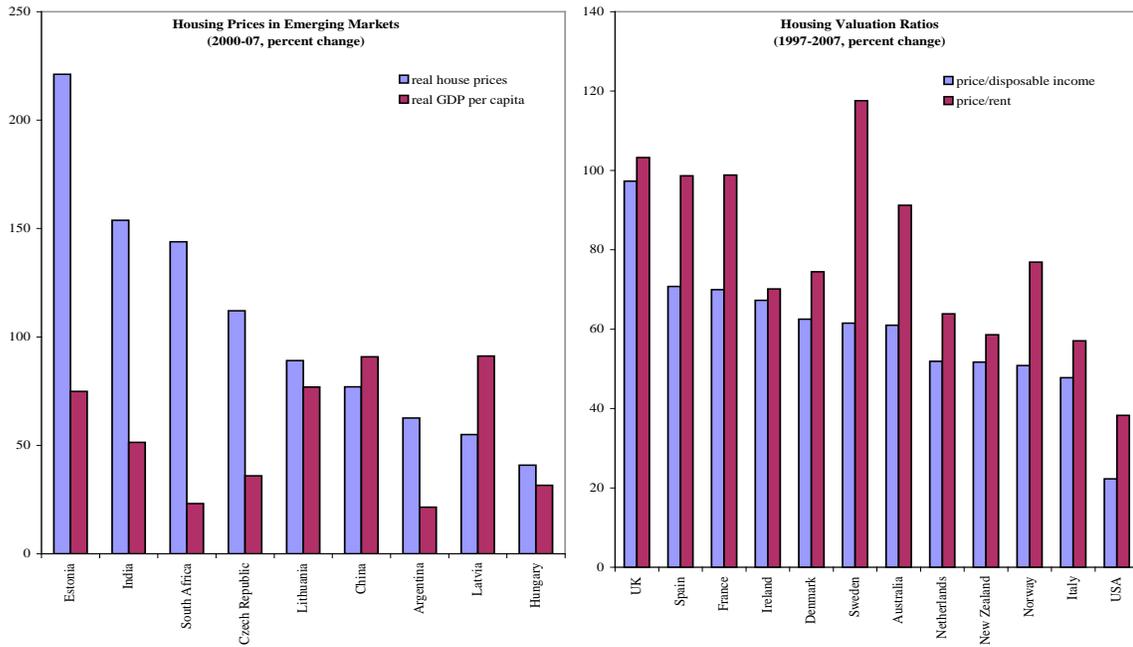
In booms, lending standards often deteriorate, as they did in the current episode in the US regions.



Sources: HMDA, Inside Mortgage Finance, IMF staff calculations.

Figure 6. Global Housing Boom in 2000s

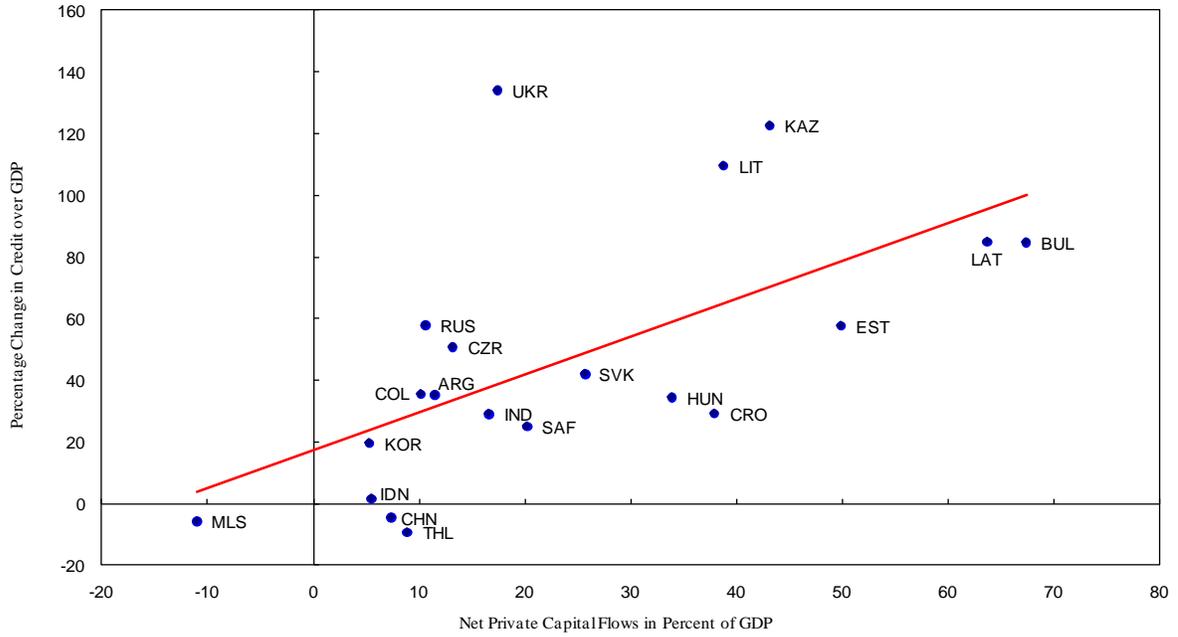
Housing booms have been in force in many countries that are currently in crisis.



Sources: OECD, IMF *International Financial Statistics*, national sources.

Figure 7. Credit Booms and Capital Flows

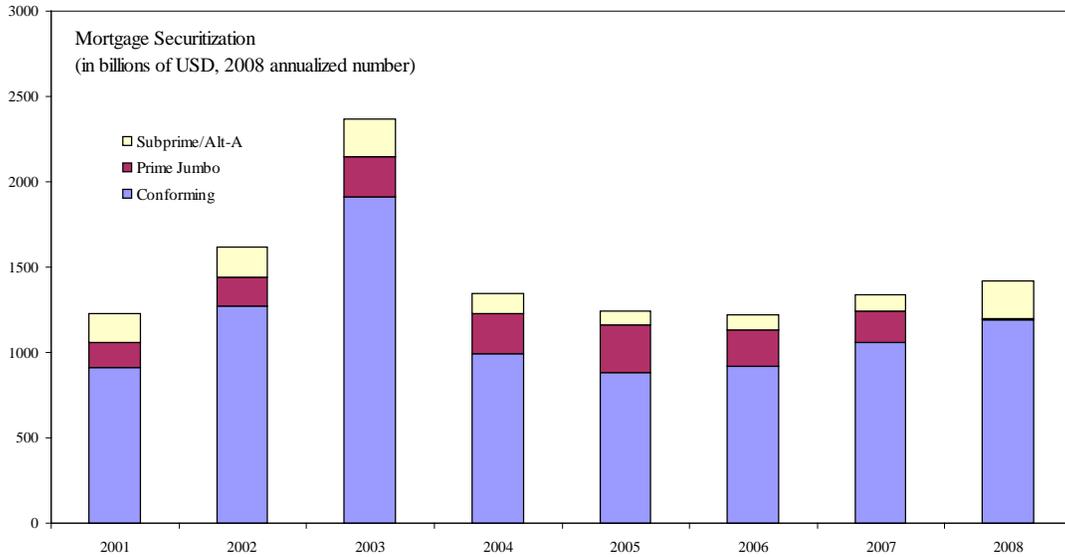
International financial integration fuelled credit booms in emerging markets.



Sources: OECD, IMF International Financial Statistics.

Figure 8. New Dimensions: Securitization

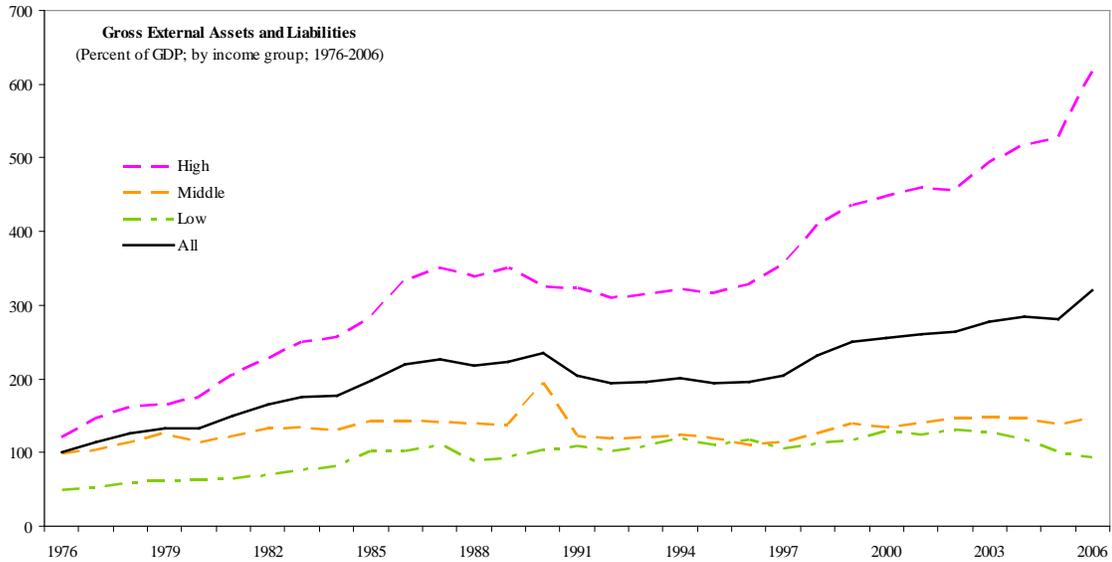
Securitization proved to be a (somewhat) new dimension, opaque to many market participants and policymakers.



Source: IMF staff estimates.

Figure 9. New Dimensions: Increasing Financial Integration

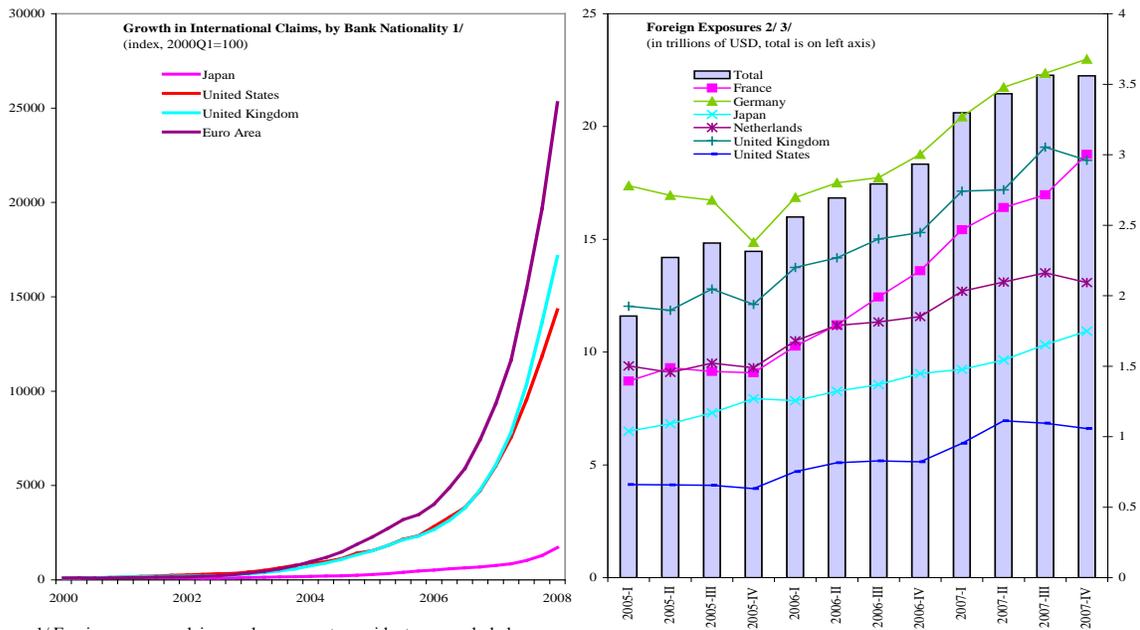
International financial integration increased sharply in last few years, escalating the risk of transmission of risks across borders.



Source: Lane and Milesi-Ferretti (2006).

Figure 10. New Dimensions: Cross-Border Banking

International lending and cross-border interbank exposures grew exponentially.



1/ Foreign currency claims on home country residents are excluded.

2/ On an ultimate risk basis and excluding inter-office transfers.

3/ Foreign claims vis-à-vis entities (banks and non-banks) in advanced economies, booked by banks headquartered in the countries shown.

Source: BIS.

Figure 11. New Dimensions: Financial System Leverage

Leverage in U.S. commercial banks rose rapidly but still slower than the pace at which leverage in U.S. investment banks and European banks grew.

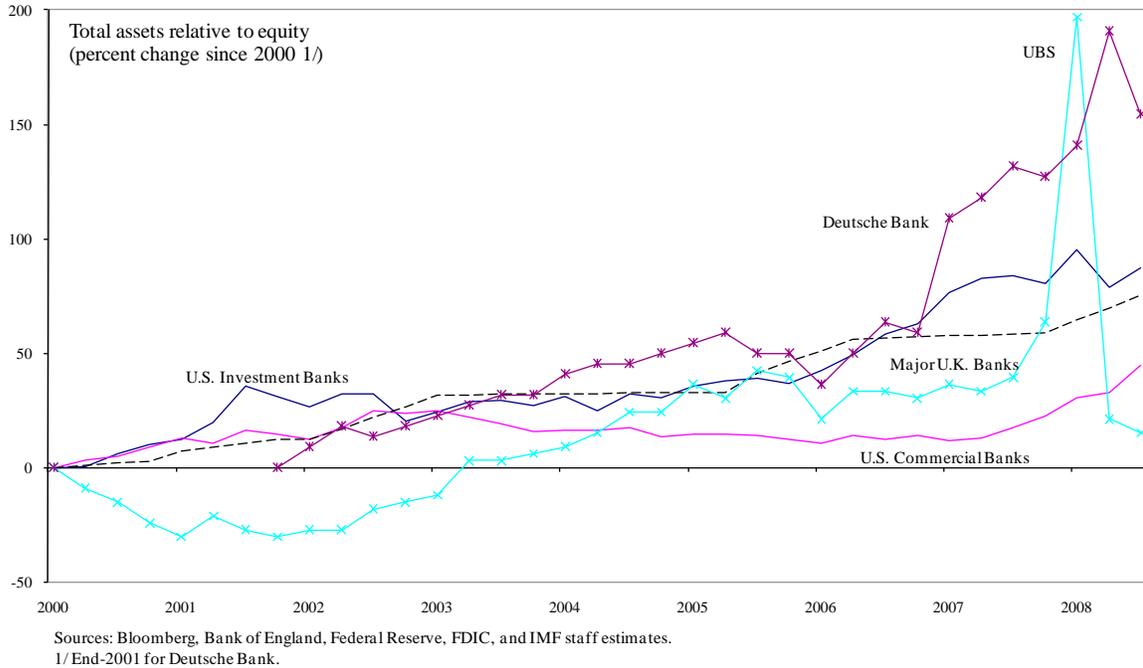
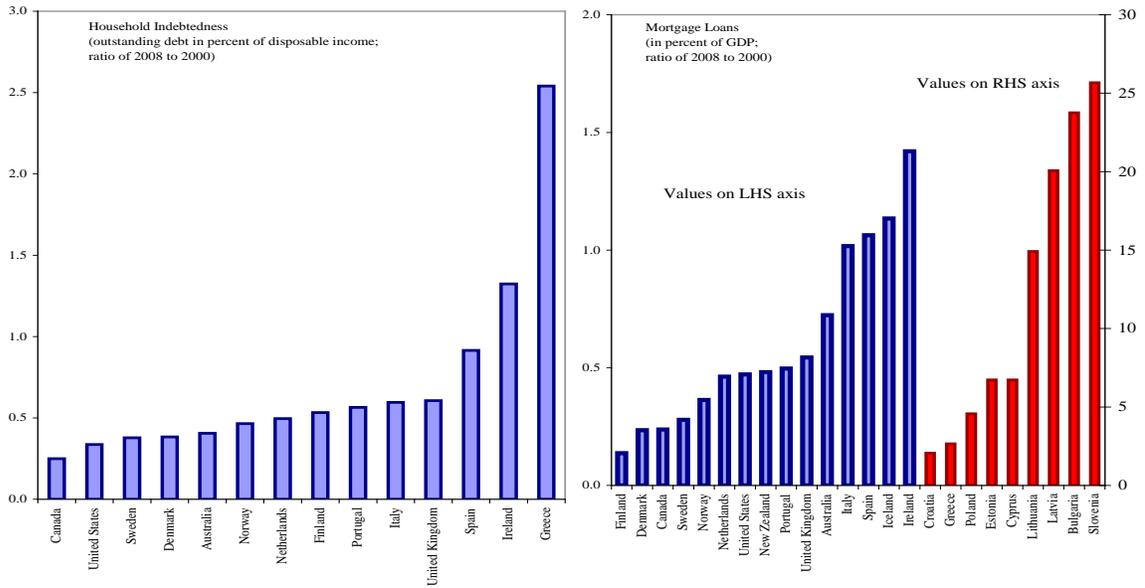


Figure 12. New Dimensions: Household Leverage

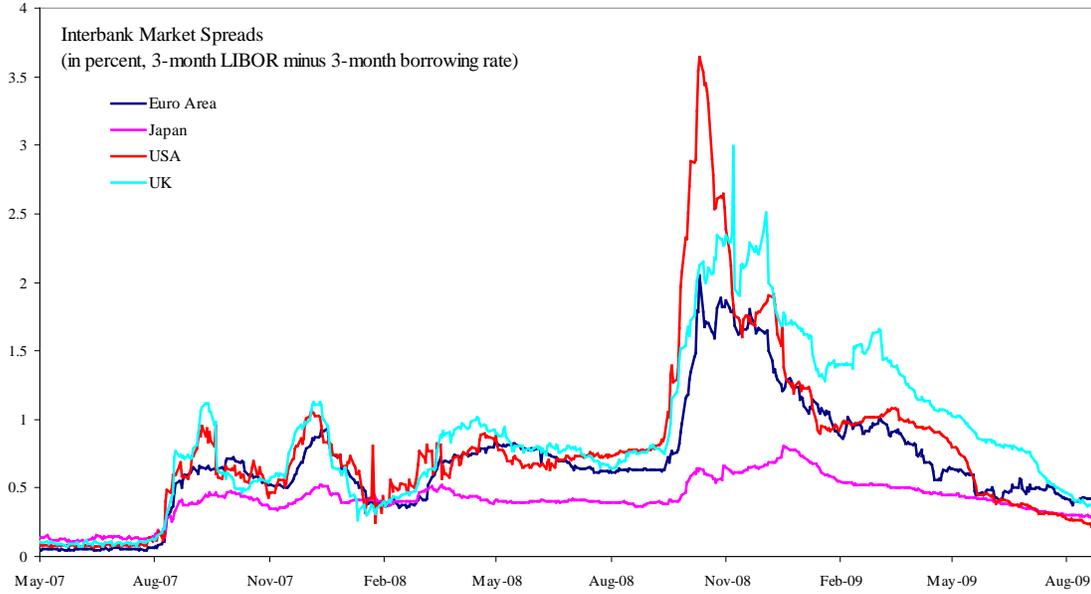
Centrality of household leverage: Not only U.S. households but also households in Europe leveraged up and saved less.



Sources: Haver Analytics, OECD, Federal Reserve Board.

Figure 13. Spread of the Global Financial Crisis

Crises spread quickly, first through lack of liquidity, and then through concerns on solvency and loss of confidence.



Source: Bloomberg.

## References

- Andritzky, Jochen John Kiff, Laura Kodres, Pamela Madrid, Andrea Maechler, Aditya Narain, Noel Sacasa, and Jodi Scarlata, 2009, "Policies to Mitigate Procyclicality," IMF Staff Position Note SPN/09/07, Washington, D.C., March 26.
- Árvai, Zsófia, Karl Driessen, and Inci Ötker, 2009, "Regional Financial Interlinkages and Financial Contagion within Europe," IMF Working Paper No. 09/6.
- Ashcraft, Adam and Till Schuermann, 2008, "Understanding the Securitization of Subprime Mortgage Credit," Federal Reserve Bank New York Staff Report No. 318, March.
- Barajas, Adolfo, Giovanni Dell'Ariccia, and Andrei Levchenko, 2009, "Credit Booms: the Good, the Bad, and the Ugly," mimeo, IMF, Washington, D.C.
- Barth, James, Gerard Caprio, and Ross Levine, 2006, *Rethinking Bank Supervision and Regulation: Until Angels Govern*. Cambridge, UK: Cambridge University Press.
- Brunnermeier, Markus K., Andrew Crockett, Charles A. Goodhart, Avinash Persaud, and Hyun Song Shin, 2009, *The Fundamental Principles of Financial Regulation*, ICMB - CEPR The Geneva Reports on the World Economy.
- Brunnermeier, Markus K., 2009, "Deciphering the 2007-08 Liquidity and Credit Crunch," *Journal of Economic Perspectives* Vol. 23 No. 1, pp. 77-100.
- Calomiris, Charles W., 2009, "The Subprime Turmoil: What's Old, What's New, and What's Next," *Journal of Structured Finance* Vol. 15 No. 1, pp. 6-52.
- Caprio, Gerard, Douglas D. Evanoff, and George G. Kaufman, editors, 2006 "*Cross-Border Banking: Regulatory Challenges*," New Jersey: World Scientific Publishing.
- Carvajal, Ana, Randall Dodd, Michael Moore, Erlend Nier, Ian Tower, and Luisa Zanforlin, 2009, "The Perimeter of Financial Regulation," IMF Staff Position Note SPN/09/07, Washington, D.C., March 26.
- Claessens, Stijn, 2009, "The Financial Crisis and Financial Nationalism," Prepared for the Joint World Bank-CEPR Conference: Trade Implications of Policy Responses to the Crisis, Brussels, May 26-27, 2009.
- Claessens, Stijn, Ayhan Kose, and Marco Terrones, 2009, "What Happens During Recessions, Crunches, and Busts?," *Economic Policy*, Vol. 60, (October), pp. 653-700.
- Dell'Ariccia, Giovanni, Deniz Igan, and Luc Laeven, 2008, "Credit Booms and Lending Standards: Evidence from the Subprime Mortgage Market," IMF Working Paper No. 08/106.

- Financial Services Authority, 2009, A Regulatory Response to the Global Banking Crisis, (The Turner Review), London, March.
- Gorton, Gary, 2008, "The Panic of 2007," In: *Maintaining Stability in a Changing Financial System*, Proceedings of the 2008 Jackson Hole Conference, Federal Reserve Bank of Kansas City, 2008.
- Gorton, Gary, 2009, "Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007," paper prepared for the Federal Reserve Bank of Atlanta's 2009 Financial Markets Conference: *Financial Innovation and Crisis*, May 11-13, 2009.
- Igan, Deniz, Prachi Mishra, and Thierry Tresselt, 2009, "A Fistful of Dollars: Lobbying and the Financial Crisis," IMF Working Paper No. 09/287.
- International Monetary Fund, 2006-2009, *Global Financial Stability Report*, various issues, Washington, D.C.
- International Monetary Fund, 2006-2009, *World Economic Outlook*, various issues, Washington, D.C.
- International Monetary Fund, 2008, "Reaping the Benefits of Financial Globalization." Occasional Paper No. 264.
- International Monetary Fund, 2009a, "Initial Lesson of the Crisis," SM/09/37, Washington, D.C. February 6.
- International Monetary Fund 2009b, "Lessons of the Global Crisis for Macroeconomic Policy," Washington, D.C., February.
- International Monetary Fund, 2009c, "Lessons of the Financial Crisis for Future Regulation of Financial Institutions and Markets and for Liquidity Management," Washington, D.C., February.
- International Monetary Fund, 2009d, "Initial Lessons of the Crisis for the Global Architecture and the IMF," Washington, D.C., February.
- International Monetary Fund, 2009e, "The State of Public Finances: Outlook and Medium-Term Policies After the 2008 Crisis," paper prepared by the IMF Fiscal Affairs Department, Washington, D.C., March.
- International Monetary Fund, 2009f, "Fiscal Implications of the Global Economic and Financial Crisis", IMF Staff Position Note SPN/09/9, Washington, D.C., June 9.
- International Monetary Fund, 2009g, "The State of Public Finances: A Cross-Country Fiscal Monitor," IMF Staff Position Note SPN/09/21, Washington, D.C., July 30.

- Jiménez, Gabriel, Steven Ongena, José Luis Peydró-Alcalde, and Jesús Saurina, 2007, "Hazardous Times for Monetary Policy: What Do Twenty-Three Million Bank Loans Say About the Effects of Monetary Policy on Credit Risk?," CEPR Discussion Paper No. 6514.
- Johnson, Simon, 2009, "The Quiet Coup," *The Atlantic*, May; available at <http://www.theatlantic.com/doc/200905/imf-advice>.
- Johnston, R. Barry, Effie Psalida, Phil de Imus, Jeanne Gobat, Mangal Goswami, Christian Mulder, and Francisco Vazquez, 2009, "Addressing Information Gaps," IMF Staff Position Note SPN/09/06, Washington, D.C., March 26.
- Laeven, Luc and Fabian Valencia, 2008a, "Systemic Banking Crises: A New Database," IMF Working Paper No. 08/224.
- Laeven, Luc and Fabian Valencia, 2008b, "The Use of Blanket Guarantees in Banking Crises," IMF Working Paper No. 08/250.
- Mateos y Lago, Isabelle, Rupa Duttgupta, and Rishi Goyal, 2009, "The Debate on the International Monetary System," IMF Staff Position Note SPN/09/26, Washington, D.C., November 11.
- Mendoza, Enrique and Marco E. Terrones, 2008, "An Anatomy of Credit Booms: Evidence from Macro Aggregates and Micro Data," NBER Working Paper No. 14049, Cambridge, MA: National Bureau of Economic Research.
- New York University Stern School of Business, 2009, *Restoring Financial Stability: How to Repair a Failed System*, editors Viral Acharya and Matthew Richardson, New York: John Wiley & Sons.
- Reinhart, Carmen and Kenneth Rogoff, 2008, "Is the 2007 U.S. Subprime Crises So Different? An International Historical Comparison," *American Economic Review* Vol. 98 No. 2, pp. 339-44.
- Reinhart, Carmen and Kenneth Rogoff, 2009, "The Aftermath of Financial Crises," *American Economic Review* Vol. 99 No. 2, pp. 466-72.
- Schinasi, Garry J. and Pedro G. Teixeira, 2006, "The Lender of Last Resort in the European Single Financial Market," IMF Working Paper No. 06/127.
- United Nations, 2009, *Report of the Commission of Experts of the President of the United Nations General Assembly on Reforms of the International Monetary and Financial System (Stiglitz Report)* Conference on the World Financial and Economic Crisis and its Impact on Development, June 24-26, New York.