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BACKGROUND PAPER

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IMF Performance in the Run-Up to the Financial and Economic Crisis: Bilateral Surveillance of the United States

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December 9, 2010

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ABBREVIATIONS

ABCP	asset-backed commercial paper
ABS	asset-backed securities
AIG	American International Group
ARM	adjustable rate mortgage
BIS	Bank for International Settlements
CDO	collateralized debt obligation
CDS	credit default swap
CFTC	Commodity Futures Trading Commission
CRA	credit rating agency
CRT	credit risk transfer
CSE	consolidated supervised entity
DD	distance-to-default ratio
EBRD	European Bank for Reconstruction and Development
ECB	European Central Bank
FBI	Federal Bureau of Investigation
FED	Federal Reserve
FOMC	Federal Open Market Committee
FSAP	Financial Sector Assessment Program
GAO	Government Accountability Office
GDP	gross domestic product
GFSR	*Global Financial Stability Report*
GSE	government-sponsored enterprise
IEO	Independent Evaluation Office of the IMF
IMF	International Monetary Fund
LCBG	large and complex banking group
LTCM	Long-Term Capital Management
MBS	mortgage-backed securities
MCM	Monetary and Capital Markets Department, IMF
MFD	Monetary and Financial Systems Department, IMF
NBFI	nonbank financial intermediary
NINJA	no income, job, or assets
NPV	net present value
NRSRO	nationally recognized statistical rating organization
OTC	over-the-counter
SEC	Securities and Exchange Commission
SFRC	Shadow Financial Regulatory Committee
SIP	Selected Issues Paper
SIV	structured investment vehicle
SPR	Strategy, Policy, and Review Department, IMF
VAR	value-at-risk
WEO	*World Economic Outlook*
WHD	Western Hemisphere Department, IMF

EXECUTIVE SUMMARY

The IMF's surveillance of the U.S. economy did not highlight critical vulnerabilities and policy weaknesses prior to the crisis. It was not sufficiently concerned about lax mortgage lending standards, and downplayed the risk of a major housing market correction or its potential impact on financial institutions. The IMF did not warn about the risks posed by the packaging of subprime mortgage-backed securities into structured products, the use of off-balance sheet conduits, the rise in leverage, or the expanding use of credit derivatives. Staff was sanguine about the propensity of securitization to disperse risk in such an environment, and about the salutary impact of market discipline on soundness in the shadow banking system. Surveillance did not give enough prominence to risk taking by the private sector, or to the regulatory decisions that motivated this. The possible impact of accommodative monetary policy on asset prices, household debt accumulation, or financial institution leverage was not assessed.

The IMF was most concerned about the risk of a disorderly decline in the dollar. Surveillance thus focused on the need for fiscal adjustment and continued financial innovation to attract capital inflows to finance the large current account deficit. But it did not probe the interplay between capital inflows and financial innovation, and its role in fueling the housing and securitization booms.

Why did U.S. bilateral surveillance fail?

Analytical weaknesses. The IMF was overconfident about the resiliency of U.S. financial institutions, and the efficacy of self-regulation as a mechanism for disciplining financial markets. It agreed in essence with U.S. authorities on the soundness of the financial system. The IMF did not take into account alternative views articulated before the crisis that proved more prescient—for example, on destabilizing incentives, their repercussions for financial market instability and risk, or the consequences of a housing boom built on unsustainable debt accumulation. Groupthink, if not intellectual capture, undermined the ability to provide an independent assessment of risks pertinent to the crisis.

Organizational and governance impediments. The internal review process did not question fundamental premises as opposed to fine-tuning, accentuating an organizational tendency to conform. It also permitted a weaker assessment of risks than contained in the *GFSR* and *WEO*. Summings Up of Executive Board discussions of Article IV Consultations did not challenge staff views with sufficient force in areas critical to the evolution of the crisis.

Self-censorship. Some staff perceived that career prospects were enhanced by conforming to consensus views, and damaged by challenging the views of the authorities, as this may not be supported by Management or senior staff. This, and the perception of a higher burden of proof in the U.S. case, appears to have undermined the incentive to focus on policy weaknesses and risks.

Reform proposals include measures to: strengthen and diversify the expertise utilized on U.S. surveillance, particularly for the financial sector; enhance the role and responsibilities of staff with such expertise; provide a focal point for thinking independently about systemic risks, while fostering an environment in which dissenting and contrarian views are given due consideration; and strengthen the review process.

I. INTRODUCTION[1]

1. **This paper evaluates the extent to which IMF bilateral surveillance identified in advance the vulnerabilities that contributed to or worsened the financial crisis in the United States, and assesses options for improving the effectiveness of such surveillance in the future.** The evaluation centers on the period 2004–07, extending back in time when relevant, and forward through the July 2008 Article IV Staff Report to assess the lessons the IMF was drawing from the evolution of the crisis. The focus is on underlying vulnerabilities and the roots of the problems that grew more serious through the summer of 2007, and not on the acute phase of the crisis that followed the bankruptcy of Lehman Brothers in September 2008. This is for two reasons: first, the period prior to the emergence of the crisis was when IMF surveillance could have been most useful in influencing U.S. policy and alerting the global community about forthcoming difficulties; and second, the scope of the evaluation does not cover the IMF's role in crisis management.

2. **Evaluation criteria and methods.** The principal yardstick used to evaluate the effectiveness of surveillance is the extent to which the IMF warned the U.S. authorities about pertinent risks and vulnerabilities in time to take corrective action to forestall or mitigate the crisis. It also looks at the effectiveness with which surveillance warned the Fund's membership at large of the onset of problems originating in the United States, an issue covered more directly in Banerji (2010).[2] The paper assesses IMF performance with the benefit of hindsight. Where comparisons are provided, they focus on the analysis that was most insightful before the crisis, since these are the comparisons that offer the greatest potential for learning. This approach tends to cast the conclusions in harsher terms than otherwise, since the paper does not discuss other analyses that missed or mis-diagnosed important elements of the crisis. It is adopted because the goal of the evaluation is to draw lessons to improve the future performance of the IMF.

[1] I would like to thank Jack Boorman, David Peretz, Larry Promisel and other participants of IEO workshops, as well as my IEO colleagues, for their helpful comments on earlier drafts of this paper. I am also grateful to Alisa Abrams, Andrew Martinez, and Chris Monasterski for research assistance, to Rachel Weaving for editorial suggestions, and to Arun Bhatnagar for administrative assistance.

[2] These criteria appear consistent with the objectives of the IMF's "2007 Decision on Bilateral Surveillance," as summarized in IMF (2010): "One of the IMF's core activities is to monitor global, regional, and national economies to assess whether countries' economic and financial policies are consistent not only with the health of their own economies, but also with the interests of the international community. This process is known as surveillance. The IMF's work in this area is intended to help head off risks to international monetary and financial stability, alert the institution's 187 member countries to potential risks and vulnerabilities, and advise them of needed policy adjustments. The IMF's policy dialogue with its members is known as bilateral surveillance. It complements the IMF's oversight of the international monetary system, commonly termed multilateral surveillance."

3. **The paper is structured as follows.** The nature and evolution of the U.S. financial crisis and the factors that contributed to it are outlined in Section II. This outline provides the framework for the evaluation of the IMF's surveillance of the U.S. economy in Section III. Section IV summarizes the main findings from the evaluation and discusses factors that may have inhibited the effectiveness of surveillance. Section V proposes options to strengthen the Fund's bilateral surveillance of a systemically-important country. Annex 1 elaborates on how the crisis evolved and the shortfalls in incentives, regulation and policy that exacerbated it to guide the choice of topics to evaluate. Annex 2 assesses the work of analysts outside the U.S. bilateral surveillance orbit who provided insightful analysis prior to the crisis.

4. **Evaluation sources.** The evaluation is based on a review of IMF Article IV Staff Reports and selected issues papers (SIPs) on the U.S. economy, on other public and internal IMF documents, commentary by other analysts on developments in the U.S. economy, and interviews with current and former IMF staff, Management, and U.S. officials.

II. Evaluation Framework

5. **Most analysts would agree that loose monetary policy, sustained capital inflows, inadequate regulation of, and misaligned incentives in the U.S. financial sector combined to inflate and prolong the U.S. asset booms before the crisis broke**—although how these factors interacted and their relative importance continues to be debated. Once the housing bubble burst in 2006, a crisis in the subprime segment of housing finance was inevitable given the design of lending standards for this segment. A major decline in household spending would also have been difficult to avoid, given the extent to which household borrowing and spending had become intertwined with the housing boom. Yet, the nature of the liquidity crisis that followed the defaults in the subprime housing market cannot be explained by macroeconomic phenomena alone. It requires assessing the innovations that attracted a global pool of investors into an environment laden with risk, and the manner in which financial institutions expanded their exposures while minimizing capital. These innovations, which helped to sustain the housing boom, proved disastrous once the bubble burst, threatening a systemic withdrawal of funding from an entire class of asset-backed securities, and with it the collapse of the U.S. and global financial systems. Box 1 summarizes key policies and events associated with the crisis.

Box 1. Crisis Snapshot—Key Policies and Events

Dec 2000:	Over-the-counter (OTC) derivatives legislated to fall outside regulatory jurisdiction
Jan 2002:	20 percent Basel risk weight assigned to those mortgage-backed securities rated AA or higher by credit rating agencies
Oct 2002:	Real federal funds rate turns negative and remains negative through April 2005
Aug 2004:	Securities and Exchange Commission suspends net capital rule for big five investment banks; leverage increases sharply
Mid-2006:	Housing prices peak, after increasing at a double digit pace during 2003–05
H2 2006:	Subprime defaults escalate
Late 2006:	Bankruptcies of mortgage originators begin, and escalate in first half of 2007
Apr 2007:	New Century Financial, second largest subprime lender, declares bankruptcy
Jun 2007:	Bear Stearns injects liquidity into two of its hedge funds invested in subprime MBS, which are nonetheless closed in July 2007
Aug 2007:	BNP Paribas halts redemptions on three money market funds exposed to subprime; diminished liquidity in inter-bank markets; run on Countrywide
Mar 2008:	Bear Stearns collapses; acquired by JP Morgan Chase with financing from Federal Reserve
Sep 2008:	Fannie Mae/Freddie Mac placed under conservatorship; Lehman Brothers files for bankruptcy; U.S. Government provides $85 billion loan to AIG in exchange for nearly 80 percent stake; run on money market funds after Reserve Primary Fund "breaks the buck"

6. **Drawing from a fuller analysis of the U.S. financial crisis in Annex 1, the paper assesses Fund surveillance of both the evolution of the crisis (in Section III A-C), and its aforementioned underlying factors (in Section III D-G), along the following lines:**

(a) The inadequacy of lending standards that accompanied and fueled the housing boom, and fueled the parallel accumulation of household debt.

(b) The rise and dominance of the securitization model for subprime home mortgages and the factors that drove its expansion and complexity. These factors included the packaging of subprime mortgage-backed securities (MBS) into structured products such as collateralized debt obligations (CDOs); the role of credit rating agencies in certifying the investment quality of such products; the use of off-balance-sheet conduits to minimize capital requirements of the issuing institutions and increase effective leverage; the growth in the use of credit derivatives, in particular credit default swaps (CDSs), to off-load risk; and the consequent transformation of market

risk to counterparty risk amidst heavy reliance on short-term funding in the shadow banking system.[3]

(c) The near collapse of the financial system after housing prices declined, defaults on subprime mortgages escalated, and illiquidity in the housing market drained liquidity from a broader class of asset-backed securities.

(d) Misaligned incentives that drove private agents to take on excessive risk financed mainly by debt, comforted by faulty risk management models, and encouraged by perceived government backing for the creditors of the largest institutions.

(e) Regulatory shortfalls that derived from over-confidence in the ability of financial markets to regulate themselves, resulting in lax supervision, as well as perverse regulation that fostered excessive risk taking by the private sector.

(f) The role of monetary policy in the early part of the decade in fostering credit expansion and the housing bubble.

(g) The domestic and external policies underlying global imbalances, and the role of capital inflows in fueling the housing and securitization booms.

7. **Surveillance is most effective when credible warnings are issued in time to take corrective action.** Thus, for instance, concerns that monetary policy may be contributing to unsustainable asset prices would best have been expressed in the early part of the decade. The risks associated with a housing bubble or the design of subprime lending would have been most effective if expressed before the bubble burst and the defaults associated with subprime loans began to escalate. Concerns about systemic liquidity repercussions stemming from the nature of innovations in the financial sector would ideally have been expressed before the U.S. financial system began to experience such problems.

[3] The so-called shadow banking system is the largely unregulated part of the financial markets comprising investment banks, hedge funds, money market funds, the affiliates and conduits of commercial banks including off-balance sheet structured investment vehicles (SIVs), and other nonbank financial entities not subject to the tighter regulation associated with depository institutions.

III. Bilateral Surveillance in the Run-Up to the Crisis

8. This section focuses on the IMF's analysis and assessments of the sources of vulnerability to the financial crisis, and the extent to which this analysis highlighted relevant risks in advance of the crisis evolution.[4] By mid-2008, most of the critical features of the financial crisis had materialized, with the exception of the acute phase of the liquidity crisis. Hence the evaluation of the July 2008 Article IV report is more limited; it appears at the end of this section and focuses primarily on the lessons the IMF was drawing at that time from the evolution of the crisis.

A. Housing Finance and Household Debt

> *So it seems likely that America's borrowing binge will end with a bang, not a whimper, that spending will suddenly drop off as both the bond market and the housing market experience rude awakenings. If that happens, the economic consequences will be ugly.* (Krugman, 2006a)

9. **The IMF's analysis of housing finance in 2005–06 welcomed the greater stability that had resulted from mortgage securitization and its contribution to attracting increased financing, but did not highlight the risks that might arise from the expanded access to financing, irrespective of the laxity of loan conditions.** The IMF issued a number of SIPs on housing finance and incorporated the insights and conclusions from these SIPs into the respective Article IV reports. The topics addressed included the relationship between boom-bust cycles in housing and the changing role of the financial structure (2005 SIP, Chapter I), the role of mortgage securitization in enhancing the attractiveness of U.S. financial markets (2006 SIP, Chapter I), and recent developments in the U.S. subprime mortgage markets (2007 SIP, Chapter V).

10. **Before the subprime crisis erupted, the Fund's analysis pointed to the benefits of mortgage securitization**. These included reducing volatility in the availability of mortgage lending, improving the process of price formation (2005 SIP), and improving efficiency and helping to sustain foreign capital inflows by intermediating domestic demand and foreign supply at attractive risk-adjusted returns (2006 SIP). SIPs in both 2005 and 2006 reviewed the likelihood of a housing bust, and the 2006 SIP estimated that in 2005 national housing prices had been 15–20 percent above the range consistent with fundamentals. Nonetheless, in comparison to several other analysts at the time, the IMF's analysis was sanguine about the

[4] Selected quotations from Article IV reports and SIPs are provided in this section; a fuller sample is provided in the roman-numbered endnotes. The messages in these documents were consistent with the dialogue conducted with U.S. authorities, and with internal IMF documents on the U.S. economy.

risk of a housing bust, buttressing its conclusions with the empirical and econometric analysis developed in the SIPs.[5]

11. **One of the arguments provided against a housing bust was that speculative construction had declined since the 1980s, and that the build-up of inventories had remained near historic lows, unlike in previous boom-bust cycles** (2005 SIP, Chapter I). The 2005 SIP concluded that the shift to securitized mortgage finance had dampened the volatility of financing flows, that real activity and prices had converged across all regions of the United States, that pricing errors had diminished sharply, and that the risk of a sharp decline in housing prices had declined as a result of reductions in inventories and in the number of speculative starts.[i] The July 2005 Article IV report was reassured by these findings as well as from the analysis in the 2005 SIP that the securitization of mortgage debt had helped to contain systemic financial sector risks by allowing the diversification of real-estate exposures. It also noted that the robust housing market had led regulators to tighten their oversight over residential lending.[ii]

12. In June 2006, as housing prices were peaking, the 2006 SIP (Chapter I) acknowledged that a correction in the housing market could entail losses to lenders and MBS holders. **But the analysis drew comfort from the fact that exotic mortgages had emerged only relatively recently and were diversified in ownership[iii]** and that:

> "Exotic mortgages have only begun to spread as better data and more refined financial tools have become available to lenders, including complex behavioral models and sophisticated financial innovations that allow the tailoring of attendant risks to dedicated investor classes."

The same paper discussed:

> "… how financial innovation turned U.S. mortgages into an asset class with world-wide investor appeal. Mortgage securitization enabled households to tap foreign savings while satisfying foreign investors' demand for higher returns on safe investments. The paper also asks whether a bubble in the

[5] By mid-2006, concerns about the bursting of the housing bubble were widespread. For example: "The front pages of *The Wall Street Journal* and other newspapers, and the covers of *The New Yorker*, *The Economist,* and virtually every news magazine and newspaper in America have heralded the bursting of the 'housing bubble'" (Case and Shiller, 2006). Richebacher (2006c) noted that "There is no question that the U.S. housing bubble is finished. All remaining questions pertain solely to speed, depth, and duration of the economy's downturn." By 2004, the FBI was warning of a mortgage fraud "epidemic," and that "The booming mortgage market, fueled by low interest rates and soaring home values, has attracted unscrupulous professionals and criminal groups whose fraudulent activities could cause multibillion losses to financial institutions" (Frieden, 2004). By 2002, the real cost of owning a home relative to the cost of renting a home was already rising sharply (Baker, 2002). U.S. housing price changes are shown in Annex Figure A1.1.

> housing market has developed as easy global financing conditions helped bring U.S. mortgage rates to historic lows. The answer is 'probably not' …."

The SIP suggested that credit and risk allocation mechanisms in the U.S. housing market had remained relatively efficient, providing reassurance that the real estate market had likely entered merely a cyclical downswing.[iv]

13. **The surveillance documents, i.e., staff reports and accompanying SIPs, did not comment on or analyze the main drawbacks of the housing finance infrastructure that had developed or the risks that these entailed until after the crisis started.** For example, they did not analyze the growing share of housing loans being issued to risky borrowers with lax lending standards and little or no government supervision. Before 2007, they did not analyze subprime lending, even though subprime housing loans constituted the riskiest and fastest growing element of mortgage lending (Figures A1.2 & A1.3), and should have been examined when considering the prospect and possible repercussions of a housing market correction. Neither was there a discussion before 2007 of predatory lending practices targeted at low-income mortgage borrowers, despite the warnings and complaints from a growing number of officials and concerned actors as early as 2004 including the General Accounting Office (GAO), state officials, community groups, as well as in Congressional testimony.[6]

14. **Thus, through June 2006—as U.S. housing prices were peaking—the Article IV documents were not on the frontier of analysis warning about the dangers of a decline in housing prices.**[7] A more apt characterization of the Fund's housing analysis in these documents is one of allaying fears, albeit backed by empirical and econometric analysis. The July 2007 SIP (Chapter V) did provide an informative discussion of the origins of the subprime mortgage market and the factors that prompted the subprime crisis, but *after* the subprime mortgage crisis had erupted.

15. **Many analysts at the time were warning that trends in housing finance were unsustainable from both stock and flow perspectives (Annex 2A).** They observed that household debt had grown rapidly, driven by mortgage debt (Figure A1.4), and that household finances would come under increased stress if house prices stopped increasing.

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[6] For example, GAO (2004) noted that "The significant amount of subprime lending among holding company subsidiaries, combined with recent large settlements in cases involving allegations against such subsidiaries, suggests a need for additional scrutiny and monitoring of these entities." Appelbaum (2009) provides an informative discussion of this issue.

[7] The IMF's April 2006 *World Economic Outlook* adopted a more concerned tone than the bilateral surveillance documents. It considered the future course of the housing market as "a key uncertainty for the U.S. economy" and noted that interest-only and negative amortization loans had risen to more than 40 percent of mortgage loans for purchase in 2005 as affordability declined. The *WEO* was also concerned about the impact of a housing slowdown on consumption, but less so about its impact on the financial sector (citing the April 2006 *Global Financial Stability Report*).

Subprime mortgages would not remain viable if house prices stopped increasing, since refinancing would no longer be possible and borrowers' incomes were too low to meet debt servicing requirements. Moreover, servicing requirements were bound to increase in an environment of rising interest rates, and given the growing proportion of mortgages with adjustable and teaser interest rates. Yet there was little in the Fund's surveillance documents highlighting concerns from rising household debt, nor from households' dependence on ever-rising housing prices to refinance their loans.

B. Subprime Securitization and Leverage

> *The bursting of the housing bubble…is going to lead to broader systemic banking problems. It is going to start with the subprime lenders…and it is going to be transmitted to other banks and financial institutions all over the country…it is still the banking system that is directly or indirectly holding this risk.* (Roubini, 2006 presentation to the IMF)

16. **The Fund's surveillance of the U.S. economy repeatedly highlighted the propensity of securitization to disperse risk, and was reassured by this attribute.** Consistent with the resulting perception of securitization as beneficial to stability, the IMF downplayed the impact of the subprime crisis on financial institutions. In 2007, the ongoing stress from the subprime crisis prompted it to increase its focus on the financial sector in the surveillance documents; two SIP chapters in that year were devoted wholly to financial sector issues under the overall heading of "Financial Innovation," and the Article IV report gave a prominent role to the financial sector. But while these reports provided pertinent information and analysis, they did not highlight key vulnerabilities that proved critical in the evolution of the crisis. Specifically, they did not detect that banks had acquired heavy exposure to subprime mortgages by placing these in structured investment vehicles (SIVs) or other ostensibly off-balance sheet conduits, or that the combination of growing leverage and securitization of subprime mortgages was raising banks' exposure to subprime mortgages. (Much of the off-balance sheet exposure would in fact be brought back on balance sheet once the conduits were drained of liquidity, as was occurring in 2007.) Further, the 2007 SIP (Chapter V) reported market participants' estimates of bank losses from subprime exposure, without scrutinizing their assumptions. These estimates turned out to be much lower than the figures published in the Spring 2008 *GFSR*.[v]

17. **The analysis thus did not capture most of the risks from the subprime securitization model that had evolved:**

- Loan quality deteriorated as nonbank mortgage originators had little incentive to be concerned about the creditworthiness of borrowers.

- The packaging of subprime mortgage-backed securities into structured products, such as investment grade CDOs, greatly augmented the financing available for subprime

and Alt-A mortgages[8] as ever-more complex instruments were devised to attract institutional and global investors into this risky market.

- The increase in effective leverage, including through the use of off-balance sheet conduits, enabled banks to retain significant exposure on their—or their conduits'—books. Their exposure to ultimately nonperforming subprime mortgages was thus much higher than it would have been without the combination of securitized finance and higher leverage (Annex IB).

- The complexity of the structured products appears to have magnified the collapse of the prices for a wider class of securitized mortgage-based assets. The opacity of these products made it difficult for investors to distinguish between different classes of assets, and contributed to the wholesale withdrawal of liquidity from securitized assets in 2007–08.

- Much of the risk that was dispersed was to counterparties whose insolvency or susceptibility to a liquidity crisis would directly impact the banks.

18. **Through the 2007 Article IV cycle, the IMF thus remained sanguine about the repercussions of the subprime crisis for financial institutions, citing the propensity to disperse risk via securitization.** The following quote from the July 2007 Article IV staff report is illustrative.[vi]

> "Rising subprime delinquencies led to a jump in spreads on higher-risk mortgage-backed securities, but there has yet been little contagion outside of the near prime (Alt-A) segment of the mortgage market, reflecting the wide dispersion of risk and concentration of difficulties in specialist subprime originators, many of which have failed."

19. **The positive view about securitization in the Article IV context contrasted with less sanguine opinions that were being expressed within the Fund at the time** in comments on the IMF's draft *Global Financial Stability Reports* and in a seminar organized by the IMF Institute.[9] This raises the question of why the Article IV was so sanguine about

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[8] Alt-A mortgages are defined as lacking full loan documentation, and considered riskier than prime mortgages but less risky than subprime mortgages.

[9] For example, in the following statement from an Executive Board member commenting on the April 2006 *GFSR*: "There may be other reasons to believe that credit risk transfers may, in practice, transfer less risk away from the banking sector than is widely believed. First, to the extent that losses do materialize on the risks for which protection is purchased, the originating bank may face reputational risk, or even the obligation to absorb losses beyond those specified in the CRT contracts. Second, credit risk which appears to have left the banking system may in fact turn out not to have done so. For example, banks may find they have counterparty exposures to the same hedge funds that are exposed to losses on bank-originated collateralized debt obligations." See also

(continued…)

securitization risks, particularly given the lack of information about how rising global exposure to subprime MBS was being accumulated, or about the capacity of the investors in these assets to manage their exposures.

C. Financial Sector Soundness and Risk[10]

> *If banks also face credit losses and there is uncertainty about where those losses are located, only the very few unimpeachable banks will receive the supply of liquidity fleeing other markets. If these banks also lose confidence in their liquidity-short brethren, the inter-bank market could freeze up, and one could well have a full blown liquidity crisis.* (Rajan, 2005a)

> *There could be a tsunami of credit evolving into a perfect storm … When positions unravel liquidity evaporates quickly and systemic issues impact innocent bystanders.* (Schinasi, drawing from his 2006 book)

20. **Through the 2007 Article IV cycle, the IMF remained confident about the soundness of the U.S. financial sector.** The following excerpts from the 2007 Article IV report are illustrative:

> "Core commercial and investment banks are in a sound financial position, and systemic risks appear low. Profitability and capital adequacy of the banking system are high by international standards. … despite a recent uptick following subprime difficulties, market measures of default risk have remained benign."

> "… the income of institutions at the core of the financial system, the commercial and investment banks, increasingly derives from bundling and servicing securitized assets for investors—asset-backed securities and collateralized debt/loan obligations—rather than from holding loans. The system has thus evolved to yield: (i) a profitable and well-capitalized core relatively protected from credit risks; (ii) an innovative and lightly-regulated periphery, including specialized institutions that originate loans and a multitude of hedge funds that support market liquidity and price discovery; and (iii) the transfer and diversification of credit risk via a wider range of securitized assets and credit derivatives. Against this rapidly changing

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the cautionary note issued by the IMF Institute in 2005 summarizing the views of seminar participants (Annex 2C).

[10] The title and content of this section have been adapted vis-à-vis Annex 1C to reflect the nature of the discussion of financial soundness in the surveillance documents, and the lack of a narrative on liquidity concerns in the staff reports prior to 2008.

financing landscape, U.S. markets have remained globally pre-eminent and robust to a range of shocks."

21. **The latter quote is worth examining more closely, because it illustrates how the Article IV team appeared not to have noticed the impending risks:**

- The report refers to *"a profitable and well-capitalized core relatively protected from credit risks,"* but (i) the core's capital ratios, as measured, were elevated via the expanding use of off-balance sheet entities that were set up precisely to reduce or dispense with capital requirements; and (ii) the core was not protected from credit risks, since the banks were either bound, felt obligated, or were unsure of the consequences of letting go of their off-balance sheet exposures once these ran into difficulty.

- The so-called *"innovative and lightly-regulated periphery"* was a drain on liquidity and did not *"support market liquidity"* once doubts about the viability of the underlying assets backing the MBS became apparent.

- The purported *"transfer and diversification of credit risk via a wider range of securitized assets and credit derivatives"* turned out to be largely illusory, since it did not take account of the higher effective leverage that banks were utilizing, nor of the capacity of the buyers of those assets to manage the risks they were assuming, nor of the repercussions for systemic liquidity once counterparties to the credit derivative transactions were pressured.

22. **IMF confidence in the strength of the financial system reflected not only faith in the robustness of the securitization model but also in the Fund's analysis of soundness of large and complex banking groups (LCBGs).**[11] Although the U.S. authorities had turned down proposals from the IMF to conduct a Financial Sector Assessment Program (FSAP) during the evaluation period, SIPs in 2004 (Chapter VI) and 2006 (Chapter V) and a brief update in 2007 addressed the issue of financial soundness within LCBGs. The 2004 analysis suggested that LCBGs' business strategies had not translated into improved individual risk profiles over the previous 15 years. It found that the average distance-to-default ratio (DD) had declined slightly for the 16 U.S.-based LCBGs over the period 1989–2003, that financial soundness indicators had on average been lower for the more complex LCBGs than for their less complex peers, and that the system DDs of the insurance and investment banking sectors

[11] The 20 LCBGs accounted for about two-thirds of bank holding companies' total assets, half of their net income, three-quarters of their securities broker-dealer assets, and virtually all their derivatives activity in 2005.

had declined between 1994–2003 (though all sectors were showing improvements beginning in 2003).[12]

23. **A similar analysis reported in the June 2006 SIP generated more upbeat results, however, suggesting that the LCBGs' financial soundness in 2004–05 had been at its strongest level in a decade,** that there were no material differences in soundness among LCBGs associated with their real estate exposure, and that there was a reduced likelihood of a systemic shock.[vii] Notwithstanding concerns expressed about payment resets on adjustable rate mortgages, the 2007 SIP (Chapter IV) also indicated that the distance-to-default indicator had improved across *each* of the most important bank holding companies, investment banks, and government-sponsored entities in the first half of 2007 compared to 2000, in many cases significantly. The figure was aptly titled: "On one market-based measure, soundness continues to improve at the most important core institutions."

24. **In retrospect, the Fund missed an opportunity to initiate a discussion with the authorities about the risk stemming from escalating bank exposures to subprime mortgage-backed securities.** The analysis in the 2006 SIP of LCBG sensitivity to a real estate shock found that real estate credit risk could materially dent profitability but not capital,[13] but it focused on retained loan books alone, setting aside MBS portfolios (whether on- or off-balance sheet), thus assuming away what may have been the riskiest segment of the real estate exposure.[14] To start a discussion on risks with the U.S. authorities, staff could have requested data on such exposures and their possible repercussions. Moreover, the analysis could have stressed that the assumptions needed to conduct the sensitivity tests may have limited the accuracy of the estimates.[15]

25. **The discussion of risk within LCBGs did not highlight the risks that arose from the interconnectedness of the LCBGs.** In particular, it did not assess how the growing use of credit default swaps on mortgage-backed structured products might affect counterparty

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[12] The distance-to-default indicator was defined as standard deviations from insolvency.

[13] The stress scenario indicated declines of about 1 percentage point for the average capital adequacy ratio for 2006–08, from a starting point of more than 11 percent.

[14] MBS portfolios were not featured in the sensitivity analysis because it was assumed they were liquid and could be sold at face value if necessary. Incorporating MBS portfolios into the risk analysis would have required imputing their market value at a future date, which was considered too speculative an exercise.

[15] For example, the IMF Monetary and Financial Systems Department conducted a parallel internal exercise in early 2006 (using a more generalized stress test that produced somewhat harsher results) but couched it as follows: "It is important to note that these estimates are crude and partial. They do not account for the effects of changing terms on loans and higher cost of funds under a disruptive scenario; do not include credit risk on other loan categories, such as commercial and industrial loans; and do not capture the effects of credit risk transfer activity, which is now widespread, especially at LCBGs. The estimates also do not include potential losses due to market risk. The development of more accurate estimates would require close dialogue with the U.S. regulatory agencies."

risk.[16] It did not probe liquidity risks in depth, and it ignored those that arose from the securitization model itself—whereby the entities that invested in non-transparent mortgage-backed structured products were drained of liquidity once defaults on subprime mortgages escalated.

26. **More fundamentally, the surveillance documents did not highlight the risks arising from the dominance of a shadow banking system** that relied primarily on short-term, increasingly overnight, repo funding but was subject to little meaningful regulation and had assets surpassing those of the commercial banking system by early 2007. The vulnerabilities underlying the financial crisis were largely created within the shadow system. They ranged from poorly underwritten mortgage loans originated by nonbank or bank-affiliated lenders, to the structured finance innovations that enabled a wider pool of U.S. and global investors to enter the securitization market, to the evaporation of liquidity in a wide segment of asset-backed securities that triggered a systemic run on the financial system.

D. Private Incentives, Innovation, and Risk

> *Ratings agencies would have incentives to engage in the financial equivalent of 'grade inflation' by supplying favorable ratings to banks seeking to lower their capital requirements … In short, if the primary constituency for new ratings is banks for regulatory purposes rather than investors, standards are likely to deteriorate.* (Shadow Financial Regulatory Committee, 2000)
>
> *There is no return without risk.* (Rajan, 2005b)

27. **The July 2007 SIP (Chapter IV) raised a number of concerns with respect to the securitization model, deterioration in underwriting and credit standards, and the incentive conflicts faced by the credit rating agencies and by other agents in the securitization chain.**[viii] These concerns were also noted in the July 2007 Article IV staff report under the title of "Ensuring a Robust Financial System," including concerns relating to systemic risks from tail events, managing counterparty risk, and potential conflicts of interest of the credit rating agencies.

28. **But most of these concerns were expressed too late to influence policy.** By mid-2007 liquidity had already been largely drained from nonbank originators of subprime loans and a market-driven collapse of subprime mortgage origination was well underway.[17] It

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[16] Lack of firm-specific data would have constrained quantitative analysis but not a qualitative discussion of risk.

[17] Origination of subprime/Alt-A mortgages fell from $1 trillion in 2006 to $466 billion in 2007 (concentrated in the first half of 2007) and $64 billion in 2008 (Figure A1.2 and Committee on Capital Markets Regulation, 2009).

was therefore too late to impose tighter standards for mortgage origination or to subject the securitization process to tighter scrutiny. By contrast, the 2006 Article IV report had not reviewed these issues, and the 2006 SIP (Chapter V) had judged the rating agencies to be "uniquely positioned to assess a wide range of structured transactions." This misread not only how credit rating agencies operated but also the complexity of structured transactions—as had been discussed before 2006 both within and outside the IMF (Annex 2C).

29. **The 2007 surveillance documents also raised concerns about systemic risks from tail events and from managing counterparty risks, but these were undermined by the underestimation of bank losses from subprime exposure, and by the parallel statements about the health of the financial sector.** For example, under the title of "Broad Policy Implications," the 2007 SIP (Chapter IV) played down the risks it had cited earlier.[ix] Moreover, the counterparty risk about which most concern was expressed was the exposure of the core to hedge funds, which did not prove critical in the crisis evolution. By contrast, counterparty risks from exposure to OTC derivatives were not mentioned as a source of concern.

30. **Even when the market for subprime securities was collapsing, the surveillance documents did not adequately assess the risks associated with such securities.** The 2007 SIP (Chapter III) and the Article IV report cast financial innovation in a positive light, not only with respect to dispersing risk but also as a means to attract foreign capital:

> "In particular, while deep, liquid, and innovative U.S. fixed income markets should continue to attract foreign capital, they will have to carry on innovating more rapidly than other financial centers to retain a relative advantage."

> "Financial innovation and stability have underpinned U.S. economic success and funding of the current account deficit. The system has been highly resilient, including to recent difficulties in the subprime mortgage market. Innovation has helped disperse risk, and has been instrumental in attracting capital inflows, with foreigners increasingly buying U.S. private sector debt securities."

31. **The surveillance documents also did not assess whether the structure of compensation within U.S. financial institutions may be contributing to excessive risk taking** (as suggested by Rajan 2005a and b, Annex 2D).

E. Regulation of the Financial Sector

> *While traders on futures exchanges must post margin and have their positions marked to market on at least a daily basis, no such requirements exist in the OTC derivatives market. … This unlimited borrowing in the OTC derivatives market – like the unlimited borrowing on securities that contributed to the*

> *Great Depression – may pose grave dangers to our economy.* (Born, CFTC Chairperson, 1998)

32. **Confidence in the health of the financial system appears to have guided the IMF's discussion of financial sector regulation.** Indeed, the IMF was not well positioned to criticize the regulatory framework because it had not highlighted several of the risks and regulatory anomalies that were embedded in the financial system. The 2005 Article IV report stated: that "The U.S. financial sector remains resilient and well regulated." The 2006 SIP discussed banking innovation, LCBG risk, and market-based surveillance and concluded (in Chapter V) that despite emerging challenges the U.S. banking system was in good health and the focus of regulators was appropriate.[x]

33. **The IMF was supportive of the regulatory philosophy in the United States that spurred the growth of the unregulated segment of the financial system.** It had expressed support for a framework that would focus supervisory attention on the core financial institutions while trusting market discipline to ensure that activity in the shadow banking system would spur innovation and safeguard financial stability. For example, the 2007 SIP (Chapter IV) noted that:

> "The key to innovation has been that market forces have been allowed to operate. The regulatory philosophy, from which our core-periphery distinction flows, has emphasized selectivity in the application of safety-and-soundness oversight—and in information gathering—with the Fed serving a singular role as guardian against more *dirigiste* temptations. A growing array of financial institutions has been made to function without the props and constraints of prudential norms and the counsel and intrusion of examiners, and many have become laboratories of innovation. Creative energy has flowed, moreover, from the interface between the core and the periphery, spurred by competition and cooperation."

34. **The surveillance documents did not point to the risks stemming from a parallel under-regulated financial system** that was leading banks to channel their activities towards it through affiliates and conduits, driven by the higher profits that would flow from the lower capital needed to operate in this sphere. Nor did they argue for measures to counteract such regulatory arbitrage.[xi]

35. **The surveillance documents did not criticize the SEC's 2004 decision to provide "capital relief" to the major investment banks in exchange for their agreement to submit to consolidated supervision.** Even though the SEC clearly lacked the manpower needed to credibly supervise the major investment banks or effectively oversee their risk management processes, the 2004 SIP stated that it was too early to assess whether the SEC would apply the requisite degree of oversight. The surveillance documents in subsequent years did not comment on how consolidated supervision by the SEC was proceeding, or on

the fact that leverage in the investment banks was rising steeply (to an average 31:1 in 2007).[18] Though the IMF was sympathetic to the argument that investment banks needed capital relief to level the playing field with commercial banks, it did not address concerns that the actions of the commercial banks were leading to excessive leverage via the use of SIVs and other conduits. Had it done so, it might have concluded that the more prudent way to level the playing field would have been to tighten the rules allowing regulatory capital arbitrage for commercial banks, rather than to loosen the capital requirements for investment banks. The July 2007 SIP (Chapter IV) did raise the issue of oversight of "consolidated supervised entities" (CSEs), suggesting that since the big five investment banking groups were of systemic importance and owned insured depositories, "the optimality of situating the CSE program at the SEC may form a reasonable question." But the Fund had still offered no assessment of the SEC's supervisory capacity or performance since the 2004 decision. Such an assessment could have lent credence to the Fund's recommendation to shift supervisory authority over investment banks to the Federal Reserve.

36. **The surveillance documents provided no in-depth analysis during 2002–08 of how credit derivatives could exacerbate counterparty and liquidity risk in the event of a major or systemic shock.** The IMF had not weighed in on the earlier debate within U.S. policy circles on the costs and benefits of the introduction, in 1998–99, of tighter regulation of OTC derivatives. In 2001, following the enactment of legislation that prevented the Commodity Futures Trading Commission from regulating OTC derivatives, an informative paragraph in the Article IV report had raised important concerns about the risks that derivatives could pose if the financial system were to come under stress—including the fact that banks' actual credit exposures could significantly exceed their reported exposures.[xii] Subsequent U.S. Article IV reports did not pursue this theme, however, even though trading in credit derivatives was growing exponentially in the decade before the crisis. The 2004 SIP did note that liquidity issues in the derivatives market were being studied by the Federal Reserve and would probably influence policy responses in potential episodes of market instability, but neither this nor subsequent reports elaborated on which issues should be/or were of most concern.

37. **The IMF did not analyze the implications when U.S. regulators in effect reduced the capital requirements for bank investments in privately issued mortgage-backed securities that the major credit rating agencies rated AA or higher.** This lowering of capital requirements opened the floodgates to private-label residential MBS from 2002 onwards.[19]

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[18] Prior to the 2004 ruling, leverage in the investment banks had been limited to 12:1.

[19] Prior to this ruling, only securities guaranteed by Fannie Mae or Freddie Mac, which maintained more stringent loan standards for issuing guarantees, were eligible for the lower capital requirements—Annex 1E contains a fuller description.

38. **To summarize, before the crisis started, the IMF did not emphasize the need for stronger capital and liquidity cushions for the major financial institutions.** Nor did it call for tightening leverage requirements, or even argue against their de facto relaxation, or draw attention to the need for management of counterparty credit risk, including by requiring greater transparency of OTC derivatives trading.

F. Monetary Policy

> *... it is important to monitor asset prices and to try to avoid the emergence of unsustainable, pronounced movements in asset prices which may subsequently lead to sharp recessions. Obviously, there cannot be a mechanical link between asset prices and monetary policy instruments. Central banks, however, should take asset price movements into account, especially if large swings in asset prices imply long-term risks to financial and economic stability.* (Papademos, ECB Vice President, 2004)

39. **For much of the first half of the decade, the U.S. federal funds rate was low by historical standards.**[20] The rate was reduced aggressively in 2000–02 in response to a slowing economy, mild 2001 recession, and weak recovery. Further easing in 2003 and the maintenance of low or negative real policy interest rates for an extended period reflected the authorities' concerns about the risk of deflation. But the 2000–06 period also witnessed the fastest increase in housing prices recorded in recent U.S. history (Figure A1.1), and was accompanied by a massive increase in household borrowing (Figure A1.4) and an increase in the U.S. current account deficit to 6 percent of GDP in 2005–06 (Figure 1).

40. **It is not the purpose of this paper to diagnose how U.S. monetary policy should have balanced concerns about recession or deflation with its impact on financial stability or the current account deficit.** But it seems reasonable to assert that the impact of monetary policy on the housing market, and borrowing by households and financial institutions should at least have entered into the dialogue between the IMF and the authorities, given the ongoing housing boom, accumulation of household debt and bank leverage, and widening current account deficit.

41. **In this context, it is worth noting that a considerable body of analysis, both within and outside the IMF, had advocated the need for monetary policy to take asset price movements into account:**

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[20] The federal funds rate is the interest rate for overnight inter-bank lending and is targeted by the Fed. The rate was reduced from 6.5 percent in May 2000 to 1 percent by June 2003. It began to be raised gradually (in intervals of 0.25 percent starting in June 2004), and reached a high of 5.25 percent in June 2006. The real federal funds rate was negative from October 2002 through April 2005.

- The Spring 2000 *WEO* had concluded that monetary policy may have a role to play in mitigating asset bubbles.

- The IMF's Financial Counselor, in the context of an internal exercise (April 2004 World Economic and Market Developments discussion), had warned that "prolonged negative real short-term interest rates" and rising liquidity were fueling asset price appreciation to "an excessive level which might make the subsequent adjustment disruptive." Successive *GFSRs* in 2004–05 had reiterated this point.

- Senior officials of the European Central Bank and Bank for International Settlements repeatedly stressed the need for monetary policy to take asset price movements into account.[21]

42. **But the IMF's bilateral surveillance essentially endorsed the thrust of U.S. monetary policy, and did not broaden the discussion to explore the impact of the policy on asset prices or financial stability.** SIPs on monetary policy were produced in 2001, 2002, 2004, and 2005, but none of them discussed the repercussions of monetary policy for the housing market or financial stability. Although Article IV reports would occasionally suggest the need for easing (as in 2003, when the federal funds rate had already been reduced to 1 percent) or tightening (as in 2005), their overall thrust was supportive of the Fed's monetary stance.[xiii]

43. **In the dialogue between the Fed and the IMF on monetary policy, the Fed emphasized its risk management approach**, which it pursued in the context of its formal mandate of maintaining full employment and low inflation. In particular, the Fed placed weight on stimulating output growth in a recession and on containing inflation during a sustainable expansion.

44. **In retrospect, IMF staff could have used the Fed's approach to broaden the concept of risk management to include factors such as financial stability, asset prices, or the impact of accommodative monetary policy on the current account deficit.** Staff could also have discussed the origins of concerns about deflation, in particular to what extent Japan's experience with deflation *following* a collapse of its housing prices (which was of concern to U.S. policy makers) was applicable to the U.S. situation, where both domestic demand and housing prices were rising, the latter by double digits starting in 2003.

45. **Even if such a discussion did not lead to a re-evaluation of the monetary stance, it could have led to a fruitful discussion on the use of financial regulation.** For example,

[21] Annex 2 discusses analytical work by BIS staff, which had pointed to the risk that monetary policy focused only on short-term inflation could exacerbate asset boom and bust cycles with damaging consequences for the economy. This work was incorporated in successive BIS annual reports.

the U.S. pursuit of stimulatory monetary policy and the parallel increase that was taking place in housing prices and household debt should have signaled the need to reinvigorate banking regulation and supervision, and in particular to take more urgent action to strengthen lending standards for housing. Even if interest rates were to be kept low to combat a perceived risk of deflation, consideration could have been given to adjusting reserve requirements or margin requirements for stocks, futures, or options as a way to counter the exuberance in asset markets.

46. **Instead, the IMF staff directed its analytical focus towards the benefits of inflation targeting.** A 2005 SIP, "Should the Fed Adopt an Explicit Inflation Objective?" basically concluded that it should. This view was reiterated in the 2006 Article IV report in the context of helping to anchor inflation expectations.

G. Global Imbalances and Capital Flows

> *Note that none of this [a credit crunch and reversal of household spending] requires foreign private investors or foreign central banks to boycott U.S. dollar-denominated assets or otherwise dump existing holdings of U.S. dollar–denominated assets, which is the prevailing scare story circulated in discussions of the resolution of U.S. financial imbalances.* (Parenteau, 2006)

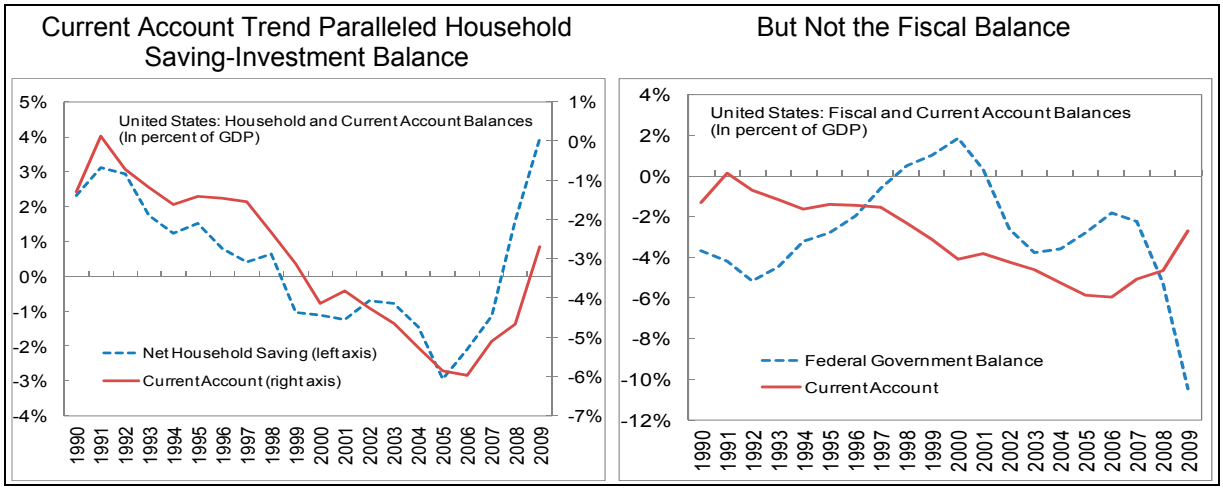
47. **The IMF was at the forefront of the global effort in the middle of the decade to reduce current account imbalances.** It conveyed its views through bilateral and multilateral surveillance and the newly created multilateral consultation vehicle. The thrust of its strategy to address global imbalances was to promote fiscal consolidation in the United States, structural reforms in the euro area, financial sector reform in Japan and emerging Asia, and more exchange rate flexibility in emerging Asia. In this paper the evaluation of this effort focuses only on the bilateral advice that the Fund provided to the United States on the objective of reducing the current account deficit, and on the analysis of risks from the large capital inflows that were the counterpart to this deficit.

48. **The U.S. current account deficit nearly doubled as a share of GDP between 1999 and 2006**, rising from 3.2 percent to 6 percent, before declining gradually in 2007–08 and more sharply in 2009. Throughout the period of rising current account deficits, IMF advice focused on the need to tackle the fiscal deficit and initiate entitlement reforms. This advice was appropriate from the perspective of improving public debt sustainability, but it was not sufficient to tackle the current account deficit.[22] Before the crisis, the deterioration in the current account balance closely paralleled the decline in the saving-investment balance of

[22] This discussion draws on an internal IMF presentation, including to the Western Hemisphere Department.

households, whereas the fiscal balance moved from large deficits to surplus and back with little impact on the current account deficit (Figure 1).[23]

Figure 1. Trends in U.S. Current Account, Household Saving/Investment Balance, and Fiscal Balance, 1990–2009



Source: Bakker and Meier, "Asset Price Booms, Monetary Policy, and Global Imbalances," IMF Mimeo, 2006, and U.S. Bureau of Economic Analysis.

49. Moreover, **household debt was larger and growing faster than public debt, driven by a level of borrowing that could not be sustained from either a stock or a flow perspective**. To tackle the rapid expansion of household debt, the IMF might have recommended stronger prudential regulation for the financial sector, in particular a tightening of mortgage lending standards. Subsidies for borrowing for housing could have been phased out, or eligibility criteria for mortgage subsidies could have been tightened. And the repercussions of the accommodative monetary policy in the first half of the decade for private demand, household borrowing, and hence the current account deficit could have been analyzed. As discussed above, the Fund's bilateral surveillance advocated none of these approaches.

50. **The IMF's dominant concern was the risk of a disorderly decline of the U.S. dollar stemming from a sudden slowdown or reversal of capital inflows.** The analysis in the surveillance documents focused on how the United States could maintain easy access to such capital inflows. It did not assess the role of capital inflows in lowering long-term interest rates or facilitating the housing and securitization booms. As discussed above, financial innovation was viewed as important to encourage continued financing of the current account deficit and diminish the risk of a disorderly dollar decline.

[23] Subsequent trends confirm the relative importance of the household saving-investment balance in determining the current account balance: notwithstanding a substantial increase in the fiscal deficit, the U.S. current account deficit fell sharply in 2009, reflecting higher net saving by households.

H. Surveillance in 2008[24]

51. **The IMF's views changed significantly in 2008 as the crisis was escalating.** The July 2008 Article IV report included a section on "Balance Sheet Strains" with separate discussions of "Housing and Households" and "Financial Intermediaries." It drew a number of appropriate lessons from the financial crisis, in the process taking positions that differed considerably from those of past surveillance:

- **It acknowledged that there had been "an unsustainable run up" in house prices.**

- **It expressed concern about household balance sheets:** "With housing assets and mortgage debt at near-record ratios to disposable income, household balance sheets are particularly exposed to house-price declines."

- **It pinned much of the blame on regulatory shortfalls:** "Financial supervision and regulation, more than monetary policy, failed to rein in lending excesses, the reversal of which is reverberating around the world. … a fragmented regulatory system missed that the financial system was becoming over-leveraged, while outdated rules failed to constrain imprudent mortgage lending."

- **It recognized the role of leverage and off-balance-sheet exposure and the vulnerability of the large banks:** "The shock to U.S. financial markets hit an overleveraged system dependent on market liquidity. The asset boom from mid-2004 to mid-2007 came mainly from lightly capitalized investment banks and off-balance-sheet affiliates of commercial banks (conduits and special investment vehicles). … Reflecting their high leverage and reliance on wholesale funding, pressures have been heaviest on the largest banks."

52. **The analysis became much more concerned than previously about banking stability and systemic risk,** as evidenced by the Article IV report, SIPs, as well as internal documents. The analysis in the 2008 SIP (Chapter VI) found that links between financial institutions rose as financial risks intensified, implying that systemic risk rose by more than those of individual institutions. Internal analysis by financial experts in the Monetary and Capital Markets Department (MCM) found that banking stability had deteriorated considerably, that Lehman Brothers would be most adversely impacted should Bear Stearns

[24] This brief overview of surveillance in 2008 is included primarily to illustrate how the IMF's views changed relative to previous surveillance exercises for the United States.

default, that a default by Lehman could have severe negative spillovers on other institutions, and that the probability of a systemic default was non-trivial under such a scenario.[25]

53. **Such concerns led the July 2008 Article IV report to countenance longer-term official support for financial institutions if needed:**

> "Given the risks, the government should be prepared to widen support for housing and, if serious dislocations reappear, in financial markets. … If major systemic financial disruptions recur, the government could support market stability by significantly extending the term of asset swaps, as has been done with Treasury backing in the United Kingdom."

54. **The Article IV report also acknowledged that monetary policy may have a role to play in preventing asset bubbles:**

> "In the wake of the housing bubble, the role of asset prices in monetary policy bears reexamination. … the fact of two asset-price busts in this decade with prolonged macroeconomic consequences underlines the dangers of inaction. Thus, given the potential for asset booms to turn into economic busts and lead to a rapid loosening of policy, further consideration should be given to allowing monetary—and regulatory—policy to lean against the wind, i.e., tightening policy by more than implied by just the short-term impact on activity and inflation."

55. **Finally, U.S. growth projections in 2008 were well below consensus projections prevailing at the time** (albeit too optimistic in the wake of Lehman's collapse and the free fall of GDP in subsequent quarters), indicating that staff concerns about financial stability had impacted its growth outlook more sharply than most outside forecasters. Nevertheless, the Article IV report did consider that the next move in interest rates, if any, should be an upward adjustment, indicating it was more concerned about inflation than about recession or a systemic financial crisis as of mid-2008: "Monetary policy should stay on hold for now, while being prepared to raise rates as recovery becomes established."

IV. Why Did U.S. Bilateral Surveillance Fail?

56. **U.S. bilateral surveillance did not recognize most of the vulnerabilities and risks which led to the U.S. financial crisis.** Specifically, it did not highlight in advance the extent of risk to financial institutions of a housing collapse; the risks associated with the packaging of subprime mortgage-backed securities into structured products; the role of credit rating agencies in certifying the investment quality of such products; the use of off-balance sheet conduits to minimize capital requirements; the use of excessive leverage; the reliance on

[25] This note was prepared just before the takeover of Bear Stearns by JP Morgan Chase.

short-term funding in the shadow banking system; or the build-up of counterparty risk from the growing use of OTC derivatives. The IMF was sanguine about the propensity of securitization to disperse risk in such an environment—and hence about the soundness of the core financial institutions. Surveillance did not address the problem of misaligned incentives in the financial sector that drove private agents to assume excessive risk (until mid-2007), and it did not assess the regulatory decisions that facilitated this drive. The IMF was thus not well positioned to take a critical view of the U.S. financial regulatory framework, nor to recommend fundamentally stronger financial sector supervision. Surveillance documents did not discuss whether the monetary policy stance through the middle of the decade may have contributed to exuberance in housing prices, or encouraged the build-up of household debt and leverage in the financial sector. Nor did they express concern that large capital inflows might be magnifying asset appreciation and deepening vulnerabilities in the under-regulated U.S. financial markets.

57. **Bilateral surveillance thus did not warn U.S. authorities about vulnerabilities sufficiently in advance to take corrective actions.** Nor did it alert the IMF's wider membership of risks originating from the United States. Moreover, given the importance of the U.S. economy and financial sector, the analysis and thinking underlying U.S. bilateral surveillance had a significant influence on the outlook adopted by the *WEO* and *GFSR* though the evaluation period.

58. **Why was U.S. bilateral surveillance not more effective in identifying weaknesses and risks?** A number of possibilities are considered below under the headings of analytical weaknesses, organizational and governance impediments, and self-censorship. For expositional ease, these factors are presented separately, although they are largely interrelated.

A. Analytical Weaknesses

59. **The analysis was overly enthusiastic about financial innovation and insufficiently concerned about resulting risks.** It placed too much faith in the sophistication and resiliency of the U.S. financial system, and the role of market discipline in containing risks. As such, it implicitly drew comfort from the efficient markets hypothesis, notwithstanding longstanding concerns in the literature about financial market failures arising from the presence of moral hazard, asymmetric information, and uncertainty. Such faith may have been bolstered by the "Great Moderation" of economic performance over the previous two decades, and by tacit acceptance of what Aizenman (2009) terms the "market-stabilizing private regulatory forces" doctrine, whereby deepening global financial integration and risk diversification were thought to reduce systemic risk. The lessons of the Asian crisis were discounted, as the Fund appeared more confident about the governance of U.S. financial institutions and about U.S. regulatory capabilities. Lessons from history were also disregarded, such as Kindleberger's (1978) chronicling of the nature of past financial crises, or Minsky's (1982) argument that stability breeds instability and deeper recessions by

encouraging more risk taking and leverage. Many of the analysts who were most prescient about the crisis during its run-up were implicitly skeptical of the efficient markets hypothesis, and more concerned about financial market fragility—a trait not evident in the Fund's U.S. surveillance documents.

60. **Bilateral surveillance was not adept at linking macro-financial or intra-financial risks.** For example, easy credit conditions before the crisis did not prompt calls for more vigilant prudential regulation. Had household balance sheets been probed, their fragility might have become apparent, and the reliance of household borrowing and spending on unrealistic housing price assumptions would have raised more concern. Such concern would have escalated as policy interest rates rose and housing price increases slowed, particularly if the growing proportion of mortgage originations accruing to high risk borrowers had been assessed (Figure A1.3). Concerns relating to the securitization model and incentive conflicts, raised by the surveillance documents in 2007, did not lead to a concurrent reassessment of risk in the financial system. There was insufficient questioning about the incentives facing private agents, the implications for herding behavior and risk accumulation, and why these factors might accentuate the need for tighter regulation and supervision, and more stringent capital and liquidity requirements.[26]

61. **Intellectual Capture and Groupthink.** The surveillance teams and Management appear to have held very similar views to the U.S. authorities in their approach to financial regulation and monetary policy (Box 2). The staff appeared over-confident in the robustness of the regulatory framework and the capability of U.S. authorities. Given the authorities', and in particular the Fed's, greater reservoir of economists familiar with the U.S. economy and better access to U.S. banking data, it was unclear to some IMF staff how they could add value to the policy dialogue. As a corollary, some staff felt the resources and organizational effort required in challenging the Fed's analysis would be prohibitive. Moreover, Management indicated that given limited financial sector expertise, the most experienced financial sector staff would be better deployed where their expertise could be most influential in impacting policy.

Box 2. Excerpts from 2005 Article IV Statement on Impact of Past Fund Advice

"U.S. officials generally emphasized that there is a broad consensus with the Fund on the fundamental factors underlying growth in the United States. Chief among these are strong property rights, sound institutions—including world class financial regulators—the flexibility of U.S. factor markets, low taxation, the relatively small size of government, and a high degree of transparency of economic policy decisions."

"The Fund has been broadly supportive of the Federal Reserve's conduct of monetary policy in recent years. In July 2004, the Board commended the Fed for its earlier forceful response to signs of deflationary pressures and endorsed the shift in the policy stance in mid-2004 toward a gradual removal of stimulus."

[26] Annex 2 describes the work of insightful analysis on these topics conducted before the crisis.

62. **Insularity.** There was a lack of curiosity about what analysts outside the mainstream were publishing before the crisis, though some of this work was published by prominent analysts and was pertinent to the analysis of risks. Compared with that in the surveillance documents, more perceptive analysis of risks and policy repercussions was conducted by analysts outside the IMF and, in some cases, within the IMF but outside the IMF's bilateral surveillance of the United States (Box 3 and Annex 2).

Box 3. Learning from Alternative Views

Analyses that were conducted well before the crisis—almost a decade before in some instances—could have mitigated the severity of the crisis had policymakers absorbed and acted on the lessons offered.

- **The most frequent warning was about the prospective collapse of the housing market, and the consequent economic recession.** This conclusion was arrived at through disparate means: illustrating the entrenched nature of home price speculation by viewing the ongoing appreciation in historical perspective (Shiller, 2005); predicting recession via asset price adjustment (Krugman, 2005, 2006a, b; Richebacher, 2006a, b, c); and linking unsustainable household balance sheets to a dramatic reversal of household spending (Parenteau, 2006).
- **Linking the housing collapse to financial implosion** was rarer, and involved recognizing that an asset bubble backed by unsupportable subprime mortgages could not endure (Burry, 2005, as described in Lewis, 2010), and probing where the mortgage risk was located and the repercussions for the institutions holding it after the prospective housing bust (Roubini, 2006).
- **Highlighting regulatory shortfalls and ensuing risks.** Almost a decade before the crisis, warnings were provided about the need to strengthen disclosure requirements and oversight over OTC derivatives (Born, 1998; 1999a; 1999b), and about the risks and conflicts of interest that were inherent in using private credit ratings of loan quality as the basis for lowering capital requirements (Shadow Financial Regulatory Committee, 2000). Also highlighted was an array of risks arising from the evolving nature of structured finance (IMF Institute Seminar, 2005) and the liquidity consequences of unraveling derivative contracts (Schinasi, 2006).
- **Highlighting risk in financial development.** In 2005, the IMF's Economic Counselor assessed how the evolution of financial development, the nature of risk taking, and the structure of compensation incentives could drive asset prices away from fundamentals, which could ultimately freeze the interbank market and lead to a full blown financial crisis (Rajan, 2005a; b).
- **Urging monetary policy to incorporate its impact on credit expansion and asset prices** and warning of the drawbacks of not doing so (Borio and Lowe, 2002; Borio and White, 2003).

Useful insights into the crisis came from a spectrum of analysts ranging from macroeconomists to market participants, from those who were motivated by concerns about instability in financial markets and the consequent need for stronger regulation, to those who perceived the potential for damage from government regulation.

Key characteristics of this disparate group (not all shared by every analyst) included**:**

- **A willingness to challenge conventional wisdom or mainstream thinking.**
- **Independence from the authorities.**
- **A focus on balance sheets and the adverse repercussions of unsustainable imbalances**—whether in individual sectors such as households, or the balance sheets of financial institutions.
- **Concern about the consequences of inadequate regulation/supervision**, while subjecting prevailing regulation to scrutiny and analyzing its unintended effects.
- **Understanding the limitations of modeling.** Recognition that financial markets can and do overshoot, and that interactions across asset categories and sectors can be consequential yet not amenable to policy-relevant modeling, particularly if the models cannot incorporate disequilibria or herding behavior. Reaching pertinent conclusions thus required diagnosing the links between risk factors across sectors, and often painstaking analysis of data and trends.

63. **Focusing on one risk to the detriment of others.** The IMF was most concerned about the possibility of a disorderly decline of the dollar from a drying up of capital inflows in the presence of a large current account deficit. It viewed financial innovation as a means to encourage continued capital inflows and hence diminish the risk of a disorderly dollar decline, which it considered paramount. This focus may have obscured concern about, and analysis of, the risks from the nature of the innovations themselves.

B. Organizational and Governance Impediments

64. **Bilateral surveillance for the United States was generally more sanguine than multilateral surveillance with respect to U.S. financial sector risks**.[27] Various *GFSR* reports warned that the proliferation of complex, leveraged financial instruments made liquidity risk more worrisome. For example, the Spring 2005 *GFSR* warned that the off-balance sheet nature and complexity of credit derivatives reduced their transparency and masked the risks to which investors and counterparties were exposed (IMF, 2005). The Spring 2006 *GFSR* discussed the consequences for subprime borrowers of a cooling housing market and rising interest rates, and the impact of these consequences on the spreads of asset-backed securities using subprime mortgages. It also noted that structured credit products were more susceptible than corporate bonds to severe downgrades (IMF, 2006). Yet the U.S. Article IV reports of 2005 and 2006, issued shortly after the respective Spring *GFSRs*, appeared less concerned about these risks, let alone elaborating on them in the U.S. context, for which they were most pertinent. Thus, the 2005 U.S. Article IV report did not analyze risks from credit derivatives; and the 2006 Article IV report did not analyze subprime mortgages as a source of risk for housing, or for the bonds that they backed.

65. **This reflects several shortcomings:** of the U.S. Article IV staff reports to absorb and contextualize the *GFSR* analysis; of the review and clearance processes to ensure consistency in Fund messages across important documents being issued almost concurrently; and of an institutional reluctance to highlight U.S. risks directly in the context of bilateral surveillance.[28]

66. **More generally, the Fund's review process was not conducive to highlighting risks.** Most of the comments on Article IV report drafts (with a few notable exceptions) focused on relatively specific analytical points, rather than questioning fundamental premises in a manner that could have resulted in major reformulation. In part this reflected tight deadlines for providing and incorporating comments. Most of the thinking about the Article IV messages also appeared to have been done before comments were solicited. In

[27] See Banerji (2010) for an evaluation of IMF multilateral surveillance in the crisis run-up.

[28] In this context, it is worth noting the prevalent tendency of area departments to soften references to risks in countries in their area, when commenting on drafts of the *WEO* and *GFSR*.

cases where comments were pertinent to the risk of a crisis, underlying issues either were not debated fully or were discussed on a schedule that discouraged adequate reflection and revision (Box 4).

Box 4. The Article IV Review Process: Minimal Impact on Analysis of the Crisis

The IMF's Article IV review process is extensive. Comments from staff are received at several stages of preparation. Clearance from management, the First Deputy Managing Director in the U.S. case, is required before starting discussion with the authorities or finalizing the report.

Yet the review process did not contribute meaningfully to the analysis of risks. Significant challenges to the Article IV team's analysis on pertinent risks in the run-up to the crisis were rare. There was little reference to the sometimes more animated discussion of U.S. financial sector risks conducted in other contexts—for example, the internal and Board discussions of the *GFSR.* The perceptions of independent analysts who were more concerned about relevant risks in the U.S. financial sector were also not raised.

On occasion, comments drafted on the U.S. Article IV reports were toned down by the commenting department's front office, since there was a reluctance to challenge influential teams such as those working on the United States. Comments that were conveyed, and could have strengthened the analysis of risks or policy weaknesses, were not necessarily incorporated. In some instances, the commenting unit concluded that it was not worth escalating the disagreement to Management given that Management was likely to side with the area department's position.

67. **The surveillance documents generated considerable discussion at the Executive Board—**written statements by Board members and the minutes of the ensuing Board discussions averaged 100 pages a year for the U.S. Article IV discussions during 2004–08—but the discussion of relevant financial sector risks was rare, and when it occurred, was not necessarily reflected in the Summings Up of the Board discussion. For example, the following paraphrased examples of interventions by Board members indicated unease with the accumulation of U.S. household debt, and the adverse repercussions from a reversal in the housing market, but were not highlighted in the Summing Up of that discussion:

> In trying to explain the reasons behind the extraordinary behavior of the U.S. consumer, the staff report refers to the easy access to financing in the context of flexible and large U.S. financial markets. This is a partial explanation. More convincing reasons that explain the behavior of the U.S. consumer could be useful to understand the growth dynamic in the U.S. and the mounting global imbalances. It is interesting to note that the staff uses the same argument—the flexibility and scope of the U.S. financial markets—to explain yet another extraordinary development taking place in the U.S. economy: the sustained inflow of capital, notwithstanding the fact that the risk of suffering capital losses is growing by the day. (Board member, July 2006)
>
> We are worried by the bad news in the mortgage market as we note that household debt is rising steeply, mortgages for second homes are becoming more common, and there is a worrying surge in mortgages combining variable interest rates with low or even no down payments. We believe that this position will

> bring, in the long run, significant problems to household and bank balance sheets. We also think that the present surge in housing prices leaves the country vulnerable to reversals where a decline in wealth from a housing price correction would hurt consumption. Even if prices were only to flatten rather than fall, consumer spending will slow, as the impulse to borrow against capital gains disappears. (Board member, July 2006)

68. **Internal governance and incentives were perceived to discourage the expression of contrarian views.** Some staff members interviewed perceived that career prospects were enhanced by conforming to consensus views, and were damaged by challenging the views of the authorities, as these views would not be supported by Management or senior staff. While contrarian views were unlikely to be appreciated, there was no perceived penalty for adopting consensus or mainstream analysis even if it turned out to be faulty. Such a modus operandi, if widespread, would render the institution too reticent to articulate risks or encourage out-of-the-box thinking.

69. **The Article IV team did not include experienced financial sector experts.** Team leaders were senior staff from the Western Hemisphere Department (WHD) with mostly macroeconomic backgrounds, who did not have in-depth experience of the financial sector, particularly in relation to the complexity of U.S. financial markets. The financial sector staff members assigned to the Article IV consultations were relatively junior in relation to the WHD team leaders. On occasion, financial sector staff members had to learn on the job, upgrading their understanding of the U.S. financial sector in the course of successive surveillance exercises, instead of providing the requisite expertise from the outset. In addition:

- The hierarchy within the Fund surveillance teams was tilted in favor of the area department. Disagreements within the teams, if any, would be resolved in favor of the area department. Policy criticism was predominantly directed at fiscal policy as opposed to regulatory or monetary policy, where the Fund staff appears to have felt less comfortable challenging the authorities.

- The Fund's more senior financial sector officials typically did not work on U.S. bilateral surveillance, or provide guidance to their more junior financial sector colleagues who did. This reflected a perception that they would have greater value added working on other countries, since the U.S. had sufficient expertise of its own.

70. **The Fund's dialogue with U.S. authorities tended to be formal and not conducive to fruitful interaction.** Although U.S. officials were not intrusive in the context of Article IV consultations, they reportedly saw little value-added from a policy perspective from bilateral surveillance before the crisis.

C. Self-Censorship: The Interplay Between Political Constraints and Incentives

71. **A number of staff members and Management interviewed did not consider political pressure to have constrained the analysis;** indeed, they judged the U.S. authorities to be among the least intrusive in their interactions on Article IV consultations, certainly among the large economies. Moreover, the IMF did express criticism in areas where it had strong views, such as on fiscal policy or the need for entitlement reform. According to a former senior IMF official, "We missed what we missed because we missed it, not because someone told us not to say it."

72. **Self-censorship is nevertheless considered to have undermined the candor of bilateral surveillance by some interviewed staff and Management.** There is a fairly pervasive view that senior area department officials and Management were reluctant to forcefully criticize the policies of the U.S. authorities, and staff thus perceived the need for a higher burden of proof when calling attention to risks and vulnerabilities. Indeed, IMF criticism of U.S. policies was largely on issues where it agreed with the authorities, and where the obstacles to reform were understood to be primarily political or legislative. By contrast, there was no substantive debate of regulatory or monetary policies that were arguably at the heart of the U.S. crisis.

V. Reform Options

73. **The key objectives of the proposals in this section are to**: (a) diversify the expertise that the Fund can bring to bear on surveillance of the U.S. economy; (b) enhance the role and responsibilities of financial experts in the context of surveillance; (c) foster an environment in which independent, dissenting, and contrarian views are encouraged in the process of articulating risks and policy responses; (d) strengthen the review process to ensure consistency and cross-fertilization with other key IMF documents; and, on a technical note, (e) upgrade the vulnerability tables.

A. Encourage Greater Diversity of Views

74. **Some of the most insightful analysis of pertinent risks prior to the crisis originated from analysts with diverse backgrounds and perspectives.** The IMF could strive to tap into such thinking on a more systematic basis to enhance the value-added of bilateral (and multilateral) surveillance. For example, it could:

- Involve eminent outside analysts, including those with non-mainstream views, on a regular or ad hoc basis to discuss the most serious risks to the U.S. and global economies with the Executive Board and Management.

- Give more prominence to discussions with financial market participants, think tanks, and academics who may have valuable insights for the surveillance process. The authors of staff reports should be encouraged to consider and cite views on financial

sector developments and risks other than those adopted in the Article IV consultation itself.

- Invite comments from knowledgeable analysts or an external advisory group. SIPs should be discussed with outside audiences with relevant expertise (in addition to the authorities) before the report is finalized.

- Consider how to make Board Summings Up more reflective of Executive Directors' concerns relating to risks. One option for major economies would be to reserve a section in the Summings Up for systemic risks, and incorporate pertinent interventions on this topic even if they do not constitute a majority view.

- Upgrade financial sector expertise in Article IV missions. Missions could include external specialists with expertise that is in short supply in the IMF. The IMF will also need more in-house staff with financial markets, regulatory and policymaking experience.

B. Align Responsibility with Expertise

75. **The IMF's review of Article IV reports does not foster discussion of alternative views, nor does it encourage highlighting the uncertainties that are inherent in the discussion of a complex financial sector.** Presently Article IV reports are cleared by the respective area department and by the Strategy and Policy Review Department (SPR), while all SIPs produced in conjunction with the Article IV consultation are cleared by the respective area department only. The findings of SIPs are generally well integrated into the findings of Article IV staff reports.

76. **Various arrangements could be considered to enhance the influence and responsibilities of MCM staff in the U.S. Article IV process**:

- MCM (in addition to SPR and the Western Hemisphere Department (WHD) could be given clearance authority for the Article IV reports for the United States (and possibly other countries with systemically important financial sectors).

- At least one senior MCM staff member with prior knowledge of the U.S. financial sector should be included in the U.S. Article IV team in an influential capacity.

- FSAPs and FSAP updates should be scheduled on a more frequent basis, and ideally initiated as warranted by the emergence of new risk factors in the financial sector.[29]

[29] This should be facilitated by the IMF Executive Board's decision on September 21, 2010 to convert the financial stability component of the voluntary FSAP into a mandatory part of the IMF's surveillance for the world's top 25 financial sectors. The first U.S. FSAP was completed in mid-2010.

- MCM should be involved in proposing topics for financial sector SIPs (in conjunction with the country authorities and WHD), take responsibility for the content and quality of financial sector SIPs, and be given clearance authority for the SIPs produced by its own staff.

C. Provide a Focal Point for Thinking Independently About Risks

77. **The IMF should consider establishing a risk assessment unit to strengthen the analysis of vulnerabilities and policy implications.** The unit would harness the knowledge and information within the Fund with the insights to be gained from independent sources to challenge the analysis of systemic issues.

- The unit would be tasked to develop risk scenarios for major economies and the global economy, articulate the policies needed to address these risks, and debate the scenarios and policy repercussions with the country team and relevant departments. The unit would be required to comment on key reports—such as the U.S. Article IV, *WEO* and *GFSR*—playing the role of "devil's inquisitor," which would be to ask skeptical questions and seek consideration of alternatives, as suggested by Bazerman and Chugh (2006).

- The unit could be staffed from within or outside the IMF by those with a reputation for independence, integrity, and ability to speak truth to power, and be granted autonomy to formulate its discretionary work program and judgments. Staff in the unit would have no stake in how their analysis is viewed by the authorities. They would be given the opportunity to delve deeper into systemic risks, inter alia, by juxtaposing a wider spectrum of views than prevailing within mainstream orthodoxy.

- Two alternative models of how such a small unit might operate are worth considering: (i) it could report directly to IMF management; or (ii) it could be made independent of IMF management and staff, in which case accountability mechanisms would need to be devised.

D. Strengthen the Review Process

78. **A more effective review process to overcome institutional silos is needed.** Management should clarify the roles and responsibilities for the internal review process, and hold the corresponding units and senior staff responsible for ensuring consistency of analysis and messages between multilateral and bilateral surveillance. Early interdepartmental collaboration—before respective views have solidified—should help to ensure robust and consistent analysis across documents. A process to address substantive differences in departments' views as they arise is also needed.

E. Upgrade the Vulnerability Tables in the Article IV Staff Report

79. **On a technical note, there is a need to revisit the objectives and redesign the content of the standard table on "Indicators of External and Financial Vulnerability."** The data presented in this table provided little predictive value prior to the crisis, and need to be tailored to the specific vulnerabilities facing the country at a given point. In addition, a modernized version of the now discarded "Monetary Aggregates" table should be reinstated to reflect the evolving U.S. financial system and the evolving nature of risks inherent in it. The tables in 2007–08, for example, could have included market sensitive data such as an ABX index, a composite index of CDS spreads for key financial institutions, the TED spread, leverage ratios of the largest commercial and investment banks, aggregate and sectoral credit expansion, debt trends across major sectors (government, corporate, household), and pertinent information (as available) of shadow banking assets as a share of total assets, the maturity structure of shadow banking liabilities, and financial institution exposure to credit derivatives.

ANNEX 1. ANATOMY OF THE FINANCIAL CRISIS IN THE UNITED STATES

1. This annex traces how distress in what started as a minor segment of the U.S. housing market—subprime mortgages for households with impaired or limited credit histories—precipitated a financial crisis with devastating consequences. It focuses initially on vulnerabilities in housing finance and the financial sector, and subsequently discusses the underlying incentive, regulatory and macroeconomic factors that prolonged the asset booms before the crisis broke and combined to aggravate these vulnerabilities. The objective is to provide a framework for the evaluation of the IMF's surveillance of the U.S. economy prior to the crisis, and in particular to provide guidance on the topics to evaluate and emphasize.

2. The following topics are analyzed, the first three of which pertain to the evolution of the crisis, while the last four address incentive problems and regulatory and policy weaknesses:

(a) The inadequacy of lending standards, particularly for subprime home mortgages, that accompanied and fueled the housing boom and the parallel accumulation of household debt.

(b) The rise and dominance of the securitization model for housing finance for subprime mortgages and the factors that facilitated its expansion and complexity.

(c) How these factors contributed to the near collapse of the financial system once the housing boom ended.

(d) Misaligned incentives that drove private agents to take on excessive risk, financed mainly by debt.

(e) Regulatory shortfalls that derived from overconfidence in the ability of financial markets to regulate themselves.

(f) The role of monetary policy in the early part of the decade in fostering credit expansion and the housing bubble.

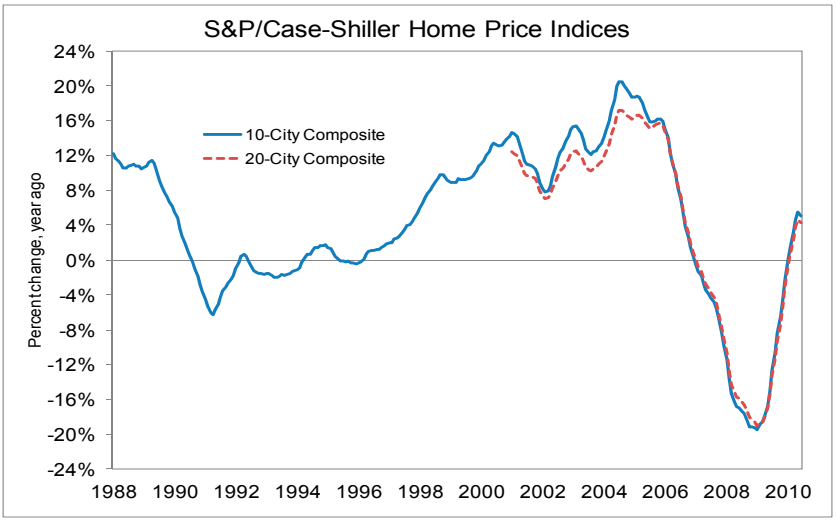
(g) The domestic and external policies underlying global imbalances, and the role of capital inflows in fueling the housing and securitization booms.

3. In assessing these factors, it is important to bear in mind the seemingly benign economic environment that prevailed in the middle part of the decade, driven in particular by robust global economic growth. This and the ability of the U.S. authorities to manage past crises without severe macroeconomic consequences had lulled both markets and policymakers into complacency.

A. Housing Finance: Inadequate Lending Standards and Rising Household Debt

4. Most analysts would agree that the financial crisis in the United States was triggered once the housing market turned, following an extraordinary period of strength in which national housing prices more than doubled in nominal terms between 1999 and 2006 (Figure A1.1).[30] As the housing market began to falter, defaults in subprime housing mortgages mounted, causing a spate of bankruptcies among subprime lenders. By March 2007, 13 percent of subprime mortgages were delinquent. By early 2007, funding for securitized subprime lending was drying up and several hundred nonbank mortgage lenders had collapsed, including the second largest subprime lender, New Century Financial, in April 2007.

Figure A1.1. U.S. Housing Price Changes
Percentage change, year ago



Source: Standard and Poor's.

5. Once housing prices stopped rising, defaults in the subprime housing market were bound to escalate sharply. Indeed, the types of instruments that came to dominate the subprime market—interest-only or negative-amortization loans and adjustable rate mortgages (with temporary teaser interest rates to be followed by sharply higher rates)—were essentially designed for either refinance or default once the teaser rate was reset. They were thus sustainable only if housing prices continued to increase. Moreover, because these loans were all originated at around the same time, mortgage lenders had inadvertently created an

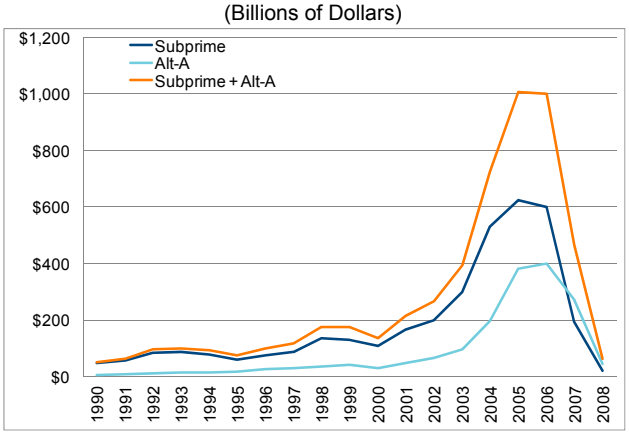
[30] The widely used S&P/Case-Shiller U.S. National Home Price index, based on prices in ten major metro areas, peaked in July 2006, though its quarterly peak occurred in the second quarter of 2006. Home sales had begun to decline well before the price peak; by July 2006, for example, new home sales were 22 percent below sales in July 2005, and existing home sales were also down sharply. The annual rate of increase for home prices in major U.S. cities peaked at more than 20 percent in July 2004.

environment that would lead to a systemic wave of defaults in the event that housing prices stopped rising (Richardson, 2009).

6. As the Federal Reserve (Fed) began to gradually raise interest rates beginning in mid-2004, lending for prime mortgages began to decline.[31] By contrast, the growth of subprime lending accelerated *after* the initiation of the Fed's tightening—even though this was the segment of the market most susceptible to rising short-term interest rates. From June 2004 through June 2007, $1.6 trillion in subprime mortgage loans and $1.2 trillion in Alt-A loans were underwritten, with slightly more than $2 trillion of the combined category being originated in 2005–06 (Figure A1.2). By 2006, these two categories of mortgage originations had jumped to nearly 34 percent of all mortgage originations, from 9 percent in 2002 (Figure A1.3).

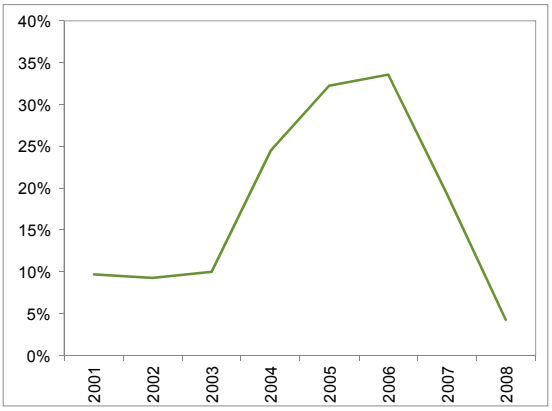
Figure A1.2. Value of Subprime and Alt-A Mortgage Originations, 1990–2008

(Billions of Dollars)



Source: Reproduced from Roberts (2010).

Figure A1.3. Subprime and Alt-A as a Share of Total Mortgage Origination, 2001–2008



Source: Committee on Capital Markets Regulation (2009).

7. The growth of subprime lending in an environment of rising interest rates should have signaled unusual risk. Numerous accounts appeared in the press about predatory lending to low-income households, characterized by weak underwriting standards. Some mortgages were provided with no verification of income, job, or assets (Ninja loans), and required little or no documentation. Expressions of concern about the explosive growth of subprime lending and predatory lending practices came from many quarters. For example, the General Accounting Office (GAO) highlighted the need for increased monitoring and scrutiny of bank holding company subsidiaries heavily involved in subprime lending (GAO, 2004). Written testimonies to the U.S. House of Representatives outlined in detail how abusive

[31] The federal funds rate had been reduced to 1 percent in June 2003 and was gradually raised between June 2004 and June 2006 from 1 percent to 5.25 percent, as discussed further below.

mortgage lending in the subprime market would lead to economic disaster among low-income households.[32] In a letter to the Federal Reserve in September 2005, Mortgage Insurance Companies of America indicated its concern about the risky lending practices being applied in the U.S. real estate market and the fact that banks were not admitting to the Fed that lending standards had in fact been reduced.

8. The era of rapid housing price increases coincided with an explosion of household debt driven primarily by mortgage debt, which rose from $4.4 trillion in 1999 to $10.5 trillion in 2007. Households also increasingly borrowed against the rapidly growing equity in their homes. Household debt had been rising for 25 years, and between 1981 and 2007 it nearly doubled as a proportion of disposable income, while personal savings declined to negligible levels (Figures A1.4 and A1.5). Median real incomes stagnated since the 1990s, driving a growing proportion of households into excessive debt, with at least the semblance of official support. Overstretched households were more likely to default in larger numbers once the housing bubble burst, even without the introduction of the exotic mortgage financing instruments. It is estimated that by late 2009, nearly a quarter of U.S. households had negative equity in their homes, a figure that rises further if only those homes with mortgages are considered.

Figure A1.4. Household and Mortgage Debt (1981–2008), ($ trillion)

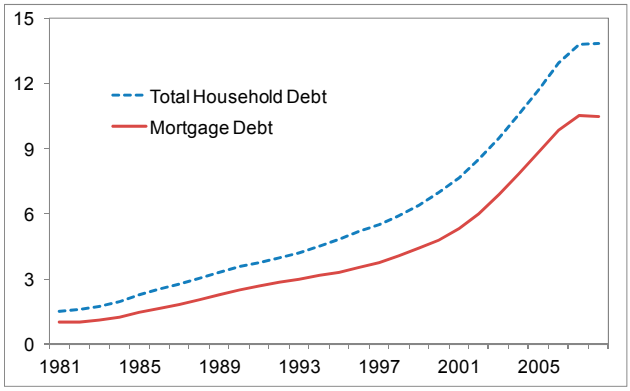
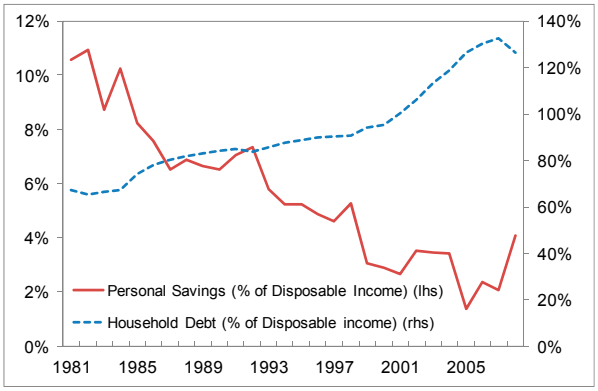


Figure A1.5. Household Debt and Personal Saving (1981–2008)



Source: Federal Reserve Flow of Funds.

B. Subprime Securitization and Leverage: A Toxic Mix

9. How could lending to such a risky segment of the housing market expand so rapidly? At the core of the expansion was a misplaced faith in the robustness of the housing market among borrowers and lenders. But a series of innovations and accommodative regulation allowed financial institutions to attract an expanding category of investors to this market,

[32] See, for example, Eakes (2005).

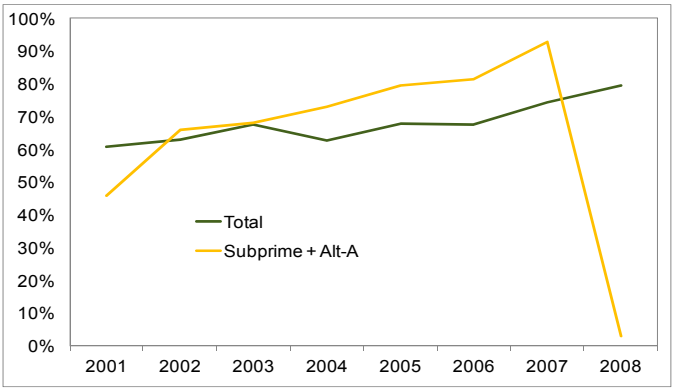
spreading the risk globally, while at the same time increasing exposure within the core U.S. financial institutions.

10. While borrowers were enticed by loosening lending standards, investors had to be enticed into making investments they would not otherwise have made. Critical to enticing investors was the conversion of risky housing loans, whose viability was linked to ever-increasing housing prices, into investment grade securities that would appeal to investors with varied risk appetites. As traditional mortgage-backed securities comprising of subprime loans would not have attracted institutional investors, innovations were developed in the form of structured products consisting of tranched claims against increasingly complicated pools of such securities. A collateralized debt obligation (CDO), for example, combined a pool of assets and sold the cash flows from these assets to investors segregated by risk appetite. Thus of the tranches of a CDO, the first (equity) tranche would absorb initial losses and be geared towards hedge funds and other aggressive investors, and the final (senior) tranche would ideally be AAA-rated and designed to attract institutional investors. Further, for a synthetic CDO, the underlying credit exposure was taken on a credit default swap rather than on a physical asset.

11. To attract institutional investors from the U.S. as well as international investors, these new securities needed to be highly rated by the credit rating agencies (CRAs). The inaccuracy of structured credit ratings provided by the CRAs has received much scrutiny since the crisis. It reflected technical shortcomings as well as these agencies' conflicts of interest in their role as objective assessors: CRAs relied on issuers to pay their fees and also acted as advisors to issuers on how to achieve the desired ratings. The quantitative models that were used to measure cash flows from mortgage loans did not capture the sudden increase in delinquencies and foreclosures that took place between mid-2005 and mid-2007, particularly those mortgages that were originated with lax lending standards and targeted at weak borrowers (Committee on Capital Markets Regulation, 2009).

12. A global pool of investors was thus attracted for the riskiest segment of the U.S. housing market at the tail end of the most significant housing boom in U.S. history. By 2007, the securitization rate for subprime/Alt-A mortgages originated in that year had grown to 93 percent, more than double the rate in 2001 (Figure A1.6). Securitization in turn freed up capital for originators to continue lending and maximize their fees, while reducing the incentive to conduct due diligence on the individual loans, given the scope for passing on their risk.

Figure A1.6. Securitization for Home Mortgages by Type (2001–08)



Source: Committee on Capital Markets Regulation (2009).

13. It is ironic that even though a key rationale of securitization was to allow loan originators to get loans off their books, the increase in financial institutions' exposure to subprime loans turned out, ex post, to be massive. About half the potential losses from exposure to subprime mortgages was borne by U.S. financial institutions such as commercial banks, securities firms, and hedge funds. This figure rises to two thirds if foreign leveraged institutions are included (Greenlaw and others, 2008).

14. Such an increase in exposure by U.S. financial institutions was made possible through a massive increase in leverage, through the use by commercial banks of credit risk transfer mechanisms to minimize regulatory requirements, and through an easing of regulatory standards for large investment banks. Commercial banks could avoid capital requirements by temporarily placing certain asset categories—including securitized mortgages—in off-balance-sheet entities such as asset-backed commercial paper conduits or structured investment vehicles (SIVs). Further, they could reduce the capital they held against assets that remained on their balance sheets if those assets took the form of AAA-rated tranches of securitized mortgages. Banks thus exploited credit risk transfer mechanisms for regulatory arbitrage, and in the process they increased both their effective leverage and their exposure to aggregate risk (Acharya and Schnabl, 2009).

15. For the big five U.S. investment banks, the increase in leverage was made possible by the Securities and Exchange Commission's decision in 2004 to relax the 1934 Securities Exchange Act rules on net capital requirements. The relaxation of the capital requirement was coupled with the potential for greater scrutiny from the SEC, but in practice the scrutiny was not effective (Labaton, 2008). Investment banks' leverage increased sharply—from the limit of 12:1 before the amendment to 31:1 by end-2007, for the five investment banks on average. The use of higher leverage thus enabled financial institutions to increase their

subprime exposure even while exposure to risky and generously rated securities was being dispersed.[33]

16. Why did financial institutions invest so heavily in MBSs and not follow the originate-to-distribute model of securitization more narrowly? The chief motivator was the high yield relative to comparatively rated investments. At the peak of the housing bubble in June 2006, AAA-rated subprime CDOs offered twice the premium offered on the AAA credit default swap of a corporation. Financial institutions would thus be earning a higher premium most of the time, and losses would only occur in the ostensibly rare event that the AAA tranche of the CDO was impacted. Financial firms were effectively writing a large number of deeply leveraged put options on the housing market, which could not be made good in the event of a systemic crisis (Richardson, 2009). The pro-cyclicality of prevailing mark-to-market accounting rules also motivated such behavior.

17. The lending boom for risky housing loans was further facilitated by the banks' ability to transfer credit risk via credit derivatives. Credit default swaps (CDSs), which provide a form of insurance against the default of a security and accounted for the bulk of credit derivatives, became the instrument of choice for insuring securities backed by subprime mortgage lending. During 2003–05, the majority of CDSs on CDOs were issued by American Insurance Group (AIG), which accumulated a $400 billion one-sided exposure. By 2006, when AIG belatedly recognized the risk it was assuming—against which it had not been setting aside additional capital—it stopped issuing such CDSs (Lewis, 2009).[34] But the major banks, rather than slowing their pace, continued the practice of subprime securitization, now assuming increasing amounts of risk on their own books. Origination of subprime and Alt-A mortgages remained at $1 trillion in 2006, essentially unchanged from 2005 even though housing prices had peaked (Figure A1.2 above).

18. Credit default swaps were one of a variety of over-the-counter (OTC) derivative contracts whose global use expanded exponentially in the decade preceding the crisis, vastly increasing counterparty risk. Many of the outstanding obligations between financial institutions could be netted out in principle, but rising counterparty credit risk can cripple netting out arrangements (Brunnermeier, 2008). Moreover, bilaterally set collateral and margin requirements in OTC derivatives trading do not take account of the counterparty risk

[33] Shin (2009) contends that rather than dispersing risk, securitization actually concentrated risks in the banking sector, as financial institutions issued liabilities backed by bad loans, in effect by buying each others' securities with borrowed money.

[34] The value of its CDSs to banks and investors also diminished once AIG lost its AAA credit rating in March 2005. Since 1996, regulators treated securities guaranteed by a seller of CDSs as having the risk level of the seller. Levine (2010) is critical of the Fed for maintaining this regulation given the mushrooming use of increasingly suspect CDSs, growing recognition of the opaque nature of the CDS market, and the fact that by 2004 the FBI was warning of the fraudulent practices associated with the issuance of subprime mortgages underlying many CDS securities.

externality that each trade imposes on the rest of the system. The result is to allow systemically important exposures to be built up without sufficient capital to mitigate associated risks (Acharya and others, 2009).

19. A number of other features of OTC derivatives trading are worth highlighting since they helped the banks to magnify their leverage, concentrate risk, and increase complexity.[35] First, unlike trades on exchanges, about a third of OTC trades required no collateral; this facilitated higher leverage. Second, derivatives trading was concentrated in the handful of dealer banks that the market considered too big to fail, since these banks' perceived implicit guarantee enabled them to provide derivatives more cheaply than others, subsidizing the market at the potential expense of taxpayers, and in the process concentrating their use. Finally, the favorable Basel capital-adequacy requirements of lending to banks reinforced the tendency towards concentration and opacity in derivatives trading, since it drove banks to share risks with other banks via credit derivatives in sectors they were overexposed to.[36] Though this action may have been warranted from the perspective of individual banks, it did not necessarily reduce the collective exposure of the banking system.

C. From Housing Stress to Systemic Crisis: A Run on the Shadow Banking System[37]

20. As housing prices began to fall, the edifice of AAA-rated securities backed by subprime loans crumbled. With subprime mortgage delinquencies rising, the previously ample liquidity available to mortgage originators evaporated, resulting in escalating bankruptcies among the nonbank originators in the first half of 2007, and a run in August 2007 on the deposit-taking Countrywide, which was the largest mortgage originator in the United States. As liquidity drained from the housing market and defaults increased, securitized mortgage pools that were once highly liquid were newly scrutinized and differentiated on the basis of the quality of their underlying loans and the care with which these loans had been documented and rated. CDOs and other complex structured products became even harder to value given their status as leveraged claims on the mortgage pools.

21. In this way, illiquidity in the housing market drained liquidity for a broader category of asset-backed securities, since investors could not easily distinguish the quality of the underlying assets across the various instruments.

22. Banks could not adequately absorb and offset the effects of the pullback in investor participation on this nonbank system, because they themselves had sponsored many of these

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[35] See *The Economist*, November 14, 2009 for a fuller discussion of these issues.

[36] The Basel capital-adequacy requirement is 8 percent for lending to a non-financial corporation versus 1.6 percent for lending to other banks.

[37] This section draws from Acharya and others (2009), Geithner (2008), and Rajan (2008).

off-balance-sheet vehicles. They had written very large contingent commitments to provide liquidity support to many of the funding vehicles that were under pressure, and in the process they retained substantial exposure to the risk of deterioration in house prices. Moreover, the funding and balance-sheet pressures on banks were intensified by the rapid breakdown of securitization and structured finance markets.

23. In June 2007, two hedge funds that were managed by Bear Stearns and heavily invested in subprime asset-backed securities became unable to meet their payment obligations. Despite an initial bailout by Bear Stearns, they were closed down shortly thereafter. This event triggered a complete repricing of risk among instruments backed by subprime/Alt-A mortgages, and an almost instantaneous halt to the issuance of CDOs. A run on the structured investment vehicles of BNP Paribas in August 2007 forced a suspension of redemptions, and called into question even the safety of broader classes of asset-backed commercial paper and SIVs, since information was not available with which to distinguish between safer assets and assets backed by subprime mortgages. The seeds of a full-blown crisis were sown once the opacity of the relatively new instruments became apparent.

24. Notwithstanding massive injections of liquidity by the major central banks, the period that followed was characterized by hoarding of liquidity amidst uncertainty about the size of "toxic" assets and about individual institutions' extent of exposure to them. It culminated in the run on Bear Stearns, which had the highest leverage among the big five U.S. investment banks and was heavily exposed to subprime mortgage risk. Though the Federal Reserve facilitated takeover of Bear Stearns by JP Morgan in March 2008 temporarily calmed the financial markets, the bankruptcy of Lehman Brothers six months later created a full-fledged global panic, given the vast array of claims that Lehman's counterparties were left holding. Significant exposure to Lehman paper by a large money market fund forced it to "break the buck," creating uncertainty about the safety of all money markets and the beginnings of a massive run, leading the government to guarantee deposits in such funds. Prior to the Lehman bankruptcy the government had placed Fannie Mae and Freddie Mac under conservatorship—as their spreads had widened to untenable levels and their solvency had been compromised in the face of rising home foreclosures and inadequate capital. And AIG had to be rescued at enormous cost, as the Lehman bankruptcy had rendered its CDS-related obligations untenable.

25. The escalating liquidity problems that culminated in the start of a systemic run in September 2008 were centered on the shadow banking system. By early 2007, assets in the shadow banking system had surpassed commercial bank assets.[38] Yet the nonbank

[38] "In early 2007, asset-backed commercial paper conduits—in structured investment vehicles, auction-rate preferred securities, tender option bonds, and variable rate demand notes—had a combined asset size of roughly $2.2 trillion. Assets financed overnight in triparty repo grew to $2.5 trillion. Assets held in hedge funds grew to roughly $1.8 trillion. The combined balance sheets of the then five major investment banks totaled $4 trillion. In

(continued…)

intermediaries that constituted this market relied overwhelmingly on short-term, often overnight, funding and did not have access to the Fed's overnight financing window. In its vulnerability to a run, the shadow banking system in some ways resembled the U.S. banking system before the advent of deposit insurance in 1934, when bank runs were relatively commonplace (Gorton, 2009). Without the emergency measures that were implemented to guarantee money market deposits and convert investment banks to commercial banks with access to funding from the Fed—and without the additional massive provision of liquidity—a wholesale collapse of the financial system would have been the likely outcome.

D. Misaligned Incentives, Moral Hazard, and Myopic Risk Management

26. The propensity to maximize current transactions, even if they were risky and in conflict with the financial soundness of the firm, was a common feature across the securitization chain, and applied to mortgage lenders, securitization professionals, fund managers, and bank officers.[39] Such behavior was driven by a number of factors:

- Nonbank originators of mortgages were motivated by the fees linked to the volume of transactions and lending, unencumbered by default risk which would be borne further up the securitization chain. This set of arrangements undermined incentives for sound risk management and underwriting standards. Until late in the housing cycle, even bank lenders could largely off-load their exposures or risks (though they often chose not to).

- For private agents ranging from traders to CEOs, with bonuses comprising a major component of their compensation packages and driven in most cases by short-term profits, there were strong incentives to maximize current transactions and revenue at the expense of longer-term risks.

- For large or interconnected firms and their creditors and counterparties, the lesson from past financial crises (borne out again in this one with few exceptions) was that bondholders and trading counterparties would be rescued along with deposit holders even if the bank or firm were to fail due to mismanagement. The expectation of creditor bailouts reduced the cost of credit for banks that were "too big or

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comparison, the total assets of the top five bank holding companies in the United States at that point were just over $6 trillion, and total assets of the entire banking system were about $10 trillion" Geithner (2008).

[39] Cassidy (2009) coined the term "rational irrationality" to illustrate how the individual actions of market participants may be rational from their own perspective, but can be destabilizing for the financial sector unless adequately regulated, building on Minsky (1982), who had argued for tough regulation of the financial sector given the unstable repercussions of financial market participant actions. Barrett (2009) provides an entertaining review of Cassidy's book.

interconnected to fail," encouraging them to substitute debt for equity even to invest in risky assets.

- Fannie Mae and Freddie Mac executives in addition operated with an implicit government guarantee, allowing them to raise massive levels of debt at below-market interest rates and operate with excessively thin capital cover, notwithstanding the concentration of their combined portfolio of some $5 trillion in essentially a single asset class.

27. **Myopic risk management.** During the 1990s, banks increased their use of value-at-risk (VaR) models and variants thereof as key risk management tools. This trend gathered impetus from 1997 onwards after the SEC and the Basel Committee on Banking Supervision began to incorporate the results of such models into their supervision frameworks, including through the design and implementation of Basel II (Haldane, 2009).

28. Notwithstanding their use of increasingly intricate and data-intensive methodology, VaR models attached diminishing probabilities to the distant past. Thus, as the period of relative stability extended, the measured risks of tail events or variances correspondingly faded, boosting the complacency already prevailing among those not versed in the models themselves. Stress tests that paid greater attention to tail events were not sufficiently utilized.

E. Self-Regulation and Perverse Regulation: Encouraging Excessive Risk and Regulatory Arbitrage

29. Since the crisis there has been much commentary on the deficiencies in government supervision and regulation of the financial sector. The deficiencies have been attributed to various factors. One of these is skepticism about the effectiveness of government regulation of financial markets in the context of an increasingly complex and innovative financial system in which regulators lacked a good technical understanding of the features and risks associated with the new instruments. A philosophy favoring self-regulation stemmed from the belief that the pursuit of self interest by private agents would produce better outcomes than those imposed by supervisors or regulators. Several analysts have attributed this thinking to the efficient markets hypothesis, which postulates that investors rationally balance risk against reward. Other observers have argued that the growing stakes from the ability to influence the design, supervision, and enforcement of regulation of the financial sector fostered an environment of regulatory capture, in which legislators and regulators were inordinately influenced by the firms they were supposed to regulate and supervise.

30. Irrespective of motive, prudential oversight was certainly lax prior to the crisis. Bank regulators did not take adequate steps to prevent or counteract the deterioration in mortgage lending standards. Lenders that were neither banks nor owned by bank holding companies were allowed to remain beyond the reach of the main regulatory oversight agencies, and they attracted increasing shares of the mortgage market. Oversight over the nonbank subsidiaries

of bank holding companies was also minimal. As a result, the largest banks developed "split personalities," in which those parts that were subjected to regular scrutiny mostly made housing loans at market rates in wealthier suburban neighborhoods, while their less regulated affiliates concentrated their lending at higher interest rates in minority neighborhoods (Appelbaum, 2009). Nonbank financial institutions such as investment banks, hedge funds, and mortgage brokers and originators, and the conduits they (as well as commercial banks) created were lightly regulated in order not to constrain innovation.

31. The laxity of regulation also allowed the proliferation of non-transparent structures for securitization; poor risk management through the securitization chain; inadequate capital; and build-up of extreme leverage by financial institutions. Nor did regulation address the incentive conflicts at the credit rating agencies, or attempt to strengthen oversight and transparency over OTC derivatives trading.

32. Regulatory neglect was not the only problem. The role of regulations and legislation in *motivating* the private sector to engage in regulatory arbitrage has received relatively little attention.[40] Among the most consequential of the regulatory measures was to link the extent of capital banks were required to hold against their investments in MBS to the ratings of these securities by the major credit rating agencies, thus encouraging banks to invest in subprime MBS as long as they were highly rated. Effective January 2002, U.S. regulators modified the Basel capital guidelines by broadening the definition of low risk securities to include securities that were rated AA or higher by the major credit rating agencies. This decision meant that the lower capital requirements that had previously applied only to securities guaranteed by Fannie Mae and Freddie Mac could now be applied to highly rated securities backed by subprime mortgages.[41] At this point, private-label securitization of subprime loans took off as lending standards were no longer constrained by Fannie Mae/Freddie Mac guarantee requirements—but now benefited from the same reduced capital requirements enjoyed by Fannie and Freddie.

33. A bank could further reduce its capital requirements by moving CDOs off its balance sheet into a SIV. As long as the bank offered only a short-term line of credit to the SIV, the

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[40] An exception is Kling (2009), from which this section draws. See also Levine (2010), who concludes that: "Either by becoming willfully blind to excessive risk taking or by maintaining policies that encouraged destabilizing behaviors, policymakers, and regulatory agencies contributed to the financial system's collapse."

[41] Previously the 20 percent Basel risk weighting for mortgage lending had applied only to securities guaranteed by Fannie Mae and Freddie Mac—both of which had initially maintained stringent standards that constrained them from issuing guarantees for securities based on loans to subprime borrowers. The first stage of the Basel Accords (in 1988) attached a zero risk weight to claims on OECD governments, 20 percent risk weight to Fannie Mae and Freddie Mac (in addition to OECD public sector entities and banks), 50 percent weight for all home mortgages, and 100 percent weight to all other loans. The 100 percent risk weight required 8 percent capital at the margin, the 50 percent risk weight required 4 percent capital, and the 20 percent risk weight required 1.6 percent capital.

assets of the SIV did not need to be included in the calculation of capital requirements. The banks were thus able to obtain regulatory permission to move some mortgage securities off their balance sheets, effectively avoiding capital requirements altogether. Once investors lost confidence in the soundness of the underlying assets, however, the banks felt obliged for reputational reasons to move most of their off-balance-sheet assets back on to their books. In retrospect therefore, it is clear that the banks should not have been allowed to reduce capital as if they were off-loading the risk of their mortgage securities.

34. These rules thus fostered regulatory capital arbitrage—or gaming of the system to minimize capital while retaining risk—which was at the heart of the financial crisis, in that it provided incentives that perpetuated the housing boom and rendered the banks less transparent and more risky than was recognized by markets or regulators. Securitization could thus be combined with the use of off-balance-sheet financing, credit derivatives, and overreliance on credit rating agencies.

35. Reluctance to regulate the risks posed by derivatives also proved costly. In 1998, an effort by the Commodity Futures Trading Commission (CFTC) to impose tighter regulation on OTC derivatives trading was overridden, and subsequent legislation in 2000 explicitly decreed that credit default swaps fell outside the jurisdiction of the CFTC. (Legislation of 1999 had debarred the SEC from regulating CDSs.) The market for CDSs grew exponentially in subsequent years. Given the unregulated status of the CDS market, it is unclear what proportion of these trades was backed by adequate reserves. But if AIG's assumption of the credit risk from securitized subprime loans without reserve backing is an indication, the lack of disclosure and scrutiny of the CDS market suggests the potential for massive under-provisioning.

36. To summarize, the use of excessive leverage can be attributed in considerable part to perverse regulations on capital requirements. For commercial banks, regulators sanctioned the improper use of securitization, credit default swaps, and off-balance-sheet conduits to hold large amounts of mortgage risk with little capital. For the big five U.S. investment banks, the increase in leverage was made possible by the SEC's decision in 2004 to relax the rules on net capital requirements stipulated by the 1934 Securities Exchange Act. AIG was effectively selling CDSs without being required to set aside capital. For Fannie Mae and Freddie Mac, the low capital ratios that had historically been applied to investments in low-risk mortgages were ultimately (and belatedly) applied to subprime mortgages. Thus, every major financial institution category was enabled to accumulate excessive mortgage risk backed by inadequate capital.

37. The relatively stringent regulation of insured deposit-taking institutions, together with little or no effective regulation of other financial institutions, and capital regulations that encouraged moving risk outside the orbit of regulators, had several shortcomings:

- The distinction between commercial and investment banks had been allowed to erode even before the formal repeal of the Glass-Steagall Act in 1999. Competitive pressures subsequently drove the major commercial banks towards the same lucrative activities engaged in by institutions outside the bank regulatory orbit.

- Major failures within the shadow banking system would clearly have systemic consequences; yet even the largest of the investment banks relied predominantly on short-term funding, faced minimal regulatory oversight, and lacked access to the Fed's overnight financing window.

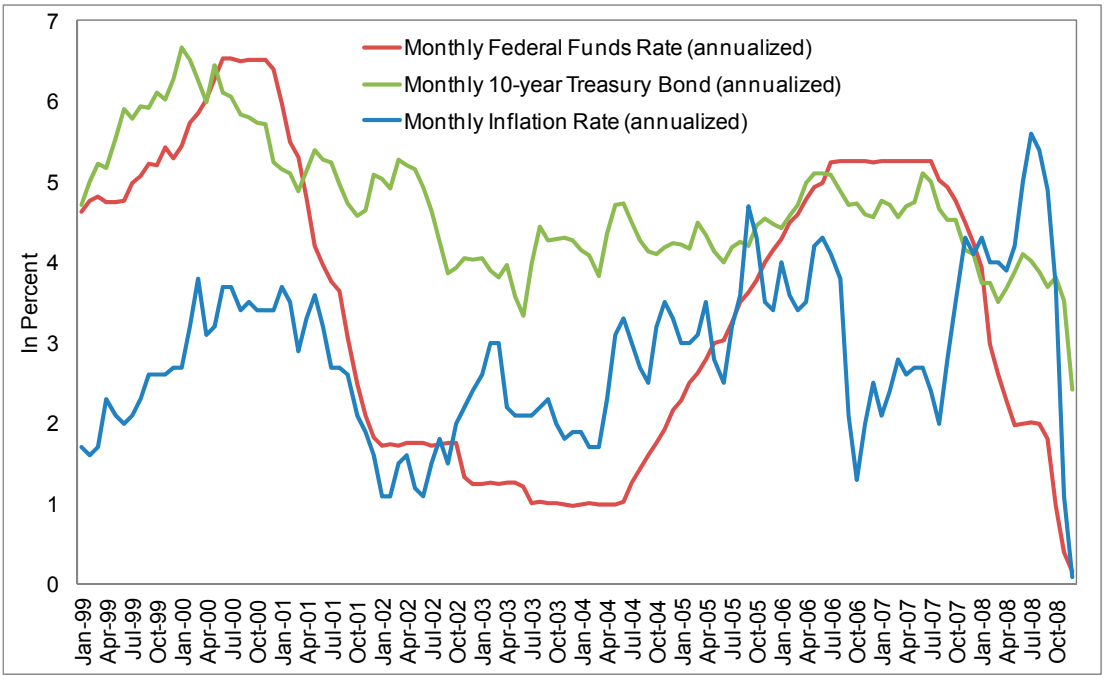
- Systemic risk was heightened by the growing interconnectedness of the various institutions. Yet the regulatory system neither recognized nor internalized such risk, focusing almost exclusively on the deposit-taking institutions and placing too much faith in the beneficial impact of market discipline for entities operating in the unregulated sector (IMF, 2009).

F. Did Monetary Policy Play a Role in the Housing Bubble?

38. There is an ongoing debate about the extent to which accommodative monetary policy in the first half of the decade contributed to the housing bubble. Many analysts believe that easy money and the moral hazard due to the "Greenspan Put" fostered the development of the housing and financial asset bubbles.[42] In particular, U.S. monetary policy has been criticized for injecting too much liquidity in 2001–03, while lowering interest rates too far and holding them down for too long following the comparatively mild 2001 recession. The federal funds rate, which is the interest rate for overnight inter-bank lending and is targeted by the Fed, was indeed low in real terms by historical standards from mid-2001 to mid-2005, and was negative in real terms during October 2002 to April 2005 (Figure A1.7), an interval centered on the most rapid rise in home prices. The drive towards excessive leverage, too, has been partly attributed to the low-interest-rate environment. And some have also attributed the rapid pace of financial innovation—such as the tranching of mortgage-backed securities into high yielding investment grade paper—as a response to the low interest rates in the first half of the decade, and the search for yield that it fostered.

[42] The "Greenspan Put" refers to the markets' belief that the Fed could be relied on to lower interest rates and inject liquidity to counteract market disturbances. This perception is considered to have become embedded in asset pricing in the form of higher valuation, narrower credit spreads, and excessive risk taking.

Figure A1.7. Key Interest Rates and Inflation, 1999–2008



Source: Federal Reserve Board and Bureau of Labor Statistics.

39. For example, the BIS, which highlighted the potential role of monetary policy in contributing to asset price exuberance in the early 2000s, concluded in its 2010 *Annual* Report that:

> "The second set of macroeconomic causes stemmed from the protracted period of low real policy rates and low real long-term interest rates that began in 2001. Those low rates had a number of important effects. Among them was the boom in credit to households in many advanced economies, which fueled some clearly unsustainable run-ups in housing prices. Another was the search for yield, which drove institutional investors to take on significant additional risk even when it would achieve only modestly higher returns."

The same report also concluded that monetary policy must play a bigger role in promoting financial stability.

40. This is an area where there is not a consensus, however. The U.S. decision to maintain low policy rates in the first half of this decade was in part a response to the perceived threat of deflation, which is best tackled before it becomes embedded—and which in fact was avoided prior to the crisis. Some U.S. policymakers have also argued that while lower interest rates indeed spawned the speculative euphoria, the relevant interest rate influencing the housing market was not the federal funds rate but that on long-term fixed-rate mortgages. Moreover, the long-standing correlation between long-term mortgage rates and the federal funds rate is said to have been severed between 2002 and 2005 as a result of

accelerating capital inflows. The main factor pushing long-term interest rates progressively lower, fueling the housing boom, was an excess of global net savings primarily in emerging markets (see, for example, Greenspan, 2009). A separate but related point made in defense of U.S. monetary policy is that it is difficult for government officials to identify asset bubbles ahead of private markets with enough conviction to take action to prevent them, and that cutting interest rates after the bubble has burst is thus preferable. Finally, a number of recent empirical studies have found a weak link between monetary policy and house prices in the run-up to the recent crisis (see, for example, Dokko and others, 2009).

41. In view of the damage from the bursting of the housing bubble, and the persistence of high U.S. unemployment after the crisis, it has become more difficult to argue that monetary policy should not have been concerned with avoiding an unsustainable asset price boom—particularly given the Fed's dual mandate of price stability and full employment. The aforementioned arguments thus continue to be debated and challenged along the following lines:

- It is unclear why the federal funds rate should have entirely ceased to influence longer-term interest rates. Moreover, an extended period of low policy rates would be expected to influence a range of financing decisions within consumer and mortgage finance, as well as the pace of household debt accumulation and the use of leverage by banks.

- The concern with deflation in 2003 may have been misconstrued, since in contrast to Japan's deflation (the chief source of U.S. concerns at the time), which was driven by weak demand that *followed* Japan's housing market collapse, U.S. demand was rising in 2002–03 (driving up its current account deficit in the process), and housing prices had begun increasing by double digits as of 2003. Moreover, at least some of the downward pressure on U.S. consumer prices arose from the growing share of manufactured goods originating in Asia and benefiting from economies of scale and competitive labor markets—which did not call for measures to boost U.S. demand.[43]

- Aligning monetary policy to goods prices alone might have been warranted had the housing and financial sectors been better regulated, and had private incentives been better aligned to financial soundness. But, given deficiencies in these areas, the impact of monetary policy on credit expansion and asset prices were legitimate concerns for policy attention.[44]

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[43] Borio and White (2003) discuss how liberalization of global markets for goods and services, advances in technology, and technology transfer contributed to disinflationary pressures globally.

[44] Bernanke (2010) acknowledged that monetary policy can be a "supplementary tool" for addressing financial risks, in case regulation cannot be strengthened adequately (in the context of arguing for the primacy of regulation and supervision to meet this objective). IMF (2009) reached a similar conclusion.

G. Global Imbalances and Capital Flows: Fueling the Fire

42. The role of capital inflows in fueling the U.S. asset boom, and the associated policies that aggravated global imbalances and augmented these flows, have generated considerable discussion since the crisis. During the seven years through June 2007, foreign holdings of U.S. long-term securities increased by about $5.5 trillion to more than $9 trillion, of which more than $4 trillion were invested in U.S. government, agency, or corporate debt (of which a large share was in MBSs), while 57 percent of marketable U.S. Treasury bonds were foreign-owned by mid-2007.[45]

43. The extent of foreign capital flows into the U.S. has led several analysts to conclude that foreign capital was an important, if not critical, ingredient in the financial crisis, as it depressed U.S. long-term interest rates and thus fed the housing and securitization booms.[46] For example: "it is impossible to understand this crisis without reference to the global imbalances in trade and capital flows that began in the latter half of the 1990s" (Bernanke, 2009), and "… it is hard to see how the vulnerabilities in the household sector of the United States could have been allowed to build for so long absent large inflows from the world's central banks" (Setser, 2009). Variants of the "global savings glut" argument have also been used to exonerate the U.S. from its regulatory and financial market shortcomings by arguing that without the high savings generating the capital surpluses, particularly from Asia, the U.S. asset booms could not have been sustained for so long and hence their reversal would have been less traumatic.

44. Alternative views stress the responsibility of the United States (and other capital flow recipients) to deploy foreign savings judiciously. The fact that large sums of foreign capital were invested in U.S. Treasuries, mortgage-backed securities, and more innovative financial products reflected both the scarcity of domestic savings in the United States and the fact that the fastest wealth accumulations were occurring in Asia, where the financial system and asset markets were insufficiently developed to absorb these savings. Moreover, the build-up of the U.S. housing boom would not have been so large had policies compatible with higher domestic savings in the U.S. been implemented, and had the financial sector been more effectively regulated.

45. The policies underlying global imbalances prior to the crisis—in both capital exporting countries and the United States—continue to be debated. Heavy foreign exchange intervention by several Asian and oil exporting countries prevented or limited their currencies from appreciating against the dollar as much as they would otherwise have done. In Asia, more significant appreciation would have been warranted not only by the emergence

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[45] Sources: Federal Reserve Flow of Funds; Bureau of the Public Debt; Treasury International Capital System.

[46] The 30-year mortgage rate, for example, declined from 8.5 percent in mid-2000 to 5.5 percent in 2005.

of large current account surpluses but also by soaring productivity growth in export industries.[47] Had key emerging market economies not constrained the appreciation of their currencies, the Fed's decision to cut the federal funds rate from 6.5 percent to 1 percent during 2000–03 could have led to a sharper weakening of the dollar, greater investment in U.S. exports, and a lesser boom in U.S. housing (Setser, 2009).

46. Though policies external to the United States may have made it more difficult to adjust the U.S. current account deficit, which reached 6 percent of GDP in 2006, no meaningful attempt at domestic adjustment was made before the crisis. The U.S. fiscal deficit increased by about 5 percent of GDP between 1998 and 2004, prompted by major tax cuts and increased spending (for the military and Medicare), and little concerted effort was made to contain the looming fiscal burden from the government's entitlement commitments (primarily the rising cost of healthcare provision). Simultaneously, personal savings had become negligible, and regulatory shortcomings allowed the mortgage boom to continue unhindered, even as monetary policy was accommodative and tax policies such as the (long-standing) mortgage interest rate deduction continued to subsidize borrowing to invest in housing. Monetary, fiscal, and incentive policies coupled with supervisory neglect were thus driving over-consumption in the household and public sectors and widening the U.S. current account deficit.

[47] For example, China's real effective exchange rate *depreciated* during the decade through 2007 notwithstanding extraordinary growth in China's exports, current account surplus, total factor productivity, and productivity in export industries during this period.

ANNEX 2. CONTRIBUTIONS OF OUTSIDE ANALYSTS PRIOR TO THE CRISIS

1. This annex reviews the work of selected outside analysts who highlighted vulnerabilities or policy shortcomings through 2006 that proved prescient in the aftermath of the U.S. financial crisis.[48] Its objective is to show that it was possible to provide such analysis in advance of the crisis on several of the risks and vulnerabilities that proved critical. To the extent that some of this analysis was conducted by prominent figures, it could have been utilized and referred to in the context of IMF surveillance. Analysis by others may have been less accessible, but it is still worth assessing why it was closer to the mark than was IMF bilateral surveillance. Lessons to draw from this work are discussed in Section IV of the main text of this paper.

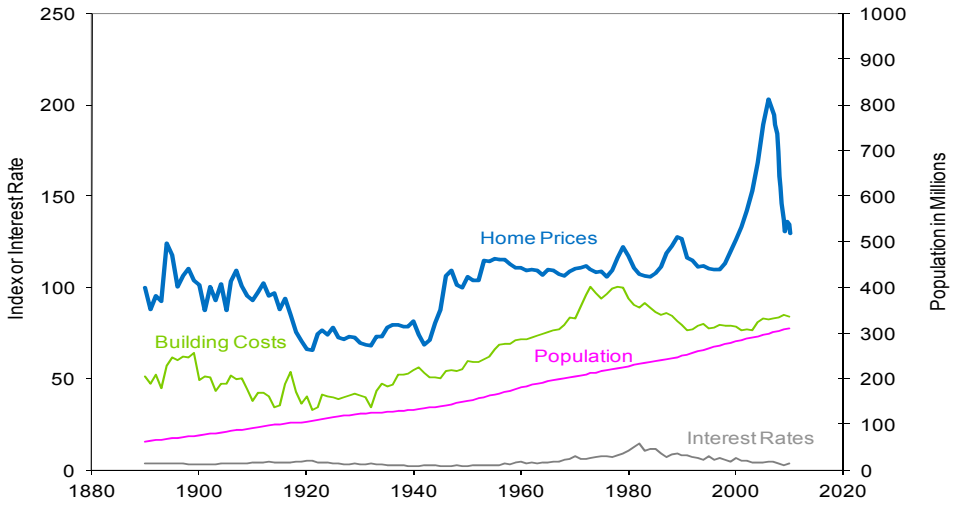
A. Repercussions of the Housing Boom and Bust

2. Concerns about a housing bubble and the consequences of its bursting were relatively commonplace before the collapse in housing prices. Indeed, Bezemer (2009) reports the findings of a large number of analysts (most of whom are not mentioned in this annex) who anticipated a collapse in housing prices and various aspects of the subsequent credit difficulties and recession.

3. **Robert Shiller: Diagnosing the housing bubble.** In the second edition of *Irrational Exuberance* (finalized in January 2005 and published in May 2005), Shiller expanded on his previous analysis of the stock market boom (contained in the first edition), and broadened it to cover the real estate market. He found that home price speculation was more entrenched than ever before. To illustrate how the housing bubble dwarfed previous episodes of real estate speculation, he constructed a long-term index of real housing prices, dating from 1890 through 2004, together with data on home building costs, population, and interest rates. One of his objectives was to show that explanations of the housing boom that were common at the time, such as the influence of increased building costs and population, or the trend in long-term real interest rates, did not suffice to explain the housing boom. In the process, he developed a behavioral theory to explain asset market exuberance, stressing the roles of structural, cultural, and psychological factors. Figure A2.1 reproduces his figure, with data extended through late 2009.

[48] "Outside analysts" are defined as anyone not responsible for the IMF's bilateral surveillance of the United States. In addition to analysts outside the IMF, this also includes IMF staff members not involved in the U.S. Article IV consultations, although the discussion excludes the analysis contained in the *WEO* and *GFSR*, which is reviewed in a parallel background paper (Banerji, 2010). The choice of cutoff date is meant to signify warnings provided sufficiently in advance of August 2007, when the Federal Reserve began to ease monetary policy out of a concern for financial stability.

Figure A2.1. U.S. Housing Prices in Historical Perspective



Source: Shiller, 2010.

4. Following up on this analytical work, Shiller gave talks at the Federal Deposit Insurance Corporation and the Office of the Comptroller of the Currency in 2005, urging them to tighten mortgage lending standards in order to undermine what he considered was irrational exuberance in the housing market (as reported in Shiller, 2008).

5. Shiller's views on housing were also widely reviewed in the popular press, for example in the following extract from *Barron's,* June 2005:

> "Shiller worries that the market has become so overheated in many areas of the U.S. that any decline could pick up momentum in two to three years, when the adjustable-rate mortgages that have accounted for nearly half of all home loans in the second half of 2004 will begin to 'reprice' at higher interest rates, potentially burying overly optimistic buyers sporting scant equity but hefty debt. Low-to-no-down-payment and interest-only mortgages would only add to the possible mayhem of involuntary sales if home prices were to sag, Shiller adds." (Laing, 2005)

6. **Paul Krugman: Disseminating through the media.** Beginning in 2005, Krugman wrote frequently about the risk and consequences of a housing crash in his bi-weekly *New York Times* columns. The following quotations from 2005–06 are representative:

> "Meanwhile, the U.S. economy has become deeply dependent on the housing bubble. … As the air begins to leak out of the bubble … everyone … should be worried." ("That Hissing Sound," August 8, 2005)

> "In practice, however, a soft landing looks unlikely … According to HSBC's estimates, houses in the bubble zone are overvalued by between 35–40 percent, creating trillions of dollars of illusory wealth. So it seems likely that America's borrowing binge will end with a bang, not a whimper, that spending will suddenly drop off as both the bond market and the housing market experience rude awakenings. If that happens, the economic consequences will be ugly." ("Debt and Denial," February 13, 2006)

> "housing has been the main engine of U.S. economic growth over the past three years, and with that engine going into reverse, it's hard to see how we can avoid a serious slowdown." ("Housing Gets Ugly," August 25, 2006)

7. **Kurt Richebacher: Predicting recession via asset price adjustment.** Many other analysts, perhaps less prominent than Krugman or Shiller, were more graphic in their concerns.[49] In a series of articles written in 2006, for example, Richebacher was unequivocal in his conviction that the housing bubble would end in economic disaster, given that it had been inflated by loose monetary policy rather than domestic saving, and had been accompanied by unsustainable debt accumulation:

> "The one thing that still separates the U.S. economy from economic and financial disaster is rising house prices that apparently justify ever more credit and debt … Given this precarious income situation on the one hand and the debt explosion on the other, it will be clear that in the foreseeable future there will be heavy selling of houses, with prices crashing for lack of buyers." (Richebacher letter, July 2006)

> "A recession and bear market in asset prices are inevitable for the U.S. economy." … This will not be a garden-variety recession, in which monetary easing unleashes pent-up demand, as it used to do in past business cycles." (Richebacher letter, August 2006).

> "The great trouble for the future is that the credit bubble has its other side in exponential debt growth" … "The U.S. liquidity deluge of the last few years has had one single source: borrowing against rising assets backed by the Fed's monetary looseness… all hinging on further rises in asset prices. But they are going to plunge." (Richebacher letter, September 2006)

> "There is no question that the U.S. housing bubble is finished. All remaining questions pertain solely to the speed, depth, and duration of the economy's downturn." (Richebacher letter, September 2006)

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[49] See Bezemer (2009) for a fuller discussion.

8. **Robert Parenteau: Predicting the repercussions of unsustainable household balance sheets.** Parenteau (2006) found that the gap between U.S. household expenditure and income in the first quarter of 2006 had grown to $600 billion on an annualized basis. Applying basic sustainability tests to household spending, income, deficits, and debt, he found that given the explosive growth in the household debt-to-income ratio, household finances could only be sustainable if asset prices continued appreciating at an unrealistic pace indefinitely. Because the increase in the price of households' principal asset, housing, was already slowing, Parenteau predicted that consumer spending would have to decelerate, with severe consequences for the economy. Interestingly, he also correctly predicted that none of these dire consequences depended on a flight of foreign investors. The following excerpts are illustrative:[50]

> "U.S. household deficit spending has achieved an alarming trajectory. So, too, has the ratio of household debt to income."
>
> "…when a conventional debt-trap equation is applied to the U.S. household sector, we find the presence of an explosive household debt-to-income trajectory. The primary financial surplus is nearly exhausted, and the long-run household income growth remains below the prevailing interest rate on household debt. Accordingly, continued household deficit spending has become increasingly dependent upon sustained asset price appreciation in a Ponzi-like fashion. Under this dynamic, an explosive household debt-to-income trajectory can be sustained only by an equally explosive asset price appreciation that lifts asset prices far from fundamentals. Central bankers, accordingly, may feel compelled to allow (if not actively generate or support) serial asset bubbles in order to avoid violating the lower threshold of their inflation target zones."
>
> "Even under optimistic assumptions, the trajectory of U.S. household spending growth is likely to slow further. With the end of the housing boom, various major lines of household credit have already slowed dramatically, which suggests that the pace of household deficit spending is likely to reverse course. If, as is typically the fashion, banks become concerned with creditworthiness, as the slowdown unfolds, a credit crunch could sharply

[50] The Levy Institute of Bard College, where Parenteau published his paper, was the source of several other papers reaching similar conclusions about the fragility of U.S. growth derived from analyzing household and government balance sheets. See, for example, Godley (2005), and Papadimitriou and Dos Santos (2005).

curtail household credit growth and force a dramatic reversal of household deficit spending."[51]

"… based on the analysis and evidence presented in this brief, the financial-balance scenarios developed by researchers at the Levy Institute surely deserve serious examination by policymakers, investors, and business leaders. A rendezvous with reality for U.S. household financial imbalances appears to have arrived. It would be best to have an adequate map in hand with which to anticipate and adequately prepare for the possible repercussions."

B. Linking a Housing Collapse to Systemic Financial Problems

9. **Nouriel Roubini: Connecting a housing price collapse to financial implosion.** Roubini was surely the most persistent conveyor of concerns about housing prospects and their repercussions for the U.S. economy. Since it was rarer to link the expected housing price decline to a financial implosion, the following discussion focuses on Roubini's statements connecting a housing collapse to the financial sector. His August 30, 2006 blog, for example, stated that:

"[t]he recent increased financial problems of … subprime lending institutions may thus be the proverbial canary in the mine—or tip of the iceberg—and signal the more severe financial distress that many housing lenders will face when the current housing slump turns into a broader and uglier housing bust that will be associated with a broader economic recession. You can then have millions of households with falling wealth, reduced real incomes, and lost jobs…" (as reported in Bezemer, 2009)

10. Shortly thereafter, on September 7, 2006, Roubini gave a well attended presentation at the IMF, which focused on why the U.S. economy was likely to enter a recession, why the risk of a "hard landing" was very high, why U.S. consumers were close to a "tipping point," and "why the housing slump could lead to a systemic problem for the financial system." The following passages from a transcript of that presentation illustrate his views on the financial sector repercussions of the housing collapse:

"Where is the housing mortgage risk concentrated given there is a huge amount of mortgage risk right now, given the trillions of dollar of mortgage debt?"

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[51] "Note that none of this requires foreign private investors or foreign central banks to boycott U.S. dollar-denominated assets or otherwise dump existing holdings of U.S. dollar–denominated assets, which is the prevailing scare story circulated in discussions of the resolution of U.S. financial imbalances."

> "I think that in part it is still the banking system that is directly or indirectly holding this risk; directly because a good chunk of the mortgages are still on their books, and indirectly because they dumped some of that mortgage risk and they got in an exchange mortgage-backed securities (MBSs) and effectively through the MBSs they are holding part of the risk. Part of it of course was distributed as a risk to asset managers and to hedge funds that are holding tons of these mortgage-backed securities. So those guys could get in trouble, but if those guys get in trouble, then the counterparties of those hedge funds are highly leveraged institutions, meaning prime brokers or investment banks. You could not rule out some systemic effects if one of these big highly leveraged institutions goes belly-up."

> "And of course a good chunk of that credit risk is now in the hands of the government-sponsored enterprises, Fannie Mae and Freddie Mac, that are holding really trillions of dollars of mortgage credit risk. In addition to that of course they are also holding the market risk of changes in interest rates. Some of this agency debt over the last few years, a lot of it has been bought also by foreign central banks, so some of the shocks could be transmitted to the rest of the world, but most of it is still domestically held, so it is somewhere in the system, and I do not think it is very diffused."

> "So there is a meaningful risk now that if you have a real housing bust that is not just a sectoral shock but leads to an economy-wide recession, then that housing slump could lead then to a systemic problem for the financial system."

> "This time around I think we are going to have a national rather than just a sectoral or regional kind of housing slump. It is not just the two coasts, prices are falling even in the Midwest. So the risks actually from a systemic point of view I think are just much larger than those that you would have in the case of the 1980s."

11. **Michael Burry: Shorting subprime-backed CDOs—in 2005.** As reported in Lewis (2010), by early 2005 investment manager Burry recognized that the subprime mortgage loans being originated at the time were bound to go bad, given how they were structured (with unsupportable loan recipient incomes, and teaser interest rates that were due to jump within two years). He also recognized the signs of a bubble in the broader U.S. mortgage bond market, as evidenced in his letters to investors in 2005:

> "Sometimes markets err big time. … they are erring right now by continuing to float along as if the most significant credit bubble history has ever seen does not exist."

> "It is ludicrous to believe that asset bubbles can only be recognized in hindsight. … There are specific identifiers that are entirely recognizable during the bubble's inflation. One hallmark of mania is the rapid rise in the incidence and complexity of fraud.… The FBI reports mortgage-related fraud is up fivefold since 2000. … The salient point about the modern vintage of housing-related fraud is its integral place within our nation's institutions." (as reported in Lewis, 2010)

12. By mid-2005, Burry had bet more than $1 billion against individual CDOs backed by subprime mortgages that he considered particularly vulnerable. He reportedly also avoided selecting counterparties to his trades that he considered vulnerable—including Bear Stearns and Lehman Brothers. Soon thereafter, a number of hedge fund managers and traders at the big banks began to short subprime-backed CDOs—typically on a larger scale than Burry (Lewis, 2010; Morgenson and Story, 2009).

C. Highlighting Regulatory Shortfalls and Ensuing Risks

13. **Shadow Financial Regulatory Committee: Highlighting the conflicting incentives of credit rating agencies.** In June 1999, the Basel Committee had released and invited public comment on a proposal outlining potential improvements to its system of capital regulation. In response, in March 2000, the Shadow Financial Regulatory Committee prepared a monograph (SFRC, 2000), which, inter alia, expressed concern about the use of private credit rating agencies to measure loan risk:[52]

> "Furthermore, the use of private credit ratings to measure loan risk may adversely affect the quality of ratings. If regulators shift the burden of assessing the quality of bank loans to ratings agencies, those regulators risk undermining the quality of credit ratings to investors."

> "Ratings agencies would have incentives to engage in the financial equivalent of 'grade inflation' by supplying favorable ratings to banks seeking to lower their capital requirements. If the ratings agencies debase the level of ratings, while maintaining ordinal rankings of issuers' risks, the agencies may be able to avoid a loss in revenue because investors still find their ratings useful. If incumbent firms do not succumb to those added incentives, new entrants are likely to arise to meet the demands for laxity. Indeed, because entities based in the United States or the United Kingdom currently dominate the ratings business, regulatory authorities in other countries would be strongly tempted

[52] The Shadow Financial Regulatory Committee is a group of independent experts on the U.S. financial services industry and its regulatory structure. Conflicts of interest within nationally recognized statistical rating organizations have been known for decades. See Levine (2010) for a fuller discussion.

> to approve new domestic ratings agencies without necessarily having full regard for the quality of their ratings. In short, if the primary constituency for new ratings is banks for regulatory purposes rather than investors, standards are likely to deteriorate."

14. As discussed in Annex 1 above, U.S. authorities nevertheless broadened the definition of low risk securities rated AA or higher by the major credit rating agencies, effective January 2002, and made such securities subject to reduced capital requirements on par with those of Fannie Mae and Freddie Mac, after which the pace of securitization of subprime mortgages increased significantly.

15. **Brooksley Born: Regulating over-the-counter derivatives.** In early 1998, Brooksley Born, Chairman of the Commodity Futures Trading Commission, became concerned at how rapidly the OTC derivatives market was growing and how little regulators knew about it. At her request, the CFTC published a "Concept Release" on OTC derivatives (CFTC, 1998), inviting comments on a comprehensive list of questions, concerns, and proposals for more transparency in this area. Subsequently, Born delivered a series of speeches in which she highlighted the need to strengthen disclosure requirements and oversight over OTC derivatives and the risks of not doing so, generating considerable opposition from derivatives dealers and the major regulatory agencies (Born, 1998; 1999a; 1999b). In June 1999, a President's Working Group suggested there was no need to strengthen regulation in this area—notwithstanding the near collapse of Long-Term Capital Management (LTCM) in September 1998, whose capital had been severely diminished in large part via the extensive use of OTC derivatives.[53] And the Commodity Futures Modernization Act of 2000 explicitly debarred the CFTC from jurisdiction over the OTC derivatives market.

16. **Gary Schinasi: Identifying systemic challenges posed by over-the-counter derivatives.** On leave from the IMF, Schinasi produced a book titled *Safeguarding Financial Stability*, which was published by the IMF in 2006. His chapter on OTC derivatives clarified the benefits these instruments bestowed, but nonetheless highlighted in detail why OTC derivatives markets were subject to dangerous instability given that a handful of financial institutions were each counterparty to tens of thousands of bilateral, price-dependent, dynamic, and opaque credit exposures, whose size and characteristics were not fully understood by market participants themselves. He noted that the severity of repeated episodes of turbulence in the 1990s and early 2000s suggested that OTC derivatives activities could produce fragility and threaten stability in ways akin to traditional bank runs. Schinasi also stressed that insufficient progress had been made in addressing counterparty, liquidity,

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[53] Prior to its near collapse, LTCM was exposed to $1.25 trillion in notional value of OTC derivatives, supported by $5 billion in capital, and required a Fed-engineered private sector bailout to curtail its disorderly unwinding.

and operational risks, and in removing legal and regulatory uncertainty, and that the implementation of further reforms along these lines was essential.

17. **IMF Institute Seminar on Asset Securitization and Structured Finance: Highlighting risks from rapid growth in new financial instruments.** In April 2005, the IMF Institute held a seminar on the above topic, inviting leading market participants and critics. Summarizing the proceedings of the seminar for IMF management, the Institute highlighted the risks from the rapidly growing market for asset-backed securities and structured instruments:[54]

- "The market for asset-backed securities and structured instruments is large and is expanding rapidly. In 2004, the issuance of asset-backed securities in the United States (US$900 billion) for the first time exceeded the issuance of corporate bonds. In Europe, issuance in the securitization market set a record in 2004 with a volume of €250 billion—three times larger than 2000 and six times larger than 1998.

- Some of the structured products are complex and concerns have been raised that a sizeable fraction of the participants in these markets may not fully understand the risks they are taking on.

- Risks are being repackaged and distributed among financial institutions. It is not clear whether these risks are borne by institutions that are best able to bear them or whether the risks have moved to institutions that are least regulated.

- Because these instruments are new, it remains to be seen how the market for these products will behave over an interest rate cycle."

A key issue was the nature of credit ratings, and the information they conveyed about structured instruments. Participants acknowledged that a single credit rating could not adequately capture the riskiness of structured products. It was imperative that investors understood the limitation of ratings, and conducted their own analysis, including stress tests on their credit exposures. Increasingly, rating agencies have been deriving a substantial fraction of their revenues from structured transactions. Some participants raised the issue of whether rating agencies were adequately managing conflicts of interest, and thought that the transparency of rating methodologies was essential for effective functioning of the market.

Even in advanced markets, such as the United States, bank supervisors had encountered problems stemming from securitizations. In some cases, banks had been weakened substantially because securitizations that went bad had to be brought back on

[54] The four key points of the memo are reproduced below; other pertinent discussion is paraphrased.

the balance sheet; in other cases banks had hidden the losses and/or suffered because internal models had been too optimistic in predicting earnings. Bank supervisors stressed that considerable expertise is required for effective supervision of securitizations and associated special-purpose vehicles.

Some speakers saw systemic risk potentially arising from the dynamic hedging in connection with structured products. Such hedging relies on continuous access to markets for frequently readjusting positions. However, in a crisis, the required market liquidity could dry up, and as a result price dynamics in the asset and credit derivatives markets could be amplified.

D. Highlighting Risk in Financial Development

18. **Raghuram Rajan: Questioning whether financial development had made the world riskier.** In an August 2005 paper and presentation at the Federal Reserve's annual Jackson Hole conference, Rajan pointed out that notwithstanding the numerous benefits conferred through financial development in the past 30 years, a number of factors were combining to increase risk.[55]

19. First was the rapid move to arm's length transactions. To illustrate, using data from the United States, Rajan reported that credit default swaps had expanded from 5 to more than 30 percent of private bank credit during 2001–04, with the pace of growth accelerating, and that global gross external assets (claims of a country on foreigners) had grown from 20 percent to 140 percent of world GDP during 1970–2005. At the same time, a growing share of savings was being placed and managed by a wide range of nonbank financial intermediaries (NBFIs) instead of banks.[56] As a result of these trends, credit risk was increasingly being traded with strangers, while competition for managing savings across institutions had grown more intense, with potentially risky repercussions.

20. Second, while banks could sell much of the risk associated with their securitized loans, the portion they typically retained was the most risky: equity tranches of the securitized mortgages. Since banks made returns by originating risks *and* by bearing them, the space that was freed up on their balance sheets by selling portions of the securitized loans could be used for originating more risk. Banks would focus on transactions in which they had comparative advantage (of liquidity backed by a reliable deposit base). Typically, competition with the NBFI "investment managers," who increasingly were capturing the

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[55] Rajan's presentation was titled: "The Greenspan Era: Lessons for the Future" and was based on his submitted paper: "Has Financial Development Made the World Riskier?" This discussion largely draws on his presentation, which was posted on the IMF's internal website. At the time, Rajan was the IMF's Economic Counselor and Director of its Research Department.

[56] Illustrated with data from the United States.

banks' traditional market share, would force banks to flirt with the limits of illiquidity, for example where explicit contracts were hard to specify, or where risks needed to be hedged.

21. Rajan also argued that the compensation of bank managers fed rather than restrained their appetite for risk. Moreover, available data indicated that banks in industrial countries were no safer than in the past: earnings volatility in the United States had increased over the last 20 years; distance-to-default ratios had remained constant or fallen; and—assuming bank earnings were growing at the same pace as the overall market—the price/earnings ratio of banks relative to the overall market was falling, suggesting that bank earnings were being discounted at an increasing rate, thus implying that the market considered them as riskier.

22. Looking at changes that had taken place in the incentives facing NBFI investment managers, Rajan noted that at the time of writing there was typically less downside and more upside from generating investment returns, and that the managers' performance relative to other peer managers mattered more than before. He argued that two concerns arose as a consequence. Since risk and return are related, investment managers had an incentive to conceal risk. And the easiest risks to conceal were tail risks (which would produce high returns most of the time but had a small probability of generating severe consequences), for example by writing guarantees against a creditor defaulting. Second, there was an incentive to herd with other investment managers, because herding provided insurance that a manager would not underperform his peers. But herd behavior could move asset prices away from fundamentals. Both behaviors would reinforce each other during an asset price boom, and could be compounded in a low-interest-rate environment. With banks providing much of the liquidity to NBFIs, perhaps the most important concern was whether the banks would be able to provide liquidity to financial markets if the tail risk materialized. A loss of confidence in this environment could freeze the inter-bank market and precipitate a full blown liquidity crisis.

E. Linking Monetary Policy to Asset Prices

23. **BIS-affiliated economists William White, Claudio Borio, and Philip Lowe: Emphasizing the perils of focusing monetary policy too narrowly on short-term inflation targets, and of ignoring the signals from asset price developments.** William White and his colleagues at the BIS published several papers warning that real and financial sector imbalances were the result of excessive credit creation, of which inflated asset prices were a symptom. In a paper presented at the Fed's Jackson Hole conference, Borio and White (2003) presented several reasons why economic booms and the build-up of unsustainable asset price increases could coexist with muted inflation:

- Long expansions would most likely develop following favorable supply-side developments such as improvements in productivity or the establishment of credible policy frameworks.

- Unsustainable asset price increases could themselves play a role in dampening inflation by artificially boosting accounting profits, allowing for more aggressive pricing strategies. By increasing tax revenue, such booms would also tend to strengthen fiscal positions, crowding in capital accumulation and hence productivity gains.

- The very success in establishing low and stable inflation, underpinned by greater central bank credibility, could further dampen the inflationary process.

24. Under such circumstances, if policy rates focused only on near-term inflation, they might fail to rise promptly enough to help restrain the unsustainable build-up of asset prices. The authors further postulated that since it could be difficult to tighten monetary policy in the absence of near-term inflation pressure, two modifications to the prevailing framework would be called for to rationalize monetary tightening: first, policy decisions should be articulated on the basis of longer horizons; and, second, greater weight would need to be assigned to the balance of risks in the outlook, as opposed to central scenarios or most likely outcomes. The following excerpts from their conclusions are illustrative:

> "The basic thesis of this essay is that edging further toward the goal of securing simultaneous monetary and financial stability calls for some subtle modifications in current policy frameworks in both the financial and monetary spheres. Their aim would be to ensure that mutually reinforcing anchors are in place, so as to reduce the scope for financial imbalances to develop and threaten the two objectives. Underpinning these modifications is an equally subtle paradigm shift in prevailing views about the dynamics of the economy. Such a shift would take financial factors, and financial imbalances, from the periphery to the core of our understanding of business fluctuations."

> "Putting in place mutually supportive anchors essentially means two modifications to policy frameworks. On the prudential side, it would imply strengthening further the 'macro-prudential' orientation of current arrangements. In terms of objectives, this means focusing more on preventing episodes of systemic distress that have costs for the real economy rather than on preventing the failure of individual institutions per se. In terms of strategy, it means thinking further about ways to address the potentially excessive pro-cyclicality of the financial system, which arguably lies behind many of the episodes of financial instability with serious macroeconomic costs. This would include, in particular, exploring means of building up prudential cushions in good times so as to partially run them down in bad times. On the monetary side, it would imply being alert to the possibility that financial imbalances can also build up when inflation is low and stable, and standing ready, occasionally, to lean against those imbalances as they develop even if near-term inflation pressures are not apparent. Current frameworks should be

capable of accommodating such a monetary policy response. In most cases, a lengthening of the policy horizon and greater attention to the balance of risks in the formulation of policy may be all that is required."

25. An earlier paper, by Borio and Lowe (2002), had reached similar conclusions:

"This paper has argued that financial imbalances can build up in low inflation environments and that in some cases it is appropriate for policy to respond to these imbalances. Indeed, the current configuration of arrangements in the monetary and financial spheres may well have increased the likelihood of low inflation coexisting with the development of imbalances in the financial system. Monetary policy rules that do not take these imbalances into account may unwittingly accommodate their further build-up. The same could be said for prudential policy. Against this background, there is a risk of greater amplitude in financial cycles going hand in hand with more disruptive booms and busts in real economic activity. A policy response worthy of serious consideration would be a strengthening of the system-wide focus in the prudential framework coupled with a greater willingness of monetary authorities to respond to the occasional development of financial imbalances that pose a threat to the ongoing health of the macroeconomy. Greater cooperation between monetary and prudential authorities is important, not just in the management of crises, as well understood today, but also in preventing their emergence."

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ENDNOTES: SELECTED QUOTATIONS FROM U.S. BILATERAL SURVEILLANCE

[i] **2005 SIP, Chapter I:** "The change in mortgage market structure from a system based on balance-sheet lending by depositories to a market-based system of securitized mortgage finance has damped the volatility of financing flows and real activity. With funding conditions now determined in a national market, trends in real activity and prices have become less cyclical and converged across all regions of the United States. As a result, a model of housing prices based on economic fundamentals finds that pricing errors—the deviations of actual prices from those estimated in the model—have fallen by half. Moreover, a change in homebuilders' behavior—in particular, a move away from speculative starts and a reduction of levels of inventories of new homes—has reduced the risk of a sharp decline in housing prices …"

[ii] **2005 Article IV report:** "The robust housing market has caused financial regulators to tighten oversight of home equity and other residential loans. Notwithstanding strong house price increases in many regions, Chapter 1 of the *Selected Issues* paper suggests that securitization of mortgage debt has limited systemic financial sector risks by allowing significant diversification of real estate exposures."

[iii] **2006 SIP, Chapter I:** "**The MBS market has shown few signs of concern about the slowing housing sector**. Given the rise in exotic mortgage products, many analysts have been concerned that a correction in the housing market could entail some financial losses on the part of real estate lenders and MBS holders. However, others have pointed out that the risks from exotic mortgages still appear limited, given their relatively recent appearance, relatively diversified ownership, and some signs of a return to more conservative lending practices in 2006."

[iv] **2006 SIP, Chapter I:** "**This paper suggests that U.S. financial markets have been skillful in developing tools that have helped households exploit favorable global financing conditions to boost home ownership and acquire housing wealth.** This is likely to have contributed to a rising current account deficit, but indications are that credit and risk allocation mechanisms in the U.S. housing market have remained relatively efficient. This should provide comfort as the real estate market has entered what so far appears to be a cyclical downswing."

[v] **2007 SIP, Chapter V:** "**The subprime crisis has so far affected mostly banks with subprime-specialist subsidiaries (e.g. HSBC) and a number of specialty finance companies**."

"Assuming flat house prices, $18–$25 billion of mark-to-market losses may accrue on about $350 billion of outstanding MBS-backed CDOs. Assuming house prices fall 5 percent, mark-to-market losses are estimated to rise to approximately $60 billion."

[vi] **July 2007, Article IV report: "Underlying the baseline forecast of a soft landing is the continuation of supportive financial conditions, even after the emergence of problems with subprime mortgages**. Rising subprime delinquencies led to a jump in spreads on higher-risk mortgage-backed securities, but there has yet been little contagion outside of the near prime ("Alt-A") segment of the mortgage market, reflecting the wide dispersion of risk and concentration of difficulties in specialist subprime originators, many of which have failed."

2007 SIP Chapter V: "After a number of warning signs, the U.S. "subprime mortgage crisis" became a headline issue in February 2007. Notwithstanding the bankruptcy of numerous mortgage companies, historically high delinquencies and foreclosures, and a significant tightening in subprime lending standards, the impact thus far on core U.S. financial institutions has been limited. And while some structured credit hedge funds have suffered large losses, mortgage securitization appears to have helped disperse the impact throughout the financial system, in contrast to the Savings & Loan crisis of the early 1990s. The credit cycle is thus largely playing out in the securities and derivatives markets, rather than on bank balance sheets."

"This paper reviews the history and structure of the subprime market. The results suggest that new origination and funding technology appear to have made the financial system more stable at the expense of undermining the effectiveness of consumer protection regulation."

[vii] **June 2006 SIP: "Financial soundness of LCBGs, as well as investment banks and insurers, is found to have improved in 2003–05**. Distance-to-default measures are at multi-year highs, while weakening co-movements of LCBG risk profiles point to diversification gains at a system level. Dividing LCBGs into real estate-focused and other, more diversified subsets, or by the share of noninterest income in total gross income, reveals no meaningful differences."

"The 'system DD' for the portfolio of LCBGs, embedding all correlations across institutions, is observed to climb faster than the average of individual DDs, implying a reduced likelihood of a shock hitting all firms contemporaneously. The widening difference between the two indicators appears to reverse a ten-year trend, observed through 2003, that had suggested LCBGs were becoming increasingly exposed to common shocks. System DDs for the investment banking, insurance, and nonfinancial corporate sectors are also observed to improve."

[viii] **2007 SIP, Chapter IV:** "… by separating the originators and bearers of risk, it [the originate-to-distribute model] may be exacerbating information asymmetries—creating a new, hitherto less than fully appreciated, "principal-agent problem" whereby originators have

incentives to embed more risks in capital structures than investors expect, notwithstanding information support from rating agencies. The changing incentives, in turn, could be amplifying pro-cyclicality in lending standards. Perhaps most importantly, from a systemic perspective, the model is changing rather than eliminating risks in the core, with liquidity risk and counterparty risk emerging as new focal points for intermediaries and supervisors alike."

"Part of the recent deterioration in credit standards may also be a by-product of newer securitization techniques. …"

[ix] **2007 SIP, Chapter IV:** "**Although complacency would be misplaced, it would appear that innovation has supported financial system soundness**. New risk transfer markets have facilitated the dispersion of credit risk from a core where moral hazard is concentrated to a periphery where market discipline is the chief restraint on risk-taking. The conduit mechanism, in turn, has facilitated broader credit extension—with the important qualitative nuance that much of the recent credit growth has reflected lending to new, previously excluded borrowers, as opposed to "more money thrown at the same people." … Although cycles of excess and panic have not disappeared—the subprime boom-bust being but the latest example—markets have shown that they can and do self-correct."

[x] **2006 SIP, Chapter V:** "**The foregoing analysis, while indicative of a banking system in good health, underscores the surveillance challenges spawned by innovation.** …. In practice, U.S. regulators have met the challenge by focusing on a few systemic institutions, with an emphasis on continuous supervisory contact, internal controls, counterparty risk management, and measures to ensure rapid clearing in critical market segments. Led by the Federal Reserve, they also monitor a host of market signals."

[xi] **2007 SIP, Chapter IV:** "… As we shall argue, however, parsimony in the application of safety-and-soundness oversight has been a key factor supporting innovation in the U.S. financial system."

[xii] **2001 Article IV report:** "The staff noted the increased reliance of U.S. banks on off-balance-sheet financial instruments, including derivatives and securitization vehicles, to manage credit and market risks. Some of these newer instruments conveyed potentially significant legal and operational risks that had not yet been tested by a recession. Supervisory authorities broadly concurred, although they did not regard these market developments as necessarily involving greater systemic vulnerability. They noted that there had been a few instances recently when banks had offered purchasers of some of their previously issued securitized credits some additional protection against defaults on the loans underlying these securities, thereby effectively bringing the credit risk associated with these securitized credits back on to the banks' balance sheets. If this practice were to become more widespread during a period of stress, banks' credit exposures could significantly exceed their reported exposures. The authorities viewed credit derivatives—which were still relatively small in

overall size—as having considerable potential to become useful tools for bank risk management as the market developed over time. All derivatives transactions were becoming increasingly concentrated, with five of the largest banks accounting for over 90 percent of gross exposures in 2000, up from 75 percent in 1995. While this concentration made supervision easier in some ways, it increased the importance of carefully monitoring these banks' risk-management practices."

[xiii] **July 2003, Article IV report: "While monetary policy has responded aggressively to the economic slowdown, further easing may still be required if the recovery does not regain momentum.** The Federal Open Market Committee has appropriately signaled its readiness to act further, if necessary, and its willingness to use a broader range of policy instruments should deflationary pressures intensify. A quantified statement of the Federal Reserve's inflation objective could further anchor inflation expectations, which might be especially helpful now that interest rates have moved close to zero and deflation is a concern."

July 2004, Article IV report: "The Federal Open Market Committee has appropriately begun preparing markets for the gradual withdrawal of stimulus. The aggressive easing of recent years has provided essential support to the recovery, and the monetary authorities are to be commended for forestalling fears of deflation that emerged last year. Nonetheless, with signs that the recovery is maturing, labor market conditions are improving, and concerns that higher energy prices could revive inflation expectations, the time has come to start removing stimulus."

July 2005, Article IV report: "The Federal Reserve's gradual and flexible approach to monetary tightening has been effective. Interest rate hikes have been coupled with clear messages that more forceful action would be required if price pressures continued to intensify, which has helped anchor inflation expectations and allowed a gradual pace of tightening. Looking forward, however, monetary conditions still appear accommodative and—especially against the background of low unemployment, the recent rise in unit labor costs, and house price inflation—a more aggressive pace of interest rate hikes cannot be ruled out."