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## United States: Selected Issues

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UNITED STATES

**Selected Issues**

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July 11, 2007

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## **Part I. International Links**

## I. SUMMARY OF FOREIGN ENTANGLEMENTS: MEASURING THE SIZE AND SOURCE OF SPILLOVERS ACROSS INDUSTRIAL COUNTRIES

IMF Working Paper WP/07/182 by Tamim Bayoumi and Andrew Swiston

1. ***The size and sources of international spillovers of activity remain subject to significant uncertainty.*** One reason for this is the difficulty of separating the impact of global and regional shocks, given the high correlation of economic cycles.
2. ***This working paper uses a new approach to differentiating these effects using disturbances to a diverse group of small industrial countries as a proxy for global shocks.*** The logic is that a disturbance to an aggregate of growth in Australia, Canada, Denmark, Norway, New Zealand, Sweden, and Switzerland—countries that are varied in location and economic structure—is a good candidate for a global shock.
3. ***Vector autoregressions (VARs) are used to estimate the size and sources of spillovers.*** The size of spillovers is estimated using VARs of quarterly growth for four regions since the early 1970s—the United States, the euro area, Japan, and the small industrial countries. Next, the channels for spillovers are investigated by adding data on real net exports, commodity prices, and financial variables (short- and long-term interest rates and equity prices) to this baseline model.
4. ***Particular attention is placed on the robustness of results across alternative approaches to identifying the baseline VAR.*** The traditional approach to identification is to assume that contemporaneous spillovers are assumed to flow in only one direction (say from the United States to the euro area) and not in the other direction. In this paper, results are also reported for a new approach to identification in which spillovers flow in both directions.
5. ***The results from the baseline VAR suggest that shocks to the United States are significant for foreign activity.*** The spillovers to the euro area, Japan, and small industrial countries are roughly one-quarter to one-half as large as the disturbance in U.S. output. They are particularly large and statistically significant for the euro area and small industrial countries (Figure 1). On the other hand, while global shocks have some impact on U.S. growth, spillovers from the euro area and Japan are small and insignificant. Similar results are found for the first and second half of the sample, except that the size of U.S. shocks diminishes considerably, reflecting the great moderation in U.S. macroeconomic volatility.
6. ***The size of U.S. spillovers is robust to alternative orderings of the regions.*** Figure 1 reports the uncertainty around the impulse response functions based on potential volatility of the parameters of the VAR and the additional uncertainty reflecting alternative orderings of the variables in the identification scheme. As can be seen, the difference between the two estimates is small for U.S. spillovers. (This is less true of responses to global shocks, identified as disturbances to the aggregate of other industrial countries



7. ***To investigate the sources of spillovers, the baseline VAR is extended to encompass the main possible conduits—trade, commodity prices, and financial variables.*** More specifically, the impact of real net exports, real commodity prices, short-term interest rates, bond yields, and equity prices on spillovers were estimated by adding these variables to the VAR. To conserve degrees of freedom, each of these variables is included separately.

8. ***U.S. spillovers to foreign output are largely transmitted through financial channels*** (Figure 2). Trade explains only a limited amount of spillovers across regions and, while slightly larger, the role of commodity prices is also limited. Financial market conditions play the largest role in transmitting spillovers across regions, with the largest contribution coming from monetary policy but significant roles also played by equity prices and bond yields.

9. ***The aggregate impact estimated from these separate sources corresponds reasonably closely to the overall impulses, providing a useful check on the results.*** Since the impact of each source of spillovers is estimated from a separate VAR, these effects can be added together to provide an alternative estimate of the size of the spillovers. As can be seen in Figure 2, there is a relatively close correspondence between the two approaches.

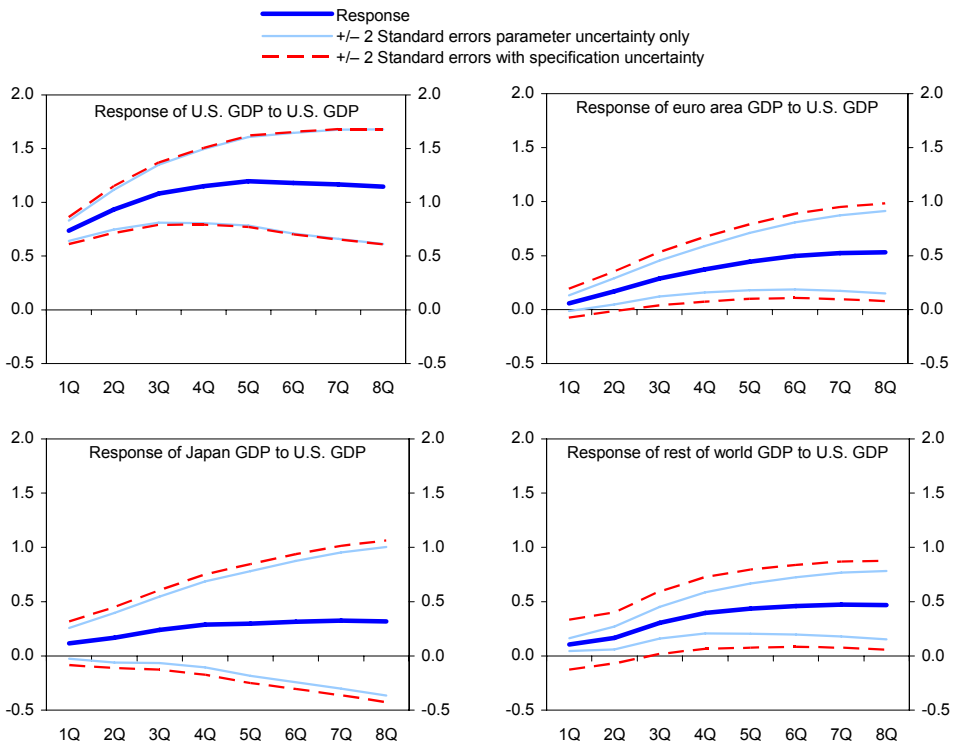
## Conclusions and Policy Implications

10. ***To summarize our findings:***

- ***The United States creates large spillovers to other regions.*** The impact of global shocks (identified in the approach using those experienced by smaller industrial countries) is also significant, although their size depends on the chosen specification. The euro area and Japan generally have limited spillovers on other parts of the world.
- ***The main source of spillovers is global financial conditions.*** Both monetary policy and financial conditions more generally matter for transferring activity across regions. By contrast, trade and commodity prices are less potent factors in this process.
- ***The great moderation in U.S. activity appears to have driven lower global output variability.*** Lower U.S. macroeconomic uncertainty, and the associated financial stability, appears to have been the main factor behind lower global output volatility.

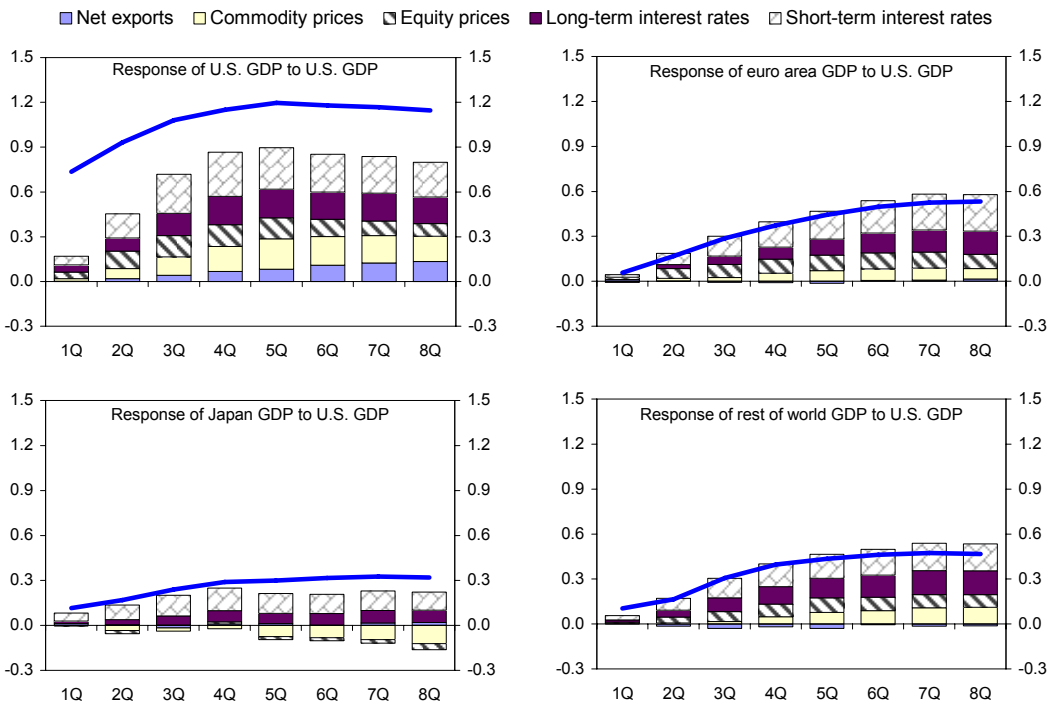
11. ***These results help explain several features of global business cycle linkages.*** First, large macroeconomic models that capture trade linkages better than financial ones have consistently failed to find large spillovers across major global regions. Second, the impact of U.S. growth on the rest of the world is higher in recessions than mid-cycle slowdowns, consistent with the fact that U.S. financial conditions have typically become tighter in the former than in the latter. Finally, the global cycle is highly synchronized. The rapid propagation of shocks is consistent with a larger role in the transmission process for financial markets, given that they adjust more quickly to new information than do trade flows.

Figure 1. Responses to shocks to U.S. GDP



Source: IMF staff calculations.

Figure 2. Decomposition of Responses to U.S. GDP



Source: IMF staff calculations.

## II. SUMMARY OF THE TIES THAT BIND: MEASURING INTERNATIONAL BOND SPILLOVERS USING INFLATION-INDEXED BOND YIELDS

IMF Working Paper 07/128

by Tamim Bayoumi and Andrew Swiston

1. ***An implication of financial market globalization is the increasing likelihood of financial spillovers across countries.*** Rising internationalization of government bond holdings, in particular, is creating an increasingly interlinked and global market. As these yields also provide the “risk free” interest rate that is the basis for pricing in a wide swath of other markets, this provides an important economic link between countries.
2. ***The paper examines these links using data from inflation-indexed bonds.*** One limitation with previous work has been the difficulty in separating real bond yields from long-term inflation expectations. Fortunately, this decomposition has been facilitated by the development of inflation-indexed bonds, which allow these two components of nominal yields to be continuously tracked. With the U.S. inflation-indexed bond market now almost a decade old, there is sufficient information to allow statistical analysis of spillovers in real bond yields and inflation expectations.
3. ***Accordingly, the paper uses data from inflation-indexed government bond markets to examine international spillovers of real interest rates and inflation expectations.*** Using data since early 2002, it analyzes spillovers between the United States and six other industrial countries with inflation-indexed bond markets—Australia, Canada, France (a proxy for the euro area), Japan, Sweden, and the United Kingdom. This covers the vast majority of the industrial world (although for Japan, inflation-indexed bonds were only issued starting in 2004). The focus is on bilateral links between U.S. markets and other countries, reflecting the dominant position of the United States in the global bond market.
4. ***The paper first examines the direction of causation across markets using standard efficiency tests.*** In an efficient market, yields should follow a random walk, independent of past information on domestic or foreign yields. The importance of spillovers can thus be gauged by seeing how well past foreign yields explain current movements in bond yields.
5. ***Consistent with earlier research, the paper finds that U.S. markets have large spillovers abroad while there is limited reverse causation.*** Tests using a short sample of intraday data suggests that U.S. nominal yields produce significant spillovers in five of the six countries, with no evidence of reverse causation. Similarly, for a longer daily data set, spillovers from U.S. markets to real rates abroad are significant in four of six cases, again with no evidence of reverse causation. By contrast, the evidence for spillovers among inflation expectations suggests smaller (and more two-way) links.

6. ***The influence of U.S. yields on those in other countries can be quantified using a vector autoregression (VAR).*** Due to the predominance of spillovers from the United States to foreign markets, our base specification assigns any contemporaneous correlation between U.S. and foreign variables to the United States, although we also report an alternate specification in which U.S. inflation expectations are affected by contemporaneous events abroad. Impulse response functions from the VARs indicate that U.S. real interest rates and inflation expectations are extremely close to a random walk, while between one-quarter and one-half of U.S. real interest rate shocks are transmitted to foreign markets. Variance decompositions show that U.S. shocks account for about half of movements in foreign real rates over the long term (Table 1). Tests on weekly data confirm these results.

### **Conclusions and Policy Implications**

7. ***A relatively uniform picture emerges from this analysis:***

- Real interest rates appear much more linked across countries than the corresponding inflation expectations, just as expected given that real rates are more likely to be linked globally while expectations depend more on domestic events.
- Real interest rate spillovers flow exclusively from the United States to other countries, and U.S. markets appear to absorb available information efficiently, in contrast to their foreign counterparts. Tests show that U.S. factors determine one-half or more of foreign real interest rates, on average.
- There are smaller international spillovers in inflation expectations, with the results again suggesting that U.S. spillovers tend to be the most important but with more evidence of reverse causation. U.S. market developments account for a quarter to a third of fluctuations in foreign inflation expectations, while reverse spillovers generally account for a smaller proportion of U.S. forecasts.

8. ***In addition to confirming the dominant position of U.S. bond markets in global yields, these results illuminate the underlying sources of these links.*** In particular, it makes sense that U.S. markets are a major factor in determining global real rates, which should involve arbitrage across destinations, while inflation expectations—which are more domestically determined—are less integrated internationally and involve more complex dynamics. In addition, while U.S. developments are clearly crucial to global bond markets given the importance of its economy and financial markets, U.S. bond yields can and do also reflect international developments, such as the global “savings glut.” Deep and liquid U.S. bond markets are hence also central to global price discovery for long-term real rates.

9. ***These financial spillovers clearly represent an extremely important conduit from the United States to other industrial countries.*** This is particularly true as real interest rates are also a key driver of many other financial instruments, such as equities.

Table 1. Variance Decompositions After 50 Days  
(In percent; daily data from January 2, 2002 to December 29, 2006)

VAR Ordering	RUS, PUS, R*, P*				VAR Ordering	RUS, R*, P*, PUS			
	Percent attributed to					Percent attributed to			
	RUS	PUS	R*	P*		RUS	PUS	R*	P*
<i>Forecasted variable</i>					<i>Forecasted variable</i>				
Australia 1/					Australia 1/				
RUS	95.9	0.2	0.1	3.8	RUS	90.2	0.2	1.5	8.1
PUS	1.0	93.0	3.1	3.0	PUS	0.5	94.9	1.1	3.5
R*	29.7	8.1	59.0	3.2	R*	23.2	4.6	70.4	1.8
P*	25.5	20.9	7.7	45.8	P*	20.3	23.3	4.3	52.2
Canada					Canada				
RUS	98.1	0.1	0.0	1.8	RUS	98.1	0.5	0.0	1.5
PUS	1.8	97.7	0.1	0.3	PUS	1.8	59.1	3.8	35.2
R*	44.3	4.1	50.9	0.8	R*	44.3	7.8	46.5	1.4
P*	15.0	41.1	8.1	35.8	P*	15.0	3.5	3.3	78.2
France					France				
RUS	99.8	0.1	0.0	0.1	RUS	99.8	0.0	0.0	0.1
PUS	0.5	80.2	6.7	12.5	PUS	0.5	61.8	2.4	35.2
R*	58.7	1.0	37.2	3.1	R*	58.7	4.8	35.2	1.4
P*	2.5	27.6	1.9	68.0	P*	2.5	7.6	0.2	89.8
Japan 1/ 2/					Japan 1/ 2/				
RUS	96.3	0.1	0.0	3.5	RUS	94.8	0.1	2.0	3.1
PUS	2.8	96.7	0.4	0.1	PUS	2.6	96.2	0.4	0.9
R*	35.8	4.6	47.0	12.7	R*	25.8	4.2	57.1	12.9
P*	1.3	29.3	1.7	67.6	P*	1.6	25.0	1.6	71.8
Sweden					Sweden				
RUS	98.9	0.9	0.2	0.1	RUS	98.9	0.7	0.2	0.2
PUS	0.1	97.3	1.1	1.5	PUS	0.1	87.6	0.4	11.9
R*	37.7	1.2	58.6	2.5	R*	37.7	2.8	58.0	1.5
P*	16.0	12.9	0.8	70.2	P*	16.0	2.5	0.4	81.1
United Kingdom					United Kingdom				
RUS	96.5	0.5	1.8	1.3	RUS	96.5	0.4	2.1	1.0
PUS	1.0	96.4	1.5	1.0	PUS	1.0	87.1	1.4	10.5
R*	32.3	2.3	60.2	5.2	R*	32.3	7.2	57.6	2.9
P*	5.4	19.5	7.5	67.6	P*	5.4	8.3	3.6	82.7
United States average					United States average				
RUS	97.6	0.3	0.4	1.8	RUS	96.4	0.3	1.0	2.3
PUS	1.2	93.6	2.2	3.1	PUS	1.1	81.1	1.6	16.2
Foreign average					Foreign average				
R*	39.7	3.5	52.1	4.6	R*	37.0	5.2	54.1	3.6
P*	10.9	25.2	4.6	59.2	P*	10.1	11.7	2.2	76.0

Source: IMF staff calculations.

1/ Alternate ordering for Australia and Japan is R\*, P\*, RUS, PUS.

2/ Sample begins in April 2004.

### III. SUMMARY OF GLOBALIZATION, GLUTS, INNOVATION, OR IRRATIONALITY: WHAT EXPLAINS THE EASY FINANCING OF THE U.S. CURRENT ACCOUNT DEFICIT?

IMF Working Paper 07/160

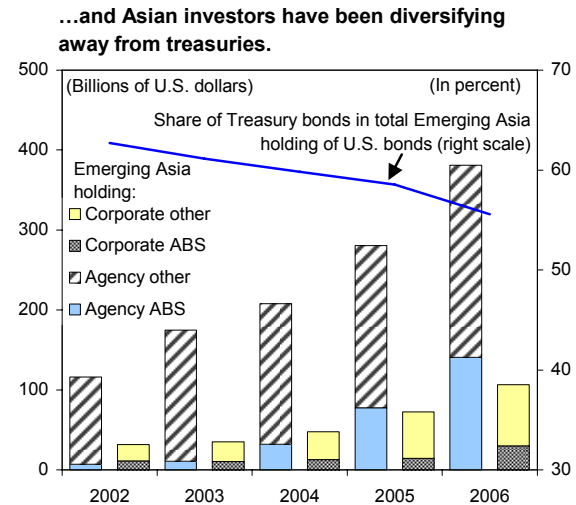
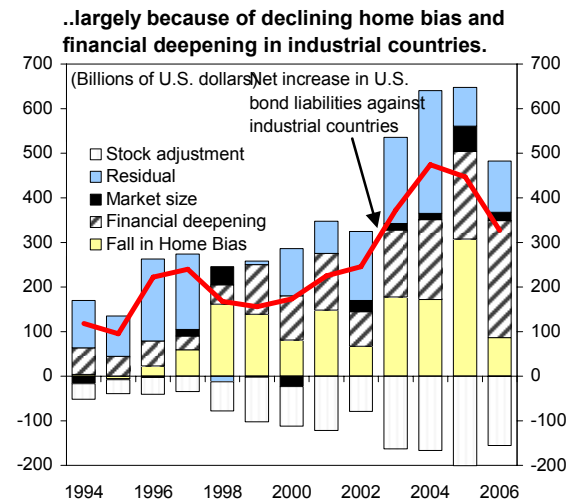
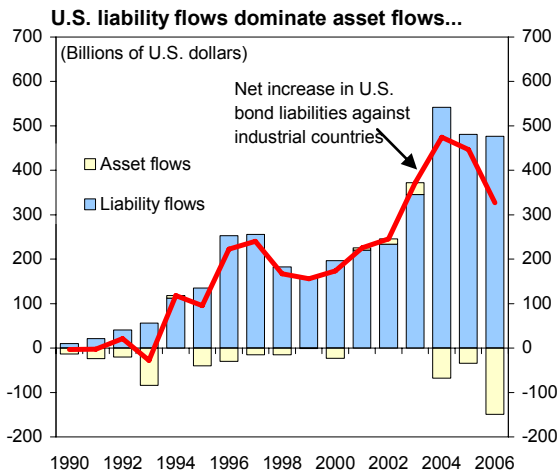
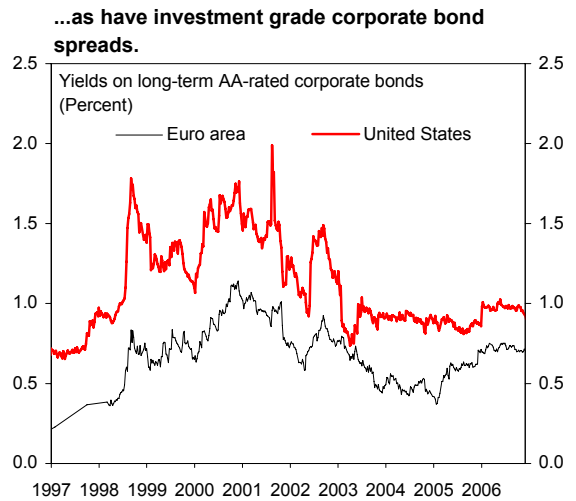
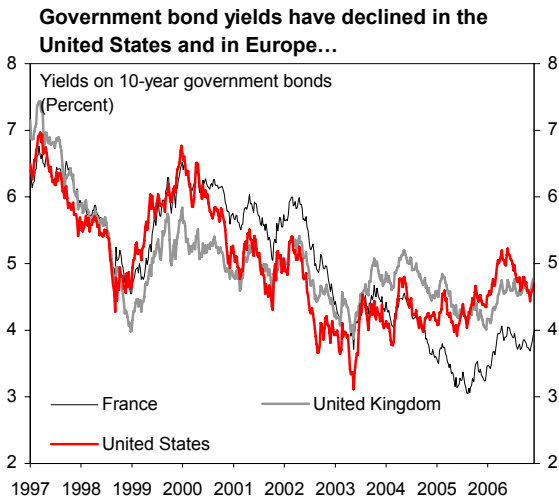
by Ravi Balakrishnan, Tamim Bayoumi, and Volodymyr Tulin

1. ***This paper evaluates alternative explanations for the easy financing of the U.S. current account deficit in recent years.*** It starts by developing a portfolio balance model which traces out the impact of the global savings glut hypothesis, financial globalization, and financial innovation on bond yields and asset allocation across regions. It then takes the model to the data, to assess which explanations work best.
2. ***To do this, the paper constructs a comprehensive dataset from a range of sources on international bond markets and capital flows.*** The data cover bond yields, capital flows, overall foreign asset and liability positions, and size of bond markets, for the United States, other industrial countries, emerging market countries (including oil exporters), and Caribbean offshore centers. This allows the study of: (i) borrowing costs on a variety of bonds across industrialized countries; and (ii) asset allocation through a decomposition of the deterioration in the U.S. net foreign asset (NFA) position into parts which can be assigned to the aforementioned factors.
3. ***The analysis highlights the importance of bond flows in explaining the easy financing of the current account over the last decade.*** In particular, the analysis rejects the oft-heard conjecture that high expected U.S. productivity growth attracts inflows. This hypothesis is inconsistent with the facts that funding has occurred almost exclusively through fixed income markets and that U.S. equity prices are moderate. Rather, globally low long-term interest rates on government debt and tightening spreads on a variety of corporate bonds suggest that either the global savings glut or declining home bias abroad may have been important drivers (Figure 1).
4. ***A detailed decomposition of these bond flows lends particular support to declining home bias and financial deepening in other industrialized countries.*** These factors appear to explain a large share of the deterioration of the U.S. NFA position with respect to bonds, although financing from emerging market countries has also grown in recent years. Above and beyond their ability to explain emerging market country financing, U.S. financial innovation and the savings glut hypothesis (including difficult-to-track petrodollar recycling) are important as potential factors behind declining home bias in industrialized countries and a generally positive and often sizable residual in the decomposition of industrial country financing. This underscores the importance of not looking at these factors in isolation, but rather as a constellation of forces that can be self-reinforcing.

## Conclusions and Policy Implications

5. ***To the extent that financial deepening and declining home bias continue in industrial countries, it would appear likely that substantial financing will continue.*** One would certainly expect continued rapid growth in financial market capitalization in other industrialized countries as they, like the U.S., make increasing use of risk-transfer instruments, such as asset-backed securities and collateralized debt and loan obligations. Regarding home bias, many industrialized countries still have much to gain from further international diversification. Combined with innovative U.S. fixed income markets providing many assets which are simply not available elsewhere, this suggests that, at least for the immediate future, a significant portion of industrialized countries' funds to be invested globally will be directed toward U.S. fixed income instruments.
6. ***Some have argued that such trends are unlikely to be supported by the large emerging market countries and oil exporters.*** In particular, as emerging market countries have accumulated significant reserve assets in recent years, it is argued that their sovereign wealth funds (often recently created) will start diversifying away from U.S. Treasuries, driving the dollar downward and relative U.S. interest rates upward. Moreover, as fixed income markets in emerging market countries continue the process of "catch up", this will reduce the share of the United States in the global bond market, causing investors to rebalance their portfolios away from U.S. assets.
7. ***In our view, however, financial deregulation and increasing investor sophistication in these countries is likely to maintain strong inflows to the United States.*** Financial deepening and falling home bias will provide a large pool of funds to be invested globally. For the same reasons as outlined for industrialized countries, and given the reserve currency role of the dollar and the level of investor protection that U.S. financial markets offer, a substantial portion of such funds should continue to go into the United States, albeit perhaps not into Treasuries.
8. ***To be sure, risks to continued easy financing of large U.S. current account deficits remain.*** 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. Moreover, markets do not appear to be factoring in the significant depreciation that is likely needed to keep the U.S. NFA position on a sustainable path. Precisely because it would be unexpected, a sharp change of market sentiment toward the dollar could force U.S. interest rates upward to sustain external financing, and thus cause financial turbulence.

**Figure 1. Financing of the U.S. Current Account Deficit**



Sources: Bloomberg L.P.; Standard and Poor's Global Fixed Income Research; Treasury International Capital benchmark surveys; Treasury International Capital system; and IMF staff estimates.



## **Part II. Financial Innovation**

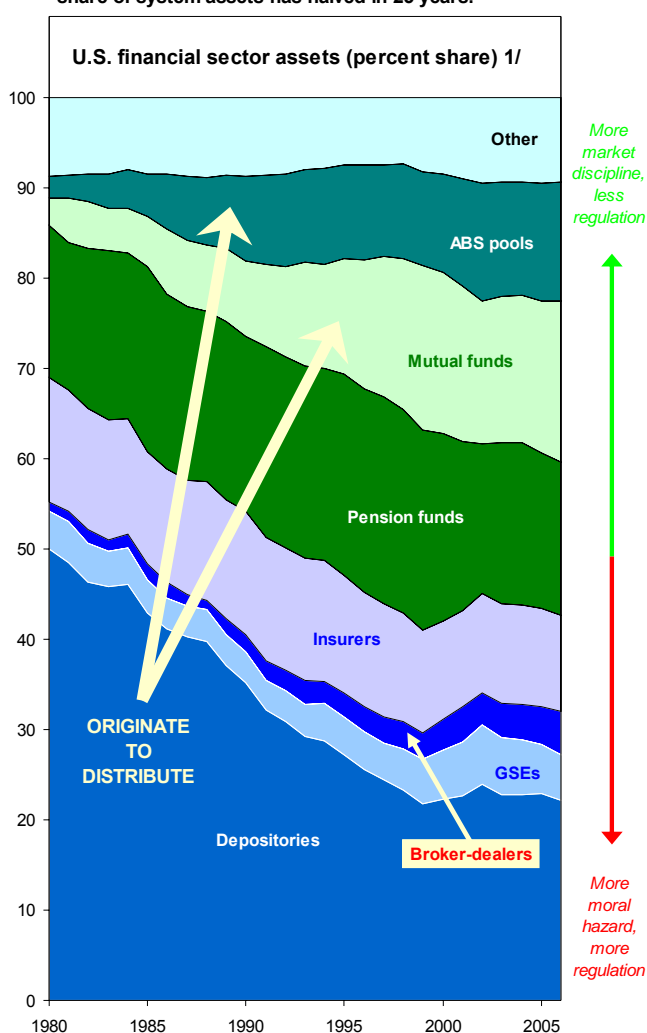
#### IV. NEW LANDSCAPE, NEW CHALLENGES: STRUCTURAL CHANGE AND REGULATION IN THE U.S. FINANCIAL SECTOR

by Ashok Vir Bhatia<sup>1</sup>

1. *The rapid evolution of the U.S. financial sector is creating new challenges for the regulatory structure.* With large financial institutions increasingly distributing loans to investors rather than holding them, the share of financial sector assets owned by insured depositories—which, along with a few large investment banks, form the focus of U.S. prudential supervision—has fallen from around half in 1980 to under one-quarter in 2006 (Figure 1). Thus, in a period during which the complexity of instruments and trades has multiplied, the portal through which the Federal Reserve views and influences financial markets on a day-to-day basis has, in one respect, halved in size. 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.

2. *Reflecting the Administration’s increased emphasis on regulatory effectiveness, this paper explores ways to fine-tune U.S. oversight arrangements.* It surveys the financial landscape, separating a highly regulated, multi-business “core” from a lightly regulated, more specialized

**Figure 1. The Shrinking Core**  
As insured depositories originate to distribute, their share of system assets has halved in 25 years.



Source: Board of Governors of the Federal Reserve System.  
1/ Excludes assets managed by hedge/private equity funds.

<sup>1</sup> The author thanks Tamim Bayoumi for overall guidance; Gianni De Nicoló for sharing insights; Ravi Balakrishnan, Thomas Helbling, Koshy Mathai, Carlos Medeiros, and Shanaka Jayanath Peiris for thoughtful comments; and María Isabel Beltrán and others for other invaluable assistance.

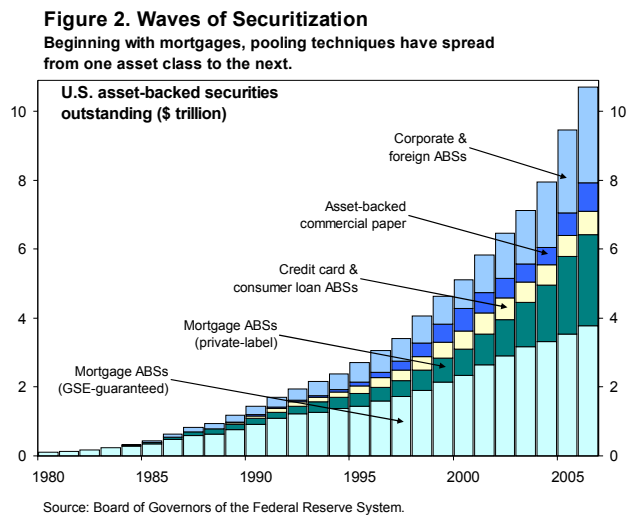
“periphery” (Section A); explains the U.S. regulatory philosophy and structure, with its focus on core institutions and its jurisdictional complexity (Section B); highlights certain new challenges, without presuming to have all the solutions (Section C); draws out some broad policy implications, from the “30,000-foot level” (Section D); and concludes with a more action-oriented assessment of a few specific reform proposals (Section E).

### A. Topography of the System

3. *With mass-production techniques doing to finance what they did to manufacturing a century ago, new instruments are shaping a new landscape.* Spurred by competition and investor demand, large financial firms are harnessing the power of IT, marrying complex modeling techniques and innovative legal structures to generate a growing array of securities with diverse risk profiles. Consumer credit scoring allows automated approval of housing, consumer, and student loans which, along with more-heterogeneous business and commercial real estate loans, are increasingly bundled together as securities (Federal Deposit Insurance Corporation (FDIC), 2006). Waves of securitization, flowing from one asset class to the next, have created new opportunities and—as we shall discuss—new challenges (Figure 2).

4. *Reflecting the technological changes, special purpose vehicles are among the fastest growing holders of financial assets.* Also referred to as asset-backed security (ABS) pools, these pass-through structures serve as “obligors,” issuing debt backed by cash flows on the assets that they own. With those assets enjoying legal safe-harbor from any previous owner’s bankruptcy, the creditworthiness of each ABS issued is a function of two, and only two, factors: the quality of the assets in the pool, and the capital structure (Moody’s Investors Service, 2007, and Standard & Poor’s, 2007a,b).

5. *ABS pools can and do transform “junk” assets into investment-grade liabilities, thereby widening their investor bases to include pension funds and foreign central banks.* Working with the rating agencies, arrangers assemble securities known as collateralized debt obligations (CDOs), with four principal forms of credit enhancement: credit “wraps” (guarantees or insurance); “excess spread” (lower interest rates on liabilities than on pooled assets); “over-collateralization” (lower volumes of liabilities than of assets); and payment “waterfalls” (seniority/subordination hierarchies). The result is a range of “bespoke” assets, suited to diverse investor preferences: typically, a ‘AAA’-rated tranche protected from all but



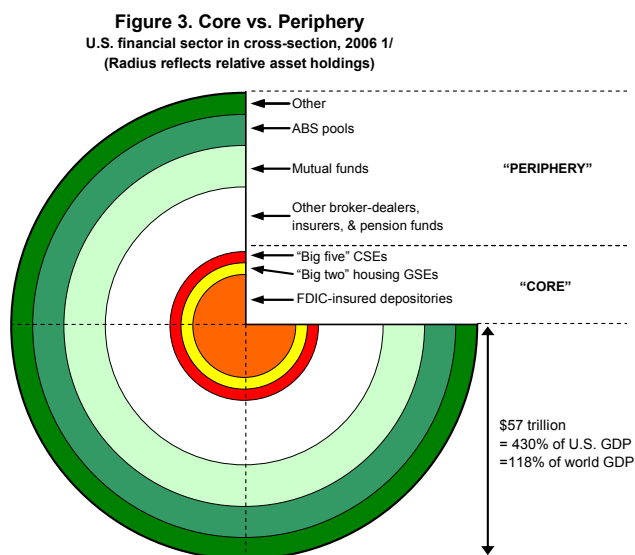
the most extreme losses, for the risk-averse investor; a speculative-grade “equity” tranche with “embedded leverage,” for the yield-hungry; and a “mezzanine” slice in between.

6. ***Hedge funds are key providers of liquidity in the new markets, and the result is a finer pricing of risk.*** As the nimblest, best-tooled investors in the system, hedge funds are major contributors to trading volume, particularly in the higher-risk segments, and are therefore central to price discovery (FitchRatings, 2007). They are also, generally, well-equipped to cope with mounting instrument complexity—assets backing CDOs may be whole loans or bonds, but increasingly are ABSs, other CDOs (creating “CDO<sup>2</sup>s” and “CDO<sup>3</sup>s”), or credit default swaps (CDSs, creating “synthetic” CDOs).

7. ***More complexity, however, entails more ratings dependency.*** Reflecting asset correlations—or overly “coarse” or otherwise imperfect ratings—CDO tranches often provide more yield than identically rated single-name securities (Bank of England, 2007, and Citi, 2007). While hedge funds generally are able to dissect and analyze the “idiosyncratic risks” posed by complex CDO structures, there is evidence that securitization is fostering greater reliance on ratings, as a simplifying force, by less sophisticated investors—especially at higher rating levels (Bank for International Settlements (BIS), 2005b). That, as we shall discuss, is placing increasing responsibility on a small group of private rating agencies.

8. ***The diverse array of institutions that make up the financial sector can be separated into a highly regulated “core” and a lightly regulated “periphery”*** (Figure 3):

- The core consists of institutions for which market discipline is relatively weak and those considered systemically important: all federally insured depositories (7,380 commercial banks, 1,270 thrifts, and 8,362 credit unions), the government-sponsored enterprises (GSEs) active in mortgage securitization and investment (Fannie Mae and Freddie Mac), and the largest broker-dealers (organized into the “big five” investment banking groups). This core now holds less than one-third of total financial sector assets.
- The periphery consists of all other financial entities, a space in which the cost of funds serves as the principal check on risk-taking: small broker-dealers and all insurance companies, finance companies, mortgage companies, funding corporations, and private



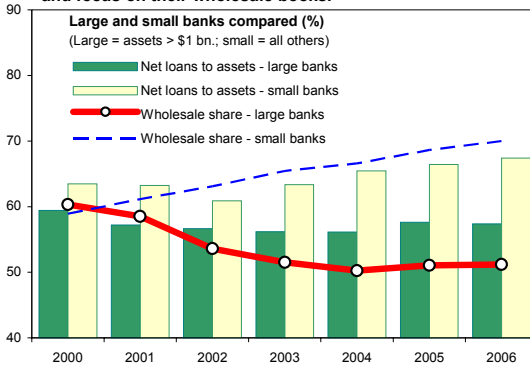
Source: Board of Governors of the Federal Reserve System.  
1/ Excludes assets managed by hedge/private equity funds.

capital pools, the latter ranging from pension funds and mutual funds to real estate investment trusts, ABS pools, hedge funds, and private equity funds. As the core has contracted in relative size, the periphery's role as a holder and originator of financial assets has grown, with ABS pools, mutual funds, and hedge/private equity funds leading the expansion in the former, and mortgage brokers and hedge/private equity funds in the latter.

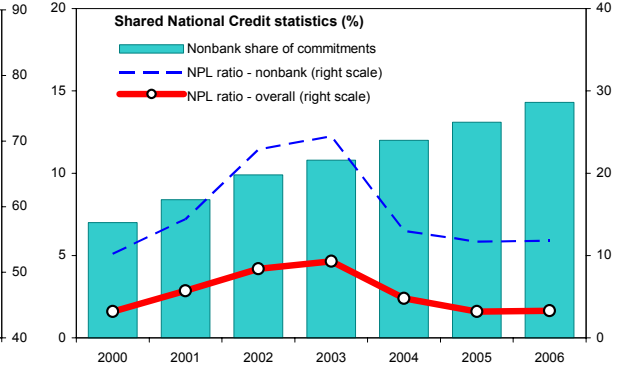
9. ***Further distinctions can be drawn, however, between large and small core institutions, as they pursue different business strategies.*** The 20 largest bank holding companies (BHCs)—which together account for some two-thirds of BHC assets—dominate the banking industry's retail business, originating residential mortgages and consumer loans on a “production line” that often includes specialized (and largely unregulated) nonbank lenders within their group structures (a practice also followed by the large investment bank holding companies). The thousands of regional and community banks, thrifts, and credit unions, conversely, are increasingly left with niche business, much of which is small-scale commercial real estate and business lending with a higher premium on local knowledge.
  
10. ***While small banks still hold most loans they make, large core institutions' embrace of the “originate-to-distribute” model has created new sources of income*** (Figure 4). Large commercial banks not only originate many loans for the explicit purpose of securitization and sale, they also purchase a pipeline of loans from other originators for the same reason. Large investment banks are similarly engaged in loan purchases for bundling, and are taking market share in syndication. While most of the structured securities are distributed to the periphery, servicing rights on the pooled loans (collections and workouts) are typically retained by commercial banks, such that servicing fees exceed bundling fees at the largest BHCs. The result is revenue diversification through a growing stream of noninterest income, which has cushioned the impact of tight net interest margins in recent years, supporting profitability, capital ratios, and various market-based metrics of solvency (Bhatia, 2006).
  
11. ***The periphery, characterized by even greater diversity than the core, serves as a shock absorber.*** Given their more specialized nature, many institutions in the periphery come and go without attracting wider notice. Scores of hedge funds have done so in recent years. Similarly, the monoline mortgage origination industry, after accounting for more than half of subprime originations in 2005–06, has born the brunt of the so-called “early payment defaults” in that segment, but problems have remained isolated (Chapter V). In many respects, the periphery can be argued to be a natural repository for credit risk from the core (Kroszner, 2007, and Kuritzkes, Schuermann, and Weiner, 2003). To cite but a few examples, insurers, with their event-based exposures, sell CDSs to diversify risk; pension funds are far less leveraged than commercial banks; and yield-hungry hedge funds are key buyers of CDO equity and key sellers of protection against speculative-grade credit risks.

Figure 4. Inside the Core

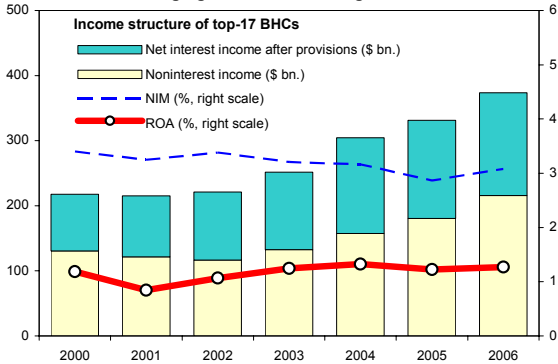
Small banks retain relatively more loans than large banks, and focus on their wholesale books.



A steadily increasing nonbank share in loan syndications may be diluting credit quality in that segment.

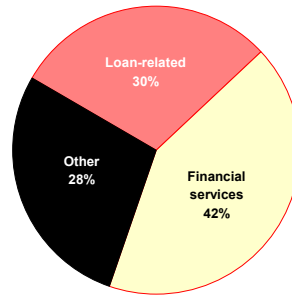


Noninterest income has supported profits at the largest BHCs, offsetting tight net interest margins...



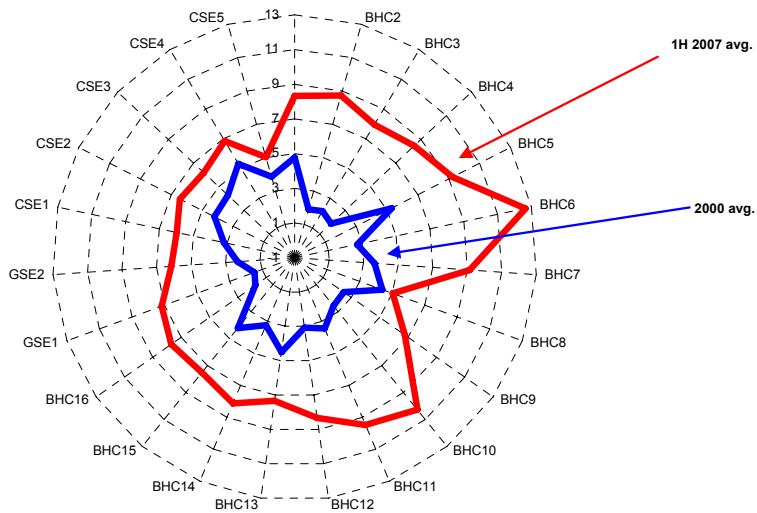
...with income from financial services activity dominating.

Noninterest income of top-17 BHCs, 2002-06 average



On one market-based measure, soundness continues to improve at the most important core institutions.

"Distance-to-default" indicator  
(Standard deviations from insolvency)



Sources: Datastream; FDIC, call reports; Board of Governors of the Federal Reserve System, *BHC Performance Reports* and *Shared National Credit* surveys; and Fund staff estimates (following the methodology in De Nicoló, Hayward, and Bhatia, 2004).

12. ***New markets have transformed the core’s risk management, with liquidity risk and counterparty credit risk assuming greater importance.*** Loan books are being actively managed, like bond portfolios, with institutions able to choose between selling loans (whole or bundled) or retaining them (and therefore the relationships) while buying CDSs (Bassett and Zakrajšek, 2003, and Fed, 2003). Both strategies, however, rely on continuous liquidity in new markets yet to be tested by a “tail event.” Additionally, CDS purchases and the provision of “prime brokerage” services to hedge funds require understanding the exposure dynamics to and creditworthiness of entities in the periphery that may furnish only limited information, placing renewed emphasis on collateral (Cole, Feldberg, and Lynch, 2007).

13. ***The core and periphery coexist symbiotically, with key players maintaining group structures that straddle both.*** Large BHCs range from those that are “bank-centric,” focusing on deposit-taking, origination, and servicing (most of them), to those more “broker-dealer-centric,” emphasizing securitization, fund management, derivatives dealing, prime brokerage, and proprietary trading (a few institutions). Similarly, the “big five” investment bank holding companies, in addition to securities broker-dealing, prime broking, and securitization, are active in syndication and the provision of financing to both bank and nonbank loan originators—and own deposit-taking subsidiaries known as industrial loan companies (ILCs), a type of state-chartered, FDIC-insured commercial bank.

## **B. Regulatory Philosophy and Structure**

14. ***The U.S. regulatory philosophy, as enunciated by the Fed, is emphatic that supervising the entire system is neither feasible nor desirable.*** Arguments for limiting the reach of safety-and-soundness regulation and supervision include the need to avoid bestowing “halo effects” upon entities that would go on to advertise themselves as important enough to be federally supervised and sound as a result of such oversight; the need to avoid cramping innovation; and pure practicality, given the complexity of the system and the fact that many institutions in it are internationally mobile (Bernanke, 2007a,c).

15. ***Two tests of the need for safety-and-soundness oversight are applied:***

- Presence of moral hazard, referring in the first instance to all commercial banks, thrifts, and credit unions, because insured depositors have “little or no incentive to evaluate the risk-taking of their bank” (Bernanke, 2007a), and the “big two” housing GSEs, “because of the belief of market participants that the U.S. government will back these institutions under almost any circumstances” (Bernanke, 2007b).
- Systemic importance, referring specifically to “very large commercial and investment banks” that “may not fully account for risks to general financial stability,” as well as to the need to prevent “failures of risk management by ... a sufficient number of smaller [institutions, that] would threaten not only the solvency of the institutions themselves but also the health of the whole system” (Bernanke, 2007c).

16. ***Only the “core” of the system is prudentially supervised, therefore, with the doctrine emphasizing “confidence in the invisible hand” of market discipline elsewhere*** (Kohn, 2007a). Examination authorities extend to all federally insured depositories (and their holding companies and group affiliates, except in the case of some ILCs), the “big five” investment banking groups, and the housing GSEs. In part, small depositories are included out of the recognition, given past experience, that they may bear systemic importance collectively if not individually. Even in this highly regulated core, however, regulators stress the value of a “hybrid system that supplements direct regulation with a substantial amount of market discipline” (Bernanke, 2007a), with supervision “designed to limit—not eliminate—the risk of failure” (Greenspan, 2005a).

17. ***Prudential oversight seeks to work with market discipline by emphasizing capital, receivership, and disclosure requirements*** (Bernanke, 2007a). Capital is viewed not merely as a cushion to absorb losses and (in the case of the depositories) to protect the deposit insurance funds, but as assurance that shareholders have their own money at stake, with incentives to control risk buttressed by linking capital requirements to risk-taking. Credible, automatic wind-up provisions are seen as central to ensuring that shareholders and uninsured creditors believe they will take losses in the event of failure, with prompt corrective action prohibitions on regulatory forbearance and least-cost resolution requirements (again for depositories) introduced through the FDIC Improvement Act (FDICIA) of 1991. Disclosure, in turn, is addressed through an extensive system of consumer protection, discussed below.

18. ***“Too-large/complex-to-fail” institutions attract special correctives.*** On the one hand, the fact that certain large commercial banks may warrant special treatment is recognized in law, with the FDICIA including a “systemic risk exception” to its least-cost resolution requirement. On the other hand, with uninsured noncore liabilities and capital as the marginal sources of funding for large BHCs (and the main sources for large investment banking groups), market discipline retains an important policing role over even the largest financial institutions (Bernanke, 2007b). Two other safeguards are in place:

- The systemic risk exception in the FDICIA was intentionally made difficult to invoke, requiring agreement by two-thirds of the FDIC Board, two-thirds of the Fed Board, and the Secretary of the Treasury “in consultation with the President” (Eisenbeis, Frame, and Wall, 2004).
- Since the 1990s, the Fed has had in place a Large Complex Banking Organization program, which focuses on risk-management policies, procedures, and controls on a continuous basis, with each institution in the program assigned a dedicated team of examiners (DeFerrari and Palmer, 2001).

19. ***Supervisory powers have progressively been extended to the owners and affiliates of depositories.*** Consolidated supervision reflects a growing consensus that financial conglomerates need to be supervised as they are managed, at the enterprise level, with due attention to cross-cutting legal, reputational, and operational risks—as a supplement to more



traditional reliance on the legal compartmentalization of the group structure. Accordingly, the BHC Act of 1956 introduced group-level supervision of BHCs; the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 addressed consolidated supervision of thrift holding companies; and the Gramm–Leach–Bliley Act of 1999 added “umbrella” supervision of financial holding companies (expanded-scope BHCs).

20. ***Consolidated supervision of financial holding companies, BHCs, and thrift holding companies focuses on “ring-fencing” risks to insured depositories.*** The BHC, Financial Institutions Reform, Recovery, and Enforcement, and Gramm–Leach–Bliley Acts all emphasize “risk-focus,” mandating examiners to ensure that holding companies and affiliates do not pose unacceptable risks to depositories within the group. The difference may appear subtle, but supporting the soundness of nonbank affiliates is not a core part of the mandate, and examination authorities over such entities are invoked sparingly.

21. ***Group-level supervision of the “big five” investment banks reflects a broader emphasis on systemic risk.*** Under the Glass–Steagall Act of 1933, repealed in 1999, the U.S. system maintained a somewhat unique separation between commercial and investment banking. As such, it took an E.U. Directive (requiring all financial conglomerates operating in the European Economic Area to be subject to consolidated supervision) to catalyze the launch, in 2004, of the Consolidated Supervised Entity (CSE) program for large investment banking groups. That program, however, has no specific mandate to protect deposit-taking ILCs within the group, emphasizing instead the systemic risks posed by “a small number of institutions ... [that] are the principal dealers in the over-the-counter derivatives markets and ... the leading clearing firms for exchange-traded derivatives” and that “also originate securitized assets ... provide financing to other originators, and often provide financing to the buyers of those assets, including buyers of the riskiest tranches” (Kohn, 2007a).

22. ***As dominant investors in the U.S. mortgage market, the “big two” housing GSEs are also systemically important—and pose a delicate policy challenge.*** On the one hand, their agency charters (which include contingent credit lines from the Treasury) give rise to the widely held presumption that their debt enjoys the backing of the U.S. government—resulting in low and relatively risk-insensitive funding costs that create incentives for them to leverage and expand their balance sheets. On the other hand, stricter oversight of the two entities could be perceived by markets as a deepening of federal involvement. Reflecting the latter concern, the Treasury and the Fed have argued that any effective GSE reform would need to be a package deal encompassing higher capital requirements, legislatively enshrined receivership provisions, and measures to limit the size and scope of their investments (Bernanke, 2007b, Greenspan, 2005b, and Snow, 2005).

23. ***Consumer and investor protection are fundamentally different from prudential oversight.*** Here, the emphasis is on disclosure, fairness, and fraud-prevention through conduct-of-business rules to underpin effective market discipline. Lenders to households are subject to disclosure requirements (and certain prohibitions) under the Truth in Lending Act

(TILA) of 1968 “to assist in shopping for credit” (Fed, 2000). Registered broker-dealers face a “net capital rule” under the Exchange Act of 1934 “to protect consumers and other market participants from broker-dealer failures and to enable those firms that fall below the minimum net capital requirement to liquidate in an orderly fashion” (*Federal Register*, 2004). Insurers, in turn, face a range of state-level regulations. Enforcement, however, includes a prominent role for private right of action, i.e., lawsuits, including class actions—requiring especially meticulous rulemaking to avoid “paralysis by litigation.”

24. ***In the application of conduct-of-business rules, distinctions are made based on the sophistication of the parties involved.*** Whereas retail depositors are seen to lack “the time and resources to gather information,” institutions and high-wealth individuals are generally regarded as “well equipped to assess” risks, with “the clout to demand the information they need” (Bernanke, 2007a). Principles-based approaches, therefore, are considered most appropriate for sophisticated players—hence the safe-harbor provisions under Rule 144A of the Exchange Act (which created an unlisted, limited-disclosure securities market restricted to “qualified institutional buyers”) and similar exclusions for high-net-worth individuals (which created the hedge/private equity fund space). More rigid, rules-based methods, in contrast, are considered better-suited to protecting small players, including homeowners.

25. ***Reflecting state powers, past experimentation, and a raft of inherited compromises, the U.S. oversight structure includes five independent federal regulators of depositories*** (Government Accountability Office (GAO), 2004):

- The Fed, founded in 1913, is umbrella supervisor of financial holding companies (some 650 of them), lead supervisor of BHCs (5,129), and joint primary supervisor of state banks that are Fed members (892) along with the states.
- The FDIC, created in 1933, is joint primary supervisor of state nonmember banks (4,783 including ILCs) and state thrifts (433), back-up supervisor of all other banks and thrifts, and insurer of all banks and thrifts (including branches of foreign banks).
- The Office of the Comptroller of the Currency, established in 1863 as a financially autonomous bureau of the Treasury, is charterer and primary supervisor of national banks (1,705), and primary supervisor of U.S. branches of foreign banks (12).
- The Office of Thrift Supervision, established in 1989 as an autonomous bureau of the Treasury, is lead supervisor of thrift holding companies (481), charterer and primary supervisor of federal thrifts (837), and joint primary supervisor of state thrifts (433).
- The National Credit Union Administration, set up in 1970, is chartering authority and supervisor of federal credit unions (5,189), and insurer of all federal and most (3,173) state credit unions.

26. ***In addition, a number of functional regulators are vested with important roles.*** The Securities and Exchange Commission (SEC) supervises the five CSEs on a consolidated

basis under its “alternative net capital rule,” while enforcing an investor protection regime for some 5,100 other broker-dealers on a stand-alone basis under its original net capital rule. The Office of Federal Housing Enterprise Oversight supervises the “big two” housing GSEs. The insurance industry is regulated exclusively by the states. The Fed writes TILA regulations for all lending to households, but shares the enforcement authority with other federal regulators of depositories, the Federal Trade Commission, and the states. Finally, an artificial line is drawn between the securities and futures markets, with the SEC, the states, NASD, and exchanges regulating the former, and the Commodity Futures Trading Commission, the states, the National Futures Association, and exchanges covering the latter.

27. ***Safety-and-soundness oversight employs a range of tools.*** As supervisors, the five federal depository agencies, occasionally in concert with the SEC, articulate principles in interagency “guidances” that are applied flexibly, on a case-by-case basis, under examination authorities. As regulators, they adopt rules, e.g., the Basel packages currently under review, that “prescribe and proscribe what must be done and what may not be done in specific areas” (Greenspan 2005a). Guidances and rules alike are promulgated through a deliberate process of interagency consensus-building, proposal, public comment, modification, and finalization. Finally, as noted, discretion is limited by the prompt corrective action provisions of the FDICIA, with mandatory interventions once certain capital thresholds are breached.

28. ***Agencies are bound together by institutionalized coordination mechanisms.*** As members of the Federal Financial Institutions Examination Council (FFIEC), the five federal regulators of depositories jointly propose principles, standards, and reporting forms. Coordination with the states is achieved through the participation in the FFIEC of a representative of the State Liaison Committee, a body comprising the Conference of State Banking Supervisors, the American Council of State Savings Supervisors, and the National Association of State Credit Union Supervisors. Coordination with the functional regulators, in turn, is achieved primarily through the Fed’s authorities over financial holding companies and BHCs, with the Large Complex Banking Organization program including arrangements for joint inspections of nonbank institutions within the group structure.

29. ***Safety-and-soundness and conduct-of-business examinations have different approaches and emphases.*** In the former, examiners are prudential supervisors, acting preemptively and enjoying considerable flexibility. In the latter, the focus is on compliance, enforcement, and the setting of examples with *ex post* punishment. Whereas the bank, thrift, and credit union agencies—including at the state level—have substantial prudential experience, the SEC, with its CSE program still relatively new, remains on a learning curve.

### C. Emerging Challenges

30. ***The changing incentives for risk-taking under the originate-to-distribute model are creating new challenges.*** On the one hand, the model is facilitating the transfer of credit risk from the financial system’s systemically important core to its more atomized periphery,

which, *per se*, should support soundness. On the other hand, by separating the originators and bearers of risk, it 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 procyclicality 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.

31. ***Underwriting standards, in particular, may be losing some stringency in response to the changing incentives.*** Originators and securitizers are exposed to early payment default risk, reputational risk, and “warehousing risk” (the risk that a sudden drying up of investor demand could leave them with pipelines of unwanted loans pending packaging, with some CDOs reportedly taking up to 120 days to assemble). In extreme cases such as the subprime bust, there is also an element of political risk. Despite these restraints, however, generous fee structures for intermediaries, and investor remoteness from any potential liability associated with the origination decision, create incentives to persist with the risk-taking for as long as the “good times last.” Thus, although rating agency models stipulate minimum standards for the assets in each pool, originators may satisfy them more in letter than in spirit, focusing on “observables” at the expense of intangibles such as due diligence in underwriting.

32. ***Part of the recent deterioration in credit standards may also be a by-product of newer securitization techniques.*** Arguably, with sophisticated methods of disassembling and reassembling risks resulting in more investor demand than might otherwise have been the case, and with CDO production requiring a wide and varied range of assets as feedstock, the more recent developments in securitization may have encouraged lending in various new and more risky niches. Thus, in the residential mortgage market—despite several guidances to depositories reiterating prudent underwriting principles—“risk-layering” practices grew sharply in 2005–06, with many loans combining adjustable-rate, interest-only, low-documentation, and multiple-lien features. As noted in the accompanying staff report, a similar cycle may be playing out currently in the leveraged loan market, with a proliferation of “covenant-lite” loans to finance leveraged buyouts (IMF, 2007).

33. ***In the current cyclical downswing in the subprime mortgage market, more novel securitization techniques may also be limiting workout flexibility.*** While it remains relatively straightforward to restructure distressed assets in single-class ABS pools, the same does not apply to multi-class CDOs. Here, the creditworthiness—and ratings—of different tranches rest on carefully stacked seniority/subordination hierarchies and other risk mitigants, such that modifying nonperforming assets in the pool is somewhat akin to removing the bottom dominos from a pile. Again, principal-agent problems come into play, with the investor owning only a small fraction of the lien on the overstretched mortgagee’s home. In an estimated one-third of CDO structures outstanding, servicers are barred, by

indenture, from restructuring more than 5 percent of the assets in the pool, without regard for whether or not cooperative solutions represent the least-cost course of action (UBS, 2007).

34. ***Ratings dependency is increasing.*** Arguably, in the assembly of complex CDO transactions, the raters are becoming active participants rather than arm’s-length assessors of risk (Mason and Rosner, 2007). As their rating (and consultancy) fees grow, so too do their incentives to facilitate expanding volumes of CDO issuance. Although the Credit Rating Agency Reform Act of 2006 is introducing certain, modest, checks on agency conflicts of interest, other official initiatives—such as the Basel IA capital rule for depositories—would cement the agencies’ role as “delegated regulators” (SEC, 2006, and *Federal Register*, 2006). Policies to catalyze greater rating competition are frequently cited as a remedy but, with the industry often considered a “natural oligopoly,” measures to promote more due diligence by investors may ultimately prove more fruitful (Bhatia, 2002).

35. ***Mounting competition from the periphery is also an issue for the core.*** Senior loan officers at large commercial banks have consistently cited increasing competition from nonbanks as a driver of easing credit standards (Fed, 2007a,b). In one recent Fed survey, several respondents noted explicitly that an interagency guidance proposed in early 2006 had had “little effect” on their commercial real estate lending decisions (Fed, 2007a). Abstracting from the specifics (the guidance had targeted small and midsize banks, not the large banks in the survey), it is to be expected that competition between variably regulated entities will create some pressures. In the current environment, with institutions in the periphery taking market share in origination in certain segments, the extent to which “regulatory intensity” needs to increase to maintain a given level of risk-taking in the core is an open question.

36. ***Regulators have responded that the “three pillars” of bank soundness—capital, origination skills, and diversification—remain as important as ever.*** Attention has centered on capital, as a source of strength and provider of critical lead time in the event of a disturbance. Implementation of Basel II represents a major effort to enhance the risk-sensitivity of regulatory capital requirements at the largest, most internationally active banks. While much of Basel II’s focus is on relatively “traditional” risks, the notice of proposed rulemaking also addresses critical new challenges, for instance by devoting a whole chapter to advanced exposure-at-default modeling techniques for counterparty credit risk (BIS, 2005a, and *Federal Register*, 2007). The parallel Basel IA package, potentially covering all other depositories in the system, would be similarly beneficial, nowhere more so than in its more “granular” capital treatment of mortgages based on loan-to-value ratios.

37. ***Nonetheless, delayed implementation of Basel IA and Basel II can be cited as a key example of how multiple, overlapping agencies can slow response times*** (GAO, 2007). While the Fed sought to press forward with Basel II, the FDIC in particular expressed concerns about excessive reductions in capital requirements (FDIC, 2005, and Meyer, 1999). Ultimately, a compromise was agreed, including retention of the minimum “leverage ratio” (tier-1 capital to total assets); a “parallel run” in 2008; “transitional floors” in 2009–11

capping capital reductions at 5 percent per year (relative to Basel I requirements); and a “holistic review” at the end of the transition period. While the dialogue may well have improved the product, it is worth noting that the equally important Basel IA package—with its likely disciplining effect on mortgage lending standards—was held up in the process, while (perhaps independently) subprime lending standards took a nosedive.

38. ***Regulators believe the overarching regulatory philosophy remains appropriate.***

With regard to the relative “shrinkage” of the highly regulated core and the implications for system oversight, the Fed makes a number of points:

- Regulators believe they retain the ability to substantially influence the system as a whole, because the largest and most important commercial and investment banks—whose balance sheet size provides an increasingly incomplete reflection of their true reach—are firmly inside the supervisory net (Samolyk, 2004).
- Extension of supervisory powers to new institutional categories could itself create risk, because “when the government singles out particular institutions or markets as being especially critical to the stability of the system, moral hazard concerns may well follow” (Bernanke, 2007c).
- Similar considerations apply to expanded information-gathering efforts, which are “unlikely to yield insights that can be acted upon and may create a false sense of comfort among market participants, which could make the system substantially more risky” (Kohn, 2007a).

39. ***The hedge fund space is an example of this approach.*** The Fed acknowledges that the industry is gaining in importance, as a key provider of liquidity and innovative trading strategies in several market segments (Kohn, 2007a, and Kroszner, 2007). Nevertheless, the Fed is steadfast in its position that restraints on the size and leverage of individual funds are best applied indirectly, by the large commercial and investment banks that serve as hedge funds’ major counterparties, including through the provision of prime brokerage services (Bernanke, 2007a,c). Accordingly, the focus has been on measures to ensure that core institutions conduct sufficiently vigorous stress tests of their net, marked-to-market exposures to individual hedge funds, and maintain appropriately conservative netting arrangements and “margining” policies governing the taking of initial and daily collateral (Cole, Feldberg, and Lynch, 2007, and Embersit, 2007).

#### **D. Broad Policy Implications**

40. ***The U.S. financial sector has demonstrated a tremendous capacity for innovation, with large benefits for the economy as a whole.*** Its creative abilities, manifest in the steady stream of new financial products and services, have in recent years supported a widening of domestic credit availability financed increasingly by foreign savings. The relative ease with

which external capital has been attracted into the system represents a revealed preference by foreign investors for U.S. private debt securities (Chapter III).

41. ***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” (Weinberg, 1995). 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.

42. ***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.

43. ***Greater complexity has altered the nature of prudential oversight.*** With instruments such as the first-loss tranches of CDOs and index-based CDSs allowing investors to take on the risks and returns of leverage without recourse to borrowing, “effective leverage” has become a combination of traditional “financial leverage” and this relatively new “embedded leverage” (FitchRatings, 2007). On the one hand, such complications, combined with the rapid expansion of off-balance sheet commitments, have rendered accounting statements increasingly incomplete reflections of complex financial institutions’ activity. On the other hand, the more discriminating pricing of a wide range of risks has created a wealth of market information. Surveillance practices have adjusted accordingly, with the Fed, for instance, monitoring a broad range of price-based indicators (Nelson and Perli, 2005).

44. ***Inevitably, uncertainties remain.*** As the highly regulated core has contracted in relative size, the ability of regulators to influence—or even view—the entirety of the system has been reduced. With trading activities gaining prominence, and with liquidity in new markets yet to be tested comprehensively, concerns have centered on whether strong financial sector profits may be akin to those of the seller of an option, with a potentially large “payout” in the event of a major disturbance (Knight, 2007). The Fed, cognizant of this risk, has discussed the role of monetary policy in such a scenario (Kohn, 2007a):

- “Systemic events in market-based financial systems are perhaps more likely to involve price fluctuations and abrupt changes in market liquidity than are systemic

events in depository-based financial systems. But ... such events can more readily be countered by macroeconomic policy instruments than could old-fashioned crises of depository intermediation.”

- “Supplying additional liquidity and reducing borrowing costs can greatly ameliorate the effects of market events on the economy, and those types of macroeconomic interventions will carry less potential for increasing moral hazard than would the discount window lending that was a prominent feature of crisis management when depositories funded more credit.”
- “Market intermediated finance also requires us to live with less control and less knowledge than we had when banks were dominant. Greater uncertainty about where risks are lodged is the flip side of better dispersion of those risks, especially to less regulated sectors, and of more resilience of the whole system.”

45. ***Risk-focused supervision of a small number of systemically important institutions and measures to ensure rapid market clearing are becoming increasingly critical.*** The largest BHCs and investment banking groups are central to financial stability not only because issues at any one such entity could cascade across the system, but also because these firms serve as “regulators by proxy,” policing risk-taking in the periphery. While the extension of direct prudential supervision to hedge funds, for example, may be infeasible and undesirable, indirect oversight through the BHCs and CSEs requires continuous vigilance. Measures to ensure the efficient functioning of payment and settlement systems are similarly important, to support the smooth flow of liquidity.

46. ***Given the stakes, it is legitimate to periodically review the regulatory structure.*** The U.S. multiple-agency model offers financial firms a unique level of choice as to how, and by whom, to be supervised—the “flipping” by banks from national to state charters or vice-versa is not uncommon—and there is little evidence to suggest that supervisory procedures are more effective when implemented under more centralized structures (De Nicoló, Hayward, and Bhatia, 2004). Nonetheless, the U.S. model raises important issues of consistency of treatment across markets and institutional categories, and requires careful interagency coordination to ensure that risks do not “slip between the cracks.”

### **E. Specific Policy Considerations**

47. ***As discussed, the U.S. financial oversight philosophy has both facilitated and withstood the tectonic shifts underway in the U.S. financial geography.*** Regulatory adjustments, therefore, are more likely to focus on organizational detail than on the scope of supervisory activity. As emphasized by the Administration, reforms need to be guided by clear principles to ensure focus and consistency across institutions and markets (Paulson, 2006). One such principle should be that initiatives be simplifying in nature. Another may well be that incremental refinements are preferable to (and more feasible than) more ambitious measures that could pose transition risks.



48. ***With the Fed bearing apex responsibility for U.S. financial stability, it is reasonable to ask whether it enjoys sufficiently broad oversight authorities.*** As indicated above, Fed preeminence among the multiple financial regulators is, in many respects, a *sine qua non* of the U.S. system. That, and the Fed’s argument that first-hand financial sector information is a critical input to its monetary policy decision-making, suggests that the location of supervisory authorities over financial holding companies and BHCs is not up for discussion (Goodhart, 2000). Given broad agreement that the “big five” investment banking groups bear systemic importance, however—and given that they own insured depositories—the optimality of situating the CSE program at the SEC may form a reasonable question.

49. ***The fact that not all groups that include ILCs are subject to consolidated supervision could, potentially, provide a segue into the broader issue of CSE oversight:***

- The Industrial Bank Holding Company Act of 2007 (H.R. 698), pending before the Congress, proposes to make new ILCs subject to broader prohibitions on the mixing of banking and commerce, while bringing their parents and group affiliates into the federal supervisory net. To do so, it proposes amending the FDIC Act to create a new institutional category, the “industrial bank holding company,” under the consolidated supervision of the FDIC—an agency that, unlike the Fed, currently enjoys limited consolidated supervisory powers. As pointed out by the Fed, the principles of consistency and simplicity would be better served by amending the BHC Act to remove the various exceptions it created for ILCs (Kohn, 2007b).
- H.R. 698 proposes (and the Fed concurs) that holding companies currently owning ILCs—a set of institutions that includes the “big five” CSEs—be grandfathered under current legal provisions. While fair-treatment considerations and legal factors may require that this be the case, it is worth noting (hypothetically) that, absent grandfathering, amendments to the BHC Act could require the owners of ILCs to choose between divesting them or becoming BHCs under the consolidated supervisory authority of the Fed. If any of the major investment banking groups were to choose the latter option, important implications for the CSE program would follow.
- As noted earlier in this paper, the still-new CSE program is distinguished from other U.S. consolidated supervisory protocols in that it is not geared specifically to the risks that a group structure may pose to its insured depository subsidiaries—instead, there is a more general emphasis on the systemic risks posed by large complex entities that are agreed to belong in the highly regulated core. At the same time, as mentioned previously, a key difference between the CSE program and the regulation of registered broker-dealers is that the latter is an investor protection exercise whereas the former centers on prudential supervision—the CSE program shares important synergies with the Fed’s BHC oversight, and in many respects sits oddly at the traditionally enforcement-oriented SEC.

- Reflecting all of the above, one significant organizational reform that may be worth more detailed study would involve the transfer of the CSE program from the SEC to the Fed, where it could be merged into longer-standing arrangements governing BHC supervision. Not only could such a move improve regulatory consistency—e.g., the CSEs are currently subject to a different variant of Basel II than that being developed for the depositories—it would also enhance the Fed’s direct access to information on, and ability to influence the behavior of, five systemically important institutions that are central to the “indirect regulation” of various unsupervised entities in the periphery of the financial system.
- The GAO, in a 2004 report, weighed the pros and cons of rationalizing financial regulators along functional lines—the so-called “twin peaks” model (GAO, 2004). In a possible *quid pro quo* for the transfer of the CSE program from the SEC to the Fed, consideration could also be given to a “twin peaks-lite” transfer of TILA rulemaking responsibilities from the Fed to the SEC, which (in the U.S. context) is generally viewed to possess unmatched expertise in matters of consumer protection.

50. ***While the above-mooted functional reorganization could materially streamline U.S. financial oversight arrangements, two other proposals warrant mention:***

- The Federal Housing Finance Reform Act of 2007 (H.R. 1427), also pending before the Congress, focuses on measures to support the safety and soundness of the housing GSEs, devoting limited attention to the systemic risks that they that pose—the “big two” are dominant players in the secondary mortgage market and the over-the-counter interest rate swaption market (Greenspan, 2005b). Given the previously noted concerns that revamping or replacing the Office of Federal Housing Enterprise Oversight could be construed by markets as a renewal of the government’s perceived commitment to the health of Fannie Mae and Freddie Mac—the “halo effect”—the Treasury and the Fed have noted, correctly in our view, that it is essential that H.R. 1427 or any successor bill include mandatory limits, in some form or other, on the GSEs’ investment portfolios or funding.
- The Markets and Trading Reorganization and Reform Act of 1995, rejected by the Congress over a decade ago but discussed more recently in the GAO’s report, proposed merging the SEC and the Commodity Futures Trading Commission—agencies with similar and converging missions, reflecting the “convergence of new financial instruments and trading strategies in the securities and futures markets” (GAO, 2004). Given that jurisdictional disputes between the two agencies have on occasion delayed the development of new financial instruments, e.g., single-stock futures, there is a strong economic case for their consolidation, notwithstanding considerable legislative impediments.

51. ***With a menu of constructive ideas available “off the shelf,” perhaps the greatest challenge for U.S. policy makers will be to achieve political consensus.*** As the Congress

deliberates and crafts initiatives to ensure the continuing adaptation and evolution of the U.S. regulatory system—including some that could be resisted by one or the other agency—legislators will doubtless remain cognizant of the adage that “a regulator is only as powerful as those it regulates.”

### **Abbreviations and Acronyms**

ABS	Asset-backed security
“Big five” CSEs	The Bear Stearns Companies Inc. The Goldman Sachs Group, Inc. Merrill Lynch & Co., Inc. Morgan Stanley Lehman Brothers Holdings Inc.
“Big two” GSEs	Fannie Mae Freddie Mac
BIS	Bank for International Settlements
BHC	Bank holding company
CDO	Collateralized debt obligation
CDS	Credit default swap
CSE	Consolidated supervised entity
Fannie Mae	Federal National Mortgage Association
Fed	Federal Reserve
FDIC	Federal Deposit Insurance Corporation
FDICIA	FDIC Improvement Act
FFIEC	Federal Financial Institutions Examination Council
Freddie Mac	Federal Home Loan Mortgage Corporation
GAO	Government Accountability Office
GSE	Government-sponsored enterprise
ILC	Industrial loan company
SEC	Securities and Exchange Commission
TILA	Truth in Lending Act

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## V. MONEY FOR NOTHING AND CHECKS FOR FREE: RECENT DEVELOPMENTS IN U.S. SUBPRIME MORTGAGE MARKETS<sup>2</sup>

by John Kiff and Paul Mills

1. *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.

2. *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. Potential solutions to the management of this trade-off are then explored.

### A. Origins and History of the Subprime Mortgage Market

3. *Subprime mortgages are residential loans that do not conform to the criteria for “prime” mortgages, and so have a lower expected probability of full repayment.* This assessment is usually made according to the borrower’s credit record and score, debt service-to-income (DTI) ratio, and/or the mortgage loan-to-value (LTV) ratio. Borrowers with low credit scores, DTIs above 55 percent, and/or LTVs over 85 percent are likely to be considered subprime. So-called “Alt-A” loans fall into a gray area between prime and subprime mortgages. These began as a more flexible alternative to prime loans, mainly for borrowers who met all of the credit score, DTI, and LTV prime criteria, but did not provide full income documentation.

4. *Several legal milestones facilitated the development of the modern subprime mortgage market.* Interest rate caps imposed by states were preempted by federal legislation in 1980 while lenders were allowed to offer adjustable-rate mortgages from 1982. Also the Tax Reform Act of 1986 left residential mortgages as the only consumer loans on which the interest was tax deductible. This made home equity withdrawal (for instance, through “cash-out” refinancing of a mortgage) a preferred means of financing home improvements and personal consumption, relative to other forms of consumer loans (Klyuev and Mills, 2006).

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<sup>2</sup> Although some might describe the subprime market as in dire straits, none of the views in this paper should necessarily be ascribed to the rock band of that name.

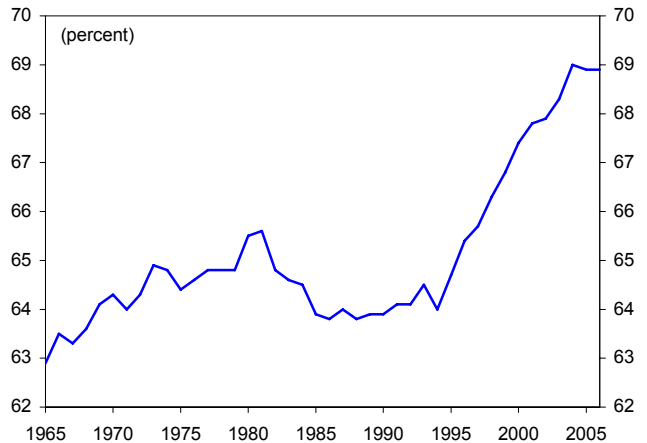


5. ***Automated underwriting and securitization were also key developments in reducing the cost of subprime mortgage lending.*** Automated underwriting (using computer models rather than loan officer judgment) has made loan origination more cost efficient, while advances in statistical credit scoring have led to more accurate and consistent assessments of borrower credit risk.<sup>3</sup> Securitization also facilitated market growth by dispersing risk, providing investors with a supply of highly-rated securities with enhanced yield, and opening up the origination business to non-depository specialty finance companies (Box 1).

6. ***Consequently, subprime lending developed as a specialist loan class in the mid-90s and facilitated a substantial expansion of home ownership*** (Figure 1).<sup>4</sup> These developments allowed a relaxation of credit rationing for borrowers—such as the poor, or those in minority communities—previously considered too risky by traditional lenders.<sup>5</sup>

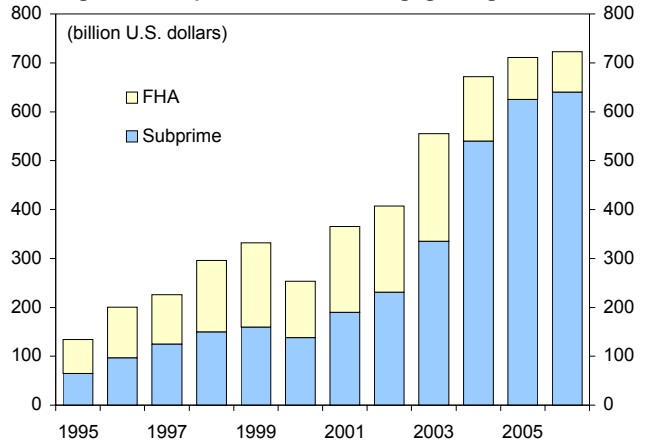
7. ***Loans for subprime borrowers were once predominantly guaranteed by the Federal Housing Association (FHA).*** However, subprime loans have displaced FHA-guaranteed lending (Figure 2) due to

Figure 1. Homeownership Rate



Source: Census Bureau.

Figure 2. Subprime and FHA Mortgage Originations



Source: Inside Mortgage Finance.

<sup>3</sup> LaCour-Little (2000) estimates that savings of up to three percent of total loan values are associated with automated underwriting, and Davis (2001) put the savings at \$916 on each loan. However, none of the model parameters that underlie these systems have been tested by a serious consumer-led recession (Bies, 2003).

<sup>4</sup> “The obvious advantage of the expansion of subprime mortgage credit is the rise in credit opportunities and homeownership. Because of innovations in the prime and subprime mortgage market, nearly 9 million new homeowners are now able to live in their own homes, improve their neighborhoods, and use their homes to build wealth.” (Gramlich, 2004). See also Doms and Motika (2006).

<sup>5</sup> See Agpar and Calder (2005). According to the U.S. Census Bureau, whereas the national homeownership rate rose from 64.7 percent in 1995 to 68.8 percent in 2006, the rise was greater among African American (42.7 to 47.9 percent) and Hispanic households (42.1 to 49.7 percent). According to the Federal Reserve’s Survey of Consumer Finances, the rise in homeownership from 1995 to 2004 was six percent in lower-income census tracts, versus four percent in higher-income tracts.

### Box 1. Twisting by the Pool: The Mechanics of Mortgage Securitization

Subprime mortgages are predominantly securitized in the form of mortgage-backed securities (MBS).<sup>1</sup> These securities are enhanced with mechanisms to protect higher-rated tranches from shortfalls in cash flows from the underlying collateral (for instance due to defaults or lower than expected interest income). These mechanisms include various kinds of explicit insurance, for instance as provided by mortgage insurers. However, most of the credit enhancement comes from structural features such as subordination, over-collateralization, and excess spread:

- **Subordination:** Losses from defaults of the underlying mortgages are applied to junior tranches before they are applied to more senior tranches. Only once a junior tranche is completely exhausted will defaults impair the next tranche. Consequently, the most senior tranches are extremely secure against credit risk, are rated AAA, and trade at low spreads.
- **Overcollateralization:** The excess of outstanding mortgage loans over the par value of the outstanding securities is used to make up any shortfalls in cash flows for the other tranches, and thus serves as a form of internal credit insurance.
- **Excess spread:** A preset amount of interest is explicitly set aside from the servicing of the collateral each month, and is used to enhance the initial overcollateralization. A “residual tranche” also collects unused excess spread and overcollateralization.<sup>2</sup>

The AAA-rated “Class A” tranches, which comprise about 80 percent of a typical transaction, enjoy a broad investor base among high-grade bond investors, including the GSEs. However, there are few natural end investors for the “Class M” mezzanine tranches, which comprise most of the other 20 percent of a typical mortgage securitization structure (10 percent AA, 5 percent A and 5 percent BBB+ and below), and these are typically resecuritized into collateralized debt obligations (see below). The below-mezzanine tranches are usually either retained by the originator or sold to hedge funds and investment bank proprietary desks.

Collateralized debt obligations (CDOs) are a key subprime MBS investor constituency, particularly for the mezzanine tranches, due to the yield pick-up available. According to J.P. Morgan Securities, about \$244 billion of ABS-backed CDOs were issued in the U.S. in 2006, about \$98 billion of which were “mezzanine” ABS CDOs (backed mainly by mezzanine MBS tranches, most of which are subprime or home equity loans).

There has been some speculation that if the “CDO bid” for subprime MBS mezzanine tranches dries up, the volume of available subprime mortgage financing could shrink dramatically (Mason and Rosner, 2007a). The idea is that, because 80 percent or so of the Class A securities cannot be sold without also selling the 20 percent or so of mezzanine and lower tranches, falling CDO demand will have a leveraged effect on the availability of mortgage loans. This leverage is said to be amplified by similar structural factors in the CDO market itself— i.e., there is no natural market for their A- and BBB-rated mezzanine tranches, which typically comprise about five to ten percent of a transaction. Hence, the mezzanine tranches are usually resecuritized in other CDOs.

<sup>1</sup> Asset-backed securities (ABS) backed by home equity loans are also referred to as subprime MBS.

<sup>2</sup> Excess spread is also characterized as the difference between the net interest rate on the underlying mortgage loans and the weighted-average coupon on the securities. After covering current period losses, the excess spread is used to over-collateralize the senior tranches. Typically, excess spread is used to over-collateralize the senior tranche only up to a certain point (e.g., three percent of notional) over a certain period of time (e.g., three years). If, after the predefined time period, the over-collateralization has attained the target level, some of the excess spread can be released to the residual tranche. This is the equivalent of a non-interest bearing subordinate tranche within the residual tranche.

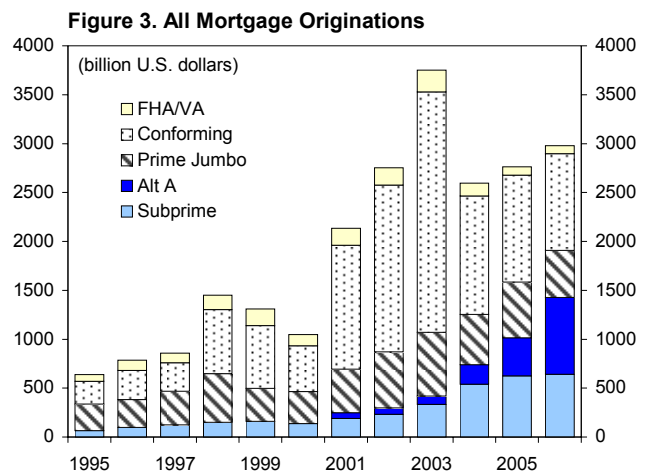
the FHA's less aggressive product mix, its lack of flexibility to changing market conditions, and its low lending limits.<sup>6</sup> Mortgage originators also complain that the fees that they earn on FHA-guaranteed mortgages do not adequately compensate for their higher processing costs.

8. *Despite advances in credit scoring techniques, the subprime market experienced its first "crisis" in 1998–99.* Subprime loan delinquencies transpired to be higher than anticipated by the new models while the East Asian and LTCM crises reduced investor appetite for higher-risk mortgage securities. As a result, the majority of the largest subprime lenders went bankrupt.<sup>7</sup>

## B. The Rapid Recent Expansion of Subprime Lending

9. *Until 2003, the majority of mortgage originations were "prime conforming" loans.* These were then purchased by two government-sponsored housing enterprises (GSEs—Fannie Mae and Freddie Mac). However, by 2006, over half of all originations did not meet the GSEs' "conforming" criteria.

10. *Consequently, the share of mortgage originations represented by subprime or Alt-A loans rose rapidly* (Figure 3). The transformation of the market was such that, of 2006 originations, only 36 percent were conforming loans, 15 percent were prime "jumbo" loans (which exceeded the ceiling for conforming mortgages), three percent comprised of loans guaranteed by the FHA and the Department of Veterans Affairs (VA) while the remainder comprised "nonprime" loans—Alt-A (25 percent) and subprime (21 percent).



Source: Inside Mortgage Finance.

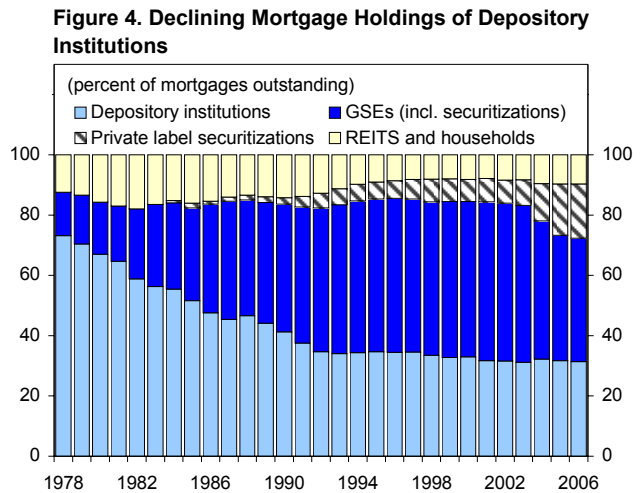
11. *There are several reasons for the rapid recent expansion in non-conforming mortgage lending.* Conforming single-family loans are currently capped at \$417,000, have strict requirements on DTI and LTV ratios, and require proof-of-income documentation. As the rapid rise in U.S. house prices stretched affordability, more loans fell outside the conforming criteria as individuals stretched to buy a house. Simultaneously, accounting and governance issues forced the GSEs to contract their mortgage purchase operations while

<sup>6</sup> See Quigley (2006) and Kogler and others (2006).

<sup>7</sup> Chomsisengphet and Pennington-Cross (2006).

innovative securitization techniques provided private label originators with lower costs of funding.

12. *Depository institutions still originate half of all mortgages, but given increased securitization, they hold only 30 percent of outstanding loans* (Figure 4). About 38 percent of end-2006 outstanding mortgages were held by GSE securitization pools (plus the three percent held directly by the GSEs), 18 percent by non-GSE (“private label”) securitization pools, five percent by finance companies, and most of the remainder by real estate investment trusts (REITs) and households.



Source: Board of Governors of the Federal Reserve System.

### C. What Prompted the Subprime “Crisis”?

13. *Recent subprime lending growth was boosted by more highly leveraged lending against a background of rapidly rising house prices.* Housing affordability dropped to the point where a significant proportion of borrowers were financially overstretching via risky “affordability products” (see Box 2), with many apparently lying about their financial resources to get loans. Also, speculative borrowers obtained loans on the basis of expected collateral appreciation, with little account taken of their ability to make the requisite mortgage payments. Although average subprime borrower credit scores have been rising, so have their LTVs and DTIs, especially as a result of increased use of second lien loans, which need not necessarily be declared to the primary mortgage lender.<sup>8</sup>

14. *At the same time, strong investor appetite for higher-yielding securities in 2005–06 probably contributed to looser underwriting standards.* Safeguards ensuring prudent lending were weakened by the combination of fee-driven remuneration at each stage of the securitization process and the dispersion of credit risk which weakened monitoring incentives. Hence, intermediaries were remunerated primarily by generating loan volume rather than quality, even as the credit spreads on the resulting securities shrank.

15. *The rapid deterioration of 2006 vintage loans has resulted largely from a slowing of house price appreciation.* While prices were rising, distressed borrowers had the equity to sell their homes and prepay their mortgages. However, as interest rates rose and house prices

<sup>8</sup> Zimmerman (2007).

### Box 2. Brothers in ARMs: Hybrids, Options, IOs, Neg-Ams, and Teasers

Most adjustable rate mortgages (ARMs) are actually hybrid products that combine floating and fixed rates. For example, about two-thirds of recent ARM originations were “2/28” hybrids, which are effectively two-year fixed rate mortgages that convert to 28-year ARMs at the end of the second year.<sup>1</sup> The initial fixed rate is often a below-market (i.e., “teaser”) rate, so that “reset shock” can be substantial when the adjustable-rate period starts, although various caps often protect the borrower from rapid and sharp increases in payments. In addition, interest-only and negative amortization loans comprise the bulk of subprime and Alt-A ARM origination. In an interest-only mortgage, payments cover just the interest accruals in the first years (usually two or three in the case of ARMs and up to ten for fixed rate mortgages), and in a negative amortization mortgage, the payments do not even cover the interest accruals. Typically, the accumulated negative amortization is subject to a 15 to 25 percent cap, relative to the original loan amount. When the cap is hit, the loan converts to a full-interest loan. At the end of every five years, the loan is recast and payments are computed on the new higher loan balance.

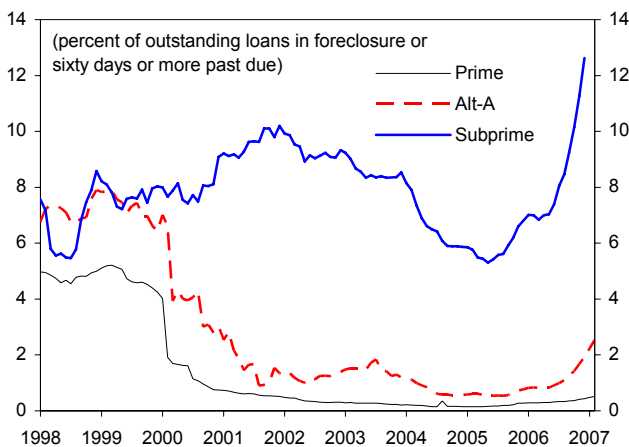
Also popular are option ARMs, which give borrowers a variety of payment options each month, including interest-only and negative amortization options. Typically, the options remain open until five years into the mortgage (the “recast date”) or the outstanding balance reaches 110 percent of the original principal. In addition, interest accrues at a deeply discounted interest rate until the recast date, after which full principal and interest payments start. Although option ARMs have been available for decades, originations have surged since 2003, from around 10 percent of Alt-A origination to about 40 percent more recently (Barclays Capital, 2006). Option ARM delinquency rates remain very low, compared to those of other ARMs, but that may change when the post-2003 issuance starts to hit recast dates after 2007.

<sup>1</sup> Most ARMs adjust every month and are indexed to a publicly-available interest rate index such as one of the Constant Maturity Treasury indices, a Cost of Savings Index, or the 11<sup>th</sup> District Cost of Funds Index. For more on mortgage mechanics see [mortgage-x.com](http://mortgage-x.com) or [mtgprofessor.com](http://mtgprofessor.com).

flattened and then turned negative in a number of regions, many stretched borrowers were left with no choice but to default as prepayment and refinancing options were not feasible with little or no housing equity.

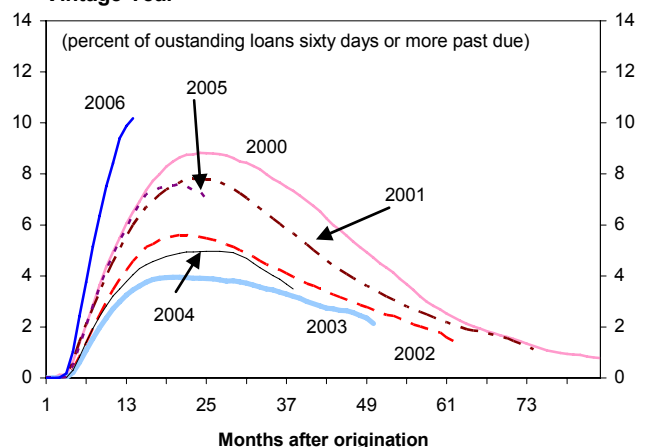
16. *As a result, delinquencies and defaults on subprime ARM mortgages originated in 2006 have soared, despite a benign economic backdrop* (Figures 5 and 6). Adjustable-rate mortgages (ARMs) have been particularly distress-prone, while fixed-rate mortgages have

Figure 5. ARM Delinquencies and Foreclosures



Source: Citigroup.

Figure 6. Subprime ARMs: Delinquencies by Mortgage Vintage Year

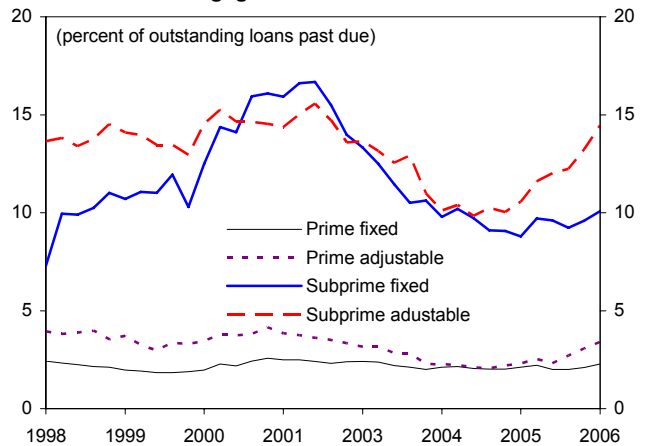


Sources: Merrill Lynch; and Intex.

generally fared better (see Figure 7). Even more striking has been the speed of the deterioration, as measured by the volume of “early payment defaults,” in which the borrower misses one or two of the first three monthly payments (Figure 8).<sup>9</sup> Fraud appears to have played a key role in accelerating the deterioration, which resulted in the failure of a number of originators in 2006–07 as securitizers exercised “put-back” options—forcing lenders to take back delinquent mortgages.

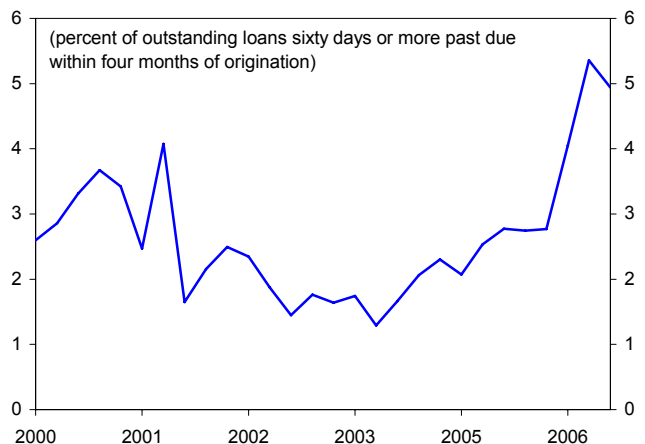
17. ***The highest delinquency rates are associated with “affordability products” such as “hybrid” and “option” ARMs.*** These require interest-only payment at fixed “teaser” rates that can result in negative amortization during the first few years. According to Freddie Mac, ARMs comprise about 90 percent of recent subprime originations, most of which incorporate affordability features. In addition, the worst performing loans involved risk “layering”—high LTV loans to high DTI borrowers who offered little income verification.

**Figure 7. Delinquency Rates for Adjustable-Rate and Fixed-Rate Mortgages**



Source: Mortgage Bankers Association.

**Figure 8. Early Payment Defaults**



Sources: Credit Suisse; and LoanPerformance.

## D. The Impact on Financial Institutions

18. ***The subprime crisis has so far affected mostly banks with subprime-specialist subsidiaries (e.g. HSBC) and a number of specialty finance companies.*** Since mid-2006 such non-depository, poorly capitalized firms, representing about 40 percent of 2006 subprime originations, have either closed down operations, declared bankruptcy, or been bailed or bought out. Some investment banks may be holding residual interests in the subprime securitization transactions that they have arranged, but losses announced thus far have been limited and may have been offset by gains on hedge transactions (e.g., ABS-

<sup>9</sup> Early payment default definitions vary, but the one used here defines it as any loan that became 60 or more days delinquent in the first four months of the loan’s life (Credit Suisse, 2006).

backed credit default swaps and short positions in the ABX, a tradable basket of 20 liquid ABS-backed credit default swaps).

19. ***Losses are likely to appear at the end of the securitization chain among the holders of unrated and lower-rated MBS and CDO equity and mezzanine tranches.*** The size of these realized losses will depend on the dollar volume of defaults among the underlying mortgage loans and on the timing of loss realizations, over which there is some uncertainty. Not all delinquent loans eventually default and there can be a long lag from when a default is registered to when MBS and CDO principal payments are impacted, because the foreclosure process can take up to 18 months to complete. During this period, the loan servicer continues to make the principal and interest payments to the MBS pool, although it then has a claim on the foreclosure proceeds.<sup>10</sup> Finally, it can take weeks for constituent MBS rating downgrades to be reflected in CDO ratings, so triggering mark-to-market revaluations (Mason and Rosner, 2007b).

20. ***Nevertheless, losses are beginning to crystallize in hedge funds specializing in lower-rated subprime ABS and CDOs.*** The lag between rising subprime delinquencies and resulting ratings downgrades means that exposed ABS and CDO investors need not necessarily revalue their portfolios to make losses apparent. However, recent investor withdrawals and margin calls have forced some hedge funds to liquidate holdings and crystallize losses. The speed with which other investors are forced to do so will be heavily dependent on rating agency downgrades of ABS and CDO securities.

21. ***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.<sup>11</sup>

### **E. The Impact on Households**

22. ***Looking ahead, the combination of interest rate resets will create significant payment shocks for borrowers in 2007–09.*** Cagan (2007) estimated that 59 percent of all 2004–06 ARM originations will see payment increases of 25 percent or more in 2007 and beyond, and on 19 percent of loans, payments will increase by 50 percent or more. In addition, about 13 percent, or 1.1 million, of these ARMs could foreclose as a result of

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<sup>10</sup> A payment is considered delinquent by servicers when it is 15 days late, but not until 90 days have passed is the loan considered “non-recoverable”, at which point workout or liquidation proceedings begin. Until the loan becomes non-recoverable, the servicer must cover the missed payments. Workouts may include forbearance (temporarily reduced payments) or loan modifications (interest rate reductions and term extensions). Liquidation takes the form of either a voluntary title transfer (“deed-in-lieu” or pre-foreclosure “short sale”), which takes an average of about 12 months to resolve; or a foreclosure, which takes about 18 months.

<sup>11</sup> Lehman Brothers (2007). Citigroup (2007) has estimated that undiscounted losses on all mortgages will amount to about \$275 billion, \$175 billion of which will be on securitized mortgages.

































