

APPENDIX B

Financial Market Developments, 1999-2005

A. Introduction and Executive Summary

At the outset of the CRMPG II initiative, it was determined that a broad, survey-based paper tracing major changes in financial markets since 1999 would enhance the work of the Policy Group. The central objectives of this paper are: first, to provide a comprehensive overview of the powerful structural, innovational and market-driven changes in financial-market practices in recent years; and second, to assess the implications of these changes, especially for the stability of the global financial system.

The central conclusion from the survey is that, on balance, recent developments in financial markets have reduced the already low probability of systemic financial shocks. However, the survey also points to a number of areas in which these developments create new and more complex risks that require increased vigilance as well as more care and diligence in risk management.

Several related factors support the view that the risk of systemic financial shocks has fallen:

1. In the post-1999 period, the financial system has demonstrated remarkable resilience in absorbing a number of major financial disturbances, in circumstances in which systemic concerns were not an issue.
2. The financial strength of financial institutions at the core of the financial system has improved, as indicated by solid profitability and strong capital positions.
3. Risk management practices have been substantially enhanced, and prudential supervisory practices have been strengthened.
4. Innovations, including the development of new financial products, have helped to diversify both market and credit risk throughout the financial system

and beyond. Of particular note is the trading of credit risk, which enables creditors and investors to diversify and redistribute this risk.

5. Hedge funds and private equity funds have provided fresh sources of liquidity to markets. Further, survey information suggests that, as a group, hedge funds have made important gains in their risk management capabilities.
6. All major markets have seen significant improvements in financial infrastructure, and major further enhancements are in progress.

While these trends are working to reduce the risk of a systemic financial shock, others may increase the damage from such a shock were it to occur. Those developments, which require careful and continuous vigilance by all market participants, include the following.

1. Innovation and new products have helped to diversify and distribute risk, but they have not eliminated it. Moreover, even for the most sophisticated firms and risk managers, these instruments often pose major challenges in risk management and monitoring. There is also the nagging question of whether ultimate risk holders always fully grasp the nature of their exposures — especially to credit risk.
2. Reflecting mergers and acquisitions among major financial institutions in recent years, there is now a relatively small number of very large and complex institutions at the core of the global financial system. Collectively, these institutions are dominant participants in many segments of financial markets, including the OTC derivatives markets. Clearly, life-threatening financial problems at any one of these institutions would create a major challenge to financial markets in general.
3. The sharp rise in the scale and importance of relatively new classes of financial institutions, including hedge funds and private equity and real estate funds, also raises new challenges. The potential fluctuations in many hedge funds' asset bases, combined with risk/return profiles, are risk factors which require close attention. In addition, for many hedge funds, risk management can be especially demanding since their targeted returns may imply high levels of risk taking. The fact that severe financial problems at a single hedge fund today are unlikely to menace financial markets generally, as was the case in 1998, does not mean that vigilance isn't necessary; a disturbance that

threatens a group of funds could achieve a critical mass that engenders broad dangers for financial markets.

4. While fundamentals have been supportive, the so-called “search for yield” has driven risk spreads and implied volatility in many markets to multiyear lows. This has raised concerns about the mispricing of risk in global financial markets, with potentially systemic consequences should the benign market environment suddenly turn more negative. Lately there is some evidence of market prices not always providing adequate compensation for risk. In an environment of rising interest rates — especially if accompanied by spread widening — pressures in financial markets and on some classes of institutions could increase.
5. The changing ownership of credit risk implied by these trends likely will have important implications for workouts — especially so-called “macro” workouts — of problem credits. Some sophisticated investors may be opting to use the new credit transfer instruments to sell problem credits at marked-down prices rather than go through the prolonged and time-consuming workout process in circumstances in which the newer holders of such credit risk may have little experience or interest in participating in complex workouts.
6. Recent developments in the housing market and the residential mortgage markets deserve particular attention because of the potential risks that they can generate. Indeed, a significant rise in the interest rate environment or a deterioration in economic conditions could result in pressures on borrowers, lenders and the mortgage markets generally. There is some potential that such pressures could be aggravated by the significant increase in the use of non-traditional mortgages and by the difficulties in hedging interest rate risk on the part of market participants including the two very large housing related GSEs.

Finally, as detailed in the Introduction and Executive Summary of this Report, it is impossible to anticipate the specific triggers and timing of financial disturbances that morph into systemic financial shocks.

The following analysis first considers factors that have reduced the risk of systemic shocks and then evaluates those requiring heightened vigilance.

B. Factors Suggesting That Systemic Risk Has Declined

1. In the post-1999 period, the financial system has demonstrated remarkable resilience in absorbing a number of major financial disturbances, in circumstances in which systemic concerns were not even an issue.

Neither traditional macro-financial disturbances nor other sources of potential trouble have nurtured systemic risk. The former include the major exchange-rate devaluation in Brazil, financial crises in Turkey, the bursting of the large equity market and technology bubble, US recession, September 11th, the wars in Afghanistan and Iraq and record high oil prices. The financial system has also shown extraordinary strength in the face of the Argentine sovereign default, a series of major corporate governance scandals and related mega-corporate collapses and defaults.

In none of these events — not even 9/11, which, in addition to the tragic loss of life, caused significant physical damage to the US financial infrastructure — was systemic risk a significant problem. In part, the ability of the financial system to absorb these disturbances was related to the generally favorable monetary and fiscal policy environment which characterized this period. Low inflation has contributed to a very favorable interest rate environment, while fiscal policy has been expansionary in many key countries, further supporting growth and underpinning economic stability. The move toward flexible exchange rates in emerging markets may also have helped by alleviating one of the major sources of macro-financial shocks. However, the health and underlying strength of the financial sector also has been a key factor in contributing to the stability of the financial system.

2. The financial strength of financial institutions at the core of the financial system has improved, as indicated by solid profitability and strong capital positions.

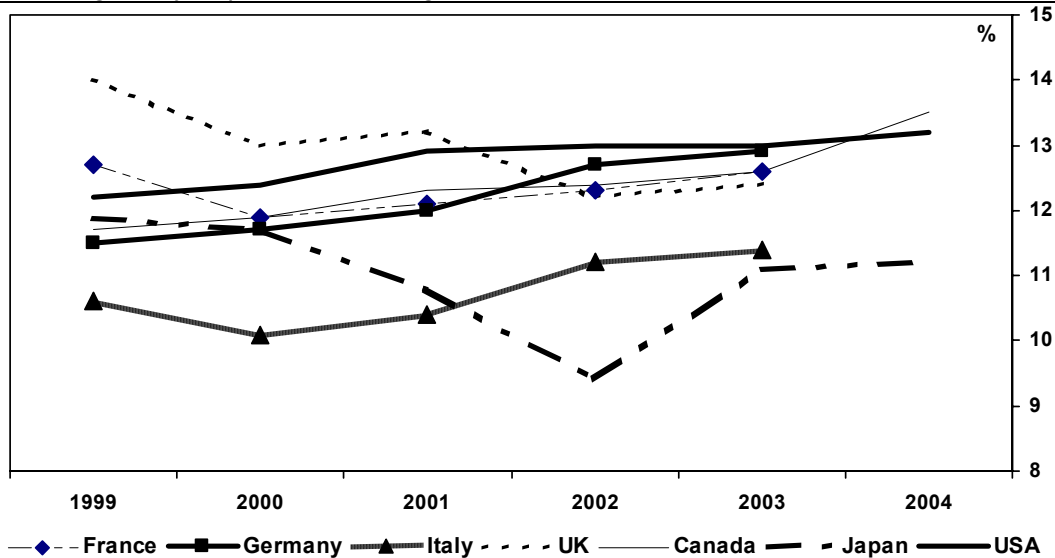
There has been a general improvement in capital ratios in the last five years, with the three major US large and complex financial institutions (LCFIs) all showing Tier 1 capital ratios rising from 2000 to 2004, and all above 8% — well above the 6% capital adequacy requirement. The OCC confirms that the underlying profitability of

US commercial banks remains strong, and that nonperforming assets have fallen to pre-recession levels.⁸

US investment banks are also in strong financial health. Their capital and equity have grown strongly in recent years, helped by high returns on equity. For example, over the past five years, their leverage ratios (average assets/average equity) have declined from about 35% to 23%, and average trading VAR has declined in relation to equity.

In Europe, profitability and solvency of the banking system has improved substantially over recent years. For the top-50 EU banks, after-tax return on equity (RoE) rose from 7.99% in 2002 to over 13% by mid-2004. Tier-1 ratios increased from 6.65% to 7.14% in the same period.⁹ These improvements reflect several factors: the recovery of financial markets and the economy; better and more active risk management, including increasing use of credit risk transfer instruments; and industry consolidation.

Chart 1
Bank Regulatory Capital to Risk-Weighted Assets in G7 Countries



Sources: IMF Global Financial Stability Report, April 2005.

For 2004 as a whole, a smaller sub-sample of large EU banks displayed another year of record results, in many cases their best ever. After-tax profits and earnings

⁸ OCC (2004): "Condition and Performance of Commercial Banks," *Quarterly Journal*, Vol. 23/4, (December).

⁹ ECB (2004): *EU Banking Sector Stability*, p. 48.

rose sharply and several banks achieved returns on equity (after tax) in excess of 20%. The record profits further bolster the banks' ability to withstand possible future shocks. According to IMF data,¹⁰ capital ratios have risen in essentially all EU member states (with the exception of Greece and the UK) between 2000 and 2003 — in spite of substantial share buy-back programs by some banks.

In Japan, the period has been characterized by a gradual but steady improvement in the condition of the major banking institutions. Indeed, after a decade or more in which Japanese banks surfaced from very high levels of non-performing loans, it now appears that reform programs are paying dividends as NPLs have declined significantly and rates of profitability are returning to more normal levels.

3. Risk management practices have been substantially enhanced, and prudential supervisory practices have been strengthened.

The turbulence that swept through financial markets in the fall of 1998 revealed that risk-management practices and supervisory and regulatory frameworks did not fully take into account the changing nature of private financial risk-taking, market dynamics and systemic risk.¹¹ Since then, significant efforts have been made to improve risk management both in the financial system and in the global economy — notably in emerging markets. Efforts led by CRMPG I, the International Monetary Fund, the Bank for International Settlements, national regulators and others have contributed to significant improvements in risk management. These efforts continue, as regulators and central banks cooperate to ensure that best practices in risk management continue to spread and develop.¹² Key developments include:

- New regulatory requirements such as Basel II have spurred advances in risk modeling and management, while improved databases and technology have also contributed significantly. The ability to separately quantify and model credit, interest rate and other risks has built on the theoretical and empirical advances of the past two decades, and the recent plunge in the cost of data

¹⁰ IMF (2005): *Global Financial Stability Report*, April, p.192.

¹¹ Schinasi, G., et al (1999), "Managing Global Finance and Risk," *Finance & Development*, Vol. 36/4, (December). IMF.

¹² See, e.g., <http://www.bis.org/cgfs/cgfsconf2005.pdf> for a 2005 joint central bank conference on risk management.

and computing power has accelerated and broadened the use of new risk management tools.

- Greater awareness of potential sources of systemic risk has also led to substantial advances in risk monitoring techniques, including new metrics and methods that further the use of aggressive scenario analysis and stress testing. At the same time, the reach and effectiveness of traditional risk mitigants such as margin, collateral and netting have been materially enhanced. Moreover, the benefits of these enhancements in risk monitoring and mitigation extend to all major classes of institutions, including hedge funds.
- Operational risk management has progressed through the discipline of Basel II and Sarbanes-Oxley. While much remains to be done in the area of modeling and measuring operational risk, the field has advanced significantly since 1999, and the momentum appears substantial.
- Innovation has helped improve risk management by providing new ways to segment, hedge and manage risk, as discussed below.
- The increased foreign participation in emerging market financial systems has helped spread best practices in risk management more broadly.¹³

4. Innovations, including the development of new financial products, have helped to diversify both market and credit risk throughout the financial system and beyond. Of particular note is the trading of credit risk, which enables creditors and investors to diversify and redistribute this risk.

The continuing surge in financial innovation has multiple causes and consequences. For example, the pace of financial innovation could not be sustained were it not for the continued advances in and falling costs of computing power and telecommunications. However, advances in technology, by themselves, are a necessary but by no means sufficient condition for financial innovation. The forces that drive the application of high technology to the arena of finance are complex. Clearly, the desire to enhance returns — especially in a low interest rate environment

¹³ Hawking, J. & Mihaljek, D. (2001), "The Banking Industry in the Emerging Market Economies: Competition, Consolidation and Systemic Stability — an Overview", *BIS Papers*, No.4 (August).

— induces behavior that relies on high level technology and rapid information processing of vast amounts of data. Ironically perhaps, the reach for enhanced returns also contributes to the environment of high tech finance in that it requires continued rapid advances in both new instrument and new risk management techniques. As an example, one counterparty to a credit default swap is reducing credit risk while the other is taking on that same credit risk in order to enhance returns. Indeed, while we have seen many forms of financial innovation in recent years, none have been more dramatic than the application of the technology which has permitted the separation of and active trading of credit risk. This subject is covered in considerable detail below and in Section V and in Appendix A of this Report.

The analysis and trading of credit separate from other characteristics of cash flows has enabled investors and lenders to diversify their single-name exposures. These developments have nurtured a more liquid secondary market in credit, which in turn promotes the creation of more derivative products based on credit instruments. Among them: credit default swaps (CDS), in which counterparties who want to assume credit risk agree to receive regular cash flows in exchange for the obligation to buy an asset if it defaults; collateralized debt obligations (CDOs), which package and slice into credit tranches a portfolio of corporate bonds; and synthetic CDOs, which package and “tranche” a portfolio of CDS. Both CDOs and their synthetic cousins provide the flexibility to customize financial transactions to match the risk appetites of investors, but in so doing, may lack the liquidity of more standardized securities.

The market for credit risk transfer mechanisms has mushroomed recently. According to ISDA, the notional value of credit default swaps outstanding jumped to \$8.4 trillion at the end of 2004, a nine-fold increase in just three years. BIS data put the notional amount at \$6.3 trillion. By comparison, the gross market value of contacts outstanding — according to the BIS, “a better measure of the amount of financial risk transfer in derivatives markets” — stood at \$134 billion.¹⁴

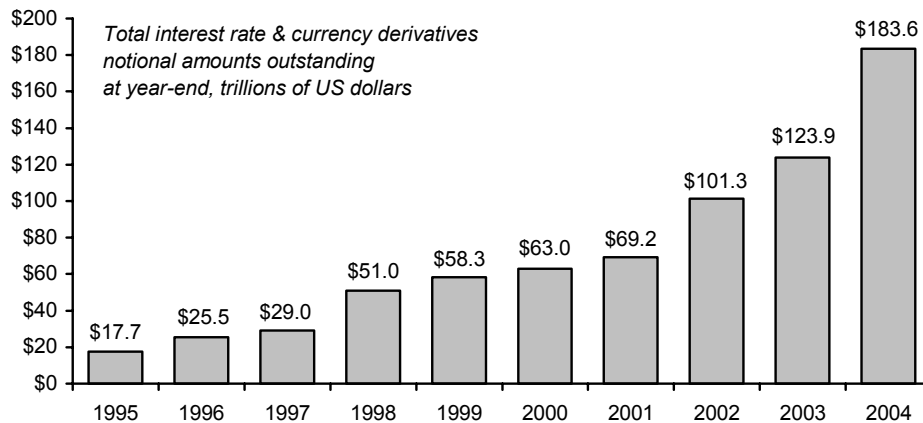
¹⁴ Bank for International Settlements, *OTC Derivatives Market Activity in the Second Half of 2004*, May 2005.

Another major trend that has been made possible by technology has been the trading of physical assets in financial form as witnessed by the explosive growth of the asset-backed securities market.

The narrowly defined asset-backed securities market alone has more than doubled in the past five years, to \$650 – \$700 billion, while the already booming residential mortgage market stands at more than \$3 trillion. Finally, the growth of securitized markets has provided access to credit for subprime borrowers who in the past would not have obtained it.

Meanwhile, the growth of more traditional derivatives and asset-backed securities — two well-developed trends — has continued at a rapid pace. The notional value of all interest rate and currency swaps and options outstanding more than tripled over the past five years to \$183.6 trillion, according to the International Swaps and Derivatives Association (ISDA).

Chart 2



These developments have nurtured both the commoditization and complexity of financial products. In ever-deeper and more liquid markets, risk-transfer products become commoditized as their use spreads, which in turn spurs further innovation. Interest rate and currency swaps and options are good examples. In addition, innovation has fostered increased complexity of financial products with trades structured to meet the needs of originators of risks and investors. Both have also diffused risk from banking institutions to investors and the broader financial system.

Legal developments have also been important for the growth of these complex financial instruments. Standardized documentation for credit default swaps and

synthetic CDOs, as well as favorable legal opinions supporting the enforceability of these contracts, has provided increased liquidity and depth to the market. Likewise, resolving tax, accounting and legal issues has helped to structure asset-backed securities. To obtain favorable "off-balance-sheet" accounting and regulatory treatment, issuers want to securitize for sale without recourse rather than on a pledged basis.

5. Hedge funds and private equity funds have provided fresh sources of liquidity to markets. Further, survey information suggests that, as a group, hedge funds have made important gains in their risk management capabilities.

Between 1999 and 2004, the hedge fund industry approximately doubled in size, with assets under management (AUM) growing from an estimated \$456 billion to \$973 billion and the total number of funds (including funds of funds) increasing from 3,617 to 7,436. Net asset flows to the industry between 2000 and 2004 were \$313 billion. Hedge funds engage in a wide variety of strategies, of which the largest in terms of assets under management are equity hedge strategies (29% of total AUM), event-driven (13%), relative value arbitrage (13%) and macro (11%).¹⁵

The growth of the hedge fund industry can have a positive effect on market functioning and efficiency as hedge funds contribute to market liquidity, help in market price discovery and contribute to the elimination of market inefficiencies.¹⁶

Hedge fund activity continues to expand into new areas such as a growing role in the credit-risk transfer market. Initially, their activity focused heavily on two-way trading in CDS, for example to exploit opportunities relative to bonds and other fixed income instruments. While this activity remains prominent, hedge funds have also been cited as playing a greater role in holding equity tranches of CDOs and participating in correlation-related trading more generally. In addition, some hedge funds sell credit protection, thereby accepting credit risk from credit originators.

In other signs of their expanding range of activities, hedge funds have started writing reinsurance coverage.¹⁷ They are playing a major role in the foreign exchange

¹⁵ HFR (2005): *Year-End 2004 Industry Report*.

¹⁶ ECB (2005): *Financial Stability Review*, (June).

¹⁷ Crombie, R. (2005), "Hedge Funds Hog the Spotlight", www.riskandinsurance.com.

markets: the non-bank professional trading community now accounts for more than one-third of the \$621 billion traded daily in the spot currency markets.¹⁸ Hedge funds have also attracted much publicity by competing for private equity deals.^{19 20}

6. All major markets have seen significant improvements in financial infrastructure, and major further enhancements are in progress.

Section IV of this Report provides a detailed discussion of improvements in financial infrastructure, documentation and related policies and practices.

¹⁸ Hughes, J. (2005), "EBS Trial Supports Hedge Fund Trading Role," *Financial Times* (March 14).

¹⁹ Lynn, M. (2005), "Hedge Funds, Buyout Firms Converge on Same Turf," *Bloomberg* (March 2).

²⁰ Smith, P. (2005), "Deals Highlight New Takeover Hierarchy," *Financial Times* (March 14).

C. Issues Requiring Continued Vigilance

1. Innovation and new products have helped to diversify and distribute risk, but they have not eliminated it. Moreover, even for the most sophisticated firms and risk managers, these instruments often pose major challenges in risk management and monitoring. There is also the nagging question of whether ultimate risk holders always fully grasp the nature of their exposures — especially to credit risk.

By design, such products segment and price a variety of risks so that those who wish can sell or transfer risk to those who are willing to accept it. For this market to function, however, both parties should be capable of absorbing any consequent losses. In turn, that requires a deep understanding of the underlying risks involved. Not surprisingly, therefore, large institutions and private investors such as hedge funds dominate these markets; their ability to invest in sophisticated analytical modeling tools is an essential ingredient for success.

However, models used without judgment can also lead risk managers astray. Models are based on historical performance and on assumptions about correlations and covariances among financial instruments. But these instruments are relatively new, continue to evolve and can be illiquid. Hence pricing may be quite volatile, and history may be a poor guide to future performance, even in normal times. Moreover, correlations and covariances in normal, liquid markets may be quite different from those in periods of market stress. The embedded optionality in these instruments thus exposes counterparties to risks that the models may not anticipate.

Fed Chairman Greenspan recently noted that "the rapid proliferation of derivatives products inevitably means that some will not have been adequately tested by market stress."²¹ He warned that "a sudden widening of credit spreads could result in unanticipated losses to investors in some of the newer, more complex structured credit products." An especially difficult issue is the assessment of default correlation across different reference entities. For example, the valuation of CDO tranches is model dependent, and market participants need to carefully evaluate the models that they use and the model parameter assumptions that they make, notably the assumptions regarding default correlations.

²¹ "Risk Transfer and Financial Stability," *Remarks at the Federal Reserve Bank of Chicago's Forty-First Annual Conference on Bank Structure*, May 5, 2005.

Recent market developments have made it clear to all participants that the evaluation of default correlations across the credit tranches of collateralized debt obligations (CDOs) depends on models, and that correlations can change significantly. For example, prior to the GM-Ford downgrades, Morgan Stanley calculates that implied correlation among on-the-run CDX equity tranches had been running at 19 – 20%, but following those events it plunged to 9%. More important, while the CDO market is not new, these vehicles for risk transfer are being used in ways — for example, long single-name credit (junior tranche) exposure and short-market (senior tranche) exposure — which magnify the leverage of buyers of credit risk, and are untested over a credit cycle, so that even the best judgment of all participants may not always be adequate to manage risks. Moreover, the more structured the products, the less liquid their markets will be in times of stress.

Thus, investing in experienced personnel who can combine models and judgment to price and manage risks across the enterprise is also critical for successfully using these new financial products. Moreover, best practices for any risk management framework should include a regular model review program. It should include frequent testing and validation of data and results and assurance that models are geared appropriately to specific products and the nature of the risks at an institution.

2. Reflecting mergers and acquisitions among major financial institutions in recent years, there is now a relatively small number of very large and complex institutions at the core of the global financial system. Collectively, these institutions are dominant participants in many segments of financial markets, including the OTC derivatives markets. Clearly, life-threatening financial problems at any one of these institutions would create a major challenge to financial markets in general.

Consolidation among banks and conglomeration between banks and non-banks has led to the creation of a relatively small number of very large and complex financial institutions at the core of the global financial system. In the US, the Gramm-Leach-Bliley (GLB) Act of 1999 provided new opportunities for the creation of large and complex financial institutions (LCFIs) by allowing banks, securities firms and insurance companies to affiliate under a financial holding company structure. The 1998 merger that created Citigroup has been followed by a wave of other mergers and acquisitions, notably the 2004 Bank of America purchase of FleetBoston, and

the 2000 merger between JP Morgan and Chase Bank, which was followed in 2004 by the merger of JP Morgan Chase with Bank One.

Leading US and European LCFIs dominate many segments of financial markets including OTC derivative markets, but especially the CDS market. Metrics that characterize concentration can be misleading, however. Many cite notional outstandings, but from a risk management perspective the fair value of outstandings is probably a better measure. Looked at in that way, the concentration of outstandings in a few hands is most pronounced in interest-rate and FX products.

There has been much discussion about the implications of these recent trends for market functioning. One frequently expressed concern is that consolidation, combined with recent trends toward market-sensitive risk management, could increase “herding” and destabilize markets.²² However, recent empirical analysis has not found supporting evidence.²³

Some empirical studies have concluded that increased concentration has tended to be associated with increased systemic risk.²⁴ However, in its April 2005 Global Financial Stability Report, the IMF’s detailed review of empirical work on systemic risk concluded that at present it would be difficult to draw significant conclusions on the impact of LCFIs on overall financial stability, either positive or negative. In the event of a systemic crisis, however, the larger size of some of the key players could increase the magnitude of the potential impact. Cross-border acquisitions, which have given some international financial companies sizeable market shares in the banking systems in many major emerging markets, could also widen the impact of a systemic problem.

²² Persaud, Avinash (2000), *World Economics* (Vol. 1, No. 4 — October-December 2000).

²³ Jorion, Philippe (2005), “Bank Trading and Systemic Risk”; forthcoming in *The Risks of Financial Institutions*, NBER.

²⁴ See, for example, IMF (2004): “United States: Selected Issues,” Chapter VI (July); and Hartmann, et. al. (2004), “Banking System Stability: A Cross-Atlantic Perspective” (October).

3. *The sharp rise in the scale and importance of relatively new classes of financial institutions, including hedge funds and private equity and real estate funds, also raises new challenges. The potential fluctuations in many hedge funds' asset bases, combined with risk/return profiles, are risk factors which require close attention. In addition, for many hedge funds, risk management can be especially demanding since their targeted returns may imply high levels of risk taking. The fact that severe financial problems at a single hedge fund today are unlikely to menace financial markets generally, as was the case in 1998, does not mean that vigilance isn't necessary; a disturbance that threatens a group of funds could achieve a critical mass that engenders broad dangers for financial markets.*

The rapid growth of hedge funds has aroused concerns about their role in financial stability.²⁵ Indeed, while hedge funds, as noted in Section B.5 above, provide fresh sources of liquidity to markets and new channels for risk diversification, the potential fluctuations in hedge funds' asset bases, combined with risk/return profiles, are risk factors which require close attention. A 4Q 2004 survey found that although less than 4% of funds require only a week's notice for redemptions, 46% allow redemptions with a month's notice.

For some hedge funds, risk management can be quite demanding since their targeted returns may require high levels of risk taking. Having said that, it is also true that risk management capabilities in the hedge fund community have improved and leverage, as conventionally defined, is nothing like what was witnessed in the LTCM episode of 1998. Yet the fact that severe financial problems at a single hedge fund today are unlikely to menace financial markets generally does not mean that vigilance is not needed. A disturbance that threatens a group of smaller funds having similar investment strategies could achieve a critical mass that engenders broad-based market dangers. Although they often follow a diverse range of strategies, there is evidence that some trades in some markets have become increasingly "crowded," leaving some hedge funds vulnerable to adverse market dynamics.²⁶

Because hedge funds are now such important counterparties to banks and investment banks (including prime broker services), the linkages between hedge funds and major institutions at the core of the financial system may now be tighter.

²⁵ See, for example, Financial Services Authority, "Hedge Funds: A Discussion of Risk and Regulatory Engagement," June 23, 2005

²⁶ ECB (2005): *Financial Stability Review*, (June).

This possibility forcefully underscores the risk management, risk monitoring and due diligence recommended in Section III of this Report. Indeed, given the rapid rate of growth in new classes of financial institutions, combined with the increasing use of complex financial products that can make the detection of leverage and risk difficult, counterparties and investors must conduct thorough due diligence to ensure they fully understand the risk appetite and profile of their counterparty.

4. While fundamentals have been supportive, the so-called “search for yield” has driven risk spreads and implied volatility in many markets to multiyear lows. This has raised concerns about the mispricing of risk in global financial markets, with potentially systemic consequences should the benign market environment suddenly turn more negative. Lately there is some evidence of market prices not always providing adequate compensation for risk. In an environment of rising interest rates — especially if accompanied by spread widening — pressures in financial markets and on some classes of institutions could increase.

The last several years have witnessed the rather extraordinary phenomenon of historically low nominal interest rates on such instruments as credit risk free US government securities. Indeed, yields on 10-year Treasury notes today remain near 4%, notwithstanding the steady rise in the Federal Funds rate since June 2004. While there are a number of compelling theories and explanations for this phenomenon, even Chairman Greenspan has described this circumstance as a “conundrum” and “virtually without precedent.” While the debate on the causes of the seemingly low long-term interest rates goes on, an important question arises as to whether such low, credit-risk-free fixed income returns have contributed to the “search for yield” phenomenon which, in turn, has depressed credit spreads in higher risk instruments.

Indeed, the same could be said about market volatility. While the decline in option-implied volatility seems to be consistent with fundamental drivers, technical factors and the search for yield may have at least partially contributed as well. In particular, the low yield environment likely encouraged option selling to shore up overall returns through premium income and the increased supply of options as a result may have depressed prices, i.e., volatility.

In other words, have seemingly low returns on benchmark government bonds caused investors to raise their appetite for lower credit quality instruments including

non-investment grade bonds, junior slices of CDOs and bonds issued by non-investment grade sovereigns, such that the spreads on such instruments are artificially depressed? And has this search for yield compressed volatility to levels that are out of line with fundamentals?

To be sure, implied and realized volatility are closely aligned, with the somewhat higher implied volatility suggesting that option sellers have not thrown caution entirely to the winds. Nonetheless, they could be facing losses if actual volatility were to spike, which may be a particular concern for market participants that do not mark their positions to market, since hidden losses could quickly escalate. Knock-on effects could also spread to the CDO market, as such exposure may be hedged with equity options. To the extent that is the case, a significant rise in long-term interest rates could also give rise to an even more rapid rise in credit spreads — or more generally, to a precipitous decline in the prices of risky assets with embedded options.

There are, of course, factors and fundamentals that help explain credit market developments including the rapid growth of instruments that permit the trading of credit risk discussed earlier. In addition, with some notable exceptions, including airlines and automobile manufacturers, corporate balance sheets, especially in the US, have strengthened materially, thus lowering default risk. Similarly, the economic and financial fundamentals in many emerging market countries have also improved. Finally, and as noted throughout this Report, credit risk has been much more widely distributed throughout the financial system and beyond than in the past.

While these favorable fundamentals are encouraging, there is at least a question as to whether returns in some market segments are proper compensation for the credit and market risks being carried by investors. Intense competition in the financial marketplace, coupled with the search for yield (and cross-selling opportunities) among financial intermediaries to meet ambitious revenue targets, may have intensified margin erosion. While the easing of credit standards and margin pressure may indicate growing risk to intermediaries' balance sheets, this is not necessarily the case, as such institutions may have increasingly hedged or securitized their credit exposures. However, the possibility of mis-pricing credit risk cannot be excluded.

Institutional and retail investors alike have shown increased risk tolerance and a willingness to explore alternative asset classes such as hedge funds, private equity

and commercial real estate paper to gain higher yields. Unexpected economic developments or political shocks could trigger the attempted simultaneous unwinding of “crowded” positions, possibly leading to spikes in volatility or even strains on market liquidity. To compensate for declining returns, some investors appear to have been increasing their involvement in less liquid and less transparent markets, where mis-pricing may conceivably be more likely.

While fundamentals in emerging markets have certainly improved, investor interest in the asset class has been propelled by the search for yield in an environment of low international interest rates. As spreads declined, some investors have turned increasingly to more “exotic” names, where investor due diligence is more difficult. The risk is a sharp and quick sell off in such securities should global interest rates or risk aversion pick up. While contagion risk within emerging markets has declined dramatically since the Asian and Russian crises, such contagion effects remain a threat, especially among lesser known and lower credit quality countries.

5. The changing ownership of credit risk implied by these trends likely will have important implications for workouts — especially so-called “macro” workouts — of problem credits. Some sophisticated investors may be opting to use new credit transfer instruments to sell problem credits at a marked-down prices rather than go through the prolonged and time-consuming workout process in circumstances in which the newer holders of such credit risk may have little experience or interest in participating in complex workouts.

Over the years one of the great strengths of the financial intermediation process has been the capacity of the system to re-structure or otherwise work out debt problems of troubled companies and countries seen to be financially viable over time. What helped to produce successful restructurings was the fact that the number of creditor institutions — most of which were banks — was relatively small and experience in executing restructurings was great, in a setting in which the fundamental economic interests of creditors and debtors were broadly similar.

Looking ahead, however, the composition of parties involved and their incentives to participate in workouts may change. While the major creditors in workouts in the past were typically banks, new types of creditors, including hedge funds, have emerged both as direct lenders and participants in the CDS market. Recent

workouts have already shown that the involvement of a larger number of less experienced investors tend to make debt resolution more problematic.

In case of sovereign default, lack of creditor coordination and the role of the IMF have naturally been viewed differently by the different market participants. In particular, the Sovereign Debt Restructuring Mechanism (SDRM) proposed by the IMF a few years ago met with strong resistance from the private sector. In the meantime, the widespread introduction of collective action clauses (CACs) in emerging market bond contracts and the sanctioning of the “Principles for Stable Capital Flows and Fair Debt Restructuring in Emerging Markets” in 2004 have been steps in the right direction and have enjoyed relatively broad agreement in the financial community. Nevertheless, the recent Argentine unilateral default on more than \$100 billion has dealt a serious blow to the traditional cooperative and voluntary sovereign debt restructuring process.

It is impossible to foresee exactly how well the vitally important credit workout process will function in the future. Yet, it seems prudent to assume that with changing players and changing motives, the re-structuring process will be more difficult. Obviously, there are circumstances in which such an outcome could add to pressures in financial markets.

6. Recent developments in the housing market and residential mortgage market deserve particular attention because of the potential risks that they can generate. Indeed, a significant rise in the interest rate environment or a deterioration in economic conditions could result in pressures on borrowers, lenders and the mortgage markets generally. There is some potential that such pressures could be aggravated by the significant increase in the use of non-traditional mortgages and by the difficulties in hedging interest rate risk on the part of market participants including the two very large housing related GSEs.

These developments include:

- The increasingly greater reliance on quantitative measures of borrower and collateral credit worthiness;
- The growing proportion of non-traditional/higher-leverage mortgage products;
- The absolute size of the government sponsored agencies and the inherent problems of these institutions in managing and mitigating interest rate risk;

- The very sharp rise in home prices in a number of locations across the US.

Mortgage origination today is largely based on quantitative measures of credit worthiness, such as FICO scores, DTI ratios, etc. This approach leaves little room for the “old fashioned” banker’s qualitative assessment of the borrower’s creditworthiness. This impersonal way of linking the borrower to the provider of credit has greatly increased the speed and volume of transactions. However, the separation of lender and borrower via the disintermediation offered by the securitization process has blurred that relationship. In the days of Frank Capra’s *It’s a Wonderful Life*, the lender’s forbearance could often ensure a restructuring of the mortgage debt in case of adverse events affecting the borrower’s ability to pay. In the current environment of securitized mortgage debt, collateral repossession and liquidation can occur much more quickly. Should such event occur in large scale, the process could generate a spiraling decline in collateral value, as more liquidations are effected. The liability of the borrower remains effectively limited to the (possibly declining) value of the home.

A troubling aspect of recent originations is the growth in interest-only (IO) loans and MTA (12-Month Moving Average Treasury index) ARMs with a negative amortization feature.²⁷ In an IO mortgage, the borrower pays no principal for the first few years. The negative amortization (or “neg-am”) loans are an extreme form of an IO loan where the principal owed by the borrower can actually increase over time. The primary attraction of these products is that the starting monthly payments can be significantly lower than regular or level pay mortgages where the borrower pays both principal and interest. This is quite troubling if one considers that some borrowers are not only exposed to payment shocks from rising rates but also from expiry of IO/neg-am features. For example, a 5/1 IO hybrid mortgage borrower will be exposed to rate reset as well as increase in monthly payments as the IO term expires and the loan is recast to amortize the principal balance over the remaining term of the mortgage.

Three governmental or quasi-governmental agencies provide funding to the home mortgage market: Ginnie Mae or the Government National Mortgage Association (GNMA), Freddie Mac or the Federal Home Loan Mortgage Corporation (FHLMC) and Fannie Mae or the Federal National Mortgage Association (FNMA). GNMA is a

²⁷ This section draws on Modukuri, Srinivas (2005), “The Changing Landscape of the Mortgage Market” (Lehman Brothers).

US government owned agency whose obligations are guaranteed by the full faith and credit of the United States government. FHLMC and FNMA are government-chartered private corporations whose stock is publicly traded on the New York Stock Exchange. The obligations of Freddie and Fannie are plainly not guaranteed by the US government. However, reflecting in part the fact that both agencies have access to a small credit facility at the US Treasury, many observers believe that as a practical matter both agencies are the benefit of an implicit government guarantee. This issue is a part of a larger issue regarding the future size, role, supervision and governance of the housing-related GSEs that is currently under consideration in Washington.

