Prologue

A Bird's-Eye View

The Financial Crisis of 2007–2009: Causes and Remedies

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The integration of global financial markets has delivered large welfare gains through improvements in static and dynamic efficiency—the *allocation* of real resources and the *rate* of economic growth. These achievements have, however, come at the cost of increased systemic fragility, evidenced by the ongoing financial crisis. We must now face the challenge of redesigning the regulatory overlay of the global financial system in order to make it more robust without crippling its ability to innovate and spur economic growth.

P.1 THE FINANCIAL CRISIS OF 2007–2009

The financial sector has produced large economic efficiencies because financial institutions, which play a unique role in the economy, act as intermediaries between parties that need to borrow and parties willing to lend or invest. Without such intermediation, it is difficult for companies to conduct business. Thus, systemic risk can be thought of as widespread failures of financial institutions or freezing up of capital markets that can substantially reduce the supply of capital to the real economy. The United States experienced this type of systemic failure during 2007 and 2008 and continues to struggle with its consequences as we enter 2009.

When did this financial crisis start and when did it become systemic?

The financial crisis was triggered in the first quarter of 2006 when the housing market turned. A number of the mortgages designed for a subset of the market, namely subprime mortgages, were designed with a balloon interest payment, implying that the mortgage would be refinanced within a short period to avoid the jump in the mortgage rate. The mortgage refinancing presupposed that home prices would continue to appreciate. Thus, the collapse in the housing market necessarily meant a wave of future defaults in the subprime area—a systemic event was coming. Indeed, starting in late 2006 with Ownit Mortgage Solutions' bankruptcy and later on April 2, 2007, with the failure of the second-largest subprime lender, New Century Financial, it was clear that the subprime game had ended.

While subprime defaults were the root cause, the most identifiable event that led to systemic failure was most likely the collapse on June 20, 2007, of two highly levered Bear Stearns–managed hedge funds that invested in subprime asset-backed securities (ABSs). In particular, as the prices of the collateralized debt obligations (CDOs) began to fall with the defaults of subprime mortgages, lenders to the funds demanded more collateral. In fact, one of the funds' creditors, Merrill Lynch, seized $800 million of their assets and tried to auction them off. When only $100 million worth could be sold, the illiquid nature and declining value of the assets became quite evident. In an attempt to minimize any further auctions at fire sale prices, possibly leading to a death spiral, two days later Bear Stearns injected $3.2 billion worth of loans to keep the hedge funds afloat.

This event illustrates the features that typify financial crises—a credit boom (which leads to the leveraging of financial institutions, in this case, the Bear Stearns hedge funds) and an asset bubble (which increases the probability of a large price shock, in this case, the housing market). Eventually, when shocks lead to a bursting of the asset bubble (i.e., the fall in house prices) and trigger a process of deleveraging, these unsustainable asset bubbles and credit booms go bust with the following three consequences:

1. The fall in the value of the asset backed by high leverage leads to margin calls that force borrowers to sell the bubbly asset, which in turn starts to deflate in value.
2. This fall in the asset value now reduces the value of the collateral backing the initial leveraged credit boom.
3. Then, margin calls and the forced fire sale of the asset can drive down its price even below its now lower fundamental value, creating a cascading vicious circle of falling asset prices, margin calls, fire sales, deleveraging, and further asset price deflation.

Even though Bear Stearns tried to salvage the funds, the damage had been done. By the following month, the funds had lost over 90 percent of their value and were shuttered. As we know now, this event was just the tip of a very large iceberg that had already been created.

Coincident with the fate of these funds, there was a complete repricing of all credit instruments, led by the widening of credit spreads on investment grade bonds, high yield bonds, leverage loans via the LCDX index, CDOs backed by commercial mortgages via the CMBX, and CDOs backed by subprime mortgages via the ABX.[1] This led to an almost overnight halt on CDO issuance. As an illustration, Figure P.1 graphs an increase of over 200 basis points (bps) in high yield spreads between mid-June and the end of July 2007 and an almost complete collapse in the leveraged loan market.

Although it is difficult to tie the credit moves directly to other markets, on July 25, 2007, the largest, best-known speculative trade, the carry trade in which investors go long the high-yielding currency and short the

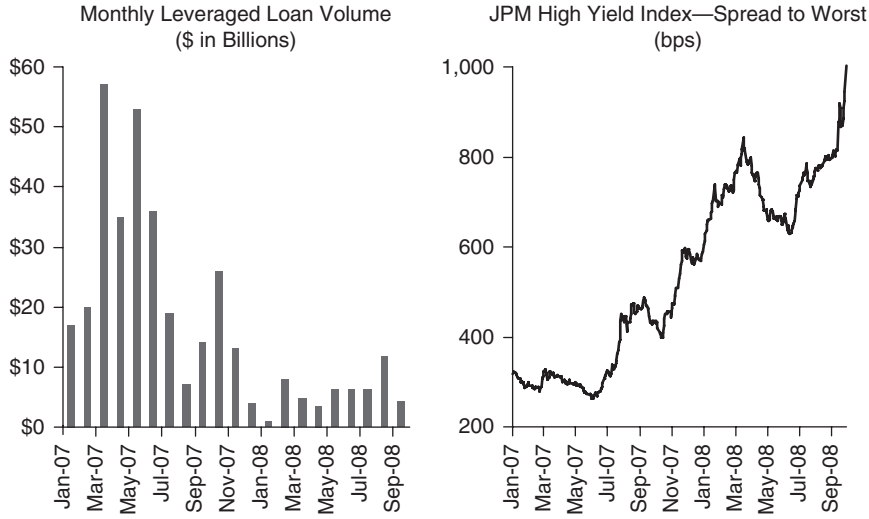

FIGURE P.1 **Leveraged Finance Market (January 2007 to September 2008)**

These graphs show the monthly leveraged loan volume and the spread on the yield to worst on the JPMorgan High Yield Index over the period January 2007 to September 2008. The yield to worst on each bond in the index is the lowest yield of all the call dates of each bond.

Source: S&P LCD, JPMorgan.

low-yielding one, had its largest move in many years. Specifically, being long 50 percent each in the Australian dollar and New Zealand kiwi and short 100 percent in Japanese yen lost 3.5 percent in a single day. The daily standard deviation over the previous three years for this trade had been 0.6 percent. It was, in short, a massive six standard deviation move. It is now widely believed that hedge fund losses in the carry trade, or perhaps a shift in risk aversion, led to the next major event—the meltdown of quantitative, long-short hedge fund strategies (value, momentum, and statistical arbitrage) over the week of August 6, 2007. A large liquidation the previous week in these strategies most likely started a cascade that caused hedge fund losses (with leverage) on the order of 25 to 35 percent before recovering on August 9.

The subprime mortgage decline had truly become systemic.

And then it happened. For over a week, there had been a run on the assets of three structured investment vehicles (SIVs) of BNP Paribas. The run was so severe that on August 9, BNP Paribas had to suspend redemptions. This event informed investors that the asset-backed commercial papers (ABCPs) and SIVs were not necessarily safe short-term vehicles. Instead, these conduits were supported by subprime and other questionable credit quality assets, which had essentially lost their liquidity or resale options.

BNP Paribas' announcement caused the asset-backed commercial paper market to freeze, an event that most succinctly highlights the next major step to a financial crisis, namely the lack of transparency and resulting counterparty risk concerns.

Consider the conduits of BNP Paribas. For several years, there had been huge growth in the development of structured products, ABCPs and SIVs being just two examples. However, once pricing was called into question as subprime mortgages defaulted, the conduit market faced:

- New exotic and illiquid financial instruments that were hard to value and price.
- Increasingly complex derivative instruments.
- The fact that many of these instruments traded over the counter rather than on an exchange.
- The revelation that there was little information and disclosure about such instruments and who was holding them.
- The fact that many new financial institutions were opaque with little or no regulation (hedge funds, private equity, SIVs, and other off-balance-sheet conduits).

Given that there was little to distinguish between BNP Paribas' conduits and those of other financial institutions, the lack of transparency on what

financial institutions were holding and how much of the conduit loss would get passed back to the sponsoring institutions caused the entire market to shut down. All short-term markets, such as commercial paper and repurchase agreements (repo), began to freeze, only to open again once the central banks injected liquidity into the system.

Private financial markets cannot function properly unless there is enough information, reporting, and disclosure both to market participants and to relevant regulators and supervisors. When investors cannot appropriately price complex new securities, they cannot properly assess the overall losses faced by financial institutions, and when they cannot know who is holding the risk for so-called toxic waste, this turns into generalized uncertainty. The outcome is an excessive increase in risk aversion, lack of trust and confidence in counterparties, and a massive seizure of liquidity in financial markets. Thus, once lack of financial market transparency and increased opacity of these markets became an issue, the seeds were sown for a full-blown systemic crisis.

After this market freeze, the next several months became a continual series of announcements about subprime lenders going bankrupt, massive write-downs by financial institutions, monolines approaching bankruptcy, and so on. The appendix at the end of this Prologue provides a time line of all major events of the crisis.

While the market was learning about who was exposed, it was still unclear what the magnitude of this exposure was and who was at risk through counterparty failure. By now, banks had stopped trusting each other as well and were hoarding significant liquidity as a precautionary buffer; unsecured interbank lending at three-month maturity had largely switched to secured overnight borrowing; the flow of liquidity through the interbank markets had frozen; and lending to the real economy had begun to be adversely affected.

Two defining events in the period to follow confirmed that these counterparty risk concerns were valid. These were the rescue of Bear Stearns and the bankruptcy of Lehman Brothers. We discuss the systemic risk concerns raised by these events in turn.

There was a run on Bear Stearns, the fifth-largest investment bank, during the week of March 10, 2008. Bear Stearns was a prime candidate; it was the smallest of the major investment banks, had the most leverage, and was exposed quite significantly to the subprime mortgage market. On that weekend, the government helped engineer JPMorgan Chase's purchase of Bear Stearns by guaranteeing $29 billion of subprime-backed securities, thus preventing a collapse. Bear Stearns had substantive systemic risk, as it had a high degree of interconnectedness to other parts of the financial system. In particular, its default represented a significant counterparty risk since it

was a major player in the $2.5 trillion repo market (which is the primary source of short-term funding of security purchases), the leading prime broker on Wall Street to hedge funds, and a significant participant—on both sides—in the credit default swap (CDS) market. Its rescue temporarily calmed markets.

In contrast, as an example of systemic risk that actually materialized, consider the fourth-largest investment bank, Lehman Brothers. Lehman filed for bankruptcy over the weekend following Friday, September 12, 2008. In hindsight, Lehman contained considerable systemic risk and led to the near collapse of the financial system. Arguably, this stopped—and again, just temporarily—only when the government announced its full-blown bailout the following week.

The type of systemic risk related to Lehman's collapse can be broken down into three categories:

1. The market's realization that if Lehman Brothers was not too big to fail, then that might be true for the other investment banks as well. This led to a classic run on the other institutions, irrespective of the fact that they were most likely more solvent than Lehman Brothers. This led to Merrill Lynch selling itself to Bank of America. The other two institutions, Morgan Stanley and Goldman Sachs, saw the cost of their five-year CDS protection rise from 250 basis points (bps) to 500 bps and from 200 bps to 350 bps (respectively), from Friday, September 12, to Monday, September 15, and then to 997 bps and 620 bps (respectively) on September 17.
2. The lack of transparency in the system as a whole:
   - Collateral calls on American International Group (AIG) led to its government bailout on Monday, September 15. Without the bailout, its exposure to the financial sector through its insuring of some $500 billion worth of CDSs on AAA-rated CDOs would have caused immediate, and possibly catastrophic, losses to a number of firms.
   - One of the largest money market funds, the Reserve Primary Fund, owned $700 million of Lehman Brothers' short-term paper. After Lehman's bankruptcy, Lehman's debt was essentially worthless, making the Reserve Primary Fund "break the buck" (i.e., drop below par), an event that had not occurred for over a decade. This created uncertainty about all money market funds, causing a massive run on the system. Since money market funds are the primary source for funding repos and commercial paper, this was arguably the most serious systemic event of the crisis. The government then had to guarantee all money market funds.

3. The counterparty risk of Lehman:
   - As one illustration, consider its prime brokerage business. In contrast to its U.S. operations, when Lehman declared bankruptcy, its prime brokerage in the United Kingdom went bankrupt. This meant that any hedge fund whose securities were hypothecated by Lehman was now an unsecured creditor. This led to massive losses across many hedge funds as their securities that had been posted as collateral disappeared in the system.
   - As another illustration, in the wake of Lehman's failure, interbank markets truly froze, as no bank trusted another's solvency; the entire financial intermediation activity was at risk of complete collapse.

What the Lehman Brothers episode revealed was that there really is a "too big to fail" label for financial institutions. We will argue that this designation is incredibly costly because it induces, somewhat paradoxically, a moral hazard in the form of a race to become systemic, and, when a crisis hits, results in wealth transfers from taxpayers to the systemic institution.

The next section presents a requiem for the shadow banking sector—how the run propagated from the nonbank mortgage lenders to independent broker-dealers and then all the way to money market funds and corporations reliant on short-term financing. Section P.3 discusses in greater detail the root causes of the crisis. Sections P.4 and P.5 describe (respectively) the basic principles of regulation we propose in order to reduce the likelihood of systemic failure within an economy such as that of the United States, and the principles of a bailout when the crisis hits. Section P.6 discusses why such regulation will be effective only if there is reasonable coordination among different national regulators on its principles and implementation.

P.2 REQUIEM FOR THE SHADOW BANKING SECTOR

Before we proceed to understanding the root causes of the financial crisis of 2007 to 2009, it is important to stress that this was a crisis of traditional banks and, more important, a crisis of the so-called shadow banking sector—that is, of those financial institutions that mostly looked like banks. These institutions borrowed short-term in rollover debt markets, leveraged significantly, and lent and invested in longer-term and illiquid assets. However, unlike banks, they did not have access until 2008 to the safety nets—deposit insurance, as well as the lender of last resort (LOLR), the central bank—that have been designed to prevent runs on banks. In

2007 and 2008, we effectively observed a run on the shadow banking system that led to the demise of a significant part of the (then) unguaranteed financial system.

This run and demise started in early 2007 with the collapse of several hundred nonbank mortgage lenders, mostly specialized in subprime and Alt-A mortgages, and continued thereafter in a series of steps that we list in the following pages. When the market realized that these institutions had made mostly toxic loans, the wholesale financing of these nonbank lenders disappeared, and one by one, hundreds of them failed, were closed down, or were merged into larger banking institutions. Given the extent of poor underwriting standards, this collapse of mortgage lenders included even some that had depository arms, such as Countrywide—the largest U.S. mortgage lender—which was acquired under distressed conditions by Bank of America.

The second phase of the shadow banking system's demise was the collapse of the entire system of structured investment vehicles (SIVs) and conduits that started when investors realized that they had invested in very risky and/or illiquid assets—toxic CDOs based on mortgages and other credit derivatives—thus triggering the run on their short-term ABCP financing. Since many of these SIVs and conduits had been offered credit enhancements and contingent liquidity lines from their sponsoring financial institutions, mostly banks, while they were *de jure* off-balance-sheet vehicles of such banks, they became *de facto* on balance sheet when the unraveling of their financing forced the sponsoring banks to bring them back on balance sheet.

The third phase of the shadow banking system's demise was the collapse of the major U.S. independent broker-dealers that occurred when the run on their liabilities took the form of the unraveling of the repo financing that was the basis of their leveraged operations. Bear Stearns was the first victim. After the Bear episode, the Federal Reserve introduced its most radical change in monetary policy since the Great Depression—the provision of LOLR support via the new Primary Dealer Credit Facility (PDCF)[2]—to systemically important broker-dealers (those that were primary dealers of the Fed). Even this LOLR did not prevent the run on Lehman, as investors realized that this support was not unconditional and unlimited—the conditions for an LOLR to be able to credibly stop *any* banklike run. The decision to let Lehman collapse then forced Merrill Lynch, next in line for a run, to merge with Bank of America. Next, the two other remaining independent broker-dealers, which after the creation of the PDCF were effectively already under the supervisory arm of the Fed, were forced to convert into bank holding companies (allowing them—if willing—to acquire more stable insured deposits) and thus be formally put under supervision and regulation

of the Fed. In fact, in a matter of seven months the Wall Street system of independent broker-dealers had collapsed.

The demise of the shadow banking system continued with the run on money market funds. These funds were not highly leveraged but, like banks, relied on the short-term financing of their investors. These investors could run if concerned about funds' liquidity or solvency. Concerns about solvency were first triggered by the Reserve Primary Fund "breaking the buck," as it had invested into Lehman debt. Like the Reserve fund, many of these money market funds, which were competing aggressively for investors' savings, were promising higher than market returns on allegedly liquid and safe investment by putting a small fraction of their assets into illiquid, toxic, and risky securities. Once the Reserve fund broke the buck, investors panicked because they did not—and could not—know which funds were holding toxic assets and how much of them were held. Given the banklike short-run nature of their liabilities and the absence of deposit insurance, a run on money market funds rapidly ensued. This run on a $3 trillion industry, if left unchecked, would have been destructive, as money market funds were the major source of funding for the corporate commercial paper market. Thus, when the run started, the Federal Reserve and the Treasury were forced to provide deposit insurance to all the money market funds to stop such a run, another major extension of the banks' safety nets to nonbank financial institutions.

The following phase of the shadow banking system's demise was the run on hundreds of hedge funds. Like other institutions, hedge funds' financing was very short-term since investors could redeem their investments in these funds after short lockup periods; also, given that the basis of their leverage was short-term repo financing, their financing fizzled out as primary brokers disappeared or cut back their financing to hedge funds. These runs were amplified by the crowded nature of many of the hedge fund strategies.

The next phase of the demise of the shadow banking system may be the coming refinancing crisis of the private equity–financed leveraged buyouts (LBOs). Private equity and LBOs are highly leveraged in their operation, but they tend to have longer-maturity financing that reduces, but does not eliminate, the risk of a refinancing crisis; it only makes it a slow-motion run. The existence of "covenant-lite/loose" clauses and pay-in-kind (PIK) toggles further allows LBO firms to postpone a refinancing crisis. But the large number of leveraged loans that are coming to maturity in 2010 and 2011—when credit spreads would have most likely massively widened—suggests that many of these LBOs may go bust once the refinancing crisis emerges. While some of the LBO firms may only require financial restructuring, it is likely that the process of restructuring will result in substantial economic losses in some cases.

The drying up of liquidity and financial distress did not spare other financial institutions such as insurance companies and monoline bond insurers that had aggressively provided insurance to a variety of toxic credit derivatives. Some of these, American International Group (AIG) in particular, which had sold over $500 billion of such insurance, went bust and had to receive a government bailout. Others, such as monoline bond insurers, eventually lost their AAA ratings. While not subject to a formal run and collapse as they had longer-term financing via the insurance premiums, the loss of the AAA rating meant that they had to post significant additional collateral on many existing contracts and were unable to provide new insurance. Their business model collapsed as a result.

Runs on the short-term liabilities caused problems even for traditional banks and for nonfinancial corporations. By the summer of 2007 and following the collapse of Lehman, there were traditional bank runs that put significant pressure on likely insolvent banking institutions such as IndyMac, Washington Mutual (WaMu), and Wachovia. Since at that stage deposits in the United States were insured up to just $100,000, only about 70 percent of deposits were insured. Uninsured deposits accounted for about $2.6 trillion of the $7 trillion of deposits in Federal Deposit Insurance Corporation (FDIC)–insured institutions. Concerns about the solvency of U.S. banking institutions peaked in the summer of 2008 following the failure or near failure of Indy Mac, WaMu, and Wachovia. The lack of active interbank lending, which manifested in the very high London Interbank Offered Rate (LIBOR) spreads and bank hoarding of liquidity, and the risk to uninsured deposits (including a substantial amount of large cross-border lines) led to concerns about a generalized bank run. The policy authorities responded to the possibility of a bank run by formally extending deposit insurance from $100,000 to $250,000 and effectively providing an implicit guarantee even to uninsured deposits (these remained significant at about $1.9 trillion) via resolution of distressed banks that would not involve any losses for uninsured deposits. The creation of new government facilities to guarantee for a period of time any new debt issued by financial institutions also provided a significant public safety net against the risk of a roll-off of maturing liabilities of the financial sector.

Other facilities created by the Fed further expanded indirectly its lender of last resort support even to foreign banks and primary dealers that did not operate in the United States (and that thus did not have access to the discount window and the new facilities). In particular, the large swap lines upon which the Fed agreed with a number of other central banks effectively allowed other central banks to borrow dollar liquidity from the Fed and then relend such dollar liquidity to their domestic financial institutions that

were facing a dollar liquidity shortage because of the roll-off of their dollar liabilities. These swap lines were both a form of lender of last resort support of non-U.S. banks and a form of foreign exchange intervention to prevent the excessive appreciation of the U.S. dollar that such a demand for dollar liquidity by foreign banks was triggering.

Finally, the risk of a run on short-term liabilities did not even spare the corporate sector. In the fall of 2008, and especially after the collapse of Lehman, the ability of corporate firms, in particular those employing commercial paper financing, to roll over their short-term debt was severely impaired. The deepening of the credit crunch and the incipient run on money market funds—the main investors in such commercial paper—led to a sharp roll-off of this essential form of short-term financing that was funding the corporate sector's working capital requirements. The risk now became one of solvent but illiquid firms' risking a default on their short-term liabilities as the consequence of their inability to roll over short-term debt induced by the sequence of market freezes just described. The U.S. policy authorities responded to this unprecedented risk with—again—an unprecedented action: A new facility was created for the Fed to purchase commercial paper from the corporate sector.

As a consequence of this run or near run on the short-term liabilities of shadow banks, commercial banks, and even corporate firms, policy makers adopted massive new and hitherto unexplored roles as providers of liquidity to a very broad range of institutions. Usually central banks are lenders of last resort; but in the financial crisis of 2007, the Fed became the lender of first and only resort: Since banks were not lending to each other and were not lending to nonbank financial institutions, and financial firms were not even lending to the corporate sector, the Fed ended up backstopping the short-term liabilities of banks, nonbank financial institutions, and nonfinancial corporations.

It is difficult to quantify the effect the financial crisis in the summer of 2007 had on the recession that started in December 2007 and is working its way through 2009. This is especially true given that a large number of households lost a majority of their wealth when housing prices started their steep downward trend in 2006. In other words, the recession may well have occurred even if the financial crisis had not taken root. But most would agree that the near collapse of the financial system in the fall of 2008 has had severe consequences for the economy. The losses that highly leveraged financial institutions faced led to a significant credit crunch that exacerbated the asset price deflation and led to lower real spending on capital goods—consumer durables and investment goods—that has triggered the overall economic contraction. It is, however, a vicious circle. Deleveraging

and credit crunches have both financial and real consequences: They trigger financial losses and they can trigger an economic recession that worsens financial losses for debtors and creditors, and so on.

With this requiem for the shadow banking sector (in fact, for most of the financial sector!), it is useful to organize our thinking around the various causes of the underlying instability in the financial sector which led to this vicious circle.

P.3 CAUSES

There is almost universal agreement that the fundamental cause of the crisis was the combination of a credit boom and a housing bubble. By mid-2006, the two most common features of these so-called bubbles, the spreads on credit instruments and the ratio of house prices to rental income, were at their all-time extremes. Figures P.2 and P.3 graph both these phenomena, respectively.

There are two quite disparate views of these bubbles.

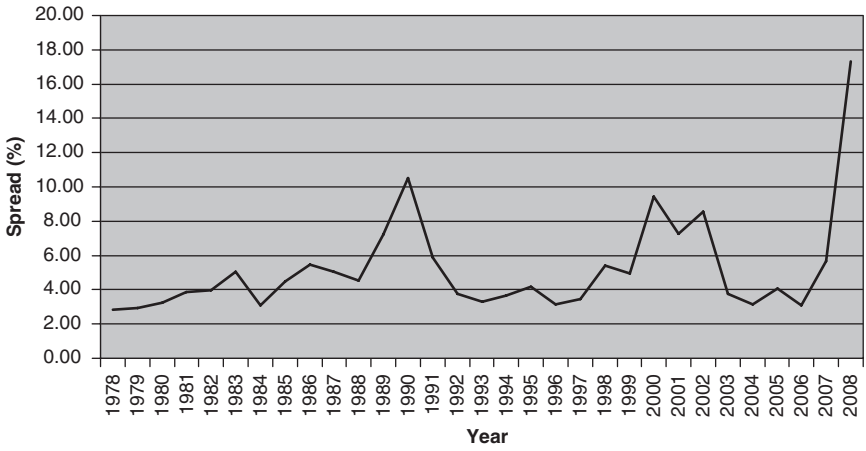

FIGURE P.2 **Historical High Yield Bond Spreads, 1978–2008**

This chart graphs the high yield bond spread over Treasuries on an annual basis over the period 1978 to 2008. The lowest point of the graph from June 1, 2006, onward, not visible due to the annual nature of the data, is 260 basis points on June 12.

Source: Salomon Center, Stern School of Business, New York University.

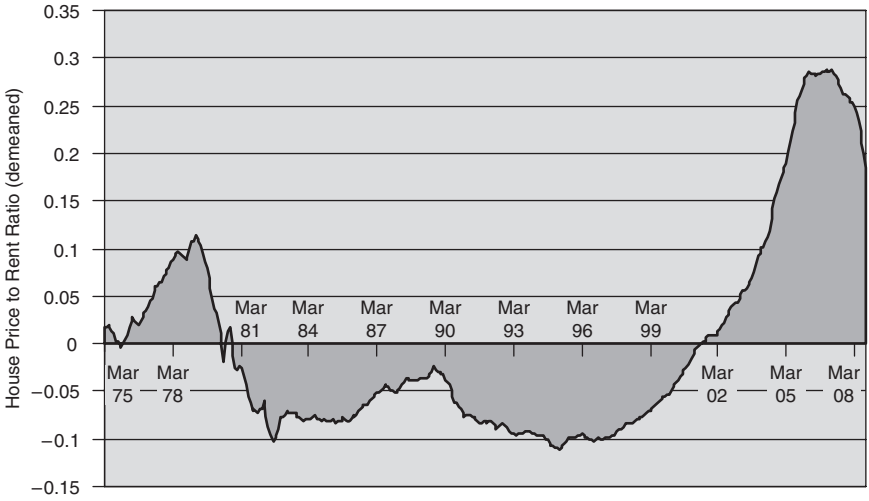

FIGURE P.3 **House Price to Rent Ratio, 1975–2008**

This chart graphs the demeaned value of the ratio of the Office of Federal Housing Enterprise Oversight (OFHEO) repeat-sale house price index to the Bureau of Labor Statistics (BLS) shelter index (i.e., gross rent plus utilities components of the CPI). Because of demeaning, the average value of this ratio is zero.

Source: Authors' own calculations, OFHEO, BLS.

The first is that there was just a fundamental mispricing in capital markets—risk premiums were too low and long-term volatility reflected a false belief that future short-term volatility would stay at its current low levels. This mispricing necessarily implied low credit spreads and inflated prices of risky assets. One explanation for this mispricing was the global imbalance that arose due to the emergence and tremendous growth of new capitalist societies in China, India, and the eastern bloc of Europe. On the one side, there were the consumer-oriented nations of the United States, Western Europe, Australia, and so forth. And on the other side, there were these fast-growing, investment- and savings-driven nations. Capital from the second set of countries poured into assets of the first set, leading to excess liquidity, low volatility, and low spreads.

The second is that mistakes made by the Federal Reserve (and some other central banks) in the past decade may have been partially responsible. In particular, the decision of the Fed to keep the federal funds rate too low for too long (down to 1 percent until 2004) created both a credit bubble

and a housing bubble. In other words, with an artificially low federal funds target, banks gorged themselves on cheap funding and made cheap loans available. In addition to easy money, the other mistake made by the Fed and other regulators was the failure to control the poor underwriting standards in the mortgage markets. Poor underwriting practices such as no down payments; no verification of income, assets, and jobs (no-doc or low-doc or NINJA—no income, jobs, or assets—mortgages); interest-only mortgages; negative amortization; and teaser rates were widespread among subprime, near-prime (Alt-A), and even prime mortgages. The Fed and other regulators generally supported these financial innovations.

There may be some truth to both views. On the one hand, credit was widely available across all markets—mortgage, consumer, and corporate loans—with characteristics that suggested poorer and poorer loan quality. On the other hand, both the credit boom and the housing bubble were worldwide phenomena, making it difficult to pin the blame only on the Fed's policy and lack of proper supervision and regulation of mortgages.

As we now know, a massive shock to one of the asset markets, most notably housing, led to a wave of defaults (with many more expected to come) in the mortgage sector. In terms of magnitude, the drop in housing prices from the peak in the first quarter of 2006 to today is 23 percent (see Figure P.3). Therefore, at first glance one might presume that mere loss of wealth might explain the severity of the crisis. However, the United States went through a similarly large shock relatively recently without creating the same systemic effects: The high-tech bubble in U.S. equity markets led to extraordinary rates of return in the late 1990s, only to collapse in March 2000. As a result, the NASDAQ fell 70 percent over the next 18 months (up until 9/11). The ensuing collapse of the dot-coms, the sharp fall in real investment by the corporate sector, and the eventual collapse of most high-tech stocks triggered the U.S. recession of 2001 and the extraordinary wave of defaults of high yield bonds in 2002. Yet there was no systemic financial crisis.

Why has the housing market collapse of 2007 been so much more severe than the dot-com crash of 2001, or, for that matter, the market crash of 1987 or any of the other crashes that have punctuated financial history (perhaps with the exception of the Great Depression)?

There are four major differences with respect to this current crisis.

First, unlike the Internet bubble, the loss in wealth for households in this crisis comes from highly leveraged positions in the underlying asset (i.e., housing). In fact, given the current price drop, the estimate is that 30 percent of all owner-occupied homes with a mortgage have negative equity, and that figure may become as high as 40 percent if home prices drop another 15 percent. Since homes are the primary assets for most households, this means that

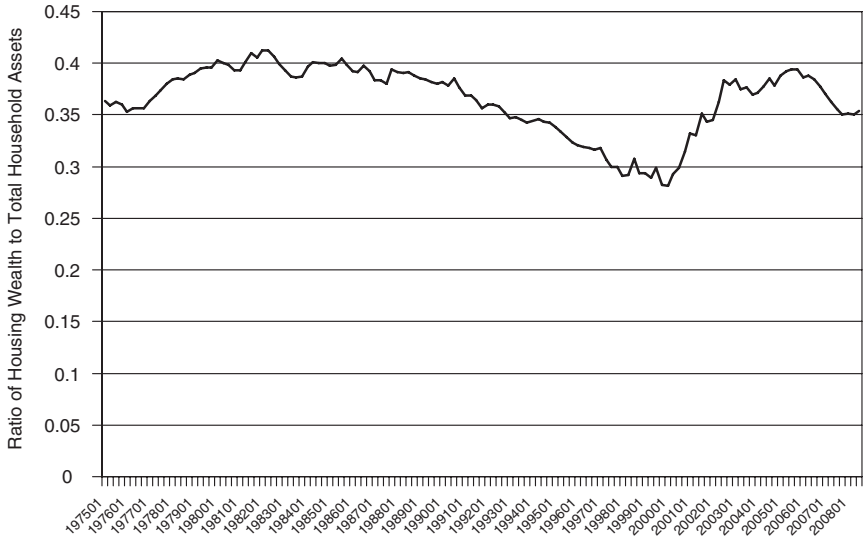

FIGURE P.4 **Housing Wealth/Total Household Assets, 1975–2008**

This chart graphs the ratio of housing wealth (owner-occupied and tenant-occupied owned by households) divided by total household assets.

Source: Federal Reserve Flow of Funds.

a significant number of households are essentially broke, leading the way for the surge in mortgage defaults, especially at the subprime and Alt-A levels.

Figure P.4 provides estimates of the importance of household wealth as a fraction of total household assets. As can be seen from the figure, the number is economically significant, varying from 30 percent to 40 percent over the period from 1975 to 2008, with 35 percent being the ratio in the third quarter of 2008. Figure P.5 adds consumer leverage to the mix and shows the extraordinary jump in consumer debt as a fraction of home value. Specifically, this ratio went from 56 percent in 1985 to 68 percent in 2005 and finally to 89 percent in late 2008. We are standing on the precipice.

It did not help that the majority of mortgages, the 2/28 and 3/27 adjustable rate mortgages (ARMs), were basically structured to either refinance or default within two or three years, respectively, making them completely dependent on the path of home prices and thus systemic in nature. In any event, independent of other activity in the financial sector, this shock to household wealth necessarily had greater consequences for the real economy than the burst of the technology bubble in 2000.

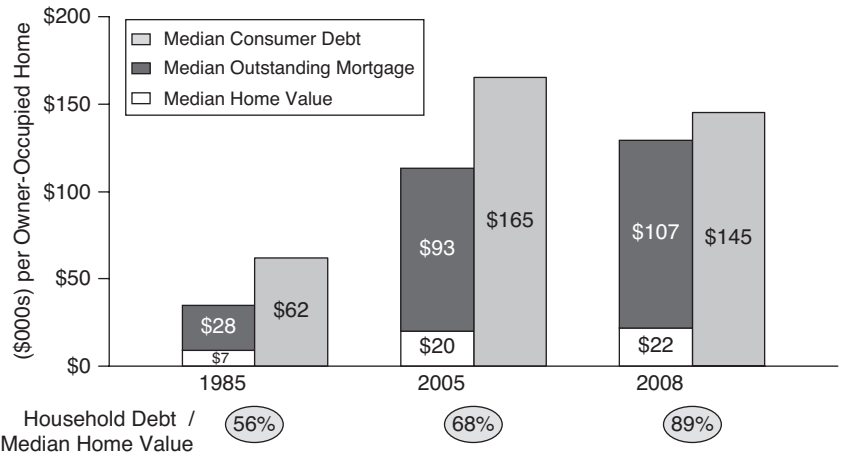

FIGURE P.5 **Household Debt/Home Values, 1985, 2005, 2008**

This chart graphs estimates of household debt over home values of the median household. Specifically, the median value of outstanding mortgage principal amount of owner-occupied units and the consumer credit per household were derived from the U.S. Census Bureau and Federal Reserve Flow of Funds. The 2008 median home value was adjusted from the fourth quarter 2005 value using the S&P/Case-Shiller National Home Price Index.

Source: U.S. Census Bureau, Federal Reserve Flow of Funds, S&P/Case-Shiller Index.

Moreover, while the focus has been primarily on the mortgage sector, and in particular on the market for subprime mortgages, the problems run much deeper. Individuals and institutions gorged on credit across the economy. Figure P.6 shows that, as of 2007, there was over $38.2 trillion of nongovernment debt, only 3 percent of which is subprime. Other breakdowns include 3 percent worth of leveraged loans and high yield debt, 25 percent corporate debt, 7 percent consumer credit, 9 percent commercial mortgages, and 26 percent prime residential mortgages. Compared to the past 15 years, the underlying capital structure of the economy appears much more levered and its assets much less healthy. For example, in December 2008, 63 percent of all high-yield bonds traded below 70 percent of par, compared to the previous high of around 30 percent discount during the blowout in 2002. The current state of the union is not for the fainthearted!

The second, and related, difference is that over the past several years, the quantity and quality of loans across a variety of markets has weakened in two important ways. In terms of quantity, there was a large increase in

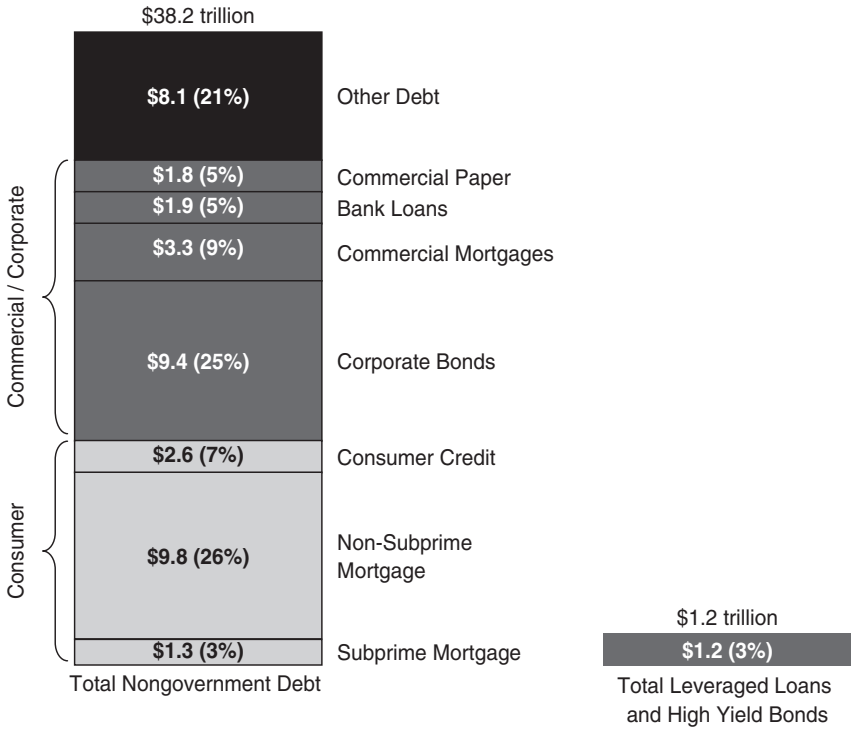

FIGURE P.6 **Total Nongovernment U.S. Debt, 2008**

This chart shows the components of total U.S. nongovernment debt in 2008. Specifically, the calculations exclude government-issued debt such as Treasury securities, municipal securities, and agency-backed debt.

Source: Federal Reserve Flow of Funds, International Swaps and Derivatives Association (ISDA), Securities Industry and Financial Markets Association (SIFMA), Goldman Sachs, U.S. Treasury.

lower-rated issuance from 2004 to 2007. As an example, Figure P.7 graphs the number of new issues rated B– or below as a percentage of all new issues over the past 15 years. There is a large jump starting in 2004, with an average of 43.8 percent over the next four years compared to 27.8 percent over the prior 11 years.

Perhaps even more frightening is the fact that historically safe leveraged loans are a substantially different asset class today. This is because historically these loans had substantial debt beneath them in the capital structure. But leveraged loans over the past several years were issued with little capital structure support. Their recovery rates are going to be magnitudes lower. To see this, Figure P.8 graphs the prices of the LCDX series 8 from the

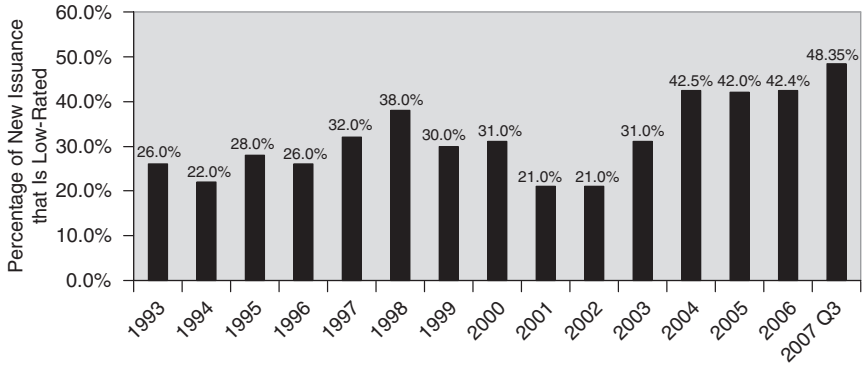

FIGURE P.7 Quality of New Debt Issuance, 1993–2007

This chart graphs total new issues rated B– or below as a percentage of all new issues over the period 1993 to the third quarter of 2007.

Source: Standard & Poor's Global Fixed Income Research.

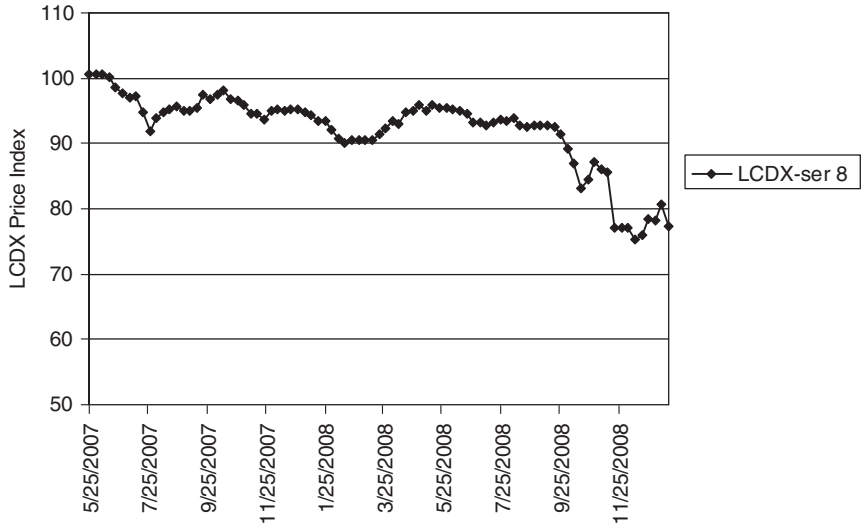

FIGURE P.8 LCDX Pricing, May 2007 to January 2009

This chart shows the series 8 of the LCDX index from May 22, 2007, to January 22, 2009. The LCDX index is a portfolio credit default swap (CDS) product composed of 100 loan CDSs referencing syndicated secured first-lien loans.

Source: Bloomberg.

end of May 2007 through January 2009. The index initially paid a coupon of 120 basis points over a five-year maturity and comprised 100 equally weighted loan credit default swaps (CDSs) referencing syndicated first-lien loans. Once the crisis erupted in late June 2007, the prices of the LCDX began to drop. By January 2009 it was at unprecedented low levels, hovering around 75 cents on the dollar.

Moreover, many of these loans were issued to finance leveraged buyouts (LBOs). Over this same period, the average debt leverage ratios grew rapidly to levels not seen previously. Thus, even in normal times, many of the companies would be struggling to meet these debt demands. In a recessionary environment, these struggles will be amplified. Figure P.9 illustrates this point by graphing the leverage ratios of LBOs over the past decade or so both in the United States and in Europe.

In terms of quality, there was also a general increase in no-documentation and high loan-to-value subprime mortgages, and "covenant-lite" and PIK toggle leveraged loans. As an illustration, Figure P.10 charts various measures of loan quality in the subprime mortgage area, starting from 2001 and going through 2006. As is visible from the graphs, there were dramatic changes in the quality of the loans during this period.

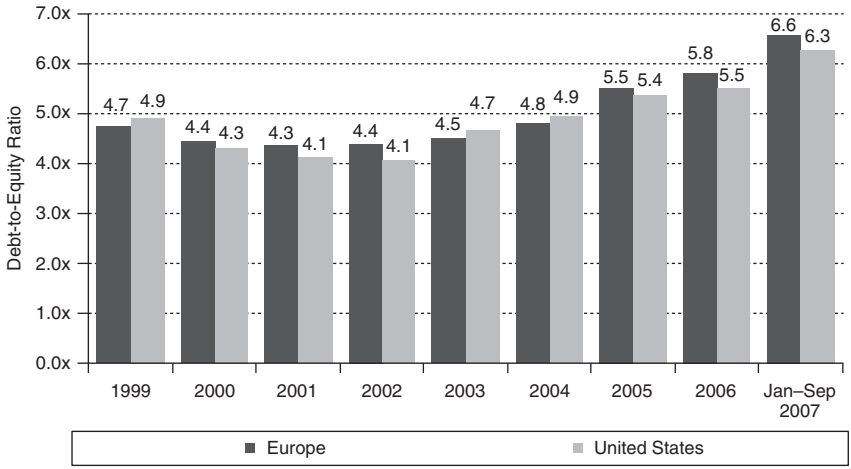

FIGURE P.9 **Leverage Ratio for LBOs, 1999–2007**

This chart graphs the average total debt leverage ratio for LBOs in both the United States and Europe with earnings before interest, taxes, depreciation, and amortization (EBITDA) of 50 million or more in dollars or euros, respectively. The chart covers the period from 1999 to 2007.

Source: Standard & Poor's LCD.

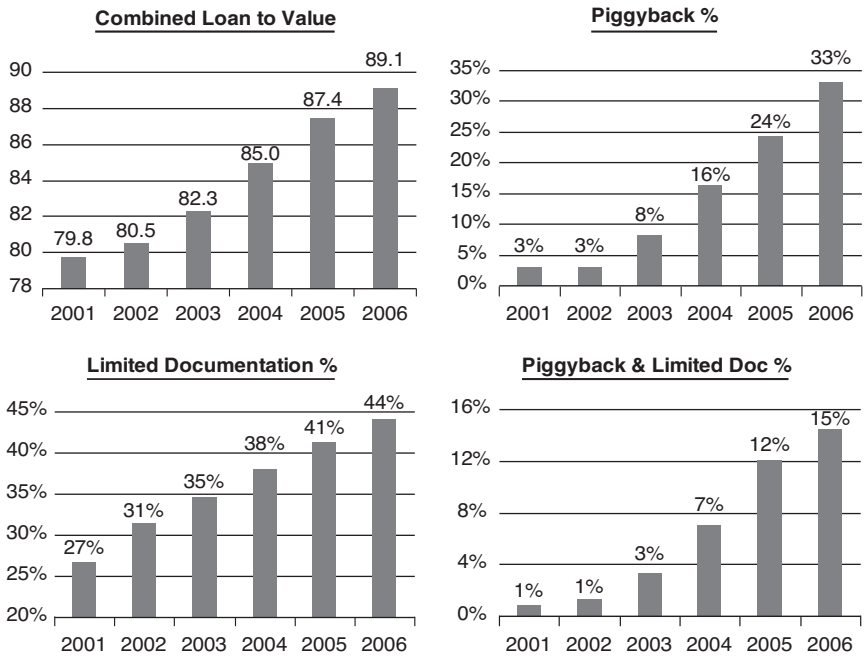

FIGURE P.10 **Deteriorating Credit Quality of Subprime Mortgages**

These four charts graph various measures of the quality of subprime mortgages, including loan-to-value ratios, percent of piggyback loans, and percent of loans with limited documentation. These are estimated over the period 2001–2006.

Source: LoanPerformance, Paulson & Co.

One explanation for deteriorating loan quality is the huge growth in securitized credit. This is because the originate-to-distribute model of securitization reduces the incentives for the originator of the claims to monitor the creditworthiness of the borrower, because the originator has little or no skin in the game. For example, in the securitization food chain for U.S. mortgages, every intermediary in the chain was making a fee; eventually the credit risk got transferred to a structure that was so opaque even the most sophisticated investors had no real idea what they were holding. The mortgage broker; the home appraiser; the bank originating the mortgages and repackaging them into MBSs; the investment bank repackaging the MBSs into CDOs, CDOs of CDOs, and even CDOs cubed; the credit rating agencies giving their AAA blessing to such instruments—each of these intermediaries was earning income from charging fees for their step of the

intermediation process and transferring the credit risk down the line. The reduction in quality of the loans and lack of transparency of the securitized structure added to the fragility of the system.

The shock to housing (and resulting defaults) and the aforementioned fragility of this system of securitized loans certainly implied significant losses in the portfolios of investors. But the whole point of securitization is precisely that by transferring credit risk from lenders to investors, the risks will be spread throughout the economy with minimal systemic effect. This leads to the third, and most important, reason for why the financial crisis occurred.

Credit transfer *did not* take place in the mortgage market and, even when intended in the leverage loan market, banks got caught holding up to $300 billion of leveraged loans when the market collapsed in late July 2007. The reality is that banks and other financial institutions maintained a significant exposure to mortgages, MBSs, and CDOs. Indeed, in the United States about 47 percent of all the assets of major banks are real estate related; the figure for smaller banks is closer to 67 percent. Thus, instead of following the originate-to-distribute model of securitization which would have transferred credit risk of mortgages to capital market investors, banks and broker-dealers retained, themselves, a significant portion of that credit risk across a variety of instruments. Indeed, if that credit risk had been fully or at least substantially transferred, such banks and other financial intermediaries would not have suffered the hundreds of billions of dollars of losses that they have incurred so far and will have to recognize in the future.

Why did banks take such a risky bet? At the peak of the housing bubble in June 2006, one can compare the spreads from the tranches of subprime MBSs (as described by the ABX index) to similarly rated debt of the average U.S. firm. Specifically, the spreads are 18 basis points (bps) versus 11 bps for AAA-rated securities, 32 bps versus 16 bps for AA-rated, 54 bps versus 24 bps for A-rated, and 154 bps versus 48 bps for BBB-rated.

Consider the AAA-rated tranche. According to estimates from Lehman Brothers, U.S. financial institutions (e.g., banks and thrifts, government-sponsored enterprises [GSEs], broker-dealers, and insurance companies) were holding $916 billion worth of these tranches. Note that these financial firms would be earning a premium most of the time and would face losses only in the rare event that the AAA-rated tranche of the CDO would get hit. If this rare event occurred, however, it would almost surely be a systemic shock affecting all markets. Financial firms were in essence writing a very large out-of-the-money put option on the market. Of course, the problem with writing huge amounts of systemic insurance like this is that the firms cannot make good when it counts—hence, this financial crisis. Put simply, financial firms took a huge asymmetric bet on the real estate market.

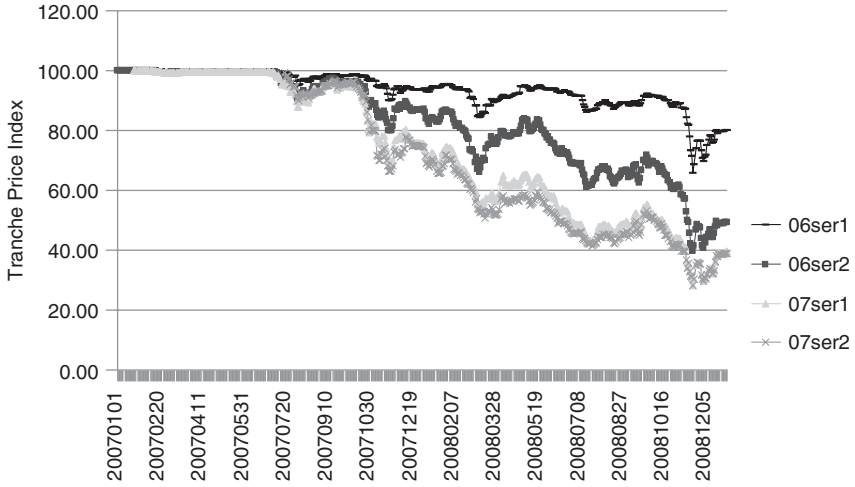

FIGURE P.11 **Subprime Mortgage AAA Tranche Pricing, 2007 and 2008**

This chart shows the AAA tranche of the ABX index of the 2006 and 2007 first and second half of the year series from January 1, 2007, to December 31, 2008. The ABX index is an index of 20 representative collateralized debt obligations (CDOs) of subprime mortgages. The AAA tranche represents an initial equally weighted portfolio of these same tranches of each CDO.

Source: Markit.

To get some understanding of how hard these tranches have been hit, Figure P.11 graphs the various AAA-rated ABX index series from their initiation to the end of 2008. Specifically, we graph the prices of the AAA tranche of the ABX index of the 2006 and 2007 first and second half of the year series from January 1, 2007, to December 31, 2008. The ABX index is an index of 20 representative collateralized debt obligations (CDOs) of subprime mortgages, and the AAA tranche represents an initial equally weighted portfolio of these same tranches of each CDO. These indexes are initially priced at par, and one can see that the 2006 series stayed around that level until late July 2007 when the crisis started. Depending on the series, the tranches are now selling at from 40 cents to 80 cents on the dollar. Putting aside issues specific to the pricing of the ABX, at the current prices in Figure P.11 and given the aforementioned $916 billion, losses to the financial sector range from $550 billion to $183 billion on their holdings of the AAA tranches of mortgage-backed securities alone.

Finally, the fourth difference is that the potential losses from these bets were greatly amplified through the use of more and more leverage

by financial firms. These firms got around capital requirements in various ways. For commercial banks, setting up off-balance-sheet asset-backed commercial paper (ABCP) conduits and structured investment vehicles (SIVs)—with recourse to their balance sheets through liquidity and credit enhancements—allowed them to move the so-called AAA assets in such a way as would not incur most of the capital adequacy requirement.

Investment banks added leverage the old-fashioned way by persuading the SEC in August 2004 to amend the net capital rule of the Securities Exchange Act of 1934. This amendment allowed a voluntary method of computing deductions to net capital for large broker-dealers. This alternative approach allowed the investment banks to use internal models to calculate net capital requirements for market- and derivatives-related credit risk. In theory, the amendment also called for greater scrutiny by the SEC. It effectively allowed big investment banks to lever up as much as they wanted.

Still, why take the risky *asymmetric* bet?

We believe there are three possibilities:

1. The first is governance. The system of compensation of bankers and agents within the financial system is characterized by moral hazard in the form of "gambling for redemption." The typical agency problems between a financial firm's shareholders and the firm's managers/bankers/traders are exacerbated by the way the latter have been compensated. Because a large fraction of such compensation is in the form of cash bonuses tied to short-term profits, and because such bonuses are one-sided (positive in good times and at most zero when returns are poor), managers/bankers/traders have a huge incentive to take larger risks than warranted by the goal of shareholders' long-run value maximization.
2. The second is that explicit and implicit government guarantees across the financial system lead to moral hazard. These guarantees remove the discipline normally imposed by depositors on commercial banks, and by debt holders on government-sponsored enterprises (GSEs) and "too-big-to-fail" financial institutions. Because these claimants are convinced of the government's guaranty function, they require a low cost of debt. Hence, the implicit guarantees, if mispriced by governments, provide the firm with an incentive to take risk and leverage.
3. The third is that, even with good governance and no guarantees from the government, the financial firm might still take the risky asymmetric bet. Each firm might maximize its risk/return profile even though such behavior exerts substantive negative impact elsewhere in the financial system. In other words, given the incompleteness of financial contracts at varying levels, financial firms did not internalize the full impact of their decisions on the rest of the system and the economy.

Whatever the reasons, and they may have differed across firms, we believe that the combination of leverage and the fact that financial firms chose *not* to transfer the credit risk (even though they pretended to do so) is the root cause of the financial crisis.

Stepping back from the experience of the current crisis, and looking forward, it is clear that the issue of financial stability remains central to assessments of the financial development of a country, and not only with respect to the current experience. Indeed, the experience of the past few decades in both emerging markets and advanced economies shows the pervasiveness of financial crises. These crises—signals of financial instability and the failure of the proper working of the financial system—have important economic and financial consequences, and usually lead to severe economic contractions that may either be short-lived or persist over time. If the real effects persist, the long-run potential and actual growth rate of an economy may be significantly lowered, negatively affecting long-term welfare.

Financial crises are also expensive, since they are associated with significant bankruptcies among households, corporate firms, and financial institutions, with all the ensuing social deadweight losses from debt restructurings and liquidations. An additional cost of these crises is that they cannot be privately resolved; that is, the crises require government intervention. Given that lack of government intervention is not credible, this creates moral hazard exacerbating the original problem. The fiscal costs of bailing out distressed borrowers (households, firms, and financial institutions) therefore end up being very high—often well above 10 percent of gross domestic product (GDP). Thus, persistent and severe financial instability, as measured by the pervasiveness and severity of financial crises, is a signal of failure of the financial system: failure to properly allocate savings to worthy investment projects and failure of corporate governance.

Of course, in a market economy, some degree of bankruptcy is a healthy sign of risk taking. A financial system so stable that no bankruptcy would ever occur indicates low risk taking and diminished entrepreneurship. The absence of somewhat risky—but potentially high-return—investment projects ultimately decreases long-term economic growth. There is a substantial difference, however, between occasional bankruptcies of firms, households, or banks—bankruptcies that are healthy developments in flexible and dynamic market economies—and a systemic banking or corporate crisis where a large number of financial institutions or corporations go bankrupt because of unfettered risk-taking incentives.

Therefore, regulation needs to balance risk taking and innovation against the likelihood of a systemic crisis. In our opinion, a primary reason to regulate systemic risk is the presence of externalities between institutions. By its very nature, systemic risk is a negative externality imposed by each

financial firm on the system. Since each individual firm is clearly motivated to prevent its own collapse but not that of the system as a whole, the private market may not be able to solve this problem. The analogous example is of a firm that pollutes and can cause a negative externality on those affected. Such a firm is often regulated to limit the pollution or taxed based on the externality it causes.

So when a financial firm considers holding large amounts of illiquid securities (i.e., CDOs), or concentrates its risk into particular ones (e.g., subprime-based assets), or puts high amounts of leverage on its books (as a way to drive up supposedly safe excess returns), it has the incentive to manage its own risk/return trade-off, provided decision makers are properly compensated. But even in this unlikely case, the firm has no specific incentive to consider the spillover risk its own leverage and risk taking imposes on other financial institutions. This externality is further amplified when many of the financial firms face similar issues. Of course, if firms fail individually, other healthy firms can readily buy them, or even otherwise take up most of their lending and related activities. Thus, real losses primarily arise when firms fail together and cannot be readily resolved, but are important to the economy—as are banks due to their intermediation activities. In such joint failure cases, financial firms know they are likely to be bailed out, and this gives them incentives to end up here in the first place.

In the next section, we suggest a series of principles and proposals for regulatory reform to minimize these issues in future.

P.4 EFFICIENT REGULATION: PRINCIPLES AND PROPOSALS

In order to provide a framework for efficient regulation of the financial sector based on sound economic principles, we reiterate the four important themes that have been intertwined in producing this trenchant crisis. While the following discussion overlaps to an extent with the preceding one, its goal is to establish the core set of issues and the linkages between them and reinforce how they combined into a lethal mixture risking the financial stability and real-sector output of our economies. These four themes are:

1. Risk-taking incentives at banks and financial institutions.
2. Mispriced guarantees awarded to the financial sector.
3. Increasing opaqueness of the financial sector and resulting counterparty risk externality.
4. Focus of regulation on institution-level risk rather than on aggregate or systemic risk.

Risk-Taking Incentives at Banks and Financial Institutions

Given their inherently high leverage and the ease with which the risk profile of financial assets can be altered, *banks and financial institutions have incentives to take on excessive risks.* Ordinarily, one would expect market mechanisms to price risks correctly and thereby ensure that risk taking in the economy is at efficient levels. However, there are several factors—some novel and some traditional—that have ruled out such efficient outcomes.

On the novel front, financial institutions have become large and increasingly complex and opaque in their activities. This has weakened external governance that operates through capital markets (accurate prices), market for corporate control (takeovers), and boards. Coincident with this, and to some extent a corollary to this, has been the fact that financial risks at these institutions are now increasingly concentrated in the hands of a few high-performance profit/risk centers. Employees (bankers, traders) in charge of these centers have skills in creating, packaging and repackaging, marking to market, and hedging financial securities. Since the skills are largely fungible across institutions, these employees have exerted tremendous bargaining power in their institutions and gotten themselves rewarded through highly attractive, short-term compensation packages that provide them significant cash bonuses for short-run performance and what has proven to be effectively "fake alpha."

Financial institutions therefore need strong internal governance, which is easier to adopt as a principle than to put into practice. No one institution or its board can change the compensation expectations alone. Were they to institute new and more appropriate incentive packages together with stronger risk-control management, they would lose their best traders to the competitors. The inefficiency is thus due to a coordination problem among financial institutions, and has manifested in the form of weak risk controls, innovation activity aimed purely at regulatory arbitrage, excessive leverage, and the so-called search for yield, which is just a polite way of describing the practice of shifting assets to riskier and illiquid ones.

Mispriced Guarantees Awarded to the Financial Sector

Are the governance failures by themselves sufficient to cause a crisis of the magnitude we have seen? Most likely not. The issues have been exacerbated by the traditional factor of *ill-designed and mispriced regulatory guarantees*—ill-designed in that the accordance of the too big to fail (TBTF) guarantee to the large, complex financial institutions (LCFIs) has led to

consolidation of all sorts of financial activities under the same umbrella, and mispriced in the sense that guarantees such as TBTF and deposit insurance have not been appropriately priced.

Government guarantees are a double-edged sword. They are aimed ex post at limiting risks from institutional failures to the rest of the system. TBTF and deposit insurance were conceived to limit the risks of contagious runs on financial institutions. However, ex ante they blunt the edge of market discipline that such runs impose. Hence, to substitute for such market discipline, it is critical that guarantees be priced correctly and supplemented with regulatory supervision. This has, however, not been the case.

For example, the GSEs have access to implicit government guarantees and are perhaps too big to fail (at least within a short period of time, especially in a crisis), but have been indulging in financial investments in securities such as CDOs based on subprime and Alt-A mortgages. This fails any smell test as far as moral hazard induced by government guarantees is concerned. In yet another important example, large depository institutions have paid no deposit insurance premium to the Federal Deposit Insurance Corporation (FDIC) for the past several years under the economically flawed argument that the FDIC fund has been extremely well-capitalized since 2000 relative to the size of deposits it insures. This has meant that a number of banks have paid little, if anything, for deposit insurance in the past several years, and are enjoying this subsidy to finance all sorts of securities activities, such as market making in CDS contracts.

Increasing Opaqueness and Resulting Counterparty Risk Externality

While there are four types of institutions with different regulation and guarantee levels—commercial banks, broker-dealers (investment banks), asset management firms, and insurance companies—mispriced guarantees to any one type can wreak havoc in the modern financial sector in a pervasive manner. This is because of the *counterparty risk externality* that has largely been unregulated. There are three aspects that have contributed to this externality.

First, the incentive to get too big to fail pushes institutions toward the LCFI model, the regulatory structure for which has yet to be fully articulated. The coarseness of regulation of such institutions has allowed the unregulated sectors—primarily, the so-called shadow banking sector and hedge funds—to thrive. Financial institutions have innovated ways by which they can take exposure to unregulated risk taking (for example, through prime brokerage activity) and temporarily park their assets off balance sheet (for example, in the form of asset-backed conduits and SIVs) so as to get

regulatory capital relief and take on additional risks. The sheer magnitude of this activity—especially with respect to the shadow banking sector—and its recourse to the financial sector have meant that systemically important pockets can easily develop in the financial system but without any regulatory oversight or scrutiny.

Second, innovations for sharing credit risk such as credit default swaps (CDSs) and collateralized debt and loan obligations (CDOs and CLOs), which have the potential to serve a fundamental risk-sharing and information role in the economy, were designed to trade in opaque, over-the-counter (OTC) markets. While such trading infrastructure is generally beneficial to large players and has some benefits in terms of matching trading counterparties, its opacity—especially in terms of counterparty exposures—is a serious shortcoming from the standpoint of financial stability during a systemic crisis. If financial institutions take on large exposures in such markets (for example, commercial banks with access to mispriced deposit insurance encourage the growth of a large insurer providing credit protection), then the failure of a large institution can raise concerns about solvency of *all* others due to the opacity of institutional linkages.

And third, regulated institutions as well as their unregulated siblings have fragile capital structures in that they hold assets with long-term duration or low liquidity but their liabilities are highly short-term in nature. While commercial banks are not subject to large-scale runs due to deposit insurance and central bank lender of last resort support, the other institutions are, and indeed, many of them, most notably Bear Stearns and Lehman Brothers, as well as a number of managed funds in the money market and hedge fund arena, did experience wholesale runs during the crisis. And, importantly, commercial banks, too, are subject to localized runs in the wholesale funding and interbank markets if they are perceived to have exposure to institutions experiencing large-scale runs.

Thus, the growth in size of financial institutions, along with their linkages and their fragility, has raised the prospect of extreme counterparty risk concerns. When these concerns have manifested, financial institutions have themselves been unable to fathom how losses from a large institution's failure would travel along the complex chains connecting them. The result has been complete illiquidity of securities held primarily by these institutions (such as credit derivatives) and a paralysis of interbank markets, and, in turn, of credit intermediation for the whole economy. It is important to realize that what superficially may appear to be a problem of illiquidity of a class of assets and markets may well be a symptom of the deeper issues of excessive leverage and risk taking, and the resulting insolvency of financial institutions fueled at least in part by mispriced guarantees.

Financial institutions, left to private incentives, do not and will not internalize this potentially severe counterparty risk externality.

Focus of Regulation on Institution-Level Rather Than Aggregate or Systemic Risk

One would think that prudential bank regulation, primarily capital requirements, aimed at constraining financial leverage and risk should be focused on such externalities so as to curb the risks to the financial sector and the economy at large. However, *current regulation is focused not on systemic risk but rather on the individual institution's risk*. This design is seriously flawed. Such regulation encourages financial institutions to pass their risks in an unfettered manner around the system and to unregulated entities. As they reduce their individual risks, financial institutions are awarded with a lower capital requirement, which gives them the license to originate more risk, possibly aggregate in nature. This new risk gets passed around in the system as well, and we end up with a financial sector in which any individual institution's risk of failure appears low to the regulator, but either it is hidden in the unregulated sector or all of it is aggregate—in either case, systemic in nature. Thus, instead of penalizing behavior that leads to excessive systemic risk, current regulation appears to be rewarding it.

While the counterparty risk externality may itself be sufficient to create high prospects of a systemic crisis, mispriced guarantees and ill-designed prudential regulation heighten the prospects even further. The effect of poor regulation of even just one type of institution (GSEs, for example) can lead to mispricing of risk in transactions between this type and the rest of the financial sector. Given the ease with which financial risks can now be transferred, the germ that causes the outbreak of a systemic crisis can arise from *any* part of the system.

Viewed in this light, the lethal mixture just described has the potential to start soon after a systemic crisis if bailout packages adopted to rescue the system are also mispriced and encourage institutions to be too big to fail.

Principles for Repairing the Financial Architecture

Since we deal with bailout-related recommendations in the next part of this overview, we focus here on the overarching principles for prudential regulation that arise from these four themes and offer the most salient examples of each. The individual chapters flesh out the proposals and thinking behind them in greater detail; they also cover more specific regulatory issues that

are not listed here (such as mortgage lender contracts, rating agencies, hedge funds, and fair value accounting); and Table P.1 at the end of this section summarizes our full set of main proposals.

1. Improved governance and compensation practices to curb excessive leverage and risk taking. In order to improve the internal governance of the large, complex financial institutions (LCFIs), regulators should get LCFIs to coordinate on the adoption of long-term performance assessment and compensation, not just for senior management but also for their high-performance (risk-taking) profit centers. In particular, the regulators should insist on:

- Greater disclosure and transparency of compensation packages and assessment criteria.
- Longer stock holding periods and stricter forfeiture rules; for example, failed senior executives and traders who are ejected might confront a minimum holding period for the shares they take with them.
- A bonus/malus approach to compensation, which represents a multi-year structure where good performances accumulate in a bonus pool used to subtract bad performances in future, not to be cashed out as and when the pool is augmented but only in a staggered manner over time.

And, to implement these changes, regulators should adopt a convoy approach wherein they employ suasion to get the most important LCFIs to agree on a basic code of best practices for compensation based on the aforementioned principles and over time get other LCFIs to follow. To this end, regulators should not hesitate to use their current leverage over the financial sector (which has arisen because of the bailout packages).

2. Fair pricing of explicit government guarantees and ring-fencing their access in some cases. Providing unpriced or mispriced guarantees to one set of institutions can readily travel through a chain of contracts to even unregulated parts of the financial sector, giving rise to systemic crisis from potentially any part of the financial system. To avoid such an outcome, regulators should price guarantees correctly and, where they are being patently abused, restrict the scope of guaranteed institutions. In particular,

- Regulators should revisit the practice of reducing (or not charging) deposit insurance premiums when the FDIC fund becomes well capitalized. Such guarantees should be priced fairly—based on institution-level risk and health (leverage, capitalization)—and for such pricing schemes to limit moral hazard associated with guarantees, the premiums should be collected on a continual basis.

- Given the sheer size of government-sponsored enterprises (GSEs) and their potential linkage through the risk-transfer mechanism, the investor function of the GSEs should be shut down. The primary function of the implicitly guaranteed GSEs was to securitize assets; this is what they should do. In other words, their scope should be limited to securitization activities so that guarantees are not exploited for risk-taking activities such as speculation in mortgage-backed assets. Killing regulatory arbitrage at these mammoth institutions may well be a significant step to financial stability.

3. Better transparency to reduce the counterparty risk externality. First, regulators should separate the economic role played by derivatives and financial transactions from shortcomings in their trading infrastructure. There is little merit in shutting down these markets (for example, short selling) altogether, even during crises. However, the counterparty risk concerns arising due to the opaque nature of OTC derivatives need to be addressed. In particular:

- Large, standardized markets such as credit default swaps (CDSs) and related indexes should be traded on centralized counterparties-cum-clearinghouses or exchanges.
- Smaller, less standardized markets such as in collateralized debt and loan obligations (CDOs and CLOs), which also pose significant counterparty risk concerns, should have at the least a centralized clearing mechanism so that the clearing registry is available to regulators to assess contagion effects of a large institution's failure.
- OTC markets can continue to remain the platform through which financial products are innovated; but, to give these markets an incentive to move to a centralized registry and eventually to a clearinghouse, there should be an explicit regulator in charge of (1) enforcing higher transparency in OTC markets, possibly in the form of bilateral information on net exposures with some time delay, and (2) providing infrastructure for enforcement relating to insider trading and market manipulation practices.
- In order to implement these changes, the regulator may simply have to play the coordinating role—possibly requiring some firmness with large players—to move trading on to centralized trading infrastructures. Also, the global nature of these markets may require a certain degree of international coordination between regulators, especially when timely counterparty information is required.

Second, the regulators should require banks and financial institutions to report their off-balance-sheet activities in a more transparent fashion, especially with details on contingencies and recourse features of these activities.

More generally, though, regulatory supervision needs to broaden its focus. In particular:

- Regulation that focuses narrowly on just one performance metric of banks will be easy to game. The current regulatory focus is on a single ratio (capital to suitably risk-weighted assets). Regulators should take a more rounded approach that examines bank balance sheets as equity or credit analysts would, relying on several aspects (such as loans to deposits, insured deposits to assets, holdings of liquid treasuries and OECD government bonds relative to assets, etc.). Using this broader set of data, regulators should create an early warning system that raises a flag when further investigation is needed and that is alert to ways in which regulatory arbitrage activities would show up in off-balance-sheet transactions and choice of organizational form.

4. Prudential regulation of large, complex financial institutions based on their systemic risk contribution to the financial sector or the economy. Current financial sector regulations seek to limit each institution's risk seen in isolation; they are not sufficiently focused on systemic risk. As a result, while individual firms' risks are properly dealt with in normal times, the system itself remains, or is induced to be, fragile and vulnerable to large macroeconomic shocks. We advocate that financial regulation be focused on limiting systemic risk, and we propose a new set of prudential regulations to achieve this goal. In particular,

- There should be one regulator for supervision of the LCFIs (say, the Federal Reserve) in charge of the prudential regulation of systemic risk. This regulator would be in a position to perform the tasks outlined under our first three proposals.
- The regulator should first assess the systemic risk posed by each firm. The assessment would be based on individual characteristics (leverage, asset quality); on measures of complexity and connectedness (that define large, complex financial institutions); and on statistical measures.
  - We propose that the regulator should estimate the contribution of each firm to the downside risk of the economy, applying at a macroeconomic level the standard risk management tools routinely employed within financial firms to manage firm-level risk. These tools include value at risk, expected loss, stress tests, and macroeconomic scenario analysis. These tools would allow the regulator to detect the systemic risk of one institution or of a group of institutions.
- The overall systemic risk assessments would then determine the regulatory constraints imposed on individual firms. In particular, each firm

TABLE P.1 Systemic Risk Causes and Proposals for Regulatory Reform

	Systemic Risk and Transparency	
	Issue	**Solution**
Causes of the Financial Crisis		
Loan Origination	Subprime loans were unwittingly structured as hybrid ARMs in such a way that they would systemically default or refinance around the reset dates.	Albeit costly, the only way to ensure no systemic default is that each borrower should be able to cover the interest. We therefore support recent amendments to Regulation Z (Truth in Lending).
Securitization of Loans	(1) Growth in market for and quality of subprime loans depended on securitization, leading to lenders having no skin in the game, and (2) financial institutions ignored a securitization business model of credit risk transfer and held on to large amounts of asset-backed securities (ABSs).	Securitization involving institutions with government guarantees should force lenders to have skin in the game. We make several suggestions.
Leverage Game	Banks created off-balance-sheet conduits to increase their leverage ratios; deregulation allowed broker-dealers to do the same.	Regulation should (1) focus on more than one metric to make capital ratios less easy to game, and (2) look at aggregate risk.
Rating Agencies	No built-in accountability, making it possible to inappropriately sanction AAA ratings of ABSs way down the chain of securitization.	We provide two proposals for increasing competition and reducing the conflict of interest between rating agencies and firms.
Governance	Similar governance across investment and commercial banks allowed ABS desks to essentially write a huge volume of out-of-the-money puts on systemic events.	Explicit/implicit guarantees need to be priced correctly. Employ suasion to get the most important LCFIs to agree on a basic code of best practices for compensation.
Fair-Value Accounting	In illiquid and disorderly markets, fair-value accounting may cause feedback effects that increase overall risk of the system.	Keep fair-value accounting. The cure is worse than the disease. We make several suggestions to deal with the illiquidity problem.

(Continued)

TABLE P.1 *(Continued)*

	Systemic Risk and Transparency	
	Issue	**Solution**
OTC Derivatives	Bilaterally set collateral and margin requirements in OTC trading do not take account of the counterparty risk externality that each trade imposes on the rest of the system, allowing systemically important exposures to be built up without sufficient capital to mitigate associated risks.	Large, standardized markets such as credit default swaps and related indexes should trade on centralized counterparty clearinghouses or exchanges. Smaller, less standardized markets (e.g., CDOs and CLOs) should have a centralized clearing mechanism available to the regulator.
Short Selling	Should short selling be blamed for the rapid decline in the stock prices of financial firms, thus leading to banklike runs?	Short selling should generally not be banned. It is crucial for generating price discovery.
Financial Institutions		
Explicit Guarantees (Deposit Institutions, GSEs)	Because some institutions have government guarantees, they are subject to moral hazard. It manifested itself here with these institutions taking large asymmetric bets on the credit, and especially the housing, markets.	Price the guarantees to market as carefully as possible and do not return the insurance fees if the events do not occur. When the guarantees are not priced (as with the GSEs), the regulator should get rid of them.
Implicit Guarantees (Too-Big-to-Fail LCFIs)	The TBTF mantra leads to a similar moral hazard problem. Moreover, the complexity of the organizations highlights transparency issues and thus counterparty risk.	Create a systemic risk regulator that specializes in LCFIs. Also, systemic risk should be priced and taxed as an externality.
Unregulated Managed Funds (Hedge Funds)	These funds act as financial intermediaries but are subject to banklike runs, causing instability in the system. During the crisis, runs took place in both the conduit and money markets.	If hedge funds do not fall into the LCFI class, only light regulation is required, primarily in the form of greater transparency to the regulator. We make suggestions for preventing banklike runs.

would pay for its own systemic risk contribution. This charge could take the form of capital requirements, taxes, and required purchase of insurance against aggregate risk.

- Capital requirements would introduce a charge for a firm's assets based on their systemic risk contribution. This would be a "Basel III" approach; or,
- Taxes could be levied based on systemic risk contribution of firms and used to create a systemic fund. This would be an FDIC-style approach but at a systemic level. It would have the added benefit of reducing the incentives for financial institutions to become too big to fail; or,
- Systemic firms could be required to buy insurance—partly from the private sector—against their own losses in a scenario in which there is aggregate economic or financial sector stress. To reduce moral hazard, the payouts on the insurance would go to a government bailout fund and not directly into the coffers of the firm. This would allow for price discovery by the private sector, enable the regulator to provide remaining insurance at a price linked to the price charged by the private sector, and lessen the regulatory burden to calculate the relative price of systemic risk for different financial firms.

With this discussion of guidelines for prudential regulation of the financial sector in future, we now turn to issues relating to crisis management and public interventions.

P.5 DESCRIPTION OF PUBLIC INTERVENTIONS TO STABILIZE THE FINANCIAL SYSTEM AND ASSESSMENT OF THEIR EFFICACY

When credit and asset price bubbles go bust, they result in significant real economic costs and they can create or amplify recessions. They also impose serious costs to the governments that must bail out overextended borrowers and/or lenders. These bailouts lead to higher fiscal deficits and public debt. Financial crises are, however, to some extent unavoidable. No matter how sound our future regulations become, financial crises will occur most likely in a newer guise. It is therefore crucial for contingency plans to be prepared based on some broad principles that typify most crises. In that respect, we have much to learn from the current crisis and regulatory responses to it.

The regulatory response to the crisis can be broken down into two stages, logically or chronologically: first, the liquidity provision by central banks, and second, the government bailout or rescue packages. We review these for the United States, then provide a framework for assessing their efficacy, and finally, present our recommendations for future interventions.

Brief Overview of the Federal Reserve's Lending Operations since August 2007

Table P.2 describes the various liquidity tools used by the Federal Reserve since August 2007 to address the first stage of the crisis:

As a first step, the Fed expanded its lending to depository institutions. Eligible depository institutions used to borrow from the discount window on an overnight basis and at a penalty rate. The Fed extended the maximum term for borrowing to 30 days in August 2007, and then to 90 days in March 2008, and it reduced the penalty spread from 100 basis points (bps) to 50 bps, and then to 25 bps. Since this was not sufficient to provide long-term liquidity, the Fed created the Term Auction Facility (TAF) in December 2007 to auction term funds to depository institutions.

In late March 2008, following the collapse of Bear Stearns, the Fed expanded the range of institutions with access to its facilities. It created the Primary Dealer Credit Facility (PDCF) to provide overnight loans to primary dealers, and the Term Securities Lending Facility (TSLF) and TSLF Options Program (TOP) to promote liquidity in Treasury and other collateral markets. PDCF is comparable in its design to the discount window, while TSLF is comparable to TAF.

As the crisis entered its deepest stage (to date) with the failure of Lehman Brothers in September 2008, the Fed announced the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) to extend loans to banking organizations to purchase asset-backed commercial paper from money market mutual funds.

In October 2008, the Fed introduced the Money Market Investor Funding Facility (MMIFF) to provide liquidity to U.S. money market investors, and the Commercial Paper Funding Facility (CPFF) to provide a liquidity backstop to U.S. issuers of commercial paper. The MMIFF provides senior secured funding to a series of special purpose vehicles to facilitate a private-sector initiative to finance the purchase of certificates of deposit (CDs), bank notes, and financial commercial paper from money market mutual funds. In contrast, the CPFF finances the purchase of highly rated unsecured and asset-backed commercial paper.

Finally, in November 2008, the Federal Reserve created the Term Asset-Backed Securities Loan Facility (TALF) to help market participants meet the

TABLE P.2 Liquidity Tools Employed by the Federal Reserve since August 2007

Facility	Acronym	Goal	Functioning	Audience	Interest Rate or Price	Quantity	Collateral or Eligible Assets	Frequency	Maturity	History
Open Market Operations, System Open Market Account	OMO, SOMA	Implement monetary policy	Repo, lending or purchase of GC securities	Primary dealers	Determined by auction	Determined by SOMA manager	General collateral (GC): obligations of U.S. Treasury, some agencies, and some agency pass-throughs (MBS)	Daily (weekly for LT repo)	Overnight (LT repo 14-day)	Monetary policy tool in normal times
Discount Window (Primary Credit Program)	DW	Provide short-term liquidity to depository institutions	Direct borrowing of reserves against collateral	Depository institutions	Fixed premium over target fed funds rate (25 bps since March 2008)	Limited only by available collateral	Very broad: obligations of states, government, and GSEs; CMOs; ABS; corporate bonds; money market instruments; real estate, consumer, commercial, and agricultural loans	Daily	Up to 90-day (initially overnight)	Modified in August 2007

(Continued)

TABLE P.2 *(Continued)*

Facility	Acronym	Goal	Functioning	Audience	Interest Rate or Price	Quantity	Collateral or Eligible Assets	Frequency	Maturity	History
Term Auction Facility	TAF	Provide medium-term liquidity to depository institutions	Direct borrowing of reserves against collateral	Depository institutions	Stop-out rate determined by auction (with minimum bid rate above OIS rate)	Fixed in advance ($150 billion since October 2008)	Very broad: obligations of states, government, and GSEs; CMOs; ABS; corporate bonds; money market instruments; real estate, consumer, commercial, and agricultural loans.	Biweekly	28-day and 84-day	Introduced in December 2007
Primary Dealer Credit Facility	PDCF	Provide short-term liquidity to primary dealers	Direct borrowing of securities	Primary dealers	Same as DW	Limited only by available collateral	GC plus investment grade corporate	Daily	Overnight	Established in March 2008
Term Securities Lending Facility	TSLF	Provide medium-term liquidity to primary dealers	Exchange GC securities from SOMA against eligible securities	Primary dealers	Determined by auction	Fixed in advance	OMO collateral plus AAA RMBS, CMBS, agency CMOs, and other ABS	Weekly	28-day	Established in March 2008
Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility	AMLF	Restore liquidity to the ABCP markets	Borrow funds from the AMLF to fund the purchase of eligible ABCP	DI, BHC, branch of foreign bank	Primary credit rate on the initiation date of the loan	Depends on size of ABCP	ABCP must be rated not lower than A1, F1, or P1 by at least two nationally recognized statistical rating organizations (NRSROs)	When necessary	120-day	Established in September 2008

Commercial Paper Funding Facility	CPFF	Provide a liquidity backstop to U.S. issuers of commercial paper	Finance the purchase of unsecured ABCP	U.S. issuers of commercial paper	Unsecured commercial paper at 100 bps spread to the overnight index swap (OIS) rate; asset-backed commercial paper at 300 bps spread to the OIS rate	The issuer's outstanding paper cannot exceed its 2008 maximum	The commercial paper must be rated at least A-1/P–1/F1 by a major nationally recognized statistical rating organization (NRSRO)	Maturity of the commercial paper	4/30/09	Established in October 2008
Money Market Investor Funding Facility	MMIFF	Provide liquidity to U.S. money market investors	Senior secured funding to SPVs	Money market investors	Primary credit rate	Quantity should be at most 15% for a single institution. Total limit will be $540 billion	U.S. dollar-denominated CDs and commercial paper of highly rated financial institutions with maturity of 90 days or less	7–90 days	4/30/09	Established in October 2008
Purchase of Obligations from GSEs		Reduce mortgage costs for U.S. borrowers	Purchase obligations of Fannie, Freddie, and FHLB by creating reserves	Primary dealers	Auction	Program to purchase up to $100 billion		Weekly		Anounced in November 2008

credit needs of households and small businesses by supporting the issuance of asset-backed securities (ABSs) collateralized by student loans, auto loans, credit card loans, and loans guaranteed by the Small Business Administration (SBA). It also announced a program to purchase obligations from Fannie Mae, Freddie Mac, and the Federal Home Loan Banks.

Brief Overview of the Bailout since September 2008

Within six months of the failure of Bear Stearns in mid-March, the economic outlook worsened progressively. Output and consumption fell. House prices collapsed, and the quality of mortgage-backed securities deteriorated. It gradually became clear that liquidity facilities, at least by themselves, were not resolving the financial crisis. On September 7, 2008, the Federal Housing Finance Agency (FHFA) announced that it was placing Fannie Mae (Federal National Mortgage Association) and Freddie Mac (Federal Home Loan Mortgage Corporation) into conservatorship. The government bailed out the large insurer American International Group (AIG) on September 16.[3] This signaled the beginning of the full-fledged bailout phase of the crisis.

On September 19 the U.S. Treasury offered temporary insurance to money market funds, and proposed a Troubled Asset Relief Program (TARP) whereby the government would purchase illiquid assets from financial institutions. The bailout plan, renamed the Emergency Economic Stabilization Act of 2008, was initially rejected in the House of Representatives (205 for the plan, 228 against) on Monday, September 29. The Senate's version of the bailout plan[4] passed 74 to 25 on October 1, and finally the House of Representatives passed the Emergency Economic Stabilization Act 263-171. The initial bailout plan was never implemented, and essentially abandoned in November 2008. No clear plan has yet been laid out to deal with the housing crisis.

The three main features of the bailout (as of December 2008) had been:

1. A loan-guarantee scheme administered by the FDIC.
2. A compulsory bank recapitalization scheme undertaken by the United States.
3. The CPFF and TALF described earlier as part of the Fed facilities.

Framework to Assess the Regulatory Interventions

How do we assess the efficacy of these regulatory responses? At a purely empirical level, the new regulatory measures were supposed to thaw the frozen money and credit markets. They did not do so. Therefore, they have

not been successful. Of course, there may not have been a viable solution, given the depth of the problems. Nevertheless, the following framework helps understand some of the reasons behind this failure with the caveat that its effects may yet be unfolding in the economy.

In general, steps of the government intervention to stabilize a financial system in a severe crisis can be broken down into various components. Conceptually, it is useful to distinguish two stages:

1. **Systemic liquidity stage.** In this stage, the monetary authority, the only credible lender of last resort (LOLR) in the economy, provides liquidity against collateral to prevent liquidity problems from morphing into widespread financial distress. All liquidity crises share three fundamental properties that drive the response of monetary authorities:
   1. The horizon of financiers and lenders shortens, so it becomes difficult to borrow at longer maturities.
   2. Lenders accept fewer securities as collateral.
   3. Lenders accept fewer institutions as counterparties, even for secured lending, since their own precautionary motives for holding liquidity become stronger.

   Any nonsystemic insolvency in this phase is resolved following standard procedures such as private-sector resolution or corrective action procedures of the deposit insurance provider, such as the Federal Deposit Insurance Corporation (FDIC).
2. **Systemic solvency stage.** If the liquidity crisis threatens to turn into a systemic solvency crisis where lenders refuse to lend to any other institution except overnight and that too at extraordinarily high rates, then a larger intervention—a bailout—is needed to rescue the system. The bailout itself has two stages:
   1. **Short-term stabilization.** The focus here is on the financial sector. The goal is to act quickly to prevent a complete collapse of the financial system. The tools used in the past crises as well as in the current one are generally loan guarantees (or more broadly, debt guarantees) and recapitalization. The critical issues in how these tools work relate to the pricing of the guarantees and capital injection, and the decision to make participation voluntary or compulsory.
   2. **Long-term solution.** The focus here is on the macroeconomy, not simply the financial sector. A plan must be offered to limit economic malaise, not just financial distress, and return the system to normality. In the current crisis, the solution involves limiting deadweight losses from foreclosures, and dealing with the debt overhang of CDOs and other instruments on balance sheets of (potentially insolvent) financial institutions.

In practice, the various stages overlap, and it is not always possible to draw clear-cut lines between providing liquidity and bailing out the system, but the distinctions just outlined are useful in framing the discussion. Indeed, an important issue is that excessive liquidity provision to the financial system can prolong solvency issues, and, should fundamentals worsen, this procrastination can lead to a deeper financial and economic crisis.

Under this framework, we offer an assessment of each phase of regulatory response to the current crisis.

Assessment of the Fed's Response to the Liquidity Stage

The number of new lending facilities (and the complexity of their acronyms!) seems to suggest that the Fed was largely improvising. Indeed, given the complexity of the crisis, its speed, and its unexpected nature, improvisation was perhaps both unavoidable and to an extent necessary. Despite the complexity, however, there is some coherent logic behind the creation of the various facilities. This logic can most readily be seen by referring to the characteristics of liquidity crises outlined at the beginning of this section: excessive shortening of horizons of investors and lenders, and drastic reductions in the range of acceptable collateral and counterparties.

Indeed, one can map the actions taken by the Fed to expand liquidity in three dimensions: time, collateral, and counterparties. Starting from its core activities of lending short-term reserves to depository institutions, the Fed has progressively introduced new facilities to provide liquidity at a longer horizon, expand the range of securities it accepts as collateral, and expand the range of institutions that can benefit from liquidity provisions.

Providing liquidity is part of the Fed's role as a lender of last resort, but it is not meant to resolve a systemic solvency crisis. In practice, however, the lines between liquidity provision and outright bailout can be difficult to draw. This was the case when, in March 2008, the Federal Reserve Bank of New York provided an emergency loan to Bear Stearns and brokered its sale to JPMorgan Chase. Similarly, CPFF and TALF are as much part of a bailout as they are part of liquidity provision.

Blurring the lines between providing liquidity to sound institutions and artificially keeping insolvent firms alive is the one chink in the armor of the Fed's response to the liquidity crisis. Indeed, providing too much liquidity can have the perverse effect of prolonging a solvency crisis. On this front, the Fed's new strategy lacks the conditionality needed to keep an undercapitalized bank (or firm) from using its facilities.[5]

We recommend that to separate the illiquidity problem from that of insolvency, the LOLR facilities, much like the private lines of credit made

by banks to borrowers, adopt material adverse change (MAC) clauses. With such clauses, the Fed's supervisory role feeds back to its lending role and banks/firms that do not raise sufficient capital in time or are patently insolvent are denied liquidity and resolved or restructured as appropriate.

Overall, though, the Fed appears to have responded reasonably well to the liquidity crisis subject to this important caveat.

Assessment of the Government Bailout Package

It is relatively more difficult to see a coherent logic behind the U.S. Treasury's actions and the design of bailout packages. Clearly, given the magnitude of the problems and the urgent need for some solutions, a certain improvisatory quality entered into the Treasury's actions as well. Increasingly, however, these actions have taken the form of a discretionary approach (that is, ad hoc or institution by institution) rather than a principles-based one. Moreover, the final plan appears to be providing a large transfer of wealth from the taxpayers to the financial sector without significant returns and without a resolution of the credit crunch at hand.

In brief, in the analysis to follow, we identify several key elements. The first is the appropriate sequencing of the government's actions with respect to the bailout. The second is that, while massive recapitalization needs to take place because the sector is close to insolvency, we must do it in a way that isolates the banks' accumulated bad assets from their ongoing operations. Moreover, high-risk borrowers must pay higher rates than others. Finally, the ultimate goal of the bailout of the financial system should be to strengthen viable banks and quickly dispose of those that are already bankrupt.

Initially, TARP proposed using complex auctions to buy back mortgage-backed securities and provide short-term stability. While partly sound in its underlying appeal, this proposal had several shortcomings in its exact implementation:

- First, since exact details of its implementation were not fully spelled out, TARP cost one month of time before loan guarantees (debt guarantees, more generally) and recapitalizations were announced. While four weeks is normally not a crucial time frame, during a systemic crisis where the situation worsens day by day, it constituted a significant delay.
- Second, the initial failure of TARP led to the erroneous conclusion—including from a large body of academics—that TARP was not necessary or was simply infeasible in the first place (even though asset-restructuring vehicles or good-bank/bad-bank separations have featured in most, if not all, severe financial crises of the past). When the Treasury

announced in November 2008 that it was dropping its initial plan entirely, it reignited the financial turmoil, thereby illustrating the expectation that such a plan would have been a valuable part of the long-term rescue plan.

- Third, while TARP's initial focus on the illiquid, hard-to-value assets on the bank's balance sheet was a step toward a long-term solution to the crisis, it ignored an essential root cause, namely the issue of mortgage defaults and foreclosures. In principle, the two issues seem fraught with equal difficulty—toxic assets with difficulty of valuation and mortgages with difficulty of legalities.
- Finally, a strategic opportunity was missed. If the Treasury had implemented the short-term solution (loan guarantees and recapitalization) immediately, it would not have been necessary to provide the details of the long-term plan right away. The announcement of a credible long-term plan would probably have been sufficient to restore investors' confidence in the financial system and, importantly, also in its policy makers, as long as the plan presented the correct diagnostic.

The rapidly unfolding nature of the crisis in September 2008 was perhaps as difficult to master for policy makers as for market participants. Once Lehman Brothers was allowed to fail, accusations multiplied that the Treasury had potentially ignited a crisis of confidence. In this context, the subsequent regulatory response can be best characterized as having signs of panic written on it. Nevertheless, from an objective standpoint, it is useful to highlight the aforementioned strategic and technical limitations of the Treasury's actions since this can help avoid such mistakes in future.

The revised plan of the Treasury did have the appropriate short-term focus. However, the program seems to fall short on two dimensions.

1. The first is that by adopting a one-size-fits-all approach, it is too generous to the financial industry (especially to a small set of institutions, for example, Goldman Sachs and Morgan Stanley, whose credit risk was substantially higher than that of others); is too costly for taxpayers; and lacks an exit plan. As just one illustration of this giveaway, our estimates suggest that the loan guarantee scheme has essentially transferred between $13 billion and $70 billion of taxpayer wealth to the banks by charging a flat fee of 75 basis points per annum to all banks regardless of their credit risk.
2. The second is that the compulsory nature of the loan guarantee and recapitalization schemes has made it more difficult for the market to distinguish sound institutions from troubled ones. The U.S. scheme has

> therefore encouraged banks to become increasingly reliant on government guarantees until the crisis fully abates. The lack of sufficient information generation by the market in the meanwhile is likely to slow down a transition away from government guarantees. Also, because these guarantees exist for three years, the concern is that a new round of moral hazard problems will likely arise, especially because guarantees are not priced fairly.

Interestingly, all these features are in striking contrast to the UK scheme, which appears to be fairly priced, mostly voluntary, reliant on market information, and suitable for smooth transition from guarantees to markets in due course.

The Missing Piece: The Housing Market

Dealing with the housing crisis as a part of the long-term solution is critical for at least two reasons. The welfare losses from the housing crisis are large: On top of the distress of displaced families, the average cost of foreclosure is 30 to 35 percent of the value of a house, and foreclosed houses have negative externalities on their neighborhood. Moreover, mortgage default losses are at the heart of the financial crisis since default losses are concentrated in the "first loss" equity and mezzanine tranches of CDOs—the risk that banks never transferred to markets. This interconnection between mortgages and the balance sheets of financial firms is such that stabilizing the housing market would also help stabilize the economy as a whole.

Unfortunately, the plans put forward to address the mortgage crisis are not properly designed. We argue that existing approaches to loan modification—for instance, the Hope for Homeowners from the Federal Housing Administration (FHA), or the FDIC plans—do not balance the incentives of the borrowers and the lenders. On the one hand, some are too lenient with delinquent borrowers and give them perverse incentives to stop making payments. On the other hand, some programs propose restructuring the loans with no write-down of principal and with a balloon payment due at the end, which is at best a temporary solution.

We instead advocate using shared appreciation mortgages (which are part of the FHA plan). Shared appreciation restructurings offer a debt-for-equity swap whereby, in return for modifying the loan, the borrower must give up some of the future appreciation in the value of the property. Designed properly, this would discourage borrowers from seeking modifications if they can continue to pay their mortgage. In addition, Congress should address the legal barriers to modifying securitized loans—for

instance, by invoking a standard such as "a good-faith effort to advance the collective interests of holders."

And, Where Should the Bailout Stop?

The massive U.S. government bailout originally intended for the financial industry has now spread to the nonfinancial sector, and the government is bailing out car manufacturers. This is partly the fault of the financial bailout itself, which was too generous to the financial industry. Unfortunately, history and political economy considerations suggest that ad-hoc government interventions to bail out industries are a recipe for long-run economic stagnation, as they prevent the Darwinian evolution whereby better firms survive and worse ones are weeded out. This does not mean, however, that the government should stay on the sidelines.

We argue that government interventions should be based on a consistent set of principles to avoid becoming excessively politicized or captured by interest groups. We present four broad principles:

1. First, the market failure must be identified.
2. Second, the intervention should use efficient tools.
3. Third, the costs for the taxpayers should be minimized.
4. And finally, government intervention should not create moral hazard.

Consider the case of General Motors (GM). Based on the four principles, there is indeed a case for government intervention in favor of GM, but this intervention should not be a giveaway bailout. The market failure that we identify is the disappearance of the debtor-in-possession (DIP) market because of the financial crisis. This provides a rationale for government intervention (first principle). To be efficient, the reorganization should be thorough, and therefore likely to be lengthy. This is why it should take place under Chapter 11 of the Bankruptcy Code (second principle). To minimize the costs to the taxpayers, the government should provide *only* DIP financing (directly or through private financial institutions), because DIP loans are well protected (third principle). Finally, reorganization in bankruptcy should not reward bad management and therefore minimize moral hazard (fourth principle).[6]

Overall Recommendations for Future Interventions

Our overall recommendations for short-term and long-term regulatory interventions during a crisis in future are summarized in Table P.3.

TABLE P.3 Regulatory Recommendations for Government Intervention

Goal	Provide liquidity	Prevent collapse	Offer long-term solution
Horizon	Very short (days)	Short (weeks)	Long (months)
Tools	Lending facilities, but conditional on bank quality	Resolve insolvent banks Guarantee bank debt Inject equity in healthy ones	Buy back risky assets Restructure loans (e.g., mortgages in this crisis)
Actors	Federal Reserve	Fed, FDIC, Treasury	Treasury, FDIC, private buyers

The following principles could be useful for regulators in such direct government intervention:

- Maximize efficiency by being clear about short-run and long-run objectives and corresponding regulatory tools.
- Avoid one-size-fits-all approach in charging for bailout packages, and as corollaries to this overall principle:
  - Rely on market prices wherever available.
  - Reward more those institutions that performed well relative to those that did not.

And, finally, take advantage of the leverage offered by the bailout to review incentive systems within institutions that may have led to the crisis in the first place; in particular, wherever feasible, replace management and pass on losses to shareholders and uninsured creditors.

P.6 THE NEED FOR INTERNATIONAL COORDINATION

It is clear that many of the policy recommendations we have put forward may be ineffective or their edge blunted if there is little international coordination among central banks and financial stability regulators. This issue is important; although cross-border banking and financial flows have expanded in scale, much of bank supervision remains national. And, while there is some consensus on prudential aspects of regulation such as capital requirements and their calculation, there is hardly any consensus on how much forbearance regulators show toward their national banks, how they should share the burden of bailing out global financial institutions, and so on.

Complications that could arise from lack of coordination among national regulators are many. Here are six examples:

1. Suppose that deposit insurance guarantees are priced fairly in the United States but commercial banking counterparts in the United Kingdom pay no premium whatsoever. This would affect the competitiveness of the U.S. banks—at least relative to those UK banks that are global players—and thereby give them incentives to lobby for lower premiums, forcing the U.S. regulators to be lenient as well, and giving rise to moral hazard issues in both sets of countries.
2. While the United States sets up a centralized clearing platform for OTC credit derivatives, say regulators in Europe do not enforce such a requirement. Then, the large players will simply move their trading offices to such credit havens to enjoy the benefits of OTC trading. The result would be that lack of transparency that manifested as counterparty risk externality in the current crisis would be an issue again when a crisis hits the financial sector in the future.
3. Suppose that the Federal Reserve adds conditionality to its terms for lender of last resort facilities, requiring that highly leveraged institutions raise sufficient capital in order to be eligible for borrowing against illiquid collateral, but central banks in other parts of the world do not require that such criteria be met. Then, a global financial firm, based primarily in the United States, could simply access liquidity from these other central banks, rendering ineffective the purpose of conditionality in the Fed LOLR.
4. Similarly, if large, complex financial institutions (LCFIs) are subject to a systemic risk charge (say, in the form of a higher capital requirement), then some jurisdictional coordination is necessary for implementing the charge. How would a national regulator acquire the rights to tax a financial entity that is not formally a part of its jurisdiction? If each country is implementing some form of LCFI tax on its players, the outcome would lead to far fewer distortions than otherwise.
5. Next, consider the bailout packages put in place in October 2008. The U.S. package, as we have discussed, adopted a one-size-fits-all pricing for the loan guarantees, whereas the UK package, being overall more market-based, relied on each institution's perceived risk in the CDS market in the preceding 12 months. This immediately led to the UK banks lobbying their regulators to soften the terms of their bailout package, even though from the standpoint of sound economic principles, the UK scheme is the more desirable one.
6. Finally, a striking historical example is the repeal of Glass-Steagall Act (in fact, its gradual erosion since the mid-1960s) in the United States, which allowed commercial banks, investment banks, and insurance

firms to operate under a single umbrella. While the United States had enforced this Act since 1933, very few other countries had. This meant that as financial markets became more global, the U.S. commercial banks started looking increasingly uncompetitive relative to the universal banks of Europe. Lobbying efforts followed, and repeal was inevitable. Many academics had questioned the Act in the first place on the basis of synergies between lending and underwriting activities.

In hindsight, however, it seems that a financial architecture where deposit insurance is provided *only* to commercial lending and securities underwriting, but not for speculation in highly risky securities activity, has several advantages: It limits the scope of regulation and therefore also of its follies; it limits linkages from the unregulated sector to the regulated (insured) sector and reduces the counterparty risk externality; and it reduces the ex post pressure on regulators to bail out even unregulated institutions, since they would no longer be "too connected to fail." Such a separation of financial activities is once again being revisited at the Bank of England, and more generally in Europe, as a possible way of insulating credit intermediaries and the payments and settlements system from securities activities. But it may be untenable in a global financial architecture unless there is coordination among national regulators: The separated entities will most likely be less profitable than their universal counterparts abroad.

All these examples suggest that a "beggar thy neighbor" competitive approach to regulation among central banks and financial stability groups in different countries, or their failure to coordinate even without any explicit competitive incentives, will lead to a race to the bottom in regulatory standards. This will end up conferring substantial guarantees to banks and financial institutions and give rise to excessive leverage and risk taking in spite of imposing substantial regulation in each country. Such an outcome needs to be avoided.

It appears to us that most regulators would find our overarching principles (pricing guarantees and bailouts fairly, requiring transparency in derivatives that connect financial institutions, avoiding the provision of liquidity to insolvent institutions) reasonably convincing. Once such agreement is reached, it is possible that individual countries will implement slightly different variants of each principle. But the coordination of overall approach will minimize the arbitrage in which financial institutions can engage by shopping for the most favorable jurisdiction. This, in turn, will ensure that the desired objectives of each individual country's financial stability plans are not compromised altogether.

Will such coordination necessarily arise? And, if yes, what form will it take?

Unfortunately, the nations of the world do not have a very good track record at creating international policy makers with significant cross-national powers. It is somewhat unlikely that an international financial sector regulator with significant power over markets and institutions will emerge right away; countries are not willing to surrender their national authority over decision making, especially during a crisis. Perhaps complete centralization is not necessary and may even be undesirable, especially since coordination has gradually increased in the past 20 years and most likely will increase going forward. Basel II provides an important precedent. No matter what one thinks of the Basle II product, the process by which the Basel Committee crafted an international consensus with a common set of rules and got countries to adhere to these rules (without any direct authority over them) has been an important achievement. The Bank for International Settlements (BIS)—which houses the Basel Committee—has gained valuable experience in setting such standardized rules and definitions for financial institutions. In fact, there is a new player on the scene as well—the Financial Stability Form (also housed at BIS) established in 1999 by the G7 countries. It has issued several reports detailing specific recommendations for strengthening and standardizing financial regulation.

Our recommendation to achieve such international coordination is thus to exploit this experience using the following three steps:

1. Central banks of the largest financial markets (say G7) should convene first to agree on a broad set of principles for regulation of banks. Each central bank should play the role of a regulator in charge of supervising and managing the systemic risk of large, complex financial institutions (LCFIs). By playing this role, the central banks would be able to agree on a common agenda of identifying the LCFIs.
2. Central banks should agree at this convention on the overarching set of principles for prudential regulation of LCFIs and for crisis management and interventions. The principled approach we have presented in this book may be a useful starting point.
3. Next, central banks should present a joint proposal with specific recommendations to their respective treasuries or national authorities, seek political consensus for an international forum such as the Financial Stability Forum or a committee of the BIS to coordinate an ongoing discussion and implementation of the commonly agreed regulatory principles, and monitor their acceptance and application.

A commitment to such a process will generate a willingness to take the outcome seriously and, it is hoped, pave the way for international

coordination on well-rounded policies that balance growth with financial stability as efforts get under way to repair national financial architectures.

APPENDIX: TIME LINE OF CRISIS

Date	Event
March 5, 2007	HSBC Holdings announces one portfolio of purchased subprime mortgages evidenced much higher delinquency than had been built into the pricing of these products.
April 22, 2007	Second-largest subprime lender, New Century Financial, declares bankruptcy.
June 22, 2007	Bear Stearns pledges a collateralized loan to one of its hedge funds but does not support another.
July 25, 2007	Carry trade experiences a six standard deviation move.
Aug. 6, 2007	Beginning of much publicized quant hedge fund meltdown.
Aug. 9, 2007	BNP Paribas suspends calculation of asset values of three money market funds exposed to subprime and halts redemptions. AXA had earlier announced support for its funds.
Aug. 9, 2007	European Central Bank (ECB) injects €95 billion overnight to improve liquidity. Injections by other central banks.
Aug. 17, 2007	Sachsen LB receives bailout from German savings bank association. Run on Countrywide.
Aug. 17, 2007	Federal Reserve approves temporary 50 basis points reduction in the discount window borrowing rate, extends term financing, and notes it will "accept a broad range of collateral."
Sep. 14, 2007	Bank of England announces it has provided a liquidity support facility to Northern Rock.
Sep. 17, 2007	Following a retail deposit run, the chancellor announces a government guarantee for Northern Rock's existing deposits.
October 2007	Citi, Merrill Lynch, and UBS report significant write-downs.
Nov. 8, 2007	Moody's announces it will reestimate capital adequacy ratios of U.S. monoline insurers/financial guarantors.

Date	Event
Nov. 20, 2007	Freddie Mac announces 2007 Q3 losses and says it is considering cutting dividends and raising new capital.
Dec. 10, 2007	UBS announces measures to address capital concerns following further write-downs.
Dec. 12, 2007	Joint Bank of England, Federal Reserve, ECB, Swiss National Bank (SNB), and Bank of Canada announcement of measures designed to address pressures in short-term funding markets. Actions taken by the Federal Reserve include the establishment of a temporary Term Auction Facility (TAF).
Dec. 20, 2007	Bear Stearns announces expected 2007 Q4 write-downs.
Jan. 11, 2008	Bank of America confirms purchase of Countrywide.
Jan. 14–18, 2008	Announcements of significant 2007 Q4 losses by Citi and Merrill Lynch, among others.
Jan. 15, 2008	Citi announces it is to raise US$14.5 billion in new capital.
Jan. 24, 2008	Société Générale reveals trading losses resulting from fraudulent trading by a single trader.
Feb. 7, 2008	Auctions for auction rate securities begin to fail. Six days later, 80 percent of these auctions fail, starting a complete freeze in these markets.
Feb. 11, 2008	American International Group (AIG) announces its auditors have found a "material weakness" in its internal controls over the valuation of the AIGFP super senior credit default swap portfolio.
Feb. 17, 2008	UK government announces temporary nationalization of Northern Rock.
Mar. 11, 2008	Federal Reserve announces the introduction of a Term Securities Lending Facility, and Bank of England announces it will maintain its expanded three-month long-term repo against a wider range of high-quality collateral.
Mar. 14, 2008	JPMorgan Chase & Co. announces that it has agreed, in conjunction with the Federal Reserve Bank of New York, to provide secured funding to Bear Stearns for an initial period of up to 28 days.
Mar. 16, 2008	JPMorgan Chase & Co. agrees to purchase Bear Stearns. Federal Reserve provides US$30 billion nonrecourse funding.

Date	Event
Mar. 16, 2008	Federal Reserve announces establishment of Primary Dealer Credit Facility.
Apr. 21, 2008	Bank of England launches its Special Liquidity Scheme (SLS) to allow banks to swap temporarily their high-quality mortgage-backed and other securities for UK Treasury bills.
May 2, 2008	Coordinated announcement from the Federal Reserve, ECB, and SNB regarding further liquidity measures.
June 2008	MBIA and Ambac lose their AAA ratings from the Nationally Recognized Statistical Rating Organizations (NRSROs).
June 16, 2008	Lehman Brothers confirms a net loss of US$2.8 billion in Q2.
July 11, 2008	Closure of U.S. mortgage lender IndyMac.
July 13, 2008	U.S. Treasury announces a rescue plan for Fannie Mae and Freddie Mac.
July 15, 2008	U.S. Securities and Exchange Commission (SEC) issues an emergency order to enhance investor protection against "naked short selling."
July 30, 2008	Federal Reserve announces the introduction of an 84-day Term Auction Facility in addition to its existing 28-day loans. The ECB and SNB announce they will provide 84-day U.S. dollar liquidity in addition to their existing operations with a maturity of 28 days.
Sep. 7, 2008	Fannie Mae and Freddie Mac are taken into conservatorship.
Sep. 15, 2008	Lehman Brothers files for bankruptcy. Bank of America announces purchase of Merrill Lynch.
Sep. 16, 2008	U.S. government provides emergency loan to AIG of US$85 billion in exchange for a 79.9 percent stake and right to veto dividend payments.
Sep. 16, 2008	Reserve Primary Fund "breaks the buck" due to its holdings of Lehman Brothers debt. Begins a run on money market funds.
Sep. 17, 2008	Bank of England extends drawdown period for SLS.
Sep. 18, 2008	Announcement of coordinated central bank measures to address continued elevated pressures in U.S. dollar short-term funding markets. Bank of England concludes a reciprocal swap agreement with the Federal Reserve.
Sep. 18, 2008	FSA announces regulations prohibiting short selling of financial shares.

Date	Event
Sep. 19, 2008	U.S. Treasury announces temporary guarantee program for the U.S. money market mutual funds (MMMFs). The Federal Reserve Board announces it will extend nonrecourse loans to banks to finance purchases of asset-backed commercial paper from MMMFs.
Sep. 19, 2008	SEC prohibits short selling in financial companies. Bans follow from a number of European regulators.
Sep. 20, 2008	U.S. Treasury announces draft proposals to purchase up to US$700 billion of troubled assets (Troubled Asset Relief Program).
Sep. 21, 2008	The Federal Reserve approves transformation of Goldman Sachs and Morgan Stanley into bank holding companies.
Sep. 23, 2008	Announcement that Berkshire Hathaway is to invest US$5 billion in Goldman Sachs.
Sep. 25, 2008	JPMorgan Chase & Co. buys the deposits, assets, and certain liabilities of Washington Mutual bank.
Sep. 29, 2008	Bradford & Bingley is nationalized by UK government. Abbey buys its branches and retail deposit book.
Sep. 29, 2008	Belgian, Dutch, and Luxembourg governments announce they will invest €11.2 billion in Fortis.
Sep. 29, 2008	Federal Reserve increases swap lines to foreign central banks.
Sep. 29, 2008	Announcement of Citi's intention to acquire the banking operations of Wachovia in a transaction facilitated by the Federal Deposit Insurance Corporation (FDIC), protecting all depositors (under the systemic risk exception of the FDIC Improvement Act of 1991).
Sep. 30, 2008	Irish government announces deposit guarantee. Other governments follow with extensions to deposit guarantees.
Oct. 3, 2008	U.S. House of Representatives passes US$700 billion government plan to rescue the U.S. financial sector (having voted against an earlier version of the plan on September 29, 2008).
Oct. 3, 2008	FSA raises the limit of the deposit guarantee to £50,000 (with effect from October 7, 2008).
Oct. 3, 2008	Wells Fargo and Wachovia agree to merge in a transaction requiring no financial assistance from the FDIC.

Date	Event
Oct. 3, 2008	Dutch government acquires Fortis Bank Nederland (Holding) N.V.
Oct. 6, 2008	German authorities announce package to save Hypo Real Estate.
Oct. 7, 2008	The Icelandic government takes control of Glitner and Landsbanki, which owns Icesave.
Oct. 7, 2008	Federal Reserve announces the creation of the Commercial Paper Funding Facility.
Oct. 8, 2008	Coordinated interest rate cuts of 50 basis points (including the Bank of England, the Federal Reserve, and the ECB).
Oct. 13, 2008	Further details of the UK support package are released.
Oct. 13, 2008	Members of the euro zone announce measures to provide their banks with capital funding. Further coordinated action to provide U.S. dollar liquidity.
Oct. 14, 2008	U.S. government announces Capital Purchase Program of up to US$250 billion.
Oct. 21, 2008	Federal Reserve Board announces the creation of the Money Market Investor Funding Facility.
Nov./Dec. 2008	Many hedge funds put up gates and suspend withdrawals as unprecedented redemption notices come in.
Nov. 10, 2008	The U.S. government modifies its bailout of AIG as the insurance company buckles as market conditions deteriorate.
Nov. 13, 2008	The announcement by the U.S. Treasury that funds from the TARP would not be used to buy distressed assets has a negative impact on the U.S. LCFIs and share prices fall substantially.
Nov. 23, 2008	The U.S. Treasury and FDIC announce a rescue package for Citigroup, which includes guaranteeing $306 billion of impaired RMBS and CMBS assets.
Nov. 25, 2008	The Federal Reserve announces that it will purchase up to $500 billion of agency MBSs, as well as buy up to $100 billion of agency unsecured debt.
Nov. 25, 2008	The Federal Reserve announces the creation of the Term Asset-Backed Securities Loan Facility (TALF) whereby up to $200 billion will be lent to holders of "new and recently originated" AAA ABSs backed by consumer and small business loans. The Treasury will provide $20 billion of credit protection via TARP funds

Date	Event
	to the Federal Reserve Bank of New York, which will be running the TALF.
Dec. 12, 2008	Bernard Madoff is arrested for allegedly carrying out a Ponzi scheme through Madoff Securities. U.S. investigators report losses to the scheme could total approximately $50 billion.
Dec. 16, 2008	The federal funds target rate is cut from 1 percent to a range of 0 to 0.25 percent, its lowest level on record dating back to 1954.
Dec. 19, 2008	The Bush administration agrees to lend $13.4 billion of TARP funds to GM and Chrysler in exchange for an agreed restructuring plan.

Source: Bank of England.

NOTES

1. The ABX, LCDX, and CMBX indexes are portfolios of credit default swaps based respectively on tranches of 20 subprime mortgage pools, 100 equally weighted loan credit default swaps referencing syndicated first-lien loans, and tranches of 25 commercial mortgage-backed securities.
2. Primary dealers are banks and securities brokerages that trade in U.S. government securities with the Federal Reserve System. As of September 2008, there were 19 primary dealers. Lehman Brothers and Bear Stearns used to be primary dealers.
3. The Fed created a credit facility for up to US$85 billion in exchange for 80 percent of equity and the right to suspend dividends.
4. The plan was modified to expand bank deposit guarantees to $250,000 and to include $100 billion in tax breaks for businesses and alternative energy.
5. One reason for such lack of conditionality could have been that the lack of a consistent response to the solvency crisis from its regulatory counterparts forced the Fed to play the dual role of LOLR and solvency regulator.
6. Specifically, we advocate a massive DIP loan to GM in bankruptcy. The current bailout plan would offer less of a breathing space to GM and imply more job cuts in the short run than our proposed bankruptcy/DIP financing plan. The DIP loan would allow the restructuring to take place over 18 to 24 months, whereas the bailout would be barely sufficient to avoid liquidation in 2009. To further limit the ripple effects of GM's bankruptcy, the government should also consider backstopping warranties and spare parts availability, even if the reorganization fails.