
The 2007 Meltdown in Structured Securitization: Searching for Lessons, not Scapegoats

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The intensity of the crisis in financial markets has surprised nearly everyone. The authors search out the root causes of the crisis, distinguishing them from scapegoating explanations that have been used in policy circles to divert attention from the underlying breakdown of incentives. Incentive conflicts explain how securitization went wrong, why credit ratings proved so inaccurate, and why it is superficial to blame the crisis on mark-to-market accounting, an unexpected loss of liquidity, trends in globalization, and deregulation in financial markets. The authors' analysis finds disturbing implications of the crisis for Basel II and its implementation. They conclude by drawing out lessons for developing countries and identifying reforms that would improve incentives by increasing transparency and accountability in government and industry alike. JEL codes: G21, G28, G32

Since August, 2007, after a long period of relative quiet in world markets,¹ a spreading financial crisis has nearly monopolized the flow of economic news. Beginning during a period of strong world macroeconomic growth and low interest rates, the crisis appears to have surprised financiers and regulators alike. The turbulence was triggered by a sudden and widespread loss of confidence in securitization and financial engineering and by the manifest failure of respected statistical models for assessing and pricing credit risk.

Most astonishingly, these now-doubtful techniques had previously been hailed as the cornerstones of modern risk management. The turbulence proved greatest in countries whose supervision of credit risk had been thought to be the best in

the world. Indeed, the regulatory standards and protocols of these countries were in the process of being emulated worldwide.

As the crisis unfolded, the world witnessed a series of unprecedented events, including a previously unthinkable rate of default on AAA instruments; the first run on a U.K. bank in 150 years; and an explicit extension of the U.S. safety net to cover a major insurance company, the entire investment banking industry, and two giant government-sponsored housing-finance enterprises (Fannie Mae and Freddie Mac). These events were followed by the demise of a number of commercial and investment banks and a sharp worldwide plunge in equity stock prices that was especially pronounced in the financial sector.

Reverberations quickly spread beyond the two financial-center countries to other industrial countries including Australia, Ireland, Iceland, Germany, and many other countries, first by financial channels and then by the collapse of world trade. By April, 2009 the IMF was estimating total losses at over \$4 trillion, about two-thirds of which would redound to banks around the world (IMF 2009, p. xi). Inquiring minds yearn to know how this crisis could have occurred in the 21st century, and especially how it could have originated in the United States, home to arguably the most sophisticated financial system in the world.

Increases in leverage and risk taking, which were key factors in the crisis, were not limited to the aforementioned countries but seen also, in particular, in the Baltics and other Eastern European countries. Developing countries had been closely emulating the approaches to financial sector regulation taken in the high-income countries, as seen in the decision by many of the former to adopt the Revised Capital Framework, or Basel II. Although most emerging markets had not yet adopted significant use of securitization in their domestic financial systems, they were well on the way to greater reliance on ratings organizations. Additionally, the failures in the incentive and information environment that were the hallmark of this crisis are relevant for developing countries, as seen in the Mexican and East Asian crises of the 1990s. Both rich and poor countries' financial systems share a vulnerability to asset bubbles, and a key message from the current crisis is that all countries need to focus on the vigilance of their regulatory authorities.

Beyond dramatic macroeffects, already seen in collapsing trade volumes and output growth, this crisis will have two important channels through which it will influence developing countries. First, influence will be felt through the upcoming reforms of the architecture of financial regulation. While we cannot predict future policies, how this reform should proceed is the focal issue of our analysis. Second, developing countries will be affected long into the future by the lessons that they draw from this crisis, regardless of the regulatory changes made in the high-income countries. We regard it as critical that these lessons can and should be implemented in low- and middle-income countries. Complex methods for

regulating risk-taking have failed miserably in this crisis, so it is time for simpler yet effective approaches to regulation and supervision.

Promptly uncovering the true roots of this crisis is important because false explanations are quick to gain a toehold. As a crisis matures and then begins to recede policymakers and pundits often latch onto simplistic theories of what happened, why it happened, and what should be done to see that similar events do not happen again. Sadly, the story that official theories are beginning to tell and the policy solutions that these flawed theories recommend tend to be dictated not by the economics of crisis generation, but by self-interested jockeying by groups and individuals that are anxious either to shift blame away from themselves or to see that national safety nets remain an important source of subsidies to large and complex institutions.

Our study seeks to make it clear that the principal source of financial instability is not to be found in the aberrant behavior of a few greedy individuals or in a sudden weakening of important institutions of a particular country at a particular time. Rather systemic financial fragility is marked by an undermining of the effectiveness of financial regulation and supervision in every country in the world, often involving contradictory political and bureaucratic incentives. Supervisory agencies overlook those occasions when financial institutions and their customers overleverage themselves in creative ways; they also close their eyes to the unbudgeted costs of the loss exposures that excess leverage passes onto financial safety nets until it is too late for anyone to control the damage that results.

To understand the sources of instability we need to remember that regulation and supervision must be viewed as an endless game of action and response (Kane 1977). In this game the regulated side is able to move more often and more quickly than the regulatory side can. As outsiders, regulators are at a disadvantage in monitoring and enforcing financial discipline, so they inevitably find themselves trying to catch up with their regulatees. Every move they make generates a series of new and creative moves by financial institutions who seek to minimize the burdens regulations ultimately place on them. The profit-making orientation of financial institutions also ensures that their moves are not only swifter, but also more complex and harder to anticipate than those of regulators. This dynamic perspective helps us to ask and answer a series of central questions about the origins of the latest crisis:

- Where did modern financial engineering, securitization, and risk management go wrong?
- Why did rating organizations not uncover the dangers, and who should bear responsibility for over-rating securitized debt?
- Can mark-to-market accounting cause a crisis or is it merely a messenger?

- What did financial globalization contribute to the crisis, and should links among national markets be restrained in some way?
- Has Basel II failed already, or would its wider implementation have stopped the spread of the current turmoil?
- What are the lessons from this and past crises for developing countries?

Finally mention should be made of two important issues that are beyond the scope of this paper. The first is the role of monetary policy in the run-up to, and the implosion of, bubbles, and the associated policy issues. For an analysis of this we refer the reader to Roubini (2005), Posen (2006), Taylor (2009), and Demirgüç-Kunt and Serven (2010). The second issue is the authorities' crisis resolution policies. These are not covered here, since it would be premature to try to summarize their triumphs and mistakes while they are still shaping and reshaping their response to the crisis.

How Did Securitization Go Wrong?

The first reaction to the breakdown of structured securitization was disbelief: How could something as universally applauded as financial engineering go so wrong? Securitization was supposed to identify risks accurately and parcel them out to parties who could easily bear the risks they assumed. But everyone now realizes that promoters of modern techniques of risk management promised a great deal more than they could ultimately deliver.

For centuries, loans were the most illiquid parts of a bank's balance sheet. Loan sales were limited by fears rooted in asymmetric information and adverse selection. Unless the sales contract specifically protected the buyer against the sellers' informational advantage, the original lender would be tempted to sell off its worst loans (its so-called "lemons") and hold back its solid loans for itself. These same issues made it hard for a buyer to resell loans when funds were needed.

Securitization provided an indirect way to sell loans, one that could offer buyers a number of useful safeguards. It also made it easy for a buyer to reverse its position later. Concerns about the quality of the loans chosen to back claims were muted when the original lender retained a "first-loss" position and also when the securities were highly collateralized.

In the United States, securitization took off in the 1970s. Its rapid development was greatly assisted by guarantees provided to investors by the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac). These government-sponsored enterprises (GSEs) regularized market practices by standing ready to buy and securitize mortgages that conformed to the particular standards that they set (Gorton and Pennachi 1995).

Subsequently, private securitizers developed protocols for trading claims to cash flows from other types of standardizable loans. The largest markets cover mortgages that were too big for the GSEs to purchase (so-called “jumbos”), credit-card debt, student loans, and automobile loans.

The 1988 Basel Accord (Basel I) also helped to generate a supply of loans that could be securitized and resecuritized. The accord tied two layers of bank capital requirements to an arbitrarily risk-weighted sum of their assets. The arbitrariness of the weights gave banks an incentive to move assets into off-balance-sheet securitization vehicles because capital charges on credit lines with which sponsors supported these vehicles were lower than the charges levied against on-balance-sheet positions. Basel II, which was just being implemented as the crisis was unfolding, further encouraged the holding of highly rated instruments and a reliance on risk models that turned out to underestimate the fragility of banks’ portfolios.

By turning the cash flows from a pool of illiquid underlying assets (such as mortgages) into tradable bonds, securitization created liquidity—and that liquidity promised to make the financial system better diversified and more resilient. Instead of bankers having to hold onto and support every loan they originated until it matured or defaulted, securitization allowed risks to be stripped from the loans and disbursed beyond the traditional geographical areas in which a particular lender had been operating to investors in any country of the world. The gain from this innovation was the reduced cost of mortgages and more affordable home ownership for a range of marginally less-creditworthy individuals.

Securitization might not greatly degrade credit quality, as long as quality is transparent and well priced to all parties along the securitization chain. Breakdowns in assessing and pricing mortgage risk played an important role in the seizing up of asset-backed markets in 2007. While securitization is simple enough, the slicing of cash flows from various mortgages and other instruments into tranches, and the pressure for high ratings over time, led securitizers to fashion very complicated structures of cash-flow disbursement. The relation of particular tranches to the underlying asset pool was often very opaque. This made tranching difficult to value and susceptible to sudden changes in risk perception.² Large banks could sell almost any pool of loans, securities, or revenues into the securitization process. Buyers would slice the claims they used into a series of at least three subordinated tranches: senior (AAA), mezzanine (BBB), and an unrated residual or equity tranche. In the event of defaults on individual loans, the equity tranche would absorb losses until the equity was used up. After that, the BBB tranche would absorb further losses until it too was exhausted. Subordinated tranching of risk does not mean that the loans in the securitized pool were divided into bands based on the credit risk of particular loans. Rather, senior tranches had the first claim on whatever cash flow the whole asset pool might generate. Buying a senior tranche offered protection against losses by

assigning them—in a probabilistic sense—to the junior tranches. Investment-grade credit ratings by credit rating organizations (CROs) awarded to the senior tranches suggested they were safe even when the underlying collateral was all subprime.³

The root problem with securitization—as with loan sales—is that outsourcing the funding side of an originator’s balance sheet undermines its incentives to monitor the quality of the loans it originates. Troubled loans become the property and problems of someone further down the transaction chain. As the demand for highly rated tranches intensified and securitization became more complicated and less transparent, underwriting incentives weakened because securitizers and CROs performed little actual due diligence. Low interest rates and increasing housing prices encouraged an overly friendly regulatory environment both for highly leveraged mortgages and for securitization structures based on them.

Because securitization caused more subprime mortgages to be written, it expanded access to home ownership substantially.⁴ Unfortunately, federal regulators and Congress were cheerleaders in this process, even though higher volumes went hand-in-hand with lower standards and severe mispricing of risk.⁵ Dell’Ariccia, Igan, and Laeven (2008) show that standards weakened the most for borrowers whose risks were highest. Increases in the volume of loan applications by subprime borrowers were associated with an increased rate of approval and lower loan quality.⁶ In contrast, for borrowers classified as prime, increased applications produced more rejections.

How can one explain the growth of securitization? Demand was high both because interest rates on the safest securities were at or near record low levels and because of the capital relief afforded to banks for holding highly rated instruments, as well as the regulatory requirements on other intermediaries to hold the same. The Securities and Exchange Commission (SEC)’s sanctioning of certain ratings agencies (see below) no doubt gave investors some comfort. On the supply side, in addition to the quest to expand home ownership, risk-shifting created arbitrage profits for institutions able to service this demand. Securitization was simply the latest innovation through which financial institutions could simultaneously collect fees from investors and arbitrage loopholes in bank regulation and supervision. By placing important tranches of risky loans through and with foreign and nonbank firms, large commercial and investment banks layered the institutional character, and broadened the geographic span, of their funding arrangements. Moreover, they did this in ways that made these institutions ever more complicated, ever more interlinked, and therefore ever more difficult to fail and unwind in the event of a crisis. All of this increased their potential claims to intangible safety-net subsidies. Investors in complex claims on securitized pools of loans tended not to rely on either the lender’s or their own due diligence and until well into 2007 many investors deemed it reasonable to allow credit rating

organizations to assess the risks for them. With supervisors closing their eyes to the fraying of contractual incentives for lenders and credit raters to fulfill their duties, few investors saw any reason to doubt that they were purchasing well-rated and well-priced securities. Investors' mistaken belief that their growing demand for highly rated investments was being properly serviced allowed the demand side of the market to expand steadily.

Outsized commissions and fees earned on securitizations assured a steadily growing deal supply. Compensation systems in commercial and investment banking paid large bonuses tied to immediate profits and required no payback if losses occurred in subsequent years. Even when compensation took the form of stock options, blackout periods before such options could be exercised were too short to align employee incentives with the long-term interest of the firm.

The development of securitization in emerging markets has not flourished at the same rate, mostly due to underdeveloped capital markets. Securitization may be beneficial for them, however, if it is kept simple and well-regulated. A prudent framework of securitization should include two key features. First, leverage should be effectively limited by capital requirements by requiring loans to remain on a bank's balance sheet. Second, loan origination should be straightforward and fully transparent.⁷

Why Were Credit Ratings so Inaccurate?

While risk-management mistakes, low interest rates, and some kind of asset-price bubbles are features of most crises, this crisis may be remembered as one in which long-successful systems for using debt ratings to control institutional risk-taking failed massively.

Although blame must be apportioned across the entire chain of securitization activity, U.S. CROs come in for special criticism because investors have seen an embarrassingly large number of downgrades and defaults for highly rated securities. In helping potential counterparties to assess the creditworthiness of individual bond issues, CROs earn profits by producing classificatory information that regulators find helpful and that investors and guarantors use to compare credit spreads on issues of risky debt. However, CRO revenues come not from the investor or regulatory side, but from fees that issuers pay CROs for analyzing the credit quality of different issues; although accurate ratings benefit investors and issuers alike, issuers are asked to pay because, once it is announced, a security's credit rating becomes public knowledge. This asymmetric arrangement poses an obvious conflict of interest for CRO managers. Borrowers have an incentive to play different CROs against one another and to hold out for higher-than-appropriate ratings. For issuers and securitizers, the counterincentive to seeking a

corrupt rating is that they also need to employ a CRO that has a well-established reputation for honest and accurate work.

Until the 1970s, ratings were generally in low demand (Sylla 2001). CROs' value added was uncertain, and as recently as the 1960s these firms employed only one to two dozen analysts, with their then meager revenues coming mostly from sales of research (Partnoy 2001). Ratings were long criticized as lagging behind the business cycle—issuing upgrades late in cyclical upswings and downgrades late in slowdowns in ways that did not help investors to anticipate or protect themselves against a rise in defaults. This is amply demonstrated by the avalanche of ratings downgrades in the 1930s.⁸ However, in 1975 the SEC created the designation of a “Nationally Recognized Statistical Ratings Organization (NRSRO),” and over time ratings-based government rules restricted the decisions of a variety of actors (pension funds, insurance companies, banks, municipalities, and so on). Government reliance on ratings encouraged private organizations to incorporate ratings into their own governance procedures or to advertise that only investments above a certain rating would be held. With financial intermediaries either strictly required to hold only highly rated instruments or allowed to hold less capital against highly rated securities, ratings understandably grew in demand, as did the pressure for “rating inflation.” By the late 1990s, when the structured finance business expanded sharply, the CRO industry expanded apace. By 2006 Moody's, which won a large share of this business, was generating over \$6 million per employee and employed over 20,000 persons worldwide.

Because many regulatory agencies, investors, and bond insurers rely on CRO credit ratings to substitute for their own due diligence, the contract interest rate an issuer has to pay falls whenever its credit rating rises. In turn, for established CROs, the time and effort required to build a reputation for reliability, and the bureaucratic difficulties to be surmounted in being named an NRSRO, create a dual barrier for would-be new entrants into the CRO industry. Reinforced by the tendency of established firms to acquire lesser players, these barriers give them a leg-up in foreign venues as well. The resulting oligopolistic market structure helps to explain why major ratings organizations do not compete either in the models they use to assess credit risks or in the criteria they use to map the forecasts their models produce onto different rating classes. This similarity in methods means that errors are likely to be similar too. The core problem in the securitization crisis is to understand how and why securitizers, CROs, and bond insurers *drastically over-rated* and *oversized* the highest-quality tranches of structured-finance obligations.

Part of the explanation lies in the conflict that managers and line employees of such firms faced between preserving the long-run value of their firm's reputation and chasing bonuses and wage raises that short-run revenue expansion can generate. Errors in classification are slow to reveal themselves. They can only be

established after a long and variable lag. This lag means that, to keep a firm's reputation strong over the long run, compensation structures must include features that promise to reward employees for taking the long view and penalize them for succumbing to short-termism. Given the high proportion of revenues earned in recent years at the top three ratings firms (Moody's, Standard & Poors, and Fitch) from rating securitizations, individual managers and analysts must have been sorely tempted to risk the firm's reputation to secure or retain the repeat business of the biggest issuers, and it is doubtful that salary structures fully neutralized this temptation. According to Portes (2008), 44 percent of Moody's 2006 revenue came from advising issuers first on how to collateralize and to assign (that is to slice or "tranche") cash flows from pools of securitizable assets to get a desirable package of ratings, and then going on to rate the credit risk of the various packages that it and other CROs helped to construct. With compensation in much of the financial sector increasing and being linked to short-term paper profits with little attention to risk it is hardly surprising that the same occurred in CROs.

What's Different about Rating Structured Instruments?

In principle, each rating should be interpreted as an interval estimate: that is as the sum of a point estimate and a two-sided margin for error. When a CRO does a good job of rating bonds or complex securities, the observed value of default and loss rates in different rating classes correlate closely with the riskiness of the grade that securities in each category had previously received. Because securitized instruments are claims on a fixed pool of individual assets, servicers who manage the cashflows can do little to mitigate the potential impact of adverse events on investor returns.⁹ Even if point estimates of loss exposure were the same for a bond and a securitized claim, their margins for error would be very different. This means that it was misleading for CROs to employ the same set of letter grades to rank the through-the-cycle loss exposures of the tranches of structured deals and ordinary bonds.

Even on ordinary bonds, ratings are lagging indicators whose changes tend to come too late to help investors avoid losses when an issuer's credit standing weakens or to achieve gains when an issuer's prospects improve. This leads scholars to question whether on most deals CROs add enough informational value to justify their existence (Sylla 2001). However, because of the growing complexity of structured instruments, there can be no doubt that ratings were central to the successful placement of synthetic securities. The SEC and other regulators effectively ceded to CROs their public-interest responsibility for monitoring and disclosing investor loss exposures in structured financial instruments. Investors flocked to the highly rated tranches of structured securitizations precisely because they

promised miraculously to combine AAA and AA ratings with extraordinarily high yields—and regulators did not challenge this promise. As noted earlier, these high yields came mostly from blending in returns from the lower-rated components of structured instruments.

Although actual and proposed reforms seek to rework the details of CRO and issuer interactions, the process of rating complex structures of securitized debt differs critically from that of rating a simple bond issue. The process of rating a structured product is a sequence of bilateral negotiations that starts with the issuer specifying the mix of credit ratings it is looking for. CROs compete by specifying the subordination structure and level of credit support needed to obtain the ratings desired. That a give and take between CROs and securitizers did occur is suggested by the high concentration of CRO forecasts for structured deals that lie at “notches” just above the thresholds that would move the different tranches into the next lower ratings class (Mason and Rosner 2007). This implies that the associated interval estimates on most issues regularly dipped at least into the next-lowest rating class.

Assessing the risk of a portfolio of infrequently traded and innovative instruments and monitoring factors that change this riskiness over time pose difficult problems for data verification and analysis. CROs could and should have identified and addressed these problems more carefully, and in particular, using a prudent-man standard, they should have discounted the margins for error assigned to complex mortgage securitizations for the modeling, sampling, legal, and documentation risks that investors were asked to assume. If the industry had been less oligopolistic, competitive pressure likely would have led independent parties to be tasked with auditing the models and criteria on which individual CRO ratings were based and to fact-check the data used to estimate model parameters. Most importantly, conscientious outside reviewers would have insisted that CROs update their models and rating methods as soon as evidence began to develop that loan pools in the 2005 and 2006 vintages were defaulting at unprecedentedly early dates. Without the protection of ratings-based legal “safe harbors,” fund managers seeing the same events would have had their decisions exposed to adjudication in court.¹⁰

To lessen ratings volatility, CROs prepare what they term “through the cycle” ratings. The models CROs use for this task were known to incorporate unverifiable and overly convenient assumptions about correlations, worst-case scenarios, and marketability that were bound to break down (that is to lose applicability) in periods of severe financial distress. Many deal structures were new and yet to be tested against the stresses that might develop during a business-cycle downturn. For example, ratings on instruments based on negative-equity or optional-payment mortgage loans to low-income households used experience-based data on default frequency and loss given default drawn entirely from a period of macroeconomic expansion and soaring house prices. To simulate through-the-cycle

experience, observed defaults on innovative instruments ought to have been supplemented by synthetic data designed to introduce effects that might unfold in times of price decline and market stress (Altman and Rijken 2006).

CROs Need to Take Responsibility for their Mistakes...

Formally a CRO's aggressive declaration that an adequately documented "true sale" of a particular loan pool had taken place was a key step in moving the assets off originator and securitizer accounting balance sheets. But CROs apparently felt no duty to describe how fully the ownership of the pool could be documented. Hence their judgments on this matter could have no legal standing in any case.

The quality of CRO analysis was and is further undermined by CRO efforts to avoid legal responsibility for any mistakes. Despite their intense and critical involvement in designing securitization structures, CROs claim only to be expressing an "opinion." They insist that the constitutional right of free speech protects them from lawsuits for damages suffered by investors who chose to rely on what might turn out to be incompetent or negligent opinions. To create a foundation for this defense, CROs routinely incorporate language into their reports stating that it is "unreasonable" for anyone to rely on their "mere opinions," which should not be construed by anyone as "investment advice." Ironically, for investors and regulators, the reputational damage CROs have absorbed from massively over-rating structured securitizations has imparted to these disclaimers an element of unintended truth that has undermined the value of their brands and is forcing them to rebuild confidence in the value of their work.

Because CRO fees were so large, and because synthetic securities could not legally have been sold in large quantities to many investors without the blessing of high ratings, the courts might impose liability on CROs in any case. Whenever someone (say, a lawyer) collects a large fee for communicating his or her opinion to another party, the distinction between opinion and advice seems to break down. The sheer size of the fees collected for forming and issuing opinions about the riskiness of complex securitizations renders hollow the claim that users should not—and therefore would not—rely on them. In fact, CROs had to foresee and value that reliance, as it explains why they were being remunerated so well. They should share responsibility with any securitizer and insurer of these deals who distorted or failed to verify the value of the analysis on which CRO "opinions" ultimately were based.

... but the Authorities also Played a Role

On the grounds that they were helping innovative U.S. firms to compete effectively in global markets, federal supervisors refused to take on the political and practical

challenge of establishing and maintaining their ability to see and discipline complicated risk exposures. By tolerating the decline in transparency that came with structured finance; by not recognizing CRO incentives and that they were using poorly tested models and issuing aggressive legal judgments about whether non-recourse “true sales” of the underlying loans had actually taken place; and by not requiring CROs to discount their ratings on these instruments for the modeling and documentation risks inherent in structured finance—supervisors made it difficult for themselves and other market participants to recognize and discipline these risks. As a result investors were fed overly optimistic estimates of the credit quality of the instruments they purchased. The flaw in relying more on CROs is critical for developing countries, since, as noted below, prior to the crisis many of them announced plans to rely more on ratings in determining bank capital requirements, in a rush to adopt Basel II.

Going forward, the problem is to find reliable ways to express and value differences in risk on structured instruments. One way is for CROs to bond the quality of their work by subjecting it to effective independent review (Goodhart 2008a) and setting aside some of their fees in a fund from which third-party special masters or expedited civil judgments could indemnify investors for provable harm in instances where the independent reviewers find that negligence or misfeasance occurred. Alternatively, requirements that various intermediaries and fund managers hold rated instruments, or received relief from capital requirements by doing so, could be dropped, and the category of NRSRO, which implies a government sanctioning of the ratings process, could be abandoned.

Did Mark-to-market Accounting Cause the Crisis?

In the United States, accounting rules consist largely of generally accepted accounting principles (GAAP) and generally accepted auditing standards (GAAS). GAAP sets rules that constrain (but do not fully determine) the information systems that financial-institution managers may use to document their firm's economic condition and performance. GAAS sets procedures to be used in examining and verifying a firm's reports and records for compliance with GAAP.

In a world of diverse and evolving circumstances, reporting systems inevitably convey options about where to book assets and liabilities and how to measure risk exposures and changes in value. The existence of these options and the ways that particular institutions use them to conceal losses is only imperfectly understood by outsiders. From a statistical point of view, accounting income and net worth are merely estimates of a firm's economic income and ownership capital. Because contemporary reporting systems only provide imprecise point estimates of the current and future earning power of a firm, careful users of accounting data must

acknowledge the existence of a margin for error. In different firms and in the same firm at different times, measures of income or net worth may be biased up or down and may vary substantially in their exposure to estimation error. GAAP has never required a firm to report interval estimates or to disclose helpful supplementary information about the degree of imprecision or bias inherent in the methods its managers adopt.

Observers who fail to acknowledge the many reporting options that fair-value accounting still allows blame it for causing the crisis. They argue that thin markets can cause a downward spiral in asset prices by encouraging institutions to sell troubled assets quickly and “forcing” them to take writedowns that understate the “true” value of the underlying assets. However, in creating and deepening the securitization crisis, the most serious impact of accounting rules did not emanate from the *values* chosen to represent various on-balance-sheet positions. It came instead from using off-balance-sheet extensions of commercial and investment banks to warehouse risks that, for reputational reasons, would have to be brought back onto the balance sheet if and when cumulative losses developed.

Especially at large and complex financial institutions, individual managers have strong incentives to discover and to exercise reporting options that overstate their capital and understate their exposure to loss. This expands their ability to extract implicit subsidies that risk-taking can generate from implicit safety-net support.

Concealment processes may be characterized as simple and complex forms of arbitraging the supervisory system. Whatever their other economic benefits, innovative instruments are designed in part to create or expand concealment options. Moreover, trade associations and managers of systemically important institutions routinely use their political and economic clout to lobby standard-setting bodies for accounting rules that make it harder for government supervisors to monitor and to discipline their important exposures to loss.

Under the historical-cost valuation principles in use during the 1980s, U.S. authorities allowed and even encouraged economically insolvent “zombie” institutions to hide their insolvency and to roll over their debts solely on the strength of government guarantees (Kane 1989). The rules did not make them record deterioration in market values, even of assets and liabilities for which perfect substitutes were trading regularly in an organized market. These rules (which still govern positions in a U.S. depository institution’s “banking book”) encouraged distressed or ruined financial institutions to endeavor to grow out of their insolvency by pursuing long-shot strategies that created stockholder value by shifting responsibility for large loss exposures onto financial safety nets.

In the United States a major purpose of moving to fair-value accounting was to require some of the developing losses at troubled financial firms to be recognized and resolved more promptly than in the past. It is mischievous for loss-making or

undercapitalized firms to blame fair-value accounting for causing the trouble they encounter in rolling over their debt. At best, fair-value accounting is a messenger that makes private counterparties and officials charged with managing a country's financial safety net aware more quickly of their need to guard against the possibility that a particular firm (such as Bear Stearns) might be seeking to fund endgame "gamble for resurrection" at their expense. Realistically, careful exploitation of the many reporting options that fair-value principles convey still allows a clever manager to greatly understate developing losses. By the time accounting evidence of insolvency can emerge, well-informed interval estimates of a firm's economic net worth would be deeply in the red.

It is misleading for critics to claim that, because temporarily disorderly markets may overshoot equilibrium prices, fair-value accounting "forces" financial institutions to book paper losses that have no practical importance. First, under fair-value principles, many portfolio positions are "marked to model" rather than to an actual transactions price. This creates incentives for managers of distressed firms to ask their quantitative staff to adjust model outcomes until they produce prespecified results. Personnel responsible for modeling decisions can do this by expanding or contracting either their samples of data points or the parameter space of their models to eliminate uncomfortable valuation outcomes. Attempts to defraud investors and creditors with models or assumptions that violate "prudent-man" standards of negligence should be settled in the court system.

Second, risk managers are free to move assets that are sensitive to changing credit spreads, either into off-balance-sheet entities or from their firm's "banking book" to its "available-for-sale" portfolio. As in the past, GAAP asks that impairments in borrower credit that affect banking-book assets be translated into explicit additions to loss reserves. Increases in loss reserves reduce reported earnings and (if large enough) erode accounting net worth as well. While assets that are classified as available-for-sale have to be fair-valued, the writedowns do not pass through current earnings and charges taken directly against GAAP net worth are not incorporated into Basel measures of regulatory capital that supervisors were using to determine capital adequacy. Finally, in estimating GAAP capital in an environment of illiquid or panicked markets, banks are allowed to ignore impairments implied by observable credit spreads simply by declaring that in management's considered view the impairments are only temporary.

Notwithstanding that mark-to-market accounting did not contribute to the crisis, U.S. authorities in early 2009 decided to ease these rules in an effort to relieve the banks of pressure. Notably this contrasts with the advice given to developing countries in past crises, where the IMF and a variety of international experts have advised developing country authorities to take account of market values in determining the viability of banks.

Did Financial Globalization Exacerbate the Crisis?

The globalization of financial markets and institutions tends to heighten competition between alternative regulatory systems (Kane 1999, 2008). Although economists often treat regulation merely as a tax on institutional income, financial institutions understand that regulation is a service that generates benefits as well as costs. Regulatory benefits include improving customer confidence and convenience. Supporting bank efforts to accumulate and exercise market power benefits banks, while resisting these efforts benefits society. Because regulation requires resources to produce, both the efficiency of its production and its pricing can vary.

In a world in which financial markets are globalized, services that provide regulatory benefits are available both from foreign suppliers and from domestic regulators of differently chartered firms. Rules and enforcement systems are continually tested and reshaped by changes in the net regulatory burdens that other jurisdictions offer. This means that a worldwide market for regulatory services exists. Regulation is supplied competitively and accepted voluntarily to the extent that entry and exit opportunities exist for banks willing to incur the transaction costs of switching all or part of their regulatory businesses to another supplier. Competition has the benefit of lowering net regulatory burdens for the regulated financial institutions. While heightened international competition has tended on balance to displace poor systems of regulation by better ones, the maximum improvement in any country is limited by switching costs and by the level of best-practice regulation that can be found elsewhere.

In the current crisis, securitization helped to bring firms that were supervised in different regulatory systems into sharper competition with one another. In this environment, competition not only encouraged deregulation, it also and more importantly reduced the effectiveness of supervision. Securitization put pressure on particular regulatory enterprises to relax their scrutiny of innovative financial instruments as a way of defending or extending their bureaucratic turf. In the United States the worst offender was the Office of Thrift Supervision (OTS). The Treasury's Office of the Inspector General confirmed that the OTS allowed several thrifts to backdate capital infusions specifically to avoid showing a capital deficiency. Other banking supervisors helped their clientele by legitimizing cutting-edge ways to hide and transfer risk without fully exploring the threat that formally uninsured "shadow" affiliates (such as structured investment vehicles) and complex new contracting structures (such as doubly collateralized debt obligations) imposed on individual-country safety nets.

Whenever a regulator authorized an innovative entry by a foreign or nontraditional firm, it also had to relax restraints that might make it hard for its traditional clients to compete with the new entrants. Institutions pressed politicians to make this happen promptly. In most countries, defects in accountability led

supervisors of commercial and investment banks to assess the risks of innovative instruments of risk transfer with less watchfulness than these instruments deserved. With structured securitizations, the SEC, banking supervisors, mortgage insurance firms, and investors jointly outsourced their duty of vigilance to appraisers, accountants, and CROs. They did this despite knowledge of these firms' obvious conflicts of interest and outsized delays in recognizing problems or downgrading distressed securities in past downturns (Portes 2008). While supervisors relaxed entry restrictions, they resisted the exit of domestically important commercial and investment banks by standing ready to let unprofitable clients be supported by safety-net bans and guarantees.

The goal of financial reform should be to induce nondiscriminatory and efficient patterns of regulation and supervision. Regulators should be made accountable not just for producing a stable financial economy, but for providing this stability fairly and at minimum long-run cost to society. In practice, this would require embracing market-based standards of supervisory performance designed to identify undercapitalized institutions promptly and to require them to shrink, raise more equity capital, or pay higher interest rates for their debt. The globalization and information revolution that is underway in finance today makes it shortsighted to require taxpayers to subsidize weak institutions and inefficient patterns of real investment.

Regulatory efforts to respond to the globalization of financial institutions and markets have been led by the Basel Committee on Banking Supervision. This Committee meets regularly to discuss ways of harmonizing national standards for banking supervision. The Committee's stated objective is to eliminate perceived cross-country competitive inequalities and to improve financial stability by promoting comprehensive risk management and consistency in regulatory standards across countries for multinational firms. Its major accomplishment is to negotiate the Basel I and II capital accords.

Has Basel II Failed Already?

The crisis has spawned a growing argument about the role Basel I may have played in causing the crisis and about whether Basel II, had it been implemented earlier, could have lessened the turmoil. This debate is critically important for developing countries, many of whom are on record as planning to adopt the revised capital framework. Basel I distinguished two types of capital: Tier One Capital (core capital, roughly the same as stockholder equity) and Tier Two Capital (which includes some hybrid forms of debt). It also defines a formula for risk-weighting categorized "buckets" of similar asset holdings and summing up the weighted values to form an aggregate measure of risk exposure called "risk-

weighted assets" (RWA). Banks are required to hold at least 8 percent of RWA in capital, at least half of which must be in Tier One (equity plus retained earnings).

The weights employed in Basel I gave banks no credit for the extent to which they might have diversified or hedged the risks in their loan portfolio; risk was evaluated on a loan-by-loan basis, rather than at the portfolio level, taking into account covariances. The formulas also did not make any effort to account for operational, interest-rate, or exchange-rate risks, though market risks were incorporated later. Finally, Basel I failed to link the risk weights it applied to particular assets to the risk premiums that can be observed in loan markets.

These weaknesses provided opportunities for arbitrage that contributed to the current turmoil: if regulatory demands for capital generated a compliance burden at a particular bank, its managers could eliminate this burden by selling or securitizing a sufficient amount of assets. For example, under Basel I, mortgages held on a bank's balance sheet were subject to a 50 percent weight, while securities backed by mortgages received only a 20 percent weight. No risk weights were assigned to loans that were sold to special-purpose bank-sponsored securitization conduits, which were regarded as "off balance sheet," or to short-term lines of credit with which sponsors supported these conduits.

Proponents of Basel II argue that the new accord will ameliorate weaknesses in Basel I, since Basel II is more granular and mitigates securitization incentives by reducing the capital charge for mortgages held on the balance sheet to 35 percent and by imposing a capital charge on short-term lines of credit. Nevertheless, long-standing concerns about the Basel approach have been reinforced by the recent turmoil.

Basel II—which was negotiated in 2004, but is still in the process of being implemented—was born out of widespread dissatisfaction with the obvious shortcomings in Basel I.¹¹ The new agreement is much more complex than Basel I and rests on three mutually reinforcing pillars: (1) minimum capital requirements; (2) supervisory review of banks' capital adequacy; (3) strengthened market discipline of capital adequacy. Besides increasing the number of risk categories in pillar one, Basel II proposes to use a mix of statistical methods and expert opinion to track a bank's changing exposure to insolvency risk over time. It also envisions improved disclosure as a way to generate complementary market discipline on bank capital positions. However, Basel II does not improve on Basel I, either in how it measures capital or in the arbitrary target ratios it sets: the definitions of Tier One and Tier Two Capital and the rules limiting their components¹² are unchanged; and the Committee continues to insist on the 4 and 8 percent minimum ratios of capital to risk-weighted assets without any rationale as to why either level is appropriate.

The new accord sets out to make capital more sensitive to credit risk in one of two ways: through reliance on external credit ratings issued by rating organizations (the Standardized Approach) or through reliance on internal ratings based

on banks' own risk models (the Internal-Ratings-Based Approach, IRB). The Standardized Approach requires banks to allocate their exposures to risk buckets and resembles Basel I, except that it incorporates a wider range of weights and asks countries to choose a set of external rating organizations and use their assessments of risk to determine country-level capital requirements. As of 2008, 105 countries' authorities have stated their intent to adopt Basel II (FSI 2008)—and in its present evolution developing countries, lacking the data and skills for reliance on banks' models, would have to place greater weight on ratings in setting capital requirements.

The IRB Approach makes use of banks' own internal risk systems for specifying minimum capital requirements, subject to the requirement that their internal models satisfy regulatory eligibility conditions.¹³ Under pillar 2, Basel II grants national regulators substantial discretion over the implementation of these options: countries could end up with widely divergent levels of required capital. This would generate increased opportunities for regulatory arbitrage and undermine effective capital control. Indeed, standards under Basel II could cease to be global standards at all, which would defeat the original purpose of the accord, as well as the *raison d'être* of the Basel Committee.

Most importantly, recent events challenge the appropriateness of both the Standardized and IRB Approaches of measuring capital charges against credit risk. The use of ratings to set risk weights in the former encourages ratings inflation because ratings organizations face revenue-based incentives to relax ratings requirements. In addition, credit ratings do not confront the issue that capital requirements are supposed to address. Loan-loss reserves are tasked with accounting for anticipated losses. Capital requirements are intended to provide a buffer against *unexpected* risks. It does not make sense to use credit ratings to set capital requirements, since they convey no information about the volatility of an asset's return around its mean exposure to loss. Ratings may be useful for establishing loss reserves for particular assets, but they say nothing about how a bank's net worth or its portfolio of assets might vary in value with unexpected events. The amount of capital that must be set aside to achieve a particular target level of safety for a particular institution has to be linked explicitly to measures of the volatility of its earnings.

The internal models employed by even the largest and most sophisticated market participants also failed to track risk accurately. The models proved inadequate in that they systematically underestimated the types of risks in complex securitizations that produced large losses and substantial downward revisions in earnings. The Basel Committee undermined accurate modeling by deciding to treat five years of data as an adequate sample span. This time period is too short to capture a full business cycle. Any serious attempt at risk modeling should have confronted the aberrant behavior of housing prices in the United

States and other countries, as well as evolving features of the market (for example new types of borrowers, lower downpayments, new mortgages in which the buyer had the option of determining payments in the initial years, and so on). Thus this experience demonstrates that it is a mistake to assess risk mechanically by using models estimated with data from periods when important features were changing. In addition, complex financial models and datasets can be manipulated to provide desired outcomes.

Although Basel II employs a more detailed categorization of credit risks,¹⁴ it fails to address “liquidity” risk and reputation risk, both of which have proved important in the current turmoil. Once doubts emerged about the accuracy and reliability of ratings and accounting net worth, holders of maturing short-term liabilities refused to renew their funding. Feedback from this so-called liquidity risk intensified credit and market risk. Reputation risk encouraged lending institutions to rescue off-balance sheet shadow entities they had sponsored, even though sponsors were not contractually obliged to assume these losses. An important reason the crisis spread rapidly from subprime loans to other securitization structures, and that the turmoil has persisted, is that the subprime meltdown revealed that serious contracting weaknesses existed at every stage of the process of securitized risk transfer. Inadequate documentation of underlying mortgages, the daunting complexity of securitized structures for allocating and reallocating cashflows from questionable loans, and the opacity of off-balance-sheet vehicles that purchase securitized instruments led investors to seek comfort not from an understanding of underlying cashflows, but from credit enhancements and the behavior of dealer spreads. Neither regulators nor market participants knew to whom risks were formally allocated, let alone on whom potential losses might finally fall. The disclosures envisaged in pillar three of Basel II have a long way to go before they can claim to unravel these issues.

Finally, while Basel II assigns to national regulators the responsibility for monitoring and controlling insolvency risk, it does not develop any protocols for preventing financial institutions from becoming insolvent, nor does it impose requirements for prompt corrective action (PCA) on supervisory authorities. The accord will eventually have to benchmark a pattern of actions that home and host authorities should take as the capital position of a client institution slips deeper and deeper below acceptable standards and is not promptly replenished. Detection and resolution of impending insolvencies is crucial. The central problem in financial regulation is to make sure that even in politically and economically stressful circumstances, regulators have robust incentives to protect taxpayers by identifying troubled banks and forcing them to recapitalize before their capital can become exhausted.

Basel’s arbitrary “risk”-weighting process has already failed. This failure underscores the importance of enforcing PCA obligations and monitoring leverage per

se. Even in the midst of the crisis, large financial institutions managed to keep from violating Basel I's risk-weighted targets by gaming authorities with sophisticated (but faulty) risk-transfer techniques. For this reason during the turmoil, markets ignored RWA ratios and focused instead on the more transparent ratio of assets to tangible net worth as the primary indicator of financial strength. We think that this is excellent advice for developing countries to follow, as argued below.

Because the volatility of and correlation between returns on different assets tend to surge in crises, the risks that modern institutions take cannot be captured in a static formula, no matter how complex it might be. When static rules are also complex, they reduce transparency and generate loopholes that foster regulatory arbitrage and support acts of supervisory forbearance. To be effective, prudential regulation must be adaptive and it must combine supervisory stress tests with market oversight. To track the changing importance of particular risks in a timely fashion, supervisors therefore should use market signals.

Current market turmoil underscores the inadequacy not only of Basel's static formulas, but also the dangers of taking accounting statements at face value, both of which are of great relevance for countries regardless of their income level. Safety-net subsidies increase effective leverage, weaken market discipline, and reduce the exposure of formally at-risk loss bearers in ways that render the usual accounting disclosures ineffective. Subsidy-induced innovations can only be countered by conscientious supervision. Supervisors must not only draw on—but help to develop—informative market signals, such as those imbedded in the prices of credit default swaps and subordinated debt. Deal making in these markets incorporates timely estimates of changing default probabilities and loss exposures. However, prices in these markets can only be a strong source of discipline under two conditions: (i) market participants do not expect to be bailed out when trouble develops; (ii) investors have access to regular flows of high-quality information (Barth, Caprio, and Levine 2006). A crucial element in limiting expected bailouts is to assign political accountability for measuring and defending safety-net costs to regulators and elected officials.

Lessons for Developing Countries

Although this crisis began in industrial countries and was associated in the United States with sophisticated financial innovations, both this crisis and its many antecedents offer a number of lessons for developing countries. When a crisis is in process, interest in drawing lessons from the past surges. Unfortunately, officials and market participants alike have vested interests in promoting views that are most beneficial for their reputation, balance sheet, or both. This is why

popular theories of past crises zero in on the bad behavior of a few convenient scapegoats. However, crises rarely result from the corrupt acts of a few greedy individuals or from a handful of isolated regulatory mistakes. Crises have their roots in longstanding structural flaws in the way that financial institutions and government officials interact. With rare exceptions, crises in developed and developing countries alike are caused or exacerbated by perverse incentives that make it worthwhile for politicians, regulators, and the private sector to ignore mounting danger signals until it is too late to avoid a widespread meltdown in asset values.

Modern Crises Are Often Revealed by Identifiable Shocks that End Booms or Bubbles in Important Macroeconomic Sectors, but the Underlying Distortions Were Building up for a Long Time

The meltdown that began in 2007 is not the first time that financial institutions, in taking advantage of regulatory loopholes, engaged in reckless risk-taking that fueled a long-lasting bubble in asset prices that in one way or another had to burst eventually. Extraordinary risk-taking is easier to disguise and rationalize during bubble or boom periods. Increasing leverage based on unsustainable surges in the price of residential, commercial property, or both, on the one hand, and corporate stock, on the other, featured prominently in an end-of-the-century spate of crises: in Japan (1990s), Malaysia (mid-1980s), Mexico (1994), Sweden (1991–94), and East Asia (1997–98). The current crisis in Ireland and several Eastern European countries occurred without sophisticated financial products, and the underlying distortions—an unsustainable housing boom in the former, and widespread currency mismatching even at the household level in the latter—were not difficult to detect.

Historically, wherever a banking industry has existed, economic booms and asset bubbles have often preceded financial crises. Demirgüç-Kunt and Detragiache (2005) survey a large literature that shows that the likelihood of crises increases with the strength and duration of economic booms and that banking crises are occasioned by shocks in asset prices, output, terms of trade, and interest rates. In addition, the same scholars (2002) assemble convincing evidence that the character of a country's financial safety net plays a critical role in encouraging institutions to make themselves vulnerable to the particular shock that brought each crisis on.

This is not to say either that crises would not occur in the absence of a safety net or that financial safety nets should be dismantled.¹⁵ It is accurate to say that financial crises have become more frequent and more expensive (in terms of losses per dollar of deposits) as safety nets have expanded.¹⁶ By permitting losses to spread to taxpayers rather than being borne solely by contracting parties, safety

nets displace market discipline (Calomiris 1995). By making it easier to attract deposits, safety nets encourage private parties to lever themselves more extensively; and increasing leverage shifts more and more of the downside onto the national safety net.

Financial Deregulation Is Often Blamed for Causing Crises, but the Fact and Character of Deregulation Is Itself Shaped by the Ways that Governments and Regulated Institutions Interact

As financial regulations were relaxed in the 1970s and 1980s, and increasing reliance was placed on prudential supervision (with little accountability), the frequency of crises did increase (Demirgüç-Kunt and Detragiache 1999). However, deregulation does not necessarily provide greater opportunities for shifting private risk exposures onto the safety net. This happens only when authorities fail to adapt their systems of insolvency detection and resolution appropriately. In principle, relaxing controls on interest rates, charter powers, and portfolio structure promised to improve the ability of banks to foster economic growth and economic justice. But coupling deregulation with inadequate supervision of leverage and asset quality is a recipe for disaster, because “desupervision” allows safety-net subsidies to be extracted by doubling and redoubling risks.¹⁷ Blaming the current turmoil on financial deregulation without mentioning the role of deficient oversight suggests that rules—not incentives—are at fault (Stiglitz 2008; Krugman 2008). During the period of deregulation, most industrialized countries introduced many new rules. The imbalance between the attention paid to rules and incentives is well illustrated by the 2004 Basel II agreement which devotes 16 pages to issues of market discipline and 225 pages to spelling out formulas and strategies imbedded in pillar one and options for national discretion authorized in pillar two.

Over Time, Regulation-induced Innovation Leads to Progressively More Complex and Less Transparent Forms of Risk-shifting

Financial crises are often driven by breakdowns in innovative financial instruments or arrangements designed to exploit loopholes in a country’s risk controls. Recent examples of risk-shifting include: overexposure to foreign exchange risk (Chile, 1981; Mexico, 1995; Nordic countries, early 1990s; Turkey, 1994; East Asia, 1997); aggressive lending to politically important foreign markets (in the developing country debt crisis of the 1980s); complex deal-making (in the securitization crisis). In seeding the current crisis, institutions abused derivative instruments—whose existence had been rationalized as vehicles that would diversify and hedge risk—in order to magnify safety-net loss exposures. Abusive trading of

derivatives instruments fueled the Orange Country fiasco (Jorion 1995) and the growth of credit default swaps (CDS).

Because Institutions Can Count on Crisis Resolution to Be Mismanaged, Safety-net Subsidies Flow to Institutions Willing to Risk Insolvency

Walter Bagehot's classic policy advice for managing liquidity during a systemic crisis is for the central bank to lend freely to solvent banks—but to minimize safety-net subsidies, the loans are to be made at a penalty interest rate and only on good collateral. Put differently, his advice is for governments to *avoid* lending to insolvent banks at all, even on good collateral, and certainly not at below-market interest rates. Unfortunately, modern governments pay only lip service to this principle. Supervisory authorities find it hard to mobilize the political and budgetary support needed to follow the Bagehot strategy. In their study of 12 recent crises, Kane and Klingebiel (2004) found that all but one country adopted a crisis-management strategy that combined blanket guarantees with extensive and immediate liquidity support for insolvent institutions.¹⁸

Advocates of using liquidity injections to halt a systemic crisis argue only that sweeping guarantees and extensive liquidity support can stop the panicky flight of depositors and other institutional creditors to less risky venues. But this begs the question of whether social costs and adverse distribution effects could be reduced by following an alternative strategy (Kane 2001).

Incentive Conflict not only Explains How a Particular Crisis Develops, but How the Manner in which a Crisis Is Resolved Affects the Frequency and Depth of Future Crises

Even in the midst of a financial crisis, it is inefficient to set aside long-term goals completely. Providing extensive liquidity support and guarantees to insolvent institutions subsidizes “gamblers for resurrection” and strengthens the risk-shifting incentive schemes that spawn crises and guarantee their recurrence. Without incentive reform, short-sighted methods of crisis resolution create the expectation that they will be used again when the next crisis inevitably arrives. This expectation undermines market discipline and financial stability in future periods.

The short-term benefits of liquidity injections have been oversold. Such policies seldom actually speed the recovery of a nation's real economy from a banking crisis or lessen the decline in aggregate output. Honohan and Klingebiel (2003) measure the impact of different crisis management strategies on the ultimate cost of resolving distress in 40 different financial crises. They find that blanket guarantees, open-ended liquidity support, and regulatory forbearance significantly increase the ultimate fiscal cost of resolving crises. They also find that spending

more to support distressed institutions does not speed the recovery. Instead, providing liquidity support for insolvent institutions tends to prolong a crisis. It does this by distorting risk-taking incentives so extensively that sound investments and healthy exits are delayed and additional output loss is generated, as discussed in Demirgüç-Kunt and Serven (2010).

Past Crises Provide Important Lessons, but They Fall on Deaf Ears

History provides clear lessons about how to minimize the frequency and cost of financial crisis. The refusal to embrace these lessons underscores the existence of persistent defects in the incentives that govern the ways in which politicians, regulators, and financial institutions interact. Authorities routinely underestimate the frequency and depth of crises. When crises do occur, they prefer to resolve the conflicting pressures under which they must function by treating troubled institutions generously, claiming that it is their duty to minimize potential short-term contagion at all cost. Underinvesting in crisis preparedness implants a preference for improvisation. But improvisation leads to inefficient and myopic solutions.

Instead we argue that there are clear principles for regulatory reform derived from recent crises and aimed not at reallocating regulatory and supervisory *authority*, but at establishing incentives that would lead supervisory authority and market forces to operate more effectively. We stress that the current crisis exemplifies not just the limits of market discipline, but the power of government-induced incentive distortions—and the limits of official supervision as commonly practiced. The failure of private parties to exercise sufficient due diligence was rooted in the failure of government supervisors to challenge decisions made by private accountants and CROs. They neglected their duty of examining and publicizing the implications that these decisions might have for safety-net loss exposure. By tolerating a decline in transparency, supervisors made it difficult to recognize and price the risk expansion not only for themselves, but also for the market participants. Many developing countries share this trait of a low degree of financial sector transparency, and the current crisis demonstrates not only the importance of increasing it, but the continuous nature of the battle to do so as well.

Authentic Reform Must Address the Contradictory Political and Bureaucratic Incentives

In the recent crisis these incentives led regulators and supervisors first to outsource their due diligence and then to resolve the crisis in inefficient ways. Incentive reform is politically difficult because existing defects in supervisory incentives did not come about by accident. They reflect the political preferences of regulated institutions and other politically powerful market participants. No

matter how drastically a proposed reform may redistribute supervisory authority, unless it also establishes accountability and transparency for the costs of safety-net management, effects will prove more ostensible than real. For this reason, our reform proposal focuses on improving the chain of incentives under which market discipline and official supervision operate. While we have many other recommendations suitable for industrial countries, here we concentrate on those that are most relevant for developing country authorities.

Lender Reform. Compensation for loan officers must be linked to long-term performance rather than to short-term profits. Whenever authorities see compensation in the financial sector growing rapidly they must suspect that great risk-taking and risk-shifting is occurring. Governments can reinforce (rather than undermine) market discipline by assisting in the dissemination of information about contract evolution and by encouraging development of better information systems. In developing countries, accurate information is often quite scarce, and officials should consider ways to encourage or compel greater information disclosure by intermediaries.

CRO Reform. CRO reform, at the top of the industrial country agenda, will have a significant impact on developing countries, and should incorporate two main elements: (i) withdrawing government blessings from their work and (ii) improving CRO accountability for ratings decisions. Because the NRSRO designation provides an explicit government blessing and introduces barriers to entry into the ratings business, it should be eliminated. Most importantly, references to ratings should be removed from all SEC and bank regulations, including Basel II. Government rules that rely on CRO ratings reduce investor incentives to conduct sufficient due diligence before making investments—indeed it is likely that far less securitization would have occurred if those managing other people’s money were not protected by the requirement that they hold highly rated instruments. At the same time, such rules reduce the accountability of government regulators and supervisors for neglecting their duty of oversight. By outsourcing due diligence to CROs, regulators shift the blame for the safety-net consequences of ratings mistakes away from themselves.

Clearly, CROs must be made more accountable for the quality of ratings they provide. Individual CROs can only recover the damage their brand has suffered by taking responsibility for their mistakes. For securitized claims, this could be done by requiring CROs to publish an *ex ante* margin for error with each credit rating and to publish the data used in establishing complex claims so that outsiders can fact-check their inputs and challenge and improve the modeling. This provides a nonbureaucratic way to subject ratings decisions to effective independent review (compare Goodhart 2008a).

Reform of Basel II. Because credit ratings and sophisticated risk-management models have been discredited, it is clear that Basel II must be reworked significantly. Some have suggested that the Basel Committee acknowledge that risk-management standards have changed so much that it is necessary to move directly to a new agreement: Basel III. Ideally, pillar two of the new system would include a simple leverage requirement and PCA rules for structured early intervention into the operations of loss-making financial institutions. This would further enhance supervisory and regulatory accountability. Framers of the new accord should find ways to use market signals from CDS and subordinated-debt markets to estimate and disclose how regulatory decisions in different countries affect safety-net costs in other countries.

We think that the Basel Committee's drive to set ever more sophisticated ways to set risk-weights is a mistake, as revealed in the current crisis. Instead, they should abandon this task and adopt simple maximum leverage ratios, which include all on- and off-balance-sheet items. Developing country authorities would have a simple system that they could implement easily, and they may want to proceed to this model on their own if Basel carries. Accordingly authorities should pay much less attention to the parts of Basel II that rely on credit ratings and models.

Reform of Government Accountability. For individual countries, systemic crises are infrequent events. This means that incumbent policymakers seldom have direct experience in working through the crisis-driven stresses generated by lobbyists for insolvent institutions. While improvisation works for well-practiced jazz musicians, the current crisis amply illustrates that, in crisis management, it deteriorates into methods of wholesale financial-institution rescue. Crisis-management decisions are full of errors because they are made in stressful circumstances by unpracticed policymakers who feel that their career in government service is on the line (Kane and Klingebiel 2004). While even high-income-country policymakers make mistakes, developing country authorities often have less skilled staff on which they can rely, due not just to a skill issue in the country but also by compensation differentials when compared with the private financial sector. Where skills are scarce, advanced planning is even more important. Decisions about which institutions to rescue and how to save them tend to follow the path of least resistance. This invariably entails bailing out deeply insolvent institutions and extending the dimensions of the safety net in a way that, by further subsidizing risk-taking, sow the seeds of future crises.

To avoid short-termism, crisis-management decisions should be made in an open debate *outside* of an actual crisis. Accountability would be improved by requiring that regulators establish and regularly test a well-publicized benchmark plan for crisis resolution. The events of the current crisis confirm that not

planning for crises prolongs and deepens the disruption by tempting regulators to subsidize loss-making institutions at taxpayer expense. The damage a crisis works on a country's financial sector and its real economy can be reduced by taking actions that promptly estimate and allocate losses during the early stages of a crisis. The critical first step is to allow time for forensic accountants to separate the hopelessly insolvent institutions from potentially viable ones. Authorities need such information to deal with insolvencies in ways that protect taxpayers and avoid subsidizing further risk-taking.

In and out of crisis, regulators need to draw on market signals to help them to track risk. A promising way to do this is to require at least the largest banks to issue at regular intervals a series of CDS, to issue large amounts of *credibly* uninsured subordinated debt, or both.¹⁹ Transactions prices for these instruments can be incorporated into information systems that the supervisors can use to improve their assessments of safety-net loss exposures. This is because holders of these instruments would apply the market discipline that pillar three of Basel II seeks to harness.

Most importantly it is necessary to strengthen the safety net by making authorities more accountable for its costs. Interactions between large banks and supervisory agencies could be made more transparent if both were required to estimate and to disclose the amount of these subsidies on their books. This requires the development of a system of fair-value accounting for intangible safety-net subsidies. If the probability of bailouts can be reduced, regulators can use CDS prices to estimate individual-institution and aggregate values of safety-net subsidies (Kane 2008). For example the spread at which CDS trade can be used to strip out the value of the safety net subsidies imbedded in that firm's market capitalization.

In government enterprises, decision-making horizons could be lengthened if employment contracts included a fund of deferred compensation that heads of supervisory agencies would have to forfeit if a crisis occurred within three or four years of leaving their office (Kane 2002). Calomiris and Kahn (1996) show that such a system worked well in the 19th century Suffolk banking system, where claims to deferred bonuses were paid only after losses had been deducted. The public embarrassment of having to forfeit compensation, in addition to the financial penalty, would incentivize top supervisors to use market signals more efficiently and help them to resist political pressure to bail out insolvent firms. The less transparent a country, and the greater the degree of corruption, the more it needs to worry about the financial incentives facing financial sector regulators.

None of these accountability enhancements—better crisis preparedness, greater use of market information to track risks and subsidies, publicizing estimates of safety-net subsidies, or offering deferred compensation—would be costly to implement. Yet current and past crises suggest that the return to implementing them would be enormous.

Lastly, developing countries need to continue to build the infrastructure that a modern financial system requires, most importantly a good information environment led by sound accounting and auditing, efficient contract enforcement, and clear incentives. As noted above, improving the information and incentive environment needs to be a continuous effort, as financial sector players in rich and poor countries alike regularly contrive to conceal risk-taking. With weaker checks and balances in government, often critical shortages of supervisory skills, and a generally less independent media, financial sector oversight is more prone to breakdowns in poorer countries. Although the specific methods of avoiding regulation that were part of structured securitization were more confined to high income countries, the general lessons on regulatory arbitrage and the need for continued supervisory vigilance are common to all. Developing country authorities can let industrialized countries experiment with new instruments but they need to ignore pressures to adopt the latest regulatory and product innovations until they have been amply tested.

Notes

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1. From 1999 to 2007 the only significant financial crisis occurred in Argentina, a country that has experienced numerous crises throughout its history. This crisis had major consequences for only a single neighboring country (Uruguay).

2. See Mason and Rosner (2007) and Brunnermeier (2009) for a description.

3. Recently one investment bank sold some of its super-senior holdings for only 22 cents on the dollar, and at least one critic claimed that their true value was closer to zero (Roubini 2008).

4. The value of subprime mortgages originated in the United States shot up from \$190 billion in 2001 to \$600 billion in 2006. Much of this growth was fueled by securitization: as a percentage of subprime mortgage originations, the volume of subprime issuance rose from 50 to 80 percent over the same interval (*Economist* May, 2008).

5. The report by the Federal Reserve Bank of Boston (2003), "Closing the Gap: A Guide to Equal Opportunity Lending", contains a variety of statements urging banks to make every effort to facilitate such lending, such as by being aggressive on lending standards, appraisals, and loan to income ratios (pp. 22–6).

6. Also see Keys and others (2010) for consistent results.

7. Joint Statement of the Shadow Financial Regulatory Committees of Asia, Australia-New Zealand, Europe, Japan, Latin America, and the United States on "Making Securitization Work for Financial Stability and Economic Growth" (2009).

8. Prior to World War I, corporate default rates were significant and ratings agencies did seem to supply some modest function, though even the most authoritative study (Hickman, cited in Sylla, 2001) fails to lay to rest the critique that ratings might at most have been modestly anticipating declines in performance and did not do demonstrably better than market indicators. In the post-World War II period through the early 1970s, the default rate on corporate bonds declined to only about 1% percent, so ratings were not critical to investors' decisions.

9. If a corporation that has issued a bond gets into trouble, it can make a variety of adjustments that will enable its bond to perform in line with ratings. A fixed pool of securities cannot adjust; it remains a claim on cashflows from a variety of sources.

10. It is interesting to speculate on how many fund managers would have successfully defended their position with the claim that they did not know what they were investing in (but neither did their competitors) or that they knowingly invested in pools of high-risk mortgages confident that housing prices would rise endlessly.

11. The Basel Committee, created by the G-10 central banks in 1974, now includes Argentina, Australia, Belgium, Brazil, Canada, China, France, Germany, Hong Kong SAR, India, Indonesia, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. The Committee itself notes that Basel II arose in response to the growth of securitization, giving the impression that this growth was an exogenous development rather than at least in part a response to Basel I and its "loan-by-loan" approach to assessing a firm's overall risk exposure.

12. The Committee continues to regard subordinated debt as inferior to shareholder equity, but only because such debt is limited in its maturity. This neglects the better incentives that debt establishes in monitoring risk. Whereas equity value varies directly with the returns promised from increasing risk, debtholders' returns can be harmed by increasing risk. This leads first-loss debtholders to exert a more conservative influence on corporate governance than equity holders.

13. The IRB Approach has two variants: Foundation and Advanced. Under the Foundation Approach, instead of relying on external assessments of creditworthiness, banks are able to use their own estimates of probabilities of default for each borrower. These borrower-specific factors, supplied by each bank, are then combined with supervisory-determined estimates of loss given default, exposure at default, and effective maturities to arrive at regulatory risk weights. If a bank satisfies the stricter eligibility conditions to qualify for using the Advanced Approach, then it can place even greater reliance on internal credit systems by using not only their estimates of the probability of default but also their own estimates of loss given default, exposure at default, and effective maturities.

14. Under pillar one, Basel II combines the evaluation of capital adequacy for credit risk, operational risk (defined as the risk of loss resulting from inadequate or failed internal processes, people, and systems, or from external events), and market risk (defined as the risk of losses in on- and off-balance-sheet positions arising from market movements in interest rates, foreign exchange, and securities or derivatives prices) with incentives for banks to invest in better risk management processes to qualify for the discretion allowed under each more-advanced approach. Interest-rate risk in the banking book is relegated to the supervisory review process of pillar two.

15. Early bubbles occurred before safety nets commonly were extended to the financial sector. During the South Sea bubble, John Martin famously said: "When the rest of the world are mad, we must imitate them in some measure." The size of the equilibrium "measure" is what the safety net influences. Unlike modern securities firms and commercial banks, Martin could not have hoped that the government would rescue his bank, since the Bank of England had not at that time begun to operate as a central bank.

16. Costs of resolving crises has risen significantly over time: in the late 19th and early 20th century, they ran at about 2 percent of GDP; in modern times they have averaged five to six times this figure, with some cases reaching the range of 20 to 50 percent of GDP.

17. Examples of deregulation with little supervision include Malaysia in the 1970s—which featured a buildup of real estate exposures to 50 percent of bank lending—and the U.S. Savings and Loans, which were allowed to gamble in high risk investments even after they were insolvent.

18. The crises studied occurred in: Argentina, 2001; Ecuador, 1998; Finland, 1991; Indonesia, 1997; Japan, 1991; Korea, 1997; Malaysia, 1997; Mexico, 1994; Russia, 1998; Sweden, 1991; Thailand, 1997; and Turkey, 2000. Only Sweden refused to supply extensive liquidity support to insolvent institutions.

19. As Calomiris (1997) and Evanoff and Wall (2001) explain, expectations of implicit support would contaminate the signal.

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