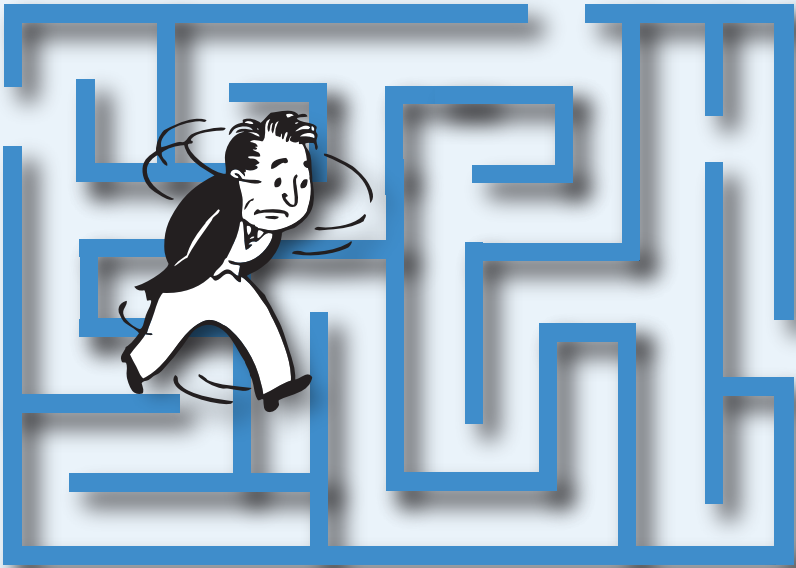


Federal Reserve Bank of Atlanta  
2009 Financial Markets Conference



# Financial Innovation & Crises

An Executive Summary of  
Conference Papers

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Federal Reserve Bank of Atlanta  
2009 Financial Markets Conference

# Financial Innovation & Crises

May 11–13, 2009  
Jekyll Island, Georgia

This booklet provides an overview of the conference themes along with summaries of the three policy papers and the panel discussion that formed the core of the conference sessions.

The enclosed CD contains the complete text of the policy papers as well as two academic papers presented at the academic preconference on May 11.

Visit [frbatlanta.org](http://frbatlanta.org) to see more conference presentations, including keynote speeches and several discussant presentations. Click “News & Events” on the navigation bar and then “Conferences.”

## A Conference Overview

# Financial Innovation & Crises

Innovative securities played an integral role in the financial turmoil and crisis of the past two years. Subprime residential mortgages were bundled and securitized and then further engineered into complex structured securities (such as collateralized debt obligations), which facilitated the transmission of losses to markets and investors around the globe. Lesser-known innovations, both in security design and market structure, also shaped the unfolding turmoil. By 2009, terms like credit default swaps, special purpose vehicles, triparty repos, and auction rate securities became part of policymakers' lexicon. Many of these markets, such as the shadow banking system, operate largely outside the reach of regulation and policy.

An obvious question following the recent crisis might be, What regulations are needed in these markets to prevent a recurrence? In planning the 2009 Financial Markets Conference, however, we wanted to take a step back from events and investigate the underlying drivers of financial crises. In particular, we were intrigued by questions concerning the widespread effects of financial innovation and whether there are indeed linkages between innovation and the potential for financial crises. It is the analysis of these questions that will ultimately form the basis for any regulatory reform that hopes to prevent a future crisis. If there is one thing we are certain of already, it is that the next crisis will occur in a changed and changing world and, almost by definition, will be quite unlike the last.

### **The risk factor**

The invention and introduction of new securities pose unique challenges for practitioners since there is, by definition, no market history with which to set parameters for the risk associated with these instruments. Pricing these securities, then, typically relies on modeling the nature and magnitude of uncertainties going forward. Such a reliance on models introduces a vulnerability to model risk—the risk that a particular pricing model does not properly incorporate important dimensions of

risk. In addition to this vulnerability, innovative securities are also subject to difficulties in estimating liquidity and counterparty risk.

The first two policy sessions of the conference focused on how these challenges affect the pricing and trading of innovative financial instruments. Stuart Turnbull addressed these issues in his paper “Work in Progress: Measuring and Managing Risk in Innovative Financial Instruments.” In particular, he illustrates the linkages between security design, pricing, liquidity, and risk management in an environment in which information is scarce. For example, the collateralized debt obligations (CDOs) at the epicenter of the crisis were complex instruments exhibiting heterogeneity in both their contractual design and underlying assets. This complexity increases the difficulty of pricing these CDOs, which in turn leads to less liquidity for these instruments and an enhanced sensitivity to disruptions in more widespread market liquidity.

These problems lead to an obvious question, one with which we confronted panelists in the second policy session: Might standardization of innovative instruments lessen some of the difficulties in pricing these securities, enhance their liquidity, and reduce the potential for systemic risk? Drawing on their varied experience, panelists discussed the evolution of innovative instruments, including credit default swaps, from idiosyncratic over-the-counter products traded bilaterally to securities with standardized contractual provisions to instruments that are cleared and traded on an exchange. Standardization and the introduction of a central counterparty (a clearinghouse) could lessen systemic risk by increasing liquidity and netting counterparty risk. Indeed, this thinking underlies current regulatory proposals. The panel, however, went beyond this basic idea to plumb ancillary issues such as: Does trade reporting provide enough transparency to lessen systemic risk, or is it necessary to move to fully exchange-traded products? How would such a clearinghouse be regulated, and how would the centralized risk be managed? And, perhaps most importantly, would the expectation of standardization lessen future innovation?

### **Global crisis and response**

The final two policy sessions shifted the focus from the role of innovative instruments in facilitating a crisis to a more macro view of the possibilities for innovative policy in combating or preventing financial crises.

While the idea of contagion in financial crises is not new, the recent turmoil has highlighted some new challenges for global financial markets and regulators.

Large, cross-border banks and other multinational financial conglomerates were central players in the recent events, and consequently, as concerns mounted about their solvency, the international transmission of the turmoil was amplified. As Stijn Claessens notes in his paper “International Exposure to U.S.-Centered Credit Market Turmoil,” “there are no ex-ante let alone ex-post rules governing cross-border bank resolution or safety nets and burden sharing, in turn leading to uneven provision of safety nets, liquidity shortages and asset grabs.” Formulating such rules entails overcoming the significant challenges associated with interna-

If there is one thing we are certain of already, it is that the next crisis will occur in a changed and changing world and, almost by definition, will be quite unlike the last.

tional cooperation, not only in terms of regulation and supervision but also in terms of resolution and risk sharing. Claessens proposes an international bank charter as a pragmatic alternative to the creation of a single world financial regulator or the current architecture of nationally based regulatory agencies.

The lively discussion on this topic during our conference was representative of the wide array of opinions, both conceptually and operationally, on innovation in international regulatory coordination.

Gary Gorton’s paper “Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007” argues that financial institutions have innovated over time to the point that the recent turmoil was largely a banking panic that did not involve banks. Rather, he argues, the wholesale, or shadow, banking system experienced a run not by depositors but by other financial institutions acting as counterparties in repurchase (repo) transactions. This evolution of credit markets, he notes, argues for increased supervision and regulation of institutions outside of the traditional banking system, most specifically those involved in the securitization market. Moreover, there may be a role for government insurance of securities used in the shadow banking system in order to render them informationally insensitive and hence lessen the risk of systemic failure. Effectively this session was one that proposed the idea of a regulatory, or informational, perimeter and raised the question of where such boundaries should lie with respect to

regulation, information acquisition, and transparency. Are we to define the scope of systemic risk and regulation on the basis of the type of institution that is engaged in financial activities, or should we perhaps shift our policy focus to the activities and markets themselves?

### What did we learn?

The lively and thoughtful discussion on these topics continued outside of the scheduled conference sessions and was particularly enhanced by the two keynote speakers—Ben Bernanke, chairman of the Federal Reserve Board of Governors, and John Taylor, a professor of economics at Stanford University.

Bernanke took this opportunity to comment on the results of the Supervisory Capital Assessment Program (the stress tests), which had been publicly released only days before. The chairman's remarks on the both the process underlying the stress tests and the lessons learned from it dovetailed nicely with the conference theme of financial innovation and crises. Bernanke noted that because the stress tests were designed to incorporate the same analysis across firms and to expressly consider risk exposures across the web of interconnected institutions, the exercise itself was instructive for illustrating the challenges regulators will face going forward as they attempt to assess risk exposures across financial institutions. This learning-by-doing will be valuable as plans for the regulation of systemic risk move forward.

Standardization and the introduction of a central counterparty (a clearinghouse) could lessen systemic risk by increasing liquidity and netting counterparty risk.

The stress tests were indeed themselves an innovative policy response, coordinated across agencies, to generate information for both regulators and the market about the vulnerability of nineteen large financial institutions to weaker-than-expected economic conditions going forward. The results helped market participants not only to quantify potential losses but also to reduce the large degree of uncertainty surrounding those losses.

### What next?

Such uncertainty, as discussed in the session on measuring and managing risks, was certainly a driver in the evolution of the crisis. Taylor

provocatively took on the \$64,000 question for policymakers in his speech “Systemic Risk and the Role of Government.” He argued that government policy, including monetary policy, played a role in causing the crisis and thus also has a role to play in reducing systemic risk going forward. The exact shape of that role will likely be debated into the foreseeable future.

A recurring motif during the conference was the role of imagination in managing risks, on the part of both practitioners who seek to value complex securities and policymakers who seek to formulate innovative responses to the changing nature of global capital markets. Imagination, or thinking outside the box, means thinking broadly and creatively about the risks, assumptions, and scenarios used in pricing models; about both the conceptual and operational considerations that will determine policy effectiveness; and, as Alistair Milne mentioned in his discussion, about planning for failure.

The very nature of the conference—which analyzed the events of the recent crisis and debated policy proposals designed to reduce the risk of a future crisis—highlighted the feedback loop between innovation in financial instruments and innovation in policy. Innovative instruments create new challenges for policy as they change the nature of markets and risks; and as policy adapts it also creates incentives and opportunities for more financial innovation.

While the theme of the conference was financial innovation and crises, it is clear that financial innovation is inherently a good thing and not a dark force that must be outlawed in order to prevent financial crises. The securitization market is a fine example of this premise. The recent financial crisis may have been triggered by the declining value of sub-prime mortgage-backed securities, but the securitization of credit card receipts, auto loans, and student loans—and, yes, even mortgages—has provided gains to households and businesses for decades. The challenge facing us now is to evaluate and manage innovative risks in real time and to formulate policies that are flexible and forward looking to deal with innovation that has yet to arrive.

*This overview was written by Paula Tkac, a financial economist and associate policy adviser in the research department of the Federal Reserve Bank of Atlanta.*



## Work in Progress: Measuring and Managing Risk in Innovative Financial Instruments

### Stuart M. Turnbull

Professor of Finance, University of Houston Bauer College of Business

It is widely accepted that improper valuation and inadequate risk management in the use of new financial instruments were central causes of the recent credit crisis. No one knew how to tell how risky these instruments are because no one had used them before.

While that view is simplistic, Turnbull notes that a lack of data about new financial instruments was at the heart of many problems that contributed to the credit crisis. He explores the myriad difficulties facing risk managers—senior managers of firms and regulators who must estimate and then attempt to manage the risks created by new financial products.

Like senior management, regulators often lack a firm grasp of the risk presented by new financial products.

Varied as those challenges are, many of them stem from a lack of information. There is little data about innovative instruments, as there is no market history from which to gather it. This dearth of data is particularly critical in regard to complex innovative financial products, like many of those at the center of the recent financial crisis.

The difficulties facing industry players and regulators include pricing, limited liquidity, devising accurate models, gauging counterparty risk, and managerial issues within firms selling the instruments.

Start with pricing. “At the center of the credit crisis,” Turnbull argues, “has been the issue of how to price different types of collateralized debt obligations.” A serious problem in establishing a price is building a reliable model to project the future behavior of the instrument and its underlying assets. For example, the limited amount of data makes it hard to predict how the default of one borrower in a large pool of loans will affect other borrowers. For pricing or for risk management, the key issue is whether the modeling at the individual borrower level can generate a realistic loss estimate for the entire portfolio.

The difficulty of pricing a new investment product is also tied to the product’s liquidity. For a new product, liquidity is always limited at first. Creating liquidity depends on price and several other factors, including

the ability to increase supply and demand, the transparency of the pricing process, and the existence of hedging tools.

Another elusive variable surrounding financial innovations is counterparty risk—the chance that a party to a contract will not honor its commitments. One complication in assessing the effects of counterparty risks is insufficient data, which makes it difficult to determine the link between risk in the underlying asset and the counterparty risk.

Turnbull also explores the unintended consequences of financial innovations. He recounts the case of subprime mortgage-backed collateralized debt obligations (CDOs). The initial profitability of those instruments spurred a huge demand for subprime mortgages. To ensure enough supply to meet that demand, originators lowered underwriting standards and thus increased the chances of default for the mortgages that were bundled into CDOs.

“Given the use of historical data, this change was not reflected in the data used to model the risk of the CDOs,” Turnbull writes. “A risk manager needs to look not just at an innovation in isolation, but [also at] the incentives facing different players that contribute to the innovation and the consequences of the incentives.”

The information problems don’t stop there. Turnbull also notes that senior managers at firms marketing new instruments often don’t fully understand them. With only cursory knowledge of the investments and their risks, top executives often rely for guidance on traders and analysts, who are typically financially motivated to make trades with little regard for risk. Therefore, risk managers who object to certain trades will likely not receive the support of senior management, who have probably been told the risks are manageable.

Turnbull concludes by discussing problems facing regulators. Like senior management, regulators often lack a firm grasp of the risk presented by new financial products. Consequently, regulators often turn to credit ratings, which Turnbull terms “a rough measure of some poorly defined credit metric.”

Instead of relying on credit ratings, regulators can require timely disclosures that would allow them to conduct their own risk testing. “To measure systemic risk,” Turnbull concludes, “all major institutions including hedge funds need to come under regulatory monitoring. Regulators need the ability to measure the holding of an innovation by different institutions and the buildup of concentrated holdings.”

## Panel Discussion: Standardization and Clearinghouses as Tools for Lessening Systemic Risk

In addition to the research papers, the 2009 Financial Markets Conference featured a panel of experts who discussed the notion of whether instrument standardization and clearinghouses can lessen systemic risk in markets characterized by one-to-one trades, such as that for credit default swaps (CDSs). Panelists were moderator Edward Kane, professor of finance at Boston College; Eric Beinstein, managing director at JPMorgan Chase; Charles Vice, president and chief operating officer of International Exchange (ICE); and Craig Pirrong, professor of finance at the University of Houston.

The discussion was predicated on the reality that innovative financial instruments often begin as idiosyncratic over-the-counter products traded in obscure, two-way transactions. This feature of the market highlights the centrality of counterparty risk, the resulting murkiness of financial linkages, and concerns regarding systemic risk exposure.

It is generally agreed that a clearinghouse, along with standardization of contract terms and underlying assets, could limit systemic risk by increasing liquidity and netting counterparty risk. Nevertheless, several questions remain: Would moves toward standardization and central clearing help the structured finance market and other innovative markets to come? Do financial market participants demand specialized contracts, or do these result from the natural diffusion and progression of innovation? Would the expectation of standardization lessen innovation? Would trade reporting create enough transparency to lessen systemic risk, or would it require regulation via exchange-traded instruments?

A core problem in such forward markets as CDSs, Kane noted, is recognizing, measuring, and managing the implicit safety net subsidies that accrue to “too difficult to fail and unwind” market participants.

Beinstein argued that the CDS market has on its own moved toward standardization as it has developed over the past ten years. “And I think [it] has, without a regulatory framework, improved and become more stable and added innovations.” He noted that North American CDS markets trade with two standard coupons and use a single terminology for credit events. These developments make trading of CDS more standard, allow netting to happen more simply, and reduce risk across the board.

As an example of this organic evolution, Beinstein cited events in the wake of the 2005 bankruptcy of the auto parts maker Delphi. A scramble in the market to buy bonds for protection sent bond prices soaring and led to the development of an auction process that continues to work well. “And so, when we look at what happened over the last couple of years and what’s happening with the autos [manufacturers], the CDS market has, I think, helped the banks avoid concentration of credit risk,” Beinstein said.

Kane discussed the limits and costs of clearinghouses and financial safety nets set up to protect markets and market participants. Those costs are not very clear, nor are the costs of systemic risk measurement and analysis in the CDS market. “We’re now trying to figure out what those rules should be for CDS markets, but we have to think more broadly in terms of innovation,” he said. A core problem in such forward markets as CDSs,

In Vice’s view, broad participation and deep liquidity make a market less vulnerable to the failure or “bad acts” of individual firms.

Kane noted, is recognizing, measuring, and managing the implicit safety net subsidies that accrue to “too difficult to fail and unwind” market participants. “As long as the principal market makers have the size, clout—political clout, that is—and complexity to be perceived as too

difficult to fail and unwind, the benefits from introducing centralized clearing and clearinghouse guarantees required a crisis to demonstrate,” Kane said.

Like Beinstein, Pirrong argued that modified arrangements between two counterparties can be more efficient than pooled risk sharing by a central counterparty. “I would just encourage the debate to begin, or at least a more intensive debate to begin,” Pirrong said.

Vice debated Pirrong’s point. Vice, whose firm acts as a clearinghouse, said central clearing brings distinct benefits to previously bilateral markets. He listed lowered systemic risk, more efficient use of capital to create and maintain positions, and greater transparency since the clearinghouse publishes volume, open-interest prices, and settlement prices for each cleared instrument.

In Vice’s view, broad participation and deep liquidity make a market less vulnerable to the failure or “bad acts” of individual firms. “So, while I’m certainly not here to say that central counterparty clearing is a panacea and doesn’t have its own negatives,” he said, “I think, all in all, it’s proven historically to be a much better solution than the alternative.”

# International Exposure to U.S.-Centered Credit Market Turmoil

## Stijn Claessens

Assistant Director of Research, International Monetary Fund, and Professor of International Finance Policy, University of Amsterdam Center for Economic Policy Research

The current financial crisis has underscored the interconnectedness of the world's financial markets and highlighted a need for greater supervisory coordination across borders. Claessens reviews the need for cross-border regulatory reforms and cooperation and offers several options for dealing with financial institutions whose business spans multiple countries and regulatory jurisdictions.

"The global nature of the crisis makes clear again that international financial markets come with risks and at times with large adverse real economic consequences, even for advanced countries," Claessens notes. While this financial crisis shares many similarities with predecessors, he cites notable differences, including sharply increased international financial integration and a heightened importance of global financial players.

That context frames Claessen's paper, in which he suggests several approaches to guard against the simultaneous buildup of systemic risk in many countries that characterized the current credit crisis.

Claessens believes that the "first best solution"—a single world financial regulator—is not only unlikely to become a reality but also would not necessarily be a good thing. So he explores other ideas. Those options include a new global charter for internationally active banks, greater harmonization of rules and practices across national borders, and enhanced cross-border coordination. These "second-best reforms," Claessens notes, offer benefits and costs that are difficult to rank, especially because those pros and cons would depend largely on how each proposal were implemented and enforced.

Nonetheless, he argues for a favorite medium-term approach: an international bank charter, with a dedicated regulator, lender of last resort, deposit insurance, and recapitalization funds. Under the proposed

While this financial crisis shares many similarities with predecessors, he cites notable differences, including sharply increased international financial integration and a heightened importance of global financial players.

international bank charter model, internationally active banks would be globally chartered and supervised by a single regulator, an international regulatory and supervisory body.

That global supervisor could be a separate new institution or part of one or more existing international agencies. It would draw its professional staff from around the world and would have to be governed by its sponsoring nations in accordance with some objective criteria consistent with its mandate of improving international financial stability and efficiency.

This body would employ the normal tools of a national financial regulator. It would regulate, license, and supervise international institutions, including commercial banks and possibly financial conglomerates, insurers, and brokers. That agency, Claessens notes, would need to be accompanied by the equivalent of an international deposit insurance corporation. “This model could achieve [close to] the first best: coordination for the largest, internationally active banks through one institution.”

Smoothing out regulatory differences across countries would promote greater global financial stability and efficiency.

What he terms a third-best course would be more decentralized—national regulatory agencies would not coordinate actions but would adapt common frameworks. At a minimum, this approach would involve more consistency among countries’ regulatory regimes in five areas:

- the rules and regulations governing international banks;
- rules for sharing information;
- the structure of a lender of last resort, liquidity support, deposit insurance, and other forms of government support and guarantees;
- resolution regimes—with foreign creditors treated the same as domestic counterparts—and recognition of collateral security across legal jurisdictions; and
- rules on burden sharing and resolution in the case of an international bank failure that requires some form of bailout or payout.

Another option Claessens puts forth is a model agreed upon by European finance ministers in June 2009: to rely on more coordination even without further aligning the rules in different countries. Under the European proposal, a set of existing agencies (the European Committees for Banking, Securities, and Insurance) will be reconstituted into three

bodies collectively called the European System of Financial Supervisors. The new bodies would have the powers to mediate in a legally binding way between national supervisors and to adopt binding technical decisions involving specific financial institutions.

Claessens concludes that smoothing out regulatory differences across countries would promote greater global financial stability and efficiency. But he places that conclusion in a realistic context. “It has to be acknowledged that there remain severe economic, legal, political and other limits to convergence in rules and practices,” he writes. “And, even with greater convergence, it remains the case that many of the precise channels through which international spillovers and contagion occur are not always well understood.”

## Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007

### Gary Gorton

Professor of Finance, Yale School of Management, and Research Associate, National Bureau of Economic Research

Complex, new financial instruments and those who trade them have received much attention as major players in the credit crisis. But what the financial markets have experienced can also be described in a decidedly old-fashioned way: a bank panic. Gorton contends that the “shadow banking” system that evolved over the past twenty-five years is, in fact, a real banking system. And after nearly seventy-five years devoid of banking panics, that system proved vulnerable.

“Indeed, the events starting in August 2007 are a banking panic. A banking panic is a systemic event because the banking *system* cannot honor its obligations and is *insolvent*,” Gorton notes. Understanding that the current crisis is a banking panic is important for thinking about regulatory reform and the future financial landscape.

He reviews the function of banks and the history of panics. Then he describes the evolution of the shadow banking system and the panic that began in 2007 and finally offers ideas on how policymakers might protect the new banking system from future panics.

Unlike the numerous banking panics of the nineteenth and early twentieth centuries, the current one is wholesale, not retail. Historically, depositors ran to their banks and demanded their cash. Unable to meet those demands, the banking system became insolvent. “The current panic,” Gorton notes, “involved financial firms ‘running’ on other financial firms by not renewing sale and repurchase agreements (repo) or increasing the repo margin (‘haircut’), forcing massive deleveraging, and resulting in the banking system being insolvent.”

That crisis, he suggests, is rooted in the emergence of a banking system that resulted from two important changes. First, derivative securities have grown exponentially in the past quarter century, spurring a huge demand for collateral—what Gorton terms informationally insensitive debt, or debt whose value typically does not fluctuate. Second, banks



have moved vast amounts of loans into the capital markets through securitization and loan sales.

The shadow system evolved largely out of the view of regulators and the general public. Yet it has become so large and important that it must be protected, in part through regulation, for the good of the financial system and economy, Gorton argues. While there are no official statistics about the size of the overall repurchase market among institutions, he notes that unofficial estimates peg it at roughly \$10 trillion, or as big as the total assets of the regulated U.S. banking sector.

In this new banking system, securitizations serve as all-important informationally insensitive debt, though it is not riskless like demand deposits, which serve the same role in traditional banking. In describing the centrality to the banking system of information-insensitive debt, Gorton uses the analogy of electricity. “Millions of people turn their lights on and off every day without knowing how electricity really works or where it comes from,” he writes. “The idea is for it to work without every consumer having to be an electrician.”

Stability for today's banking system might result from creating charter value and informationally insensitive debt.

A systemic shock to the financial system is an event that causes such debt to become informationally sensitive—that is, with its value moving up or down because the shock creates sufficient uncertainty to make speculation profitable. Gorton's analogy explains that when a shock hits, the electricity suddenly shuts down. Because blackouts are so rare and unexpected, no one understands how it could happen. But it makes no sense for everyone in the future to become an electrician.

Neither will large numbers of people become experts on the shadow banking system. Rather, there should be certain people who know how it works as well as rules to try to keep it functioning normally.

That is where history comes in. A critical factor in the seventy-five-year “quiet period” that preceded the current crisis was the existence of a highly valuable bank charter. Stability for today's banking system might result from creating charter value and informationally insensitive debt, Gorton proposes. His proposal would mean, broadly, three things: (1) Senior tranches of securitizations of approved asset classes should be government insured. (2) The government must supervise and examine

securitizations rather than rely on ratings agencies. (3) Limits should be placed on entry into securitization, and any firm that enters is a “bank” and subject to supervision.

The first and second proposals would create informationally insensitive debt, which then provides a way for repurchases to serve as a short-term savings tool for firms. The third proposal creates charter value for firms that produce informationally insensitive debt. Thus, being able to securitize is valuable.

“The sketch of banking reform outlined above, while no more than a sketch, suggests that policy should be firmly based on an understanding of the problem,” Gorton writes, “not just a reaction to the crisis.”

## Other Conference Highlights

In addition to the papers summarized in this booklet, the conference featured the following:

### Keynote Speeches

#### **The Supervisory Capital Assessment Program**

Ben S. Bernanke

#### **Systemic Risk and the Role of Government**

John B. Taylor

### Academic Papers

(presented at the academic preconference May 11)

#### **Tranching and Rating**

Michael J. Brennan, Julia Hein, and  
Ser-Huang Poon

#### **Market Liquidity and Funding Liquidity**

Markus K. Brunnermeier and  
Lasse Heje Pedersen

See the full text of the speeches and the academic papers at [frbatlanta.org](http://frbatlanta.org). Click “News & Events” on the navigation bar and then “Conferences.”



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