

## **How Should Regulators Respond to Financial Innovation?**

The Philadelphia Fed Policy Forum

Philadelphia, Pennsylvania

December 1, 2006

Jeffrey M. Lacker

President, Federal Reserve Bank of Richmond

The subject of this panel is “Financial Markets and Growth.” There is now quite a substantial literature devoted to understanding how improvements in the effectiveness of the financial sector can and do contribute to growth and economic well-being in developing countries. My focus will be on the innovations in financial markets and practices that have been particularly striking in the United States over the last couple of decades, and the key benefits of those innovations. We’ve seen tremendous changes in financial arrangements in recent years, particularly with regard to the ways in which financial markets allocate risk; derivative markets have made risks increasingly divisible and tradable, and consumers have seen vastly expanded opportunities in credit markets. I believe these changes have produced noteworthy economic benefits. Many observers, however, acknowledge the benefits but believe the recent wave of financial innovation also has contributed to increasing financial fragility. The proliferation of new instruments seems to have made it easier for someone to accumulate large risk exposures and harder for counterparties to evaluate them.

In my remarks today, I will offer up the perspective of an economic policymaker from a more developed country, out of a belief that such a perspective has at least some relevance to policymakers in the developing world. I will speak at a fairly broad and abstract level, and will not address specific policy questions. I also will speak as an ex-research economist, which means I am entitled to leave it to others to validate or refute the hypotheses I advance here.

My main hypothesis is that one of the most difficult challenges posed by financial innovation has to do with the interplay between institutions that are relatively closely regulated and institutions that operate less constrained by government intervention. In many developing countries, the real dilemma in financial development has been how to foster growth in institutions and market segments that are more credibly distanced from the government than are the institutions that have tended to be government controlled or protected. In some Asian economies, for instance, the role of the banking system in lending to historically state-run enterprises makes it hard to liberalize the set of saving options available to households, for fear of a destabilizing flight of funds from the banking system.

In developed economies, much of the financial innovation taking place in the last 20 years has been associated with the movement of credit risk and other exposures off of the balance sheets of regulated banks and into such less-regulated entities as hedge funds.

The presence of a sector that is less regulated (or, one might say, “regulated primarily via market discipline”) has proven useful as a testing ground for new financial products and practices, but some have argued that the ability of such entities to amass concentrated exposures poses a potential threat to the stability of regulated institutions.

Let me again emphasize that I offer up just one policymaker’s views. As always, those views are not necessarily shared by any of my colleagues in the Federal Reserve.

## **Financial innovation**

In my discussion of the effects of developments in financial markets, I want to focus on the period since the early 1980s. I think we can look to the 1980s as a rough starting point for a broad wave of innovation in financial markets and instruments, driven by advances in information and communication technologies. And this wave affected the financial opportunities of both households and businesses. On the household side, what can be fairly called a revolution in unsecured credit began in the 1980s and accelerated in the 1990s. Mortgage and home equity lending also benefited in this period from the same fundamental forces. Falling costs of computing and telecommunications facilitated advances in credit evaluation and the pricing of risk, which facilitated more finely partitioned credit origination decisions and improved intermediation of the resulting financial claims through securitization. Credit became available to more borrowers and on better terms.<sup>1</sup>

In the world of business finance, this period saw a significant expansion in the set of contingent claims available to market participants, and a significant expansion in the set of claims that are actively traded in secondary markets. Derivative contracts, swaps, loan sales, credit derivatives and securities backed by various types of assets all proliferated during this period. These developments increased the divisibility and marketability of specific risks, and greatly enhanced the ability of businesses and intermediaries to transfer particular risks to other market participants. For example, banks now seem to have a greater ability to move corporate credit exposures off of their books and into the hands of other banks and, increasingly, nonbank intermediaries such as institutional investors and hedge funds. Banks, however, have remained important in the origination of credits and they remain major providers of lending facilities through which exposures could flow back into the banking system under some circumstances.

The period since the early 1980s was also one of markedly diminished macroeconomic volatility. This change, which has been dubbed the “great moderation,” shows up in virtually all aggregate time series for real variables. For example, expansions have been longer and recessions have been shallower and less frequent. This phenomenon has been noted by many authors and the relevant facts were described by Chairman Bernanke in a 2004 speech.<sup>2</sup>

---

<sup>1</sup> Lacker (2005)

<sup>2</sup> Bernanke (2004)

There are natural reasons to expect a connection between the performance of financial markets and the variability of real macroeconomic variables. One of the most fundamental economic purposes of financial markets and institutions is to facilitate household smoothing of consumption against both life-cycle variations and unexpected shocks to income. In an idealized, perfectly frictionless financial market, households would be able to shed all idiosyncratic risks and to achieve a consumption profile that is at least as smooth as average income. (Rob Townsend's research has emphasized the usefulness of this idealized world as a benchmark for evaluating financial market performance.)<sup>3</sup>

But households' ability to smooth consumption appears to be more limited than in such ideal markets. Most notably, direct insurance against some of the most significant individual shocks that households face – especially persistent income shocks – does not appear to be readily available. (Moral hazard or other informational frictions presumably limit the feasibility of such insurance.) In fact, households seem to achieve much of their smoothing with a relatively limited set of financial instruments. Households build up stocks of savings that they can draw on to smooth consumption when faced with unexpected reductions in income or increases in expenses. And households also smooth through such shocks by borrowing against future income.

The rising use of debt by U.S. households since the 1980s suggests that previously, borrowing was a relatively expensive tool for consumption-smoothing. If so, then one might have expected households to rely somewhat more heavily on savings before the innovations that reduced borrowing costs in the 1980s. As borrowing costs fell, the need for savings to smooth consumption fell also. With easier access to credit, many households may have found themselves with more savings than they needed for smoothing purposes. As access to credit and the amount of borrowing grew, one might have expected household savings rates to decline. And this is exactly what happened.<sup>4</sup>

Financial innovation could contribute to growth, therefore, by reducing the volatility of consumption relative to income and expense shocks. While the intuition for this is straightforward at the level of an individual household, the effect of improved consumption-smoothing opportunities on aggregate volatility is not unambiguous. A decrease in the aggregate consumption volatility associated with a given process for fundamental shocks could be offset by greater volatility in hours worked or through investment. A complicated set of interacting forces is at work in a general equilibrium setting, and the net outcome depends on fundamentals of technology, preferences and the nature of the fundamental shocks. And a variety of other causes have been offered to explain the macroeconomic moderation, including better monetary policy and the good fortune of receiving smaller shocks. Nonetheless, a causal link between the great moderation and the simultaneous wave of financial innovation would seem to be a plausible conjecture.

---

<sup>3</sup> Townsend (1987)

<sup>4</sup> Weinberg (2006) reviews trends in household borrowing, while Athreya (2004) conducts quantitative exercises to argue that the leading candidate for the cause of increased borrowing is falling borrowing costs.

The basic story for households, then, appears to be one of reduced credit constraints leading to improved consumption-smoothing opportunities. A similar story might apply to businesses. A large literature has argued that many firms face credit constraints, and that these constraints result in firms' investment spending being more tied to available internal cash flow than would otherwise be the case. Such a mechanism would have the potential to amplify and propagate more fundamental shocks. But if such a mechanism is at work, and if financial innovation has reduced borrowing costs and expanded access to credit for business firms, then we would expect the amplifying effect of credit market constraints to have fallen as well. This, too, could have contributed to the great moderation.

The arguments I've presented here suggest that financial innovation may have a role in explaining the great moderation. But these arguments do not address the concerns often expressed about the volatility- or fragility-increasing effects of financial innovation. One line of reasoning underlying such concerns is that while financial innovation has enhanced the divisibility of risks and made it easier to allocate risks across a broader array of investors, these innovations also have facilitated greater concentrations of risk. The effectiveness of markets for new financial claims depends to some extent on the presence of entities willing and able to arbitrage away pricing misalignments, should they arise. That ability goes along with an ability to acquire relatively large positions in a relatively narrow set of claims, and thus to accumulate substantial risk exposures. This is arguably a good description of the role that hedge funds have come to play in financial markets. The flexibility that hedge funds have in responding to what they perceive to be pricing misalignments stems in part from their nature as entities free of much of the regulation facing other financial firms. The efficiency-enhancing benefits of financial innovations thus might be difficult to disentangle from the rise of less regulated intermediaries.

Concerns about possible fragility-increasing effects of financial innovation tend to revolve around low-frequency events – financial crises in which losses incurred by one financial market participant have repercussions for other market participants. Such events might be economically costly if, for example, they caused some positive net present value investment opportunities to be missed or some ongoing, economically viable projects to be shut down. Alternatively, concentration of exposures within hedge funds or other entities could prove complicated and costly to resolve in situations of financial distress. In particular, if such a resolution were costly enough, its effects on the prices of financial assets might have the effect of curtailing the flow of capital to productive purposes, resulting in a disruption to real economic activity.

## **Two Views on the Role of Regulation**

To talk about the implications of financial innovation for regulation, I think it is useful to first be clear about the underlying reasons for financial regulation. There are two broad views on this question, and each tends to be associated with a corresponding view on how

policy should respond to the risks associated with the financial activities of less-regulated intermediaries.

One view sees the government financial safety net as the central motivation for the regulation of financial intermediaries. The safety net has the potential to distort risk-taking incentives of protected institutions, and supervisory oversight attempts to prevent excessive risks from accumulating in sectors supported by the safety net. In this view, regulators might be thought of as playing a role similar to that played by private providers of insurance, financial guarantees, or other credit enhancements, who by various means monitor and constrain risk-taking by their clients.

The safety net reduces the incentives of private financial counterparties to manage the exposures they take on. And these incentive effects arise not just from such explicit safety net guarantees as deposit insurance. They may also result from the expectations of private market participants about actions that the central bank or other public sector entity might take during a financial crisis. The mere possibility of public sector action to stem so-called “systemic” losses, such as central bank lending, can provide an implicit safety net that makes some participants more willing to hold concentrated exposures. Hence, under this moral hazard view of the need for regulation, the safety net itself can be a source of “systemic” risk.<sup>5</sup>

How does the financial innovation process I have sketched affect the potential for moral hazard induced by the safety net? By expanding the variety of risks that a supported institution is capable of taking on, the development of new instruments could provide new means to accumulate excessive exposures. Left unchecked, this could exacerbate the moral-hazard costs of the safety net. Enhancements in supervisory practice in the U.S. and elsewhere since the early 1990s seem to have made significant progress in constraining the distortionary effects of the safety net.

The second view, while not discounting the importance of moral hazard related to the safety net, sees a more fundamental justification for regulatory intervention. In this view, there are inherent market failures in financial markets – leading some risks, especially those that might be labeled “systemic,” to be mispriced. Often this market failure is portrayed as an externality. Systemic risks are said to distort choices because a counterparty does not take into account the effect of its own possible losses on its counterparty’s counterparties. Alternatively, market failures are attributed to such market frictions as imperfect information, the idea being that if it’s impossible to know all of the risk-relevant information about a counterparty’s characteristics and past and future actions, then credit to that party cannot be priced as precisely as it would under full information.

Coordination failures are a closely related type of market imperfection in which multiple market participants take the same action, such as attempting to sell a particular exposure or withdraw funds from an institution, causing losses to all that might have been avoided.

---

<sup>5</sup> Goodfriend and Lacker (1999) examine the implications of limited commitment in central bank lending.

The canonical example of a financial coordination failure is the Diamond-Dybvig bank run.<sup>6</sup>

Under the market failure view, the safety net acts to ameliorate friction-induced distortions and coordination problems, and financial innovation raises an array of concerns. Since distortions arise in the context of transactions, a dramatic rise in the volume of gross transactions relative to real economic activity would raise the level of risk and expand the need for safety net protection and the associated risk-taking constraints. Moreover, growth in the number of distinct market-traded financial instruments would multiply the potential for coordination failures. Offsetting these adverse effects, however, is the fact that innovation improves the ability to assess, measure and price risk, and thus could reduce the incidence of mispricing. A market failure amounts to the deviation of a market price from the normative fundamental value of the underlying claim, as when systemic effects are undervalued and lead to wrongly priced risks, or when coordination failures induce “firesale” liquidations at prices below fundamental values. The occurrence of such mispricing relies on the inability of any market participant to recognize and act on the deviation of price from fundamental value. It is exactly the ability to identify and exploit such deviations, however, that financial innovation has tended to enhance.

So which of these two views do I align myself with? I think it is useful to bring a healthy skepticism to the table about the extent of inherent market failures in financial markets. First, I would point out that work some 20 years ago by my co-panelist Rob Townsend (together with Edward C. Prescott) made clear that information imperfections – moral hazard, asymmetric information, and the like – do not constitute market failures.<sup>7</sup> Rather, the financial instruments and contracts we actually observe, and the rich variety of contractual features they display, should be understood as the market’s adaptation to information limits. And the logic that says markets can allocate risk optimally subject to informational constraints is essentially identical to the logic that says markets are efficient when there is perfect information.

Second, I think that the notion of “systemic risk” as an externality in the classical sense is fundamentally flawed. If I take on a credit-risk exposure to a counterparty who has material exposure to another counterparty, then surely that should figure in my risk assessment. And similarly with that counterparty’s exposure to others, and so on. Now, it might be quite costly to know everything one would like to know about one’s counterparties’ counterparties. But as I’ve just argued, limits to information do not imply a market failure.

Skepticism regarding market failures does not imply a Panglossian stance, however. Actual markets are complex, and are evolving in ways that are difficult to predict. Measuring and assessing risk in such an environment is an intellectually challenging endeavor. Moreover, not all market participants will acquire sophistication and proficiency with new products and practices at the same pace. As a result, mistakes

---

<sup>6</sup> Diamond and Dybvig (1983)

<sup>7</sup> Prescott and Townsend (1984)

inevitably will be made, some of which could result in high-profile losses to some market participants – indeed we see these with some regularity, whether in households, business firms or financial institutions. The occurrence of such mistakes does not represent a form of market failure, but rather is an integral part of the innovation process. While market participants should certainly be encouraged to ensure that their own risk-measurement and risk-management practices keep pace with market developments as much as possible – and supervisors should certainly help in this regard with regulated financial institutions – reducing the probability of such mistakes to zero is unlikely to be optimal and could well inhibit beneficial innovation.

### **So What Should Regulators Do?**

The picture that I have painted here today leads me to a few general principles about the role of supervision and regulation in the face of financial innovation.

First, we must always remain mindful that reducing constraints and freeing up institutions to pursue new products and processes can have tremendous benefits. In part, these benefits stem from removing constraints to innovation, and I've devoted some time today to the hypothesis that the fruits of financial innovation can be seen at the macroeconomic level in the form of reduced real volatility. But reducing regulatory constraints can also more directly improve the allocation of credit and risk. Recent research has used the varying times at which states deregulated their banking industries to find that state-level deregulation was associated with improvements in income-smoothing for people within the state.<sup>8</sup>

Second, to effectively carry out their role of monitoring risks in financial institutions, it is essential for regulators to keep pace with changes and advances in the marketplace. If supervisors are to assess the adequacy of banks' risk-management practices, they must have a thorough understanding of emerging instruments and practices. This task is all the more challenging if innovations originate outside of the regulated banking sector.

Third, it is possible for regulation itself to be a driver of innovation. The advent of the one-year, "364-day" credit facility was prompted by the 1988 Basel capital rules. This imposed a higher capital charge on credit lines with maturities of one year or more – hence, a facility lasting a day less than a year. Similarly, concentration limits on loan portfolios spurred the development of the secondary loan market, and the prohibition of interest on corporate deposits spurred the development of "sweep accounts." While it may often be the case that innovations designed to "bypass" regulations ultimately lead to wider benefits for the market, this motivation generally makes innovation less likely to enhance efficiency.

Finally, when innovation occurs outside of the banking industry, regulators' main concern should be with the interactions between the regulated and unregulated sectors. For example, supervisors and institutions have focused heavily in recent years on

---

<sup>8</sup> Demyanyk et al, J. Finance, forthcoming

strengthening counterparty risk management practices and the settlement infrastructures undergirding important new financial markets. As I noted earlier, supervising this boundary requires that regulators broadly understand the activities of the unregulated sector, but perhaps even more important, it also requires regulators to understand how innovations change the ways in which exposures can flow back into the banking sector.

These observations point to a regulatory approach that avoids being overly proscriptive, but that attempts to ensure that regulated institutions' practices for measuring and managing risks are appropriate for the changing environment. Regulators should avoid extending constraints motivated by safety-net considerations to entities that do not receive safety-net support. And regulators should scrupulously avoid any actions or practices that would contribute to the perception that there is a probability of safety net support being extended into sectors that are now governed chiefly by market discipline.

In summary, I believe there is a strong case that financial innovation in the U.S. has brought real, tangible benefits for macroeconomic performance and growth, and I am drawn to the hypothesis that financial innovation can bring similar benefits to economies at different stages in the growth process. At the same time, some observers have expressed concerns that this wave of innovation also has resulted in concentrations of risk that add to financial market fragility. But at least as persuasive is the notion that the same advances that have made it easier for market participants to evaluate and exchange various risks have also made it possible for markets to respond more resiliently to disruptions by allowing market allocations to change more flexibly in response to changing market circumstances. As a consequence, I believe regulators serve their mission best, not by second-guessing observed risk allocations, but by assuring that individual institutions with access to a public sector safety net conduct their businesses using risk measurement and management practices that keep pace with the ever-changing market.

## References

- Athreya, K., 2004. "Shame as it Ever Was: Stigma and Personal Bankruptcy," Federal Reserve Bank of Richmond *Economic Quarterly*, 90 (Spring), 1-19.
- Bernanke, B., 2004. "The Great Moderation," speech to the Eastern Economic Association in Washington D.C., Board of Governors of the Federal Reserve System, <http://www.federalreserve.gov/BOARDDOCS/SPEECHES/2004/20040220/default.htm>
- Demyanyk, Y., C. Ostergaard, and B. Sorensen, forthcoming. "U.S. Banking Regulation, Small Business, and Interstate Insurance of Personal Income," *Journal of Finance*.
- Diamond, D., and P. Dybvig, 1983. "Bank Runs, Deposit Insurance and Liquidity," *Journal of Political Economy*, 91 (June), 401-19.
- Goodfriend, M. and J. Lacker, 1999. "Limited Commitment and Central Bank Lending," Federal Reserve Bank of Richmond *Economic Quarterly*, 85 (Fall), 1-28.
- Lacker, J., 2005. "Retail Financial Innovation," speech to Virginia Bankers Association, Hot Springs, Va., Federal Reserve Bank of Richmond, [http://www.richmondfed.org/news\\_and\\_speeches/presidents\\_speeches/index.cfm/2005/id=74](http://www.richmondfed.org/news_and_speeches/presidents_speeches/index.cfm/2005/id=74)
- Prescott, E. C., and R. Townsend, 1984. "Pareto Optima and Competitive Equilibria with Moral Hazard and Adverse Selection," *Econometrica*, 52 (January), 21-46.
- Townsend R., 1987. "Arrow-Debreu Programs as Microfoundations of Macroeconomics," in T.F. Bewley, *Advances in Economic Theory: Fifth World Congress*, Econometric Society Monograph Series no. 12, New York and Melbourne, Cambridge University Press, 379-428.
- Weinberg, J. 2006. "Borrowing by U.S. Households," Federal Reserve Bank of Richmond 2005 Annual Report, 4-16.