

# Regulation and Failure

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Only under certain ideal circumstances may individuals, acting on their own, obtain “pareto efficient” outcomes, that is, situations in which no one can be made better off without making another worse off. These individuals involved must be rational and well informed, and must operate in competitive marketplaces that encompass a full range of insurance and credit markets. In the absence of these ideal circumstances, there exist government interventions that can potentially increase societal efficiency and/or equity.

Some of the major elements of these interventions are by now well accepted: antitrust laws, to prevent the creation of monopoly power and/or its abuse; consumer protection legislation, designed especially to address potential problems of exploitation arising from information asymmetries; and regulations to ensure the safety and soundness of the banking system, which are made necessary by systemic externalities (spillover effects of economic transactions affecting many people who were not parties to the transactions) that can arise when a “systemically” important institution fails, or is allowed to fail.

The current economic crisis has highlighted the need for government intervention in the event of the failure of a systemically important institution. But the need for massive intervention implies, in turn, the need to take actions to prevent the occurrence of such failures in the first place. Sometimes the damage done by actions that have adverse effects on others can be compensated for after the fact, but in the cases at hand, this is in general not possible. Policy interventions should be designed to make less likely the occurrence of actions that generate significant negative spillovers, or externalities.

But these are not the only reasons for government intervention. Markets fail to produce efficient outcomes for a variety of other reasons that economists have explored over the last twenty-five years. Markets are plagued by problems of information asymmetries, and there are incentives for market participants both to exploit and to increase these information asymmetries. For a variety of reasons key markets (such as those for insurance against some of the important risks that individuals and firms face) are missing. (Risk management is the principal subject of chapter 4 of this volume.)

Even when markets are efficient, they may fail to produce socially desirable outcomes. The wealthy and powerful may “exploit” others in an “efficient” way: the gains to one are offset by the losses to others, and in traditional economic parlance, so long as that is the case, markets are efficient. No one can be made better off without making someone else worse off. But such outcomes are socially unjust, and unacceptable. Governments impose regulations to prevent such exploitation and to pursue a number of other social goals.

These interventions take a variety of forms. Some are more intrusive than others. Some are more robust than others; that is, they can withstand attempts at circumvention. In recent decades, policy has focused on the design of packages of intervention that are robust, recognizing that the costs of the failure of intervention are typically on an order of magnitude greater than the costs of the interventions themselves. In financial markets, interventions include: (a) disclosure of information; (b) restrictions on incentive schemes (including conflicts of interest); (c) restrictions on ownership; (d) restrictions on particular behaviors; and (e) taxes designed to induce appropriate behaviors.

In addition, there are interventions to ensure competition. One of the big failures that the recent global financial crisis has exposed is that we allowed financial institutions to grow “too big to fail.” Not only may such large institutions be able to exploit market power, but they also pose systemic risk to the economy and have perverse incentives that encourage such behavior. Institutions that grow too big to fail inevitably know that if they undertake high-risk activities and fail, government will pick up the pieces, but if they succeed, they walk away with the gains.

While regulation has typically focused on preventing “harmful” behaviors, there are some regulations that encourage “constructive” behaviors. These include CRA (Community Redevelopment Act) lending requirements, designed to ensure that there is a certain flow of credit to underserved communities.

Some interventions combine traditional equity concerns with market failures: governments may encourage private provision of retirement insurance (recognizing the social consequences of old-age poverty), but also recognize the abuses that may arise, unless there are restrictions to ensure that ordinary workers are treated symmetrically with management. Again, this crisis has exposed a regulatory failure: regulators failed to prevent the exploitation of poor and poorly educated borrowers by lenders. These people were not able to ascertain well the risks associated with various lending provisions, such as variable-rate mortgages with negative amortization, in a period in which interest rates were at a historically low level. The lenders should, of course, have been able to do a better job of risk assessment, but because of another set of market failures, they

did not. The result is a massive social and economic disaster: people are losing their homes and their life savings, and our economy is facing a meltdown.

By its nature, a regulation restricts an individual or firm from doing what it otherwise would have done. Those whose behavior is so restricted may complain about, say, their loss of profits and potential adverse effects on innovation. But the purpose of government intervention is to address potential consequences that go beyond the parties directly involved, in situations in which private profit is not a good measure of social impact. Appropriate regulation may even advance welfare-enhancing innovations.

In short, regulation is necessary because social and private costs and benefits, and hence incentives, are misaligned. Such misalignment leads to problems not only in the short run but also in the long run. Incentives to innovate are distorted. America's financial system has been highly innovative, but to a great degree innovation has recently been directed at circumventing laws and regulations designed to ensure the efficiency, equity, and stability of the financial sector. Brokerages, banks, and insurance companies, among others, have been engaged, in effect, in accounting, tax, and regulatory arbitrage. But our financial system did not innovate in truly important ways that would have enabled Americans to better manage the risks they face—failing even to help manage the relatively simple risk of financing most people's most important asset, their home.

The design of regulatory structures and systems has to take into account: (a) asymmetries of information, since the regulator is often at an informational disadvantage relative to the regulated; (b) moral hazard, since there are often problems in ensuring that a regulator's behavior is consistent with social welfare (for example, that he/she is not beholden to those whom he/she is supposed to be regulating); and (c) human fallibility, since mistakes are inevitable, and we need to minimize the costs of such mistakes. Well-designed regulations take into account the limitations of implementation and enforcement. While no regulatory system is perfect, economies with well-designed regulations can perform far better than those with inadequate regulation. Regulations can both enhance markets and protect those who might otherwise suffer in unregulated markets.

## **Adam Smith and the Theory of Market Failures**

No idea has had greater impact on policy than Adam Smith's notion that profit-maximizing firms interacting with rational consumers in competitive markets are led, as if by an "invisible hand," to society's general well-being. Smith was far more aware of the limitations of the market than his latter-day followers. Today, we realize that the reason that the invisible hand often seems invisible is that it is not there. Instead, we see a host of pervasive market failures, circumstances in which markets produce too much of some things (such as pollution)

and too little of others (such as innovation). Whenever there are important imperfections and asymmetries of information (that is, situations in which one party knows something different from what others know), markets are not in general efficient. But such problems mean that markets are almost never fully efficient. The relatively recent recognition by economists of this phenomenon has had a profound effect in changing presumptions (Greenwald and Stiglitz 1986).<sup>1</sup> Previously the presumption that markets were efficient was widespread, with the corollary that only under exceptional circumstances (such as monopoly and massive pollution) were there failures that warranted intervention. Now, among mainstream economists, there is no presumption that markets are efficient. Government interventions thus necessarily need to focus on areas where market failures are most pronounced, such as in the health and finance sectors. In my remarks here, I focus on finance, because this area illustrates most of the key issues and is the subject of crucial current policy discussions.

The most obvious aspect of market failure in finance is associated with systemic externalities: as noted above, these are failures in the financial sector that have systemic effects. Those outside the financial sector today are suffering as a result of the mistakes made by those working in the sector. In making their decisions (for example, about lending practices), they did not take into account the systemic consequences of their actions. They never asked, If our loans go bad, what would happen to the entire economy? They looked only to their own balance sheets.

But looking deeper into the financial sector, we see a further set of problems: the incentives of those making the lending decisions were not aligned even with their shareholders' interests. The bonus system in place allowed them to reap large rewards when things went well while allowing them to evade the consequences when things went badly. These incentive structures encouraged shortsighted and excessively risky behavior. The banks' shareholders have not even been served well. This highlights another market failure: the separation of ownership and control, emphasized by Adolphe Berle and Gardiner Means, whose conclusions I have worked to set on more rigorous information-theoretic foundations (Stiglitz 1985). Such problems of corporate governance came to the fore in the aftermath of the Enron scandal, but the Sarbanes-Oxley Act of 2002 did not fully address the problem, since it left in place stock options, which not only provide asymmetric incentives but also provide incentives for bad accounting, allowing executives to increase their pay by providing information to shareholders that leads to higher share prices. Such market manipulation encourages the kind of off-balance-sheet behavior that played a major role in fomenting the current crisis.

Much of the proposed financial market regulatory reform focuses on precisely these problems: we need better corporate governance, to reduce the likelihood of these perverse incentives; and in the case of banks, where perverse incentives lead to drastic systemic consequences, with great costs to the economy and to taxpayers, we need direct restrictions on the form of compensation offered to executives. Compensation should be based on long-term performance, with far fewer asymmetries in the treatment of gains and losses. Stock options in particular need to be restricted. At the very least, shareholders should be aware of the consequences of offering stock options as part of executive pay packages in terms of share dilution. Banks that use stock options (or which otherwise maintain incentive structures encouraging excessively risky behavior) need to be subject to tighter supervision.

Because banks (or bank officials) do not always have any incentive for transparency—indeed, there may even be incentives for a lack of transparency (Edlin and Stiglitz 1995)—we need strong regulations concerning transparency and accounting, including regulation of the practice of marking assets to market. Without adequate regulations, it is possible to obtain only a very inaccurate picture of the liquidity and solvency of banks. Moreover, a lack of regulation also gives rise to perverse incentives that encourage banks to realize the gains in assets that have gone up in value and leave on their books those that have decreased in value. Worse still, knowing that they can thereby give a biased view of their position, banks then have an incentive to engage in excessive risk taking. The current crisis has exposed some of the problems that arise from inappropriate use of mark-to-market accounting by regulators, but that should not undermine efforts to enhance market transparency through mark-to-market accounting. What the system needs is a change in the use to which this information is put, and the elimination of incentives to obfuscate the information provided.

Managers often have an incentive to obfuscate, and standard transparency regulations by themselves may not go far enough. The problem with many derivatives was that they were so complex that even if all the information about them had been disclosed, most market participants would not have been able to assess their real value. Exchange-traded derivatives would have provided most of the risk management services needed, but in a more transparent way, with more competitive pricing. We will need to develop regulations restricting or inhibiting the use of over-the-counter derivatives, at least for banks and other systemically important institutions.

Because taxpayer money is at risk when a bank fails, excessively risky behavior needs to be directly circumscribed. Thus, we need much tighter restrictions on leverage. Ideally, these restrictions should be countercyclical, to

discourage excessive lending in booms and to encourage more lending in recessions. (Such interventions illustrate another important class of “externalities,” those associated with macroeconomic behavior.) Typically, the quality of bank lending goes down when banks expand lending rapidly, and this factor should be reflected in bank regulation and supervision.

Some have suggested that depositors should play a bigger role in bank supervision. Providing deposit insurance gives rise to “moral hazard,” removing the incentive to supervise. But the current crisis should make clear how impossible it would be for any ordinary depositor to really monitor what is going on in a given bank. In this case, monitoring is a public good—something that everyone in society would benefit from—and should be provided publicly.

### **Market and Individual Irrationality**

Much of modern economic theory has been predicated on the assumption of rational individuals and profit-maximizing firms interacting in competitive markets. Government policy has been directed at ensuring that markets are competitive—even Adam Smith recognized that there were strong incentives on the part of firms to engage in anticompetitive behavior. It is often easier to increase profits by restricting competition than by coming up with a better product.

By the same token, modern discussions of corporate governance have highlighted the ways in which modern corporations are often not well described by the standard “Marshallian” theory of profit- (or stock market value-) maximizing firms. The separation of ownership and control has meant that decisions are often made by managers, whose interests are not necessarily well aligned with other stakeholders, including shareholders. (Moreover, modern economic theory reveals that, given imperfect and asymmetric information and imperfect risk markets, even shareholder-value maximization—and especially shortsighted shareholder value maximization—may not be in society’s interest (Stiglitz 2008).

I have discussed above the regulatory implications of both of these market imperfections. The assumption that individuals necessarily make rational economic decisions, however, has gone largely unassailed until recently. It is not, of course, that anyone really believes that individuals are always fully rational. But economic theorists have worried that without the assumption of full rationality, economists would be unable to say anything meaningful about individual behavior. But recent research has made it clear that individuals often act systematically in a way markedly different from that predicted by models of rationality. (Daniel Kahnemann received the Nobel Memorial Prize in economics in 2002 for his work, much of it in collaboration with the late Amos Tversky, in analyzing these irrationalities. This work has grown into a major subfield, called behavioral economics. For a fuller treatment of these issues, see

chapter 2 of this volume.) The failure of people to act rationally is especially important in risk assessment—which is, of course, central to financial markets. An analysis of what went wrong in the financial markets to cause the current crisis shows a host of “irrationalities,” behaviors that are hard to reconcile with any model of rational individuals and firms. Indeed, anyone looking at the history of bubbles, manias, and panics would find it hard to reconcile such behaviors with rationality (Kindleberger 2005). Alan Greenspan had called attention to these irrationalities in his famous “irrational exuberance” speech of December 1996, but in spite of an awareness of such irrationality, he continued to believe that market participants were sufficiently rational that they would not undertake undue risk. It was this belief that led to the widespread confidence that self-regulation would work. As Greenspan admitted in his recent Congressional testimony (Greenspan 2008) in the aftermath of the meltdown, the crisis shattered this belief. Self-regulation was based on a flawed confidence in rationality. (For new ideas on co-regulation, see chapter 6 of this volume.)

If this “flawed” rationality had affected only the parties directly involved in a given transaction, its effects would have been limited. But flawed rationality affected the entire economy. Thus, as Greenspan finally admitted, it is not enough to rely on rational behavior to ensure that individuals and firms undertake “prudent” risks.

But there was another flaw in Greenspan’s analysis: even if each individual or firm were rational, that would not ensure systemic stability. There are externalities. This is critical to understanding the appropriate role of government in regulation. Earlier approaches focused on, for instance, protecting individual investors from abusive practices, or ensuring the safety and soundness of particular institutions. More recent discussions have focused on ensuring that “systemically significant institutions” are well regulated. However, what we have seen is a systemic failure, and such systemic failures can also arise from the correlated behavior of a large number of institutions, none of which is itself systemically significant. They can arise whether market participants are rational or not. But pervasive and persistent irrationalities—including flawed risk perceptions—may make such systemic failures more likely and provide a strong rationale for comprehensive government regulation of financial markets.

## **Regulatory Failure**

So far, I have discussed a number of market failures within the financial sector that could be addressed by appropriate regulation. It is clear that our regulatory structure failed. Evidently, there was market failure, but there was also government failure. The primary reason for the government failure was the belief that markets do not fail, that unfettered markets would lead to efficient outcomes,

and that government intervention would simply gum up the works. Regulators who did not believe in regulation were appointed, with the inevitable outcome that they did not do a very good job of regulating.

There is now a widespread consensus on the need for regulation, but that still leaves open the question: even if we have good regulations, how do we ensure that they will be enforced? How do we prevent regulatory failure?

There is no easy answer, but the approach that the United States has by and large taken is I think correct: multiple oversight, a broad system of checks and balances. The costs of duplication are far less than the costs of mistakes. The attorney general of New York has partially filled in for the deficiencies in the Securities and Exchange Commission. Tort law provides incentives for firms not to engage in egregious behavior.<sup>2</sup> There may have been abuses in class-action suits; but now, we may have excessively weakened this important part of our economy's incentive system.

Another part of the answer is to ensure that the voice of those whose interests are likely to be hurt by failure are well represented in the regulatory structures. Too often, the regulatory system gets captured by those that are supposed to be regulated. They are, after all, the "experts" who understand the system. The risk is especially severe in a political system such as ours, which is highly dependent on campaign contributions. But capture also occurs in a more subtle way: through the promulgation of ideas. When AT&T was threatened with a breakup under antitrust laws, its supporters objected that what mattered was not the actual level of competition in the telecommunications marketplace, but only *potential* competition. Similarly, the financial sector in recent years actively promoted the idea that markets could be self-regulating.

The current system has made regulatory capture too easy. The voices of those who have benefited from lax regulation are strong; the perspectives of the investment community have been well represented. Among those whose perspectives need to be better represented are the laborers whose jobs would be lost by macro-mismanagement, and the pension holders whose pension funds would be eviscerated by excessive risk taking.

One of the arguments for a financial products safety commission, which would assess the efficacy and risks of new products and ascertain appropriate usage, is that it would have a clear mandate, and be staffed by people whose only concern would be protecting the safety and efficacy of the products being sold. It would be focused on the interests of the ordinary consumer and investors, not the interests of the financial institutions selling the products.

Reducing the risk of regulatory capture must, of course, play an important role in the design of financial services regulations. Simple and transparent regulatory systems with limited regulatory discretion may be more immune to



regulatory capture. There is a cost, for example, in the reduced scope for tailoring regulation to the circumstances at hand. But in many circumstances, that cost is far less than the benefit that arises from regulatory certainty.

### **Broader Social Objectives**

So far, I have focused mostly on the single objective of ensuring the safety and soundness of the financial system (which entails more than just the safety and soundness of individual banks). But there are several other social and economic objectives of financial sector regulation.

As I noted in the introduction, one of the problems that has become manifest in this crisis is that financial institutions have grown too big to fail. Such large institutions not only represent a threat to competition—and without competition, markets are not efficient—but, again, they also create perverse incentives. As I noted in the opening of this essay, institutions that grow too big to fail have an incentive to undertake excessive risk, since their directors know that if the risks pay off, they get to keep the proceeds, but if they fail, taxpayers will pick up the pieces. Elsewhere, I have referred to this new form of “socialism” as “socialism American style”—privatizing gains but socializing losses. Regulators have a responsibility to ensure that institutions do not grow too big to fail (and in many cases, too big to be managed). There is little convincing evidence that there are substantial economies of scale sufficient to offset the adverse incentives to which such gigantism gives rise.

As we noted, an awareness of the risks of regulatory failure, including those resulting from regulatory capture, should play an important role in regulatory design. For instance, the costs of allowing financial institutions to grow too big are now apparent; the benefits of size—the economies of scale and scope—are questionable. But long experience should have taught us that financial institutions will try to use their political influence to weaken constraints on their size and reach, and in some cases they will succeed. If for one reason or another governments are unable to restrict the size of these institutions and prevent the development of too-big-to-fail institutions, regulators need to exercise intensive scrutiny, including restrictions on incentive structures that give rise to excessive risk taking and on the excessively risky practices themselves. To be sure, financial institutions will try to weaken such regulations, but by having a system with multiple checks—regulations of both products and institutions, at both the state and federal levels—we make regulatory circumvention and erosion of regulatory controls more difficult. There is a cost, as always, but it should be evident that the costs of insufficient oversight are far greater.

Financial markets also fail to make access to credit available to certain underserved groups. This may be because of discrimination. But, more generally, social

returns to lending may not accord with private returns. Society may have an interest in ensuring inclusive growth and more broadly pursuing objectives of social justice, and there may be a variety of instruments with which it can and should do this (*see* for example chapter 7 of this volume, on “embedded liberalism.”) The old “neoclassical” model (the same model in which Adam Smith’s invisible hand worked) argued that distributional goals should be achieved solely through “lump sum” (that is, nondistortionary) tax redistributions. No government does this, and for good reason: the information that would be required to implement such a scheme makes it totally unrealistic. All redistributive schemes thus have, at the same time, allocative effects, and, in general, it is optimal to use a variety of instruments—including interventions such as the Community Reinvestment Act, which directs banks to allocate a certain fraction of the lending capacity to serve underserved communities.

### Other Issues in Regulatory Design

There are many complex institutional issues that the market-failure approach to regulation raises, especially concerning the optimal form of government intervention, given the limitations of government, including government’s often disadvantageous position relative to those that it is supposed to regulate (for example, public sector pay is lower than salaries in the private sector; there are information asymmetries, etc). In this short essay, I can only address a few of these.

First, the task of regulators is different from the task of those who create risky financial products, just as the skills (and pay) of those who test drugs are different from those who create them. The regulators’ task is in some ways simpler: to ascertain safety and effectiveness. So too in financial-market regulation. The enforcement of simple regulatory restrictions (such as those on leverage and “speed bumps”) requires different skills than the design of new regulations. To be sure, regulators have to be aware of the strong incentives for regulatory arbitrage and evasion and attempt to guard against these risks.

That is one of the reasons that much of regulation should focus on simple regulations, such as strict limits on leverage. Off-balance-sheet activities and tailor-made products should be looked at askance, if not simply forbidden, at least for commercial banks.

There is, here, an important tension between the concern, discussed earlier, in trying to prevent regulatory capture and the need to prevent innovative regulatory arbitrage. We argued earlier that concerns about regulatory capture suggest limited discretion. But innovative strategies of regulatory evasion require regulators to ascertain whether there is, for instance, “hidden leverage.” New York’s Martin Act (aimed at combating financial fraud) has been used effectively to

curb certain “creative” abusive practices, but only because New York has had a series of attorneys generals who have been committed to using the law. They have focused on stopping the abusive practices rather than punishing the guilty parties.

The incentive for regulatory arbitrage also explains why regulation has to be comprehensive: if there is a highly regulated banking system, there will be incentives to move banklike activities into a shadow banking system, with equally disturbing systemic risks.

The strong incentives for regulatory evasion and arbitrage, combined with the inherently disadvantageous position of regulators, also explains why regulation has to focus both on products and institutions and on the overall economic/financial system. Awareness of the strong incentives for regulatory evasion and arbitrage, together with awareness of the asymmetries in costs and benefits (the costs of failures being borne by society, the benefits accruing to a few private parties), suggest that regulators should be both proactive and cautious. Complex products that seemingly serve no good risk-mitigation function should perhaps be banned, or at least restricted in usage, say to small hedge funds that are not highly leveraged. The costs of delay in introducing such products into the market would be relatively low—certainly much lower than the costs of the current crisis.

Some have focused on the fact that even with the best of regulators and regulations, there will be regulatory evasion. But this is not an argument against good regulations. To paraphrase the argument put forward by Paul Volcker in the midst of the East Asia crisis of 1997, even a leaky umbrella provides some protection in the midst of a thunderstorm. In arguing for restrictions on capital flows, I have used another analogy: a dam is not intended to stop the flow of water from the mountain to the sea, but even an imperfect dam may help protect people from a flood.

## Concluding Comments

Markets are at the center of every successful economy. But unfettered markets often do not serve society well. Over the past two hundred years, economic theory and historical experience has shown that financial markets often fail to perform their essential functions of managing risk and allocating capital well, with disastrous social and economic consequences. While we have taken great pride in the success of our financial sector, a good financial sector would not only have performed these tasks better than ours has recently, but it also would have done so at much lower costs. Finance is a means to an end, not an end in itself. A good financial sector would have used few of society's resources; in a competitive financial sector, profits would have been low. Our financial sector

was large, and it garnered a third of corporate profits. Some of the profits were based on exploitation of the poor; some were based on noncompetitive practices in credit card lending. It is hard to escape the conclusion that the sector did not serve our society well; and now, the costs that it has inflicted on the global economy are enormous. It is not just the trillions of dollars of taxpayer money that have been put at risk. The shortfall in production between the economy's potential and actual output will, cumulatively, also amount to trillions of dollars. Even a rich society can ill afford such waste.

That there is a need for better regulation now appears to be self-evident. But there will be those who will push for cosmetic reforms, not the deep reforms that are required.

In this paper, I have tried to outline the market-failure approach to reform, with especial application to the financial sector. This approach provides clear guidelines for the range and scope of requisite regulation and, together with the theory of government and regulatory failure, also provides guidelines for the design of a new regulatory system, one that will not only make such failures less likely in the future, but that will help ensure that the financial sector performs the vital role that it needs to perform in a dynamic modern economy.

## Notes

- 1 Throughout this book, short-form citations are given in the run of text wherever possible. Full references may be found in the list of references at the end of each essay.
- 2 I am taking an expansive view of "regulation" in this paper. Regulation is any intervention in the market that changes behavior from what it otherwise would have been. Thus taxation should be viewed as part of the regulatory system, but so too should tort law. Tort law is directed at correcting one important set of externalities, those that arise when the actions of one individual "hurt" another. By forcing the individual who imposes the damage to compensate the injured party, tort law brings incentives better into alignment. It partially corrects the externality. But tort law has several limitations. First, it corrects the damage *ex post*, and in some cases, that may be too late. Indeed, it may be impossible to recover adequate compensation. Second, when many individuals are injured—that is, when the costs are diffuse—it is difficult for them to act together to secure appropriate compensation. Class-action suits are an imperfect attempt to address this problem. Finally, the legal system is very costly. In the current context, we can see these limitations very clearly. It would be difficult, if not impossible, for the millions of Americans—and those around the world—who have been injured by the actions of the financial system to receive adequate compensation for what they have suffered. The companies that have inflicted the damage are, in many cases, bankrupt. Each would claim that the global consequences are largely the result of the actions of others.

## References

- Edlin, Aaron, and Joseph E. Stiglitz. "Discouraging Rivals: Managerial Rent-Seeking and Economic Inefficiencies." *American Economic Review* 85 no. 5 (December 1995): 1301–12. Previously published as National Bureau of Economic Research Working Paper 4145, 1992. Available at <http://www.nber.org/papers/w4145>.
- Greenspan, Alan. "The Challenge of Central Banking in a Democratic Society." Address delivered at Annual Dinner and Francis Boyer Lecture of the American Enterprise Institute for Public Policy Research, Washington, D.C. December 5, 1996. Available at <http://www.federalreserve.gov/boarddocs/speeches/1996/19961205.htm>.
- . Testimony at House Committee of Government Oversight and Reform hearing on the Financial Crisis and the Role of Federal Regulators, October 23, 2008. Available at <http://oversight.house.gov/documents/20081023100438.pdf>.
- Greenwald, Bruce, and Joseph E. Stiglitz. "Externalities in Economies with Imperfect Information and Incomplete Markets." *Quarterly Journal of Economics* 101, no. 2 (May 1986): 229–64.
- Kindleberger, Charles. *Manias, Panics, and Crashes: A History of Financial Crises*. 5th edition. Hoboken, NJ: John Wiley & Sons, 2005.
- Stiglitz, Joseph E. "Credit Markets and the Control of Capital." *Journal of Money, Banking, and Credit* 17, no. 2 (May 1985): 133–52.
- . "Banks versus Markets as Mechanisms for Allocating and Coordinating Investment." In J. A. Roumasset and S. Barr, eds., *The Economics of Cooperation: East Asian Development and the Case for Pro-Market Intervention*. Boulder, CO: Westview Press, 1992. (Originally presented at Investment Coordination in the Pacific Century: Lessons from Theory and Practice Conference, University of Hawaii, January 1990.)
- . "Regulating Multinational Corporations: Towards Principles of Cross-Border Legal Frameworks in a Globalized World Balancing Rights with Responsibilities" (The Ninth Annual Grotius Lecture). *American University International Law Review* 23, no. 3 (2008): 451–558.
- . "Lessons for Economic Theory from the Global Financial Crisis" (Presidential Lecture to the Eastern Economic Association). *Eastern Economic Journal*. Forthcoming 2009.