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A Regulatory Framework for Managing Systemic Risk

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How should we regulate *systemic* risk? Many regulatory responses, like the Dodd-Frank Act in the United States, consist largely of politically motivated reactions to the financial crisis, looking for villains (whether or not they exist).² To be most effective, however, the regulation must be situated within a more analytical framework.

I. SCOPE AND GOALS OF REGULATION

First, we need to consider the scope of systemic risk regulation. There has been a great deal of regulatory focus on banks and other financial institutions (hereinafter, “financial firms”). Some of this is path dependent: historically, a chain of bank failures remains an important symbol of systemic risk. The media and politicians also have focused on financial firms because they are so visible and their problems have been so dramatic.

But we also need to recognize that the ongoing trend towards disintermediation—enabling companies to directly access the ultimate source of funds, the capital markets, without going through financial intermediaries—is making financial markets themselves increasingly central to any examination of systemic risk.³

For example, although the bankruptcy of Lehman Brothers in 2008 filled the headlines, its trigger was the collapse of the market for mortgage-

² The Dodd-Frank Act delegates much of the regulatory details to administrative rulemaking, in many cases after the relevant government agencies engage in further study. Perhaps even more significantly, the Act creates a Financial Stability Oversight Council, part of whose mission is to monitor and identify potential systemic threats in order to find regulatory gaps. Dodd-Frank Act § 112. The Council will be aided in this task by a newly-created and, hopefully, nonpartisan Office of Financial Research. *Id.* Regulators therefore will have the ability to look beyond the Act’s confines.

³ Steven L. Schwarcz, *Systemic Risk*, 97 GEORGETOWN LAW JOURNAL 193, 200 (2008).

backed securities. Many of these securities were collateralized in part by risky subprime home mortgages, which were expected to be refinanced through home appreciation. When home prices stopped appreciating, the borrowers could not refinance. In many cases, they defaulted. These defaults caused substantial amounts of investment-grade rated mortgage-backed securities to be downgraded and, in some cases, to default. Investors began losing confidence in these and other rated securities, and their market prices started falling.

Lehman Brothers, which held large amounts of mortgage-backed securities, was particularly exposed. Lehman's counterparties began demanding additional safeguards, which Lehman could not provide. Absent a government bailout, Lehman filed for bankruptcy. That, in turn, caused securities markets to panic; even the short-term commercial paper market virtually shut down, and the market prices of mortgage-backed securities collapsed substantially below the intrinsic value of the mortgage loans backing those securities.⁴ That accelerated the death spiral, causing financial firms holding mortgage-backed securities to appear, if not be, more financially risky; requiring highly leveraged firms to engage in fire-sales of assets (thereby exacerbating the fall in prices); and shutting off credit markets, which impacted the real economy.

This illustrates that both financial firms *and* financial markets can, if they fail, be triggers and transmitters of systemic risk. The scope of any

⁴ Even prior to Lehman's collapse, MBS may have been undervalued in the market. For example, in July 2008 I was an expert in the Orion Finance SIV case in the English High Court of Justice. Orion's mortgage-backed securities had a market value of around 22 cents on the dollar, whereas the present value of its reasonably-expected cash flows was around 88 cents on the dollar because most of the mortgages were prime.

regulatory framework for managing systemic risk should therefore include both financial firms and markets.

Before attempting to design such a regulatory framework, we need to examine what the framework's goals should be. The primary goal for regulating *financial* risk is micro-prudential: maximizing economic efficiency. Systemic risk is a form of financial risk, so efficiency should certainly be a goal in its regulation. But systemic risk also represents risk to the financial system itself. Any framework for regulating systemic risk therefore should include this macro-prudential goal: protecting the financial system itself.⁵

II. MAXIMIZING ECONOMIC EFFICIENCY WITHIN THE FINANCIAL SYSTEM

Financial regulation can help to maximize economic efficiency by correcting market failures. I believe that at least four types of partly interrelated market failures occur within the financial system: information failure, rationality failure, principal-agent failure, and incentive failure.

A. Correcting Information Failure

Complexity is the main cause of financial information failure.⁶ Financial markets and products are already incredibly complex, and that

⁵ For a critical discussion of the rationale of financial regulation, see EMILIOS AVGOULEAS, *GOVERNANCE OF GLOBAL FINANCIAL MARKETS: THE LAW, THE ECONOMICS, THE POLITICS* (2012).

⁶ See generally Steven L. Schwarcz, *Regulating Complexity in Financial Markets*, 87 WASHINGTON UNIVERSITY LAW REVIEW 211 (2009/2010). Information failure can arise from other causes as well, including the potential for transaction costs relating to information acquisition to diminish the value of new

complexity is certain to increase. Profit opportunities are inherent in complexity, due in part to investor demand for securities that more precisely match their risk and reward preferences. Regulatory arbitrage increases complexity as market participants take advantage of inconsistent regulatory regimes both within and across national borders. And new technologies continue to add complexity not only to financial products but also to financial markets.⁷

Complexity has been undermining disclosure, which has been the chief regulatory response to financial information failure.⁸ Although most, if not all, of the risks on complex mortgage-backed securities were disclosed prior to the 2008 financial crisis, many institutional investors—including even the largest, most sophisticated, firms—bought these securities without fully understanding them.⁹

The Dodd-Frank Act puts great stock in the idea of improving disclosure.¹⁰ I fear its efficacy will be limited, however. Commentators have questioned whether some financial structures are getting so complex that they are incomprehensible.¹¹ Furthermore, it may well be rational for an

information (and thus the incentive to acquire such information). Sanford J. Grossman & Joseph E. Stiglitz, *On the Impossibility of Informationally Efficient Markets*, 70 AM. ECON. REV. 393 (June 1980).

⁷ I have argued that there are two aspects to complexity: cognitive complexity, meaning that things are too complicated and non-linear to understand; and temporal complexity, meaning that systems work too quickly and interactively to control. *Regulating Complexity in Financial Markets*, *supra* note 6, at 214-15. Engineers sometimes refer to temporal complexity as tight coupling. *Id.*

⁸ *See, e.g.*, Cynthia A. Williams, *The Securities and Exchange Commission and Corporate Social Transparency*, 112 HARVARD LAW REVIEW 1197 (1999) (discussing the general purpose of disclosure in the Exchange Act and the Securities Act).

⁹ *See* Steven L. Schwarcz, *Disclosure's Failure in the Subprime Mortgage Crisis*, 2008 UTAH LAW REVIEW 1109, 1110 (2008).

¹⁰ *E.g.* Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, § 1103, 124 Stat. 1376, 2118 (2010) (requiring additional disclosure).

¹¹ *See, e.g.*, David Barboza, *Complex El Paso Partnerships Puzzle Analysts*, N.Y. TIMES, July 23, 2002, at C1 (discussing that “one industry giant, the El Paso Corporation, is growing ever more reliant on deals

investor to invest in high-yielding complex securities without fully understanding them. Among other reasons,¹² the investor simply may not have the staffing to evaluate the securities, whereas failure to invest could competitively prejudice the investor vis-à-vis others who invest.

This begs the question whether institutional investors will hire experts as needed to decipher complex deals. The evidence suggests they do not always do so, and theory explains why. Although experts may be hired to the extent that their costs do not exceed the benefits gained from more fully understanding the complexity, at some level of complexity those costs will exceed, *or at least appear to exceed* any potential gain. This is because the cost of hiring experts is tangible, whereas the benefit gained from fully understanding complex transactions is intangible and harder to quantify—especially since constantly innovating markets cause rapid informational obsolescence. Managers attempting a cost-benefit analysis may well give greater weight to the tangible cost and less credence to any intangible benefit. The more complex the transaction, the higher the costs, and thus the more likely it is that the cost-benefit balance will be out of equilibrium.¹³

Information failure not only undermines investor disclosure. It also undermines the ability of regulators themselves to keep up with the financial

[using off-balance sheet partnerships] so complex that securities experts call them incomprehensible”). It appears hyperbolic to say that structures created by humans cannot be understood by humans. The larger problem may be that relatively few people can understand the structures and that many structures may not be able to be understood by any single person.

¹² For a comprehensive review of these reasons, see *Disclosure's Failure in the Subprime Mortgage Crisis*, *supra* note 9, at 1113-15.

¹³ The analysis above is taken from *Disclosure's Failure in the Subprime Mortgage Crisis*, *id.*

industry, and indeed regulators have extreme difficulty keeping up with financial innovation.¹⁴

A possible way to address information failure resulting from complexity would be to require investments and other financial products to become more standardized. One of the goals of the Dodd-Frank Act, for example, is to standardize more derivatives transactions. To this end, the Act requires many derivatives to be cleared through clearinghouses,¹⁵ which generally require a high degree of standardization in the derivatives they clear.¹⁶

But standardization can backfire. Dodd-Frank's clearinghouse requirement might inadvertently concentrate systemic risk in the clearinghouses themselves. And the overall economic impact of standardization is unclear because standardization can stifle innovation and interfere with the ability of parties to achieve the efficiencies that arise when firms craft financial products tailored to the particular needs and risk preferences of investors.

Dodd-Frank also attempts to address information failure by requiring sellers of securitization products to retain a minimum unhedged position in each class of securities they sell—the so-called “skin in the game.”¹⁷ This

¹⁴ See, e.g., Dan Awrey, “Complexity, Innovation and the Regulation of Modern Financial Markets” 37-51 (Univ. of Oxford Legal Research Paper Series, Paper No. 49/2011, Sept. 2011), *available at* <http://www.ssrn.com/abstract=1916649> (discussing the relationship between complexity and financial innovation in the regulation of OTC derivatives).

¹⁵ Dodd-Frank Act sec. 723(a), § 2.

¹⁶ This can become a little circular, though, because Dodd-Frank includes an exception for derivatives that a clearinghouse will not accept for clearing. Dodd-Frank Act sec. 723(a), § 2(h)(3).

¹⁷ See Dodd-Frank Act sec. 941, § 15G (directing the SEC to require sponsors of asset-backed securities to

too can backfire. By retaining residual risk portions of certain complex securitization products they were selling, underwriters may actually have fostered false investor confidence, contributing to the 2008 financial crisis. Complexity, in other words, not only can cause information asymmetry but also mutual misinformation.¹⁸

In our world of complexity, disclosure will not always be sufficient to correct information failure. Moreover, even perfect disclosure would be insufficient to mitigate information failures that cause systemic risk. Individual market participants who fully understand the risk will be motivated to protect themselves but not necessarily the financial system as a whole. A market participant may well decide to engage in a profitable transaction even though doing so could increase systemic risk, since much of the harm from a possible systemic collapse would be externalized onto other market participants as well as onto ordinary citizens impacted by an economic collapse.¹⁹

There are, therefore, no complete solutions to the problem of financial information failure.

B. Correcting Rationality Failure

Even in financial markets, humans have bounded rationality—a type of information failure, but one distinct and important enough to merit a

retain at least five percent of the credit risk of the underlying assets).

¹⁸ See *Regulating Complexity in Financial Markets*, *supra* note 6, at 241-42 (discussing mutual misinformation).

¹⁹ See *Regulating Systemic Risk*, *supra* note 3 (explaining this concept and describing it as a type of “tragedy of the commons”). It is a tragedy of the commons insofar as market participants suffer from the actions of other market participants; it is a more standard externality insofar as non-market participants suffer from the actions of market participants.

separate category. Investors are complacent, following the herd in their investment choices and over-relying on heuristics, such as rating-agency ratings.²⁰ And market participants are also prone to panic.²¹

Dodd-Frank attempts to fix a sliver of this problem by attempting to improve rating-agency ratings.²² However, the actions of S&P and Moody's during the 2008 financial crisis arguably met the Act's requirements, even had those requirements applied during the financial crisis.²³

The regulatory hurdle is that human nature cannot be easily changed. It is unclear—and Dodd-Frank does not address—how complacency can be remedied. And although panics are often the triggers that commence a chain of systemic failures, it is impossible to identify all the causes of panics that can trigger systemic risk.

C. Correcting Principal-Agent Failure

Scholars have long studied inefficiencies resulting from conflicts of interest between managers and owners of firms. The Dodd-Frank Act attempts to fix this traditional type of conflict. It ignores, however, a much more insidious principal-agent failure: the intra-firm problem of secondary-management conflicts.²⁴ The nub of the problem is that secondary managers

²⁰ Steven L. Schwarcz, *Protecting Financial Markets: Lessons from the Subprime Mortgage Meltdown*, 93 MINNESOTA LAW REVIEW 373, 379-83 & 404-05 (2008).

²¹ For a thoughtful analysis of how rationality failures help to explain the 2008 financial crisis, see Geoffrey P. Miller & Gerald Rosenfeld, *Intellectual Hazard: How Conceptual Biases in Complex Organizations Contributed to the Crisis of 2008*, 33 HARV. J. L. & PUB. POL'Y 807 (2010).

²² Dodd-Frank Act §§ 931-939H.

²³ [Explain why-cite]

²⁴ See Steven L. Schwarcz, *Conflicts and Financial Collapse: The Problem of Secondary-Management Agency Costs*, 26 YALE JOURNAL ON REGULATION 457 (2009).

are almost always paid under short-term compensation schemes, misaligning their interests with the long-term interests of the firm.

Complexity exacerbates this problem by increasing information asymmetry between technically sophisticated secondary managers and the senior managers to whom they report. For example, as the VaR, or value-at-risk, model for measuring investment-portfolio risk became more accepted, financial firms began compensating secondary managers not only for generating profits but also for generating profits with low risks, as measured by VaR.²⁵ Secondary managers turned to investment products with low VaR risk profile, like credit-defaults swaps that generate small gains but only rarely have losses. They knew, but did not always explain to their superiors, that any losses that might eventually occur would be huge.

In theory, firms can solve this principal-agent failure by paying managers, including secondary managers, under longer-term compensation schemes—e.g., deferred compensation based on long-term results. In practice, however, that solution must overcome a collective action problem: firms that offer their secondary managers longer-term compensation may not be able to hire as competitively as firms that offer more immediate compensation. Regulation will be needed to solve this collective action problem not only within nations but also across nations, because good secondary managers can work in financial centers worldwide.

D. Correcting Incentive Failure

²⁵ See, e.g., PHILIPPE JORION, VALUE AT RISK: THE NEW BENCHMARK FOR MANAGING FINANCIAL RISK 568 (3d ed. 2006).

Risk dispersion can create benefits, such as investment diversification and more efficient allocation of risk. But risk can be marginalized, becoming so widely dispersed that rational market participants individually lack the incentive to monitor it.²⁶ This problem is not unlike the tragedy of the *anticommons* in property law; where too many owners have rights to exclude others from a scarce resource, no individual owner has an effective privilege of use and the resource becomes prone to underuse.²⁷ In a financial market context, by analogy, where too many owners (e.g., investors) have rights in a scarce resource (a class of securities), no single investor will have a sufficient amount at risk to individually motivate monitoring. Undermonitoring caused by this incentive failure appears to have contributed, at least in part, to the 2008 financial crisis.²⁸

The problem of incentive failure is difficult to solve. Although regulation could require—perhaps for certain large issuances of complex securities—that a minimum unhedged position be held by a single sophisticated investor in each class of securities,²⁹ regulatory attempts to limit risk dispersion would have tradeoffs: increasing the potential for regulatory arbitrage, impairing the ability of parties to achieve negotiated market efficiencies, and possibly even increasing financial instability.³⁰

E. Summary

²⁶ See Steven L. Schwarcz, *Marginalizing Risk*, 89 WASHINGTON UNIVERSITY LAW REVIEW issue no. 3 (forthcoming 2012), available at <http://ssrn.com/abstract=1721606>.

²⁷ See Michael Heller, *The Tragedy of the Anticommons*, 111 HARVARD LAW REVIEW 621 (1998).

²⁸ Cf. Jean-Claude Trichet, President of the European Central Bank, Speech before the Fifth ECB Central Banking Conference (Nov. 13, 2008) (arguing that ‘the root cause of the [financial] crisis was the overall and massive undervaluation of risk across markets, financial institutions and countries’); Joe Nocera, *Risk Mismanagement*, N.Y. TIMES, Jan. 4, 2009, § 6 (Magazine).

²⁹ For a discussion of this type of regulation, see *Marginalizing Risk*, *supra* note 26.

³⁰ *Id.*

I've so far examined the first goal of any regulatory framework for managing systemic risk: maximizing economic efficiency within the financial system. There are at least four types of market failures that impair efficiency. Information failure is primarily caused by complexity, for which there are no perfect solutions. Rationality failure is difficult, if not virtually impossible, to correct because human nature cannot be easily changed. Principal-agent failure can theoretically be addressed by paying managers—including secondary managers—under longer-term compensation schemes; but in practice that solution must overcome collective action problems, both within and across national borders. And the problem of incentive failure has only second-best solutions. Regulation therefore cannot completely prevent market failures within the financial system.³¹

Let's next discuss the second goal of any regulatory framework for managing systemic risk—protecting the financial system itself. Although uncorrected market failures can lead to inefficiencies in the allocation of capital within the financial system, they also can contribute to systemic failures.

III. PROTECTING THE FINANCIAL SYSTEM ITSELF

There are at least three ways that regulation could protect the financial system itself. First, regulation could attempt to limit the triggers of systemic

³¹ In other contexts, I have summarized these markets failures more intuitively as the “3Cs” of complexity, conflicts, and complacency—complexity corresponding to information failure and incentive failure; conflicts corresponding to principal-agent failure; and complacency corresponding to rationality failure. *See, e.g.*, Steven L. Schwarcz, *Understanding the Subprime Financial Crisis*, 60 SOUTH CAROLINA LAW REVIEW 549 (2009) (first suggesting the 3Cs categorization). Combined with the tragedy of the commons (*see infra* note 47), these failures collectively can be referred to as the 3Cs and the TOC.

risk. Second, regulation could attempt to limit the transmission of systemic shocks. Third, regulation could attempt to stabilize the financial system when afflicted by systemic shocks.

A. Limiting the Triggers of Systemic Risk

Ideal regulation would act *ex ante*, eliminating the triggers of systemic risk.³² Realistically, however, we cannot eliminate those triggers. I have mentioned that although panics are often the triggers that commence a chain of systemic failures, it is impossible even to identify all the causes of panics.

To some extent also, the market failures discussed³³ could trigger panics or other systemic shocks. For example, information failure, principal-agent failure, and incentive failure could, individually or in combination, cause one or more large firms to overinvest, leading to bankruptcy; and rationality failure could cause prices of securities in a large financial market to collapse. As I've shown, these market failures cannot be completely corrected.

It is inevitable, therefore, that our financial system will face systemic shocks from time to time. Consider next how to limit the transmission of these shocks.

B. Limiting the Transmission of Systemic Shocks

³² Cf. Steven L. Schwarcz, Keynote Address: *Ex Ante Versus Ex Post Approaches to Financial Regulation*, 15 CHAPMAN LAW REVIEW 257, 258 (2011) (observing that “[o]nce a failure occurs, there may already be economic damage, and it may be difficult to stop the failure from spreading and becoming systemic”).

³³ See *supra* Part II.

Second-best regulation could act ex post, after a systemic shock is triggered, by limiting the transmission of the shock—i.e., limiting its contagion. This approach takes inspiration from chaos theory, which holds that in complex engineering systems—and, I have argued, also in complex financial systems—failures are almost inevitable.³⁴ Therefore remedies should focus on breaking the transmission of these failures.³⁵

To break the transmission of systemic failures would require that the transmission mechanisms all be identifiable. It probably is not feasible, though, to identify all those mechanisms in advance. Nonetheless, based on a study of four financial crises in the past century, Professor Iman Anabtawi of UCLA and I have attempted to describe at least one such transmission mechanism.³⁶

We argue that two otherwise independent correlations can combine to transmit localized economic shocks into broader systemic crises. The first is an intra-firm correlation between a firm's financial integrity and its exposure to risk from low-probability adverse events that either constitute or could lead to economic shocks. The second is a system-wide correlation among financial firms and markets.

³⁴ See *Regulating Complexity in Financial Markets*, *supra* note 6, at 248-49. One aspect of chaos theory is deterministic chaos in dynamic systems, which recognizes that the more complex the system, the more likely it is that failures will occur. Thus, the most successful (complex) systems are those in which the consequences of failures are limited. In engineering design, for example, this can be done by decoupling systems through modularity that helps to reduce a chance that a failure in one part of the system will systemically trigger a failure in another part.

³⁵ *Id.*

³⁶ Iman Anabtawi & Steven L. Schwarcz, *Regulating Systemic Risk: Towards an Analytical Framework*, 86 NOTRE DAME LAW REVIEW 1349 (2011), available at <http://ssrn.com/abstract=1735025>.

The 2008 financial crisis, for example, almost certainly was caused, or at least made worse, by the two correlations working in combination. Subprime mortgage loans were bundled together as collateral to partially support the payment of complex mortgage-backed securities that were sold to banks and other financial firms worldwide.³⁷ When home prices began falling, some of these mortgage-backed securities began defaulting, requiring financial firms heavily invested in these securities to write down their value, causing these firms to appear, if not be, more financially risky.³⁸ This represented a failure of these firms to see, or at least to fully appreciate, the intra-firm correlation between low-probability risk—in this case, the risk that home prices would significantly fall—and firm integrity.³⁹

The 2008 financial crisis also involved a failure to see system-wide correlations—*not only* the tight interconnectedness among banks and non-bank financial firms *but also* the tight interconnectedness between financial

³⁷ To some extent, the U.S. government itself pressured banks and other mortgage lenders to make and securitize subprime mortgage loans, in order to expand homeownership. *See, e.g.*, PETER J. WALLISON, *THE LOST CAUSE: THE FAILURE OF THE FINANCIAL CRISIS INQUIRY COMMISSION* (2011), <http://www.aei.org/docLib/FSO-2011-02-g.pdf>. Misguided government policy can certainly contribute to systemic risk. *See, e.g.*, e-mail from Charles Calomiris, Henry Kaufman Professor of Financial Institutions, Columbia University Graduate School of Business, to the author (Oct. 13, 2011) (observing that “[g]overnment policy is the main contributor to systemic risk, not just in the recent crisis, but more generally”).

³⁸ *See supra* note 4 and accompanying text.

³⁹ The problem of assessing the risk of low-probability adverse events is especially acute during periods in which there have been no major adverse economic shocks. Recent stability then allays fears of adverse occurrences, and market participants begin to view the recent event-data as following a normal distribution, in which observations that deviate dramatically from the mean lie in the distribution’s thin tails. In reality, however, longer-term data may reveal a distribution of outcomes with higher kurtosis, or “fat tails,” so that the true risk of extreme events is far greater than it is under a normal distribution. Market participants may also underestimate mundane low-probability events. Unusual events, such as a large meteor hitting the earth, are highly salient, whereas more mundane events, such as changes in collateral value, are commonplace, possibly existing on a continuum. The very familiarity with collateral of individuals working in the financial sector might have led them to underestimate the potential consequences of a drop in collateral prices. *See Anabtawi & Schwarcz, supra* note 36.

firms and markets.⁴⁰ What made the financial crisis so devastating was that these failures combined to facilitate the transmission of economic shocks.

Regulation should try to increase awareness of these types of correlations and limit their potential to combine. Prof. Anabtawi and I have shown, however, that the same types of market failures that impair efficiency—which I have just demonstrated cannot be completely prevented by regulation⁴¹—make it unlikely that financial market participants will use sufficient effort to either identify the correlations or attempt to prevent their combining.⁴² Furthermore, we have identified only one of potentially many transmission mechanisms for systemic failure.⁴³ Regulators therefore need to turn to ways to stabilize the financial system that go beyond limiting the transmission of systemic shocks.

C. Stabilizing the Afflicted Financial System

Regulation could also work ex post even after a systemic shock has been triggered and is being transmitted. The regulation would then attempt to stabilize the afflicted financial system. This could be done by trying to stabilize systemically important firms and financial markets impacted by the

⁴⁰ The tight interconnectedness described above also can have a temporal component insofar as the connections, being interactive, work too quickly to control. *See supra* note 7.

⁴¹ *See supra* note 31 and accompanying text.

⁴² Information and incentive failure, for example, can cause failures to identify or fully appreciate both correlations: between low-probability risk and firm integrity, and among financial firms and markets. Rationality failure can also foster failures to identify or fully appreciate the first correlation: between low-probability risk and firm integrity. And principal-agent failure can result in a failure to identify or fully appreciate the first correlation: between low-probability risk and firm integrity. *See Anabtawi & Schwarcz, supra* note 36.

⁴³ *Cf. supra* note 37 (noting that misguided government policy can contribute to systemic risk). Being driven by short-term political decisions and other non-economic factors, government policy will always be a risk factor.

transmission.⁴⁴ This approach again takes inspiration from chaos theory, insofar as that theory holds that remedies should also focus on limiting the consequences of failures.⁴⁵

There are at least two ways that regulation could stabilize systemically important firms and financial markets: by ensuring liquidity to those firms and markets, and by requiring those firms and markets to be more internally robust.

1. *Ensuring Liquidity to Firms and Markets.* Liquidity has traditionally been used, especially by government central banks, to help prevent financial firms from defaulting. The U.S. Federal Reserve Bank, for example, has had this role of lender of last resort to banks.⁴⁶ And the European Commission is in the process of attempting to help recapitalize European banks that are exposed to sovereign-debt risk.

Ensuring liquidity to stabilize systemically important firms would follow this pattern, except that the source of the liquidity could at least be partly privatized by taxing those firms to create a systemic risk fund. Privatizing the source of liquidity would help to address the public costs of a lender of last resort: the shifting to taxpayers of the costs of loans that are not repaid, and the fostering of moral hazard that could result by encouraging financial firms—especially those that believe they are “too big to fail”—to be fiscally reckless. Also, internalizing costs by privatizing the

⁴⁴ To the extent regulation stabilizes a systemically important firm that otherwise would be failing due to endogenous or non-systemic exogenous causes, the regulation could also be viewed as an ex ante solution.

⁴⁵ See *supra* note 34 and accompanying text.

⁴⁶ Federal Reserve Act of 1913 § 13(3), 12 U.S.C. § 343 (2010).

source of liquidity would help to address the dilemma that market participants, even those that are not (and that know they are not) too big to fail, are economically motivated to create externalities that could have systemic consequences.⁴⁷

Perversely, the Dodd-Frank Act undercuts liquidity by sharply limiting the power of the Federal Reserve to make emergency loans to individual or insolvent financial firms.⁴⁸ That categorical limitation appears somewhat excessive, if not dangerous; a lender of last resort can be an important safeguard if it acts judiciously. Even more perversely, the idea of a systemic risk fund was originally included in the bill that would become the Dodd-Frank Act but was taken out before enactment because of opposition by politicians who believed that the fund would increase moral hazard by institutionalizing bailouts.⁴⁹ I believe that belief is misguided. The likelihood that systemically important firms will have to make additional contributions to the fund to replenish bailout monies should motivate those firms to monitor each other and help control each other's risky behavior.

The European Commission apparently has been considering the idea of a systemic risk fund in connection with its proposal to tax the financial sector.⁵⁰ Although the ultimate use of the tax revenues is currently

⁴⁷ Cf. *supra* notes 18-19 and accompanying text.

⁴⁸ Dodd-Frank Act § 1101.

⁴⁹ S. Amdt. 3827, 111th Cong. (2010) (eliminating the proposed \$50 billion dollar fund, financed by a tax on banks, that would help wind down failed financial companies).

⁵⁰ European Commission, *Taxation of the Financial Sector*, a Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: (Brussels COM (2010) 549/5; SEC (2010) 1166). See also European Draft Directive on a Common System of Financial Tax (Sept. 28, 2011), available at http://ec.europa.eu/taxation_customs/taxation/other_taxes/financial_sector/index_en.htm.

unresolved,⁵¹ news reports indicate that an originally contemplated use was a systemic risk fund.⁵² The IMF also appears to be using the European Commission tax proposal as a platform to announce that “new taxes on banks [are] needed to provide an insurance fund for future financial meltdowns and to curb excessive risktaking.”⁵³

I’ve so far discussed ensuring liquidity to stabilize systemically important firms. But recall that financial markets too can be triggers and transmitters of systemic risk. Liquidity can also be used to stabilize systemically important financial markets.⁵⁴ For example, in response to the post-Lehman collapse of the commercial paper market, the Federal Reserve created the Commercial Paper Funding Facility (“CPFF”) to act as a lender of last resort for that market, with the goal of addressing “temporary liquidity distortions” by purchasing commercial paper from highly rated issuers that could not otherwise sell their paper.⁵⁵ The CPFF apparently helped to stabilize the commercial paper market.⁵⁶

⁵¹ *Id.* (indicating that one of the possible uses of the tax would be to provide a source of funds for the EU).

⁵² *Commission Proposes a Bank Tax to Cover the Costs of Winding Down Banks that Go Bust* (May 26, 2010), available at http://ec.europa.eu/news/economy/100526_en.htm (last visited Mar. 1, 2011).

⁵³ Larry Elliott & Jill Treanor, *IMF: Supervise and Tax Banks or Risk Crisis*, THE GUARDIAN, Oct. 8, 2010, at 25 (London-final ed.) (paraphrasing an announcement by the IMF’s then-Managing Director Dominique Strauss-Kahn).

⁵⁴ This was first proposed in *Systemic Risk*, *supra* note 3, at 225-30.

⁵⁵ See Tobias Adrian, Karin Kimbrough, & Dina Marchioni, *The Federal Reserve’s Commercial Paper Funding Facility*, FED. RESERVE BANK OF N.Y. STAFF REPORT NO. 423 (April 1, 2010).

⁵⁶ *Id.* at 11 (concluding that “[t]he CPFF indeed had a stabilizing effect on the commercial paper market”). This is very different from quantitative easing, in which a central bank purchases securities as a form of monetary policy. For example, the U.S. Federal Reserve has been engaged in quantitative easing programs, purchasing U.S. Treasury securities in order to hold down long-term interest rates. In contrast, I contemplate the task of a market liquidity provider of last resort as much more targeted: to prevent market collapses due to panic.

This same approach can be applied more broadly to respond to panic in securities market.⁵⁷ Say, for example, that the intrinsic value—effectively the present value of the expected value of the underlying cash flows—of a type of mortgage-backed security is estimated to be in the range of 80 cents on the dollar. If the market price of those securities had fallen significantly below that number, say, to 20 cents on the dollar, the market liquidity provider could purchase these securities at, say, 60 cents on the dollar, thereby stabilizing the market and still making a profit. To induce a holder of the mortgage-backed securities to sell at that price, the market liquidity provider could, for example, agree to pay a higher “deferred purchase price” if the securities turn out to be worth more than expected.⁵⁸ This is just one (simplified) example of the flexible pricing approaches used in structured financing transactions to buy financial assets of uncertain value which could be adapted to a market liquidity provider’s purchases.⁵⁹

2. Requiring Firms and Markets to be More Internally Robust.

Regulation could also help to stabilize systemically important firms

⁵⁷ One might ask why, if a market liquidity provider of last resort can invest at a deep discount to stabilize markets and still make money, private investors would not also do so, thereby eliminating the need for some sort of governmental market liquidity provider. One answer is that individuals at investing firms will not want to jeopardize their reputations (and jobs) by causing their firms to invest at a time when other investors have abandoned the market. Another answer is that private investors usually want to buy and sell securities, without having to wait for their maturities; whereas a market liquidity provider of last resort should be able to wait until maturity, if necessary.

⁵⁸ See Steven L. Schwarcz, *Too Big To Fail?: Recasting the Financial Safety Net*, in *THE PANIC OF 2008* (Lawrence E. Mitchell & Arthur E. Wilmarth, Jr. eds., Edward Elgar 2010), available at <http://ssrn.com/abstract=1352563> (using this example).

⁵⁹ Alternatively, a market liquidity provider of last resort could attempt to stabilize the market by entering into derivatives contracts to strip out risks that the market has the greatest difficulty hedging—in effect, the market’s irrationality element—thereby stimulating private investment. By hedging—and not actually purchasing securities directly—the market liquidity provider would appear to be taking less investment risk, and thus its function may be seen as more politically acceptable. *Id.*

and markets by requiring them to be more internally robust.⁶⁰ This could be accomplished in various ways. First consider firms.

The Dodd-Frank Act, for example, requires banks and, to the extent designated as “systemically important,” other financial firms to be subject to a range of capital and similar requirements.⁶¹ Addressing the possibility that a firm could nevertheless end up failing, the Act also requires these firms to submit a resolution plan—a so-called “living will”—that sets forth how the firm would liquidate in an orderly manner to minimize further systemic impact.⁶²

The extent to which these types of approaches will work, and their potential impact on efficiency, are open questions. Reducing a firm’s leverage, for example, can certainly enable the firm to withstand economic shocks and reduce its chance of failure.⁶³ The Basel capital requirements, however, did not prevent the many bank failures resulting from the 2008 financial crisis. Setting regulatory limits on leverage could also backfire because some leverage is good but there is no optimal across-the-board amount of leverage that is right for every firm. Regulation should at least focus, however, on attempting to prevent firms from opportunistically overleveraging themselves during boom times, thereby correcting that type of cyclical imbalance.

⁶⁰ Although I refer to regulation requiring firms to become more internally robust as ex post (in the sense that more robust firms can better withstand a systemic shock), such regulation could also be viewed as ex ante in the sense that robust firms are less likely to fail and thereby trigger a systemic shock. I am still pondering the appropriate ex-ante/ex-post distinction.

⁶¹ Dodd-Frank Act §§ 115(b) & 165(i). The Dodd-Frank Act directs the Federal Reserve, for example, to set “prudential” capital standards for certain large financial firms, including a maximum debt-to-equity ratio of 15:1. *Id.* § 165(j).

⁶² *Id.* § 165(d).

⁶³ *Cf.* text following note 4, *supra* (discussing highly leveraged firms engaging in fire-sales of assets).

One also might question Dodd-Frank’s living-will requirement. Ex ante plans (such as a liquidation plan made when a financial firm is healthy) rarely match ex post realities (such as the realities facing the firm when financially challenged). Moreover, it is uncertain whether future politicians would, or should, force the liquidation of a large financial firm, even pursuant to its living will, without considering the consequences at that time.

The Dodd-Frank Act also includes procedures for limiting a systemically important firm’s right to make risky investments—often referred to as the Volcker Rule.⁶⁴ This is a highly paternalistic approach, substituting a blanket regulatory prescription for a firm’s own business judgment. I’m generally skeptical of any rule that attempts to protect a sophisticated financial firm from itself⁶⁵—and indeed, Moody’s has warned that a leaked early draft of interagency rules implementing the Volcker Rule would, if adopted, probably “diminish the flexibility and profitability of banks’ valuable market-making operations and place them at a competitive disadvantage to firms not constrained by the rule.”⁶⁶

Dodd-Frank appropriately does require many large public firms to institute internal governance procedures to protect the firm, including

⁶⁴ See Dodd-Frank Act sec. 619, § 13 (codifying steps to implement the Volcker Rule limiting proprietary trading). Several federal agencies—the Federal Reserve Bank, the Federal Deposit Insurance Corporation (FDIC), and the Office of the Comptroller of the Currency—recently proposed rules to implement this.

⁶⁵ I recognize that even sophisticated financial firms sometimes might not fully understand a highly complex investment. *Cf. supra* note 18 and accompanying text (discussing misinformation). The ultimate question of the value of the Volcker Rule will therefore be empirical: whether the benefits of its limitation on proprietary trading will outweigh profits lost by losing the ability to engage in such trading. Although some may argue that those benefits, which accrue to all, should be more highly weighted than profits, which accrue only to the financial firms themselves, my proposal for a privatized systemic risk fund should help to internalize any harm of proprietary trading. *See supra* notes 46-53 and accompanying text.

⁶⁶ Edward Wyatt, *Regulators to Set Forth Volcker Rule*, N.Y. TIMES, Oct. 10, 2011 (quoting Moody’s).

establishing risk committees (with at least one risk-management expert) responsible for enterprise-wide risk management oversight.⁶⁷ Well managed firms should—and in my experience already do—have these types of procedures and committees.

Also, appropriately in my judgment, the Dodd-Frank Act does not attempt to artificially limit the size of financial firms. Some have argued that size limits would minimize the potential moral hazard from firms that believe they are “too big to fail.” There is, however, no clear evidence of such risky behavior, and financial firm losses can be explained by other reasons. Size should be governed by the economies of scale and scope needed for firms to successfully compete, domestically and abroad—so long as that size is manageable.

We should be cautious, however, of financial firms that increase their size, especially by acquisition of other firms, primarily to satisfy senior management egos. Dodd-Frank indirectly addresses this concern (at least weakly) by linking senior executive compensation to long-term results—for example, requiring stock exchanges to adopt standards whereby listed companies implement policies to recoup senior executive compensation in the event of an accounting restatement.⁶⁸

Another way that regulation could make systemically important firms more internally robust is by requiring at least some portion of their debt to

⁶⁷ Dodd-Frank Act § 165(h).

⁶⁸ *Id.* § 954.

be in the form of so-called contingent capital.⁶⁹ Contingent capital debt would automatically convert to equity upon the occurrence of pre-agreed events. Requiring contingent capital is therefore effectively like requiring a pre-planned debt restructuring or workout.

It's unclear if regulatory-imposed contingent capital would be efficient. If contingent capital is a good idea, markets themselves should implement it; I don't see any market failures impeding that implementation. I'm also skeptical whether regulatory-imposed contingent capital might have unforeseen consequences. For example, might automatic conversions of debt claims to equity interests create counterparty risk by reducing the value of firms holding those claims?⁷⁰

Finally, regulation could focus on making systemically important firms more internally robust at least to the extent such firms provide public goods. In the United States, for example, the Glass-Steagall Act (which has since been revoked) had created a separation between commercial and investment banking—the former including deposit taking and lending, the latter including securities underwriting and investing. Although the Dodd-Frank Act does not reinstitute this separation, the final report of the U.K. Independent Commission on Banking (often called the Vickers Report⁷¹) recommends a more limited form of separation, which it calls ring-fencing, intended to protect the “basic banking services of safeguarding retail

⁶⁹ See, e.g., John C. Coffee, Jr., *Systemic Risk After Dodd-Frank: Contingent Capital and the Need for Regulatory Strategies Beyond Oversight*, 111 COLUMBIA LAW REVIEW 795 (2011).

⁷⁰ The conversion would constitute an actual reduction in value if the pre-agreed trigger is sensible.

⁷¹ Although I provided input for this Report in a November 12, 2010 meeting at All Souls College, University of Oxford, with Commission Chairman Sir John Vickers and other members of the Commission's Secretariat, I did not suggest the ring-fencing procedure that the Report eventually adopted.

deposits, operating secure payments systems, efficiently channelling savings to productive investments [i.e., making loans], and managing financial risk.”⁷² The ring-fencing proposed in the Vickers Report appears to have similarities to ring-fencing used in the United States to protect essential public utilities, which often operate as subsidiaries within holding-company structures.⁷³

Ring-fencing is more of a micro- than macro-prudential approach since its focus is more on protecting retail banking activities rather than on preventing systemic collapse.⁷⁴ Nonetheless, to the extent it improves consumer confidence, ring-fencing of retail banking might help to improve the real economy.

I have discussed how regulation could help to stabilize firms. Regulation could also help to stabilize systemically important markets. This

⁷² Vickers Report, at 7.

⁷³ In expert testimony to a state public service commission, I have recently defined utility ring-fencing as follows: “The term ring-fencing is not always clearly defined. By ‘ring-fencing,’ I mean protection of [the utility subsidiary] and its assets from harm caused by the [utility subsidiary’s] affiliates. A primary goal of ring-fencing is protecting the [utility subsidiary] from harm caused by a possible bankruptcy of one or more of its affiliates. This is achieved by making it unlikely that an affiliate’s bankruptcy will involuntarily force the [utility subsidiary] into bankruptcy or cause a substantive consolidation of the affiliate and the [utility subsidiary] or cause the [utility subsidiary] to voluntarily file for bankruptcy. Another goal of ring-fencing is protecting the [utility subsidiary’s] assets from being raided by an affiliate. This can be achieved by imposing dividend restrictions on the [utility subsidiary] and by restricting non-arm’s length transactions that are unfair to the [utility subsidiary].” The Vickers Report similarly proposes that the “banks’ UK retail activities [] be carried out in separate subsidiaries. The UK retail subsidiaries would be legally, economically and operationally separate from the rest of the banking groups to which they belonged.” Vickers Report at 11.

⁷⁴ Cf. Laurence Kotlikoff, *Why the Vickers Report Failed the UK and the World*, FIN. TIMES, Sept. 20, 2011 (observing, among other things, that the flaw of “ring-fencing good banks and letting bad banks do their thing” is demonstrated by “the collapse of Lehman Brothers [which Prof. Kotlikoff likens to a bad bank], whose failure nearly destroyed the global financial system”).

could occur, for example, by requiring appropriate circuit breakers, a topic which I do not (unfortunately) have the time to discuss.⁷⁵

D. Summary

Regulation could protect the financial system in at least three ways: by limiting the triggers of systemic risk, by limiting the transmission of systemic shocks, and by attempting to stabilize the system. Eliminating the triggers of systemic risk is not feasible. Eliminating the transmission of systemic shocks is likewise not feasible.

It therefore is critical to try to stabilize the financial system against the consequences of systemic shocks. This will involve stabilizing both systemically important financial firms and markets impacted by the shocks. I have examined two approaches to stabilization: ensuring liquidity to those firms and markets, and requiring those firms and markets to be more internally robust.

I am reasonably comfortable with the first approach (ensuring liquidity), especially if the source of the liquidity could be privatized. That not only would stabilize firms and markets but also would help to control the motivation of systemically important firms to externalize their costs (and thus reduce public costs). The extent to which regulation can efficiently require systemically important firms and markets to be more internally robust is a more open question.

⁷⁵ For a discussion of market circuit breakers, *see, e.g.*, Anabtawi & Schwarcz, *supra* note 36, at 1398-1401.

IV. CONCLUSIONS

I have attempted to build an analytical framework for regulating systemic risk. Any such framework, however, will be imperfect and have tradeoffs. Complexity and complacency, among other factors, make ex-ante preventive regulation insufficient. Regulation therefore must operate ex post as well, by attempting to limit the transmission of systemic risk and reduce systemic consequences.

For example, regulation to limit principal-agent failures by paying managers, including secondary managers, under longer-term compensation schemes would operate ex ante, or preventively. To avoid prejudicing the competitiveness of firms in any given nation (or, as in the EU, any region), this type of regulation ideally should be global.

Regulation to provide liquidity to systemically important firms and markets would operate more ex post, by helping to stabilize the financial system. The source of this liquidity could—and arguably should—be privatized by requiring firms to contribute to a systemic risk fund. That type of requirement should (again) ideally be global to avoid prejudicing the competitiveness of any nation or region—a fact that the European Commission has recognized in connection with its similar proposal to impose a tax on the financial sector.⁷⁶

Thank you.

⁷⁶ See *supra* notes 50-53 and accompanying text.