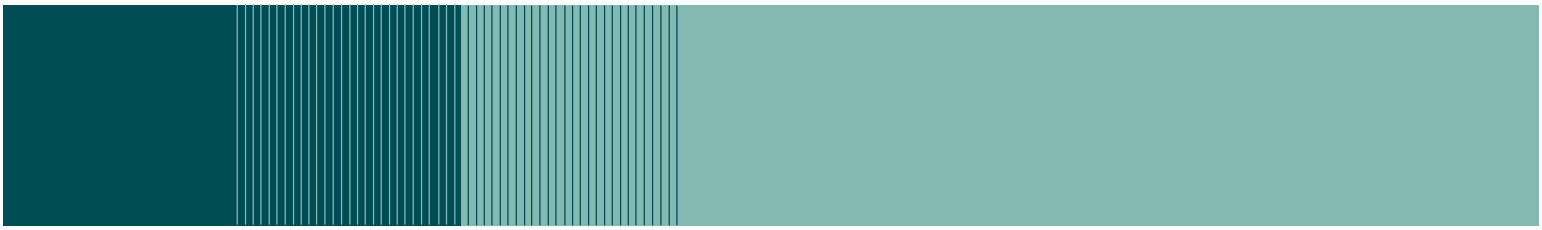
24 February 2011

NERA Economic Consulting Response to Central Bank of Ireland Consultation Paper: *Consultation on Impact Metrics for the Risk Based Supervision of Financial Firms by the Central Bank and on Impact Based Levies*



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In a Consultation Paper,[1] the Central Bank of Ireland ("Central Bank") seeks input on which metrics it should use to assess the "impact" of the financial firms that it regulates. These impact metrics would be used in determining the level of supervisory resource allocated to each regulated firm, and could also play a role in determining the fees levied on regulated firms.

The Consultation Paper defines ***impact*** as, "in essence, size or ability to cause prudential harm or customer loss…Another way of describing impact would be to talk about the ability of a financial firm, were it to fail on any dimension, to cause societal damage."[2] The concept of impact—the potential harm that the failure of a firm could cause—is distinguished from the ***probability*** of the firm failing.

The Central Bank describes two types of impact. ***Prudential or systemic impact*** encompasses the concept of systemic risk, i.e., the possibility that the failure of one firm can lead to contagion or spill-over effects that have a negative impact on other firms and may harm the broader economy. ***Customer impact*** is the potential for the failure of a firm to cause losses to retail and other customers.[3]

NERA has undertaken substantial research on the issue of systemic risk, a concept which, as noted above, is closely related to prudential or systemic impact as defined in the Consultation Paper. NERA experts have recently authored or co-authored several reports on how to measure systemic risk and on what are appropriate policies to address systemic risk. These reports reach conclusions that are relevant to the issues raised in the Consultation Paper and that we hope will be helpful to the Central Bank's determination of what are appropriate impact metrics for the firms it regulates.

A key finding of NERA's research is that policy distortions can result from overreliance on firm size as an indicator of financial institution systemic risk. Assessing systemic risk solely on the basis of firm size—or overemphasizing firm size at the expense of other important factors —can

[1] Central Bank of Ireland, 2010, "Consultation on Impact Metrics for the Risk Based Supervision of Financial Firms by the Central Bank and on Impact Based Levies". Hereinafter, "Consultation Paper".

[2] Consultation Paper, section 2.2.

[3] Consultation Paper, section 2.3.

result in a misallocation of regulatory resources. Moreover, policy that relies on size as the primary determinant of systemic risk can have negative economic consequences.

In particular, size-based metrics can identify as systemically risky certain firms that do not in fact pose systemic risk; at the same time, such metrics may fail to identify as systemically risky other firms whose failure could cause substantial harm to the broader economy. This is because elements not directly linked to size are important considerations in the identification and quantification of systemic risk.

One critical factor is interconnectedness.[4] This is the idea that the transactions, investments, or decisions of a financial institution affect other financial institutions. Because of these connections, the default of a financial institution can lead to reactions by others. The simplest example is when the default of an institution leads to sufficiently large losses by creditors that additional defaults occur, potentially leading to domino-like collapses.

Other elements that are not directly linked to size, but which are important considerations in the identification and quantification of systemic risk, include cyclicality, leverage, liquidity, and transparency. While incorporating such elements into the identification and assessment of systemically risky financial institutions may increase the complexity of the process, policies based on size alone could result in more economic harm than good.

These ideas are discussed in greater detail in three recent NERA reports, which were originally prepared for the Property Casualty Insurers Association of America. The reports, which follow as Attachments 1, 2, and 3, are briefly described below:

Attachment 1 is a NERA report entitled "Why 'Too Big to Fail' is Too Short-Sighted to Succeed: Problems with Reliance on Firm Size for Systemic Risk Determination", dated 18 January 2010 and authored by NERA Vice Presidents Christopher Laursen and Dr Sharon Brown-Hruska, Senior Vice President Dr Robert Mackay, and Oliver Wyman Group Partner Dr John Bovenzi.[5] The authors discuss why relying on size as the primary determinant of financial

[4] We note that the Consultation Paper mentions interconnectedness in its discussion of prudential/systemic impact in section 2.

[5] Oliver Wyman is a sister company of NERA Economic Consulting.

institution systemic risk is inappropriate, and describe negative economic consequences likely to result if a sized-based process is used. The authors note that, while several large financial institutions significantly contributed to the systemic risk episode recently experienced (in the context of the global financial crisis), absolute size is not an appropriate proxy for a firm's systemic risk contribution. They find that policy proposals that rely on a size-based identification process would erroneously identify a number of financial firms as systemically risky, when in fact they are not. Meanwhile, other firms that do in fact pose significant systemic risk would fail to be identified. The authors argue that policies that identify systemic risk based on size would create a cross-subsidy of significant magnitude from firms that do not pose systemic risk to those firms whose activities are systemically risky. The resulting moral hazard would encourage increased risk-taking at small to mid-sized institutions and, as such, could ultimately defeat the policy goal of reducing the economy's exposure to systemic risk.

Attachment 2 is a NERA report entitled, “De-Mystifying Interconnectedness: Assessing ‘Too Interconnected to Fail’ and the Fallout from Getting it Wrong”, dated 23 April 2010, and authored by NERA Vice Presidents Christopher Laursen and Dr Sharon Brown-Hruska, Senior Vice President Dr Robert Mackay, and Oliver Wyman Group Partner Dr John Bovenzi. In this paper, the authors call for a more balanced approach to addressing systemic risk regulation and resolution authority in financial services regulatory reform. The report describes financial system interconnectedness and its importance to systemic risk. It also details the negative consequences associated with a failure to consider varying levels of interconnectedness across financial firms in regulatory reform efforts. These economic impacts include: inefficient regulation and competing mandates; increased legal and market uncertainty; inefficient capital structure and increased cost of capital; reduced transparency and increased risk; "free-riders" and loss of economic efficiency; adverse incentives and new additional moral hazard; undermined market discipline; and job losses and a decline in competitiveness.

Attachment 3 is a NERA report entitled, “Institution-Specific Systemic Risk Assessment Methodology”, dated 16 November 2010 and authored by NERA Vice President Christopher Laursen and Special Consultant Dr Ethan Cohen-Cole. The report outlines a risk assessment process that may be used to determine the level of systemic risk posed by various individual financial institutions. Application of the assessment methodology to a broad set of financial firms

will allow rank ordering of firms in terms of systemic risk. The relative rankings provided by the process will allow regulators to properly prioritise oversight efforts across a broad spectrum of financial market participants.

We believe that NERA's research on systemic risk will be helpful to the Central Bank in arriving at appropriate impact metrics for regulated entities. Please do not hesitate to contact us if you have any questions about our response or the attached reports.

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PCI White Paper

January 18, 2010

Why 'Too Big to Fail' is Too Short-Sighted to Succeed

Problems with Reliance on Firm Size for Systemic Risk Determination

Research by: NERA Economic Consulting

Prepared for: Property Casualty Insurers Association of America

PCI Property Casualty Insurers Association of America
Shaping the Future of American Insurance

NERA Economic Consulting

PCI White Paper

Why 'Too Big to Fail' is Too Short-Sighted to Succeed

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PCI is comprised of more than 1,000 member companies, representing the broadest cross-section of insurers of any national trade association. PCI members write over $180 billion in annual premium and 37.4 percent of the nation's property casualty insurance. Member companies write 44.0 percent of the U.S. automobile insurance market, 30.7 percent of the homeowners market, 35.1 percent of the commercial property and liability market, and 41.7 percent of the private workers compensation market.

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Christopher Laursen, NERA Senior Consultant, is a leading expert in financial products and markets, risk management, and financial regulation. Prior to joining NERA, he served as Manager of Risk Policy and Guidance for the Supervision and Regulation Division of the Federal Reserve Board, supervising the development of risk-oriented policies and guidance issued to financial institutions and examiners. He also worked closely with other domestic and international financial supervisors and Basel groups to craft various interagency and international supervisory and capital policies. During his Federal Reserve tenure, Mr. Laursen also held roles including Head of Trading & Capital Markets Risk and Lead Capital Markets Examiner over Bank of America Corporation. He also served as an examiner for the Office of the Comptroller of the Currency. Mr. Laursen holds an MBA with a finance concentration from the University of Pennsylvania's Wharton School and a BBA in finance from the University of Miami.

Sharon Brown-Hruska, NERA Vice President, is a leading expert in securities and derivatives markets, investments, trading, and risk management. Prior to joining NERA, she served as Commissioner and Acting Chairman of the U.S. Commodity Futures Trading Commission, and as a member of the President's Working Group on Financial Markets. Dr. Brown-Hruska has advised exchanges, businesses, and governments on regulation and compliance issues, and has addressed numerous governmental and financial organizations and financial industry associations, including U.S. House and Senate committees, the International Monetary Fund, and the International Organization of Securities Commissioners. Prior to her public service, Dr. Brown-Hruska was an Assistant Professor of Finance at George Mason University and at Tulane University. She holds a PhD and MA in economics and a BA in economics and international studies from Virginia Polytechnic Institute and State University.

John Bovenzi, Oliver Wyman Group Partner, has an extensive background in banking and financial industry regulation. Prior to joining Oliver Wyman, he was the Deputy to the Chairman and the Chief Operating Officer at the Federal Deposit Insurance Corporation ("FDIC"), directing the organization's day-to-day operations, including those related to deposit insurance, bank supervision, and the resolution of insolvent banks. He also served as a principal policy advisor to the FDIC Chairman; Chief Executive Officer of IndyMac Federal Bank (an FDIC owned and operated conservatorship); Director of the FDIC's Division of Resolutions and Receiverships; Deputy to the Chairman; and Deputy Director of the FDIC's Division of Research and Statistics. He is the author of numerous publications, and was the editor of "Managing the Crisis, the FDIC and RTC Experience." Mr. Bovenzi holds MA and PhD degrees in economics from Clark University and a BA in economics from the University of Massachusetts.

Robert Mackay, NERA Senior Vice President, specializes in providing risk management advisory services and securities and financial markets litigation support. Before joining NERA, Dr. Mackay was Professor of Finance and Director of the Center for Study of Futures and Options Markets in the College of Business at Virginia Polytechnic Institute and State University. He also served as Chief of Staff of the U.S. Commodity Futures Trading Commission and as a member of the Senior Staff of the President's Working Group on Financial Markets following the 1987 stock market crash. Dr. Mackay holds a PhD in economics from the University of North Carolina at Chapel Hill and a BS in economics from the University of South Florida.

Executive Summary

This paper discusses why relying on size as the primary determinant of financial institution systemic risk is inappropriate, and details negative economic consequences likely to result if a sized-based process is utilized in financial reform legislation.

To be sure, several large financial institutions significantly contributed to the systemic risk episode recently experienced. However, absolute size is not an appropriate proxy for a firm's systemic risk contribution. Legislative proposals that rely on a size-based identification process would erroneously identify a number of financial firms as systemically risky, when in fact they are not. Other firms that do in fact pose significant systemic risk would fail to be identified. Such a process, if enacted, would create a cross-subsidy of significant magnitude from firms that do not pose systemic risk to those firms whose activities are systemically risky. The resulting moral hazard would encourage increased risk-taking and, as such, could ultimately defeat the legislation's intent of reducing the economy's exposure to systemic risk.

Further, if a size-based process for identification of systemically risky financial firms were accompanied by heightened regulatory requirements and new systemic risk charges, the following economic results would be expected:

- Increased financial system risk as a result of new sources of moral hazard;
- Distortions in the competitive environment, impacting economic efficiency and creating potential barriers to entry;
- Increased costs to consumers for basic, often required, financial services, as a result of the pass-through of assessment cost, and costs associated with increased regulation; and
- U.S. job losses, including those predicted to result from reductions in capital and labor expenditures and economic dislocation, as a result of efforts by firms to structure to avoid size thresholds.

On balance, the costs of the proposal, considering the moral hazard and economic impacts, are economically significant, easily exceeding the benefit of the actual systemic risk fund itself.

Though reducing systemic risk and related taxpayer costs is critically important, to achieve these goals and avoid negative economic distortions, underlying sources of firm systemic risk must be properly identified. Elements not directly linked to size, including interconnectedness, cyclicality, leverage, liquidity, and transparency are important considerations in the identification and quantification of systemic risk. While incorporating such elements into the official identification and assessment of systemically risky financial institutions may increase the complexity of the process, a size-based process could result in more economic harm than good.

Introduction

On December 11, 2009, the U.S. House of Representatives approved H.R. 4173, the "Wall Street Reform and Consumer Protection Act of 2009," which requires that asset size be used to determine whether a financial firm is deemed a "covered financial company" and subject to assessments that would pre-fund a "systemic dissolution fund." As described in the House Financial Services Committee's Summary, "The Fund will be pre-funded by assessments on financial companies with more than $50 billion in assets and by hedge funds with more than $10 billion in assets."[1] A pending Senate bill, expected to be taken up in early 2010, may also require that asset size be used as a determinative factor in designating financial firms as systemically risky and subjecting such firms to new assessments.

The intent of the systemic dissolution fund is to prevent the government, and ultimately the taxpayers, from incurring the cost of supporting or winding-down of financial institutions during future systemic risk episodes. However, the economic problems associated with approaches currently pursued may outweigh any actual benefits.

This paper discusses problems with identifying systemically risky institutions based on size and negative economic consequences associated with subjecting these firms to heightened regulatory oversight and new assessments to pre-fund a systemic dissolution fund. These problems include: consumer price increases for basic financial services, heightened systemic risk as a result of increased moral hazard, potential U.S. job losses, and other economic inefficiencies.

1 HR 4173, TITLE I—Financial Stability Improvement Act, Summary, available at http://financialservices.house.gov/Key_Issues/Financial_Regulatory_Reform/FinancialRegulatoryReform/HR4173_summaries_by_title/Title_I_FISA_120309.pdf, accessed December 29, 2009.

Sources of Financial Firm Systemic Risk and Failings of Size-Based Determinations

Systemic Risk Defined

To best determine those firms that are systemically risky or systemically important requires an understanding of what constitutes systemic risk. No single agreed upon definition of systemic risk exists. However, various authorities have offered definitions reflecting the manner with which institutions they govern contribute to or are affected by systemic risk. The Chairman of the Federal Reserve, Ben Bernanke stated in a letter to Congress, "Systemic risks are developments that threaten the stability of the financial system as a whole and consequently the broader economy, not just that of one or two institutions."[2] According to the Property Casualty Insurers Association of America ("PCI"), systemic risk is "the likelihood and the degree that the institution's activities will negatively affect the larger economy such that unusual and extreme federal intervention would be required to ameliorate the effects."[3] Thus, systemic risk arises and manifests in a microeconomic context, but can induce instability in the macroeconomic context.

A sample of other definitions from various informed authors is provided below.

- A report from the Congressional Research Service's Marc Labonte states that, "Systemic risk within the financial system is often characterized as contagion, meaning that problems with certain firms or parts of the system spill over to other firms and parts of the system."[4]
- The Commodity Futures Trading Commission ("CFTC"), which regulates futures and options markets, recognizes that systemic risk results from default and the resulting interconnectedness among market participants and markets in general. The CFTC Glossary defines systemic risk as, "the risk that a default by one market participant will have repercussions on other participants due to the interlocking nature of financial markets. For example, Customer A's default in X market may affect Intermediary B's ability to fulfill its obligations in Markets X, Y, and Z."[5]
- During a speech on June 26, 2006, to the Housing Policy Council of the Financial Services Roundtable, U.S. Treasury's Assistant Secretary for Financial Institutions, Emil W. Henry, Jr. defined systemic risk as, "the potential for the financial distress of a particular firm or group of firms to trigger broad spillover effects in financial markets, further triggering wrenching dislocations that affect broad economic performance. Perhaps a useful analogy is to think about systemic risk as an illness that can become highly contagious."[6]

continued

2 Ben Bernanke, in a letter to Senator Bob Corker, dated October 30, 2009, quoted in "Bernanke Offers Broad Definition of Systemic Risk," WSJ Blogs, November 18, 2009, available at http://blogs.wsj.com/economics/2009/11/18/bernanke-offers-broad-definition-of-systemic-risk/, accessed December 29, 2009.

3 Testimony of Robert DiMuccio, before the Subcommittee on Capital Markets, Insurance, and Government Sponsored Entities, U.S. House of Representatives, March 5, 2009, p. 4.

4 Marc Labonte, "Systemic Risk and the Federal Reserve," Congressional Research Service, October 28, 2009, p. 1.

5 CFTC Glossary, available at http://www.cftc.gov/educationcenter/glossary/glossary_s.html, accessed December 29, 2009.

6 Remarks of Emil W. Henry, Jr., Before the Housing Policy Council of the Financial Services Roundtable, June 26, 2006, available at http://ustreas.gov/press/releases/js4338.htm, accessed December 29, 2009.

Notably, none of the definitions above mentions "size." As might be expected, these and other systemic risk definitions focus on the negative impact that failures or problems in an individual or groups of firms can have on the entire financial system, and ultimately the economy at large. In a market-based financial system, the failure of individual private firms is expected, and ultimately serves to improve efficiency. However, the demise of certain firms or groups of firms can pose "systemic" problems, the overall impacts of which are disproportionately large relative to their size.[7]

As referenced in many of the definitions, the disproportionately large impacts of systemically important firms stem from contagion or spillover effects. Spillover from, or to, a firm or group of firms can occur both directly and indirectly. Direct spillovers result from contractual exposures such as credit arrangements and other contractual commitments. The inability or unwillingness of a firm to honor significant contractual commitments with other institutions can lead to direct spillover, which may create a "domino" effect. Indirect spillovers can arise as a result of fear and uncertainty among market participants who lack sufficient information to determine if other firms retain direct exposure to a known problem firm, or the issues impairing the problem firm. In his 2006 speech, Assistant Secretary Henry stated, "Indirect spillovers typically develop, not from direct exposures to the firm at the epicenter of the crisis, but when this firm causes a lack of confidence leading to a sense of panic and turbulence that results in action that generates substantial losses for firms that were not directly exposed to the impaired firm."[8]

In that regard, the Bank of England cites "information frictions" as prominent in the run-up to the crisis including, "Network externalities which arise when agents in a financial system do not have the information necessary to determine the risks to which they are exposed."[9] The risk of indirect spillovers within a system tends to increase with opacity and complexity.

Sufficient transparency of financial institution exposures, appropriate diligent prudential supervision, and efficient pre-established resolution regimes can increase market understanding of problems and likely outcomes, thereby reducing indirect spillover risk, at least among regulated financial firms.

Recent Bail-Out Experience and Financial Institution Size

Given the recent explicit government support provided to certain large financial institutions (i.e., "bail-outs"), there is an understandable tendency to associate size with systemic importance and risk. The association begins with a focus on highly visible household-name financial firms that were bailed-out by governments, and became popularly known as "too-big-to-fail" institutions. The association leads to the following implicit line of thought:

- Each of the large individual institutions that was bailed-out must have been systemically important
- Systemic importance existed as a result of each firm's large size, an easily identifiable common factor
- Any financial firm of significant size must be systemically important, and therefore poses systemic risk

7 A financial firm's relative size and market power is limited by various anti-trust statutes and other regulations. Potential systemic risk arising from a firm or firms' market concentration should be addressed specifically by such existing authorities.

8 Henry Remarks, June 26, 2006.

9 "The role of macroprudential policy," Bank of England discussion paper, November 19, 2009, p. 12.

In summary, the above concludes that financial institution size always causes, and is the sole cause of, systemic risk. In essence, a perceived correlation between institution size and bail-outs is stretched to reach the conclusion that size equals systemic risk. In reality, each of the points above is inaccurate. An examination of facts along with basic intuition reveals aspects of the underlying premise, as well as the conclusion, to be false.

Government Support Beyond Large Financial Firms

First, though a few poorly regulated large financial firms that were bailed-out during the recent financial crisis received much attention, many intermediate- and small-sized institutions also received direct government support to mitigate potential negative systemic effects. These firms include hundreds of regional and community banks that received government funds from the Troubled Asset Relief Program ("TARP"). Though such smaller banking firms typically exhibited relatively low interconnectedness, many had undertaken risks similar to those of the larger firms, including exposure to real estate prices and high use of financial leverage. As a group, a large-scale and rapid failure of these mid-size and small banking firms would have led to significant negative economic effects.

Beyond TARP fund injections, the FDIC's increase of the deposit insurance threshold represented broad support to U.S. insured depositories of all sizes. Given a relatively high reliance on deposit funding by most intermediate and small banks, this support reduced pressure on banking sector liquidity, thereby reducing overall systemic risk.

Government support of financial institutions not considered large is not unique to the most recent crisis. See Appendix for additional historical background on systemic risk and government support.

Government Support Not Provided To All Large Financial Firms

Second, though a number of large financial firms indeed contributed to systemic risk, other large financial firms had minimal or no contribution. In fact, many large financial firms neither required nor received direct government support during the recent systemic risk episode. Large private Property and Casualty ("P&C") firms including Liberty Mutual and GEICO received no government support, and GEICO's parent company, Berkshire Hathaway, was even able to provide liquidity to Goldman Sachs during the most uncertain times of the financial crisis.

As seen on the following page, during the turbulent market period from June 2008 through June 2009, equity performance across various sub-groups of the financial sector varied significantly. Large P&C insurance companies, which obtained no explicit government support, fared significantly better than other financial sub-groups. The market appears to have recognized that, regardless of size, P&C insurers exhibited relatively low interconnectedness to troubled parts of the financial system.

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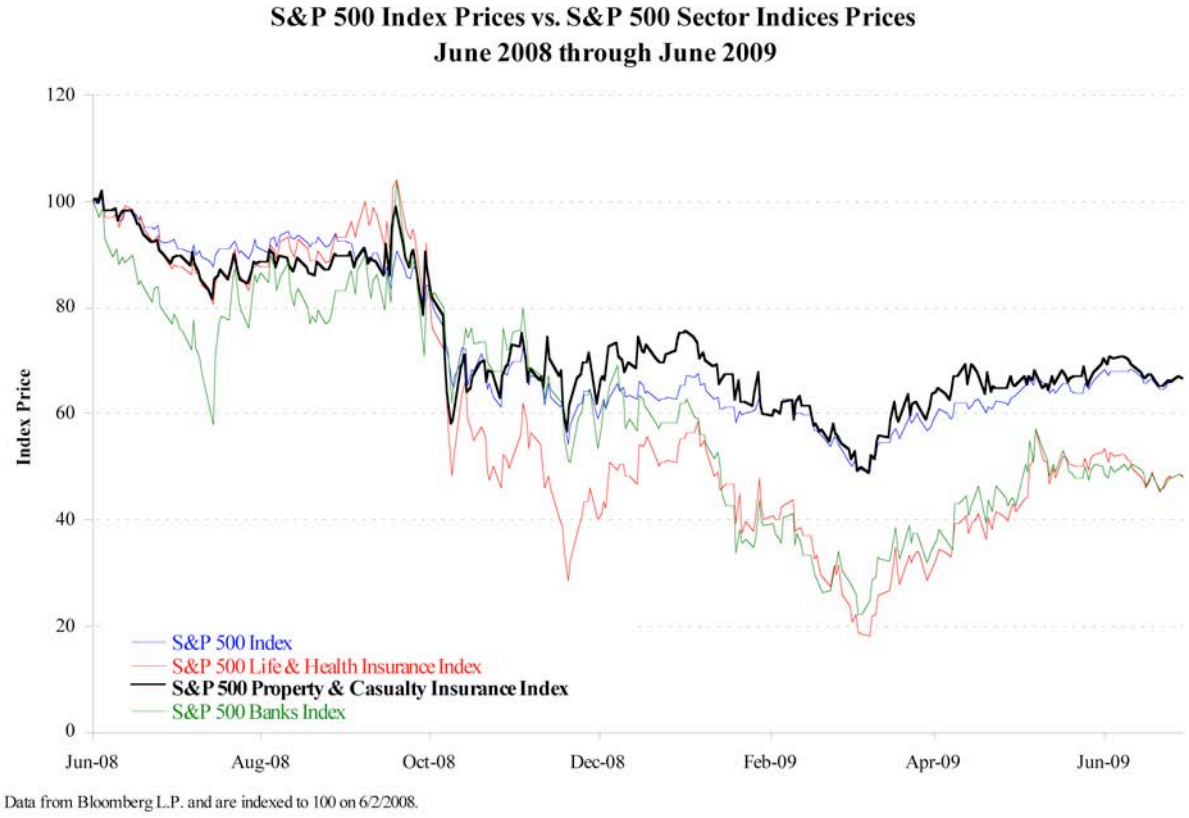


Some Large Financial Firms Supported in "Abundance of Caution"

Finally, certain large financial firms were almost certainly supported in an "abundance of caution." Given a lack of information, the government was uncertain as to whether certain firms were at risk of failure, and whether their failures would have posed systemic risk.[10] Fearing downside risk of "not doing enough" the government was willing to provide too much support, rather than too little. Given the concentration of banking assets held in the top 20 largest firms, it was most efficient for authorities to insure the survival of a large part of the banking sector by grouping these firms together and injecting capital into each of them.

The actual level of "cautionary" vs. "necessary" support provided by the government cannot be known. However, capital injections into large banks which, in some cases, was reportedly accepted only begrudgingly, seems to have been deemed necessary as a result of a number of key system failings. These include:

- **Opacity:** A lack of sufficient public transparency regarding risk exposures of certain financial firms and complex financial instruments posed the threat of indirect spillovers. For example, large unknown commitments booked off-balance sheet by some banking firms included contractual recourse that ultimately brought exposures on-balance sheet. Once the existence of these hidden exposures became generally known, investors became wary of what they may not know about seemingly sound banking institutions.

10 The fact that the U.S. banking and investment banking system had become highly concentrated within the top 20 institutions allowed the U.S. government, with its explicit pledges of support subsequent to the Lehman Brothers failure, to efficiently and definitively keep a large percentage of the total banking market open. Though expedient, this should not lead one to conclude that each of these institutions was disproportionately important relative to its size (i.e., systemically important).

NERA Economic Consulting - Response to CP49 - Attachment 1

- **Failure of Prudential Regulators:** Bank and securities company regulators lacked sufficient institutional knowledge to deal with a financial downturn. In the midst of the crisis, regulators were unable to gather and analyze (non-public) information quickly enough to determine an individual firm's true financial condition and its potential systemic risk upon failure.
- **Lack of Effective Systemic Oversight:** No regulatory authority was explicitly charged with the understanding and oversight of systemic risk issues across financial institutions and markets. Though there were programmatic efforts led by the New York Federal Reserve Board's ("NYFRB") Supervision area to identify and manage systemic risk, this group failed, even with respect to the universe of institutions over which it maintained direct authority.[11]
- **Ineffective Resolution Regimes:** Financial companies that were bailed-out tend to be characterized by the lack of effective resolution regimes. In some cases this was due to a myriad of complex intra-connections within financial conglomerates (e.g., holding company entities intertwined with bank entities). Clear and expedient resolution processes would have allowed institution failures, while minimizing spillover and customer effects.[12]

It is notable that each of the above failings is broadly accepted as having contributed to the recent systemic risk episode. Each is also currently in process of being specifically addressed in new legislation. Remediation of these core system problems and others should reduce future systemic risk, as well as the likelihood and scale of future bail-outs. The creation of a new systemic risk fund to pay for future bail-outs, in effect, assumes failure to correct core failings.

Key Elements Leading to Financial Firm Systemic Risk

A growing body of literature analyzing financial system risk identifies key sources of firm-based systemic risk.[13] These sources are largely indifferent to institution size. Though it is not the goal of this paper to comprehensively identify, define, and weight the importance of each of these sources, they are introduced here as important considerations for any systemic risk identification and assessment process. These sources will also provide useful context for the examples discussed in subsequent sections.

Interconnectedness

As noted in the systemic risk definition section above, interconnectedness, sometimes termed, "spillover" or "contagion," reflects the impact that financial firms have on one another. This concept is virtually synonymous with systemic risk. A group of firms or an individual firm, however large, that is not significantly impacted by other firms' problems, and whose failure does not significantly impact creditors, counterparties, and customers, should not be

continued

11 The Federal Reserve's Large Financial Institution Committee ("LFIC"), led by a chairperson and risk-head from the NYFRB was designed, in part, to develop cross-institutional perspectives and identify key and emerging risks.

12 In contrast, the resolution process for insurance companies, including the state-based guaranty fund system, has been effective in stemming potential systemic impacts from insurer insolvencies.

13 Certain elements of systemic risks stem from the system framework, within which firms operate, rather than directly from individual firms themselves. The framework is largely defined by various laws and regulations, as well as accounting principles. Part of the system framework that influences systemic risk includes requirements surrounding clearing and reporting of derivatives trades.

deemed systemically risky. Conversely, a group of firms or an individual firm that is highly impacted by other firms' problems, or whose own problems pose potential large negative impacts on other firms or customers, is more likely to encompass systemic risk.

In discussing connectivity and stability, Andrew Haldane of the Bank of England, notes,

> Within a certain range, connections serve as a shock absorber. The system acts as a mutual insurance device with disturbances disbursed and dissipated… But beyond a certain range, the system can flip the wrong side of a knife-edge. Interconnections serve as shock-amplifiers, not dampeners, as losses cascade. The system acts not as a mutual insurance device but as mutual incendiary device.[14]

Cyclicality/Correlation of Risk Exposures

When a group of financial institutions is heavily exposed to the same macroeconomic cycles or events, the entire sector can deteriorate simultaneously. Even without significant interconnectedness, the demise of a large portion of firms in a sub-sector of the financial industry can result in a reduction of services that cannot be replaced efficiently by healthy firms. This can harm deserving consumers and businesses and thereby weigh negatively on the economy.

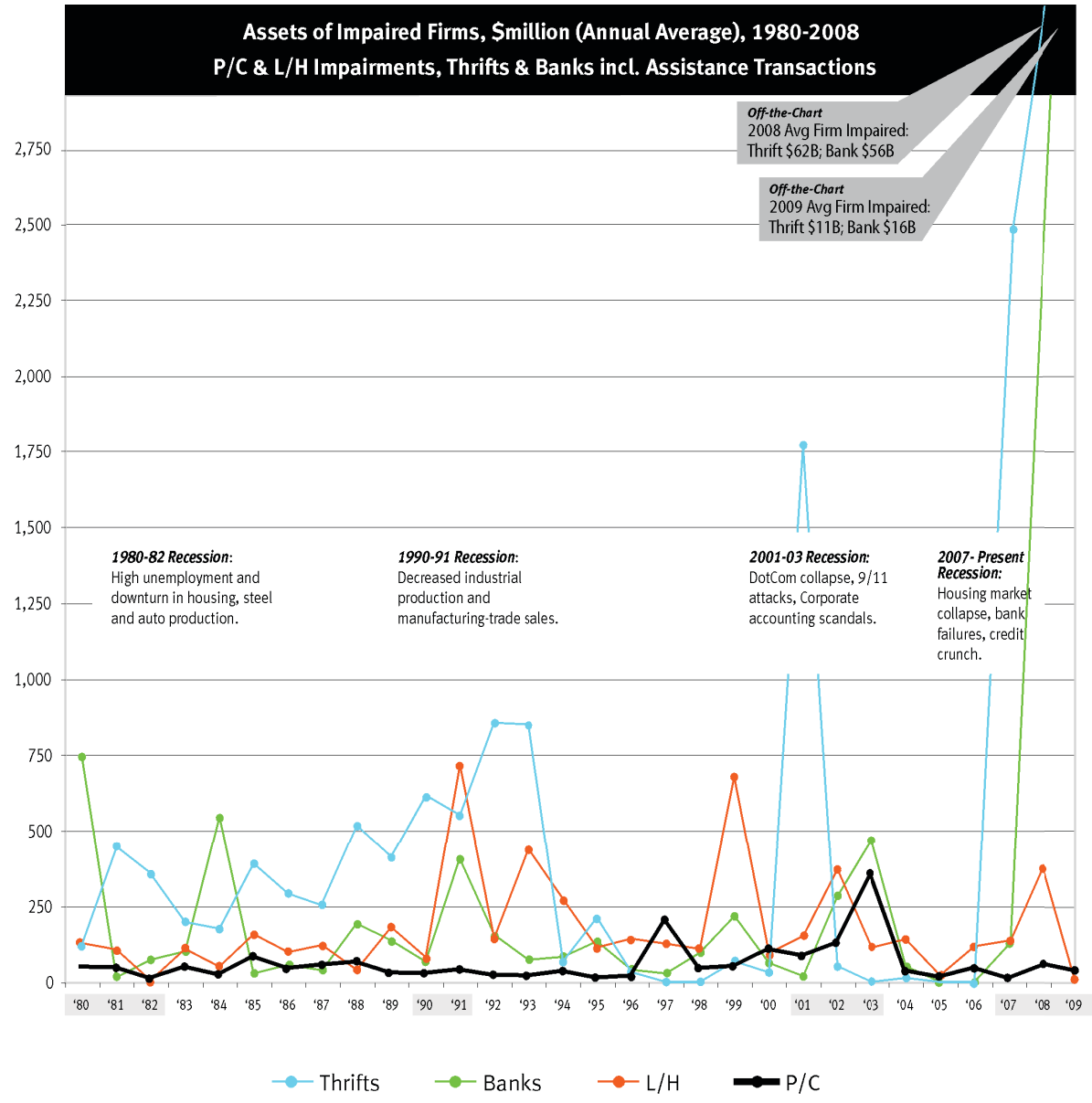
A clear example from the recent crisis is the exposure among a significant portion of the U.S. banking market to declining real estate prices. With respect to correlated risk exposures of banks, the Dallas Federal Reserve's Fisher and Rosenblum write that:

> The problem isn't just the riskiness of a big bank's assets, nor even the bank's size relative to the overall system. It's important to know whether the bank's asset holdings are highly correlated with those of other banks. Did they all make the same bad bets at the same time? Did they all bet that real-estate prices would rise forever? As we all know, the answer, in this decade, unfortunately, is "yes."[15]

14 Andrew G. Haldane, "Rethinking the Financial Network," Speech delivered at the Financial Student Association, Amsterdam, April 2009, p.10.

15 Richard W. Fisher and Harvey Rosenblum, "The Blob That Ate Monetary Policy," *Wall Street Journal*, September 27, 2009, available at http://online.wsj.com/article/SB10001424052748704471504574438650557408142.html, accessed December 29, 2009.

The chart below illustrates exposure to recessions of various sub-groups within the financial industry. Banks and thrifts show noticeable increases in impairment levels during various economic downturns over the prior 30 years. The life and health insurer industry exhibits less cyclical impairment, while P&C insurer impairments show virtually no correlation to cycles.



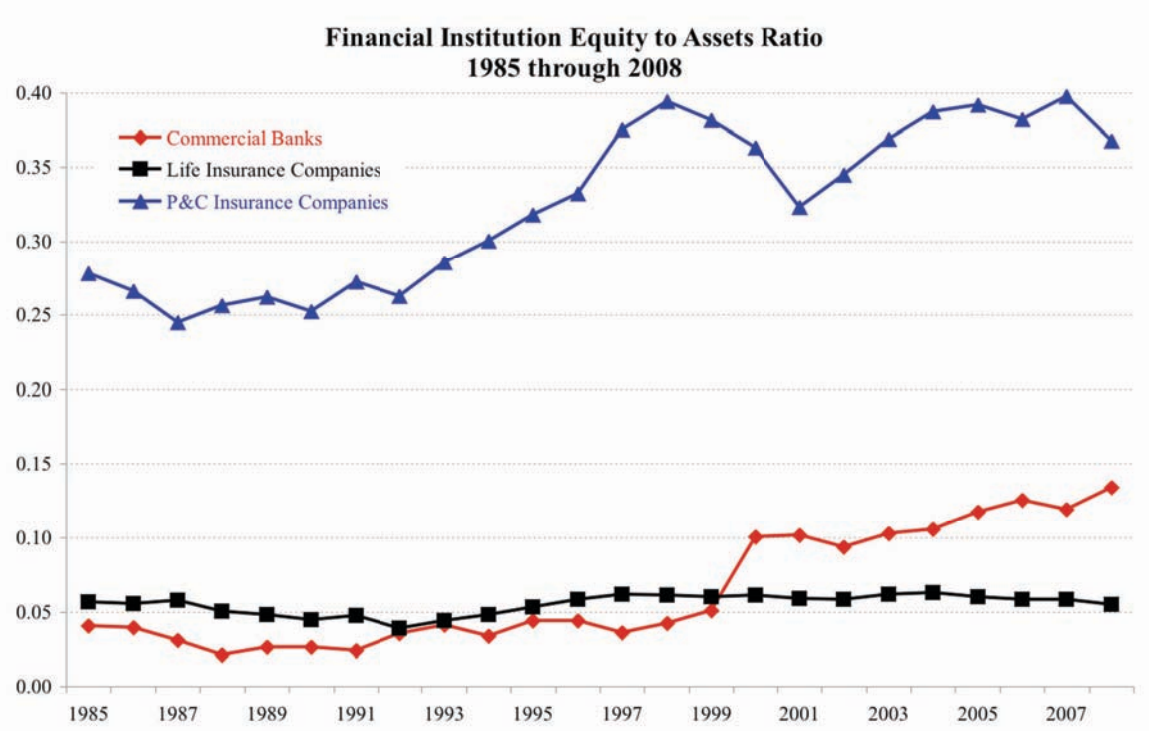
Source: "Impairment Experience of the Financial Services Industry," Property Casualty Insurers Association of America, May 22, 2009.

continued

Leverage

In finance, leverage is known as an agnostic amplifier of returns. Leverage in a firm, or within an industry, amplifies both positive and negative returns. All else being equal, a firm with a higher amount of capital has more cushion to weather financial difficulties and cycles, relative to a firm with less capital. As a result, financial firms and sub-sectors of the industry with higher leverage are inherently more risky. The higher risk of failure results in greater likelihood of negative systemic effects.

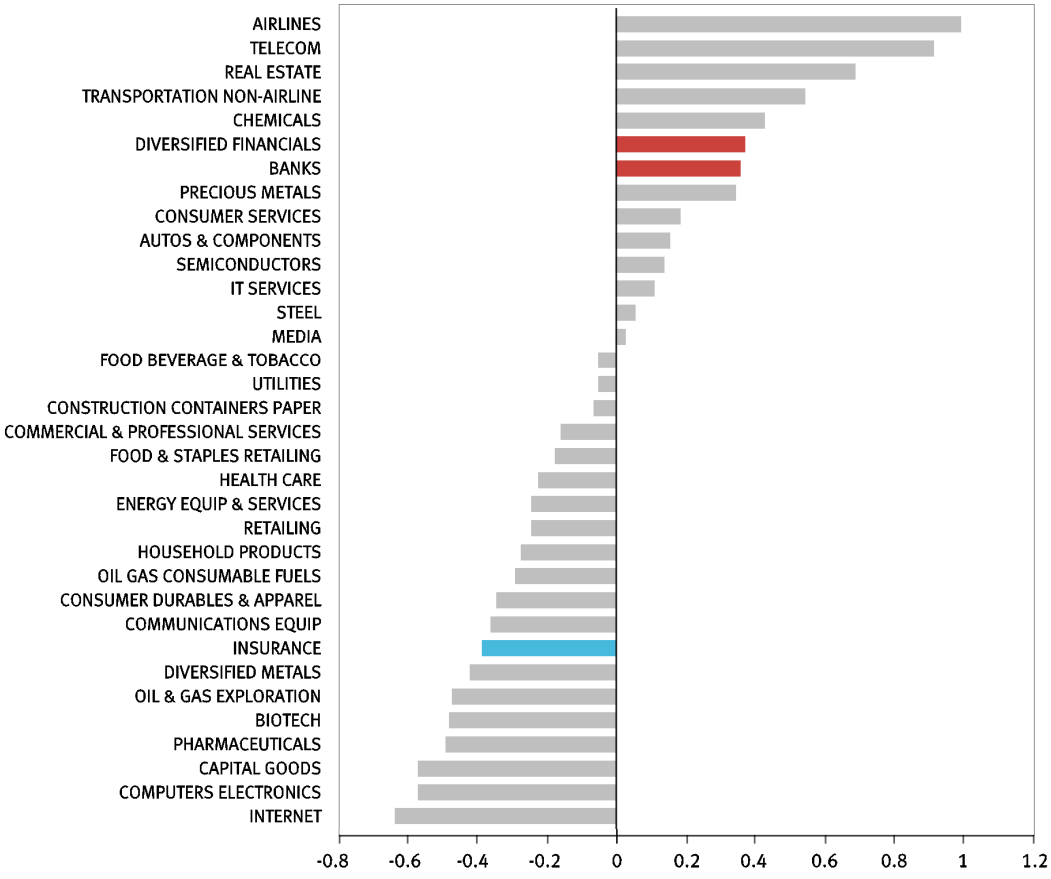
As a result of FDIC insurance, other government support, and the perceived safety associated with being highly regulated, the market is generally accepting of a high level of leverage within U.S. banking entities. During good times, when financial accounting earnings are high, banking institutions often employ stock buy-backs and high dividend pay-outs which keep capital levels lean, thereby resulting in high returns on capital. However, during crisis periods, bank equity can become quickly depleted. The illustration below shows the average capitalization levels of various types of financial firms over time. P&C insurers tend to hold capitalization that is several times that of banks and life insurance companies.



Data from the Federal Reserve Flow of Funds accounts and are not seasonally adjusted. Leverage ratio = (total financial assets - total financial liabilities)/total financial assets.

The figure below depicts financial leverage across a variety of industries. Banks rank seventh on the list and maintain higher than average leverage, while insurance companies, which rank twenty-seventh, have significantly lower than average leverage.

Cap-Weighted Leverage for Various Industries (Average 1994 - 2008)



Source: Financial Leverage," MSCI Barra Research Bulletin, October 2008, p.3

Liquidity Risk/Asset-Liability Mismatch

Firm-specific and sector liquidity are important considerations with respect to systemic risk. For many financial firms, liquidity is partly a sub-set of interconnectedness. For example, banking firms that tend to fund long-term, less liquid assets with short-term liabilities are naturally reliant on the funding parties to "roll-over" funding. A reluctance to do so can quickly result in the borrowing firm's failure to meet obligations.

Liquidity risks are paramount for banks, investment banks, and hedge funds, as significant declines in the values of assets can lead to reduced liquidity. In effect, liquidity tends to become unavailable just when it is needed most. This run-on-the-bank phenomenon is not experienced by traditional insurance companies (e.g., property, casualty,

continued

life). Though some insurance company contingent funding sources may decrease during market stress, contractual liabilities and pay-outs on traditional policies are not correlated with declines in overall market liquidity.

The risk of significant asset-liability mismatches was realized in 2008, particularly by some former "stand-alone" investment banks, whose heavy reliance on short-term wholesale borrowings to fund illiquid long-term securities left them at the mercy of short-term funders. Firms whose asset and liability maturities are more closely matched tend to be less exposed to cycles and less reliant on the funding element of interconnectedness.

Transparency

Transparency with respect to a firm's financial and other risks has a significant impact on the willingness of investors to continue holding the firm's debt and equity, particularly during episodes of market stress. Relatively opaque firms that experience difficulty are less likely to retain support from investors (and funding parties) as a result of various unknown risks (e.g., counterparty and off-balance sheet exposures).

While hedge fund investors have traditionally been accepting of the industry's opacity, as returns declined during the recent market crisis, opacity almost certainly contributed to the large withdrawals of capital from the industry.

Stylized Examples Illustrating Lack of Impact with Respect to Firm Size

Two stylized examples are presented below that provide intuition as to why financial firm size should not be equated with high risk or high systemic risk. These examples illustrate the importance of commonly discussed firm-specific and systemic risk sources unrelated to size.

The following context is presented as a foundation for the examples. For a financial firm to significantly contribute to a systemic risk episode two criteria must be met:

1. It must fail or significantly reduce operations (as a result of illiquidity or insolvency).
    - The firm's demise may be caused by its own traditional internal asset/liability risk exposures or due to significant spillovers from other firms. If a firm continues normal operations, providing financial services to customers, it cannot cause or exacerbate a systemic risk episode.
2. Given reduced operations or failure of a financial firm, negative impacts must spillover to the broader system, given reduced operations or failure of a financial firm.
    - An individual firm failure that does not have significant negative impacts on consumers or other firms in its market or nearby markets, by definition, does not affect the "system."[16]

16 As discussed earlier, it is possible that a large group of participants in a certain market fails as a result of similar concentrated risk exposures. However, risk transparency, along with diligent prudential supervision and systemic oversight, would minimize such cases. Appropriate resolution regimes would facilitate the replacement of services to minimize economic impacts.

Example 1

Consider two large financial firms, both with $100 billion in total assets, with the following attributes.

Attributes	Firm 1	Firm 2
Asset Size	$100 Billion	$100 Billion
Character of Liabilities Funding	Mixed deposit types with significant short-term wholesale borrowing	Non-cyclical insurance liabilities funded with regular premium payments
Character of Assets	Long-term real estate and commercial loans/ securities; proprietary trading positions	Low risk earning assets with durations matched closely to liabilities
Capitalization	High financial leverage (10 to 1)	Low to Moderate financial leverage (3 to 1)
Complexity of Risk	High: Significant assets with high complexity; concentration of "tail" or cyclical risks	Low: Predictable liabilities funded with non-complex high credit quality assets
Intra-Company Dependency	High: Individual business cross legal entity lines and rely on common IT infrastructure	Low: Ring-fenced liquidity and capital, and stand-alone IT infrastructure
Regulatory Oversight	Multiple legal entity regulators	Single regulator
Transparency Level	Low to Moderate: Public company with significant opaque off-balance sheet contractual exposure	High: Financial statements reflect all significant exposures
Special Activities	U.S. Treasury primary dealer	None
Resolution Process	Specific resolution process for bank and broker; other affiliates fall to standard bankruptcy laws	Specific single resolution process/authority
Guarantee Fund	Banking and brokerage deposits guaranteed up to thresholds; no guarantee for other customers	Industry guarantee fund at state level covers all customers up to thresholds

Given risk concentrations, leverage, interconnectedness, and exposure to direct and indirect spillovers, over time economic and market-based values of Firm 1 would be expected to exhibit relatively high volatility, particularly in times of general economic stress. Conversely, Firm 2, with its lower leverage, low and predictable risk exposures, and relatively low potential spillovers, would be expected to exhibit economic and market-based firm values that are relatively less volatile through time.

continued

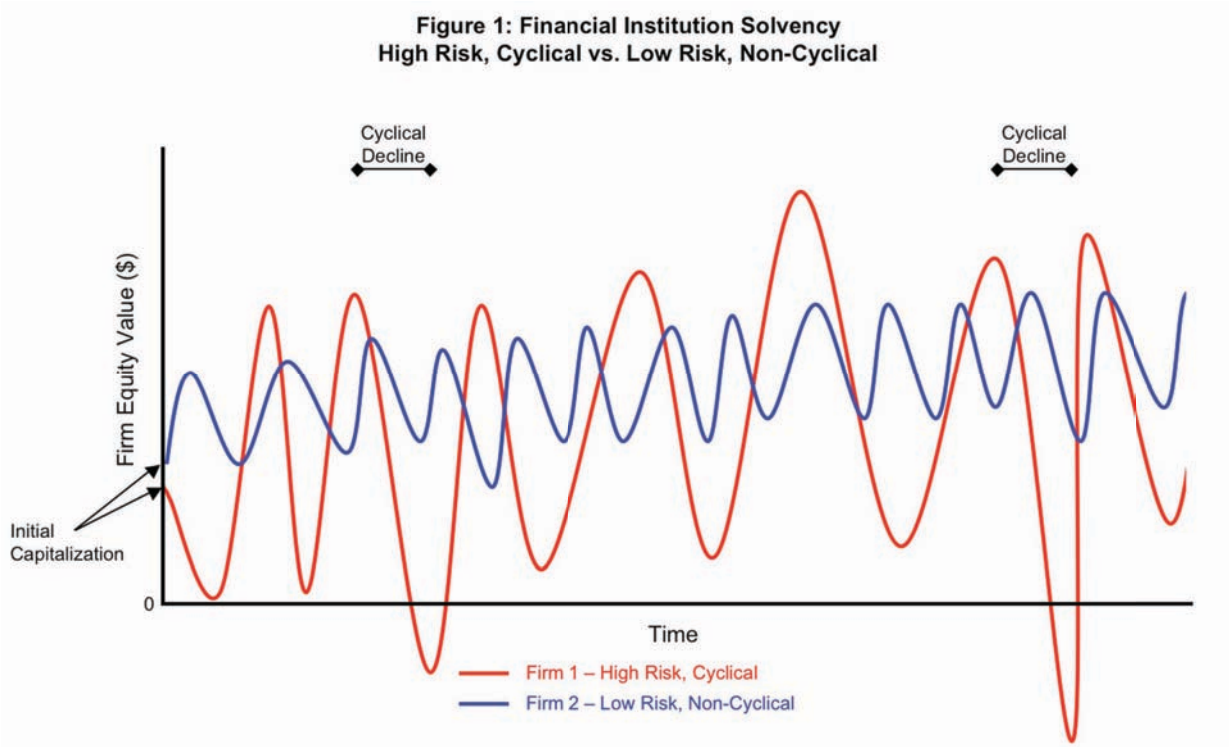
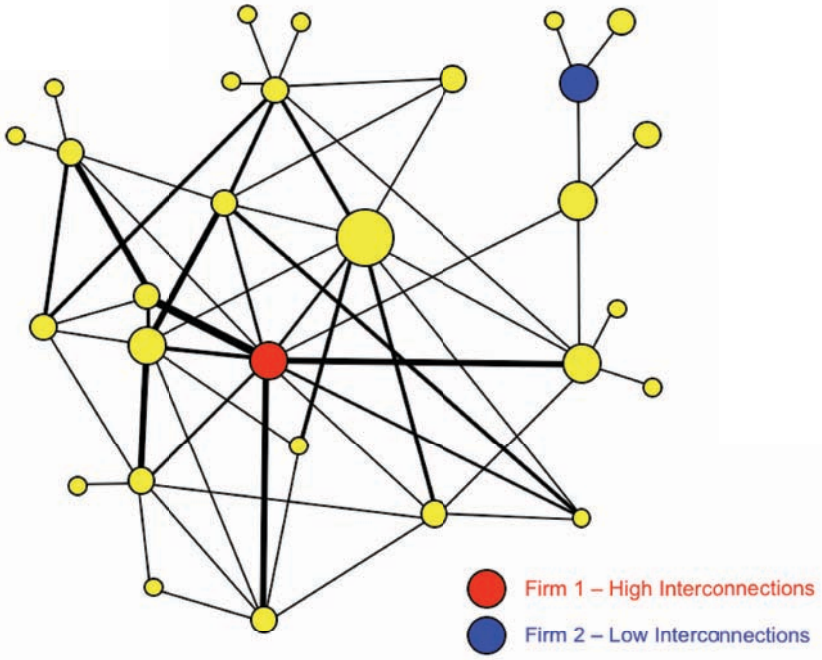


Figure 1 above reflects how the volatility of Firm 2's equity value remains relatively low and stable. Firm-value remains positive through time and is not impacted by stressful economic and market conditions. Given its relative stability and lack of cyclical exposure, Firm 2 is unlikely to contribute to systemic risk, despite its size, as it is unlikely to fail. Conversely, Firm 1 exhibits relatively high firm-value volatility (i.e. it is a high-risk firm). Capital growth is constrained in strong economic periods as a result of stock buybacks, dividends, and large compensation payouts. However, Firm 1 is more likely to become insolvent, particularly during stressful economic environments, and is therefore more likely to contribute to systemic risk.

Figure 2: Financial Institution Interconnectedness
High vs. Low Interconnected Firms



Notes:
Circles represent financial firms.
Circle sizes represent the asset size of the firms.
Lines represent connections between firms.
Thickness of lines represents degree of connection.

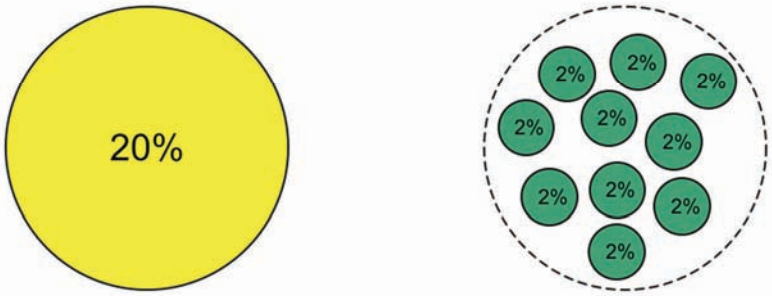
As noted above, for a troubled firm or group of firms to contribute significantly to systemic risk, it must have a significant negative impact on its market or nearby markets. Figure 2 above depicts differences in "connectedness" between Firm 1 and Firm 2 within the system. Firm 2's lack of significant derivatives positions and cyclical contingent liabilities (e.g., off-balance sheet positions with contractual recourse) minimizes potential negative impacts from, or to, other institutions. Furthermore, even in the case of firm failure, the presence of Firm 2's industry guarantee fund prevents negative impacts from spreading to customers and financial counterparties. The resolution regime and ease of replacement of Firms 2's customer policies allows surviving firms to absorb customer needs without significant negative spillovers. Firm 1 maintains a far greater number and significance of interconnections. The connections are also more complex as indirect exposures are more likely to ultimately flow to or from Firm 1. As a result, systemic risk posed by Firm 1 clearly exceeds that of Firm 2.

continued

Example 2

In this example a single large firm represents 20 percent of a particular financial market. A separate group, comprised of 10 firms, each represents a 2 percent pro-rata share of the same market. All other significant risk features of the large and small firms are virtually identical, including interconnectedness, cyclicality, leverage, liquidity, and transparency.

Figure 3: Financial Institution Size
Single Large Firm vs. Group of Smaller Firms



Note: Percentages represent the firm's share of the market.

Given the described attributes and illustration above, the pertinent question is, "does the single large firm pose more systemic risk than the group of smaller firms?" Current pending legislation that would identify the large firm as systemically risky and impose additional monetary assessments implies that the large firm poses risks that are greater than those of the group of small firms. However, assuming the large firm is operating freely and not in violation of anti-trust rules, the source of any significant incremental risk to the system is not apparent.

In terms of risk of firm deterioration or failure, the single large firm and the group of smaller firms are both equally exposed to the same financial and economic risks, and so the likelihood of failure is virtually identical. Further, assuming deterioration or failure, because the level and scale of interconnectedness between the single firm and the group of firms is the same, the net transmission of financial problems should not differ.

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A few potential differentiating factors are considered below:[17]

Operating Efficiency Differences

It may be assumed that as a result of their smaller size, the smaller firms operate with less efficiency (e.g., economies of scale) relative to the large single firm. As a result, over time there may be less retained profits to buffer the smaller firms from failure, resulting in a higher likelihood of failure. Additionally, given the smaller firms' relative inefficiency, the group's failure may result in a higher level of direct employee job loss, relative to the larger firm.

These considerations would tend to indicate a somewhat higher potential systemic impact from the group of smaller firms.

Psychological Impacts

Given a potentially higher level of media reporting and broader name recognition, a failure of the large firm, though not inherently more likely, may have an incrementally higher risk of indirect spillover due to psychological (e.g., fear) factors. However, assuming relatively high transparency of risk positions within the industry and efficient resolution regimes, indirect spillover effects would be mitigated.

In any case, these considerations would tend to indicate a somewhat higher potential systemic impact from the single large firm.

Conclusion

Even when considering the above potential mild differentiating factors, the systemic risk posed by the larger firm and the group of smaller firms appears to be highly comparable. In terms of potential systemic risk legislation, this argues against identifying systemically important firms by asset size and subjecting such firms to heightened regulation and additional assessments.

17 The listing may not encompass all potential differences.

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Problematic Results Arising from Implementation of a Size-Based Systemic Risk Identification Process

Negative Results Introduction

Several negative economic effects would occur if legislation for identifying systemically important financial institutions were based on firm size. These effects, in general, result from the undesirable incentives associated with inappropriate identification processes and associated costs. A number of overarching issues are introduced below and are discussed more thoroughly in subsequent text.

Results from Erroneous Identification of Non-Systemically Risky Firms

As illustrated in the examples from the previous section, firms of the same absolute size can have wide variances with respect to their potential contributions to systemic risk. Some large financial firms simply do not pose significant systemic risks. Identifying a large firm as systemically risky when, in fact, it is not would have the following negative effects:

Cost Increases to Undeserving Customers: The costs of additional regulation and required systemic dissolution fund assessments would act as an excessive tax on mis-identified firms. This tax is likely to be passed-through to the ultimate financial firm customer. As a result, an undeserving group of consumers would be forced to pay to fund the systemic dissolution pool, from which they would likely never receive any benefit.

Cross-Subsidization of Risky Firms: Beyond the direct cost increases to consumers, the erroneous charges would serve to subsidize the risk-taking of those firms that truly do pose significant systemic risks. Simply stated, low-risk large firms would pay more than their fair share.

Incentives to Increase Risk: Beyond customer cost increases and cross-subsidization of risky firms, an underlying incentive would remain for lower-risk firms to increase their systemic riskiness in line with the new costs they face from increased regulation and monetary assessments.

Results of Failure to Identify Systemically Risky Firms

As also illustrated in the examples from the previous section, individual groups of smaller firms may pose the same or greater systemic risk than large financial firms. Should a systemic dissolution fund be generated from assessments only on large financial institutions, systemically risky financial firms falling under the subjective size threshold would inevitably be missed. The failure to identify such systemically risky firms would likely have the following negative effects:

Increased Likelihood of Future Taxpayer Funded Bail-outs: If additional regulatory oversight and systemic dissolution fund monetary assessments were not required of a number of systemically risky firms falling under arbitrary size thresholds, a systemic risk episode in the future may not be avoided, and could come as a surprise to regulators.

continued

In such a case, despite any dissolution fund financed by firms, taxpayers would likely bear much of the direct and indirect economic costs of the episode.

Free-Rider Problems and Reduced Economic Efficiency: Firms that are effectively supported by the dissolution fund, and by a high tier of government support given the actual systemic risk they pose, would become "free-riders" if missed as a result of a size-based threshold. Free-riders would benefit from systemic stability and various backstops to systemic risk without paying their fair share. This provides the free-riders with a significant competitive advantage, particularly when compared against large firms that are not significantly risky but are explicitly assessed (i.e., the excessively taxed). This would allow less efficient firms to gain advantage over more efficient firms, a poor economic result.

Potential Legislation Does Not Remedy Sources of Systemic Risk and Increases Moral Hazard and Economic Inefficiency in the Financial System

Moral Hazard

The establishment of backstop insurance measures, such as a systemic dissolution fund, in a sense assumes failure by lawmakers and regulators to directly address and properly monitor sources of financial system risk, as discussed earlier. Though an effort to reduce the public cost of potential future systemic risk episodes may seem prudent, a bifurcation of "systemically important" and "other" financial firms not only creates competitive issues, it can increase the likelihood of future systemic risk episodes. This is because moral hazard would be increased beyond the level that is already inherent in implicit government guarantees provided to financial entities.

The contribution of moral hazard to the recent financial crisis has been widely acknowledged by reports and economic studies evaluating the crisis. As described by the Congressional Oversight Panel in its analysis of the various programs utilized to avert systemic failure during the crisis:

> [T]he guarantee programs discussed in this report have broader costs resulting from the moral hazard that arises when the government agrees to guarantee the assets and obligations of private parties. Generally, the question of moral hazard arises when a party is protected, or expects to be protected, from loss. The insured party might take greater risk than it would otherwise, and market discipline is undermined.[18]

The Bank of England in its November 2009 paper states, "Incentive problems are widely believed to have contributed to excessive risk-taking in the run-up to the crisis, including through: Moral hazard arising from explicit or implicit guarantees of official sector support offered to state-regulated financial institutions."[19] The proposed systemic dissolution fund that unduly focuses on size thereby has the potential to introduce additional incentives to engage in risky activities thereby increasing moral hazard created by government guarantees, whether explicit or implicit.

18 Congressional Oversight Panel, "November Oversight Report: Guarantees and Contingent Payments in TARP and Related Programs," November 6, 2009, p. 70.

19 "The role of macroprudential policy," Bank of England, p. 12.

The identification of systemically important financial firms and the establishment of a pre-funded dissolution pool would effectively establish a higher tier of financial firms that would be implicitly "more supported" by the U.S. government and explicitly supported by the systemic fund. The additional support, whether real or perceived, is likely to encourage higher risk-taking among the more supported firms. Financial firm customers (e.g., depositors, counterparties, etc.) will likely feel comfortable doing business with firms identified as systemically important, even if they are aware of relatively high risk activities, given the higher level of implied government support. These results are similar to that created through FDIC insured bank deposits. Fully insured depositors have no incentive to economically reward or punish a bank based on the firm-specific or systemic risk that it undertakes. The moral hazard that would be created within the financial firms above the size threshold is likely to result in many negative results, including an increased likelihood of systemic risk episodes.

Economic Inefficiency

The moral hazard effects on market perception described above also are predicted by economic scholarship to distort the competitive environment in which firms covered by the assessments operate. For example, financial entities operating in the capital markets that are guaranteed, whether explicitly or implicitly, would be able to obtain cheaper funding (lower capital costs) since they are perceived to be less risky (as a result of the government guarantee). This provides those firms with a competitive advantage due to lower funding costs. Competitors that are more efficient, or those with higher actual credit quality, which are not perceived to be covered by the guarantees, may have a less favorable competitive stance with higher cost of capital and with potentially less investment opportunity.

The assessment approach based on size could also discourage competitors and the positive impact such competition can have on firm efficiency and consumers. The lower cost of capital and competitive advantage for companies with government guarantees creates higher explicit costs and barriers to entry for smaller competitors. Instead of rewarding efficiency and astute management of business activity, the competitive environment for smaller firms is unbalanced, leading to distortions in resource allocation and market efficiency.

Mis-Aligned Incentives

The proposal to assess fees on financial institutions above a certain threshold also creates moral hazard by imposing costs on financial entities unrelated to their business activity and by failing to align the incentives of the financial entities that pose or could potentially pose systemic risk. One of the most basic ways to align incentives is to ensure that the assessment for the systemic dissolution fund is directed at the source of risk and commensurate with the magnitude of risk created by that entity. By seeking to measure and match risk-taking activity with the level of assessment, an efficient policy will cause firms to take the costs into account prior to engaging in the risky activity, as well as force firms to internalize the externality they pose on the financial system by engaging in the activity.

In effect, the potential legislation's size-based approach provides financial firms with incentives to either:

- Take steps to avoid size thresholds, at which new supervision and assessments would begin, or
- Take maximum advantage of the additional implicit and explicit support associated with being identified as systemically important.

continued

Neither of the resulting actions has the effect of reducing firm-generated systemic risk or reducing the likelihood of systemic risk episodes.

Potential for Increased Systemic Risk-Taking

In an economic context, systemic risk is an externality imposed on the financial system by an entity that is not confined to the risks it willingly and purposely assumes to pursue its own business and economic objectives. By assessing firms for the additional risks they impose on others, a properly designed assessment would align the incentives of those firms to take account of the risks they pose to the financial system (external risks). While it may be difficult to design a policy that precisely assesses those external risks and assesses costs accordingly, a model that assesses a fee on large firms (in the current proposal those firms with assets above $50 billion) may also fail to curtail the external risk-taking of those firms below the threshold.

Since firms are not incentivized to minimize external risks they pose, the proposal could actually result in greater risk-taking by financial entities, given that they still fall under the umbrella of protection should their activities give rise to systemic threats. This result has been observed with other guarantee systems, in many cases at the encouragement of regulators or policymakers, with costly results (e.g., the Treasury encouraged banks to relax underwriting standards to reignite the economy, which resulted in greater risk-taking by financial firms). At the margin, regardless of their size, those firms in danger of default may have additional incentives to push the envelope to engender help from the systemic dissolution fund. In that event, the result is a cross-subsidy from firms above the threshold regardless of their external risk to those whose activities pose external risks undeterred by the assessment policy.

A counter-argument to concerns regarding the assessment scheme may be that stronger regulators will be required to undertake more scrutiny with respect to the firms designated systemically important. However, this argument has little merit for two reasons. First, experience suggests that financial regulators have historically failed to take necessary actions to prevent major crises. Second, if, in fact, prudential and systemic oversight functions do effectively perform their roles, then no systemic dissolution fund would be necessary.

Failure to Encourage Systemic Risk Reduction

An incentive-compatible assessment program would encourage financial institutions to adopt strategies to reduce those activities that increase systemic risk, or at least would not discourage risk-reducing behaviors. Risk-reducing strategies can only be incented by a mechanism that reinforces or increases the incentives of stakeholders (such as shareholders, creditors, and counterparties) likely to benefit from government intervention.

An assessment policy should not act to defeat market discipline by those entities whose investment in or connection with the financial entity is governed by its own due diligence and decisions regarding its interactions with the financial entity. In order to efficiently reduce systemic risk, stakeholders must be encouraged to monitor the institution and act according to their best interest, whether that means pulling their credit lines, contractually assessing counterparty credit risk, or buying/selling the shares of the institution based on the risks they pose, etc. For example, if the perception of a government guarantee is present, private sector approaches to mutualize or reduce

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risk (such as clearing, private resolution funds, or insurance) may become less feasible in a cost-benefit sense. Through these market mechanisms, systemic risks are effectively and efficiently reduced since firms act to avoid negative consequences of interacting with the entity exposing it to heightened risks.

Taxpayers Remain at Risk Under Current Proposal

Another issue related to a potential systemic dissolution fund is that no fund will be able to compensate for the entire costs that a systemic risk episode poses to the economy. The cost of the most recent financial crisis is estimated in the trillions of dollars by many accounts.[20] In a systemic risk episode any systemic dissolution fund will absorb only a fraction of total economic costs. As a result, taxpayers will directly or indirectly continue to pay the bulk of any costs associated with systemic risk episodes. This argues for appropriate measures to prevent systemic financial crises, rather than mechanisms that attempt to partially fund such crises.

What is clear is that firms charged systemic dissolution assessments will seek to offset these costs in order to maintain competitive financial returns verses firms that are not charged. This creates an incentive for the charged firms to increase opaque risk-taking, which would ultimately increase financial system risk.

Potential Reduction in Employment and Investment

If firms are to be assessed based on the size of their assets, where does the money come from? Economic research provides an answer. Assessments on firms are akin to taxes on the economic infrastructure necessary to produce goods and services. If economic experience is a guide, an assessment based on size is likely to reduce investment in those very assets necessary to innovate and increase productive capacity. As described by Richard Vedder, these types of tax regimes "can have an adverse impact on the magnitude of labor and capital resources used in making goods. Moreover, such taxes can lower investments and capital formation over the long run, having further long-run consequences on output and income."[21] By causing firms to shift funds from their current allocation, the assessments have the potential for distorting economic efficiency of those firms, impacting both capital and labor expenditures.

The economic consequences of reductions in these expenditures are a loss of efficiency and potential job losses for employees of assessed firms. This is manifest in a reduction in employment overall, and lower wages generally, as firms seek to manage costs.[22] In addition, efforts by firms to avoid the size-based assessment, perhaps by reducing assets or in an attempt to lower consolidated asset values, may lead firms to move production, and therefore jobs, overseas. The potential decrease in employment predicted by empirical research into business taxes, coupled with

continued

20 Global Financial Stability Report: Navigating the Financial Challenges Ahead, International Monetary Fund, October 2009.

21 Richard Vedder, "Taxes, Growth, Equity, and Welfare," in *Taxation, Economic Prosperity, and Distributive Justice*, Part 2, E. F. Paul, F. D. Miller, and J. Paul, ed. (Cambridge University Press, 2006), p. 54.

22 Vedder describes the empirical literature noting that "new taxes have adverse effects on economic indicators such as income, output, employment, migration, business investment, and plant location." Ibid., p. 56.

the potential loss of jobs from economic dislocation due to migration of assets or restructuring to avoid the size threshold, could lead to job losses at a time when the impact of the financial crisis continues to plague economic recovery.

In the financial services sector (which includes banking and insurance), assets are not predominantly physical assets, but are often intangible, and with generally higher reliance on human capital in the provision of customer service, marketing, product and asset management. While historically recognized that service and reputation in the provision of financial services is important to performance, the competitive pressure to reduce costs and generate returns has been particularly relevant in this sector over the last two decades (coinciding with growth of telecommunications and increased globalization). The assessment on U.S. firms will cut into revenues and intensify pressure to find means to reduce costs to maintain competitiveness.

In the competitive environment characterizing financial services, foreign companies can penetrate a market through the internet or in the operation of offshore call centers, where labor is relatively cheaper. As this competitive pressure has increased, U.S.-based labor has become progressively vulnerable to being supplanted as a result of increased substitution of technology capital for labor (such as through increased automated self-service) and by the export of basic financial services to foreign locations. Not only does the assessment on U.S. companies harm their ability to compete with foreign entities, it will hasten the pressure for U.S. companies to increase substitution of technology capital for labor and lead to a reduction in U.S. jobs.

The impact of the assessment on jobs will depend on a number of factors, including the substitutability of capital for labor, and how labor intensive each company's operations are. Economic models of corporate taxes and employment suggest that the assessment is likely to raise the cost of capital, reducing its return, which in turn leads to lower wages and a reduction in labor productivity.[23] All of these factors act to bring about a reduction in labor demand, which lowers employment.[24] In its Industry Overviews of various subsectors, Hoover's reports that average annual revenue per employee in the investment banking sector is just under $1,000,000, while in the insurance sector, average annual revenue per employee ranges from $200,000 to $400,000.[25] While it is difficult to predict the precise impact on jobs in the different subsectors, the impact on the insurance sector would be predicted to be more detrimental to jobs than that in the investment banking industry, which has a greater revenue base and higher relative capital intensity.

The binary assessment methodology identifying large firms for contribution to the systemic dissolution fund, while excusing other firms from the contribution, creates the prospect for economic distortion and a significant impact on real economic activity. In his study of corporate taxation, Austan Goolsbee finds that differential tax treatment for corporations versus non-corporations affects a firm's choice of organizational form and this can lead to distortions that have an impact on real economic activity.[26] Corporations have been found to engage in restructuring, such as moving to incorporate offshore as opposed to producing through consolidated operations and to explicitly move more assets offshore, which is commonly observed in the case of financial assets) to avoid higher tax burden.[27]

23 Roger Gordon, "Taxation of Investment and Savings in a World Economy," American Economic Review 76, no. 5 (1986): 1086-1102.

24 Bettendorf, et al., provide a stylized macroeconomic model that yields useful insight into the effects of a corporate tax on employment and other economic variables. Bettendorf, et al., "Corporate Tax Policy and Unemployment in Europe: An Applied General Equilibrium Analysis," Tinbergen Institute Discussion Paper TI 2007-056/2, May 30, 2007.

25 See Hoover's Industry Overviews for Insurance Agencies, Insurance Carriers, and Investment Banking, available at http://www.hoovers.com/free/ind/fr/list.xhtml, accessed January 12, 2010.

26 Austan Goolsbee, "The Impact of the Corporate Income Tax: Evidence from State Organizational Form Data," Journal of Public Economics 88 (2004): 2283-2299.

27 James R. Hines, Jr. and Eric M. Rice, "Fiscal Paradise, Foreign Tax Havens and American Business," Quarterly Journal of Economics (February 1994), p. 157.

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In addition, the negative effect on jobs in the finance and insurance industry will also have a negative spillover effect on other sectors. First, cutbacks in the service sector can have negative effects on supporting industries and local communities. Second, Jacob Kirkegaard (2009) observes that "the larger a country's services sector as a share of the economy and employment, the richer the country."[28] In the U.S., the services sector is positively integrated with overall wealth and welfare of the economy due to its importance to wealth generation and risk management; a decline in this sector could have a multiplier effect on employment and overall wealth in other sectors. Considering that the financial services sector has already experienced "large-scale layoffs" and that employment is now in structural decline, even moderate cuts in employment or expenditures as a result of the assessment would lead to more significant negative impacts on employment, wealth, and welfare in the services sector, local communities, and the economy at large.

The assessments on firms must come from other sources, so in the financial services industry, for example, firms would have little choice but to pass along the costs of the assessments to their customers. This creates a competitive disadvantage for these firms vis-à-vis their competitors. In fact, economic theory suggests that only firms that operate in industries with barriers to entry or that have products or services that are not substitutable would be able to avoid the competitive effects resulting from the increased costs and economic dislocation from the assessment.

In the P&C industry, many may look to the surplus as a source of the funds for the assessment. The surplus is used to support claims and overall operations, and is invested in assets that generate returns. It is part of the economic infrastructure that is used to support operations. Thus, a reduction in the surplus would result in a reduction in underwriting capacity. A firm's ability to pull funds from the surplus is limited by state insurance regulation. In addition, a reduction in the surplus to support the assessment could also have a negative effect on the credit rating of the firm (since rating agencies look to surplus as an indicator of credit quality), further increasing the cost of capital.

A focus on size also runs the risk of focusing firms' attention on the size of their assets, while potentially ignoring those factors that have recently contributed to systemic risk, such as leverage, liquidity, and mismatches in maturities underlying the balance sheet. As Andrew Lo noted in his Congressional testimony, "in a recent study commissioned by the G-20, the IMF determined that systemically important institutions are not limited to those that are the largest, but also includes others that are interconnected and that can impair the normal functioning of financial markets, including the provision of credit to households."[29]

continued

28 Jacob F. Kirkegaard, "The US Financial Sector is Now in Structural Employment Decline," Peterson Institute for International Economics, June 30, 2009, available at http://www.iie.com/realtime/?p=773, accessed January 12, 2010.

29 Andrew W. Lo, "The Feasibility of Systemic Risk Measurement," Written Testimony prepared for the U.S. House of Representatives Financial Services Committee, October 19, 2009, p. 3.

Examples of Structuring Around Size and Harmful Firm Behavior

As noted earlier, setting a size threshold that determines at what point firms must pay into a systemic dissolution fund is likely to result in structuring or gaming by some firms seeking to avoid the assessments. Such efforts can be undertaken by firms initially under the threshold or firms that are already in excess of the threshold. In discussing the potential for a rigid size-based criteria for identifying systemically risky institutions, Viral Acharya et al., state, "Clearly, there would be tremendous advantage for banks that are near the lower threshold of the top size category to remain just below that size. Indeed, larger banks may simply break themselves up yet retain virtually identical models; the true systemic risk will not be reduced, even though it is now contained in many more, smaller institutions."[30]

Potential Firm Strategy: "Originate to Distribute"

One strategy that may be employed by a firm seeking to remain below a subjective size threshold is engaging in increased "originate-to-distribute" activities. Rather than maintaining risk as assets on-balance sheet, originated financial products may be sold to other entities that are not at risk of being charged assessments. This would allow the firm to capture value of originating financial assets, but cap asset size. This technique can be used by firm managers to keep their institutions below any subjective size-based threshold.

New incentives to originate-to-distribute could add to the negative implications already associated with the activity. It has been noted that the originate-to-distribute model may have contributed to a significant decline in the overall quality of system financial assets thereby exacerbating systemic risk. For instance, Purnanandam notes, "We show that the transfer of credit risk through the OTD channel resulted in the origination of inferior quality mortgages."[31] The incentive to distribute risky assets that would result from a size-based systemic risk identification process is at odds with efforts to have financial firms maintain keep "skin in the game" with respect to originated exposures.

Potential Firm Strategy: Split-Up or Replicate Institutions to Avoid Size Tax

Another strategy to avoid what may be perceived as size-based taxes that is generally simple to implement would be for growing organizations simply to replicate themselves, rather than continuing growth within an individual legal entity. A financial firm near a subjective size threshold could simply set up separate legal entities not residing under a common holding company. The new firm would be able to share many of the original firm's strategies and processes, and may even be able to share management. The firm replicas could be interconnected to the extent allowed by law, while avoiding size-based systemic risk assessments.

Certain existing large financial firms, including banking companies that have grown over time through acquisition, would be able to undertake a similar technique. Most of these firms maintain several "legacy" bank charters, though they currently tend to concentrate assets under one charter. Such banking companies could avoid firm size-based assessment by redistributing assets across multiple bank charters and moving the various charters out of the current

30 Viral Acharya, et al., "Measuring Systemic Risk," Chapter 4 in Real Time Solutions for Financial Reform, NYU Stern Working Group, December 2009, p. 23.

31 Amiyatosh Purnanandam, "Originate-to-Distribute Model and the Subprime Mortgage Crisis," working paper, April 15, 2009, p. 1.

NERA Economic Consulting - Response to CP49 - Attachment 1

parent holding company structure. Such spin-offs to create sister banking companies could be used to avoid simple size-based thresholds. Alternatively, large financial firms could simply book more positions and operate more heavily outside the U.S., to avoid capture within a size-based determination process. This reaction has implications to the U.S. job market, as noted previously.

Potential Harmful Incentive: Crises May Represent Opportunity for Large Firms

Under a bifurcated financial system comprised of large firms designated systemically important and other firms, the large firms could prosper as a result of crises. Specifically, during a crisis period, a customer flight from small firms to the designated systemically important large firms could allow large firms to garner additional market share and further increase economies of scale.

Consider the example of a depositor at a small bank who holds funds in excess of FDIC insured levels. At the first sign of systemic trouble, the depositor could make a rational decision to move funds to a large bank designated systemically important to achieve a higher perceived level of government protection. Not only would such action exacerbate any liquidity issues at small banks and make failure more likely, the "flight to quality" would benefit the pool of large institutions. Such a paradigm actually provides an incentive for large firms designated systemically important to allow crises to occur. This is a significant and negative unintended consequence of the current proposal.

Conclusion

Recently proposed financial market legislation would effectively divide financial firms into two classes: Those that are systemically important (i.e., systemically risky) and those that are not. This bifurcation on its own can lead to negative economic effects, as firms deemed systemically important may view themselves (and be viewed by consumers) as being "more supported" by the government.

However, if individual firms truly posing significant systemic risks were more closely regulated and appropriately charged for the external costs they pose to the system, such measures may provide reasonable incentives for firms to keep systemic risk in check.

Unfortunately, the proposed legislation fails to appropriately identify systemically important firms. Instead, an arbitrary asset size threshold is relied upon as the sole factor for effectively determining whether a firm is systemically important or not. Such a process is not only subject to gaming by firms, but is conceptually flawed, as well-known key factors for evaluating firm systemic risk are ignored. These factors, to be discussed further in a forthcoming white paper, include interconnectedness, cyclicality, leverage, liquidity risk, and transparency.

Should additional regulation and explicit monetary charges be assessed against an incorrectly identified set of financial firms deemed systemically important based on asset size, the following effects are likely:

- Increased frequency of systemic risk episodes, as a result of increased moral hazard;
- U.S. job losses as a result of efforts by firms to structure to avoid size thresholds;
- Increased costs to consumers, as a result of the pass-through of assessment costs and costs associated with increased regulation; and,
- Distortions in the competitive environment, impacting economic efficiency and creating potential barriers to entry.

The significant economic costs of such a flawed policy are likely to outweigh any potential benefits associated with the increased regulation of large firms and the planned creation of a systemic dissolution fund.

Appendix: Historical Background – Systemic Risk Episodes

Explicit government actions taken during the current, and previous, financial crises support the argument that size should not be the sole basis for determining systemic risk. Size did not protect the uninsured and unsecured creditors at all large financial firms against losses during the current and previous financial crises, and size did not subject uninsured and unsecured creditors at all insolvent small financial firms to losses during the current and previous financial crises.

Continental Illinois was the original "too-big-to-fail" bank. It received open bank assistance in 1984, yet its shareholders were wiped out. It was the uninsured and the unsecured creditors that were protected against any losses because of that government assistance.

During the years following the assistance provided to Continental Illinois, thousands of small banks became insolvent. They were treated in a manner that largely had the same effect on creditors as did the assistance provided to Continental Illinois. That is, shareholders were wiped out but uninsured and unsecured creditors generally were protected against any losses.

In other words, the treatment of small and large bank creditors during the previous financial crises was essentially the same regardless of bank size.

While the deposit insurance funds were only obligated to protect insured deposits, the protection was extended to uninsured deposits as well. Why were uninsured depositors protected against losses? In part, there was an equity argument: small bank creditors should not be subject to losses if large bank creditors were not. In part, there were operational considerations: banks were failing on average at a rate of one per day. This created operational difficulties in segregating insured from uninsured deposits quickly and effectively. This problem was avoided if all depositors were protected against any losses.

The most significant concern, however, related to maintaining financial stability. Even though the individual failures were in small banks, there were enough small bank insolvencies to create systemic concerns. The loss of public confidence that would arise if the general public had fears about the safety of their money was not something policymakers wanted to risk, so it was a safe decision to protect all depositors. Indeed, public confidence was maintained as a result of these actions. Bank closings became routine events. The general public was unconcerned because they knew they were protected against any losses even if their account balances exceeded the deposit insurance limits.

If small bank failures were few and far between this would not have been an issue. However, the cyclical nature of small bank failures created concerns related to systemic risk.

In the aftermath of the Savings and Loan Crisis in the 1980s, Congress, concerned about moral hazard, reacted to the protection provided to all bank creditors by enacting a least cost test for the deposit insurer. Beginning in 1991 the FDIC, by law, had to choose the bank resolution that resulted in the least cost to the deposit insurance

continued

fund, unless there was a systemic risk determination. Least cost generally meant that uninsured deposits would be left unprotected in the future, enhancing market discipline.

The legislation worked largely as intended during the 15 or so years between the two crisis periods. Bank failures were infrequent events without systemic concerns and uninsured and unsecured creditors were exposed to losses in those situations.

That changed in 2008, but not right away. IndyMac, a $32 billion bank that operated a $184 billion mortgage servicing operation, was closed in July 2008. Uninsured and unsecured creditors were not protected against losses. Washington Mutual was closed in September 2008. It was the sixth largest bank in the United States at that time with roughly $300 billion in total assets. Again unsecured and uninsured creditors were not protected against losses. There was no systemic risk determination for Washington Mutual. There were no losses to the deposit insurance fund or to taxpayers. There were costs associated with the closing, but they were borne by the bank's shareholders and other uninsured and unsecured creditors, including the holders of senior notes and subordinated debt. These losses are in the billions of dollars.

A number of large financial institutions did receive government assistance in September 2008, Fannie Mae and Freddie Mac among them. A systemic risk determination was made for Wachovia even though it was subsequently purchased by Wells Fargo without help from the deposit insurance fund. But as bank failures and other financial sector problems grew, policymakers became increasingly concerned over the systemic risk implications throughout the financial system.

The concerns about financial stability extended well beyond large financial firms. Risks to the system existed due to interdependencies that were largely unrelated to size. Policymakers began to look for ways to protect the entire financial system, not just the creditors at large banks.

Individual money market funds were not all large, but they were interconnected with the entire financial system in ways that raised systemic concerns. They all received temporary government guarantees.

Uninsured depositors did not need to have their deposits in large banks in order to worry about the safety of the banking system as a whole. One small bank failure meant there would be many small bank failures due to the cyclical, leveraged, and interconnected nature of their business models. The deposit insurance limit was temporarily raised to $250,000, effectively protecting almost all deposits against losses.

TARP was enacted by Congress. This resulted in the provision of $700 billion, much of which was invested in large and small banks.

The FDIC created the Temporary Liquidity Guaranty Program ("TLGP"), which guaranteed certain liabilities at both large and small banks. The TLGP was authorized by the use of a systemic risk determination.

The Federal Reserve created a number of new lending programs to increase liquidity throughout the financial system.

The federal government also provided substantial financial assistance to help stabilize the mortgage market throughout the country.

These government actions taken during the current and the previous financial crises illustrate the point that systemic risk is not driven just by the size of individual institutions; rather it is a function of interdependencies within the broader financial system.

Deposit insurance programs, such as that of the FDIC, provide bank managers with access to low- cost deposit funding for investment, while insulating them from the full risk of their decisions. Customers need not concern themselves with differentiating good bank managers from bad bank managers, as depositors know that the U.S. government ultimately guarantees the return of their funds.

PCI White Paper

April 23, 2010

De-Mystifying Interconnectedness

Assessing "Too Interconnected to Fail" and the Fallout From Getting it Wrong

Research by: NERA Economic Consulting

Prepared for: Property Casualty Insurers Association of America

PCI Property Casualty Insurers Association of America
Shaping the Future of American Insurance

NERA Economic Consulting

PCI White Paper

De-Mystifying Interconnectedness

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PCI is comprised of more than 1,000 member companies, representing the broadest cross-section of insurers of any national trade association. PCI members write over $180 billion in annual premium and 37.4 percent of the nation's property casualty insurance. Member companies write 44.0 percent of the U.S. automobile insurance market, 30.7 percent of the homeowners market, 35.1 percent of the commercial property and liability market, and 41.7 percent of the private workers compensation market.

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Executive Summary

Congress is currently considering broad legislation to address heightened financial services and systemic risk regulation. In December, the U.S. House of Representatives passed legislation H.R. 4173, the "Wall Street Reform and Consumer Protection Act of 2009," which requires that asset size be primarily used to determine whether a financial firm is deemed systemically risky. The Senate is now also considering using asset size as a determinative factor in similar systemic risk legislation. However, this approach is flawed, as it fails to consider a firm's level of interconnectedness, in relation to the larger financial system.

Interconnectedness – the extent to which a firm impacts and is impacted by other firms – is a more accurate and efficient measure of systemic risk. As addressed in the January 2010 NERA study, "Why 'Too Big to Fail' is Too Short-Sighted to Succeed," using size alone to determine whether a firm poses systemic risk paints an incomplete and distorted picture.

Financial system interconnectedness is a key factor for understanding systemic risk and the potential for future market failures. It is important for Congress to consider a financial firm's interconnectedness in any new systemic risk regulation efforts. Firms that maintain a higher degree of interconnectedness pose greater systemic risk and warrant a higher prioritization in any systemic risk mitigation efforts undertaken. Firms that are less connected and pose less risk to the financial system should be treated commensurately.

Failure to appropriately differentiate between firms with varying levels of interconnectedness may not only lead to an inefficient and possibly ineffective systemic risk mitigation process, but can also bring about other undesirable economic results. These economic impacts include:

I. Inefficient Regulation and Competing Mandates

II. Increased Legal and Market Uncertainty

III. Inefficient Capital Structure and Increased Cost of Capital

IV. Reduced Transparency and Increased Risk

V. "Free Riders" and Loss of Economic Efficiency

VI. Adverse Incentives and New, Additional Moral Hazard

VII. Undermined Market Discipline

VIII. U.S. Job Losses and Decline in U.S. Competitiveness

Interconnectedness should be considered in any assessment of an individual firm's inclusion in proposed systemic risk and resolution legislation. Financial regulation should also consider the other major sources of firm-based systemic risk, including: cyclicality, leverage, liquidity risk and transparency. The significant economic costs of a flawed policy based on "Too-Big-To-Fail" are likely to outweigh any potential benefits.

Introduction

The paper begins by briefly describing financial system interconnectedness ("IC") and its importance to systemic risk. It then describes the negative consequences associated with a failure to consider varying levels of IC across financial firms within financial reform efforts. Inappropriate consideration of financial firm IC would lead to inefficient use of regulatory resources and pose significant unnecessary costs to firms, consumers, and the system as a whole.

In Part II, the paper defines and discusses specific categories of financial firm IC in non-technical terms, providing examples. Certain interconnectedness mitigants are also described which can reduce negative spillovers that may otherwise result from a firm's inherent IC.

In Part III, a description and the results of a survey of financial firm IC are discussed. The survey ranks the IC of five stylized financial institutions (list 5 types). These firms in aggregate represent a large portion of the total U.S. financial system. For each stylized financial firm, the inherent IC, mitigants to IC, and net IC were ranked by a group of external[1] financial markets experts.

The survey results indicate that significant differences in IC exist across various firm types. It follows that the potential for different financial firm types to initiate or contribute to a systemic risk episode will vary widely as a result of IC differences.

We conclude it is important for legislators and regulators to ensure that differences in financial firm IC are reflected within any new systemic risk reduction efforts.

1 Survey respondents are external in that they are not employed by the contributors' employers (i.e., NERA and Oliver Wyman).

Part I: The Importance of Interconnectedness to Systemic Risk

Interconnectedness, sometimes referred to as "spillover" or "contagion," reflects the impact that entities have on one another. Across financial firms, a high level of IC is sometimes viewed positively, as it may be associated with the ability to "lay-off" risks to counterparties. However, during episodes of stress, IC can take on the negative connotation of contagion, when problems at one or a few firms are transmitted across networks, infecting counterparties and customers.

As described by Mayr, "On the one hand, an interbank system or a risk transfer market provides an insurance against liquidity shocks. On the other hand, it exposes a wider range of institutions to systemic risk."[2]

IC is, in fact, a primary reason that many view the failure of certain financial firms as creating potentially more overall systemic risk than non-financial firms. Some financial firms maintain a high number of very significant connections that are difficult to fully monitor. The issue is summarized by Bullard, et al.:

> In the normal course of business, large commercial and investment banks lend and trade with each other through interbank lending and deposit markets, transactions in over-the-counter (OTC) derivatives, and wholesale payment and settlement systems….The lightning speed of financial transactions and the complex structures of many banks and securities firms make it especially difficult for a firm to fully monitor the counterparties with which it deals, let alone the counterparties of counterparties. The rapid failure of a seemingly strong bank could potentially expose other firms to large losses. Even firms that do not transact directly with the affected bank can be exposed through their dealings with affected third parties.[3]

A high number and degree of connections between firms creates the potential for systemic risk. Intuitively, a group of firms or an individual firm whose failure does not significantly impact its creditors, counterparties, or customers, and that is not significantly impacted by other firms' problems, is unlikely to initiate or contribute to a systemic risk episode.[4] Conversely, a group of firms or an individual firm whose own financial problems pose large negative impacts to other firms, or that has a significant likelihood of becoming impaired as a result of exposure to troubled firms, is more likely to contribute to a systemic risk episode. As described in the Report to G20 Finance Ministers and Governors:

continued

2 Bernhard Mayr, "Financial Contagion and Intra-group Spillover Effects," Dissertation no. 3303 of the University of St. Gallen, Graduate School of Business Administration, January 22, 2007, p. 31.

3 James Bullard, Christopher J. Neely, and David C. Wheelock, "Systemic Risk and the Financial Crisis: A Primer," Federal Reserve Bank of St. Louis Review 91, no. 5, Part 1 (September/October 2009), pp. 408-409.

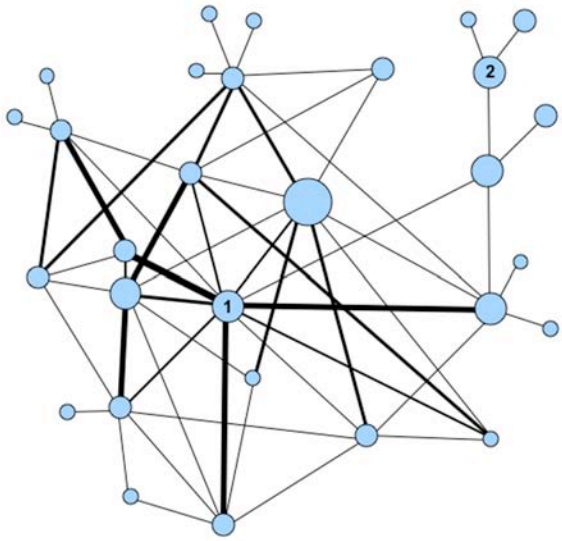
4 The surprise demise of a firm that serves to wipe out equity holders would negatively impact any investors with concentrated equity holdings. However, diversification can mitigate this.

> Interconnectedness captures situations when financial distress in one institution materially raises the likelihood of financial distress in other institutions because of the network of contractual relations in which the institution operates. This chain effect operates on both sides of the balance sheet, i.e., there are inter-connections on the funding side as well as on the provision of funds. The larger the number of links (the larger the number of creditors and clients), the higher potential to cause spillovers onto either clients and/or creditors. In addition, the larger the size of the individual exposures (the "thickness" of the links), the greater the potential that these effects will be magnified.[5]

Whether through direct contractual obligations or indirect relations, all financial firms maintain some degree of IC. However, within a continuum of IC, different financial firms have a greater or lesser number and degree of linkages as a result of their natural and preferred business activities. Additionally, certain firm types have mitigants or firewalls in place that effectively reduce the likelihood of financial problem transmission. To assess a firm's net IC, this concept must first be defined and explained.

The figure below illustrates a hypothetical financial institution network, and focuses on two specific firms. Firm #1 maintains a high number and degree of interconnections, and therefore naturally poses a greater risk to the system, should it encounter financial problems. Firm #2, which is less connected, both poses less risk to the system and is less exposed to risks emanating from other firms. It is notable that the absolute size of the firms does not reflect their degree of IC.[6]

Financial Institution Interconnectedness
High vs. Low Interconnected Firms



Circles represent financial firms. Circle size represents firm asset size.
Lines represent connections between firms. Line thickness represents degree of connection.

5 *Report to G20 Finance Ministers and Governors: Guidance to Assess the Systemic Importance of Financial Institutions, Markets and Instruments: Initial Considerations*, International Monetary Fund, Bank for International Settlements, Financial Stability Board, October 2009, p. 10.

6 For more complete discussion related to failure of size as a determinant of specific risk, see "Why 'Too Big to Fail' is Too Short-Sighted to Succeed," PCI White Paper, Research by NERA Economic Consulting, January 18, 2010.

A useful comparison to the systemic risk of the financial system is the "hub-and-spoke" model that airlines use to efficiently transport passengers. In the airline system, the "hub" cities, whether very large in terms of resident population such as New York, NY, or smaller such as Charlotte, NC, are of critical importance to the efficacy of the entire transport network. An airport closure in a hub city can result in massive travel disruptions regardless of travelers' ultimate destinations. Conversely, an airport closure in a less significant "spoke" city will result in problems for a much smaller portion of air-travelers. Additionally, the system's capacity to facilitate work-arounds to spoke cities, such as flights to airports nearby followed by ground transportation, is much higher.

Though financial institution networks may not be purposely designed in a hub-and-spoke model, financial networks can naturally end up in a similar design with similar weaknesses. An analogous example could be a particular over-the-counter ("OTC") securities or derivatives markets in which the majority of transactions ultimately involve a relatively small number of dealer firms.

To summarize the introduction to IC, it is intuitive that different financial firms maintain different quantities and significance of connections. Given that the financial system or network is the framework through which systemic risk is transferred, firms exhibiting more significant connection nodes have a relatively greater potential to contribute to a systemic risk episode. Developing the necessary financial and regulatory infrastructure to assess the level and significance of IC is critical to averting the type of financial crisis experienced recently. In addition, a program that misses the mark, or relies too heavily on identifying and regulating the wrong factors may actually give rise to increased costs to business, changes in economic behavior, and an erosion of market discipline that leads to increased systemic risk. The following section details the economic research and evidence from recent crises in which systemic risk became palpable, and conducts an analysis of current proposals for contending with systemic episodes.

Economic Consequences of Interconnectedness and Efforts to Regulate Systemic Risk

As the need to address systemic risk has reached a level of urgency for regulators and legislators in the wake of the financial crisis, many have come to recognize that the critical target for future policies is not one that is directed at those firms that are "too-big-to-fail," but more precisely "too-interconnected-to-fail." While there seems to be widespread agreement on the importance of addressing IC, proposals for reform have continued to focus on the former, with increased regulation and government resolution authority still considered as a remedy for the latter. As a result, these proposals have the potential to have an unintended negative impact on firms whose IC is low or unlikely to lead to a systemic risk episode, while failing to target or discourage those firms whose activities give rise to IC-generated systemic risk.

Analysis of IC or "channels of contagion" by economists Allen and Gale (2000) indicates that the structure of linkages between banks can result in the transmission of shocks (such as an unexpected demand for liquidity) across financial entities which can spread across regions.[7] The extent to which the markets or industries in which the firms operate are interconnected and complete (risks are traded or efficiently priced contractually) determines

continued

7 Allen and D. Gale, "Financial Contagion," *Journal of Political Economy 108*, no. 2 (2000), p. 2.

whether a shock is transmitted and gives rise to systemic risk episodes.[8] As we demonstrate in the sections that follow, depending on structural relationships, IC can act as a shock absorber or, conversely, as a transmitter of contagion and negative spill-over effects. Consistent with the insight of economic studies, our results confirm that different industries display different levels of IC and therefore pose different levels of systemic risk.

The characteristics of firms within an industry and their relationships to each other, their clients (depositors, creditors, policyholders, etc.) and the correlation of risks in assets become critical factors in determining the role of IC in relation to systemic risk. Since IC can be fundamental to the transmission of systemic risk, changes to regulatory programs and new authorities designed to address systemic risk must take IC exposures into account. Also, policies must recognize how existing contractual, legal and various regulatory structures act to reduce IC and the correlated exposures that give rise to systemic risk.

Economic studies find that IC alone does not give rise to systemic risk, but combined with higher levels of debt among interconnected firms and lower levels of capital, the likelihood of contagion leading to a systemic event is greater. This is confirmed by Nier, et al., who find in their study that the knock-on effects of a failure in a banking system depends on the level of concentration, the extent of interbank linkages, and the level of capital available to act as a buffer to absorb shocks. In general, the authors find that high levels of concentration, larger-sized interbank linkages, and lower capital levels increase the scope for transmission of systemic risk.[9]

The factors identified by Nier, et al., are also consistent with evidence regarding the causes, scope, and spread of the Asian financial crisis of 1997. In addition to organizational interconnectivity common to Asian financial conglomerates, there were high levels of IC in the financial relationships among those entities in the services sector accompanied by high levels of debt.[10] Reliance on offshore finance, and its simultaneous pullback at the signs of early problems, led to significant losses and the onslaught of the crisis that ensued.

The lethal combination of high interbank connectivity, large interbank liabilities, high debt levels, and low levels of capital certainly were at play in the recent financial crisis. But it is important to remember that not all financial industries exhibit these characteristics to the degree seen in the Asian crisis or in recent experience. The property and casualty ("P&C") insurance industry has low levels of IC, does not carry the high levels of debt found in the banking industry, has greater asset to capital ratios, and is not generally reliant upon outside capital for funding. As a result, the network effects predicted by economic experience that result in the transmission of systemic risk are unlikely to be observed in the P&C industry.

Various proposals contemplate a regulatory authority that would assume responsibility for regulating systemic risk, whether that involves the creation of a council of existing regulators, creation of a separate agency or combination of agencies (such as a consolidated banking authority), or a specialized group housed within an agency (such as the Federal Reserve) designated to explicitly focus on identifying systemic risk and addressing it through policy and direct intervention. In most proposals under consideration, the systemic risk regulator would have expansive resolution authority which it could use to intervene in, and potentially restructure or dismantle, a firm in order to forestall a systemic risk episode.

8 *Ibid*., p. 6.

9 E. Nier, J. Yang, T. Yorulmazer, and A. Alentorn, "Network models and financial stability," Bank of England Working Paper No. 346 (April 2008), p. 3.

10 Martin Perry, *Small Firms and Network Economies* (London: Routledge, 1999), p. 124.

To address those instances of systemic risk episodes, proposals have called for a systemic dissolution fund to "bail-out" the entity (or implicitly, its counterparties and other stakeholders) to ensure that losses that the firm suffers and obligations that are in jeopardy of being defaulted upon do not have a domino effect on others. The goal of the fund would be to corral the risk at the source, so that any spill-over effects upon firms to which it is connected are minimal. However, creating an effective regulatory solution involves ensuring that the approach can deliver a real reduction in systemic risk, and the regulatory solutions themselves do not duplicate other efforts and give rise to greater risk-taking behavior.

Inefficient Regulation and Competing Mandates

To determine the economic effects of proposals under consideration, we focus our analysis on the regulatory proposals that are seen as necessary to address systemic risk, but which at present fail to fully account for the impact and contribution of interconnectedness. A mechanism strictly based on the size of the firm, for example, would run the risk of capturing firms that exceed the size threshold but that are not interconnected, and as a result, do not pose systemic risk. Such a regulatory structure would be less effective at reducing systemic risk, and would increase costs for affected firms without a commensurate benefit, creating an inefficient regulatory program.

Government efforts to contain the spread of systemic crisis have had the effect of rewarding systemically interconnected firms, leaving non-interconnected firms without the same level of support. As the government shifts to remove the support and/or pushes to internalize the cost of the systemic risk externality imposed upon the financial system, it is important that the costs are not now shifted to firms whose IC did not contribute to the recent crisis and do not contribute to systemic risk generally.

The concern with proposals to create an additional regulatory authority is that they by and large contemplate a federal-level, bank-centric approach in the provision of regulatory authority. All proposals put forth thus far implicitly assume that federal authorities are necessary to counter systemic risk, and fail to recognize that state, regional, and industry-level regulatory authorities (such as self-regulatory organizations or national guaranty associations) can and have been effective at providing implicit and powerful safeguards against IC exposures that can act as a conduit for systemic risk.

In various industries, including the P&C insurance industry, state regulatory authorities are an important and effective facet of a regulatory model that helps ameliorate systemic risk on an ongoing basis before it becomes a concern to federal authorities. For example, regional trends may lead to the failure of various firms within a particular state or region, and local and state authorities are often in a better position to identify the source of the emerging problems and craft loans, subsidies, or apply targeted tax policy to address the problem before it becomes a "systemic" crisis. While data on state and local responses to economic decline and loss are more difficult to compile and studies in the literature are focused on economic development in a comparative sense, the impact is substantial in the U.S. economy where local economic concerns are as important to economic welfare as more national issues, in large part because of the interconnected nature of regional economies. Local and state responses confound the domino effect of IC-transmitted systemic risk by addressing the problem at the source and internalizing the externality of systemic risk at the local level.

Another concern is how firms are restructured, sold, or dissolved as a failure ensues. In the case of a federally-insured depository institution, there is a statutory framework for the resolution and receivership processes. When a

continued

banking organization becomes insolvent it is closed by its federal or state chartering authority and placed into receivership. The Federal Deposit Insurance Corporation ("FDIC") reimburses the insured depositors either by transferring their insured funds to another banking organization or by paying them directly. The FDIC is then responsible for managing the receivership process.

By law the FDIC seeks to maximize the returns to the bank's creditors. They sell the bank's assets and use the proceeds to pay the creditors of the failed bank. Secured creditors are protected against losses to the extent they have sufficient collateral. Proceeds from the sale of the other assets are then used to cover the other creditors of the failed bank to the extent possible. Losses are borne first by shareholders, then by subordinated debt holders, general creditors, and depositors, in that order. The FDIC stands in line in the place of the insured depositors. This ensures that the failed institution's non-deposit creditors bear losses before the deposit insurance fund. The exception is if there is a finding of systemic risk in which case certain categories of creditors can be reimbursed amounts above what they would otherwise be entitled to in order to mitigate the systemic risk.

The process by which firms in the insurance industry are dissolved are subject to relevant insolvency and liquidation laws and the regulatory framework particular to the governing state jurisdictions. Insurance companies have established guaranty associations to protect consumers and policyholders in the event of a firm insolvency. Unlike the guarantee provided to depository institutions by the FDIC, there are multiple guaranty funds dispersed geographically and jurisdictionally to ensure that policyholders and consumers do not suffer financial loss as a result of a failure of an insurance provider. This system allows the impact of the failure to be mutualized in a more diversified way, and helps minimize spillovers to the broader economy. But the priorities and objectives of a systemic risk regulatory authority are different from, and in fact could be contradictory to, those of the state authorities (whose primary concerns are the economic impact on the relevant business and market within its jurisdiction) and guaranty funds (whose mandate is to protect policyholders as a first priority).

As noted, if the new systemic risk regulatory authority deems a firm's eminent losses or insolvency will lead to losses at counterparties and creditors, which in turn, could have a systemic effects, it could act to forestall the ensuing default by taking the entity into receivership, much like the process used by the FDIC. Banking authorities could reach through a holding company for the purposes of protecting counterparties or creditors, potentially raiding insurance or other business subsidiaries whose equity holders, creditors, or other stakeholders would be considered to be less systemically risky. While it is certainly not likely that the intent of Congress is to create an authority that would put insurance policyholders at risk, the net result could be just that.

Increased Legal and Market Uncertainty

Various proposals under consideration involve the expansion of the current model for the resolution authority for depository institutions and grant new authority to federal agencies that gives them the ability to take over non-bank entities, including companies whose primary business may include insurance or other financial services. To be efficient and effective, the resolution program should be directed at the source of IC-generated risk, and those firms that contribute to systemic risk.

The potential for a duplicative systemic risk authority that could circumvent established resolution processes would not only unnecessarily increase costs to taxpayers, but could lead to competing and confusing standards for acting upon a crisis situation. Since insurance firms are not interconnected to the same degree as banking institutions, an insolvency may not have systemic consequences. As noted above, there is no "run-on-the-bank" psychology that would ensue in a crisis. In addition, there are resolution priorities dictated by statute. A bank-centric or federal level regulatory authority with a different orientation may create legal uncertainty for what types of obligations take precedence or would receive payment priority in the event of a default.

Even in the case of a large financial holding company that has subsidiaries that are interconnected and cyclical, an intervention by the systemic risk regulator that would supersede established priorities for guarantee and resolution may be dangerous and counterproductive. These established priorities ultimately reduce systemic risk, and reliance upon them creates legal and market certainty that helps mitigate the spread of a crisis.

It is important that efforts to create a regulatory authority charged with identifying sources of systemic risk do not work to supplant the structures that have been in place in guaranty funds that have heretofore been governed by state regulators to protect local businesses and institutions that support those industries within a particular region. In a time of increased concern about the growth of the federal deficit as a result of the massive bailouts from the recent financial crisis, a recognition that state authorities designed to focus on industries within their purview provide substantial and effective regulatory supervision of industries is critical. Creating duplicative regulatory authorities whose purpose may in fact conflict with the state mandates, e.g., systemic risk reduction versus respect for contracts whose costs and benefits are born and realized locally, is economically inefficient and could even be counterproductive. In the insurance example, payment of claims and protection of policyholders is tantamount to state insurance regulators. Erecting a federal authority whose powers can take precedence over state strictures creates legal uncertainty and can create IC exposure where it did not exist before.

The possibility that federal authorities may circumvent local efforts to combat sources of risk gives rise to additional moral hazard in that those state authorities may choose to let fail those entities that they would have otherwise resolved as a result of the federal level systemic guarantee. While it is tempting to presume that states would continue the same level of intervention and support for firms in their jurisdictions, cost concerns in economic downturns lead state and localities to vie for federal assistance whenever available.

Current regulatory proposals under consideration would clearly weaken existing contractual and legal protections that prevail under conditions of bankruptcy. While bankruptcy in general is not thought of as a desirable outcome, in many industries the precedents for resolving a bankrupt entity are well developed in the law and in practice, and this enables bankrupt firms, investors, and creditors a level of certainty regarding the dissolution of a failed firm. For example, subordination established in the issuance of debt and equity specifies payment priorities that determine

continued

ex ante returns to an investment as well as the ex post distribution of proceeds or liquidation value in the event of default. The establishment of separate resolution authority may enable these authorities to supersede or act to circumvent those provisions.

Inefficient Capital Structure and Increased Cost of Capital

The creation of authorities whose primary purpose is the identification and resolution of systemic risk has the potential to increase uncertainty in the capital markets which could increase the cost of capital. Also, as noted above, assuming those firms with high levels of IC are more likely to foment systemic risk concerns, they would be more likely candidates for government to step in and circumvent the bankruptcy process than those that are not subject to IC. The potential for reordering of payment priorities established in financial contracts and in bankruptcy law governing particular industries could be undermined by well-meaning efforts to control systemic risk. Thus, the establishment of resolution authority has the potential to undermine a firm's choice of the capital structure (which determines payment priority in bankruptcy) as well as frustrate efforts to compensate investors for the risks and expected rewards emanating from that structure.

It is important that any systemic risk authority recognizes the degree of interconnectedness in those firms for which this authority is granted and focuses on those activities that give rise to interconnectedness. Thus, those proposals that focus on greater supervision of payment, clearing, and settlement systems properly recognize the contribution of interconnectedness of financial activities to systemic risk by minimizing the transmission of systemic exposure arising from counterparty credit risk. Similarly, encouraging central counterparty solutions that increase transparency and recognition of credit risks through the maintenance of necessary collateral addresses IC concerns within those sectors (for example, in the derivatives and securities markets). However, imposing collateral or other requirements on entities that fall under state level authority that limit the use of derivatives and are not interconnected creates unnecessary burdens on those entities.

Another concern is that the market and the public, rightly or wrongly, may perceive those firms that are covered by the systemic dissolution fund to have a lower risk of loss or failure due to the government back-up. This creates an economic advantage for those firms if markets believe they are a lower risk. A perceived lower risk of default translates into a lower cost of capital (since a firm's contracting ability and borrowing rates are affected by the likelihood of default) and potentially greater investment opportunities. Conversely, those firms that do not fall under the umbrella may experience greater cost of capital, reduced investment opportunities, and a competitive disadvantage relative to those covered.

Reduced Transparency and Increased Risk

As noted, in proposals passed by the House and under consideration in the Senate, legislators have put forth a fund that would be generated by assessments on systemically risky firms that would be used to bail out a firm whose failure would pose significant systemic consequences. In general, proposals have focused on tapping firms of a particular size based on consolidated assets, and assessing those firms some amount commensurate with their size or other factors that have yet to be stipulated (e.g., interconnectedness, the likelihood of failure, cyclicality, etc.).

Failure to identify interconnectedness can lead to opacity and increased likelihood of risk transfer. If proposals focus on the use of size thresholds for identification of systemically risky firms and do not account for IC and the speed and intensity of the transmission of risk through IC channels, government will not fully identify systemically risky firms for which regulatory oversight is needed. Those high risk firms that go unidentified would increase the likelihood of systemic risk sources building, and catching regulatory authorities unaware. Opportunities for the firm and authorities to mitigate risk through prompt action and reduce the systemic threat will be missed. Further, the potential for risk to spread is increased if the source is also opaque to counterparties and creditors. Funds not raised from risky firms that inevitably draw upon it creates a cross-subsidy from those firms who contribute while also increasing the likelihood that taxpayers would have to pay to support the firm.

"Free-Riders" and Loss of Economic Efficiency

Another potential cost associated with using a myopic approach that does not take into account levels of IC is that those firms that pose systemic risk may nonetheless look to the government for assistance should they get in financial trouble. The potential that some firms will be tapped to contribute to the fund, while other risky firms will not be required to contribute gives rise to a "free-rider" problem. Free-riders do not pay into the systemic dissolution fund but nonetheless may be able to draw upon the fund and otherwise benefit from the financial support and stability that result from the government guarantees.

The potential for free-riding also provides those firms with an advantage over competitor firms who, by virtue of their size or other factors, must contribute to the fund. The emergence of competitive advantages for free-riding firms also impedes economic efficiency and results in a cross-subsidy as firms that must contribute implicitly support the risk-taking of competitors who do not pay their share.

Adverse Incentives and New, Additional Moral Hazard

While the potential for free-riding is perhaps indicative of any governmental financial assistance program, the availability of a systemic dissolution fund for such assistance increases incentives to take incremental risk in expectation of the back-stop assistance available also from the fund. The creation of additional government backstop measures creates various and significant moral hazards. Moral hazard, a term that is derived from the economics of insurance markets, refers to the case in which a party who has insurance coverage would take on greater risk than he normally would knowing that he will not have to bear the cost should losses occur.

As the government has extended more guarantees to cover risk of loss of individual and financial activity (e.g., unemployment benefits, the FDIC, Fannie Mae, and Freddie Mac), economic studies have found that those covered are more likely to engage in risky activities. Moral hazard is created because of the expectation that the government, not they, will be responsible for the losses. While moral hazard is evident in various contexts, it is of increased concern when its effects land on taxpayers who must ultimately bear the cost of financial losses.

In the case of the systemic dissolution fund, the potential for increased moral hazard occurs because financial entities may take additional risks in expectation that if they incur losses, the government will step in to make good on their obligations to avoid systemic consequences. In the recent financial crisis, many noted sources, including

continued

Congressional committees and global regulators, ascribed the incidence of excessive risk taking by banks and other financial entities to the misaligned incentives that result from moral hazards associated with implicit and explicit government guarantees.

Another related negative consequence of creating a resolution fund that pools both highly, interconnected systemically-risky firms in with those who may be large, but not interconnected is that it expands the government safety net to financial entities that do not necessarily need it, which could change decision-making and economic behavior both by the firms, their counterparties, and thus stakeholders. Companies subject to competitive pressure and market discipline to manage their risks could instead rely upon the government, and would achieve quasi-public status, much like Fannie Mae and Freddie Mac did, both of which were availed to massive bailouts by the U.S. taxpayer. Many government and economic officials have noted that it was the implicit guarantee that enabled the excessive risk taking by these entities. In the same vein, expanding these implicit guarantees may well increase the risk of systemic crisis.

Undermined Market Discipline

The importance of IC in transmitting systemic risk is not given sufficient treatment in current proposals that use size of assets as a threshold for identification of systemically risky firms. By targeting size, and not systemic risk, the proposals do not incentivize firms to reduce systemic risk and undermines those market forces and behaviors that reduce risk. This is because firms, counterparties, investors, and other potential stakeholders may infer from their identification and inclusion in the regime as being subject to a higher level of government protection than other firms. This reduces stakeholders' incentives to perform the necessary due diligence with respect to the firm's risks and act accordingly. For example, potential stakeholders such as counterparties and investors have market incentives to monitor a firm for risk levels and to reduce credit, increase the risk premium on the debt, or sell their debt and equity as risks increase. Inclusion in the government program mutes these forces of market discipline that would discourage risky behavior.

In addition, private sector solutions, such as guaranty funds, insurance, and clearing, which result in risk reduction, may seem less necessary or feasible if the perception of a government guarantee prevails. If the collective market discipline these efforts represent are hampered, systemic risks will be effectively increased as firms have less incentive to mitigate risky behaviors and their participants have less incentive to monitor and exert pressure upon them to do so.

In a free market system, the failure and exit of inefficient firms is a natural dynamic of the competitive market. Not allowing entities to fail, or cross-subsidizing those that do through greater forbearance, would have significant long-term economic consequences. Forbearance includes extensions of low rate loans, establishment of liquidity facilities (low cost access to government funds), government purchase of equity (as was the case with Citibank and General Motors, for example), and outright government guarantees of assets (including for example, commercial paper and money market funds). As noted by Acharya, et. al., "forbearance during systemic crisis creates incentives for banks to herd and become interconnected." (p.2) In their model and study of systemic risk, they find that forbearance creates what the authors refer to as collective moral hazard, which increases systemic risk. Setting aside the debate of how necessary such massive intervention was in the recent crisis, institutionalizing and expanding the structures that led to the crisis through the expansion of resolution authority has the likely result of increasing moral hazards that increase interconnectedness and contribute to systemic risk.

U.S. Job Losses and Decline in U.S. Competitiveness

If levels of IC are not incorporated into the mechanism for determining whether a firm is systemically risky, and size of assets is legislated as the means for determining the assessment, investment in productive capacity and employment are likely to be affected. In the financial services sector characterized by a higher rate of substitutability of technology capital for labor and an abundance of low-cost foreign-based labor, a broad-based assessment that fails to account for economic factors including IC on U.S. firms will lead to an increase in unemployment in the U.S. and a loss of competitiveness. This is particularly true of industries such as insurance which has historically been a more labor intensive industry and slower to outsource basic services due to the localized nature of the P&C services. This is distinct from the banking and mortgage markets, where outsourcing certain activities, such as loan or mortgage servicing, is common and has given rise to agency costs along the chain that proved insurmountable. Unfortunately, however, as an assessment is levied on low IC industries and the focus of regulation is shifted toward the federal level, resulting increases in costs for U.S. firms may hasten outsourcing to foreign-based labor and cuts in U.S. jobs as U.S. companies strive to maintain competitiveness.

If the regulatory focus and assessment on firms is based on size and not IC, those U.S. firms that have access to the global capital markets and the flexibility could choose to restructure the firm to shift assets (to avoid the size threshold) and its labor demand offshore. So not only would the assessment itself lead to a predicted decrease in employment as firms seek to raise funds to cover the cost, but also firms may shift additional jobs overseas to maintain competitiveness and escape the greater regulatory costs. The net result would be a loss of U.S. jobs with no reduction in IC, which when combined with other economic trends, is the primary conduit for systemic risk. This could result in a shrinking of the U.S. tax base and a simultaneous and unprecedented increase in government guarantees.

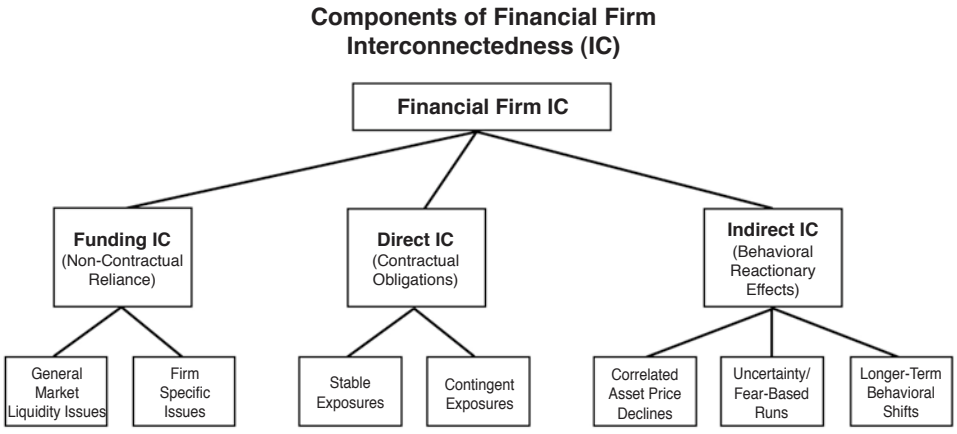
It is envisioned that the costs of the new financial regulatory program, including the dissolution fund, will be borne by the industries which are its presumed beneficiaries. However, there is no way to identify these beneficiaries ex ante. Instead, the affected industries will have no choice but to cut operating costs (which may lead to a loss of jobs) or to pass along the costs of the new strictures and the contribution to the dissolution fund to consumers. Since many of the affected financial services provided by these industries are consumed by individuals and small business as well as large, the economic impact will be broad-based and significant.

Part II: Key Types of Inherent Interconnectedness ("Inherent IC")

Assessing the level of a firm's IC and its potential to contribute to systemic risk can be challenging given the variations and complexities in financial markets and products. In an effort to describe IC in the context of financial institutions and facilitate an assessment process, we parse IC into various categories. The three broadest categories of a firm's inherent IC are:

1. **Direct Interconnectedness ("Direct IC");**
2. **Funding Interconnectedness ("Funding IC"); and**
3. **Indirect Interconnectedness ("Indirect IC").**

Within each of these major IC categories, risk posed to, or coming from, the system can be discussed in more granular sub-types. We discuss these sub-types but acknowledge that additional perspectives and descriptions are not precluded. A diagram below summarizes the composition of interconnectedness from an individual firm perspective, as described in this section.



1. Direct Interconnectedness

Direct IC is the most straightforward form of connection between financial firms. It encompasses contractual exposures or obligations between legal entities. Such exposures may be broadly thought of as "promises to pay."[11] Intuitively, risks to individual firms, and to the system as a whole, can arise when an unexpectedly large portion of promises to pay go unmet.

A larger number of contractual obligations can increase the direct IC of a financial firm. Similarly, a higher significance (or potential significance) of obligations increases direct IC.

continued

11 The other side of a promise to pay is the right to receive.

First-Order and Second-Order Contagion

Clearly, direct IC exposures have the capacity to transmit problems from an individual firm to its immediate counterparties. Such exposure may be described as "first-order contagion." However, the chain-like network of direct IC exposures can result in "second-order"[12] contagion as well. Second-order contagions can result in impairments to firms that have no direct connection with the "source" firm and maintain no financial exposure to specific market events at hand. Such occurrences, sometimes referred to as "cascading" or "domino" effects, create the potential to infect a large portion of the connected financial system.

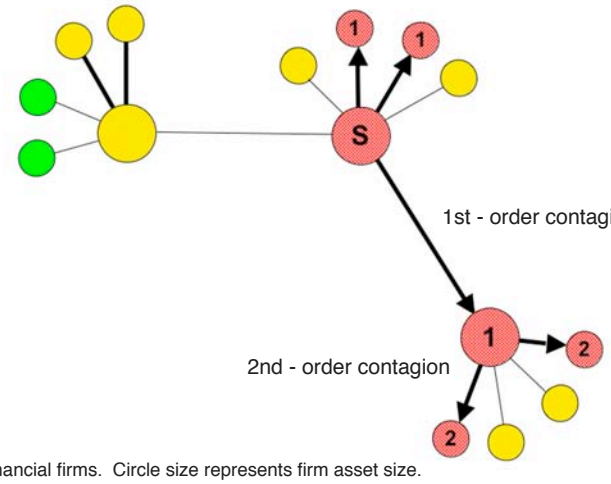
First- and second-order direct IC is discussed by Mayr:

> [D]irect contagion is always concerned with an obligation that cannot be met by the primary entity and, this has immediate consequences for the affected entity in the form of a pecuniary loss. In particularly adverse instances those events may even trigger chain reactions (i.e., domino effects), provoking the failure of other entities. This chain reaction is then associated with contagion. The infection of these companies, however, does not have any direct relation to the initial shock, e.g. a liability that cannot be met. The exposure simply comes from the linkage between the entities.[13]

An illustration of the contagion described is provided below.

In the figure, when one major firm (the source) becomes significantly impaired, firms maintaining significant direct connections (i.e., contractual exposures) with the source experience problems. Counterparties with more substantial connections to the source are more impacted. First-order impaired firms, in turn, spread weakness to their own dependent counterparties. In such a situation, initial positive features associated with potential risk distribution ultimately infect the broader network in a viral-like fashion.

First-Order and Second-Order Contagion



Circles represent financial firms. Circle size represents firm asset size.
Lines represent connections between firms. Line thickness represents significance of exposure/dependence.
Arrows indicate direction of contagion.

S = Source: Initally impaired firm.

- Healthy
- Marginal
- Highly impaired or failed

12 We broadly consider any contagion beyond first-order to be "second-order".

13 Bernhard Mayr, "Financial Contagion and Intra-group Spillover Effects," Dissertation no. 3303 of the University of St. Gallen, Graduate School of Business Administration, January 22, 2007, p. 29.

Types of Direct IC

The contractual direct IC exposures discussed above can be broken into two primary types. Broadly speaking, an individual firm can enter into a financial contract with a counterparty or customer resulting in either 1) a stable exposure or 2) a contingent exposure. Each type of direct IC is discussed below.

A. Stable Exposures

We define "stable exposures" to include traditional credit extensions, such as loans and repurchase agreements ("repos").[14] Loans and repos require repayment of a stated principal amount over a pre-determined period under contractual terms. Such borrowing arrangements tend to be bounded in terms of size, and so the lending firm's maximum financial loss from the contract can be easily determined at any point in time.[15] Many stable exposures, such as loans, amortize or can be prepaid during the term of the contract, so the current outstanding is not constant over time. However, the principal due and the primary terms of repayment are not highly dependent on market variables or events.[16]

B. Contingent Exposures

Contingent exposures represent a more dynamic form of direct IC. These contractual exposures may come due or result in a "current obligation" to a financial firm only under specifically delineated circumstances. Contingent exposures encompass a wide variety of financial instruments including letters of credit, swaps and other derivative contracts, guarantees, liquidity facilities, and insurance contracts. A firm's current obligation under a contingent exposure at any time may be dependent on the path of a referenced economic variable(s).[17] For example, an interest rate referenced by an interest rate swap determines the current obligations of the swap counterparties. Another form of contingent exposure may become current as a result of a customer demand or call. For example, a borrower's demand under the terms of a committed line of credit creates a current obligation to the lender. Finally, in another form of contingent exposure, a contract may create a current obligation only as a result of a particular non-market event. For example, a home fire can create a current obligation for a fire insurance company (e.g., a policy payout).

Under a given contingent exposure, there may never arise a circumstance in which an obligated financial firm takes a financial loss or is required to pay out funds to a counterparty. However, under other circumstances, the same contractual exposure may result in very significant current obligations on a firm.

Some contingent exposures such as traditional insurance contracts (e.g., auto, hazard, life) are relatively non-complex and well-understood. Underwriters have the benefit of a long robust history of experience as they determine the risk and price of coverage. Such insurance contracts typically include a stated maximum liability. Because traditional insurance contracts reference non-financial events, in large pools the expected payouts on policies are quite predictable.

continued

14 A repurchase agreement is a form of collateralized loan.

15 Some loans or credit arrangements have revolving features, but line increases are typically un-committed and so maximum exposure at any point in time is equivalent to the outstanding exposure. Undrawn but committed lines are considered contingent exposures, discussed next.

16 We consider a floating rate loan to represent a stable exposure, even though the interest requirements can change over time based on the level of a market interest rate. There is no bright-line delineation between a stable exposure and contingent exposure.

17 Many financial derivative payouts are said to be "path-dependent."

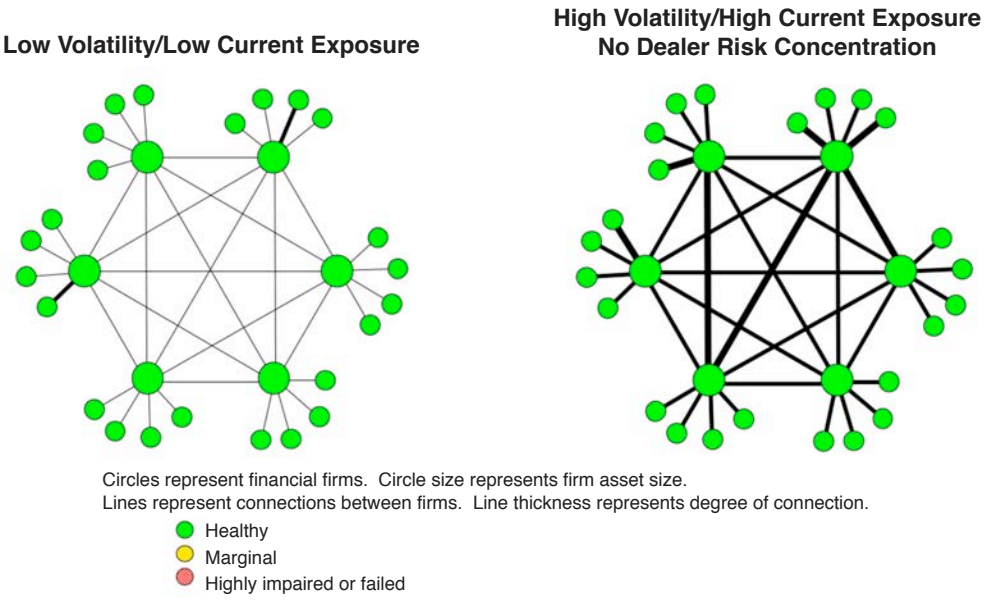
However, other forms of contingent exposures can be complex and less well-developed, making risks difficult to assess. For example, the current obligations resulting from certain derivative contracts referencing financial market variables can be highly unpredictable given a short history of experience, lack of market depth, and reliance on unobservable or estimated model inputs for valuation. Some derivative contingent exposures can even pose unlimited exposure to a financial firm.[18]

Contingent Exposures: General Market Volatility/Stress

In a financial network in which firms maintain numerous outstanding contingent exposures that reference financial market variables, the network's aggregate level of current exposure can be expected to grow when markets become volatile or stressed. This can effectively make financial firms more dependent on the continued health of their direct and indirect counterparties, who, ironically, may be competitors. In such an environment, assuming all firms in the network are not overly exposed to any unexpected severe market movements, the health of individual firms would be unlikely to change significantly. Under this assumption, both contingent and stable exposures will be met as expected by the network of connected institutions. That is, no significant new financial firm problems would pose a threat of spillover to connected firms.

The figures below illustrate the direct IC of a hypothetical network of financial institutions under two different market scenarios. The six inner circles represent major over-the-counter ("OTC") dealers for a particular class of securities. The outer circles represent other firms that could be investment funds, brokers, or other investors.

Even with the same set of contractual exposures, if a significant volume of exposures are contingent, under certain market circumstances the firms become more exposed to, and dependent on, one another. In this example all firms remain healthy (green) and are all able to meet their heightened current obligations (represented by the thickened lines).



18 For example, writing a naked call option or shorting a stock exposes the writer to the potentially unlimited increases in the reference position's price.

The illustration above clearly represents the ideal case from the system standpoint, in which portfolios of risks held by individual firms are not overly exposed to a market shift. The lack of any individual firm impairment may be the result of purposeful risk management by individual firms or simply good luck. However, the favorable result above is not always the case.

Contingent Exposure: Concentrated "Tail Risk" Exposures

Tail risk can be generally described as undertaking a risk exposure that has a low likelihood of occurrence.[19] Many types of financial firms seek to prudently undertake various forms of tail risk by entering into contingent exposures for which they are compensated. However, financial firms can implicitly or purposefully undertake tail risk concentrations, particularly via contingent exposures tied to financial markets.[20] Though the particular contingency referenced may have a low perceived likelihood of occurrence, a firm with a concentrated position will experience a high severity loss when the contingency does occur.

Some forms of concentrated tail risks may be generally known and even become accepted within markets. For instance, the total level of financial firm exposure to a significant decline in U.S. housing prices may not have been fully transparent in 2006, but it was clearly a concentrated risk exposure at a number of financial firms that were considered to be in strong financial health. Despite the potential severity, for most investors, analysts, and rating agencies, a 30% nationwide decline in U.S. home prices was not considered within the set of possible outcomes in 2006. Much of the risk to housing declines was undertaken through various contingent exposure forms including credit default swaps, credit enhancements, liquidity facilities, and unfunded synthetic securitizations.

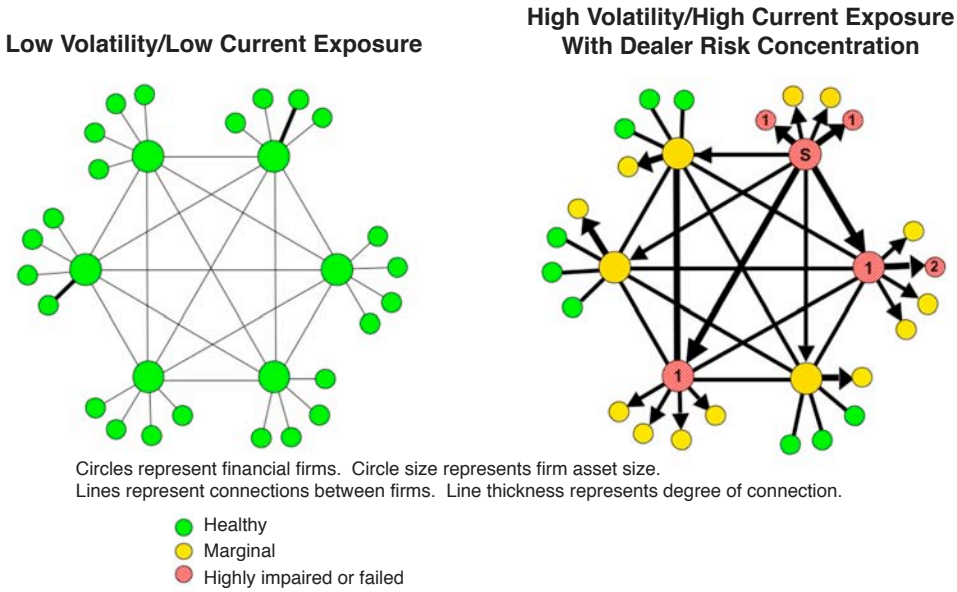
Other concentrations of contingent exposures can be more difficult to identify either due to opacity or because fundamentally unrelated exposures can become correlated during market stress. This phenomenon is discussed later under indirect IC. Unexpected high severity losses experienced by a highly connected firm can rapidly spread distress among dependent counterparties, as significant obligations go unmet.

continued

19 In trading products terminology, tail risk can be described as writing a deep out-of-the money put option.

20 Stable exposures, such as loans and bonds, may also represent concentrations of tail risk, but such exposures tend to be more transparent and stable, with well-defined maximum financial exposure.

In the illustration below, when the previously depicted network of firms is exposed to unexpected market moves and volatility, one or more connected firms which maintained significant concentrations to the relevant tail risk(s) becomes impaired. As a result of IC contagion, the problem firm threatens the entire system.



2. Funding Interconnectedness

With direct IC we discussed the onset and transmission of potential firm financial problems arising from contractual failures by firms. However, with funding IC, there is no contractual failure. Rather funding IC exists when a financial firm is dependent on other institutions to renew or replace contractual funding as it matures. The retention of these funding connection(s) clearly depends on both the ability and willingness of a lending institution to continue lending.

As many financial institutions employ a significant degree of financial leverage, maintaining sufficient sources of wholesale debt market funding can represent a critical activity.[21] Managers that perceive their firms to be in satisfactory financial condition may come to rely heavily on uncommitted[22] institutional/wholesale funding. The use of relatively inexpensive short term-borrowings to fund longer-term less-liquid but higher yielding assets is a constant temptation for banks and certain other financial institutions seeking to increase earnings.[23]

Clearly, over-reliance on market counterparties for uncommitted but necessary funding can expose a firm to risk of failure. There are two general circumstances in which significant reliance on uncommitted funding becomes problematic. First, declines in general market liquidity, which may result from economic or market conditions, can

21 This role is typically undertaken by a financial firm's corporate treasurer.

22 If untapped funding lines are "committed," they would be categorized as direct IC, given the contractual requirement to fund.

23 The asset-liability management risk discipline seeks to manage the risk associated with variations between maturities (and re-pricings) of assets and liabilities.

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lead wholesale lenders to reduce the amount of funding available to a dependent firm. In this case the lending firms may themselves suffer from reduced sources of funds, or otherwise seek to bolster liquidity to meet potential obligations. Second, lending firms may become unwilling to roll-over funding to a specific borrowing institution, because the borrower is perceived to have become an unacceptable credit risk. Another motive to cut funding to an individual firm is because a lender(s) may have incentives to push the borrowing firm into distress. To the extent that reductions in borrowed funds exceed a firm's liquid assets, the result is likely an illiquidity-based failure. A failure of an individual firm as a result of an inability to maintain sufficient funding can serve as the catalyst for broad system problems, as the illiquid firm fails to honor contractual exposures (i.e., direct IC), thereby infecting counterparties.

Kroszner discusses liquidity reliance in the recent crisis noting, "It did not matter whether there were a few large institutions or many smaller institutions – funding from key sources suddenly dried up and firms relying upon this funding, large or small, were forced into fire-sales by liquidity squeezes. The key is the interconnection and the correlation, not the size in and of itself."[24]

Structural Wrong-Way Risk

The recent financial crisis provides a reminder that significant market-based deterioration in a financial firm's asset values (or increase in current obligations) can coincide with deterioration in general market liquidity and the ability of a firm to maintain uncommitted funding. In terms of the descriptions above, direct IC obligations can increase just as funding IC becomes problematic. We characterize this dangerous aspect of some financial firms as "structural wrong-way risk." Certain firms are more naturally exposed to structural wrong way risk than others, but the level is also impacted by firm profit strategies and risk management.

U.S. Investment Bank Example

Structural wrong-way risk was prevalent within a number of investment banks prior to the financial crisis that ensued in 2007. These investment banks were not only highly dependent on the short-term debt markets for a large portion of their ongoing funding, but also entered into massive contingent exposures, providing various forms of financial market instrument guarantees (e.g., guarantees on the value of mortgage-backed securities). As financial market participants pulled back from risk-taking in 2007 and 2008 and de-levered, the overall level of liquidity available in markets fell quickly. This made it difficult for some investment banks to roll over short-term and other near-maturity funding. Simultaneously, contingent exposures referencing financial assets (e.g., long positions in mortgage-related assets), created additional large current obligations. For firms such as Bear Stearns, just as market liquidity became challenging, the firm sustained large market-based losses. These simultaneous problems led to the firm's rapid deterioration.

continued

24 Randall Kroszner, "Interconnectedness, Fragility and the Financial Crisis," Prepared for Financial Crisis Forum, Financial Crisis Inquiry Commission, Washington, DC, February 26-27, 2010, p. 7.

Because a number of investment banking firms that had undertaken significant structural wrong-way risk maintained a high level, intensity, and complexity of connections, direct and indirect government support was deemed necessary in some cases. A key reported government concern was that a "daisy chain" of failures could be set off should highly interconnected firms fail suddenly.

Property and Casualty (P&C) Insurance Company example

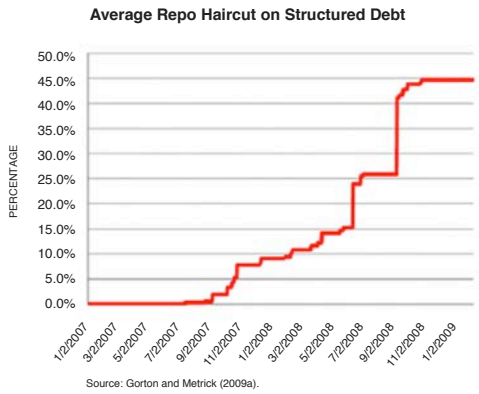
Firms such as property and casualty ("P&C") insurance companies are not exposed to the same form of structural wrong-way risk as discussed above. This is primarily because the vast majority of P&C firm contingent exposures do not reference financial market variables or instruments. For instance, contingent exposures of a P&C company may become current obligations as a result of auto accidents or building fires. Such human errors or natural events are not inherently correlated with financial market weakness and tend to occur in a fairly stable and predictable fashion. Further, with respect to funding, P&C firms are not highly dependent on the roll-over of short-term debt, as funding tends to be more matched with pools of insurance obligations.

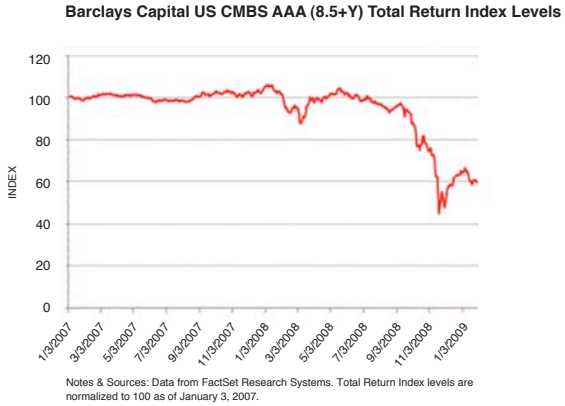
Given the above, an increase in a P&C company's current obligations would not be expected to occur in a coordinated fashion with a decline in the liquidity of a P&C firm. As a result, counterparties dependent on traditional P&C firms for payments under either stable or contingent exposures are less exposed to financial market shocks.

Alternative Perspectives on Wrong-Way Risks

Structural wrong-way risk, as discussed above, can be described from different perspectives and using different terms. For example, one might simply conclude that certain financial firms are more exposed to financial market cycles, without explicitly considering the correlation of market-based contingent exposures and market-based liquidity reliance. Traders may describe the combined structural elements as a negative market gamma position. However described, the key point is that financial networks that include highly connected firms that are exposed to this combination of risks can be prone to significant contagion.

The graphs below illustrate the concurrent issues with market funding and market asset prices during the recent crisis. As the cost and difficulty of obtaining short-term secured borrowing increased (as shown by the required average repo haircut), market values of highly rated securities fell (as shown by an AAA index of commercial mortgage securities).





3. Indirect Interconnectedness

Once a significant market shift or crisis reaches some critical level, significant indirect IC issues may arise. Indirect IC does not result from first-order or second-order contractual or funding exposures, but rather is based on customer and financial firm behavioral changes. These behaviors may be driven by imperfect information, limited time to digest information, or a general desire to de-risk or preserve liquidity in uncertain times. Indirect IC tends to exacerbate the effects of direct and funding IC problems, but can also pose negative impacts to financial firms where these exposures are not significant.

Indirect IC is categorized into three sub-types, though there are no strict bright-lines dividing the categories. These include:

A. Declines in Fundamentally Unrelated Assets

B. Uncertainty/Fear-Based Runs on Institutions

C. Consumer Behavioral Shifts

A. Declines in Fundamentally Unrelated Assets

When markets re-assess the value/risk of a certain asset class, resulting in significant market value declines, firms holding significant exposure to that class are likely to find themselves in a weakened condition. This situation often leads weakened firms to sell fundamentally unrelated asset classes which can: 1) provide immediate liquidity, and 2) provide realized gains (i.e., profit) that bolster firm capital levels. However, if several troubled firms choose to sell

continued

the same un-troubled asset class simultaneously, an unexpectedly high level of market supply can result. This drives down market prices, as the new extra supply cannot be easily absorbed by markets.

As a result of the above phenomena, financial firms unaffected by initial market problems can suddenly face significant market losses and deterioration of capital. High financial leverage exacerbates the impact of such asset price declines. Though these follow-on market price declines may be primarily liquidity-based, the declines may be of such severity and/or longevity that a firm's financial health is threatened. This well-known effect reduces intended benefits of firm asset diversification strategies when market stress is significant.[25] Given the lack of transparency with respect to market participants' holdings and the uncertainty of firm liquidation decisions, it can be virtually impossible to determine which initially unrelated asset classes may be negatively impacted.

Mayr describes the above phenomena, noting, "This contagious effect reduces the benefits of diversification because it generates positive correlation between the investments, even though these may be independent, in terms of their fundamentals."[26]

In the recent financial crisis, when "AAA"-rated securities backed by non-prime mortgages of certain vintages were determined to encompass higher credit risk than originally anticipated by many investors, market prices fell. Several major financial institutions (e.g., banks, investment banks, hedge funds) holding concentrations of these securities incurred major losses unexpectedly. To shore up liquidity and capital, some of these companies began to liquidate other fundamentally unrelated assets, such as municipal bonds or corporate leveraged loans. The large quantity and relatively rapid sales of these initially unrelated debt instruments pushed market prices down, resulting in losses even for financial firms that had not been significantly impacted by the declining mortgage securities.

B. Uncertainty/Fear-Based Runs on Institutions

A lack of information or lack of understanding with regard to a healthy institution's actual exposure to troubled assets and troubled counterparties can cause customers and investors to exit funding relationships and other dealings in an "abundance of caution." Such cautionary or fear-based actions undertaken to avoid potential losses on deposits are often characterized as "run on the bank" behavior. The perception of a limited time to retrieve all funds often leads to the velocity of this effect.

A financially sound deposit-gathering or investment firm that is perceived as being risky relative to its level of capital and liquidity, or is perceived as being more connected to problem institutions, is more prone to runs, even if perceptions are incorrect. Often a financial institution's loss of liquidity resulting from funding runs forces it to engage in rapid asset sales in the face of undesirable markets. This sale activity can lead to broad downward pressure on market prices as described earlier.

Kroszner describes the potential for funding runs based on firm opacity, complexity, and secondary contagions, "With lengthy and complex intermediation chains, it can be difficult to assess the health of an individual institution

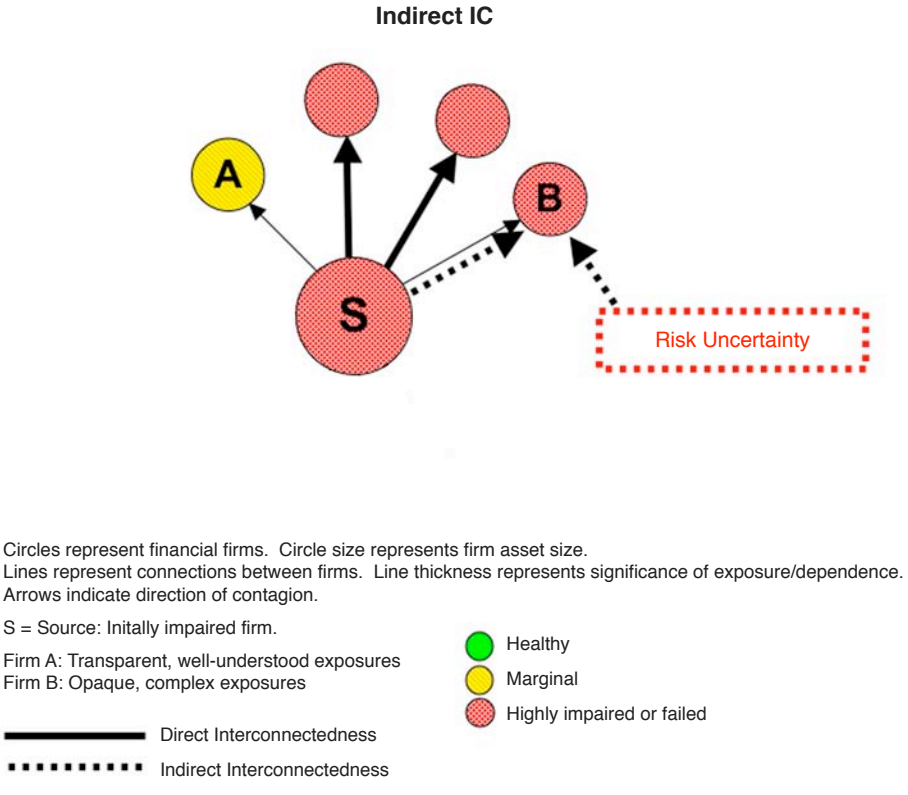
25 It is sometimes said that under stress all asset correlations go to 1, indicating that in severe market stress scenarios, virtually all financial asset prices decline as a result of distressed sales and declining liquidity.

26 Mayr (2007), p. 33.

because its health will depend significantly upon the health of its counterparties, which in terms depend upon the health of their counterparties, as well as upon the health and behavior of their funders. The difficulty in determining the actual health of a particular financial firm caused by this opacity – in parallel to the inability of depositors to determine the solvency of individual banks – makes the entire system vulnerable to funding runs."[27]

Kroszner goes on to describe the situation in the recent financial crisis by noting, "Funding dried up for all intermediaries due to lack of information on intermediaries' exposures to the troubled assets and potentially troubled institutions along with an increase in risk aversion."[28]

The figure below illustrates that even when the direct IC and exposure to a problem firm are minimal, indirect IC resulting from risk exposure uncertainty can impair a firm. Both firms A and B maintain modest direct exposure to a problem firm S (source). However, firm B is negatively impacted by indirect IC, because its customers and the markets in general lack transparency and/or understanding of B's actual exposures. In contrast, because the market understands that firm A has minimal exposure to the source firm, its indirect exposure is much less significant.



continued

27 Kroszner (2010), pp. 6-7.
28 Kroszner (2010), p. 10.

C. Consumer Behavioral Shifts

Another component of indirect IC results from broader and longer-term behavior shifts of customers and investors. When crisis conditions lead to fundamental changes in market participant behavior, these new behaviors can impact otherwise unscathed financial firms. This is true even when customers and investors retain confidence that a given firm is not impacted by market problems.

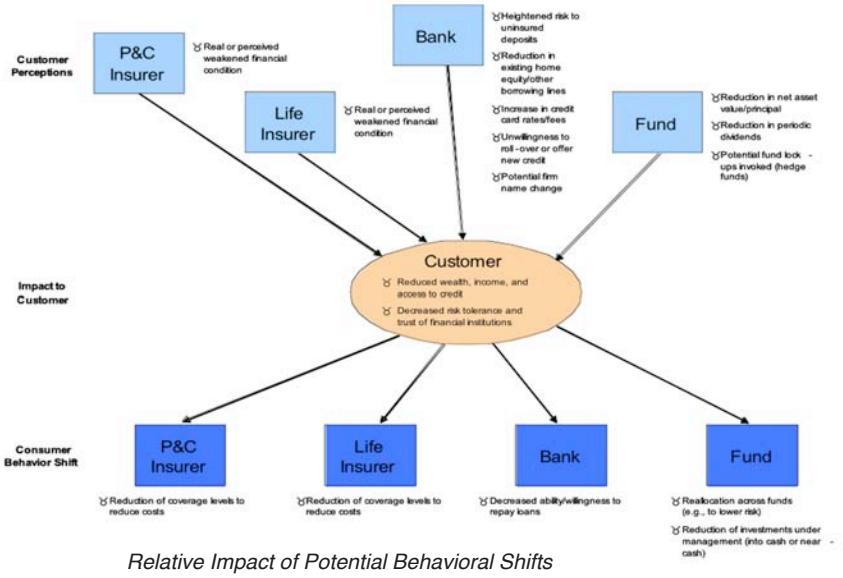
An example is an increased allocation to risk-free assets or reduced indebtedness by consumers who seek to de-risk once a crisis ensues. Such shifts can begin quickly, but can persist for long periods as memories of crisis-based losses linger. Such behavior can reduce the level of assets and/or number of transactions undertaken within mutual funds that are comprised of risky assets. Similarly it can reduce demand for bank borrowing or other more complex capital raising transactions.

Mayr notes, "indirect contagion results in changes in others' behaviour, which in turn may cause consequential loss or exposure."[29] Mayr goes on to further describe indirect IC from behavioral shifts, "...when contagion is indirect the affected entity suffers no immediate loss, as a result of liabilities or difficulties of the emanating entity, but due to the prospected change in behaviour of other agents. The consequences cannot be directly referred to the original event, even if it was the (main) trigger of these adverse reactions, that is, without the event one would not have seen any reactions."[30]

In a sense, broad behavioral shifts, brought about by a financial crisis can traverse into generally unrelated sub-industries and result in deterioration in financial results. It is intuitive that a significant crisis encompassing macro-economic declines can lead to such behavioral shifts.

The illustration below lists potential impacts to a retail customer arising from a financial market crisis. As the customer experiences declines in wealth and risk tolerance, behavioral changes ensue in relation to a broad set of firms. Even firms without significant direct or funding IC can be negatively impacted by significant financial crises.

Behavioral Shifts by Financial Product Consumers

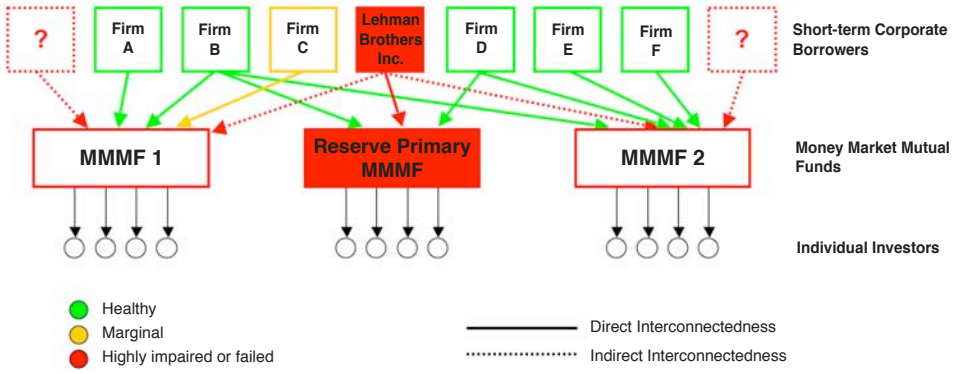


Relative Impact of Potential Behavioral Shifts

29 Mayr (2007), p. 29.
30 Mayr (2007), p. 29.

Though each of the firm-types depicted above can be negatively impacted by indirect IC from consumer behavioral shifts, the level of impact varies significantly. For example, the financial impact to a bank is very high if consumers become less willing or able to repay loans. Recently, as a result of the reduction in home values, some borrowers who are able to make mortgage payments choose not to, given their homes values have fallen below their mortgage debt. This creates sizeable direct losses to banking firms. On the other end of the spectrum are traditional insurance companies. Should customers cease to make payments on their policies, the policies are cancelled and the company's related liabilities are removed. Though the loss of policies or reductions in coverage levels can result in reduced earnings for traditional insurers, the impact is modest in relation to the issues faced by bank companies.

The figure below illustrates direct and indirect IC impact of the Lehman Brothers bankruptcy on money market mutual funds (MMMFs). When Lehman Brothers became unable to meet its debt obligations (direct IC), the Reserve Primary MMMF lost principal value (i.e., the fund broke the buck.[31]) However, other MMMFs that were not directly exposed to Lehman began to experience significant fund-holder withdrawals, as fears of potential exposure to Lehman or other problem debt issuers proliferated. This indirect IC threatened to force many sound MMMFs to liquidate positions into already declining markets, potentially aggravating downward pressure in market prices of financial instruments (e.g., short-term corporate debt). The Federal Government, recognizing the start of a run, intervened with unprecedented guarantees of MMMFs.



Concentrated Legal Entity Exposures vs. Concentrated Risk Exposure

Up to this point, the discussion of IC has focused primarily on the negative impact that a single counterparty or otherwise obligated firm can have on another institution. However, it is also important to consider IC exposures from a consolidated counterparty perspective. For instance, if multiple counterparties of a firm, each with modest connections, simultaneously fail to meet their obligations, or decided to tighten or eliminate funding, this can spark a firm's failure.

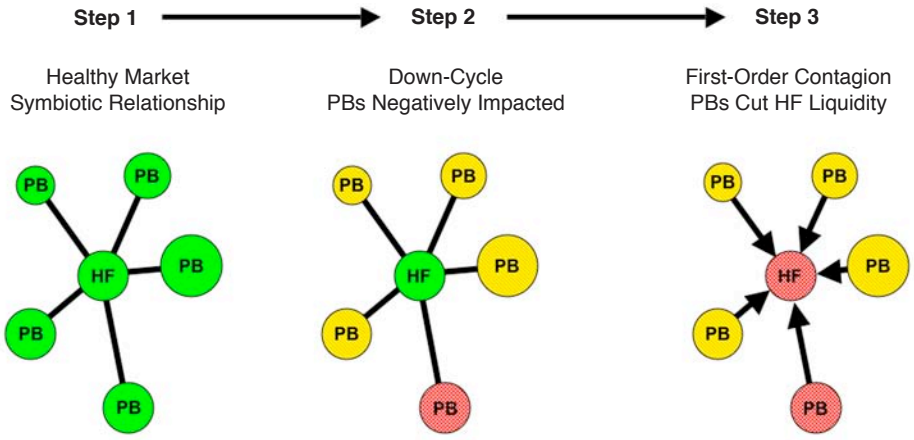
Such a portfolio-based view of IC must consider how much correlation exists with respect to the health of the set of counterparties. If numerous counterparties with modest obligations to a firm are all highly exposed to the same financial market cycle, the firm itself can have a significant indirect exposure to that cycle. Indirect exposure to financial cycles via counterparties is a considered a form of IC risk.

continued

31 When a money market mutual fund's net asset value (NAV) drops below $1 per share it is said to "break the buck." Money market funds have an implied promise to preserve capital at all costs and preserve the $1 floor on share prices.

As an example, a hedge fund may be dependent on continued funding and leverage from a group of five bank or investment bank prime brokers (counterparties). However, if each of the prime brokers is highly exposed to a particular financial market decline, leading them to reduce funding and leverage provided to the hedge fund, the fund may be forced to liquidate positions into an undesirable market or to shut down. The diversification of obtaining funding and leverage from multiple sources can prove ineffective if all sources are at risk to the same events.

The illustration below depicts a hypothetical hedge fund (HF) with five prime brokers (PB).[32] *In a stable market, all firms are in healthy condition. However, when a down-cycle ensues, in an effort to reduce risk and conserve liquidity, the prime brokers cut lending and increase hedge fund margin requirements. These actions can force the fund to sell assets into an undesirable market, locking in losses. The pressure can ultimately lead to the fund's total liquidation.*



Mitigants to Inherent IC

A range of techniques can be undertaken by individual firms to reduce their IC exposure. Some mitigation techniques, simply involve the application of sound counterparty risk management and the provision of a high degree of transparency to markets, investors, and customers.

1. Reduction of Current and Potential Counterparty Exposures

Even firms that by their nature are highly connected to institutional counterparties can reduce IC risk through the application of strong counterparty risk management. For instance, requiring counterparties believed to be highly creditworthy to fully collateralize with cash or cash equivalents any current exposures from derivatives positions (i.e., contingent exposures) reduces the potential for IC losses should the counterparty become unexpectedly impaired. Such frequent "settling-up" on a mark-to-market basis essentially reduces the "thickness" of connections between counterparties. From a system standpoint, the collateralization of current exposures can reduce the occurrence of rapid firm failures that may occur on the heels of credit downgrades or other signs of difficulty, which can prompt multiple counterparties to suddenly demand collateral.

32 Prime brokers, typically major banks or investment banks, are parties used by hedge funds to transact various trades. Prime brokers often also offer the hedge funds forms of financing (e.g., funding) and other services.

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Requiring the posting of initial margins on derivative transaction by less creditworthy counterparties is also prudent. This at least partly ensures that a counterparty has the capacity to fund potential losses on contingent exposures.

From a broad portfolio counterparty risk management context, financial firm managers can take additional steps to limit aggregate counterparty exposures. For instance, contingent exposures to firms within the same sector or to firms highly exposed to structural wrong-way risk can be limited to mitigate IC risk.

2. Transparent and Clearly Understood Exposures

As described earlier, risk opacity and/or exposure to highly complex or difficult to understand risks can expose firms to indirect IC. Conversely, a financial firm that takes steps to maintain a high level of transparency and undertake exposures in forms that are understood by market participants is less likely to experience indirect IC issues.

The Bank of England cites "information frictions" as prominent in the run-up to the recent crisis including, "Network externalities which arise when agents in a financial system do not have the information necessary to determine the risks to which they are exposed."[33] Heightened transparency reduces information frictions.

In the same spirit, with respect to counterparty dependencies, firms that seek to mitigate direct and indirect IC should reduce exposures to opaque counterparties that can pose real or perceived threats to firm health.

3. Resolution Processes and Industry Guaranty Funds

Certain financial firm types are covered by pre-designated resolution processes and industry guaranty funds that aid in troubled firm resolution. These processes seek to limit negative impacts to customers and counterparties that may result from a lengthy or disorderly firm bankruptcy. Generally, such processes provide for orderly disposition of contractual obligations, when a regulator deems a firm to have reached a certain threshold of weakness, prior to insolvency. The existence of the resolution processes and guaranty funds can reduce the prevalence of funding runs by customers and counterparties who may otherwise seek to sever contractual relationships/exposures at early signs of firm weakness.

A well-known financial resolution process is undertaken by the FDIC with respect to federally insured bank legal entities. At certain pre-determined levels of financial weakness, the FDIC takes banks into receivership. The primary goal of FDIC receivership is to liquidate bank assets in an orderly fashion and to repay insured depositors, incurring the least cost to the insurance fund. During the wind-down, the FDIC continues to operate the firm to minimize any system disruptions.

Similar to the FDIC, when state insurance regulators deem that an insurance company has insufficient strength to continue operations, the company is shut down through an orderly resolution process. Any customer insurance obligations that are due but cannot be paid are funded up to pre-defined thresholds by state insurance guaranty funds. Like the FDIC fund, the state insurance guaranty funds are derived from assessments to industry firms.

continued

33 Bank of England, "The Role of Macroprudential Policy," November 2009, p. 12.

The orderly nature and increased certainty of outcome provided by resolution processes reduces the potential for a problem firm to spread financial problems through direct or indirect IC.

4. Ease of Entry and Substitutability of Firms

Within a financial sub-sector, the ease of entry and ability of customers to switch firms can be an important mitigant to system IC. In a highly concentrated sector that has few players who are able to defend their market-shares, the impact of a single firm failure on the system is relatively large. For instance, the U.S. OTC derivatives market is largely concentrated amongst a small group of banking firms. According to the OCC's "Quarterly Report on Bank Trading and Derivatives Activities" for the fourth quarter of 2009, "the five banks with the most derivatives activity hold 97% of all derivatives, while the largest 25 banks account for nearly 100% of all contracts."[34] Though firms other than banks engage in derivatives dealing, banking companies currently dominate dealing in OTC derivative instruments. The failure of one of the top five banking firms can be highly consequential as these entities serve as counterparty on a vast number and notional of proprietary trades, which can be difficult to replace.

Conversely, in a financial sub-sector that has relatively low barriers to entry and a robust number of competing firms, systemic risk is relatively small. The ability of customers/counterparties to easily switch their dealings to other firms, or to easily replace their contracts upon firm failure reduces systemic risk. Auto insurers represent an example of a highly competitive financial product sub-market.

Though there are clearly some natural barriers to entry for certain financial activities, including specialized labor and technology requirements, this mitigation factor largely depends on the rules set out legislatively and by regulators. Regulators seeking to reduce systemic risk should institute requirements that allow a robust competitive market.

34 Comptroller of the Currency, "OCC's Quarterly Report on Bank Trading and Derivatives Activities, Fourth Quarter 2009," p. 7.

Part III: Institutional IC Assessment

Description of Analysis

In this section we discuss and provide results from a survey of external industry experts on financial firm interconnectedness. The survey responses provide benchmarks of relative IC levels for five stylized U.S. financial firms. The complete firm descriptions are included in the Appendix of this whitepaper. The firm types include 1) Complex Banking Corporation [B]; 2) Hedge Fund [HF]; 3) Mutual Fund [MF]; 4) Life Insurance Company [LI]; and 5) Property and Casualty Insurance Company [PC].

It is implicit that within actual sub-groups of the financial industry there are variations in IC that stem from a firm's breadth of activities and management choices. The stylized examples utilized here seek to capture the essence of a typical or average firm.

Survey Respondents:

The respondents, though anonymous, consist of a variety of individuals with significant financial industry experience and knowledge. None of the respondents are current employees of NERA, Oliver Wyman, or PCI or its affiliates. Additionally, none of the individuals surveyed was provided any coaching on desired responses or told that the survey was part of a paper commissioned by PCI.

Each of the individuals can be classified as at least one of the following:

- Current or former financial regulator;
- Current or former financial industry employee (e.g., financial consultant, financial firm accountant);
- Individual with advanced academic background in finance or economics (e.g., college professor, PhD economist).

The respondents have average experience in the industry of 18 years.

Survey Instructions:

Each survey participant was provided Part II of this paper describing IC, along with the appendix containing the descriptions of five stylized financial firm types.

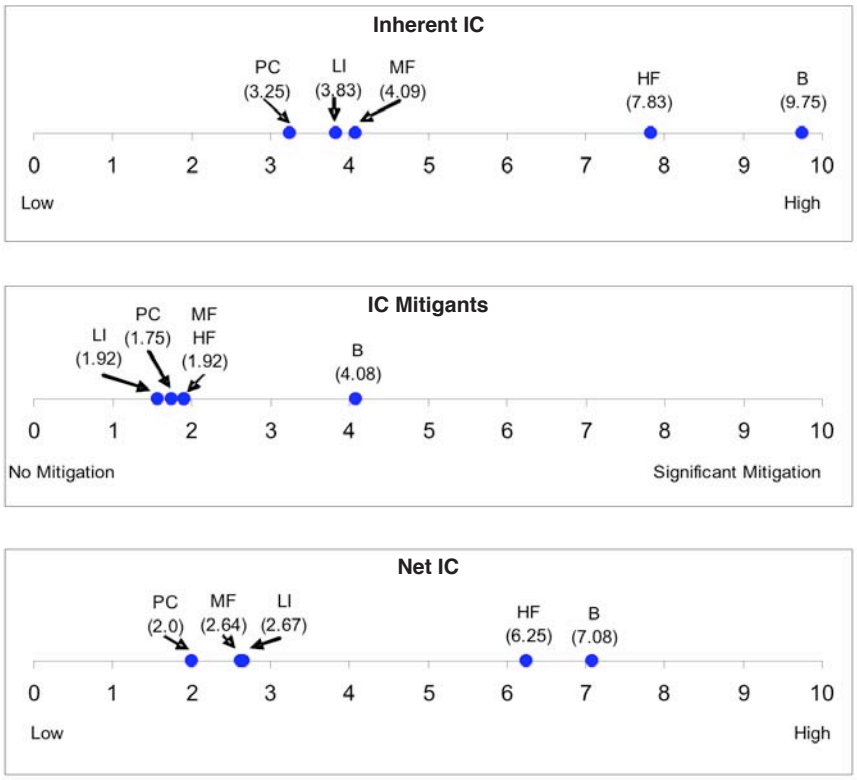
Participants were asked to read the stylized firm descriptions as well as the narrative discussion of IC. They were then asked to provide relative rankings for each firm type on three ranking continuums. The continuums, each a number line from 1-10, were titled: 1) "Inherent Interconnectedness," 2) "Interconnectedness Mitigants," and 3) "Net Interconnectedness."

continued

The authors believe that survey results represent a well-informed and meaningful benchmark of IC risk for the various firm types. A high level of precision in the ratings was not the intent.

Survey Results:

In total, 35 surveys were distributed and 12 completed survey responses were received within the allotted time. The average results from the surveys are provided below.



B = Complex Banking Corporation HF = Hedge Fund MF = Mutual Fund LI = Life Insurer PC = Property & Casualty Insurer

Discussion of Results

The following conclusions can be drawn from the results:

1. Significant dispersion among financial firm types

Respondents indicated that the stylized firm types differ significantly within each of the continuums, particularly with respect to inherent and net interconnectedness. Given the close relationship of IC with systemic risk, results indicate that the different financial firm types vary significantly with respect to their potential to contribute to a systemic risk episode.

2. Rank order of results

Banking firms were rated consistently highest in terms of IC. Though respondents indicated complex banking firms also had a notable degree of IC mitigation, on average the net IC for the banks also ranked highest. Insurance firms, both life and P&C, were judged to have relatively low inherent IC and low net IC. In particular, the P&C insurance firm was judged to have the lowest IC of all five firm types. The banking firm was judged to be over 3 times as interconnected as the P&C firm on a numerical scale.

Overall Survey Conclusions

The survey, though not large in scope, provides a clear indication that differing financial firm types should not be viewed similarly with respect to their level of IC. While banking companies and hedge funds are viewed as highly interconnected, other firms, particularly P&C firms pose less systemic risk as a result of their low IC.

Conclusion

The level of IC is an overarching factor in the systemic risk posed by a financial firm. In this paper, we have endeavored to break out firm IC into individual components that may be meaningfully assessed on an institution by institution basis. Our analysis indicates that IC varies significantly by financial institution type. Results from a survey of external experts confirm this dispersion, indicating that certain financial firms, especially P&C insurance firms, tend to have a low level of IC, while other firms such as complex banking companies exhibit high levels of IC. Any efforts to monitor and reduce systemic risk should naturally focus on those firms posing the greatest risk.

Our study and review of the evidence indicates that a failure to appropriately differentiate between firms with varying levels of IC may not only lead to an inefficient and possibly ineffective systemic risk mitigation process, but can also bring about other undesirable economic results. Specifically, potential side effects include:

- Reduced transparency regarding the true underlying sources of risk and greater likelihood of taxpayer-funded bailouts;
- Reduced stakeholder incentive to perform necessary due diligence with respect to a firm's risks, which as a result reduces market discipline that would discourage risky behavior;
- Potential for greater systemic risk as a result of misaligned incentives that arise from moral hazards associated with implicit and explicit government guarantees;
- An increase in unemployment and a loss of U.S. competitiveness; and
- New cost burdens to businesses whose IC does not pose significant systemic risk, which may be passed through to consumers.

Given these compelling and problematic results, it is important that legislators and regulators ensure that differences in financial firm IC are reflected within any new systemic risk reduction efforts. Because of the effect of IC, compounded by the moral hazard arising from government policy, it is vital that proposals for increased resolution authority and coverage by a systemic dissolution fund allow proper targeting and prioritization of efforts. Those companies that are not interconnected, whose risks are not correlated, and who do not exhibit pro-cyclicality, should not be included in the resolution structure. Those companies whose financial activities lead them to create and to propagate systemic risk should be included. By incorporating a measure or adjustment for interconnectedness and other relevant factors, the regulatory proposals would reduce negative economic consequences, government costs, and uncertainty. By establishing clear mechanisms for measuring systemic risk that minimize incentives to increase systemic risk, greater certainty regarding the consequences and costs of certain risk activities will ultimately increase market confidence.

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Appendix: Description and Background Discussion of Financial Firm Types

Below we provide brief descriptions of five stylized financial firm types.[35] These descriptions are provided as background material to survey respondents (described in section II).

A. Complex Banking Company

Banking companies play a key financial intermediary role within the U.S. economy, through their traditional activities of accepting deposits and offering credit. This activity is often characterized as "maturity transformation," by which shorter-term deposits and other borrowings (i.e., bank liabilities) are transformed into longer-term loans (i.e., bank assets).

Banks typically maintain a relatively high degree of financial leverage. The market is generally accepting of bank's high leverage given a perception of limited risk-taking ability associated with stringent supervision and regulation. Additionally, most banks derive a significant portion of their funding from FDIC insured deposits. The government deposit insurance program creates a relatively high level of stability for this funding source.

Significant changes in the banking industry have occurred over the last two decades. First, a high level of consolidation in the industry has concentrated a majority of industry assets and deposits into a relatively small number of firms. The recent financial turmoil, with its government assisted mergers has only increased industry concentration and has led the remaining major stand-alone investment banks to become banking companies.

With the repeal of Glass Steagall in 1999 and reduction of other regulatory restraints, a number of banking companies became more complex, moving heavily into the investment banking and trading arenas. These new businesses led several of the top banking firms to increase their levels of counterparty exposure through derivatives transactions and other contingent exposures. For example a number of complex banking companies maintain significant contingent exposures through offerings of principal protected products, holdings of highly-rated unfunded synthetic CDOs, and issuance of other forms of sold put options. Such exposures tend to be difficult to assess for external financial analysts and investors and tend to have low regulatory capital requirements relative to the losses they can generate under stressed conditions.

Additionally, over the past decade, top banking firms, in an effort to increase return on equity ("ROE"), increased so-called "originate-to-distribute" activities. Rather than maintain loans on balance sheet and earn a spread above the cost of funding, banking firms began to package and distribute loans and other instruments. Originate to distribute allowed banks to realize profits more quickly (which tend to be paid out in dividends and incentive compensation) and also to remain under balance sheet-based leverage constraints. However, many banking companies continue to support their "distributed" products through liquidity facilities or implicit guarantees.

continued

35 The financial firm sub-groups presented are stylized examples representing "pure-play" providers. It is recognized that a financial conglomerate could own each type of company listed; this is considered in a separate section discussing intra-connectedness.

In addition, banks often retain exposure to various forms of buyer recourse, where buyers of securities are able to "put-back" underlying non-performing loans found not to meet various underwriting requirements.

Finally, over the last decade many major complex banks have begun to rely less on retail deposits for funding and more on the wholesale markets. Traditional bond offerings of various maturities provide some of this funding. However, short-term inter-bank borrowings, commercial paper, and repurchase agreements have become a significant source of funding for many banking firms. This increased reliance on short-term uninsured market funding combined with increased mark-to-market on banking assets has significantly increased the structural wrong-way risk within some major firms.

B. Hedge Fund

The term "hedge fund" has come to encompass a heterogeneous class of alternative investment vehicles. A precise definition of hedge funds remains unresolved, as noted by Judge Randolph in a 2006 ruling related to hedge fund regulation, "[t]he term is commonly used as a catch-all for 'any pooled investment vehicle that is privately organized, administered by professional investment managers, and not widely available to the public.'"[36]

Hedge fund investors are generally more limited in their redemptions than mutual fund investors; a typical requirement is that an investor requesting redemption has to wait 90 days. Hedge funds may follow many different investment strategies but many engage in investment strategies that involve high amounts of leverage, from financial institution prime brokers, to increase returns. Leverage can be the direct result of borrowing, such as when hedge funds invest in equities using margin agreements or when hedge funds invest in fixed income assets with funds borrowed in a repurchase agreement. OTC derivatives are heavily utilized by some hedge funds.

Because hedge funds have more sophisticated/risky investment strategies and are largely unregulated or lightly regulated, they are generally available only to qualified investors. Prime brokers may get to see a part of a given hedge fund's portfolio but most investors do not have access to individual position information.

Hedge funds' leverage contributes significantly to their interconnectedness, particularly during market stress or unexpected correlations across markets. A hedge fund generates profits (or loss) from its chosen financial positions. The only collateral that a hedge fund has to support leverage derived from financial institutions is those same positions. In essence the primary source and secondary source of repayment is the same. As a result, it is intuitive that during a market stress, in which a hedge fund begins to generate losses, that prime brokers who lend to the fund would tighten lending terms.

During the boom, hedge funds increased leverage as the price of borrowing declined and repurchase agreement and other margin requirements fell. In the most recent crisis, hedge fund borrowing via repo agreements resulted in major financial disruptions as fixed income repo collateral fell in value, repo haircuts increased, and the resulting spiral of reduced lending, higher cost lending, and asset sales has been characterized as a "run on the shadow banking system" (Gorton, 2009).

Lo (2009) noted that even though there are many hedge fund investment strategies, the returns of hedge funds were becoming more correlated over time, suggesting that systemic risk from hedge fund investments might be increasing.[37]

36 *Phillip Goldstein, et al v. Securities and Exchange Commission*, p. 2.

37 Andrew W. Lo, "The Feasibility of Systemic Risk Measurement," Written Testimony Prepared for the U.S. House of Representatives, Financial Services Committee, October 19, 2009.

C. Mutual Fund

Mutual funds represent the largest amount of assets under management. Mutual fund shares are uninsured. Although there may be fees for investors to move funds in and out of mutual funds, investors can typically liquidate positions daily at the net asset value. There are many different types of mutual funds. Fund prospectuses dictate fund objectives, allowable strategies, and potential assets. Some funds seek to track the returns of a specified index, while other funds are actively managed and seek to outperform benchmarks. Mutual funds are able to hold a variety of equity and debt securities.

Mutual funds offer their investments to the public and are subject to substantial regulation that prohibits leverage and requires periodic, detailed position reporting. Given the high level of liquidity provided to fund-holders, mutual funds function as savings vehicles for many. Not surprisingly then, one of the most significant systemic risks faced by mutual funds is liquidity risk caused by a run on the assets. This was the case when exposure to Lehman Brothers Holdings Inc. debt led to redemptions on concerns about asset values which led the Reserve Primary Fund to cut its share price to less than $1 per share. The fact that this money market mutual fund "broke the buck" led to wider concerns and additional redemptions in money market mutual funds ended in intervention by the Federal Reserve to supply liquidity and guarantee values in the market.

Separately, and prior to the Lehman event, a number of money market mutual funds had invested directly or indirectly in private label mortgage, asset-backed, and CDO securities. Some of these exposures were undertaken by investments in short-term paper issued by structured investment vehicles ("SIVs") which held the underlying asset-backed paper. When the market for underlying asset-backed positions quickly dried up in summer 2007, many of these mutual funds took unexpected losses and some were bailed out by their sponsoring banking companies.

The mutual fund industry's exposure to "run on the bank" liquidity problems is an example of the industry's direct IC to the municipalities and individuals, and a run can result in a substantial decline in value and a spreading of a financial problem. However, outside of the bank runs, the mutual fund industry is unlikely to have significant spillover effects to other financial institutions. Regulation and reporting requirements result in relatively transparent obligations and prevent mutual funds from holding leverage that would tend to amplify shocks to other entities.

D. Life Insurance Company

In general, insurers have some significant differences from other financial institutions. They are regulated at the state level, provide financial reports annually that include details of assets and liabilities, and they have few unreported obligations (i.e., they do not have significant off-balance sheet credit promises and other obligations). In terms of investments, insurer regulation has been relatively more stringent than regulation of other financial institutions, limiting their ability to take on off-balance sheet risk or investments in derivatives. Insurance companies are somewhat different from financial institutions that are focused on investing clients' funds. In contrast, insurers receive policyholders' funds and invest them; and then, if a covered event occurs, the insurer makes a payment to the policyholder.

Insurance is often divided into life and property and casualty ("P&C") lines. Life insurance products generally provide protection from mortality-related risks. Life insurance products that provide more of a savings component, such as whole life, universal life, guaranteed investment contracts ("GICs"), and some annuities, are more connected to

continued

markets than products that primarily reflect mortality risk such as term insurance. Life insurers offering such savings products can find themselves with promised values to clients that exceed the value of supporting assets, particularly after a severe market downturn. After such a market decline customers may find it necessary or attractive to cash out, leaving the insurer with realized losses.

The life insurance industry has historically had greater exposure to mortgages and junk bonds than the nonlife insurance industry. In the early 1990s, there were a number of high profile bankruptcies by large life insurers that had large investments in junk bonds, commercial real estate, or both. A number of these bankruptcies were preceded by large withdrawals of policyholder funds. There has been debate about whether these were examples of policyholder runs but it is unclear whether most of the insurers who had promised high returns on a number of investment products would have been solvent to pay out their obligations.

Since the early 1990s, there have been several regulatory changes for life insurers which reduce the chance of a similar event. In general, both life and nonlife insurers have held diversified, high quality portfolios of assets. The insurance industry, like many other investors in the recent low interest rate environment, has moved toward a higher proportion of corporate and private label or non-agency mortgage-backed securities at the expense of government bonds and government-sponsored entity obligations. The applicable risk-based capital requirements supported this type of substitution because the assets carried the same risk weights as government and agency-guaranteed obligations but gave a higher yield. However, overall exposure has remained relatively low.

The risk to consumers of a failed life insurer is limited through state insurance guaranty funds. These funds make policy pay-outs should a firm become illiquid or insolvent.

E. Property and Casualty Insurance Company

Property and Casualty ("P&C") insurers are part of the overall insurance industry as introduced above, but offer specific non-life insurance protection to consumers including fire, homeowners, medical malpractice, workers' compensation, automobile liability and physical damage, aircraft, burglary, and theft. P&C insurers do not offer variable annuity products where an insurer may have to make up for losses from un-hedged major market moves. The major assets of the companies that make up the P&C sector are fixed-income securities, though equities and other types of securities are also held. Historically, P&C insurers have been among the larger holders of municipal securities. Regulations limit the use of derivatives. The companies' primary liabilities represent amounts payable to policyholders.

Capital and funding is largely provided via insurance premiums. It is unlikely that suppliers of capital, the policy-holders, will pull funds from the insurers at a time when they have to fund liabilities. To the extent that capital is pulled, insurance liabilities decline as well given an insurer is no longer liable to cover future expected losses of a lapsed policy.

P&C insurers are limited in their ability to take advantage of (or take on the risk of) asset-liability mismatches, unlike the mismatch risks taken on by many financial institutions prior to the most recent crisis. Duration matching is viewed as a source of value in the industry. For P&C insurers, liabilities are of varying duration (e.g., physical damage auto is short, liability is longer, product liability and workers compensation can be very long) and corresponding earning assets tend to match specific liability pools.

Property and casualty typically follow what is referred to as the “insurance cycle,” which is not highly correlated with the business cycle. The P&C cycle is impacted by asset returns: when they are high the industry becomes more competitive (that is, insurance prices fall and insurers compete aggressively for policyholders), but when asset values fall, industry capacity falls and the market hardens (or at least softens less) due to the reduced capacity. The P&C insurance cycle is not correlated with the business cycle since unexpectedly high occurrences of non-financial events is not inherently more likely when financial markets fall.

With respect to the recent financial market crisis the higher quality, relatively liquid assets held by nonlife insurers have limited downside financial impact to both stand-alone P&C insurers and P&C insurers that are part of larger financial conglomerates.

The risk to consumers of a failed P&C insurer is limited through state insurance guaranty funds. These funds make policy pay-outs should a firm become illiquid or insolvent.

PCI Property Casualty Insurers Association of America
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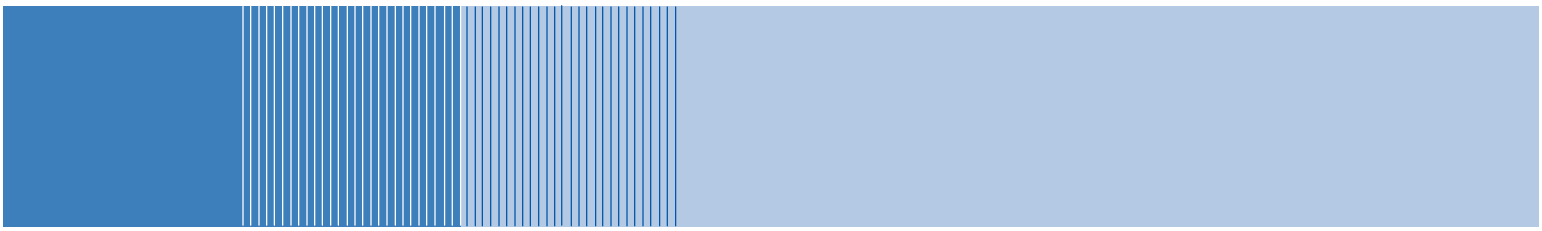
November 16, 2010

Institution-Specific Systemic Risk Assessment Methodology



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Introduction

This paper outlines a risk assessment process that may be used to determine the level of systemic risk posed by various individual financial institutions. Application of the assessment methodology to a broad set of financial firms will allow a rank ordering of firms in terms of systemic risk.

The process, which has been constructed over a number of months, should be considered as regulations that require the Financial Stability Oversight Council ("FSOC") to identify financial institutions posing significant systemic risk are devised by regulators. The relative rankings derived from the process will allow the FSOC to properly prioritize its oversight efforts across the broad spectrum of financial market participants.

Though not designed in response to the Advance Notice of Proposed Rulemaking[1] ("ANPR") published on October 6, 2010, in the Federal Register, the assessment process is responsive to many of the key questions posed.[2] Though developed at the request of PCIAA, the methodology has been empirically designed and is purposely broad enough to be applied to all types of financial institutions whether they are characterized as hedge funds, banks, private equity firms, mutual funds, or insurance companies.

To reflect the many facets and complexities of a financial firm's systemic risk contribution, and to consider relevant legislative requirements, the process is designed in a multi-component "CAMELS"-like format.[3] Each letter in the CAMELS system represents a key component of safety and soundness for an individual bank legal entity; each component is derived from various qualitative and quantitative considerations and ultimately weighted and aggregated to arrive at a composite rating. A similar construct that rates systemic importance or risk components which are then aggregated to a composite systemic risk rating will allow capture of the specific considerations denoted in the *Dodd-Frank Wall Street Reform and Consumer Protection Act* ("Dodd-Frank"), and give regulators latitude to add and weight individual considerations as deemed appropriate. The multi-component CAMELS-like format is familiar to most regulators and financial market participants, which should aid in implementation.

[1] "Advance Notice of Proposed Rulemaking Regarding Authority to Require Supervision and Regulation of Certain Nonbank Financial Companies," *Federal Register* Vol. 75, No. 193, October 6, 2010.

[2] "Advance Notice of Proposed Rulemaking Regarding Authority to Require Supervision and Regulation of Certain Nonbank Financial Companies," *Federal Register* Vol. 75, No. 193, October 6, 2010.

[3] The CAMELS system is used by the Federal Reserve, the Federal Deposit Insurance Corporation ("FDIC"), the Office of the Comptroller of the Currency ("OCC"), and numerous state banking regulators to rate banking institutions' overall condition and performance. The six factors examined are Capital adequacy, Asset quality, Management administration, Earnings, Liquidity, and Sensitivity to market risk. Ratings are based on financial statements and on-site examinations.

Assigning Systemic Risk Ratings

The sections below outline key components for the evaluation of financial firm systemic risk. Each systemic risk component is described and various metrics and qualitative considerations are suggested that may be considered in arriving at the component rating. The components are:

1. Interconnectedness
2. Market Concentration
3. Implied Product Support
4. Cyclicality of Financial Results
5. Transparency
6. Liquidity
7. Capitalization
8. Joint Factor: Liquidity and Interconnectedness
9. Mitigant/Amplifier: Sector and Firm Specific

The first seven of these are primary factors that largely determine a firm's likelihood to contribute to a systemic risk episode. Components 1-4 are designed to reflect the impact that the failure or impairment of an individual firm may have on the financial system. Component 5 involves issues that have repercussions at both a systemic level as well as at the individual firm level. Components 6 and 7 are the summary factors that determine the likelihood that a financial firm will be able to remain un-impaired during stressed conditions. The final two categories reflect joint and mitigating factors that can either increase or decrease a firm's likelihood of contributing to systemic risk.

Each of the nine components can be assigned ratings in a fashion similar to the CAMELS ratings used in banking regulation. That is, each component ratings, may be scored from 1-5, with 1 the best possible and 5 the worst.[4] A composite systemic risk rating for each institution will be derived from the nine component scores.

[4] Alternative numerical scales (e.g. 1-10) that offer a higher rating granularity could also be used. This paper uses a scale of 1-5, simply to be consistent with CAMELS ratings.

Multi-Stage Systemic-Risk Determination Process

The nine components comprising the full rating system should not be applied to every financial institution. For efficiency, a full assessment (and potential systemic risk designation) should only be undertaken for institutions that qualify under the two pre-tests described below.

I. Exposure Test: Total Quantity of Liabilities

Though exposure size may not be strongly correlated with systemic risk potential for all firms with relatively large total exposure levels, it is intuitive that a firm with a small total exposure level will not pose a systemic risk. A quantitative exposure hurdle that considers all balance sheet liabilities, notional amounts of derivative contracts, and other contractual or contingent liabilities should be utilized to reduce the universe of institutions that are subject to a more detailed assessment.

The exposure test threshold may be set at a single nominal amount (e.g., $10 billion) for all institutions, or may vary according to type of institution (i.e., property and casualty insurer vs. bank). The size test threshold(s) may change over time and the exact level may or may not be made public (to prevent potential gaming).

II. Core Systemic Component Test

Institutions above the designated exposure threshold should be assessed under a sub-set of the nine components detailed. The two components for consideration for this test would be: 1. Interconnectedness; and 2. Market Concentration. Each firm above the Exposure Test threshold would be assigned a score (e.g. 1-5) for these two key factors. In a 5 point rating system it is suggested that if either of the two component scores are rated 4 or higher, or the sum of the two scores is 6 or higher, the institution would be subject to a full systemic risk assessment.

Briefly, the Interconnectedness and Market Concentration components[5] were chosen for a pre-test because, regardless of the other component ratings, if the failure or rapid deterioration of a particular institution does not have the potential to cause significant losses among other institutions (interconnectedness) and does not remove a significant financial service/product provider from an important market (market concentration), then the individual firm would be extremely unlikely to pose a systemic risk. That is, the individual firm's demise would not be expected to have any substantial impact on the financial system.

Firms that exceed both of the pre-test thresholds described above would be subject to a comprehensive assessment considering all nine factors, as detailed in the next section.

[5] The Interconnectedness and Market Concentration components are more fully described in the next section.

Key Components for Evaluation of Financial Firm Systemic Risk

I. Interconnectedness: Potential for Spill-over

Interconnectedness is the potential for a financial firm, as a result of its failure or impairment, to transmit financial difficulties to other financial and non-financial firms. Interconnectedness results from the reliance that other entities place on a financial institution to fully meet the terms or obligations of various contractual commitments including but not limited to derivatives, guarantees, committed lending facilities, and insurance. See PCIAA/NERA whitepaper.[6]

An interconnectedness assessment looks at the total exposures of a financial firm and various concentrations that may exist from such exposures. Total exposure goes beyond any accounting methodologies used to determine balance sheet totals, and considers so-called risk shifting activities (e.g., written credit default swaps, securitization of mortgages with credit or liquidity risk guarantees, other guarantees or sold puts). The capture of risk-shifting activities addresses potential moral hazard issues inherent in the originate-to-distribute model of lending and the disaggregation of risky products. A number of authors and commentators have emphasized the importance of capturing institutions' contribution to risk shifting. See Kane (2009, 2010a,b) for leading examples.[7]

A firm with a high level of interconnectedness inherently poses a greater level of financial system risk. Ultimately, various nominal and risk-weighted exposure metrics may be considered for different types of financial institutions in assessing interconnectedness, but a strict rules-based formula is not recommended.

The following sections of Dodd-Frank relate to or require consideration of interconnectedness:

- Section 113 Considerations: (B), (C), (G), (I), (J), (D)
- Section 210 Considerations[8]: (i), (ii), (vi), (ix)

Rating - Interconnectedness

The rating should take into account the degree of interconnectedness that an institution has with other firms. Key factors to consider include:

(1) the significance of commitments with counterparties, including

[6] For a more complete discussion related to interconnectedness, see "De-Mystifying Interconnectedness: Assessing 'Too Interconnected to Fail' and the Fallout From Getting it Wrong," PCI White Paper, Research by NERA Economic Consulting, April 23, 2010.

[7] Kane, Edward J. (2009), "Incentive Roots of the Securitization Crisis and Its Early Mismanagement," Yale Journal on Regulation, 26 (summer), 405-416. Kane, Edward (2010a), "Redefining and Containing Systemic Risk," Atlantic Economic Journal (forthcoming). Kane, Edward (2010b), "Missing Elements in the US Financial Reform: A Kubler-Ross Interpretation of the Inadequacy of the Dodd-Frank Act," Keynote Address, 2010 Infiniti Conference.

[8] Section 210 Considerations points come from Section 210(o)(4)(C), unless otherwise noted.

(a) size and number of commitments,

(b) size and nature of any margin or collateral, and

(c) clearing time;

(2) the correlation of counterparty dependence with the condition of the firm being assessed (e.g., do commitments to counterparties increase when assessed firm is in weakened condition?);

(3) the correlation of counterparty dependencies in general (e.g., are all counterparty commitments likely to come due at the same time?);

(4) the importance of the assessed institution to the management or operation of exchange, clearing house, or other central system; and

(5) the size and scope of the assessed firm's securities lending operations.

Regulators are encouraged to consider each of these factors in determining a rating for the institution. A number of methods from the academic literature may be useful in determining the importance of the financial institutions in the financial network. We encourage regulators to consider at least two components of network structure when evaluating the contribution of an entity. First, we encourage a simple metric of network centrality, such as connectedness – a measure of how many "links" an institution has to other institutions. More links could imply more risk should the institution fail. Second, we encourage regulators to consider how "important" a financial institution is in the network. An institution that transacts daily with every other institution in the world, but only for $1, is not "important" even though it is highly inter-connected. A measure such as Bonacich centrality is designed to capture this importance. Ballaster, et al. (2006), Calvo-Armengol, et al. (2009), and Cohen-Cole, et al. (2010) provide more detail regarding the theory and application behind the use of this measure.[9]

A final rating of 1-5 may reflect the following summary descriptions:

1. *Completely independent*
2. *Somewhat independent*
3. *Moderately interconnected*
4. *Highly interconnected*
5. *Very highly interconnected*

[9] Bonacich, P. (1987), "Power and Centrality: A Family of Measures," *American Journal of Sociology* 92, 1170-1182; Ballaster, C., A. Calvo-Armengol, A. and Y. Zenou (2006), "Who's Who in Networks. Wanted: The Key Player," *Econometrica* 74, 1403-1417; Calvo-Armengol, A., E. Patacchini, and Y. Zenou (2009), "Peer Effects and Social Networks in Education," *Review of Economic Studies* 76, 1239-1267; Cohen-Cole, E., Kirilenko, A, and Pattachini, E. (2010), "Are Networks Priced? Network Topology and Order Trading Strategies in a High Liquidity Market" University of Maryland, mimeo, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1597738, accessed September 1, 2010.

II. Market Concentration: Firm Market Share; Ease of Product/Service Substitution; Granularity of Market(s); Standardization/Customization of Products

Individual financial product/service offerings consumed by retail and institutional customers may be offered by a large number of firms within a highly competitive market or by a smaller, more concentrated group of firms. Less competition within a particular product/service class can result in substantially more difficulty in product replacement/substitution should one of the offering firms exit the market as a result of impairment, failure, or otherwise.

As financial product markets largely controlled by a few firms grow in terms of importance to overall markets and the economy at large, the firms offering such products pose increasing levels of systemic risk. For example, if a few firms serve as counterparties to the vast majority of credit default swaps ("CDS"), and the CDS market is of high importance to the overall market/economy, such firms may pose significant systemic risk, regardless of total balance sheet size or the scope of other activities. A firm that represents a particular market concentration may itself not have a firm-level portfolio concentration (firm-level risk concentrations are considered within the Capitalization and Liquidity ratings).

Market concentration risk considers product/service offerings and direct holdings of financial products, as well as off-balance sheet exposures and assets under management that are effectively controlled by an institution (or may become direct holdings).

The following sections of Dodd-Frank relate to or require consideration of market concentration:

- Section 113 Considerations: (D), (E), (F), (G), (I)
- Section 210 Considerations: (i), (iii), (ix), (x), (xi)

Rating - Market Concentration

The assigned rating may be based on market concentration indices for product lines. Ratings may consider national, regional, and local concentrations.

We encourage consideration of standard concentration statistics, such as the Herfindahl-Hirschman Index (HHI). The HHI is a measure of the size of firms (or products) in relation to the industry. It is defined as the sum of squares of the market shares of the 50 largest firms within the industry. Where there are fewer than 50 firms, it uses all firms. The index itself is a number between 1/N and 1, where N is the number of firms in the industry. An HHI above 0.18 is typically considered a highly concentrated industry. In order to ascribe a value to each firm, we suggest considering the portion of the HHI that each firm contributes. This is a number between zero and 1 and is a measure of market power of the firm within that segment.

Regulators are encouraged to consider somewhat granular product lines, as well as relevant geographical concentrations. For example the system may consider commercial and industrial ("C&I") lending or even sub-components of this category, rather than all lending. Each product category may be assigned a national (or global) score as well as several local scores.

A final rating of 1-5 may reflect the following summary descriptions:

1. *One of many actors in local markets or small actor in national market. No significant concentration in any product category.*
2. *One of few actors in local markets or small to medium actor in national market. No significant concentration in any product category.*
3. *One of limited actors in local markets or medium actor in national market. Some concentration in limited product categories.*
4. *Key actor in multiple local markets or medium to large actor in national market. Concentration in many product categories.*
5. *Key actor in national market and in numerous local markets. High concentration in many product categories.*

III. Implied Product Support

Even in the absence of contractual exposures or obligations (that would be considered in the Interconnectedness rating) a financial firm may, in docile markets, support or imply support for certain positions or products. This may be the result of the firm having involvement in initial underwriting or distribution or by having staked out a position as a key liquidity provider in a certain product class. A firm may have even set previous precedents of supporting products in the past during relatively stressed environments.

Such support may be abandoned by a firm in times of stress in an effort to shore up its own condition. However, abandoning products where implied support had existed can cause or exacerbate broader market problems and thereby increase systemic risk.

The following sections of Dodd-Frank relate to consideration of implied product support:

- Section 113 Considerations: (B), (C), (D), (G)
- Section 210 Considerations: (i), (ii), (iii), (v), (vi), (ix), (x), (xi)

Rating – Implied Product Support

In arriving at the component rating, regulators are encouraged to consider the dependence by the market on the implied support or product(s) provided by the firm being considered. If the dependence is high in a particular product class or classes that are important to markets, then the implied support rating should be high. Implied support may be high but if wide support is provided by a number of firms then the support may be less important. A lack of implied support or potential importance of support would result in a low score.

A final rating of 1-5 may reflect the following summary descriptions:

1. *No implied support on products or support is not relied upon*
2. *Minimal implied support relative to resources*
3. *Some implied support relative to resources*
4. *Significant implied support relative to resources*

5. *Strong implied support for a number of key market products with high reliance by market for continued support. Level of support is high relative to resources*

IV. Cyclicality of Financial Results: Exposure to, or Correlation with, Market Cycles

Cyclicality is reflected by the likelihood that a firm's financial performance will deteriorate commensurate with the timing of declines or increased volatility within general financial markets. Financial firms that are highly exposed to financial market cycles tend to pose higher systemic risk than others. For instance, if a firm needs to increase capital or liquidity levels just as market conditions deteriorate, not only can firm-specific problems ensue, but the troubled firm's forced sale of assets into a declining market can exacerbate overall market deterioration.

More cyclically exposed firms may be properly capitalized and sufficiently liquid to weather even significant cycles, and so it should not be assumed that more cyclical firms are always more likely to contribute to systemic risk or become impaired. However, the behavior of more cyclical firms can be more important to the system during downturns. Finally, it should be noted that some firms may be exposed to certain cycles, but if those cycles are not highly correlated with broad market and economic downturns, those firms are unlikely to contribute to a systemic risk episode.

The following sections of Dodd-Frank relate to or require consideration of cyclicality:

- Section 113 Considerations: (B), (G), (I), (J)
- Section 210 Considerations: (i), (ii), (xi)

Rating – Cyclicality of Financial Results

The component rating may be informed by the correlation of a firm's previous earnings (or forward-looking earning estimates) with a set of key market indicators. We encourage regulators to consider using three sets of cyclicality measures: general economic conditions, consumer cyclical information, and financial market conditions:

(1) General Economic Conditions

(a) GDP

(b) M3

(c) Inflation/unemployment

(2) Consumer Cyclical

(a) Housing/Commercial Real Estate price index

(b) Consumer confidence

(c) Consumer spending/borrowing

(3) Financial Market

(a) S&P, Dow, FTSE index, etc.

(b) VIX-type measures

A final rating of 1-5 may reflect the following summary descriptions:

1. *Strong negative correlation with key measures*
2. *Mild negative correlation with key measures*
3. *No correlation with key measures*
4. *Mild positive correlation with key measures*
5. *Strong positive correlation with key measures*

V. Transparency: Disclosure and Market Comprehension of Financial Exposures

Transparency provides market participants and regulators with information regarding a financial firm's various risk exposures. A high level of transparency allows the market to estimate the financial position of a firm in the current environment and under various potential future scenarios. Lack of transparency – opacity – creates uncertainty about a firm's financial position and future prospects, which can increase risk to the individual firm and to the system as a whole. This is because during stressed periods, opacity tends to exacerbate fear and related "runs on institutions" by retail and institutional customers and counterparties. Such runs can result in incremental asset sales, increased volatility, and delevering within already stressed markets.

The following sections of Dodd-Frank relate to or require consideration of transparency:

- Section 113 Considerations: (B), (I)
- Section 210 Considerations: (i), (ii), (xi)

Rating - Transparency

The rating will be based on the regulators' discretion, with regulators encouraged to take into account a number of factors including the timeliness and detail of financial institutions' release of:

(1) level, quality, and trend of capital;

(2) derivative positions and off-balance sheet contractual exposures;

(3) counterparty positions and various forms of counterparty concentration; and

(4) level, quality, and trend of liquidity.

It is important to note that the timeliness and level of disclosure required by regulators of various institutions can vary significantly. Some institutions that are largely unregulated may have minimal or no reporting requirements. As such, a firm that meets current regulatory reporting requirements for its industry could receive either a high or low rating within this framework.

A rating of 1-5 may reflect the following summary descriptions:

1. *Financial institution releases substantial, timely information in each key category*
2. *Financial institution releases substantial, timely information in some categories*
3. *Financial institution releases some information in each category or substantial information in one category*
4. *Financial institution releases some information in limited categories*
5. *Financial institution releases little information on any category (e.g., status quo quarterly call reports only)*

VI. Liquidity: Ability to Meet Cash Obligations

A firm's liquidity position determines its ability to meet current and potential cash obligations. Higher levels of liquidity reduce the need for a firm to sell (potentially less liquid) assets to meet current obligations. Firms with low liquidity relative to potential needs have a relatively high potential for failure and therefore a higher likelihood of contributing to a systemic risk episode. This is particularly true for a firm that represents a market concentration or that is highly interconnected.

The following sections of Dodd-Frank relate to or require consideration of firm liquidity:

- Section 113 Considerations: (I), (J)
- Section 210 Considerations: (ii), (v), (vii), (viii), (xi)

Rating - Liquidity

It is recommended that the rating be focused on the ability to meet potential cash obligations under stress. Where available, liquidity ratings from safety and soundness regulators may be considered (e.g., L in CAMELS, for banks). However, within this systemic framework, regulators are encouraged to focus on a firm's ability to meet liquidity demands under potentially stressful future environments. Current obligations in docile markets are typically met with a combination of existing liquidity in the form of cash, liquid securities, and various borrowings. However, the ability to meet obligations in a stressed future environment must consider potential liquidation values of assets, changes in margins/haircuts on collateralized borrowings, and the potential for committed liquidity providers to fail to meet their obligations. Portfolio exposure concentrations tend to increase liquidity risk.

The matrix below illustrates an example of one potential input to a liquidity component rating. The matrix considers the portion of liabilities maturing in less than 30 days and the sources for meeting those liabilities.

	Sources for Meeting Liablities				
	Cash/Treasury Only				***Credit Lines Only***
	(1)	***(2)***	***(3)***	***(4)***	***(5)***
>10% of liabilities <30 days	1	2	3	4	5
>20% of liabilities <30 days	2	2	4	4	5
>30% of liabilities <30 days	2	3	4	5	5
>40% of liabilities <30 days	3	3	5	5	5
>50% of liabilities <30 days	3	4	5	5	5

VII. Capitalization: Degree of Leverage

Capital serves as a buffer to absorb financial company losses. The size of a financial institution's capital relative to its various risk exposures and the correlation of those exposures is a key determinant of firm survival. Concentrations (e.g., portfolio concentration) or multiple disparate risk exposures under certain scenarios can rapidly deplete a financial firm's capital and threaten its survival. Low levels of capital (i.e., high levels of leverage) increase the likelihood of a firm's failure, thereby increasing the potential for a firm to contribute to systemic risk. This is particularly true for a firm that represents a market concentration or is highly interconnected. For purposes of this framework the continued adequacy of capital under more severe financial and economic downturns should be considered.

We encourage regulators to consider not only the size of a financial firm's assets, liabilities, and other exposures, but also the risks and correlation associated with those positions. A simple leverage ratio is not comparable across financial firms that undertake different activities. For instance a fund that undertakes concentrated exposures in one area of the financial market would likely need a significantly lower leverage ratio to obtain a capitalization rating commensurate with a company that has diverse exposure to largely uncorrelated physical events and maintains a high quality asset pool in support of potential exposures.

The following sections of Dodd-Frank relate to or require consideration of capitalization:

- Section 113 Considerations: (A), (I), (K)
- Section 210 Considerations: (i), (iv), (vii)

Rating - Capitalization

If available, the capitalization rating may consider relevant regulatory "safety and soundness" capital ratings (e.g., C in CAMELS, if a bank), which generally reflect firm capital in relation to various exposures, as well as the quality of earnings and capital. However, in rating both liquidity and capitalization in this framework, it is important that potential differences in arriving at safety and soundness ratings across various types of financial firms are considered. Functional regulators may tend to rate an individual firm within a sector relative only to the other regulated firms in that sector; however, in this more overarching framework it should be realized that a "satisfactory" liquidity or capitalization rating for a firm in one sector may not be commensurate

with a "satisfactory" rating for a firm in a different sector. Recent policy discussion and academic work has emphasized the importance of firms holding not only common equity to buffer against shocks, but also the importance of contingent capital. One set of prominent suggestions includes the issuance of conditional capital buffers in initial debt form. This type of debt would automatically convert to equity based on a set of pre-determined criteria such as the level of the firm's stock price. In this fashion, the firm would have access to additional capital precisely when it is exposed to systemic shocks.

One input to a final Capitalization component rating may be based on a table such as the one below, along with other relevant qualitative and quantitative considerations. The C column across the top of the matrix represents the primary regulator's capital rating for the institution (e.g., The C in CAMELS, for regulated banks):

	Primary Regulator's Capital Rating				
	C-1	***C-2***	***C-3***	***C-4***	***C-5***
Common Equity (CE) > 8% and conditional capital (CC) > 5%	1	2	3	4	5
CE > 6% and CC > 5%	2	3	3	4	5
CE > 4% and CC > 5%	3	4	4	5	5
CE > 4% and CC > 3%	4	5	5	5	5
CE < 5%	5	5	5	5	5

VIII. Joint Factor: Liquidity + Interconnectedness

This rating is intended to capture the fact that interconnected institutions are a greater risk to the financial system if they are themselves illiquid. Higher liquidity risk is more likely to trigger an event which can cascade through the system. It also serves to reward even interconnected institutions with sound liquidity and liquidity management processes.

The table below could be used as one method to arrive the joint factor rating:

		Interconnectedness				
		(1)	***(2)***	***(3)***	***(4)***	***(5)***
Liquidity	***(1)***	1	2	3	4	5
	(2)	2	2	3	4	5
	(3)	3	3	3	4	5
	(4)	4	4	4	4	5
	(5)	5	5	5	5	5

IX. Mitigants/Amplifiers: Sector and Firm-Specific

Individual firms or groups of firms may be supported by various mitigants that serve to reduce the gross level of systemic risk contribution, as reflected by the components above. For example, the existence of a group resolution fund can reduce the systemic impact from a group member's failure. Additionally, the existence of a robust and low-impact wind-down plan approved by regulators can reduce the systemic risk posed by a financial firm. Finally, a firm that has superior information systems with respect to its own exposures as well as superior market monitoring capabilities may be able to take steps to avoid exposure to potential stressful environments.

The following sections of Dodd-Frank relate to or require consideration of mitigants:

- Section 113 Considerations: (H)
- Section 210 Considerations: Section 210(o)(4)(B)

Rating – Mitigants/Amplifiers

This rating is intended to capture the variety of methods that a financial institution may use to mitigate its systemic risk. Rating examples below are indicated. A rating of 1 would reduce the systemic risk score, a 3 would have no impact, and a 5 would amplify the composite rating.

1. *Sector guarantee funds; Detailed wind-down plan; Strong information systems*
2.
3. *Satisfactory wind-down plan and information systems*
4.
5. *Lack of detailed wind-down and contingency plans; Marginal information systems*

Future Development

When considered together, the component ratings above should reflect the net systemic risk posed by various financial institutions, while encompassing all considerations required by Dodd-Frank.

Going forward in the development of the assessment process, each individual component may be further defined and detailed by regulators. Specific qualitative and quantitative measures may be specified that are utilized in arriving at the component ratings. For firms that are currently lightly regulated with minimal reporting, regulators may need to set up new information flows in order to arrive at informed ratings. Treasury's Office of Financial Research ("OFR") may coordinate this process. In other more highly regulated sectors, current exposure information reported in public and regulatory filings may be sufficient to derive an informed systemic risk rating.

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