

PCI White Paper

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De-Mystifying Interconnectedness

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

Research by: NERA Economic Consulting

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Property Casualty Insurers
Association of America

Shaping the Future of American Insurance

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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: cyclicity, 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 external¹ 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:

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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.

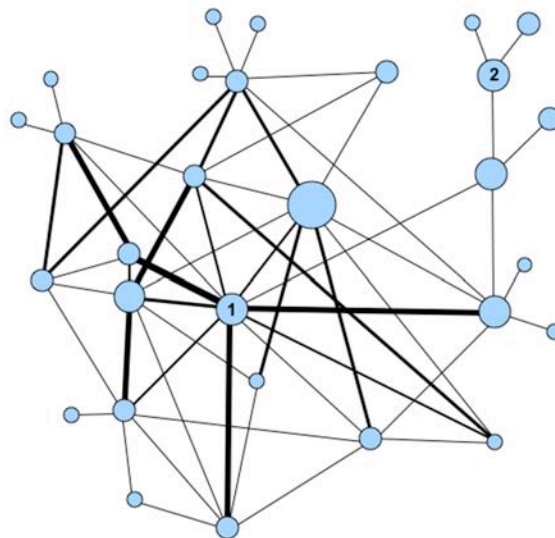
4 The surprise demise of a firm that serves to wipe out equity holders would negatively impact any investors with concentrated equity holdings. However, diversification can mitigate this.

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

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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

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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

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, cyclicity, 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

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.

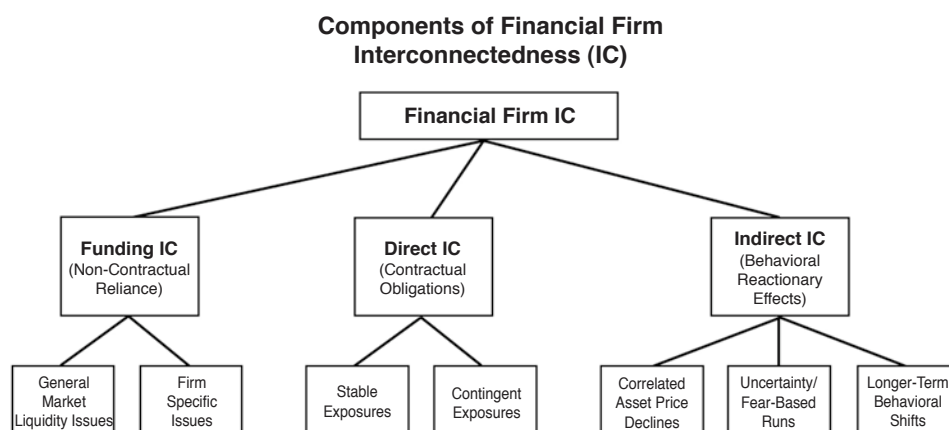
It is envisioned that the costs of the new financial regulatory program, including the dissolution fund, will be borne by the industries which are its presumed beneficiaries. However, there is no way to identify these beneficiaries ex ante. Instead, the affected industries will have no choice but to 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

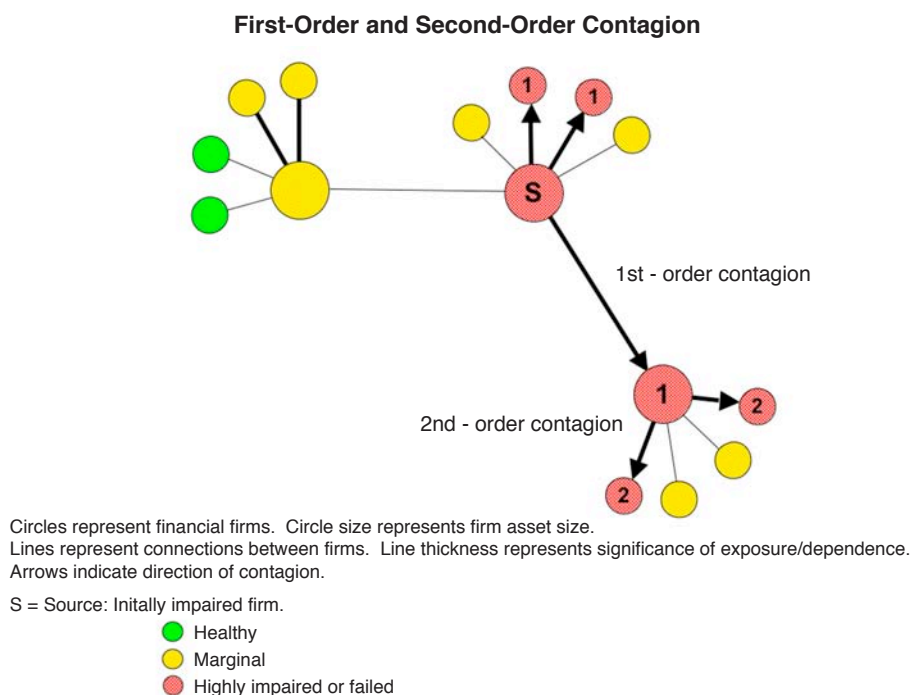
Clearly, direct IC exposures have the capacity to transmit problems from an individual firm to its immediate counterparties. Such exposure may be described as “first-order contagion.” However, the chain-like network of direct IC exposures can result in “second-order”¹² contagion as well. Second-order 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.



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.”

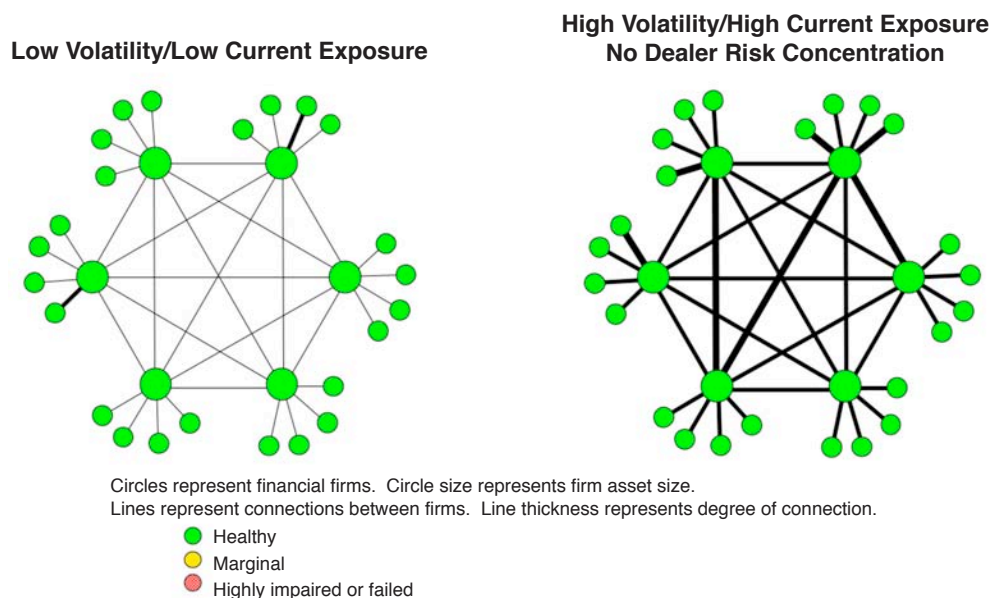
However, other forms of contingent exposures can be complex and less well-developed, making risks difficult to assess. For example, the current obligations resulting from certain derivative contracts referencing financial market variables can be highly unpredictable given a short history of experience, 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.

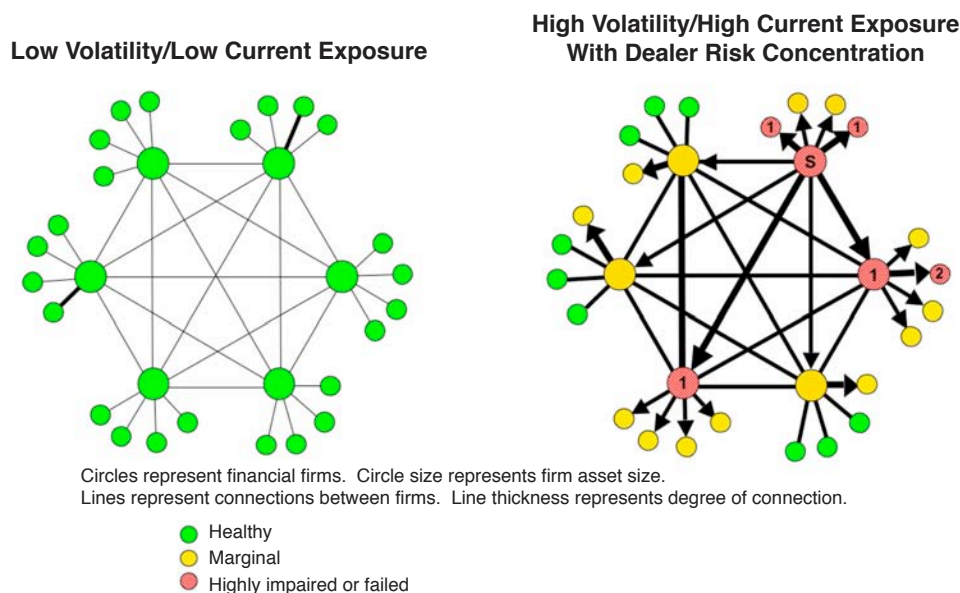
Other concentrations of contingent exposures can be more difficult to identify either due to opacity or because fundamentally unrelated exposures can become correlated during market stress. This phenomenon is discussed later under indirect IC. Unexpected high severity losses experienced by a highly connected 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 uncommitted²² 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.

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

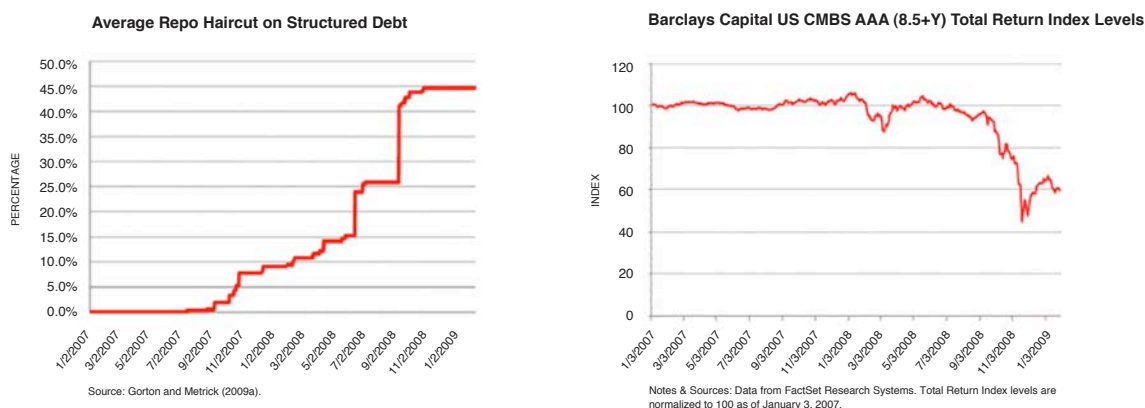
Firms such as property and casualty (“P&C”) insurance companies are not exposed to the same form of structural wrong-way risk as discussed above. This is primarily because the vast majority of P&C firm contingent exposures do not reference financial market variables or instruments. For instance, contingent 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

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

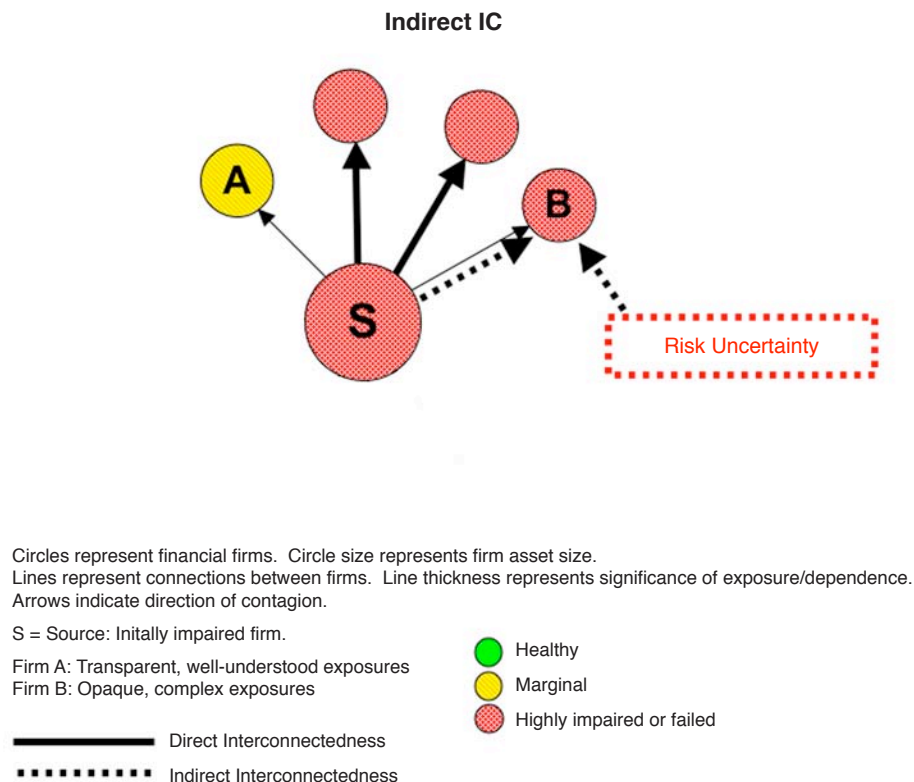
25 It is sometimes said that under stress all asset correlations go to 1, indicating that in severe market stress scenarios, virtually all financial asset prices decline as a result of distressed sales and declining liquidity.

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.



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27 Kroszner (2010), pp. 6-7.

28 Kroszner (2010), p. 10.

C. Consumer Behavioral Shifts

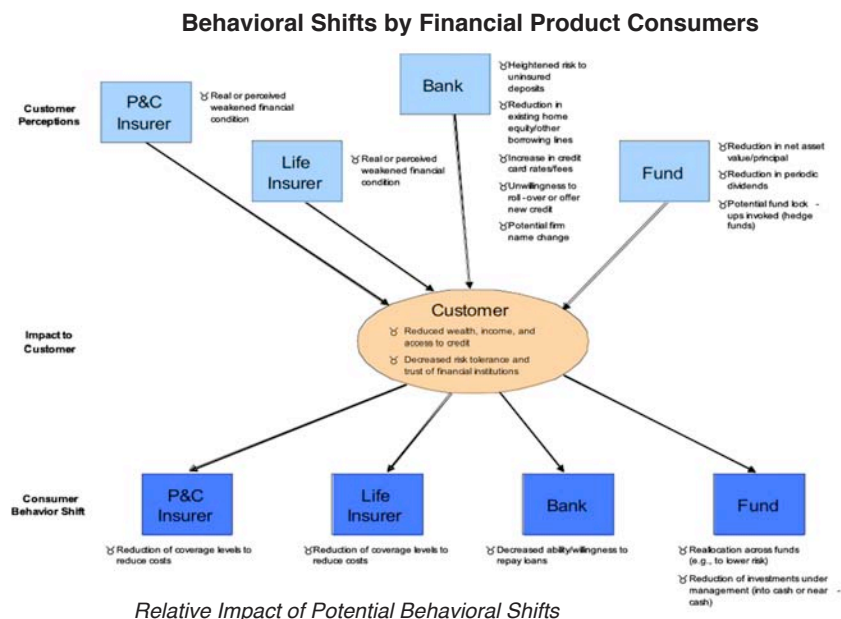
Another component of indirect IC results from broader and longer-term behavior shifts of customers and investors. When crisis conditions lead to fundamental changes in market participant behavior, these new behaviors can impact otherwise unscathed financial firms. This is true even when customers and 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.

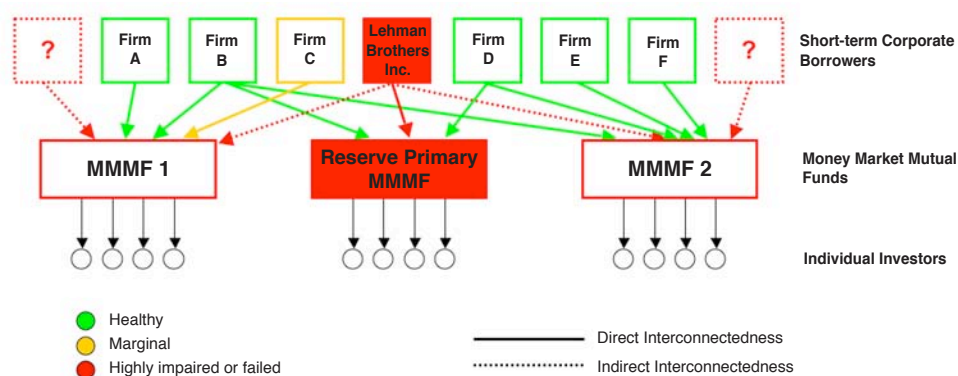


29 Mayr (2007), p. 29.

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.

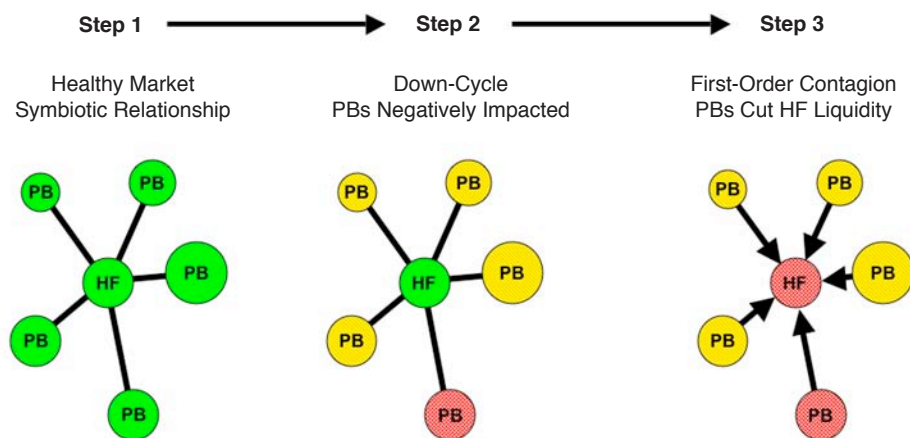
Such a portfolio-based view of IC must consider how much correlation exists with respect to the health of the set of counterparties. If numerous counterparties with modest obligations to a firm are all highly exposed to the same financial market cycle, the firm itself can have a significant indirect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

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

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.

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:

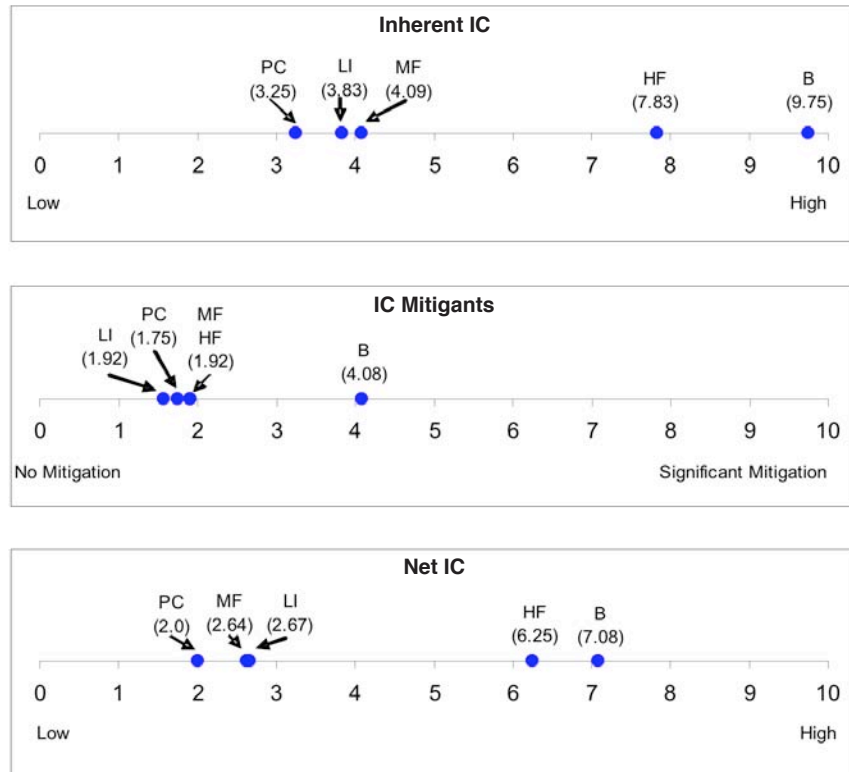
Each survey participant was provided Part II of this paper describing IC, along with the appendix containing the descriptions of five stylized financial firm types.

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."

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.

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

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 policyholders, 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.



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