

Assessing the Systemic Importance of Financial Institutions

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Introduction

The financial crisis showed that some financial institutions have the potential to disrupt the broader financial system if they fail. Whether it is because of their size, their complexity, their global reach, the degree of their financial connections with other financial institutions or the uniqueness of the services they offer, financial institutions that are “too big (or too interconnected) to fail” can pose serious risks to the broader financial system and the real economy.

The fundamental issue is that some of the risks associated with the actual or impending failure of a very large and complex financial institution may be borne, not by its own shareholders and creditors, but by households and corporations that experience spillover effects. Second, the potential for system-wide financial turmoil may motivate the authorities to support a systemically important institution when it comes under duress. For both of these reasons, the funding costs of such an institution may be partly insulated from the risks that it takes—in effect, triggering a breakdown of market discipline. Consequently, the institution’s incentive to manage such risks may diminish as it grows or becomes more complex: actions that are in the best interest of a financial institution’s shareholders can thus be less than optimal from a system-wide perspective. The funding-cost advantage that systemically important financial institutions (SIFIs) enjoy may also further concentrate financial activity and risk in these institutions. All of these factors together could contribute to the probability of distress in the future. The case of AIG demonstrates that such risks stem not only from banks, but from other types of financial entities as well.

To address these challenges, the G-20 asked the Financial Stability Board (FSB) to identify SIFIs: banks,

insurers and other financial institutions whose failure could jeopardize worldwide financial stability. Under the FSB’s coordination, methodologies to identify such global SIFIs have been developed, as well as guidance to help national authorities identify banks that pose systemic risks to their domestic economies, even though these risks don’t extend globally. The FSB also adopted a framework to decrease the probability of a SIFI failing, through, for example, capital surcharges and more intensive supervision. In addition, the consequences of a SIFI’s failure are being reduced by effective resolution regimes that lower the potential for contagion.

This report explores the approaches used by authorities to identify SIFIs in both the global and domestic financial systems. We outline the differences in the methodologies tailored to banks, insurers and other types of financial institutions, providing a critical assessment of each and a discussion of their implications for Canada. We also illustrate a possible application of these methodologies, adapting the framework developed by the Basel Committee on Banking Supervision (BCBS) for global systemically important banks (G-SIBs) to Canadian deposit-taking institutions.

International Work on Assessing Systemic Importance

Canada has been an active participant at all levels in the international work to identify SIFIs, including the work done by the FSB, the BCBS, the International Association of Insurance Supervisors (IAIS) and the International Organization of Securities Commissions (IOSCO). Based on the 2013 rankings by these groups, no Canadian financial institution has been identified as globally systemically important.

A fundamental principle guiding the FSB approach to SIFIs is that there are important dissimilarities in the business models of different financial institutions that need to be taken into account in assessing their systemic importance. For example, since insurance policies are typically long-term contracts, insurance companies that engage in traditional activities are less likely than banks to respond to market stress in a way that transmits and amplifies stress, such as selling assets or withdrawing financing from other institutions. Global policy-makers have thus agreed to develop specific methodologies for identifying banks, insurers and other types of financial institutions that are of global systemic importance. These methodologies are intended to measure not the *vulnerability* of a given financial institution, but the *potential* for adverse spillovers in the event that the institution defaults. In short, it is not the probability that a financial institution will fail that determines its systemic importance, but the potential consequences of such an event.

The various methodologies developed for this purpose follow a broadly similar approach, and great care has been taken to ensure that they are mutually consistent. All of the methodologies combine quantitative, indicator-based assessments with supervisory judgment.

Quantitative measures provide a more objective and consistent basis for assessing the systemic importance of firms. However, these measures are sensitive to the specifications used, including the selection of variables and the weightings (which are not calibrated but informed by judgment). Moreover, data are not available for all of the factors that contribute to systemic risk. Each approach uses judgment to varying degrees to consider information that may not be readily quantifiable, as well as to determine cut-off thresholds.

Consistent with the academic literature on the topic (**Box 1**), the international identification exercises all use a set of five factors that can lead to systemic risk:

(i) **Size:** The larger the firm, the more impact its distress or failure is likely to have on the global financial system.

(ii) **Interconnectedness:** Measures the extent of the institution's financial system obligations (which provide transmission channels for shocks) and raises the likelihood of common exposures among interconnected firms.

(iii) **Cross-jurisdictional activity:** The more cross-border activity that a firm engages in, the greater the probability that its distress or failure will have a global impact.

Box 1

Assessing Systemic Risk: Advances in the Academic Literature

Advances in the quantitative assessment of systemic risks are also evident in the academic literature. Where countries have the data and human capital in place to undertake model-based assessments, a more informed assessment is possible. For the most part, however, model-based assessments are currently difficult for regulators to apply, owing to data limitations and other factors. To date, the main benefit of such models has been in guiding the development of future methodologies (including the selection of variables) and improving the understanding of transmission channels.

This work falls into two broad categories:

(i) **Market-based models** extract the default probabilities used by market participants when pricing financial instruments (i.e., each institution's contribution to systemic risk). This approach uses high-frequency data and is considered to be "forward looking." One drawback is that it requires the assumption that asset markets are efficient even during stress periods.

Market-based models have shown that, while size tends to be associated with larger contributions to systemic risk, additional

indicators are also required (Adrian and Brunnermeier 2011; Zhou 2010; Gravelle and Li 2013).

Gravelle and Li (2013) also find that U.S. banks pose the greatest external risks to Canadian banks, but that Canadian banks are more exposed to other domestic financial institutions.

(ii) **Exposure-based network models** use data on bilateral bank exposures to model the direct connections among banks in order to simulate the effects of a systemic event on banks within a network. A chief drawback to this approach is that it has extensive data requirements.

Martínez-Jaramillo et al. (2012) find that interconnectedness in the Mexican banking system is not necessarily related to asset size; De Jonghe (2010) and Knaup and Wagner (2010) find that non-traditional banking practices create more hazardous risk-transmission channels. A number of authors (e.g., Brunnermeier and Pedersen 2009) find that funding relationships between hedge funds and large banks exacerbate systemic risk.

Box 2

Policy Measures to Safeguard the Financial System

Addressing the problem of “too big to fail” requires a multi-pronged and integrated set of policies. Accordingly, the G-20 has agreed to the following policy measures:

- (i) the Key Attributes of Effective Resolution Regimes for Financial Institutions, which are an international standard established by the Financial Stability Board (FSB 2011) that sets out the responsibilities, instruments and powers necessary for all national resolution regimes to enable authorities to resolve failing financial firms in an orderly manner and without exposing taxpayers to the risk of loss;
- (ii) requirements for recovery and resolution planning and resolvability assessments for global systemically important financial institutions (G-SIFIs), and for the development of institution-specific cross-border co-operation agreements and crisis-management groups so that home and host authorities of G-SIFIs are better prepared to deal with crises and have clear guidance on how to co-operate in a crisis;
- (iii) requirements for G-SIFIs to maintain additional loss-absorption capacity that is proportionate to the impact of their default; and
- (iv) more intensive and effective supervision of all SIFIs through, for example, stronger supervisory mandates, resources and powers, as well as higher supervisory expectations for risk-management functions, data-aggregation capabilities, risk governance and internal controls.

The International Association of Insurance Supervisors has committed to develop, by the end of 2014, straightforward, backstop capital requirements that will serve as the foundation for higher loss-absorbency requirements for global systemically important insurers.

In September 2013, the G-20 Leaders endorsed a proposal by the FSB to develop policy requirements for G-SIFIs other than banks and insurers. No timeline has been set.

(iv) **Substitutability:** If a firm plays a relatively large role in providing services in a particular business line or segment of the global market, the likelihood that the institution’s distress or failure would be disruptive to global economic activity increases. If the firm fails, is there another that can readily take its place?

(v) **Complexity (non-traditional business activity in the case of insurers):** The more complex a financial institution’s operations, the more difficult they are to unwind in an orderly manner.

By including factors other than size, authorities are better able to capture systemic risks such as a breakdown in the provision of critical services to other members of the financial system or an institution’s capacity to transmit shocks.

Identifying SIFIs is the first step in safeguarding the financial system against the failure of such institutions. The second step is adopting the appropriate remedial policies. To this end, the FSB has developed a three-pronged approach that subjects SIFIs to stricter supervision, higher capital requirements and more-robust resolution procedures in the event of failure. These policy measures are outlined in **Box 2**. Some commentators have noted that being designated as systemically important could increase a SIFI’s funding advantage by making an implicit government guarantee explicit. However, any such advantage is partly counterbalanced by the higher capital

requirements and the establishment of credible resolution regimes, which should help to mitigate the perception that even the most systemically important financial institutions will not be allowed to fail, thereby levelling the playing field in funding markets.¹

The following sections outline key differences among the methodologies.

Global systemically important banks

The methodology used to identify G-SIBs is based on a quantitative approach, in which a systemic importance score is calculated using one to three indicator(s) for each of the five risk factors described above (see **Table 1** for the indicators).² Each risk factor contributes equally (20 per cent) to the systemic importance score, and each indicator is also equally weighted within the category. Banks that score above a certain threshold on the scale of systemic importance are identified as G-SIBs by the FSB (**Table 2**). National authorities can add to this list if they judge that a bank from their own jurisdiction should be designated as a G-SIB, even if its score is below the numerical threshold. This list is updated annually. See **Box 3** for an application of this approach to Canadian banks.

¹ This is particularly true for resolution regimes that can credibly impose losses on debt holders (i.e., through instruments such as a bail-in).

² For more detail on the G-SIB identification methodology, see <http://www.bis.org/publ/bcbs255.htm>.

Table 1: Indicators of systemic risk for global systemically important banks

Systemic risk factors (weighted at 20% each)	Individual indicator	Indicator weighting (%)
Cross-jurisdictional activity	Cross-jurisdictional claims	10
	Cross-jurisdictional liabilities	10
Size	Total exposures as defined for use in the Basel III leverage ratio	20
Interconnectedness	Intra-financial system assets	6.67
	Intra-financial system liabilities	6.67
	Securities outstanding	6.67
Substitutability/financial institution infrastructure	Assets under custody	6.67
	Payments activity	6.67
	Underwritten transactions in debt and equity markets	6.67
Complexity	Notional amount of over-the-counter derivatives	6.67
	Level 3 assets	6.67
	Trading and available-for-sale securities	6.67

Source: Basel Committee on Banking Supervision (2013)

Global systemically important insurers

A similar approach for identifying global systemically important insurers (G-SIIs) was developed by the IAIS.³ Unlike the approach used to identify G-SIBs, most of the weight is put on two risk factors: (i) the involvement of firms in non-traditional business (45 per cent of the overall score) and (ii) their interconnectedness (40 per cent).⁴ These choices reflect the judgment that insurers with linkages to other insurers or to the banking sector, or that engage in non-traditional activities such as credit default swaps for non-hedging purposes or leveraged investment strategies, are more likely to amplify or contribute to systemic risk.

Another difference between the approach used to identify G-SIIs and that used for G-SIBs is that no specific numerical cut-off point is established for the designation of systemic importance. The FSB and national authorities make these determinations on a case-by-case basis using judgment. Table 2 provides a list of insurers that are currently designated as G-SIIs.

Global systemically important non-bank, non-insurer financial institutions

IOSCO and the FSB will soon propose methodologies to identify systemically important finance companies, broker-dealers and asset-management entities, including mutual funds and hedge funds. While these methodologies propose indicators for each of the risk factors outlined above,

Table 2: Global systemically important banks and insurers in 2013 (alphabetical ranking)

Banks	Insurers
Bank of America	Allianz SE
Bank of China	American International Group, Inc.
Bank of New York Mellon	Assicurazioni Generali S.p.A.
Barclays	Aviva plc
BBVA	Axa S.A.
BNP Paribas	MetLife, Inc.
Citigroup	Ping An Insurance (Group)
Credit Suisse	Company of China, Ltd.
Deutsche Bank	Prudential Financial, Inc.
Goldman Sachs	Prudential plc
Groupe BPCE	
Groupe Crédit Agricole	
HSBC	
Industrial and Commercial Bank of China Limited	
ING Bank	
JP Morgan Chase	
Mitsubishi UFJ FG	
Mizuho FG	
Morgan Stanley	
Nordea	
Royal Bank of Scotland	
Santander	
Société Générale	
Standard Chartered	
State Street	
Sumitomo Mitsui FG	
UBS	
UniCredit Group	
Wells Fargo	

Sources: Financial Stability Board (2013a, b)

³ For more detail on the G-SII identification methodology, see http://www.iaisweb.org/view/element_href.cfm?src=1/19151.pdf.

⁴ The remaining three risk factors each contribute 5 per cent to the overall score.

Box 3

Application of the G-SIB Indicator-Based Methodology to Canadian Banks

To provide an example of the quantitative techniques that can be used by regulators to understand systemic risks, we show how the indicator-based methodology used by the Basel Committee on Banking Supervision (BCBS) to identify global systemically important banks (G-SIBs) could be adapted to Canadian deposit-taking institutions.

To construct our quantitative index, we used the five risk factors applied to G-SIBs¹ and matched the indicators to Canadian data. Based on this approach, an index consisting of 18 indicators was constructed. The sample of banks chosen consisted of a pool of the 15 largest federally regulated banks (as measured by assets), including the Canadian activities of foreign banks. The data were drawn from supervisory returns, payments systems data, Bloomberg and Bankscope.

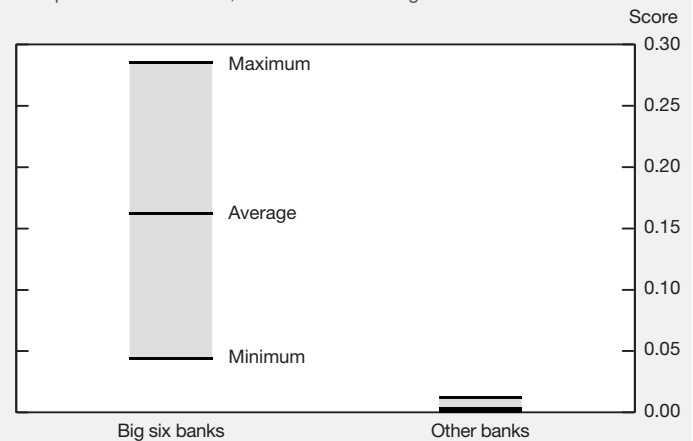
Chart 3-A shows the indicator results for banks. The scores are all relative to the other banks in the sample, and the scores for individual banks sum to one. The big six banks score well above the highest score of the other banks in the sample, suggesting that no federally regulated financial institution outside of the largest six is likely to have systemic effects. This finding is consistent with the Office of the Superintendent of Financial Institutions' designations of the big six banks as domestic systemically important banks (D-SIBs). In Canada, factors other than size have not changed the outcome of the D-SIB designations, although international evidence underlines the importance of ongoing monitoring of the broader set of factors.

Chart 3-B extends this analysis to credit unions and to caisses populaires in Quebec, given that these institutions have grown in both size and complexity in recent years. Doing so reduces our data set to 13 indicators, owing to differences in reporting requirements. Our results suggest that credit unions outside of Quebec pose considerably less systemic risk to the broader Canadian financial system than banks.² Caisses populaires in Quebec score higher, owing to

their larger share of the provincial financial system and integrated structure. This score is consistent with the decision of the Autorité des marchés financiers (AMF) to designate Desjardins Group as being systemically important in Quebec.

Chart 3-A: The big six banks are far more systemically important than other federally regulated banks...

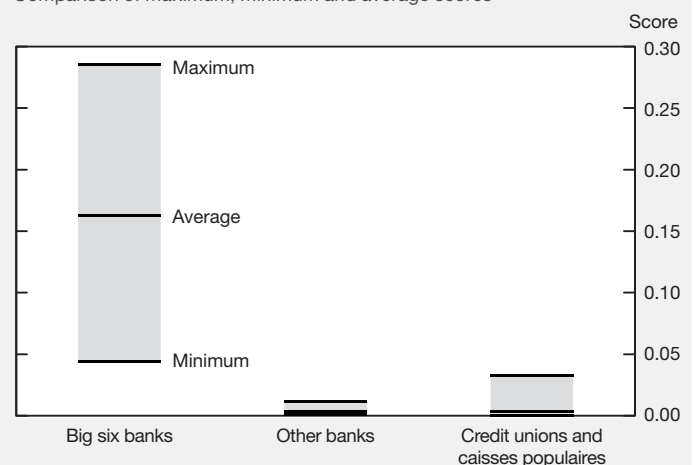
Comparison of maximum, minimum and average scores



Sources: Supervisory data, Bloomberg and Bank of Canada calculations (2012 data)

Chart 3-B: ...and provincial credit unions and caisses populaires

Comparison of maximum, minimum and average scores



Sources: Supervisory data, Bloomberg, Bankscope and Bank of Canada calculations (2012 data)

1 The international guidance that the BCBS provides for identifying domestic systemically important banks does not include measures of global activity. We included global variables because cross-border operations can make institutions more difficult to resolve, since they require resolution efforts to be coordinated across jurisdictions and create legal complexity (i.e., contracts could be subject to dissimilar treatment under different legal regimes).

2 Credit unions are highly interconnected through the credit union centrals. Hence, individual risks can spread more easily throughout the credit union system. However, connections to the broader financial system (through counterparty exposures) are more limited than those of banks. While not shown here, even aggregate credit union scores (which require the unrealistic implicit assumption of a synchronized failure of all credit unions) still rank below the smallest of the big six banks.

qualitative information will play a greater role in the assessment of systemically important entities other than banks and insurers. The heterogeneity of these types of institutions and the considerable differences in the availability of data on their balance sheets and on their activities across jurisdictions make it more difficult to develop a common, indicator-based global assessment methodology.

Domestic systemically important banks

The BCBS has developed a framework for identifying banks that, although not of global significance, are systemically important to their domestic financial systems (D-SIBs).⁵ Given the need to customize measures based on differences across jurisdictions, a principles-based approach has been adopted to allow for some discretion and flexibility. The principles articulate that authorities should take into account factors such as size, interconnectedness, complexity and substitutability. The implementation of the D-SIB framework will be subject to a BCBS peer review. No internationally agreed upon framework has been developed to identify domestic systemically important financial institutions other than banks.

Financial market infrastructures

A similar principles-based approach has been adopted for financial market infrastructures (FMIs) that (often by design) may play systemically important roles in the financial system. The CPSS/IOSCO Principles for Financial Market Infrastructures (CPSS-IOSCO 2012) provide guidance on the identification of, and standards for, systemically important FMIs.⁶ While not prescribing an identification methodology per se, the Principles recommend that authorities assume that all securities settlement systems, central securities depositories, central counterparties and trade repositories are systemically important. Payments systems, on the other hand, are of systemic importance only if they can transmit systemic disruptions. Among such payments systems are those that:

- are the sole payments system in a country or the principal system in terms of the aggregate value of payments;
- mainly handle time-critical, high-value payments; and
- settle payments used to effect settlement in other systemically important FMIs.

⁵ For more information, see BCBS (2012).

⁶ For more information on the application of these principles in Canada, see Bank of Canada (2012).

Assessing the Methodologies for Identifying SIFIs

While the development of methodologies to identify SIFIs is an important step in ending the problem of “too big to fail,” some important issues will need to be addressed in applying them.

First, there are challenges in balancing the use of quantitative analysis versus supervisory discretion. While judgment can take into account additional information that may be difficult to quantify or incorporate into models, it lacks transparency. Quantitative analysis can help to provide analytical rigour and improve transparency, but it cannot make a definitive identification of systemic importance. To balance these concerns, quantitative analysis should be used (as appropriate) to limit the scope for judgment (as is done with G-SIBs and G-SIFIs).

Second, given the latitude in the international guidance for D-SIBs, it will be important to ensure a degree of consistency in the identification methodologies used across jurisdictions. To address this concern, the FSB is planning to conduct a peer review to promote a rigorous application of this guidance in the identification of D-SIBs.

Finally, the role and size of an institution, together with the systemic risk it poses, evolve over time. Supervisors will monitor these institutions on an ongoing basis, and this information will supplement the annual identification exercises.

Systemic Importance of Canada’s Financial Institutions

At the domestic level, and in accordance with international guidance, the Office of the Superintendent of Financial Institutions (OSFI) has identified six Canadian banks as D-SIBs,⁷ based on an assessment of such indicators as asset size, intra-financial claims and liabilities, their roles in domestic financial markets and in financial infrastructures, and supervisory knowledge.⁸ The Autorité des marchés financiers (AMF) has also identified Desjardins Group as systemically important for the province of Quebec, basing its assessment on similar factors, as well as on regional concentration.⁹ These designations will result in more intensive supervision, recovery and resolution planning requirements,

⁷ The six banks are Bank of Montreal, Bank of Nova Scotia, Canadian Imperial Bank of Commerce, National Bank of Canada, Royal Bank of Canada and Toronto-Dominion Bank.

⁸ OSFI March 2013 Advisory: Domestic Systemic Importance and Capital Targets—DTIs.

⁹ AMF Advisory June 2013: Avis relatif à la désignation du Mouvement Desjardins à titre d’institution financière d’importance systémique intérieure.

Box 4

How the United States Identifies Systemically Important Financial Institutions

The Financial Stability Oversight Council (FSOC), which is charged with coordinating the assessment of system-wide risk in the United States, has developed a set of assessment criteria to identify systemically important financial institutions (SIFIs) and place them under enhanced prudential supervision by the Federal Reserve Board. These assessment criteria make a distinction between bank holding companies (BHCs), non-bank financial companies (NBFCs) and financial market utilities (FMUs).

Bank holding companies

By law, the SIFI designation automatically applies to BHCs with \$50 billion or more in total consolidated assets. Firms with assets below this threshold may also be designated, based on considerations that include:

- the complexity of the institution's business activities (products and services);
- whether there are operations in multiple supervisory jurisdictions; and
- other implications for systemic risk to the financial system or the banking system.

Significant non-bank financial companies

The FSOC uses a three-stage process for assessing NBFCs to determine the systemic importance of firms that have total consolidated assets of \$50 billion or more and exceed at least one of five thresholds.¹ It assesses the loss given

¹ The five quantitative thresholds are: (i) \$30 billion in credit default swaps outstanding; (ii) \$3.5 billion in net derivatives liabilities; (iii) \$20 billion in total debt outstanding; (iv) a 15-to-1 leverage ratio; or (v) a 10 per cent short-term debt ratio.

default and the probability of default using a six-category analytic framework (size, interconnectedness, substitutability, leverage, liquidity risk and mismatch, and existing regulatory scrutiny) that is based on public and supervisory information. The FSOC will then follow up with any non-bank financial companies that are judged to merit further detailed evaluation. The final stage is designation. On 8 July 2013, the FSOC voted to designate two NBFCs as systemically important: American International Group (AIG) and General Electric Capital Corporation. Prudential Financial was designated on 20 September 2013 after it had unsuccessfully contested its potential designation.

Financial market utilities

The FSOC designates an FMU as systemically important if it determines that the FMU's disruption or failure could create significant liquidity or credit problems among financial institutions or markets. Four specific factors are considered:

- (i) the aggregate monetary value of transactions processed by the FMU;
- (ii) the aggregate exposure of the FMU to its counterparties;
- (iii) the relationship, interdependencies or other interactions of the FMU with other FMUs or payment, clearing or settlement activities; and
- (iv) the effect that the failure of or a disruption to the FMU would have on critical markets, financial institutions or the broader financial system.

Other factors that the FSOC deems appropriate may also be considered.

higher capital surcharges, and enhanced disclosure requirements.¹⁰ The 2013 federal budget also included a commitment to implement a bail-in regime for D-SIBs.

For an overview of how U.S. authorities have adapted all of these methodologies to assess the systemic importance of their domestic financial institutions, see **Box 4**.

Conclusion

The identification of systemically important financial institutions is a key step in efforts by regulators to end "too big to fail" and prevent future financial crises.

While regulators take different approaches in assessing systemic importance, all of them look beyond size to evaluate the importance of each institution for the financial system. These efforts can help regulators to develop more effective policy frameworks, which will be aided by future refinements in the techniques for assessing the methodologies.

¹⁰ A 1 per cent common equity surcharge has been applied by the federal and provincial regulators.

References

- Adrian, T. and M. K. Brunnermeier. 2011. "COVAR." National Bureau of Economic Research Working Paper No. 17454.
- Bank of Canada. 2012. "Guideline Related to Bank of Canada Oversight Activities Under the Payment Clearing and Settlement Act."
- Basel Committee on Banking Supervision (BCBS). 2012. "A Framework for Dealing with Domestic Systemically Important Banks" (October). Bank for International Settlements.
- . 2013. "Global Systemically Important Banks: Updated Assessment Methodology and the Higher Loss Absorbency Requirement" (July). Bank for International Settlements.
- Brunnermeier, M. K. and L. H. Pedersen. 2009. "Market Liquidity and Funding Liquidity." *Review of Financial Studies* 22 (6): 2201–38.
- Committee on Payment and Settlement Systems and Technical Committee of the International Organization of Securities Commissions (CPSS-IOSCO). 2012. "Principles for Financial Market Infrastructures" (April). Bank for International Settlements.
- De Jonghe, O. 2010. "Back to the Basics in Banking? A Micro-Analysis of Banking System Stability." *Journal of Financial Intermediation* 19 (3): 387–417.
- Financial Stability Board (FSB). 2011. "Key Attributes of Effective Resolution Regimes for Financial Institutions" (October).
- . 2013a. "Global Systemically Important Insurers (G-SIIs) and the Policy Measures That Will Apply to Them" (18 July).
- . 2013b. "2013 Update of Group of Global Systemically Important Banks (G-SIBS)" (11 November).
- Gravelle, T. and F. Li. 2013. "Measuring Systemic Importance of Financial Institutions: An Extreme Value Theory Approach." *Journal of Banking and Finance* 37: 2196–209.
- Knaup, M. and W. Wagner. 2010. "Measuring the Tail Risks of Banks." Swiss National Centre of Competence in Research on Trade Regulation Working Paper No. 2009/14.
- Martínez-Jaramillo, S., B. Bravo-Benítez, B. Alexandrova-Kabadjova and J. P. Solórzano-Margain. 2012. "An Empirical Study of the Mexican Banking System's Network and Its Implications for Systemic Risk." Bank of Mexico Working Paper No. 2012-07.
- Zhou, C. 2010. "Are Banks Too Big to Fail? Measuring Systemic Importance of Financial Institutions." *International Journal of Central Banking* 6 (4): 205–50.