

Systemic Importance Indicators for 33 U.S. Bank Holding Companies: An Overview of Recent Data

by Meraj Allahrakha, Paul Glasserman, and H. Peyton Young

The authors used a new dataset collected by the Federal Reserve System to evaluate the systemic importance of the largest U.S. bank holding companies by comparing their scores on size, interconnectedness, complexity, global activity, and dominance in certain customer services (known as “substitutability”). They also applied an OFR financial connectivity index to the data to measure interconnectedness. Overall, the analysis reinforces the need for measuring, monitoring, and evaluating multiple aspects of systemic importance.

The Basel Committee on Banking Supervision, a group of banking supervisors from 28 jurisdictions, in 2011 created a set of 12 financial indicators to identify global systemically important banks (G-SIBs). These are banks whose failure could pose a threat to the international financial system.¹ The most recent list identified 30 banks across the world as G-SIBs, including eight U.S. bank holding companies.

A bank designated as a G-SIB must meet a higher risk-based capital ratio to enhance its resilience, and is subject to additional regulatory oversight. This capital buffer represents an important new structural macroprudential tool for containing systemic risk. On December 9, 2014, the Federal Reserve proposed a draft rule implementing the G-SIB buffer for U.S. bank holding companies that could result in some banks holding larger capital buffers than those proposed by the Basel Committee.²

The largest U.S. bank holding companies reported in August 2014 their systemic importance indicators as of December 31, 2013. This important new dataset provides more transparency and is a significant step in quantifying specific aspects of systemic importance. Our analysis showed:

- The largest U.S. banks generally scored highest for all systemic risk indicators, but had relatively low Tier 1 leverage ratios compared to smaller banks.
- Several of the largest banks scored high in systemic importance because they dominate specific businesses, such as

payments and asset custody services. Others scored high in complexity because of their trading and derivatives businesses.

- Seven of the eight U.S. G-SIBs had high values under the OFR’s connectivity index, introduced in an earlier OFR working paper.
- Basel Committee-recommended capital buffers would still leave U.S. G-SIBs with generally lower capital ratios than other large U.S. banks.

The Purpose of the Indicators

Annual systemic risk scores for major banks around the world all use the same indicators. In the United States, each U.S. bank holding company with over \$50 billion in assets is required to annually disclose its systemic risk indicators to the Federal Reserve by filing a Form Y-15, or Banking Organization Systemic Risk Report.³ A total of 33 banks — including eight subsidiaries of foreign banks⁴ — filed the Y-15 for 2013 and the Federal Reserve published the data on its National Information Center website.⁵

The Basel Committee designates banks with the highest scores as G-SIBs and each must hold an additional capital buffer of up to 3.5 percent of its risk-weighted assets. The Financial Stability Board (FSB) in November 2011 published its first annual list of G-SIBs using a process developed with the Basel Committee.

Figure 1. Systemic Importance Indicators Reported by Large U.S. Bank Holding Companies (\$ billions)

Systemic risk scores are based on size, interconnectedness, substitutability, complexity, and cross-jurisdictional activities

| Bank Holding Company (stock ID) | Size | Interconnectedness | | | Substitutability | | | Complexity | | | Cross-Jurisdictional Activity | | 2013 Score (percent) |
|------------------------------------|-----------------|------------------------------|-----------------------------------|------------------------|-------------------|----------------------|-----------------------|---------------------------|-------------------------------------|----------------|-------------------------------|--|----------------------|
| | Total exposures | Intrafinancial system assets | Intrafinancial system liabilities | Securities outstanding | Payments activity | Assets under custody | Underwriting activity | Amount of OTC derivatives | Adjusted trading and AFS securities | Level 3 assets | Foreign claims | Total cross-jurisdictional liabilities | |
| Weight (percent) | 20 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 10 | 10 | |
| JPMorgan Chase & Co. (JPM) | 3,570 | 422 | 544 | 599 | 321,458 | 21,320 | 508 | 68,004 | 446 | 69 | 693 | 674 | 5.05 |
| Citigroup Inc. (C) | 2,895 | 421 | 513 | 596 | 300,783 | 11,096 | 331 | 59,472 | 130 | 46 | 839 | 742 | 4.27 |
| Bank of America Corp. (BAC) | 2,696 | 294 | 220 | 489 | 83,705 | 136 | 390 | 54,887 | 203 | 32 | 387 | 246 | 3.06 |
| Wells Fargo & Co. (WFC) | 1,961 | 110 | 129 | 508 | 28,761 | 2,400 | 86 | 4,880 | 128 | 37 | 70 | 130 | 1.72 |
| Goldman Sachs Group, Inc. (GS) | 1,518 | 337 | 107 | 310 | 9,585 | 866 | 371 | 50,355 | 138 | 43 | 347 | 319 | 2.48 |
| Morgan Stanley (MS) | 1,283 | 535 | 182 | 231 | 9,812 | 1,369 | 262 | 43,611 | 316 | 23 | 353 | 470 | 2.60 |
| U.S. Bancorp (USB) | 525 | 11 | 22 | 139 | 6,918 | 959 | 17 | 106 | 13 | 4 | 3 | 34 | 0.35 |
| PNC Financial Services (PNC) | 425 | 18 | 13 | 68 | 2,004 | 161 | 10 | 252 | 26 | 11 | 5 | 2 | 0.30 |
| Bank of New York Mellon Corp. (BK) | 410 | 79 | 230 | 61 | 166,279 | 23,590 | 6 | 1,158 | 39 | 0 | 87 | 164 | 1.50 |
| HSBC N.A. Holdings Inc. (HSBC) | 406 | 36 | 55 | 50 | 1,061 | 43 | 49 | 5,194 | 40 | 4 | 43 | 1 | 0.38 |
| State Street Corp. (STT) | 345 | 30 | 209 | 43 | 59,122 | 20,411 | - | 1,141 | 54 | 8 | 47 | 125 | 1.48 |
| Capital One Financial Corp. (COF) | 336 | 14 | 2 | 94 | 914 | 3 | 2 | 63 | 16 | 4 | 9 | 2 | 0.19 |

Notes: This list shows BHCs with assets over \$250 billion. The eight gray-shaded BHCs were G-SIBs as of 2013. HSBC North America is a holding company for the U.S. operations of HSBC Holdings, plc, incorporated in the United Kingdom.

Sources: Company Y-15 reports, OFR analysis

The committee in July 2013 updated the methodology it uses to calculate a systemic risk score for each bank and released the latest scores on November 6, 2014.⁶

Based on their 2013 scores, the 30 banks would be required to hold extra capital of 1 percentage point to 2.5 percentage points under the Basel Committee methodology.⁷ As noted, the Federal Reserve proposed potential alternative requirements with respect to funding which could result in even higher capital buffers for some U.S. bank holding companies. The Basel Committee suggests that national regulators phase in G-SIB capital buffers beginning in January 2016.

The systemic risk indicators are grouped into five categories, as shown across the top of **Figure 1**. Each category has a total weight of 20 percent divided equally among its indicators.⁸ A description of the five categories and their indicators follows.

Size. This category has a single indicator, a comprehensive measure showing a bank’s total exposures. The indicator reflects total assets plus the net value of certain securities financing transactions plus credit derivatives and commitments as well as counterparty risk exposures. This measure of size is also used to calculate a bank’s supplementary leverage ratio under the Basel III international banking accord. (Basel III established a supplementary leverage ratio requiring large banks to hold Tier 1 capital of at least 3 percent of total exposures to absorb losses; the U.S. rule set the ratio at 5 percent for bank holding companies.)

Interconnectedness. The failure of a bank to meet payment obligations to other banks can accelerate the spread of a financial system shock if the bank is highly interconnected. This category includes measurements of a bank’s total claims on the financial system, its total liabilities to the financial system,

and the total value of debt and equity securities issued by a bank. For the first two of these indicators, the financial system includes banks, securities dealers, insurance companies, mutual funds, hedge funds, pension funds, investment banks, and central counterparties.

Substitutability. A bank is more systemically important if it provides important services that customers would have difficulty replacing if the bank failed. Three indicators measure this effect: a bank's payments activity, assets under custody at the bank, and the bank's total underwriting transactions.⁹ The Basel Committee methodology applies a cap to the substitutability categories when the indicators are combined into an overall score. The draft U.S. rule would take the higher of the Basel Committee methodology or an alternative methodology which replaces the substitutability component with a score based on banks' short-term wholesale funding usage, effectively giving substitutability indicators a zero weight in determining a bank's G-SIB buffer.

Complexity. A bank with highly complex operations is more difficult to resolve and has a broader impact if it fails. Complexity is measured by a bank's notional amount of over-the-counter (OTC) derivatives; total amount of trading and available-for-sale securities; and total illiquid and hard-to-value assets, which are also known as Level 3 assets.

Cross-Jurisdictional Activity. Banks with international operations can transmit problems from one region to another during a financial crisis. Global banks are also more difficult to resolve because they require coordination among national regulators. The scale of a bank's global activity is measured by its total foreign claims and its total cross-jurisdictional liabilities.

Each systemic risk category raises significant measurement challenges. Even the size measurement is far from straightforward. The current indicators and G-SIB capital buffer are important steps in an ongoing process to strengthen prudential regulation of the largest financial institutions.

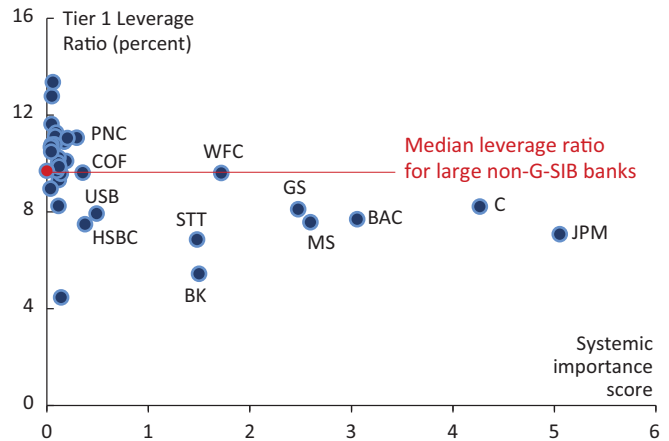
Analysis of 2013 U.S. Data

In the United States, each bank reported its systemic importance risk indicators as of December 31, 2013. The names of the banks and the financial data each submitted are summarized in **Figure 1**, along with each bank's overall score of systemic importance.

We followed the Basel Committee procedure in scoring banks by first normalizing each indicator by the total value for that indicator among the world's 75 largest banks.¹⁰ For example, if a bank has a value of \$4 billion for one indicator and the group's total value for that indicator is \$100 billion, the bank's score for the indicator is 4 percent. This approach puts the scores for different indicators on a common scale. The normalized scores for indicators were averaged within each category to produce a subscore. The five category subscores were then averaged to produce an overall score. We capped the category

Figure 2. Tier 1 Leverage Ratios (percent)

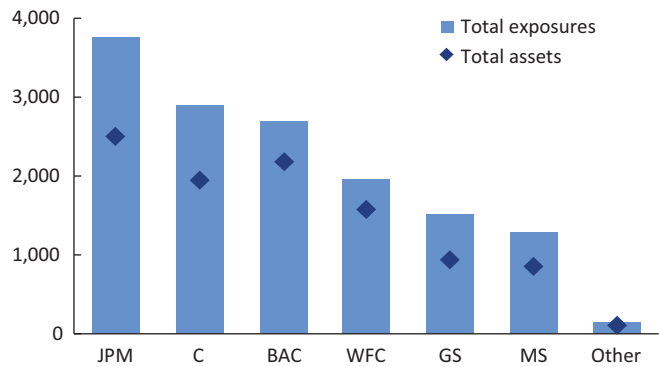
Peer banks that are not G-SIBs have a higher median Tier 1 leverage ratio of close to 10 percent



Sources: Federal Reserve BHC Performance Reports, OFR analysis

Figure 3. Exposures and Assets (\$ billions)

Total exposures are considerably greater than assets for U.S. G-SIBs



Note: Analysis includes JPMorgan Chase & Co., Bank of America Corporation, Citigroup Inc., Wells Fargo & Company, Goldman Sachs, Morgan Stanley, and the median of remaining bank holding companies with assets greater than \$50 billion.

Sources: Federal Reserve Y-15 and Y-9C reports

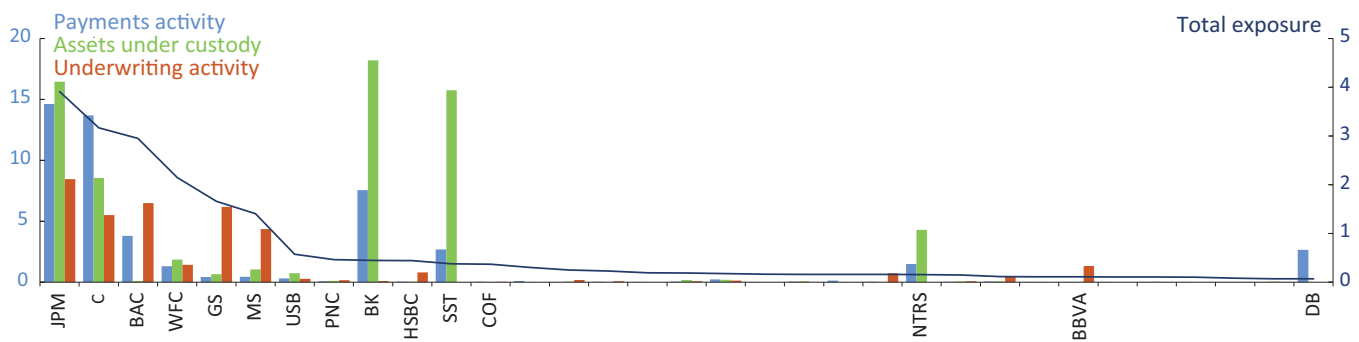
score for substitutability at 5 percent, in keeping with the Basel procedure.¹¹

Of the 33 U.S. banks, the eight designated as G-SIBs in 2012 had the highest systemic importance scores in 2013. JPMorgan Chase & Co. had the highest score at 5.05 percent, followed by Citigroup Inc. (4.27 percent), Bank of America Corp. (3.06 percent), Morgan Stanley (2.60 percent), Goldman Sachs Group, Inc. (2.48 percent), and Wells Fargo & Co. (1.72 percent).

The eight U.S. G-SIBs already have sufficient capital to meet their risk-based capital ratios, inclusive of the Basel G-SIB buffer on a fully phased-in basis. Even so, their Tier 1 leverage ratios, which are not risk-weighted, remain below those of large U.S. banks that are not G-SIBs. **Figure 2** illustrates that banks with higher overall G-SIB systemic importance scores tended to have lower Tier 1 leverage ratios than the median large non-G-SIB.

Figure 4. Substitutability (percent)

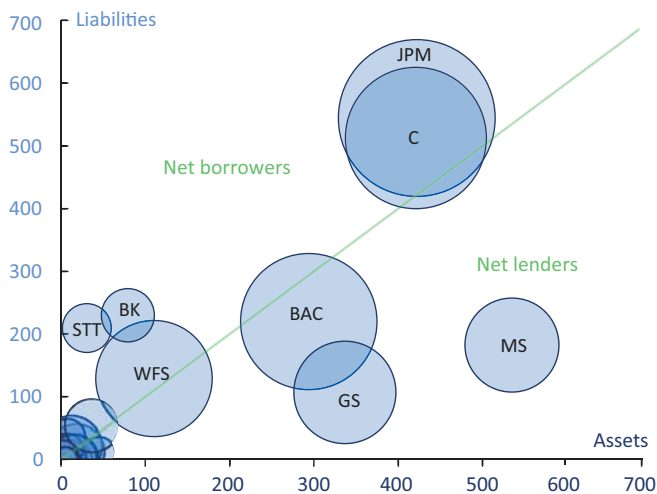
Some smaller banks scored higher on substitutability due to custodian, underwriting, and payments businesses



Sources: Federal Reserve Y-15 reports and Basel Committee on Banking Supervision

Figure 5. U.S. G-SIBs' Liabilities and Assets (\$ billions)

Banks vary in their use and provision of funding



Note: Bubble size shows total exposures.

Source: Federal Reserve Y-15 reports

Size

Bank size is an important component of systemic risk. **Figure 3** presents two measures of size, total assets and total exposures, the size measure used in the G-SIB methodology that includes derivative positions and securities financing transactions, such as repurchase agreements and securities lending. By either measure, the six largest U.S. banks dominated the others, accounting for nearly 70 percent of total assets and 72 percent of total exposures. The same six had total exposures 44 percent larger than their total assets. By comparison, the other banks' total exposures were just 27 percent larger than their total assets.

Substitutability

Six banks scored higher on the substitutability indicator than their size would suggest, as shown in **Figure 4**.¹² The horizontal axis orders the 33 banks by size. Bank of New York Mellon Corp., State Street Corp., and Northern Trust Corp. (NTRS) have large operations as custodian banks. Goldman Sachs and

Morgan Stanley have large underwriting businesses. Deutsche Bank Trust (DB), a U.S. subsidiary of the largest German bank, has a high level of payment activity despite being the smallest of the 33 banks. The indicators were normalized (as described above) so they are all on a scale from zero to 100 percent. The figure does not reflect the 5 percent cap on the substitutability indicators that is used in the Basel methodology — without the cap, the overall scores for Bank of New York Mellon, Citigroup, JPMorgan, and State Street would be even higher.

Interconnectedness

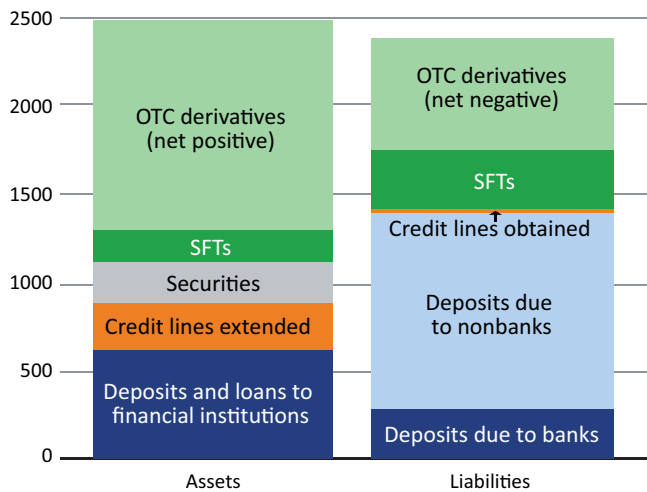
In the Y-15 data, a bank's interconnectedness is measured by the intrafinancial system assets it owns and the intrafinancial system liabilities that it owes. Averaged over the 33 U.S. banks, intrafinancial system assets and liabilities were nearly equal at \$75 billion and \$72 billion, respectively.¹³ But the averages do not reflect notable differences for individual banks (see **Figure 5**). In the figure, the bubble sizes are proportional to each bank's total exposures. Banks above the diagonal line had net obligations to the financial system, and banks below the diagonal line had net claims on the financial system. Differences in these indicators of interconnectedness partly reflect differences in activities measured by the substitutability and complexity indicators: those above the line generally have large payments activities or assets under custody, while those below the line generally have large trading, derivatives, and underwriting operations.

Total intrafinancial system assets and liabilities of the bank holding companies were nearly equal — \$2.5 trillion for assets and \$2.4 trillion for liabilities. The largest component of total intrafinancial system assets was the fair value plus potential future exposure (PFE) of OTC derivatives, at \$1.2 trillion (48 percent).¹⁴ Deposits and loans to other financial institutions were a distant second at \$615 billion (25 percent). Securities financing transactions (SFTs) accounted for just 7 percent (see **Figure 6**).

Intrafinancial system liabilities primarily took the form of deposits, which made up \$1.4 trillion or 59 percent. Most of the deposits, \$1.1 trillion, were due to nonbank financial institutions. Surprisingly, OTC derivatives contributed only about half as much to intrafinancial system liabilities (\$632 billion) as to intrafinancial system assets (\$1.2 trillion). Across all OTC

Figure 6. U.S. G-SIBs' Combined Intrafinancial Assets and Liabilities (\$ billions)

Nearly half of assets are OTC derivatives and most liabilities are deposits from nonbanks



Source: Federal Reserve Y-15 reports

market participants, derivatives assets must equal derivatives liabilities, so this imbalance indicates that the U.S. banks held large positive OTC derivatives positions with financial institutions outside this group.

In contrast, securities financing transactions were a net source of funding to the U.S. banks from the rest of the financial system. Securities lending contributed \$336 billion to intrafinancial system liabilities and \$186 billion to intrafinancial system assets. Bank holding companies are allowed to report both securities financing transactions and derivatives transactions on a net basis (subject to a valid master netting agreement). However, OTC derivatives are reported on a more expansive basis that includes PFE. As a result, smaller reported numbers for securities financing transactions may have underweighted their risks relative to firms' OTC derivatives risks.

Figure 7 shows individual banks' OTC derivatives positions with positive value (intrafinancial system assets) and OTC positions with negative value (intrafinancial system liabilities) as a percentage of the bank's total exposures. This comparison shows that the imbalance in OTC positions was primarily due to the positions of just two U.S. banks, Goldman Sachs and Morgan Stanley.

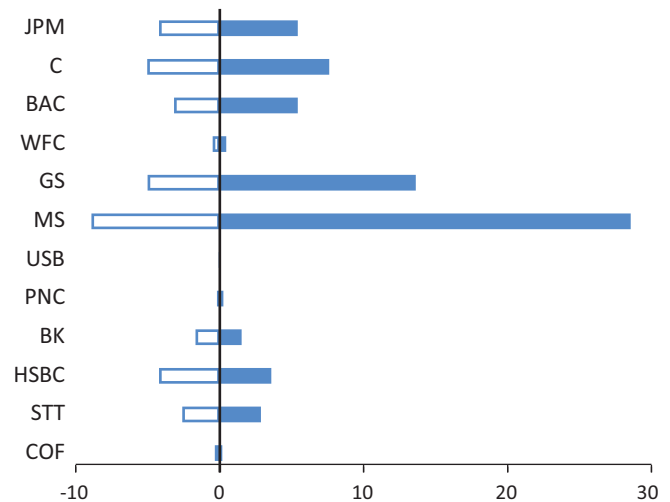
A similar comparison of the 12 largest banks' securities financing transactions shows that the imbalance varied across banks (see **Figure 8**). Four of the six largest banks were net borrowers from the financial system. Bank of New York Mellon and State Street, which run large securities lending businesses, had large negative net positions.

Complexity

The three activities measured by the systemic risk indicators for complexity — derivatives, trading assets, and illiquid (Level 3) assets — played a large role in the financial turmoil of 2007-08.

Figure 7. OTC Derivatives Exposures (percent)

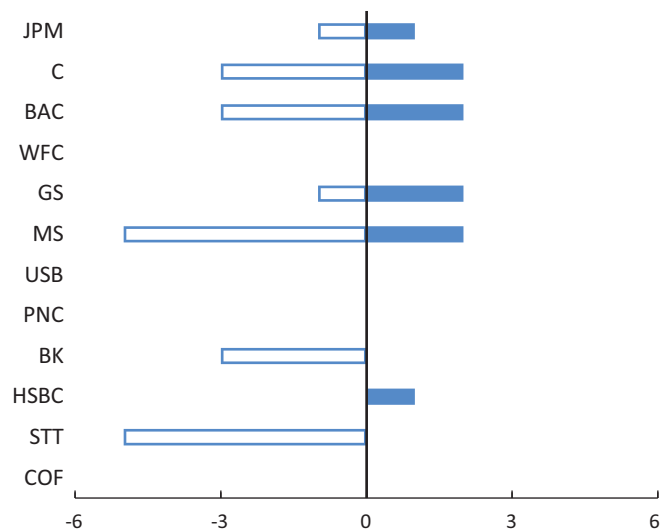
Banks' positive and negative OTC derivatives values are shown as a percent of their total exposures



Source: Federal Reserve Y-15 Reports

Figure 8. Securities Financing Transactions (percent)

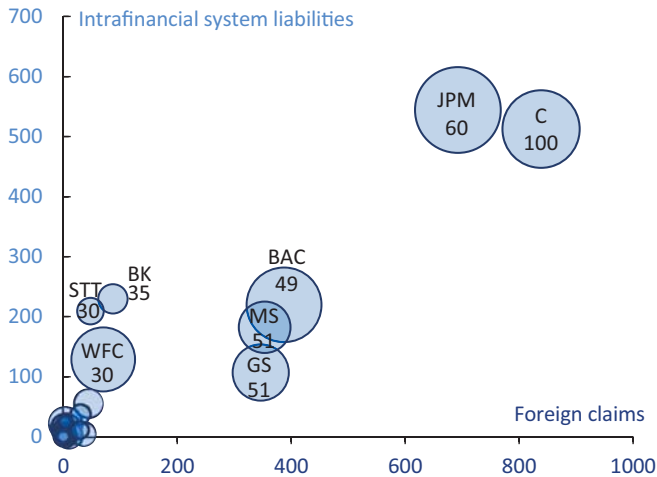
Banks' net borrowings and net lending from the financial system are shown as a percent of their total exposures



Source: Federal Reserve Y-15 Reports

Figure 9. Foreign Claims (\$ billions)

Banks with large foreign claims are also highly interconnected to the financial system

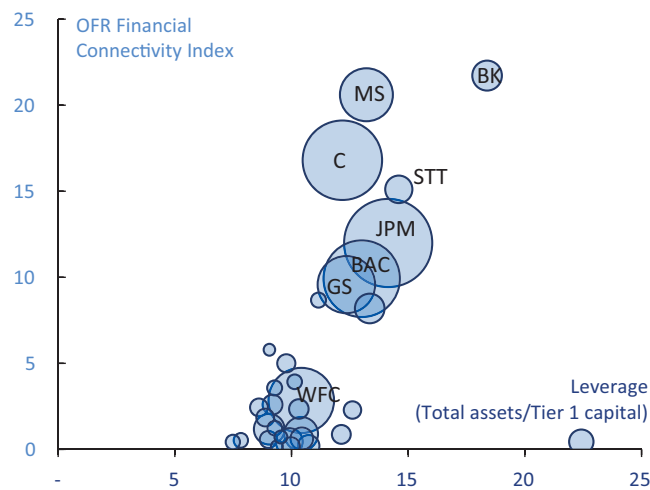


Note: Bubble size shows total exposures. Bubble label shows number of jurisdictions in which the BHC operates.

Source: Federal Reserve Y-15 reports

Figure 10. Leverage and the OFR Financial Connectivity Index

Highly leveraged banks are also the most interconnected



Note: Bubble size shows total exposures.

Sources: Federal Reserve BHC Performance Reports, OFR analysis

The six largest banks scored highest on the complexity indicators, with OTC derivatives largely confined to five of those six (see **Figure 1**).

Cross-Jurisdictional Activity

A bank that has large foreign assets and large intrafinancial system liabilities is a potential source of spillover risk. If a large loss in value in foreign assets caused such an institution to fail, the losses could be transmitted to the rest of the U.S. financial system. Five banks had large foreign assets (exceeding \$300 billion) and Citigroup and JPMorgan had large figures for both foreign assets and intrafinancial system liabilities. The bubble sizes in **Figure 9** reflect firm size, based on total exposures.¹⁵ Again, the largest banks are the most interconnected and they are involved in the most cross-jurisdictional activity.

OFR's Financial Connectivity and Contagion Indexes

In addition to analyzing the Y-15 data, we also estimated a financial connectivity index for each bank holding company, as defined in an OFR working paper in 2013.¹⁶ The index measures the fraction of liabilities held by other financial institutions. All else being equal, the default of a bank with a higher connectivity index would have a greater impact on the rest of the banking system because its shortfall would spill over onto other financial institutions, creating a cascade that could lead to further defaults.

High leverage, measured as the ratio of total assets to Tier 1 capital, tends to be associated with high financial connectivity and many of the largest institutions are high on both dimensions (see **Figure 10**). Seven of the eight U.S. G-SIBs had high financial connectivity index values; Bank of New York Mellon and State Street were high on both dimensions despite their relatively smaller sizes.

The same OFR working paper also introduced a contagion index that combined the connectivity index with measures of a bank's size and leverage. The larger the bank, the greater the potential spillover if it defaults; the higher its leverage, the more prone it is to default under stress; and the greater its connectivity index, the greater is the share of the default that cascades onto the banking system. The product of these three factors provides an overall measure of the contagion risk that the bank poses for the financial system. Five of the U.S. banks had particularly high contagion index values — Citigroup, JPMorgan, Morgan Stanley, Bank of America, and Goldman Sachs.

Conclusions

The collection of systemic importance indicators is a significant step in providing information to banking supervisors and the public about the potential impact of the failure of a major financial institution. Additional capital requirements for G-SIBs could enhance the resilience of the financial system. The indicators agreed upon through the Basel Committee recognize several dimensions to systemic importance. Although the largest

banks tend to dominate all indicators of systemic importance, the indicators of substitutability, interconnectedness, complexity, and global activity provide useful additional information to understand differences among these institutions.

Some dimensions of systemic importance are not captured by the indicators. One is the extent to which a bank engages in maturity and liquidity transformation. Funding long-term illiquid assets with short-term liabilities can make a bank resolution more difficult. A second dimension is the extent to which

a bank's home sovereign relies on the bank for funding activities and financial services; this type of reliance can contribute to a bank's systemic importance. A third dimension is that the current substitutability indicators do not directly measure all critical services, such as clearing and settlement operations.

The type of analysis reported here can help drive future data collections and can point to further work on indicators. These efforts are needed for monitoring risks as well as for identifying systemically important banks.

Endnotes

- ¹ The Basel Committee said the measures were not meant to reflect the probability that an institution will fail. "The Committee is of the view that global systemic importance should be measured in terms of the impact that a bank's failure can have on the global financial system and wider economy, rather than the risk that a failure could occur." See Basel Committee on Banking Supervision (BCBS), *Global Systemically Important Banks: Updated Assessment Methodology and the Higher Loss Absorbency Requirement*, Bank for International Settlements, Basel, July 2013, p. 5 (available at www.bis.org/publ/bcbs255.pdf, accessed December 2, 2014). The list of G-SIBs is available at www.bis.org/press/p141106.htm.
- ² Board of Governors of the Federal Reserve System, Press Release, December 9, 2014 (see www.federalreserve.gov/newsevents/press/bcreg/20141209a.htm, accessed December 10, 2014).
- ³ Form Y-15 follows the Basel Committee's template for collecting the systemic indicators (see www.bis.org/bcbs/gsib, accessed December 2, 2014).
- ⁴ These include subsidiaries of Banco Bilbao Vizcaya Argentaria, S.A. (BBVA); BNP Paribas Group; Deutsche Bank AG; Mitsubishi UFJ Financial Group, Inc.; Royal Bank of Scotland Group plc; and Banco Santander. Each of these parent companies has been designated a G-SIB. The other two foreign parent companies are TD Bank and Bank of Montreal. Only the U.S. holding companies file Form Y-15, not their foreign-based parent companies. A comparison of indicators across international banks will be the subject of a future OFR Brief.
- ⁵ See www.ffiec.gov/nicpubweb/nicweb/NicHome.aspx.
- ⁶ See BCBS, *Global Systemically Important Banks*.
- ⁷ The complete list of institutions is available on the FSB's website (see www.financialstabilityboard.org/2014/11/2014-update-of-list-of-global-systemically-important-banks, accessed December 2, 2014).
- ⁸ Information on the weights and the descriptions of the indicators that follow are from BCBS, *Global Systemically Important Banks*, and Board of Governors of the Federal Reserve System, *Instructions for Preparation of Banking Organization Systemic Risk Report* (available at www.ny.frb.org/banking/reportingforms/FR_Y_15.html, accessed December 2, 2014).
- ⁹ A high score on these substitutability indicators means a lack of readily available substitutes to replace the bank's services if it were to fail.
- ¹⁰ To be consistent with the Basel Committee's procedure, in calculating normalized scores we divided by the totals for the group of 75 international banks and not the 33 U.S. banks. We normalized by the totals for 2013 as reported by the BCBS at www.bis.org/bcbs/gsib/denominators.htm (accessed December 3, 2014).
- ¹¹ The 5 percent cap was imposed in the committee's July 2013 updated methodology because substitutability was found to have a greater than intended effect on the overall score.
- ¹² U.S. G-SIBs are even more leveraged relative to non-G-SIB U.S. peers on an enhanced supplementary leverage ratio basis, which uses total exposures instead of total assets.
- ¹³ They are not equal because the 33 bank holding companies do not make up the entire financial system.
- ¹⁴ Potential future exposure (PFE) is defined as the maximum exposure estimated to occur on a future date at a high level of statistical confidence.
- ¹⁵ The number of jurisdictions is reported as an ancillary indicator in the Basel template and in Form Y-15.
- ¹⁶ Specifically we estimated the numerator from the Y-15 data as an institution's intra-financial system liabilities (which include derivative liabilities) minus deposits from nondepository institutions such as mutual funds, pension funds, and insurance companies. We excluded these deposits because we wanted to estimate a given institution's potential spillover effect on other banks. If these deposits were included, the estimated connectivity index would be larger. See Paul Glasserman and H. Peyton Young, "How Likely is Contagion in Financial Networks?," OFR Working Paper no. 0009, June 21, 2013, forthcoming in the *Journal of Banking and Finance*; and Office of Financial Research, *2013 Annual Report*, Washington, pp. 63-70.