

Breaking (Banks) Up is Hard to Do: New Perspective on Too Big To Fail

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Big is bad. At least that has become the view of many individuals about big banks ever since the financial crisis of 2007-2009. The fear is that if a big bank gets into trouble, its problems will infect other financial institutions and threaten the entire economy. In theory, of course, regulators have long been expected to prevent banks from reckless behavior and to shut down failing banks in a timely, orderly, and cost-effective manner. Historically, however, big banks in the United States and in many other countries have been implicitly treated as “too big to fail.” In the United States, the practice of treating troubled big banks differently from troubled small ones dates back to the 1984 bailout of Continental Illinois Corporation. That taxpayer-funded rescue was based on fears that a bank collapse of Continental’s magnitude would destabilize the entire financial system (see Kaufmann, 2002; Shull, 2010; and Barth, Prabha, and Swagel, 2012).¹ Those same fears prompted far bigger bank bailouts, both in the U.S. and abroad, during the recent global financial crisis. In the wake of that experience, regulators and banking experts almost unanimously agree that regulatory reform is essential to ensuring that no bank is ever again too big to fail.

Unfortunately, there is far less agreement about the best approach for ending too big to fail. In the United States, some believe that the Dodd-Frank Act– the sweeping overhaul of financial regulation in 2010 – will solve the problem. Dodd-Frank limits the growth of major banks by prohibiting mergers or acquisitions if the resulting bank would have more than 10 percent of aggregate consolidated liabilities of all financial companies nationwide. It also requires the Federal Reserve to impose stricter prudential oversight on bank holding companies with assets of more than \$50 billion. In the event that a major bank holding company encounters financial difficulty and early remediation efforts fail, the Federal Reserve is to recommend to the Treasury Department and the Federal Deposit Insurance Corporation (FDIC) that the company be “resolved” under the FDIC’s new orderly liquidation authority. Other countries are weighing alternative approaches. In the United Kingdom, the Independent Commission on Banking (in the so-called Vickers report) recommends that a high “ring-fence” be placed around vital retail banking activities. In the European Union, the High-level Expert Group (in the so-called Liikanen report) recommends requiring banks to create separate legal entities for proprietary trading and other trading activities if those activities account for a significant share of a bank’s business.

Despite all this effort, it is far from clear that any of the new regulatory approaches will end too big to fail. As a result, a number of prominent bank regulators and industry experts recommend a more drastic change: simply breaking up the biggest banks. “[T]here is only one fail-safe way to deal with too big to fail,” declared Richard W. Fisher, president of the Federal Reserve Bank

¹ It might be noted that the assets of the five biggest U.S. bank holding companies accounted for 21 percent of all banking assets in 1986. At year-end 2011, the corresponding figure had increased to 52 percent.

of Dallas, in 2011. “I believe that too-big-to-fail banks are too-dangerous-to-permit...I favor an international accord that would break up these institutions into more manageable size.” Mervyn King (2009, p.7), governor of the Bank of England, made the case even more bluntly, arguing that “if some banks are thought to be too big to fail, then ... they are too big.” Daniel K. Tarullo (2012, p. 23), a governor of the Federal Reserve Board and the Fed’s designated coordinator of regulatory reform efforts, offered a more nuanced proposal to “limit the non-deposit liabilities of U. S. financial firms to a specified percentage of U.S. gross domestic product.”

In this paper, we offer a little perspective on this large issue. There is no question that too big to fail is an urgent problem in need of a solution. But there are huge complexities at almost every level. What is “big?” How big is too big? What is a “bank?” What kinds of risk-taking are appropriate for a bank – and why? What do we know about the costs and benefits of different strategies?

In the next section, we examine a basic but important question: how do you measure “big,” and how do policy makers distinguish between banks that are merely big and banks that are too big to fail. The simplest and most straightforward approach is to rank banks by asset size. Indeed, this is what the Dodd-Frank Act does by setting a “threshold for systemically important financial institutions” at \$50 billion in assets. As we shall see, however, such rankings, fail to take into account differences in accounting practices of different countries. We also examine a number of measures of “bigness” in addition to asset size. We present these and other measures for the world’s 100 biggest publicly-traded banks. Our conclusion: every measure has its own strengths and weaknesses, and can produce different impressions of bigness.

The third section discusses the difficulty of another basic and seemingly simple question: what is a “bank?” Big banks come in wildly different shapes and colors, mainly because of differences in regulations and organizational structures between countries. In some countries, “banks” are bank holding companies that own an umbrella of separate subsidiaries for traditional banking and a host of other financial services. In both of these cases, moreover, the scope of financial services that are allowed differs across countries. Other countries allow universal banks, which provide a wide range of financial services through a single entity. Likewise, some countries allow non-financial firms to own banks while others do not. As a result, the actual business of a “bank,” and the kind of risk it takes on, varies between and sometimes within countries.

The fourth section of this paper describes various actual or proposed regulatory reforms to end too big to fail. The goal of all the reforms is to promote a safer and sounder banking system and to ensure that taxpayers never have to bail out another big bank. The reforms range from relying on more stringent capital requirements to regulations limiting the size and activities of

banks to enhanced resolution authority, and to breaking up big banks. We conclude, however, that there is not enough evidence yet to assess the costs and benefits of the different strategies. Some of the reforms, moreover, are too new to have produced meaningful information about their impact.

The fifth and last section summarizes our conclusions. There are two major and legitimate concerns about big banks. The first is that big banks, through a concentration of power, will successfully lobby regulators for leniency and effectively receive greater leeway for excessive risk taking. The second concern is that the failure of a big bank can radiate instability throughout the financial system, forcing policy makers to bail out troubled big banks for the sake of the overall economy.

Unfortunately, there is little evidence that the regulatory reforms now being enacted will solve the problem. Indeed, this uncertainty and complexity has increased the popularity of proposals to simply break up the biggest banks. We believe that would be a mistake at this time. Contrary to popular perceptions, there is surprisingly little evidence that big banks per se caused the recent financial crises. Breaking up some or all of the world's biggest financial institutions would unleash forces with unpredictable consequences and considerable risks. Any such break-up should be based on concrete evidence that the benefits would outweigh the costs. In the absence of that evidence, policymakers may simply have to monitor the incremental reforms they have already begun to implement and make adjustments as the results come in. Given the poor past performance of the regulatory authorities, it may also be prudent to establish procedures to hold them more accountable for achieving stability in the future.

Just How Big Are the World's Biggest Banks?

There are several different ways to measure "big." We start by ranking the 100 biggest publicly-traded banks in the world by their total assets.² This enables us to work with a large but not unmanageable sample of banks. It also enables us to obtain information about market assessments on the value of banks as well as other relevant information.

Table 1 ranks these big banks by total assets as of the second quarter, 2012. The banks are headquartered in 26 different countries and show a wide range in the asset size.³ The biggest is

² The total assets of banks worldwide are based on publicly-traded banks in 180 countries and obtained from Bloomberg. The IMF Global Financial Stability Report, September 2011, reports that the consolidated assets of commercial banks worldwide were \$100 trillion in 2010. Based on Bloomberg and BankScope, the total assets of publicly-traded banks worldwide were \$91.5 trillion in 2010. The latter figure increased to \$99 trillion in the second quarter of 2012.

³ The 26 countries account for roughly 60 percent of world population, 82 percent of world GDP, 92 percent of world bank assets, 85 percent of world equity market capitalization, and 95 percent of world bonds outstanding.

Deutsche Bank of Germany, with \$2, 822 billion in assets, while the smallest is American Express of the United States with \$148 billion in assets. The biggest bank is therefore 20 times the size of the 100th biggest bank in the world. There are 24 “trillion dollar banks” in the world, of which four are U.S. banks, according to our list.

Ranking total assets, however, does not produce an apples-to-apples comparison. There is no uniform worldwide accounting standard for measuring assets. Most of the home countries for banks in this table rely on International Financial Reporting Standards (IFRS), but others rely on their own Generally Accepted Accounting Principles (GAAP).⁴ That leads to big differences. For example, countries that use IFRS, and some that use GAAP, report derivatives on a gross rather than a net basis. In Switzerland, banks are allowed to choose between the two accounting standards. When an adjustment is made to measure total assets on a comparable basis, the result is a significant change for several of the world’s biggest banks. In particular, JP Morgan Chase reports total assets of \$2.3 trillion under U.S. GAAP, in which case derivatives are measured on a net basis. When derivatives are calculated on a gross basis, JP Morgan’s assets almost double to \$4 trillion and the bank jumps from third place to first place among the world’s largest. Likewise, Bank of America leaps from tenth place to second.

Table 1. The world’s 100 biggest banks ranked both by reported total assets and total assets when derivatives are on a gross, not net (U.S. GAAP), basis (IFRS), Q2 2012⁽¹⁾ (G-SIBs identified by the Financial Stability Board as of November 2012 are highlighted)⁽²⁾

	Bank name	Country	Accounting standard ⁽³⁾	Total assets (\$billions)	Total reported derivatives on-balance sheet (\$billions)	Total derivatives when based on gross rather than net basis (\$billions)	Total assets when derivatives based only on gross basis (\$billions)
1	Deutsche Bank	Germany	IAS/IFRS	2,822	1,068	N/A	2,822
2	Mitsubishi UFJ Financial Group	Japan	JP GAAP	2,708	n.a	N/A	2,708
3	Industrial & Commercial Bank of China	China	IAS/IFRS	2,699	2.3	N/A	2,699
4	HSBC	United Kingdom	IAS/IFRS	2,652	356	N/A	2,652
5	Barclays	United Kingdom	IAS/IFRS	2,545	808	N/A	2,545
6	BNP Paribas	France	IAS/IFRS	2,480	583	N/A	2,480
7	JP Morgan Chase	United States	US GAAP	2,290	86	1,746	3,981
8	Crédit Agricole S.A.	France	IAS/IFRS	2,269	57	N/A	2,269
9	Royal Bank of Scotland Group	United Kingdom	IAS/IFRS	2,208	759	N/A	2,208
10	Bank of America Corp.	United States	US GAAP	2,161	60	1,576	3,682
11	China Construction Bank Corp.	China	IAS/IFRS	2,135	2.4	N/A	2,135
12	Agricultural Bank of China	China	IAS/IFRS	2,040	1.1	N/A	2,040

⁴ It is useful to elaborate on the importance of this distinction. The Europe-based International Accounting Standards Board (IASB), for example, allows less balance sheet offsetting than the U.S.-based Financial Accounting Standards Board (FASB). The different offsetting requirements result in a significant difference between assets presented in accordance with IFRS and assets in accordance with U.S. GAAP. This is particularly the case for entities that have large derivative activities (see ISDA, 2012).

	Bank name	Country	Accounting standard ⁽³⁾	Total assets (\$billions)	Total reported derivatives on-balance sheet (\$billions)	Total derivatives when based on gross rather than net basis (\$billions)	Total assets when derivatives based only on gross basis (\$billions)
13	Mizuho Financial Group	Japan	JP GAAP	2,034	n.a	N/A	2,034
14	Bank of China	China	IAS/IFRS	2,028	6.4	N/A	2,028
15	Citigroup	United States	US GAAP	1,916	61	1,022	2,893
16	Sumitomo Mitsui Financial Group	Japan	JP GAAP	1,727	n.a	N/A	1,727
17	Banco Santander S.A.	Spain	IAS/IFRS	1,627	15	N/A	1,627
18	Société Générale	France	IAS/IFRS	1,570	323	N/A	1,570
19	ING	Netherlands	IAS/IFRS	1,558	n.a	N/A	1,558
20	Lloyds Banking Group	United Kingdom	IAS/IFRS	1,500	91	N/A	1,500
21	UBS	Switzerland	IAS/IFRS	1,478	480	N/A	1,478
22	Wells Fargo	United States	US GAAP	1,336	29	98.0	1,443
23	UniCredit	Italy	IAS/IFRS	1,202	152	N/A	1,202
24	Credit Suisse Group	Switzerland	US GAAP	1,092	44	949.3	1,997
25	Goldman Sachs	United States	US GAAP	949	71	916.5	1,794
26	Nordea Bank	Sweden	IAS/IFRS	892	199	N/A	892
27	Commerzbank	Germany	IAS/IFRS	847	155	N/A	847
28	Intesa Sanpaolo	Italy	IAS/IFRS	839	15	N/A	839
30	Metlife (4)	United States	US GAAP	825	2.7	17.0	840
29	Bank of Communications	China	IAS/IFRS	815	0.7	N/A	815
31	Royal Bank of Canada	Canada	CA GAAP	810	89	N/A	810
32	National Australia Bank	Australia	IAS/IFRS	787	39	N/A	787
33	Banco Bilbao Vizcaya Argentaria S.A.	Spain	IAS/IFRS	784	70	N/A	784
34	Toronto Dominion Bank	Canada	CA GAAP	782	56	N/A	782
35	Morgan Stanley	United States	US GAAP	749	34	112.1	826
36	Commonwealth Bank of Australia	Australia	IAS/IFRS	717	n.a	N/A	717
37	Westpac Banking Corp.	Australia	IAS/IFRS	680	32	N/A	680
38	Bank of Nova Scotia	Canada	CA GAAP	667	32	N/A	667
39	Australia and New Zealand Banking Group	Australia	IAS/IFRS	627	38	N/A	627
40	Standard Chartered	United Kingdom	IAS/IFRS	624	62	N/A	624
41	Danske Bank	Denmark	IAS/IFRS	590	81	N/A	590
42	Bank of Montreal	Canada	CA GAAP	532	47	N/A	532
43	China Merchants Bank	China	IAS/IFRS	525	0.3	N/A	525
44	Banco do Brasil S.A.	Brazil	IAS/IFRS	520	0.9	N/A	520
45	Dexia	Belgium	IAS/IFRS	518	42	N/A	518
46	Resona Holdings	Japan	JP GAAP	517	n.a	N/A	517
47	Shanghai Pudong Development Bank	China	CN GAAP	480	0.1	N/A	480
48	China CITIC Bank Corp.	China	IAS/IFRS	461	0.8	N/A	461
49	Nomura Holdings	Japan	US GAAP	445	n.a	n.a	445
50	Itau Unibanco Holdings	Brazil	IAS/IFRS	440	6.0	N/A	440
51	Sumitomo Mitsui Trust Holdings	Japan	JP GAAP	424	n.a	N/A	424
53	China Minsheng Banking Corp.	China	IAS/IFRS	410	0.1	N/A	410
54	Shinkin Central Bank	Japan	JP GAAP	402	n.a	N/A	402
55	DnB ASA	Norway	IAS/IFRS	397	15	N/A	397
52	Canadian Imperial Bank of Commerce	Spain	IAS/IFRS	392	n.a	N/A	392
56	Bankia S.A.	Canada	CA GAAP	392	26	N/A	392
57	Banco Bradesco S.A.	Brazil	IAS/IFRS	388	n.a	N/A	388
58	Sberbank of Russia	Russia	IAS/IFRS	379	1.9	N/A	379
59	Svenska Handelsbanken	Sweden	IAS/IFRS	365	19	N/A	365
60	KBC	Belgium	IAS/IFRS	360	1.4	N/A	360
61	State Bank of India	India	IN GAAP	358	n.a	N/A	358

	Bank name	Country	Accounting standard ⁽³⁾	Total assets (\$billions)	Total reported derivatives on-balance sheet (\$billions)	Total derivatives when based on gross rather than net basis (\$billions)	Total assets when derivatives based only on gross basis (\$billions)
62	US Bancorp	United States	US GAAP	353	1.6	1.9	353
63	Skandinaviska Enskilda Banken	Sweden	IAS/IFRS	341	n.a	N/A	341
64	China Everbright Bank	China	CN GAAP	331	0.3	N/A	331
65	Bank of New York Mellon Corp.	United States	US GAAP	330	3.9	31.3	367
66	PNC Financial Services Group	United States	US GAAP	300	2.7	9.7	308
67	Capital One Financial Corp. (4)	United States	US GAAP	297	1.9	1.9	297
68	Banca Monte dei Paschi di Siena	Italy	IAS/IFRS	292	23	N/A	292
69	Woori Finance Holdings	Korea, Rep.	IAS/IFRS	278	3.5	N/A	278
70	DBS Group Holdings	Singapore	IAS/IFRS	277	16	N/A	277
71	Erste Group Bank	Austria	IAS/IFRS	271	15	N/A	271
72	Swedbank	Sweden	IAS/IFRS	263	14	N/A	263
73	Shinhan Financial Group	Korea, Rep.	IAS/IFRS	259	1.7	N/A	259
74	Hana Financial Group	Korea, Rep.	IAS/IFRS	257	2.7	N/A	257
75	Oversea-Chinese Banking Corp.	Singapore	IAS/IFRS	227	4.2	N/A	227
76	Daiwa Securities Group	Japan	JP GAAP	225	n.a	N/A	225
77	Banco de Sabadell SA	Spain	IAS/IFRS	210	3.2	N/A	210
78	VTB Bank	Russia	IAS/IFRS	209	n.a	N/A	209
79	State Street Corporation	United States	US GAAP	201	4.2	7.6	204
80	Ping An Bank	China	CN GAAP	200	n.a	N/A	200
81	Banco Popular Espanol S.A.	Spain	IAS/IFRS	199	3.3	N/A	199
82	Bank of Ireland	Ireland	IAS/IFRS	199	7.6	N/A	199
83	Raiffeisen Bank International	Austria	IAS/IFRS	192	13	N/A	192
84	Standard Bank Group	South Africa	IAS/IFRS	188	21	N/A	188
85	Cathay Financial Holdings	Taiwan	TW GAAP	186	0.1	N/A	186
86	United Overseas Bank	Singapore	IAS/IFRS	185	n.a.	N/A	185
87	National Bank of Canada	Canada	CA GAAP	179	6.5	N/A	179
88	BB&T Corp.	United States	US GAAP	179	1.6	1.6	179
89	SunTrust Bank	United States	US GAAP	178	3.1	9.4	185
90	Bank of Beijing	China	CN GAAP	174	0.01	N/A	174
91	Industrial Bank of Korea	Korea, Rep.	IAS/IFRS	173	1.9	N/A	173
92	SNS Reaal	Netherlands	IAS/IFRS	169	5.0	N/A	169
93	Banco Popolare	Italy	IAS/IFRS	168	1.0	N/A	168
94	UBI Banca	Italy	IAS/IFRS	168	3.4	N/A	168
95	Macquarie Group	Australia	IAS/IFRS	164	n.a	N/A	164
96	Allied Irish Banks plc	Ireland	IAS/IFRS	163	3.6	N/A	163
97	Fukuoka Financial Group	Japan	JP GAAP	161	n.a	N/A	161
98	Malayan Banking Berhad	Malaysia	MY GAAP	154	0.7	N/A	154
99	Bank of Yokohama	Japan	JP GAAP	152	n.a	N/A	152
100	American Express	United States	US GAAP	148	0.7	1.4	149

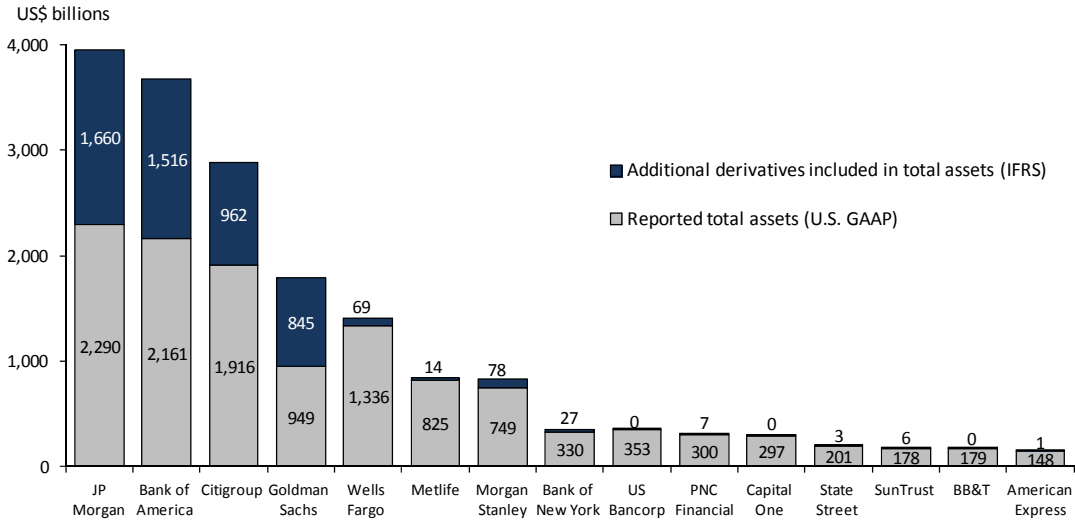
Note: n.a. = not available and N/A = not applicable. IAS denotes to International Accounting Standards.

- (1) Data from previous quarter are used if the most recent quarterly data are not available.
- (2) Groupe BPCE is identified as of a G-SIB, but is not included on our list of the world's 100 biggest banks because it is not publicly-traded.
- (3) Switzerland allows companies the choice of reporting derivatives on a net or gross basis.
- (4) Unlike most U.S. banks, Metlife and Capital One present derivatives on a gross basis, and does not reflect the impact of legally enforceable master counterparty netting agreements, or collateral received/posted.

Sources: BankScope, Bloomberg, World Bank Survey IV, annual reports, discussions with regulatory authorities in selected countries, Financial Stability Board (2012) and Milken Institute.

It is useful to explain more fully the impact on total assets of the treatment of derivatives under different accounting standards.⁵ Figure 1 shows what happens to the total assets of the 15 U.S. banks if derivatives are measured under the IFRS rules rather than under U.S. GAAP. The most dramatic changes occur at the biggest of the big U.S. banks, which carry out a disproportionate share of trading in derivatives. As a result, several of those institutions suddenly appear to eclipse competitors in other countries if they are measured on the same basis. Indeed, U.S. GAAP treatment may be understating the assets of all U.S. banks on our list by a total of \$5 trillion.

Figure 1. Differences in total assets of big U.S. banks due to differences in the accounting treatment of derivatives, Q2 2012



Sources: BankScope, Bloomberg, annual reports, and Milken Institute.

As already noted, the world’s 100 biggest publicly-traded banks are headquartered in 26 countries. Table 2 shows that there are a total of 1,074 publicly-traded banks in these countries with total assets of \$93 trillion. The 100 biggest banks account only for 9 percent of all the banks, but 84 percent of the total assets. The United States has the most publicly-traded banks of any nation, with 681 banks. Japan and Russia rank second and third with 93 and 25 banks, respectively. The United States is also the country whose publicly-traded banks collectively have the most total assets – \$15.5 trillion. The publicly-traded banks in Japan and China are ranked second and third in terms of total assets at \$12.5 trillion and \$12.4 trillion, respectively. The total assets of the banks in these three countries total \$40.4 trillion, or 42 percent of assets at all of the banks on our list.

⁵ For purposes of satisfying the Basel Capital Accord, all banks are allowed to use net derivatives when calculating the risk-based capital requirements under Basel II. However, no final decision has yet been made regarding the leverage requirement under Basel III.

Another way to view the world’s 100 biggest banks is not simply in terms of total assets but their total assets relative to the total assets of all banks. In terms of individual countries, Table 2 shows the ratio of the total assets of the biggest banks to total bank assets ranges from a low of 17 percent in Taiwan to a high of 100 percent in Ireland and the United Kingdom.⁶ In the case of the United States, the comparable ratio is 78 percent.

Still another way to view the world’s 100 biggest banks is by measuring total assets as a share of GDP⁷. By that measure, Swiss banks are by far the world’s “biggest,” with assets equal to 458 percent of Switzerland’s GDP. Russia’s banks would be the “smallest,” with assets equal to only 43 percent of GDP. The 15 biggest U.S. banks are at the lower end of the range, with assets equal to 99 percent of U.S. GDP.

Table 2 shows the 100 banks by the ratio of their total assets to equity market capitalization plus bonds outstanding. Sweden and Switzerland both have the highest ratios at 210 percent, while the comparable ratio for the United States is 36 percent. The median ratio for all the countries is roughly 110 percent. Higher ratios are associated with bank-oriented financial markets, while lower ratios are associated with capital-oriented financial markets.

Table 2. Importance of the world’s 100 biggest banks in 26 home countries, Q2 2012

Country	Number and assets of publicly-traded banks by country		Number and assets of the world’s 100 biggest banks by country		Importance of the biggest banks and banking assets by country		Importance of total assets of publicly-traded banks to equity market capitalization plus bonds outstanding (%) (2011)
	Total number of publicly-traded banks	Total assets of publicly-traded banks (\$billions)	Number of banks in top 100	Combined assets of top 100 (\$billions)	Combined assets of banks in the top 100 (% of total assets of publicly-traded banks)	Total assets of publicly-traded banks (%GDP)	
Australia	8	3,167	5	2,976	94	200	138
Austria	9	597	2	463	78	146	143
Belgium	3	900	2	878	98	181	122
Brazil	18	1,722	3	1,349	78	70	64
Canada	14	3,582	6	3,362	94	198	97
China	16	12,418	12	12,298	99	155	185
Denmark	14	699	1	590	84	218	77
France	21	7,603	3	6,319	83	280	160
Germany	8	4,082	2	3,668	90	117	112
India	21	1,208	1	358	30	68	78
Ireland	2	362	2	362	100	173	94

⁶ These data are obtained from BankScope, which accounts for over 90 percent of all banking assets in country (see, for example, Houston, Lin, and Ma, 2012).

⁷ For comparison, as of the second quarter of 2012, the collective assets of the world’s 100 biggest non-financial companies are 27 percent of the combined GDPs of the countries in which the companies are headquartered. Of these companies, 32 are U.S. companies and their collective assets are 30.4 percent of U.S. GDP.

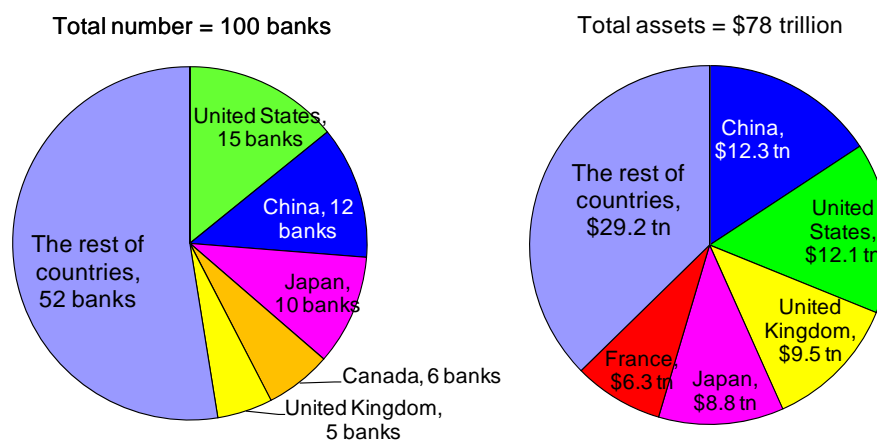
Italy	21	3,214	5	2,670	83	156	91
Japan	93	12,506	10	8,795	70	209	61
Korea, Rep.	7	1,091	4	967	89	94	45
Malaysia	13	565	1	154	27	185	80
Netherlands	5	1,852	2	1,727	93	231	163
Norway	18	537	1	397	74	107	94
Russia	25	869	2	588	68	43	n.a.
Singapore	7	700	3	689	98	259	113
South Africa	10	605	1	188	31	144	94
Spain	9	3,617	5	3,212	89	259	174
Sweden	5	1,980	4	1,862	94	360	210
Switzerland	13	2,843	2	2,570	90	458	210
Taiwan	23	1,116	1	186	17	232	105
United Kingdom	10	9,572	5	9,530	100	390	198
United States	681	15,503	15	12,211	78	99	36
Total	1,074	92,907	100	78,366			
World total	1,470	99,191	Weighted average for 26 countries		84%	135%	

Note: Publicly-traded banks are commercial banks, savings banks, cooperative banks, or bank holding companies. Total assets of publicly-traded banks are based on the individual countries' accounting policies. This means, for example, that the total assets based on U.S. GAAP will differ from those based upon International Financial Reporting Standards (IFRS). In particular, derivatives are reported on a net basis under U.S. GAAP and on a gross basis under IFRS.

Sources: Bloomberg, BankScope, World Bank, and International Monetary Fund.

Figure 2 shows the distribution of the world's 100 biggest banks by number and total assets across the 26 countries. The United States, with 15, has more banks than any other nation on the list. China ranks second and Japan third, with 12 and 10 banks, respectively. The remaining 23 countries account for 63 banks. Measured by total banking assets, however, China's big banks lead the world with \$12.3 trillion. The United States' banks come in second, with combined assets of \$12.1 trillion, and the United Kingdom ranks third with \$9.5 trillion. Banks in the remaining countries have \$44.3 trillion in assets, or 57 percent of the worldwide total.

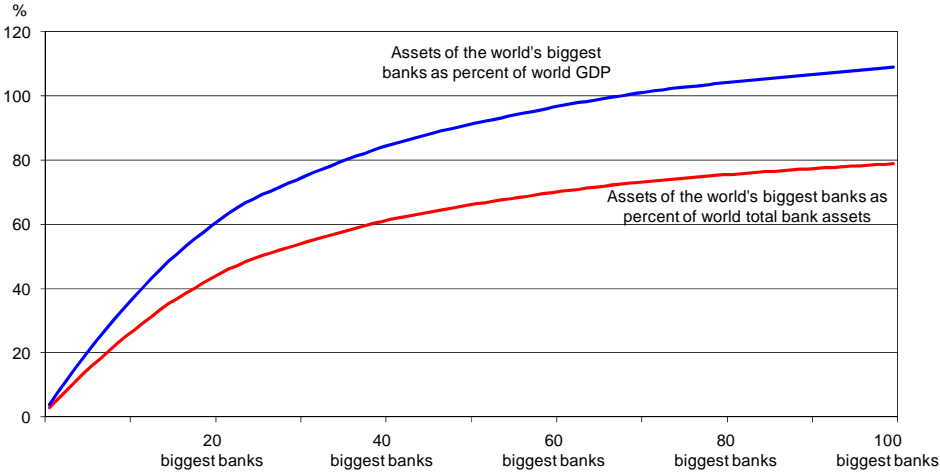
Figure 2. Number and assets of the world's 100 biggest banks by country, Q2 2012



Sources: BankScope, Milken Institute.

Instead of focusing on the world’s 100 biggest banks, one can focus on various subsets of these banks. Figure 3 plots the cumulative assets of the world’s biggest banks, starting with the biggest and ending with the smallest, as a share of both total bank assets worldwide and world GDP.⁸ Although both ratios increase as the assets of additional banks are added, the asset-to-world GDP ratio is always higher than the ratio to worldwide assets. That reflects the fact that global bank assets are larger than world GDP. As of the second quarter of 2012, global bank assets for all publicly-traded banks totaled \$99 trillion and world GDP was \$72 trillion.⁹

Figure 3. Cumulative assets of the world’s biggest banks, Q2 2012

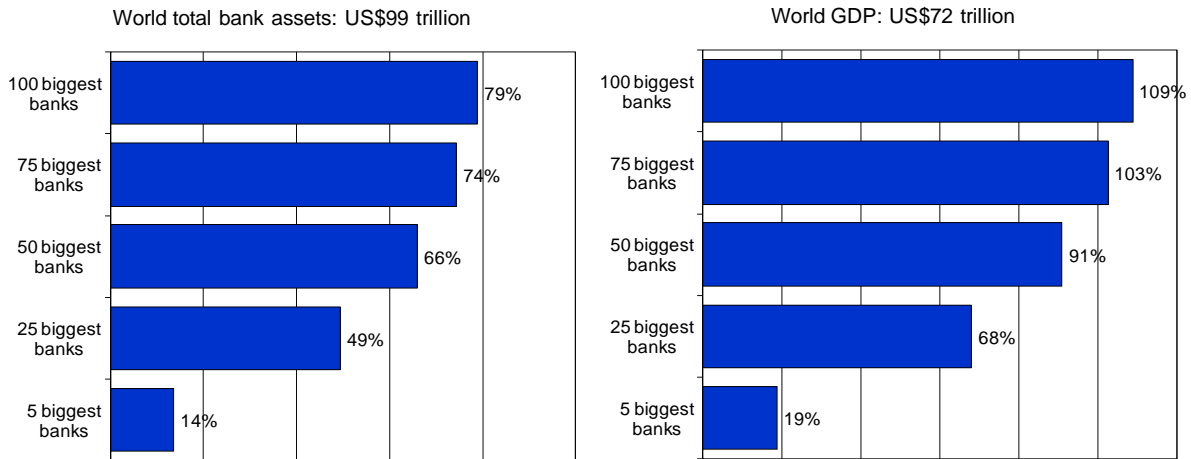


Note: The 100 biggest publicly-traded banks in the world ranked by total assets. World GDP is a 2012 IMF estimate. World total bank assets are based on all publicly-traded banks worldwide, which include commercial banks, savings banks, cooperative banks, and bank holding companies.
Sources: Bloomberg, International Monetary Fund, Milken Institute.

Figure 4 provides a clearer breakdown of the relative importance of different subsets of the world’s 100 biggest banks. The largest 25 banks account for about half of the total assets of all banks worldwide. The assets of the same banks are slightly more than two-third of world GDP. As may be seen, only a few of world’s 1,470 publicly-traded banks are big in terms of either their share of the global bank assets or global GDP. The list of big banks would be even smaller if U.S. banks accounted for their derivatives under IFRS rather than US GAAP rules.

⁸ The detailed information for Figure 4 is provided in Appendix 1.
⁹ The world’s bank assets grew four times as fast as world GDP over the period 1977-2011.

Figure 4. Combined assets of the world's biggest banks, Q2 2012



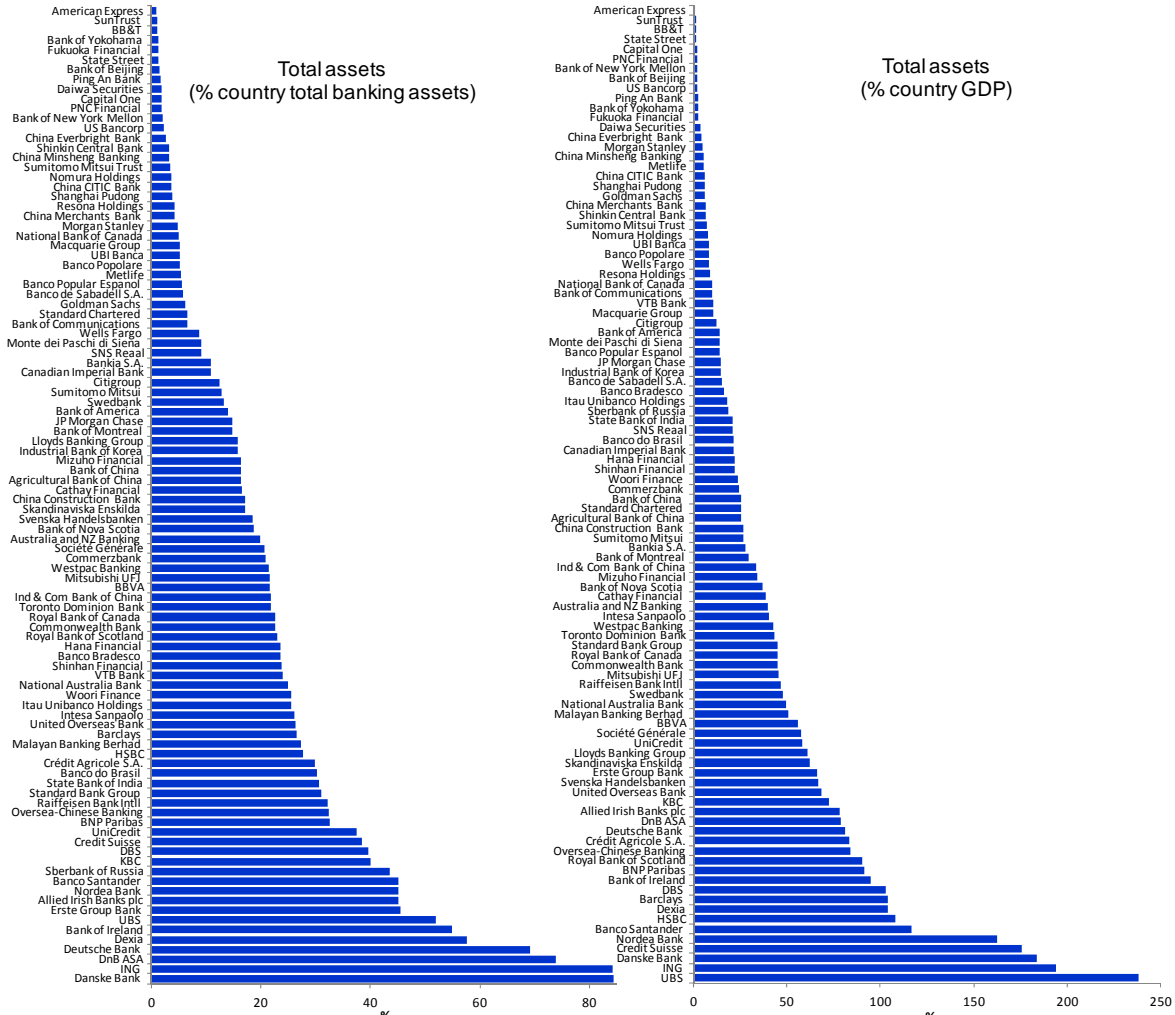
Note: The 100 biggest publicly-traded banks in the world ranked by total assets. World GDP is a 2012 IMF estimate. World total bank assets are based on all publicly-traded banks worldwide, which include commercial banks, savings banks, cooperative banks, and bank holding companies. Sources: Bloomberg, International Monetary Fund, Milken Institute.

There are still other ways in which to rank the size of banks. Two of these ways are to measure individual banks by their assets as a share of either total banking assets in their home countries or as a share of their home-country GDP. The left-hand panel of Figure 5 shows the size of individual banks relative to total banking assets. Danske Bank in Denmark tops the list, with 84 percent of Denmark's total banking assets. American Express in the United States accounts for the smallest share, at 1 percent US banking assets. The median share is 17 percent. Among US banks, JP Morgan Chase was in first place with 14.8 percent of the total. In the global context, however, JP Morgan Chase ranks only 58th among the world's biggest 100 banks. This means that the biggest U.S. banks are relatively small when compared to the world's other 100 biggest banks on the basis of the share of an individual bank's total assets relative to the all banking assets of the bank's home country.

The other way to compare individual banks is by their total assets relative to the home country's GDP.¹⁰ In this case, the right-hand panel of Figure 5 shows that UBS ranks number 1 with assets equal to 238 percent of Switzerland's GDP. Once again, American Express is at the bottom of the list with total assets equal to a mere 0.9 percent of U.S. GDP. The median ratio is 25 percent. JP Morgan Chase, with total assets equal to 17.4 percent of U.S. GDP, ranks 64th worldwide. In short: the biggest U.S. banks are relatively small players in their own country when compared to many of their counterparts elsewhere in the world.

¹⁰ Of course, total assets include both domestic and foreign assets. One might wish to distinguish between the ratio of domestic assets to domestic GDP and the ratio of foreign assets to the GDPs in which the assets are located.

Figure 5. The world's 100 biggest banks: Ranked by individual bank assets to total bank assets and to GDP, Q2 2012



Sources: BankScope, International Monetary Fund, and Milken Institute.

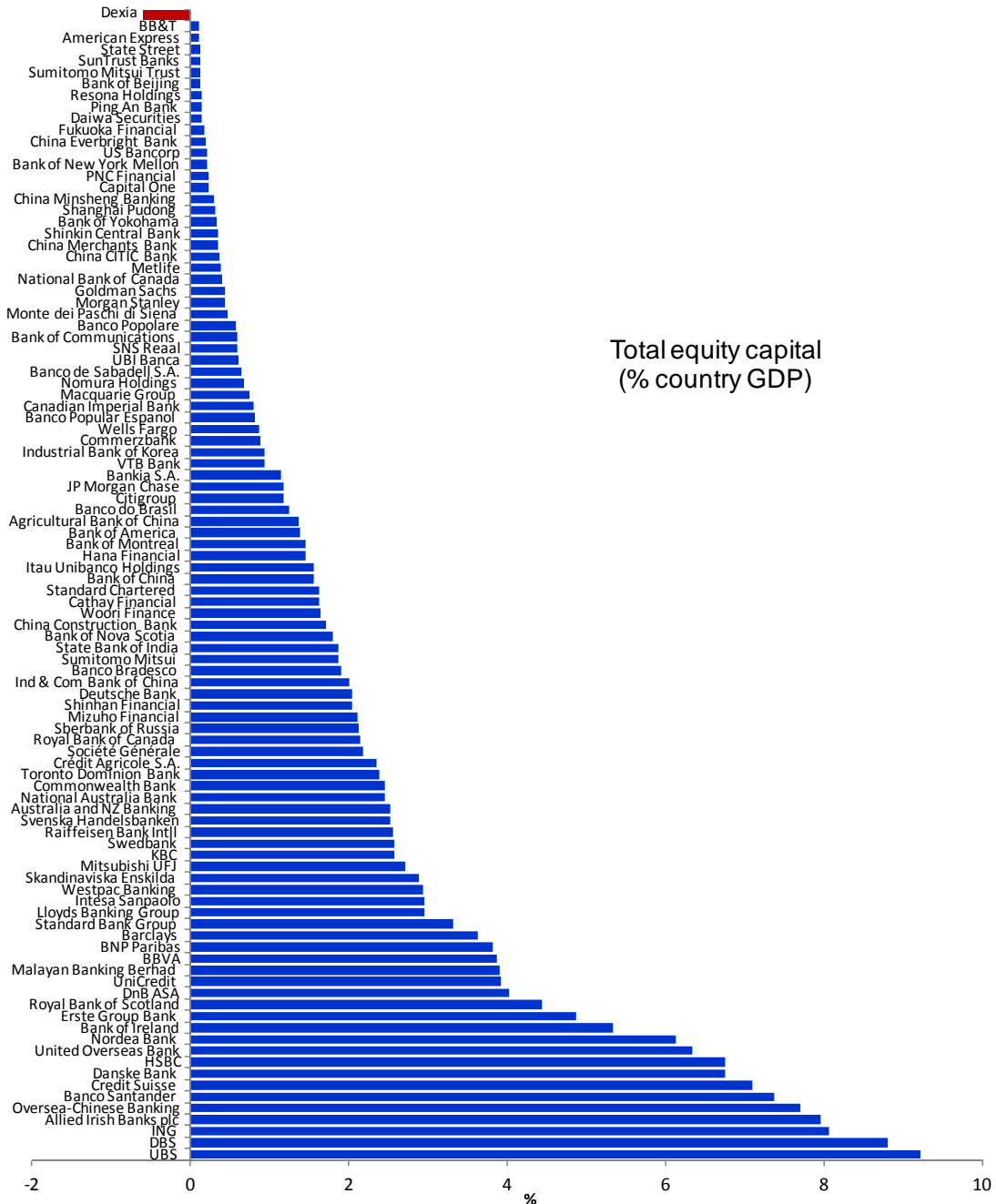
One last way to measure bigness is in terms of a bank's equity capital relative to GDP. Dermine and Schoemaker (2010, p. 2) point out that the ratio of equity capital to GDP is a better indicator of relative size than the ratio of assets to GDP. Their justification for using this ratio is based on the argument that it "...measures the unexpected losses that could arise and of the subsequent public bail out costs." They add that "...[t]he equity-to-GDP ratio can be justified by the fact that, under Pillar 2 of the Basel 2 capital regulation, banks must plan economic capital large enough to cover unexpected losses." ¹¹ Figure 6 shows that Dexia in Belgium has the lowest ratio of equity capital to GDP at -0.6 percent. ¹² This bank had its capital depleted by

¹¹ Appendix 2 presents similar information for both tangible equity capital and the market capitalization of each of the world's 100 biggest banks, both with respect to total assets and GDP.

¹² This bank is currently undergoing a resolution process.

losses and therefore either requires that it be bailed out or allowed to fail, if private capital is not forthcoming to recapitalize the bank. UBS in Switzerland has the highest, at 9.2 percent. The median for all 100 big banks is 1.6 percent. In the case of the United States, the three banks with the highest ratios are Bank of America, Citigroup, and JP Morgan Chase at 1.4, 1.2, and 1.2 percent, respectively, all of which have ratios below the median.

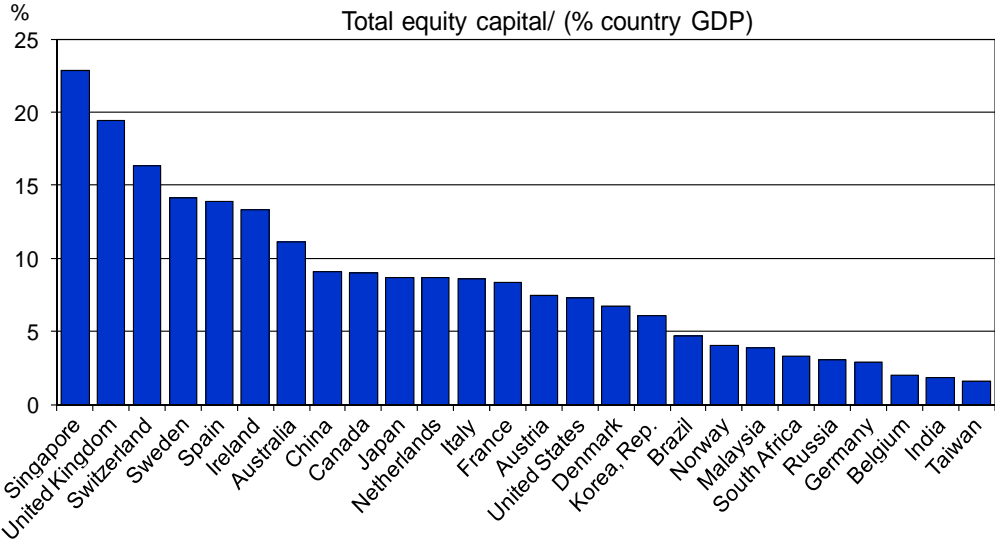
Figure 6. The world's 100 biggest banks: Ranked by individual bank equity to GDP, Q2 2012



Sources: BankScope, International Monetary Fund, and Milken Institute.

Figure 7 provides information on the total equity capital of all the world’s 100 biggest banks to the GDPs of the countries in which the banks are headquartered. Singapore has the largest total equity capital-to-GDP ratio at 22.8 percent, while Taiwan has the lowest ratio at 1.6 percent. The United States ranks 15th of the 26 countries with a total bank equity capital-to-GDP ratio of 7.3 percent.

Figure 7. World’s 100 biggest banks: Total bank equity capital-to-GDP ratios by country, 2012



Note: Bank equity capital is for the second quarter of 2012 and individual country GDPs are 2012 IMF estimates. Sources: BankScope, International Monetary Fund, and Milken Institute.

What Is a Bank?

It is important to digress for a moment and define the term “bank.” Under U.S. law, a bank is a firm that offers demand deposits, makes commercial and industrial loans, and has its deposits insured by the FDIC. The “biggest banks” are typically holding companies, which conduct banking and certain other financial activities, such as securities and insurance activities, through separate subsidiaries.¹³ All 15 U.S. banks on our list are bank holding companies, and it is the total assets of the holding companies, not simply of their banking subsidiaries, that appear in the many of the tables and figures. In some countries, however, the biggest banks are universal banks in which banking and other financial activities are conducted in the same entity. In order to make apple-to-apple comparisons, we include U.S. bank holding companies rather than simply the bank subsidiaries.

¹³ Prior to the Dodd-Frank Act, the regulatory authorities could seize subsidiary banks, but not the holding companies. This is no longer the case under the new law.

Even then, however, “big banks” come in different shapes and sizes. Table 3 shows that the total assets of the 15 bank holding companies are \$12 trillion, while the total assets of all their FDIC-insured bank subsidiaries are \$8 trillion. It’s clearly more accurate to compare the assets of a U.S. bank holding company with those of a universal bank such as Deutsche Bank. But that doesn’t mean the comparisons are strictly accurate. Regardless of how they are organized, most of the world’s big banks have a mix of businesses with very different kinds of assets. Indeed, some bank holding companies are primarily in non-bank businesses, such as insurance. The distinction is especially dramatic for Metlife, which is overwhelmingly an insurance provider. The assets of its FDIC-insured subsidiaries account for only 1.1 percent of its total assets and only 2.3 percent of total equity capital.

That makes cross-border comparisons difficult at either the individual or aggregate bank level. Largely because of differences in regulation between countries, the assets of big banks can include different mixtures of bank loans, securities, insurance policies and other products (see Barth, Caprio and Levine, 2006). This diversity is wide even among U.S. bank holding companies. As Appendix 3 shows, however, it is even wider between banks from different countries. As Appendix 4 shows, moreover, the big banks also display major differences in Tier 1 capital regulatory ratios and sources of revenue and profitability.

Not surprisingly, financial markets assess the value of big banks in very different ways. In the United States, for example, the ratio of market value to book value for the banks listed in Table 3 ranges from a high of 3.44 for American Express to a low of 0.41 for Bank of America, as of the end of the second quarter, 2012. In addition to American Express, four other banks have market-to-book ratios of greater than 1.0: US Bancorp (1.84), Wells Fargo (1.29), BB&T (1.18) and State Street (1.10). In addition to Bank of America, the other banks with ratios of less than 1.0 include PNC Financial (0.95), Capital One (0.85), Bank of New York Mellon (0.76), JP Morgan Chase (0.74), Goldman Sachs (0.70), SunTrust (0.64), Metlife (0.54), Morgan Stanley (0.47), and Citigroup (0.44). The markets clearly recognize that the 15 big U.S. banks represent a range of different business models, which suggests that they should not be viewed as the same when it comes to tackling the problem of too big to fail, especially any proposals to break them up.¹⁴

¹⁴ For additional information on different business models of European banks, see Ayadi et al. (2012).

Table 3. Total assets and equity of the U.S. biggest bank holding companies and their FDIC-insured subsidiaries, Q2 2012

	Holding company		FDIC-insured subsidiaries			% holding company	
	Total assets (\$billions)	Total equity capital (\$billions)	No. of insured subsidiaries	Combined total assets (\$billions)	Combined total bank equity capital (\$billions)	Total assets	Total equity capital
JP Morgan Chase & Co.	2,290	184	4	1,944	160	84.9	87.0
Bank of America Corp.	2,161	217	5	1,652	207	76.5	95.1
Citigroup	1,916	186	3	1,350	156	70.4	83.9
Wells Fargo & Co.	1,336	138	5	1,236	133	92.5	96.3
Goldman Sachs	949	68	1	115	20	12.1	29.1
Metlife	825	61	1	9	1	1.1	2.3
Morgan Stanley	749	70	2	91	11	12.2	15.7
US Bancorp	353	34	2	349	38	98.9	112.5
Bank of New York Mellon Corp.	330	35	4	275	24	83.3	67.5
PNC Financial Services Group	300	37	1	292	39	97.4	106.0
Capital One Financial Corp.	297	37	3	332	47	112.1	125.6
State Street Corp.	201	19	1	197	19	98.1	97.7
BB&T Corp.	179	18	2	176	22	98.8	118.2
SunTrust Bank	178	20	1	172	21	96.5	104.3
American Express	148	19	2	69	13	46.6	68.4
Total	12,211	1,143	37	8,260	910		

Note: Financial data for bank holding companies represent the summation of FFIEC Call Reports or OTS Thrift Financial Reports (TFR) filed by all FDIC-insured bank and thrift subsidiaries held by a bank holding company, and do not reflect nondeposit subsidiaries or parent companies. Data values have not been adjusted for intra-company transactions, which mean that some percentages for some holding companies can exceed 100 percent.

Sources: National Information Center, Federal Reserve, FDIC, Bloomberg, and Milken Institute.

The United States contains yet another major variant among banks: industrial loan companies, or ILCs. These are FDIC-insured depository institutions, but some are owned by non-financial corporations.¹⁵ Table 4 shows nine such institutions currently operating in the United States. The largest non-financial company that owns one is General Electric (GE), with \$694 billion in assets. Toyota is the second largest owner with \$376 billion in assets, while BMW is third with \$160 billion in assets. Under U.S. law, these corporate parents are not currently considered to be financial services or bank holding companies even though they own FDIC-insured depository institutions (see Barth, et al., 2012). For that reason, we do not include the corporate parents in any of the earlier tables and figures, even though all of them could qualify as one of the world's 100 biggest banks. In practice, the ILCs have very different business models from both bank holding companies and financial services companies. As Table 4 indicates, moreover, the ILCs are relatively unimportant in terms of their shares of the total assets and total equity of their parent companies.

¹⁵ The United States, with the exception of existing ILCs, is only one of two countries, the other being Namibia, that currently prohibit non-financial companies from owning banks based on information from World Bank Survey IV.

Table 4. Importance of corporate parents to commercially-owned industrial loan companies, Q2 2012

Parent company	Parent company					Commercially owned ILC	State	ILC					
	Total assets (\$billions)	Total equity capital (\$billions)	Equity capital to total assets (%)	ROA (%)	ROE (%)			ILC assets as % of its parent's assets	ILC equity as % of its parent's equity	Equity capital to total assets (%)	ROA (%)	ROE (%)	
BMW	160.2	34.8	21.7	1.0	4.7	BMW Bank of North America	UT	5.8	3.2	11.9	1.1	9.6	
Harley-Davidson	9.3	2.7	28.6	2.7	9.3	Eaglemark Savings Bank	NV	0.3	0.3	23.1	6.9	29.8	
CMS Energy	16.3	3.2	19.3	0.6	3.2	EnerBank USA	UT	3.2	1.8	11.0	1.5	13.2	
Fry's Electronics	n.a.	n.a.	n.a.	n.a.	n.a.	First Electronic Bank	UT	n.a.	n.a.	86.4	4.8	5.5	
General Electric	694.1	123.9	17.8	0.4	2.5	GE Capital Financial Inc.	UT	1.8	1.7	17.0	1.2	7.3	
Pitney Bowes	8.1	0.3	3.2	4.8	152.1	The Pitney Bowes Bank Inc.	UT	9.1	20.6	7.1	5.4	75.3	
Target Corp.	46.6	15.8	33.9	6.6	19.6	Target Bank	UT	0.1	0.1	35.6	9.6	27.0	
Toyota	376.3	138.2	36.7	0.6	1.7	Toyota Financial Savings Bank	NV	0.2	0.1	18.6	1.3	6.8	
Flying J*	1.8	0.5	29.7	18.9	63.5	TAB Bank*	UT	29.1	13.5	13.2	1.8	13.2	
						All FDIC-insured institutions			11.46	0.99	8.84		

Total assets of U.S. nonfinancial corporate business (Q2 2012): \$31 trillion.

Total net worth of U.S. nonfinancial corporate business (Q2 2012): \$17 trillion.

Notes: *As of Q2 2010. The owner of Transportation Alliance Bank Inc. changed from Flying J to FJ Management Inc. in July 2010. TAB Bank, Inc. was formerly named as Transportation Alliance Bank, Inc.

Sources: "Flow of Funds," Federal Reserve, FDIC, Bloomberg, and Milken Institute.

What Should Be Done to Resolve the Too Big to Fail Problem?

The purpose of the regulatory reforms being proposed or already being carried out is to prevent future banking crises whenever possible and to lessen the severity of those that do occur.¹⁶

The reforms attempt to tackle too big to fail in roughly five ways: 1) restricting the size of banks; 2) restricting the scope of bank activities; 3) requiring higher capital levels for systemically important institutions; 4) providing an orderly framework for shutting down troubled banks, including through requirements that banks prepare "living wills" and through an expansion of the government's "resolution" authority; and 5) various combinations of these approaches.

The first type of reform involves restricting the size of banks. The Dodd-Frank Act limits the size of banks by prohibiting bank mergers or acquisitions if the resulting bank would hold more than

¹⁶ This section draws upon Barth, Prabha and Swagel (2012).

10 percent of total nationwide bank deposits or more than 10 percent of the aggregate consolidated liabilities of all financial companies. These limits could impede future mergers and acquisitions in the banking industry.¹⁷

Table 5 shows the potential impact of the merger restriction based on deposits. Two of the largest U.S. banks, JP Morgan Chase and Bank of America, already exceed the limit on deposits and therefore would be prohibited from any further external growth. Other banks on the list still have room for expansion, but it would be limited. Meanwhile, Federal Reserve governor Tarullo has suggested limiting non-deposit liabilities of U. S. banks to a specified percentage of U.S. GDP. Table 5 also shows the potential impact if those liabilities were limited to 2 percent of GDP, as proposed by some lawmakers in the Safe, Accountable, Fair & Efficient (SAFE) Banking Act of 2012.¹⁸ Under that requirement, six banks would be immediately prohibited from any further mergers and acquisitions. Another eight banks would have some leeway for further external growth.

Simon Johnson (2010, pp. 214-215) also states that “[t]he simplest solution [to the TBTF problem] is a hard cap on size: no financial institution would be allowed to control or have an ownership interest in assets worth more than a fixed percentage of U.S. GDP.” He adds that “[a]s a first proposal, this limit should be *no more than 4 percent of GDP*, or roughly \$570 billion in assets today.” For investment banks, he states that “[a]s an initial guideline, an investment bank (such as Goldman Sachs) should be effectively limited in size to *2 percent of GDP*, or roughly \$285 billion today.” Based upon GDP in the second quarter of 2012, 4 percent amounts to \$624 billion. Table 5 shows that JP Morgan Chase, Bank of America, Citigroup and Wells Fargo all have assets that exceed this amount. Moreover, Goldman Sachs and Morgan Stanley both have assets that exceed 2 percent of GDP, or \$311 billion.¹⁹

The problem, of course, is that there is no bright line that enables one to easily distinguish between big banks that are or will become a systemic risk versus those big banks that are or will not become such a risk. To the extent that the demarcation line is adjusted for individual banks of different degrees of bigness, the end result might once again lead back to a TBTF problem. Indeed, the G-SIBs identified in Table 1 are of different asset sizes and some of these banks are smaller than other banks not so identified. Moreover, some of the U.S. banks are identified G-SIBs even though their asset size is substantially less than 4 or even 2 percent of U.S. GDP.

¹⁷ The Dodd-Frank Act provides exceptions to these limits in the case of mergers and acquisitions of troubled institutions.

¹⁸ This is a bill introduced by Senator Sherrod Brown (see <http://www.brown.senate.gov/newsroom/press/release/brown-introduces-bill-to-end-too-big-to-fail-policies-prevent-mega-banks-from-putting-our-economy-at-risk>).

¹⁹ Metlife is excluded for purposes of these calculations.

Table 5. Impact of actual and proposed limits on the size of banks, Q2 2012

	Total assets (\$billions)	Total deposits (\$billions)	Total deposits/all deposits (%)	Total deposits exceeding 10% of all deposits (\$billions)	Non-deposit liabilities (% of GDP)	Non-deposit liabilities exceeding 2% of GDP (\$billions)
JP Morgan Chase & Co.	2,290	1,116	10.8	83.6	7.5	861.2
Bank of America Corp.	2,161	1,035	10.0	3.0	7.2	812.6
Citigroup	1,916	914	8.9	-117.9	6.4	689.1
Wells Fargo & Co.	1,336	929	9.0	-103.3	2.6	94.2
Goldman Sachs	949	267	2.6	-765.4	4.4	368.7
Morgan Stanley	749	188	1.8	-844.5	3.6	247.7
US Bancorp	353	241	2.3	-790.9	0.7	-201.2
Bank of New York Mellon Corp.	330	221	2.1	-811.1	0.7	-203.9
PNC Financial Services Group	300	207	2.0	-825.3	0.6	-220.4
Capital One Financial Corp.	297	214	2.1	-818.3	0.5	-230.4
State Street Corp.	201	144	1.4	-888.5	0.4	-256.1
BB&T Corp.	179	126	1.2	-906.2	0.3	-260.6
SunTrust Bank	178	128	1.2	-903.8	0.3	-263.2
American Express	148	36	0.3	-996.3	0.7	-200.9

Note: Metlife is excluded because it has an extremely small deposit base.

Sources: Bloomberg, FDIC, IMF, and Milken Institute.

A potential weakness with such limits on size such is that they could reduce economies of scale, not to mention economies of scope, in banking. That could increase the cost of banking services. In this regard, Wheelock and Wilson (2012, p.171) found that “...as recently as 2006, most U.S. banks faced *increasing* returns to scale, suggesting that scale economies are a plausible (but not necessarily only) reason for the growth in average bank size.” In addition, Hughes and Mester (2011, p. 23) found that “...evidence of large scale economies at smaller banks and even larger economies at large banks...” They added that these measured economies of scale did not result from cost advantages that large banks may derive from being considered “too big to fail.” To the extent that U.S. banks are limited in size, they may also be at a competitive disadvantage to the big banks in other countries that don’t impose such limits. The implication is clear: one should not rush to limit bank size unless one can be more certain that the benefits outweigh the costs.²⁰

The second type of reform involves requiring banks to legally separate certain particularly risky activities or simply barring banks from those activities altogether. The Liikanen report proposes

²⁰ See Saunders and Walter (2010) for a more general discussion on this issue.

separating proprietary trading of securities and derivatives, and certain other activities linked to those markets, from deposit-taking banks within a banking organization. Similarly, the Vickers report proposes a structural, but not legal, separation between retail banking and wholesale/investment banking. The “ring-fenced” banks would take retail deposits, provide payments and services, and supply credit to households and businesses. In the U.S., the Volcker Rule under Dodd-Frank goes further by prohibiting an insured depository institution or its affiliates from engaging in “proprietary trading.” It also prohibits insured institutions from sponsoring or acquiring ownership interests in hedge funds or private equity funds.²¹ The theory is that simpler banks pose less risk to the financial system and the broader economy, because some activities are inherently more risky and because simpler organizations are easier to manage and regulate.

An important concern with the Volcker Rule, and for that matter with the Liikanen and Vickers reports, is that it is difficult to evaluate the costs and benefits. It is not clear, for example, that proprietary trading was a significant factor in the recent financial crisis. The losses that led to problems at Lehman Brothers, Bear Stearns, IndyMac, Washington Mutual and other failed institutions were mainly connected to mortgage-backed securities and real estate, rather than to losses from the kind of trading that would be targeted by the Volcker Rule.²² Nor is there clear evidence that separating commercial banking from investment banking would increase safety. Despite strong separation between the two businesses in the 1980’s under the Glass-Steagall Act, several big banks nevertheless almost failed because of bad loans in Latin America. Likewise, legions of savings-and-loans failed due to real estate loans. This suggests it is unlikely that by simply reinstating Glass-Steagall problems at big banks in the future would not occur. In a sense, it is not even easy to pinpoint the problem that the Volcker Rule would solve. This is not to say that there will be no benefits from it. It may be true that simpler institutions are less prone to excess and less likely to contribute to a future crisis. But without evidence that this is the case it seems difficult to justify reorganizing the banking industry.

Some evidence regarding trading losses might be helpful in this regard (see Barth and McCarthy, 2012). Since 1990, there have been 15 instances when traders at different firms lost at least \$1 billion (in 2011 dollars). The losses totaled nearly \$60 billion and ranged from a low of \$1.1 billion on ill-fated foreign exchange derivatives at a Japanese subsidiary of Shell Oil to a high of \$9 billion on credit default swaps at Morgan Stanley. Four of the firms were banks, two were investment banks, two were hedge funds, one was a local government, and six were manufacturing or petrochemical firms. In other words, almost half the losses were not at

²¹ The so-called Lincoln Amendment in the Dodd-Frank withholds FDIC insurance and Federal Reserve borrowing from derivatives dealers, which may force banks to establish separate affiliates in which to engage in many derivatives activities.

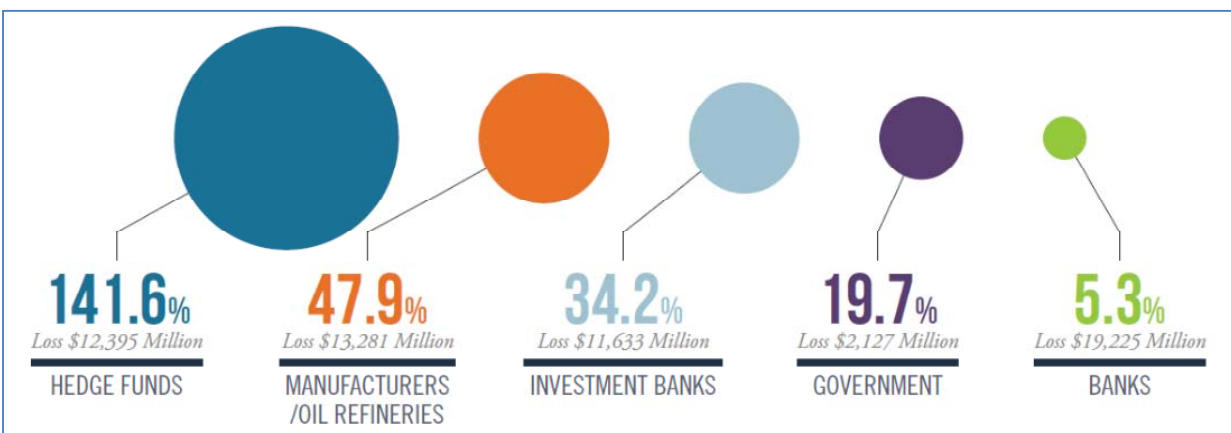
²² See Barth et al. (2009).

financial services firms but at institutions that typically use financial products for hedging purposes. Fully 26 percent of the losses occurred at manufacturing, petrochemical firms and local governments. The remaining 74 percent occurred at financial services firms – 33 percent at banks, 21 percent at hedge funds, and 20 percent at investment banks. It is quite clear that the proprietary trading problem is not limited to banks.

While the magnitude of these losses was staggering, that was only a small part of the story. A smaller trading loss that jeopardizes a firm’s entire equity capital poses a greater threat—to the institution itself, to other market participants, and (in the case of banks) to the federal deposit insurance fund and to taxpayers—than a bigger trading loss at a larger and better-capitalized firm. The latter firms are better able to sustain trading losses, and thus less likely to fail and present costs to counterparties.

Look at the same fifteen losses above in relation to the equity those institutions had at the time. As Figure 8 shows, the losses at the banks were less threatening to financial stability than those at the non-bank firms. Relative to equity, the largest losses were at non-banks. Thus, the Volcker Rule may be targeting the wrong firms. The more regulators limit banking activities, moreover, the more they are likely to create incentives for those same activities to take place at non-banking firms or offshore firms. Already there have been indications that proprietary traders are moving from banks to non-banks. Given that the hedge funds suffering major losses over the past 20 years either failed or required bailouts, this may not be a good thing for financial stability. More generally, the so-called shadow banking system may more than benefit by gaining additional business from banks as more stringent regulations curtail their size and scope of activities. In the process, however, risks may also shift from the banking industry to the shadow banking system.

Figure 8. The 15 biggest trading losses relative to equity by type of firms since 1990



Source: Barth and McCarthy (2012).

Furthermore, as noted in Swagel (2011), the Volcker Rule is likely to both reduce liquidity and increase transactions costs. That would translate into less investment, slower economic growth, and less job creation.²³ This concern is implicit in the exemption with respect to trading in Treasury securities. It is also implicit in the entreaties of domestic state and local borrowers, and of foreign governments, for similar treatment. There may be benefits to separating certain derivatives activities from bank holding companies, but there is no evidence yet. Indeed, regulators have found it difficult to implement these provisions of the Dodd–Frank Act, in part because of concerns about both the costs and benefits.

The post-crisis regulatory regime embodied in Dodd–Frank does not seek to break up big banks or to reinstitute Glass-Steagall barriers between commercial and investment banking. This perhaps reflects the observation that the failures of banks in the crisis are not well correlated with the end of the Glass-Steagall restrictions. Bear Stearns and Lehman Brothers both suffered failures but both were essentially pure investment banks. By contrast, JP Morgan Chase combined investment and commercial banking but weathered the crisis well. An alternative to Glass–Steagall-like restrictions would be for regulators to focus on activities that appear to pose particular risks, and to act more pre-emptively to head off systemic problems. This approach is embodied in the creation of the Financial Stability Oversight Council (FSOC), an umbrella group of federal regulators that is meant to watch over the entire financial system. One, however, is right to question whether this new approach will indeed be successful.²⁴

The third type of reform involves requiring banks to hold additional equity capital. This is meant to ensure that firms have a bigger buffer against losses and a greater ability to survive a crisis. More equity capital would also provide more protection for taxpayers against future bailouts. Table 6 shows the guidelines for new and more stringent capital requirements under Basel III. The guidelines for globally systemically important banks (G-SIBs) call for additional requirements, as shown in the table. The identification of the G-SIBs banks is based upon a variety of factors with weights as shown in Figure 9. In addition, the Dodd–Frank Act subjects the largest banks, defined as those with assets of \$50 billion or more, to an enhanced supervisory regime. That enhanced regime includes additional capital requirements and heightened regulatory scrutiny.

In a first, the Basel III agreement among international bank regulators calls for a minimum leverage ratio. This ratio is not risk-based, like the other capital guidelines. According to Haldane (2012, p. 19), “...the leverage ratio [should play] the frontstop role [in Basel III] given its simplicity and superior predictive performance.” He adds that “[t]he more complex the bank,

²³ The liquidity of corporate bond trading would also be limited by the proposals in the Liikanen and Vickers reports, which would increase the cost of bond financing.

²⁴ For further discussion of this and related issues, see Barth, Caprio and Levine (2012).

the stronger is this case.” Furthermore, we concur with Hoenig (2012), who states that “[a]n effective capital rule should result in a bank having capital that approximates what the market would require without the safety net in place. The measure that best achieves these goals is what I have been calling the tangible equity to tangible assets ratio.” During the U.S. financial crisis, this seemed to be the only ratio that anyone paid attention to insofar as banks in general were amply capitalized by nearly all the other capital ratios.

Table 6. Basel III: New capital guidelines and phase-in arrangements beginning January 1, 2013

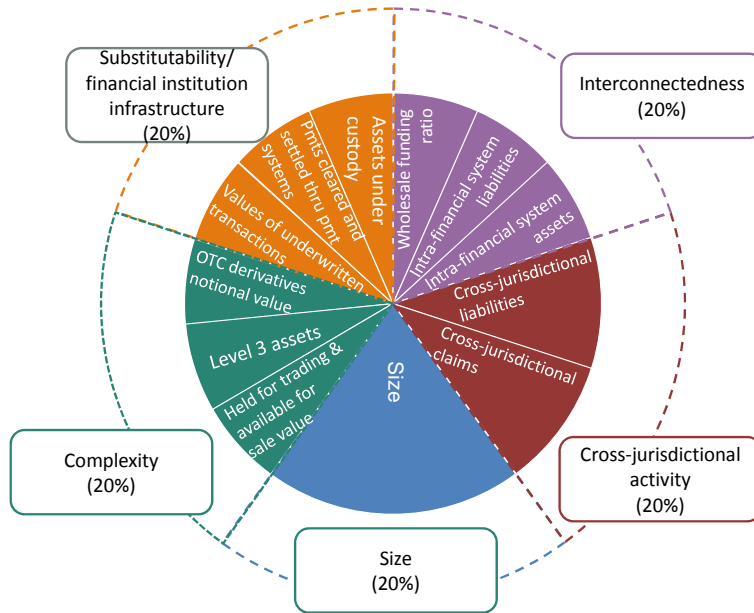
	2012 (current)	2013	2014	2015	2016	2017	2018	As of 1/1/2019
Leverage ratio	n.a.	3.5%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Min. tier 1 common equity ratio	n.a.	3.5%	4.0%	4.5%	4.5%	4.5%	4.5%	4.5%
Capital conservation buffer (CCB)	-	-	-	-	0.625%	1.25%	1.875%	2.5%
Min. tier 1 common equity plus CCB	n.a.	3.5%	4.0%	4.5%	5.125%	5.75%	6.375%	7.0%
Min. Tier 1 capital ratio	4.0%	4.5%	5.5%	6.0%	6.0%	6.0%	6.0%	6.0%
Min. Tier 1 capital plus CCB	4.0%	4.5%	5.5%	6.0%	6.625%	7.25%	7.875%	8.5%
Min. Total capital ratio	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
Min. Total capital ratio plus CCB	8.0%	8.0%	8.0%	8.0%	8.625%	9.25%	9.875%	10.5%
Countercyclical buffer (discretionary) ⁽¹⁾	-	Up to 2.5%						
Surcharge for global SIBs ⁽²⁾	-	-	-	-	1.0-2.5% (In theory: 0-3.5%)			

Note: (1) Only applies to “Advanced Approaches Banking Organizations” (i.e., U.S. banking organizations with \$250 billion or more in consolidated total assets or \$10 billion or more in consolidated total on-balance sheet foreign exposure). “The countercyclical capital buffer amount in the U.S. would initially be set to zero, but it could increase if the agencies determine that there is excessive credit in the markets, possibly leading to subsequent wide-spread market failures.”

(2) “The Basel Committee on Banking Supervision (BCBS) is calibrating a methodology for assessing an additional capital surcharge for global systemically important banks. The Federal Reserve Board intends to propose a quantitative risk-based capital surcharge in the United States based on the BCBS approach and consistent with the BCBS’s implementation timeframe. The forthcoming proposal would contemplate adopting implementing rules in 2014, and requiring G–SIBs to meet the capital surcharges on a phased-in basis from 2016–2019.”

Sources: BIS, U.S. Federal Reserve, Barth, Caprio and Levine (2012), Davis Polk & Wardwell LP, Credit Suisse.

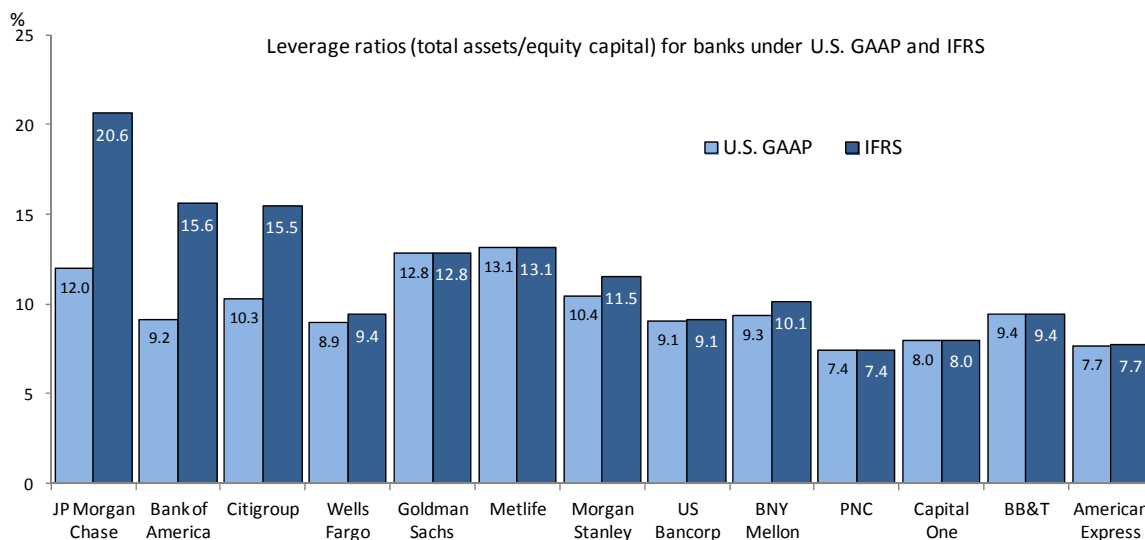
Figure 9. Factors used to identify globally systemically important banks



Sources: Financial Stability Board (2011) and Milken Institute.

It is useful to consider the impact of the leverage ratio on the 15 biggest U.S. banks when total assets are calculated with derivatives reported on a gross rather than net basis. Figure 10 shows there is a substantial difference in the amount of assets per dollar of equity – the leverage -- depending on which method is used to measure derivatives. Using U.S. GAAP, JP Morgan Chase’s equity capital would be wiped out if it suffered an 8.3 percent decline in assets. But under IFRS, its equity capital would be wiped out by a mere 4.9 percent decline in assets. Similar calculations but with slightly smaller impacts apply to Bank of America and Citigroup. Once again, this demonstrates the importance of the accounting treatment of derivatives. Although no official decision has been made, it seems likely that the Basel III leverage ratio will be based on net derivatives, as in Basel II.

Figure 10. Impact of the treatment of derivatives on the leverage ratios for the U.S. 15 biggest banks



Sources: BankScope, Bloomberg, annual reports, and Milken Institute.

Additional capital requirements for big or systemically important banks provide an incentive against size (and perhaps also against complexity or interconnectedness). These might also be seen as an “incentive” that offsets the possible funding advantages of big banks—a disincentive for size, but not a blunt restriction along the lines of the Volcker Rule or the recommendations of the Liikanen and Vickers reports. If a big bank failure imposes costs on society, additional capital charges could also be used to correct for the latent negative externality, though in this case the implicit revenue from the tax accrues to private suppliers of capital rather than to the government.

As already noted, it should be kept in mind that big banks provide benefits as well as costs to society, a point discussed by the Clearing House Association (2011) and by Swagel (2011). Moreover, the capital charge, as usual with a tax, results in a deadweight loss in the form of reduced lending and economic activity. The quantitative importance of this impact remains a subject of considerable debate. Admati et al. (2010) see little negative impact of higher capital requirements. But Kashyap, Stein, and Hanson (2010) see a meaningful impact on bank funding costs during the transition period as banks raise additional equity capital, and then a modest ongoing impact. Research by regulators points to modest impacts, while banks and their associations point to greater impacts. In the wake of the recent crisis, it is certain that big banks will hold more capital, both at the insistence of regulators and of their own volition. Given the considerable changes in the banking industry and its more stringent regulation, the ongoing impacts of higher capital standards will be understood only over time.

The fourth type of reform involves changes to the framework for dealing with the collapse of big or systemically important banks. There are two motivations behind such policies: first, to better ensure the stability of the system; second, to alert market participants that banks are more likely to be allowed to fail and that creditors will be forced to take losses. That awareness may help remove advantages that big banks have previously enjoyed by being perceived as too big to fail.

The Dodd-Frank Act requires banks to devise their own “living wills,” or plans for an orderly shut-down if they begin to fail. This could prove to be a symbolic step, because no one knows how or if the plans will work in the event of an actual crisis. Even so, however, the preparation of a living will may provide an additional signal that regulators will let banks collapse rather than bail them out in the future.

The new orderly liquidation authority in the Dodd–Frank Act could fundamentally change the way in which failures at big banks are resolved.²⁵ As noted earlier, it could also have profound impacts on the cost of funding for big, complex banks. Bondholders and other creditors are now more likely to incur losses if a bank fails, even though the Act allows for the deployment of government resources to support a bank and slow its demise through the Orderly Liquidation Fund. Absent additional Congressional action (which is now hard to imagine, given the unpopularity of the Trouble Asset Relief Program, TARP), in the case of a future failure of a big bank that involves the resolution of the holding company beyond simply the insured depository institutions, bondholders will incur losses.

While it is difficult to predict how the new resolution authority will be used, it seems likely that FDIC would initially deploy public funds to prevent a repeat of the crisis that followed the collapse of Lehman Brothers. The FDIC might then use its new authority to arrange a debt-for-equity swap that recapitalizes the failing bank, turning the former bondholders into the new owners. Such a debt-for-equity recapitalization would be similar to a pre-packaged Chapter 11 reorganization under the bankruptcy code, but the new authority would allow this to be done faster and with government providing the equivalent of debtor-in-possession financing. Losses to the government would be borne by bondholders. The resolution authority provides government officials with an open checkbook to act through the troubled bank, with bondholders picking up the tab. It seeks to narrow the FDIC’s scope of action by guaranteeing bondholders that they will receive as much through the resolution as they would have through a bankruptcy.

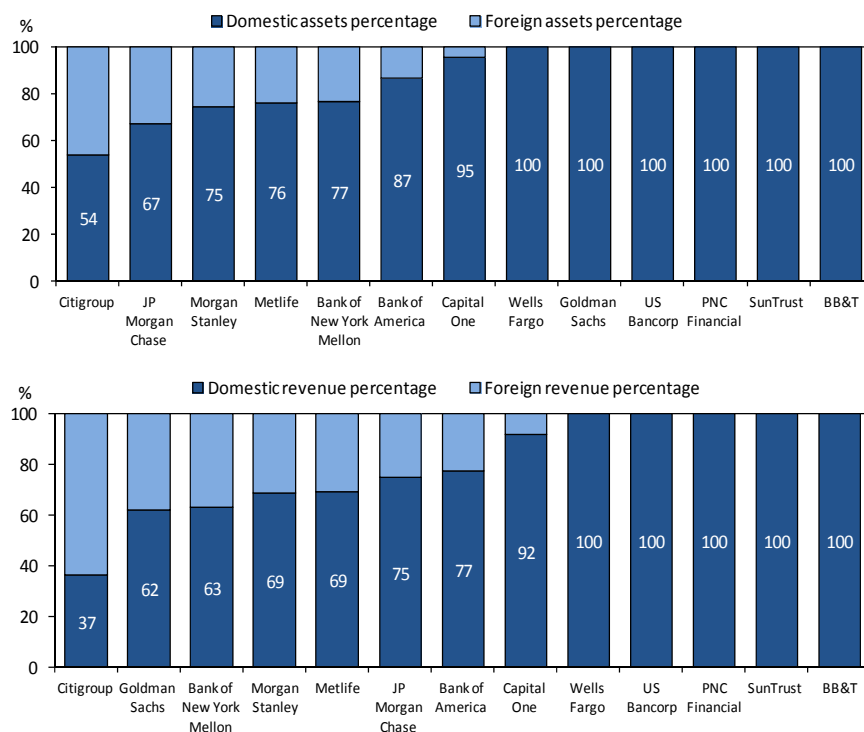
The possibility of having such a swap imposed on them should affect the terms under which potential creditors, such as bond buyers, are willing to provide funding to banks that might be

²⁵ For a discussion of resolution procedures in other countries, see Wihlborg (2012).

put through a resolution. One risk is that the new resolution authority could give providers of funding an incentive to flee at first hint of trouble. The threat of such bank runs is an important disciplining device, but it could also lead to more hair-trigger responses and inadvertently prove destabilizing.

Either way, however, the resolution authority will be incomplete and perhaps unworkable until there is more international coordination of bankruptcy regimes. In the case of Lehman’s failure, for example, the U.K. bankruptcy regime disrupted the operations of many U.S.-based firms when it froze their overseas assets. Figure 11 shows the degree to which the biggest U.S. banks work broadly across the global financial system.²⁶ Of the 13 U.S. banks on our list for which information is available, seven have foreign assets. Among the latter banks, Citigroup has the largest share of foreign assets at 46 percent, while Capital One has the smallest share at 4.5 percent. (Similar data are presented in the figure for revenue).²⁷

Figure 11. Domestic versus foreign assets and revenue of the U.S. biggest banks



Note: The ratios of assets for JP Morgan Chase, Citigroup, and Goldman Sachs only refer to the FDIC-insured subsidiaries of the holding companies. The other ratios refer to the holding companies. The ratios of revenue are for holding companies. Citigroup’s domestic revenue is unavailable, so its North American revenue is used instead.

²⁶ Appendix 5 provides information on the number of domestic and foreign subsidiaries as well as the number of host countries of the world’s 100 biggest banks. Nearly all the banks have operations abroad.

²⁷ To repeat an earlier point, to the extent that any limits on asset size adversely affect foreign assets, there may be a cost in terms of geographical diversification. The ability of banks to service their customers that operate more globally may also be curtailed in this case.

International coordination of regulatory regimes for both normal times and during resolution or bankruptcy procedures will be crucial for the continued evolution of the global financial system.²⁸ As Brummer (2012, p. 250) points out, “In the absence of detailed, prescriptive global standards, national regulators enjoy considerable discretion with regard to their local approaches. In practice, such flexibility means any one country’s efforts to deal with the problem can potentially be undercut by another country’s inaction.”

The fifth type of reform is a combination of the first four approaches as well as other factors. This includes a provision of the Dodd-Frank Act requiring the Federal Reserve to impose more stringent liquidity standards on the largest bank holding companies. It also includes the use of regular stress tests with the goal to provide better information for regulators and market participants, which in turn will have an impact on bank behavior. While this will not directly address the potential for banks to become too big to fail, such information and the resulting incentives could help affect behavior in a way that makes it less likely that future failures will transpire. In addition, other factors that the 26 countries hosting the world’s 100 biggest banks are relying on to address the TBTF problem are provided in Tables 7 and 8. As the tables show, there is no uniformity among the countries. Some supervise systemically important institutions differently from non-systemic ones, and the countries rely on different factors to assess systemic risks. Some countries have established a specialized department to deal with financial stability and systemic supervision, while others have not. Not all countries have the same tools to oversee and/or limit the activities of large/interconnected institutions. Tracking these differences will provide valuable information about which approaches work best in preventing and mitigating future crises. Unfortunately, it will take a future crisis to make a real assessment.

²⁸ See, for example, Prabha and Wihlborg (2012) for a discussion of this issue as it relates to global bank organizational structure.

Table 7. Information on regulations for too big to fail banks, by country

Country	Do you supervise systemic institutions in a different way than non systemic ones?	If yes, do you have any tools to oversee more closely and/or limit the activities of large/interconnected institutions?								
		Additional capital requirements	Additional liquidity requirements	Asset/risk diversification requirements	Restrictions/limits on activities	Restrictions/limits on size of institution	Additional corporate taxes for large institutions	Closer or more frequent supervision	Restrictions on the group's legal structure	Other
Australia	Yes	No	No	No	No	No	No	Yes	No	No
Austria	Yes	No	No	No	---	No	Yes	Yes	No	No
Belgium	Yes	Yes	No	No	Yes	No	No	Yes	No	Yes ^a
Brazil	Yes	No	No	No	No	No	No	Yes	No	Yes ^b
Canada	No	---	---	---	---	---	---	---	---	---
China	Yes	Yes	Yes	Yes	---	---	---	Yes	---	---
Denmark	Yes	No	No	No	No	No	No	Yes	No	No
France	Yes	No	No	No	No	No	Yes	Yes	No	No
Germany	---	---	---	---	---	---	---	---	---	---
India	Yes	No	No	No	No	No	No	No	No	No ^c
Ireland	Yes	Yes	Yes	No	No	Yes	No	Yes	No	---
Italy	Yes	Yes	No	Yes	Yes	No	No	Yes	No	---
Korea, Rep.	No	---	---	---	---	---	---	---	---	---
Malaysia	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes ^e
Netherlands	Yes	No	No	No	No	No	No	Yes	No	No
Norway	Yes	Yes	No	Yes	Yes	No	No	Yes	No	No
Russia	Yes	No	No	No	No	No	No	Yes	No	No
Singapore	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
South Africa	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No ^f
Spain	Yes	No	No	No	No	No	No	Yes	No	Yes ^g
Taiwan	No	---	---	---	---	---	---	---	---	---
Switzerland	No	---	---	---	---	---	---	---	---	---
United Kingdom	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	---
United States	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes

^a Assessment of business plan.

^b Dedicated supervisory teams - Usually a group of examiners, headed by a supervisor, is responsible for a group of Brazilian banks. In the case of systemic banks, The Central Bank of Brazil has decided to associate each financial conglomerate to a group of examiners and a dedicated supervisor.

^c Close monitoring through off-site financial conglomerates returns.

^d The current framework does not provide for a special regulatory regime for systemically important institutions. In accordance with the proportionality principle - which guides the whole supervisory activity - large and important banks (and banking groups) are subject to a more intensive supervision.

^e Requirements to obtain the Bank's approval prior to declaring dividend and bonus by financial institutions.

^f Large/interconnected banks are supervised in terms of Basel II. In terms of the supervisory review and evaluation process (SREP), all banks in the sector are risk graded according to high, medium or low risk. The supervisory cycle will be adapted to 12, 18 or 24 months based on the risk classification. Large/interconnected banks are graded as high risk and, as a result, subject to more intensive supervision.

^g They are subject to more intense reporting requirements and ad-hoc demand for information, including periodical internal management reports.

Source: World Bank Survey IV, September 2012.

Table 8. Information on factors considered for too big to fail banks, by country

Country	Is there a specialized department in your agency dealing with financial stability and systemic supervision?	Which of the following factors do you consider in assessing systemic risk?											
		Bank capital ratios	Bank leverage ratios	Bank profitability ratios	Bank liquidity ratios	Growth in bank credit	Sectoral composition of bank loan portfolios	FX position of banks	Bank non-performing loan ratios	Bank provisioning ratios	Stock market prices	Housing prices	Other
Australia	No	X	X	X	X	X	X	X	X	X	X	X	X ^a
Austria	Yes	X	X	X	X	X	X	X	X	X	X	X	---
Belgium	Yes	X	X	X	X	X	X	X	X	X	---	X	---
Brazil	Yes	X	X	X	X	X	X	X	X	X	X	---	X ^b
Canada	Yes	X	X	X	X	X	X	X	X	X	X	X	X ^c
China	---	---	---	---	---	---	---	---	---	---	---	---	---
Denmark	No	X	X	X	X	X	X	---	X	X	---	---	---
France	Yes	---	---	---	---	---	---	---	---	---	---	---	X ^d
Germany	---	---	---	---	---	---	---	---	---	---	---	---	---
India	Yes	X	X	X	X	X	X	X	X	X	X	X	---
Ireland	Yes	---	---	---	---	---	---	---	---	---	---	---	X ^e
Italy	No	X	X	X	X	X	X	---	X	X	X	X	---
Korea, Rep.	No	---	---	---	---	---	---	---	---	---	---	---	---
Malaysia	Yes	---	---	---	---	---	---	---	---	---	---	---	X ^f
Netherlands	Yes	X	X	X	X	X	X	X	X	X	X	X	---
Norway	No	X	---	---	X	X	X	---	X	---	X	X	---
Russia	Yes	X	---	X	X	---	---	X	X	X	X	X	---
Singapore	Yes	X	X	X	X	X	X	X	X	X	X	X	X ^g
South Africa	Yes	X	X	X	X	X	---	X	X	---	---	---	X ^h
Spain	Yes	X	X	X	X	X	X	---	X	X	X	X	X ⁱ
Switzerland	No	X	X	---	X	X	---	---	X	---	---	X	---
Taiwan	No	---	---	---	---	---	---	---	X	---	---	---	---
United Kingdom	Yes	X	X	X	X	X	X	X	X	X	X	X	---
United States	No	X	X	X	X	X	X	X	X	X	X	X	X ^j

^a All of the above and much more, depending on industry risk profiles.

^b The Central Bank of Brazil also considers the following factors: open market positions, gold positions, fixed income positions, reserve requirements positions at the Central Bank of Brazil.

^c Interconnectivity across FRFI's. Central Bank opinion.

^d Comprehensive approach based on multiple indicators.

^e The Central Bank would use a number of the above factors in assessing systemic risks. This is currently being enhanced.

^f 1. Key financial soundness indicators for insurance/takaful sector; 2. Household and business sector financial position, indebtedness and debt repayment/leverage capacity, including payment arrears exposures and interbank rates; 3. Contagion effects (arising from linkages between financial and non-financial sectors, markets, infrastructure and institutions, including cross border linkages); 4. Capital flow indicators; 5. External assets and liabilities of Financial Institutions and non-Financial Institutions

^g All market risk positions (not just FX positions) of banks, household and corporate leverage ratios, geographic composition of bank portfolios, bank credit concentration risks, bank contingent liabilities, net private capital flows.

^h Household indebtedness and credit standing of consumers, corporate sector strength and activity, financial strength and regulatory compliance of non-bank financial sector, financial market trends, external vulnerabilities (e.g foreign debt ratios, reserves ratios, exchange rate pressures).

ⁱ All previous factors are considered (with the exception of FX position in banks) as well as others (sovereign spreads, macroeconomic variables)

^j We consider numerous factors and not just one.

Source: World Bank Survey IV, September 2012.

It's important to note, however, that some regulators and experts would take a much more direct approach on too big to fail: simply break up the big banks.²⁹ Johnson and Kwak (2010, p. 208), for example, state that "...do not allow financial institutions to be too big to fail; break up the ones that are." However, others disagree. For example, Krugman (2010) states that:

Breaking up big banks wouldn't really solve our problems, because it's perfectly possible to have a financial crisis that mainly takes the form of a run on smaller institutions. In fact, that's precisely what happened in the 1930s, when most of the banks that collapsed were relatively small — small enough that the Federal Reserve believed that it was O.K. to let them fail. As it turned out, the Fed was dead wrong: the wave of small-bank failures was a catastrophe for the wider economy. The same would be true today. Breaking up big financial institutions wouldn't prevent future crises, nor would it eliminate the need for bailouts when those crises happen. The next bailout wouldn't be concentrated on a few big companies — but it would be a bailout all the same. I don't have any love for financial giants, but I just don't believe that breaking them up solves the key problem.

The fact that these and other distinguished individuals do not agree on whether the TBTF problem can be solved by breaking up the big banks suggests that one should be cautious about adopting such an approach without evidence regarding its benefits and costs. In this regard, Scott (2010, p. 20) states that "...the surprising fact is that we do not know whether larger institutions pose greater systemic risk and, if so, whether that increase is significant."³⁰ Moreover, breaking up big banks seems to be based on the assumption that such banks per se caused the financial crises in the United States and other countries, and therefore will cause future crises, despite other reforms being implemented. Yet, in the case of the United States, Gorton and Metrick (2012, p.150) point out that:

One strong similarity to history comes in the acceleration of system-wide leverage just before the crisis, the strongest predictor of crises in the past two centuries. Furthermore, the recent crisis was preceded by rapid increases in housing prices, also a feature of all major crises since World War II. At this macro level, the pattern (but not the scale) of our crisis is very ordinary.

The crisis was exacerbated by panics in the banking system, where various types of short-term debt suddenly became subject to runs. This, also, was a typical part of historical crises. The novelty here was in the location of runs, which took place mostly in the new evolving 'shadow banking' system, including money-market mutual funds, commercial paper, securitized bonds, and repurchase agreements. This new source of systemic vulnerability came as a surprise to policymakers and economists, and some knowledge of its details is necessary for understanding the contagion that eventually spread to the real economy.

²⁹ This is not a replacement for other reforms discussed earlier but in addition to these reforms.

³⁰ Also, see the discussion by Calomiris (2009) and Wallison (2012).

Summary and Conclusion

That some banks are too big to fail is not new. Neither is the challenge for policymakers to implement reforms that eliminate the need to bail out big banks. The regulatory regimes for big banks in many countries are undergoing changes from those that prevailed before the global financial crisis. Banks will now be required to hold more capital, have more robust access to liquidity, undergo increased regulatory scrutiny, and face restrictions on certain activities. In the United States and in other countries, many of these changes are still evolving as some reforms are being implemented and proposals for additional reforms are still being evaluated.

We share the concern of individuals who believe that these reform efforts may fall short of solving the too big to fail problem. Some, therefore, recommend that the most definitive solution to the problem is to break up the big banks. However, there does not appear to be any agreement on how big is too big or how big banks should be broken up. Big banks do pose considerable power that may be used to influence the regulatory authorities to pursue policies that increase the risk of a systemic crisis. The regulatory authorities, moreover, may also pursue such policies based upon a bias in favor of banks. Yet, despite these legitimate concerns, there is far too little evidence on the costs and benefits of breaking up big banks. In the absence of that evidence, policymakers may simply have to monitor the incremental reforms they have already begun to implement and make adjustments as the results come in. Barth, Caprio and Levine (2012) point out that given the poor past performance of the regulatory authorities, it may also be prudent to establish procedures to hold them more accountable for achieving stability in the future.

References

Admati, A.R., P.M. DeMarzo, M.F. Hellwig, and P. Pfleiderer, "Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity Is Not Expensive," Stanford GSB Research Paper No. 2063, September 2010.

Ayadi, R., E. Arbak, and W.P. De Groen, 2012, *Regulation of European Banks and Business Models: Towards a New Paradigm?*, Center for European Policy Studies.

Barth, J.R., G. Caprio, and R. Levine, *Rethinking Bank Regulation: Till Angels Govern*. Cambridge University Press, 2006.

Barth, J.R., G. Caprio, and R. Levine, *Guardians of Finance: Making Regulators Work for Us*, MIT Press, 2012.

Barth, J.R., T. Li, W. Lu, T. Phumiwasana, and G. Yago, *The Rise and Fall of the U.S. Mortgage and Credit Markets: A Comprehensive Analysis of the Meltdown*, John Wiley & Sons, 2009.

Barth, J.R., A.P. Prabha, and P. Swagel, "Just How Big is the Too Big to Fail Problem?" *Journal of Banking Regulation*, 13, 2012, pages 265–299.

Barth, J.R., T. Li, A.P. Prabha, Y. Chiang, and L. Li, "Industrial Loan Companies: Where Banking and Commerce Meet," *Financial Markets, Institutions & Instruments*, 21(1), 2012, pages 1-69.

Barth, J.R., and D. McCarthy, "Trading Losses: A Little Perspective on a Large Problem," Milken Institute, November 2012.

Basel Committee on Banking Supervision, "Global Systemically Important Banks: Assessment Methodology and the Additional Loss Absorbency Requirement," Bank of International Settlements, November 2011.

Brummer, C., *Soft Law and the Global Financial System: Rule Making in the 21st Century*. Cambridge University Press, 2012.

Calomiris, C., "In the World of Banks, Bigger Can Be Better," *Wall Street Journal*, October 19, 2009.

Clearing House Association, "Understanding the Economics of Large Banks," November 2011. <http://www.theclearinghouse.org/index.html?f=073071>.

Dermine, J., and D. Schoenmaker, "In Banking: Is Small Beautiful?" *Financial Markets, Institutions & Instruments* 19, 2010, pages 1-19.

Financial Stability Board, "Update of group of globally systemically important banks," November 1, 2012. http://www.financialstabilityboard.org/publications/r_121031ac.pdf.

Fischer, R.W., "Taming the Too-Big-to-Fails: Will Dodd–Frank Be the Ticket or Is Lap-Band Surgery Required?" Remarks before Columbia University's Politics and Business Club, New York City, November 15, 2011. <http://dallasfed.org/news/speeches/fisher/2011/fs111115.cfm>.

Fisher, R.W., and H. Rosenblum, , "How Huge Banks Threaten the Economy," *Wall Street Journal*, April 4, 2012.

Gorton, G., and A. Metrick, "Getting Up to Speed on the Financial Crisis: A One-Weekend-Reader's Guide," *Journal of Economic Literature*, 50(1), 2012, pp. 128-150.

Haldane, A.G., "The Dog and the Frisbee," Bank of England, August 2012.

High-level Expert Group on reforming the structure of the EU banking sector (Liikanen report), Brussels, October 2, 2012.

Hoening, T.M., "Back to Basics: A Better Alternative to Basel Capital Rules," Speech to the American Banker Regulatory Symposium, Washington, D.C., September 14, 2012. http://www.fdic.gov/news/news/speeches/chairman/spsep1412_2.html.

Houston, J.F., C. Lin, and Y. Ma, "Regulatory Arbitrage and International Bank Flows," *Journal of Finance*, 67(5), 2012, pp. 1845-1895.

Hughes, J.P., and L.J. Mester, "Who Said Large Banks Don't Experience Scale Economies? Evidence from a Risk-Return-Driven Cost Function," *Working Papers No. 11-27*, 2011, Federal Reserve Bank of Philadelphia.

Independent Commission on Banking, Final Report Recommendations (Vickers report), September 2011.

International Swaps and Derivatives Association (ISDA), "Netting and Offsetting: Reporting derivatives under U.S. GAAP and under IFRS," May 2012.

Johnson, S., "Too-Big-To-Fail Not Fixed, Despite Dodd–Frank" , *Bloomberg*, October 10, 2011. <http://www.bloomberg.com/news/2011-10-10/too-big-to-fail-not-fixed-despite-dodd-frank-commentary-by-simon-johnson.html>.

Johnson, S., and J. Kwak, *13 Bankers: The Wall Street Takeover and the Next Financial Meltdown*, New York: Pantheon, 2010.

Kashyap, A.K., J.C. Stein, and S. Hanson, "An Analysis of the Impact of 'Substantially Heightened' Capital Requirements on Large Financial Institutions," Harvard University mimeo, May 2010.

Kaufman, G., "Too Big to Fail in Banking: What Remains?" *The Quarterly Review of Economics and Finance*, 42, 2002.

Kaufman, G., "Too Big To Fail: What Does It Mean?" Mimeo, 2012.

King, M., Speech at the Lord Mayor's Banquet for Bankers and Merchants of the City of London at the Mansion House, Bank of England, June 17, 2009.

Krugman, P., "Too Big to Fail Fail?" *New York Times*, June 18, 2009.
<http://krugman.blogs.nytimes.com/2009/06/18/too-big-to-fail-fail>.

Krugman, P., "Financial Reform 101," *New York Times*, April 1, 2010.

Prabha, A., and C. Wihlborg, "Cross-Border Banking in Subsidiaries and Branches; Organization, Supervision and Resolution," *Encyclopedia of Financial Globalization*, edited by Gerard Caprio, Elsevier, 2012.

Prabha, A., T.D. Willett, and C. Wihlborg, "Market Discipline for Financial Institutions and Markets for Information," in James R. Barth, Chen Lin and Clas Wihlborg (eds.), *International Research Handbook on Banking and Governance*, Edward Elgar Publishing, 2012, pp. 239-269.

Saunders, A., and I. Walter, "Financial Architecture, Systemic Risk, and Universal Banking," *Financial Markets and Portfolio Management*, Volume 24, No. 1, edited by Markus Schmid, Springer, March 2010.

Scott, H., Prepared Written Testimony Before The Committee on Banking, Housing And Urban Affairs United States Senate, February 4, 2010.

Shull, B., "Too Big to Fail in Financial Crisis: Motives, Countermeasures, and Prospects," *Levy Economics Institute of Brad College Working Paper No. 601*, 2010.

Swagel, P., "Enhanced Supervision: A New Regime for Regulating Large, Complex Financial Institutions," Testimony on large complex financial institutions, Senate Banking Committee, December 7, 2011.

Tarullo, D. K., "Financial Stability Regulation," Remarks at University of Pennsylvania Law School, Distinguished Jurist Lecture, Philadelphia, PA, October 10, 2012.

Wallison, P.J., "Breaking Up the Big Banks: Is Anybody Thinking?" American Enterprise Institute for Public Policy Research, August-September 2012.

Wheelock, D. C., and P.W. Wilson, "Do Large Banks Have Lower Costs? New Estimates of Returns to Scale for U.S. Banks," *Journal of Money, Credit, and Banking*, 44(1), 2012, pp. 171-199.

Wihlborg, C., "Developing Distress Resolution Procedures for Financial Institution," *SUERF Studies*, The European Money and Finance Forum, forthcoming.

Appendixes

Appendix 1. The world's 100 biggest banks: Size relative to banking system assets and GDP, Q2 2012

	Bank	Country	Total Assets (\$billions)	Total assets (% country publicly-traded bank assets)	Total assets (% country GDP)	Cumulative Assets (% world publicly-traded bank assets)	Cumulative Assets (% world GDP)
1	Deutsche Bank	Germany	2,822	76.9	81.1	2.8	3.9
2	Mitsubishi UFJ Financial Group	Japan	2,708	31.3	45.3	5.6	7.7
3	Industrial & Commercial Bank of China	China	2,699	21.9	33.8	8.3	11.4
4	HSBC	United Kingdom	2,652	27.8	108.1	11.0	15.1
5	Barclays	United Kingdom	2,545	26.7	103.8	13.5	18.7
6	BNP Paribas	France	2,480	39.3	91.5	16.0	22.1
7	JP Morgan Chase & Co.	United States	2,290	19.0	14.7	18.3	25.3
8	Crédit Agricole S.A.	France	2,269	35.9	83.7	20.6	28.5
9	Royal Bank of Scotland Group	United Kingdom	2,208	23.2	90.0	22.9	31.5
10	Bank of America Corp.	United States	2,161	17.9	13.8	25.0	34.5
11	China Construction Bank Corp.	China	2,135	17.4	26.7	27.2	37.5
12	Agricultural Bank of China	China	2,040	16.6	25.5	29.2	40.4
13	Mizuho Financial Group	Japan	2,034	23.5	34.0	31.3	43.2
14	Bank of China	China	2,028	16.5	25.4	33.3	46.0
15	Citigroup	United States	1,916	15.9	12.3	35.3	48.7
16	Sumitomo Mitsui Financial Group	Japan	1,598	18.4	26.7	36.9	50.9
17	Banco Santander S.A.	Spain	1,627	50.7	116.4	38.5	53.2
18	Société Générale	France	1,570	24.8	57.9	40.1	55.3
19	ING	Netherlands	1,558	90.2	194.2	41.7	57.5
20	Lloyds Banking Group	United Kingdom	1,500	15.7	61.2	43.2	59.6
21	UBS	Switzerland	1,478	57.5	238.0	44.7	61.6
22	Wells Fargo & Co.	United States	1,336	11.1	8.6	46.0	63.5
23	UniCredit	Italy	1,202	45.0	58.2	47.2	65.2
24	Credit Suisse Group	Switzerland	1,092	42.5	175.9	48.3	66.7
25	Goldman Sachs	United States	949	7.9	6.1	49.3	68.0
26	Nordea Bank	Sweden	892	47.9	162.4	50.2	69.3
27	Commerzbank	Germany	847	23.1	24.3	51.1	70.4
28	Intesa Sanpaolo	Italy	839	31.4	40.6	51.9	71.6
29	Metlife	United States	825	6.8	5.3	52.7	72.7
30	Bank of Communications	China	815	6.6	10.2	53.6	73.9
31	Royal Bank of Canada	Canada	810	24.1	44.9	54.4	75.0
32	National Australia Bank	Australia	787	26.4	49.6	55.2	76.1
33	Banco Bilbao Vizcaya Argentaria S.A.	Spain	784	24.4	56.1	56.0	77.2
34	Toronto Dominion Bank	Canada	782	23.3	43.3	56.7	78.3
35	Morgan Stanley	United States	749	6.2	4.8	57.5	79.3
36	Commonwealth Bank of Australia	Australia	717	24.1	45.2	58.2	80.3
37	Westpac Banking Corp.	Australia	680	22.9	42.9	58.9	81.3
38	Bank of Nova Scotia	Canada	667	19.9	37.0	59.6	82.2
39	Australia and New Zealand Banking Group	Australia	627	21.1	39.6	60.2	83.1
40	Standard Chartered	United Kingdom	624	6.6	25.5	60.8	83.9
41	Danske Bank	Denmark	590	100.0	183.6	61.4	84.8
42	Bank of Montreal	Canada	532	15.8	29.5	62.0	85.5
43	China Merchants Bank	China	525	4.3	6.6	62.5	86.2
44	Banco do Brasil S.A.	Brazil	520	38.1	21.2	63.0	86.9
45	Dexia	Belgium	518	59.0	104.2	63.5	87.7
46	Resona Holdings	Japan	517	6.0	8.6	64.1	88.4
47	Shanghai Pudong Development Bank	China	480	3.9	6.0	64.5	89.1
48	China CITIC Bank Corp.	China	461	3.7	5.8	65.0	89.7
49	Nomura Holdings	Japan	445	5.1	7.4	65.5	90.3
50	Itau Unibanco Holdings	Brazil	440	32.2	18.0	65.9	90.9
51	Sumitomo Mitsui Trust Holdings	Japan	424	4.9	7.1	66.3	91.5
52	China Minsheng Banking Corp.	China	410	3.3	5.1	66.7	92.1

	Bank	Country	Total Assets (\$billions)	Total assets (% country publicly-traded bank assets)	Total assets (% country GDP)	Cumulative Assets (% world publicly-traded bank assets)	Cumulative Assets (% world GDP)
53	Shinkin Central Bank	Japan	402	4.6	6.7	67.2	92.6
54	DnB ASA	Norway	397	100.0	79.1	67.6	93.2
55	Canadian Imperial Bank of Commerce	Canada	392	11.7	21.7	67.9	93.7
56	Bankia S.A.	Spain	392	12.2	28.0	68.3	94.3
57	Banco Bradesco S.A.	Brazil	406	29.7	16.6	68.8	94.9
58	Sberbank of Russia	Russia	379	64.5	18.7	69.1	95.4
59	Svenska Handelsbanken	Sweden	365	19.6	66.5	69.5	95.9
60	KBC	Belgium	360	41.0	72.4	69.9	96.4
61	State Bank of India	India	369	100.0	20.7	70.2	96.9
62	US Bancorp	United States	353	2.9	2.3	70.6	97.4
63	Skandinaviska Enskilda Banken	Sweden	341	18.3	62.0	70.9	97.9
64	China Everbright Bank	China	331	2.7	4.1	71.3	98.3
65	Bank of New York Mellon Corp.	United States	330	2.7	2.1	71.6	98.8
66	PNC Financial Services Group	United States	300	2.5	1.9	71.9	99.2
67	Capital One Financial Corp.	United States	297	2.5	1.9	72.2	99.6
68	Banca Monte dei Paschi di Siena	Italy	292	10.9	14.1	72.5	100.0
69	Woori Finance Holdings	Korea	278	28.8	23.9	72.8	100.4
70	DBS Group Holdings	Singapore	277	40.3	102.6	73.1	100.8
71	Erste Group Bank	Austria	271	58.5	66.1	73.3	101.2
72	Swedbank	Sweden	263	14.1	47.9	73.6	101.5
73	Shinhan Financial Group	Korea	259	26.8	22.3	73.9	101.9
74	Hana Financial Group	Korea	257	26.6	22.1	74.1	102.3
75	Oversea-Chinese Banking Corp.	Singapore	227	32.9	83.9	74.3	102.6
76	Daiwa Securities Group	Japan	225	2.6	3.8	74.6	102.9
77	Banco de Sabadell S.A.	Spain	210	6.5	15.0	74.8	103.2
78	VTB Bank	Russia	209	35.5	10.3	75.0	103.5
79	State Street Corporation	United States	201	1.7	1.3	75.2	103.7
80	Ping An Bank	China	200	1.6	2.5	75.4	104.0
81	Banco Popular Espanol S.A.	Spain	199	6.2	14.3	75.6	104.3
82	Bank of Ireland	Ireland	199	54.9	94.8	75.8	104.6
83	Raiffeisen Bank International	Austria	192	41.5	46.9	76.0	104.8
84	Standard Bank Group	South Africa	188	100.0	44.8	76.2	105.1
85	Cathay Financial Holdings	Taiwan	186	100.0	38.6	76.4	105.4
86	United Overseas Bank	Singapore	185	26.8	68.4	76.6	105.6
87	National Bank of Canada	Canada	179	5.3	9.9	76.7	105.9
88	BB&T Corp.	United States	179	1.5	1.1	76.9	106.1
89	SunTrust Bank	United States	178	1.5	1.1	77.1	106.4
90	Bank of Beijing	China	174	1.4	2.2	77.3	106.6
91	Industrial Bank of Korea	Korea	173	17.9	14.8	77.4	106.8
92	SNS Reaal	Netherlands	169	9.8	21.1	77.6	107.1
93	Banco Popolare	Italy	168	6.3	8.1	77.8	107.3
94	UBI Banca	Italy	168	6.3	8.1	78.0	107.5
95	Macquarie Group	Australia	164	5.5	10.4	78.1	107.8
96	Allied Irish Banks plc	Ireland	163	45.1	78.0	78.3	108.0
97	Fukuoka Financial Group	Japan	161	1.9	2.7	78.4	108.2
98	Malayan Banking Berhad	Malaysia	154	100.0	50.5	78.6	108.4
99	Bank of Yokohama	Japan	152	1.8	2.5	78.8	108.7
100	American Express	United States	148	1.2	0.9	78.9	108.9

Note: Total assets are based on the individual countries' accounting policies. Total assets from previous quarter are used if the most recent quarterly data are not available.

Sources: BankScope, International Monetary Fund, and Milken Institute.

Appendix 2. The world's 100 biggest banks: Equity capital, tangible common equity, and market capitalization, relative to bank assets and GDP (ranked by total equity/GDP), Q2 2012

Bank Name	Country Name	Total equity capital/ GDP (%)	Total equity capital/ Total assets (%)	Tangible common equity/ tangible assets (%)	Tangible assets / GDP (%)	Market capitalization/ total assets (%)	Market capitalization/ GDP (%)
UBS	Switzerland	9.2	3.9	2.7	2.4	3.0	7.0
DBS Group Holdings	Singapore	8.8	8.6	7.3	1.0	9.6	9.8
ING	Netherlands	8.1	4.2	3.9	1.9	1.6	3.1
Allied Irish Banks plc	Ireland	8.0	10.2	7.3	0.8	26.8	20.9
Oversea-Chinese Banking Corp.	Singapore	7.7	9.2	7.6	0.8	10.5	8.8
Banco Santander S.A.	Spain	7.4	6.3	3.0	1.1	3.8	4.5
Credit Suisse Group	Switzerland	7.1	4.0	2.4	1.7	2.1	3.8
Danske Bank	Denmark	6.8	3.7	3.0	1.8	2.2	4.0
HSBC	United Kingdom	6.7	6.2	5.0	1.1	6.0	6.5
United Overseas Bank	Singapore	6.3	9.3	7.6	0.7	12.5	8.6
Nordea Bank	Sweden	6.1	3.8	3.3	1.6	3.9	6.3
Bank of Ireland	Ireland	5.3	5.6	4.6	0.9	1.9	1.8
Erste Group Bank	Austria	4.9	7.4	5.9	0.7	2.8	1.8
Royal Bank of Scotland Group	United Kingdom	4.4	4.9	3.7	0.9	1.7	1.5
DnB ASA	Norway	4.0	5.1	4.8	0.8	4.1	3.2
UniCredit	Italy	3.9	6.8	5.2	0.6	1.8	1.1
Malayan Banking Berhad	Malaysia	3.9	7.8	6.3	0.5	14.0	7.1
Banco Bilbao Vizcaya Argentaria S.A.	Spain	3.9	6.9	5.3	0.6	4.9	2.7
BNP Paribas	France	3.8	4.2	3.4	0.9	1.9	1.8
Barclays	United Kingdom	3.6	3.5	2.9	1.0	1.2	1.3
Standard Bank Group	South Africa	3.3	7.4	6.6	0.4	11.4	5.1
Lloyds Banking Group	United Kingdom	3.0	4.9	3.9	0.6	2.3	1.4
Intesa Sanpaolo	Italy	3.0	7.3	5.2	0.4	2.6	1.1
Westpac Banking Corp.	Australia	2.9	6.9	5.1	0.4	10.2	4.4
Skandinaviska Enskilda Banken	Sweden	2.9	4.7	4.7	n.a.	4.2	2.6
Mitsubishi UFJ Financial Group	Japan	2.7	5.5	5.0	n.a.	2.6	1.2
KBC	Belgium	2.6	3.6	2.5	0.7	2.0	1.4
Swedbank	Sweden	2.6	5.4	4.6	0.5	6.5	3.1
Raiffeisen Bank International	Austria	2.6	5.5	4.4	0.5	3.3	1.6
Svenska Handelsbanken	Sweden	2.5	3.8	3.5	0.7	5.6	3.7
Australia and New Zealand Banking Group	Australia	2.5	6.4	5.2	0.4	10.3	4.1
National Australia Bank	Australia	2.5	5.0	4.1	0.5	7.1	3.5
Commonwealth Bank of Australia	Australia	2.5	5.4	4.1	n.a.	12.0	5.4
Toronto Dominion Bank	Canada	2.4	5.5	3.7	0.4	9.8	4.3
Crédit Agricole S.A.	France	2.4	2.8	1.8	0.8	0.5	0.4
Société Générale	France	2.2	3.8	3.2	0.6	1.1	0.6
Royal Bank of Canada	Canada	2.2	4.8	3.6	0.4	10.3	4.6
Sberbank of Russia	Russia	2.1	11.4	11.1	0.2	15.2	2.8
Mizuho Financial Group	Japan	2.1	4.1	3.6	n.a.	1.9	0.7
Shinhan Financial Group	Korea	2.1	9.2	7.9	0.2	n.a.	n.a.
Deutsche Bank	Germany	2.0	2.5	1.8	0.8	1.2	1.0
Industrial & Commercial Bank of China	China	2.0	6.0	5.6	0.3	7.8	2.6
Banco Bradesco S.A.	Brazil	1.9	7.4	6.1	n.a.	14.0	2.3
Sumitomo Mitsui Financial Group	Japan	1.9	4.2	3.3	n.a.	2.8	0.7
State Bank of India	India	1.9	5.3	5.1	n.a.	n.a.	n.a.
Bank of Nova Scotia	Canada	1.8	4.9	3.5	0.4	9.5	3.5
China Construction Bank Corp.	China	1.7	6.4	6.1	0.3	8.0	2.1
Woori Finance Holdings	Korea	1.6	6.9	6.8	0.2	n.a.	n.a.
Cathay Financial Holdings	Taiwan	1.6	4.2	4.1	0.4	n.a.	n.a.
Standard Chartered	United Kingdom	1.6	6.4	5.2	0.3	8.3	2.1
Bank of China	China	1.6	6.2	5.9	0.3	5.8	1.5
Itau Unibanco Holdings	Brazil	1.6	8.7	7.7	0.2	14.5	2.6
Hana Financial Group	Korea	1.5	6.6	6.1	0.2	n.a.	n.a.
Bank of Montreal	Canada	1.5	4.9	3.8	0.3	7.2	2.1
Bank of America Corp.	United States	1.4	10.1	5.8	0.1	4.1	0.6
Agricultural Bank of China	China	1.4	5.4	4.9	0.3	6.5	1.7
Banco do Brasil S.A.	Brazil	1.3	5.9	2.8	0.2	5.4	1.1

Bank Name	Country Name	Total equity capital/ GDP (%)	Total equity capital/ Total assets (%)	Tangible common equity/ tangible assets (%)	Tangible assets / GDP (%)	Market capitalization/ total assets (%)	Market capitalization/ GDP (%)
Citigroup	United States	1.2	9.7	6.9	0.1	4.2	0.5
JP Morgan Chase & Co.	United States	1.2	8.0	5.6	0.1	5.9	0.9
Bankia S.A.	Spain	1.2	4.1	4.1	n.a.	2.1	0.6
VTB Bank	Russia	0.9	9.2	6.8	0.1	8.8	0.9
Industrial Bank of Korea	Korea	0.9	6.3	6.2	0.1	n.a.	n.a.
Commerzbank	Germany	0.9	3.7	2.7	0.2	1.2	0.3
Wells Fargo & Co.	United States	0.9	10.3	6.9	0.1	13.2	1.1
Banco Popular Espanol S.A.	Spain	0.8	5.7	4.4	0.1	2.3	0.3
Canadian Imperial Bank of Commerce	Canada	0.8	3.7	3.1	0.2	7.8	1.7
Macquarie Group	Australia	0.8	7.3	6.1	0.1	6.0	0.6
Nomura Holdings	Japan	0.7	6.8	6.8	n.a.	3.7	0.3
Banco de Sabadell S.A.	Spain	0.6	4.3	3.1	0.1	2.1	0.3
UBI Banca	Italy	0.6	7.6	5.5	0.1	1.7	0.1
SNS Reaal	Netherlands	0.6	2.8	1.6	0.2	0.2	0.0
Bank of Communications	China	0.6	5.8	5.6	0.1	6.3	0.6
Banco Popolare	Italy	0.6	7.2	5.5	0.1	1.4	0.1
Banca Monte dei Paschi di Siena	Italy	0.5	3.4	2.9	0.1	1.0	0.1
Morgan Stanley	United States	0.4	9.4	8.1	0.0	3.9	0.2
Goldman Sachs	United States	0.4	7.2	6.6	0.1	5.0	0.3
National Bank of Canada	Canada	0.4	4.2	3.2	0.1	7.1	0.7
Metlife	United States	0.4	7.4	5.8	0.1	4.0	0.2
China CITIC Bank Corp.	China	0.4	6.6	6.5	0.1	6.0	0.3
China Merchants Bank	China	0.4	5.5	5.0	0.1	7.2	0.5
Shinkin Central Bank	Japan	0.4	3.4	3.4	n.a.	2.2	0.1
Bank of Yokohama	Japan	0.3	6.1	6.0	n.a.	4.4	0.1
Shanghai Pudong Development Bank	China	0.3	5.4	5.3	0.1	5.0	0.3
China Minsheng Banking Corp.	China	0.3	6.0	5.5	0.1	6.5	0.3
Capital One Financial Corp.	United States	0.2	12.5	7.3	0.0	10.7	0.2
PNC Financial Services Group	United States	0.2	12.4	9.0	0.0	10.8	0.2
Bank of New York Mellon Corp.	United States	0.2	10.6	3.9	0.0	7.9	0.2
US Bancorp	United States	0.2	9.7	6.5	0.0	17.2	0.4
China Everbright Bank	China	0.2	5.0	4.9	0.0	0.5	0.0
Fukuoka Financial Group	Japan	0.2	5.2	3.9	n.a.	2.3	0.1
Daiwa Securities Group	Japan	0.2	5.5	4.5	n.a.	3.0	0.1
Ping An Bank	China	0.2	6.0	5.0	n.a.	6.1	0.2
Resona Holdings	Japan	0.1	2.4	1.9	n.a.	2.2	0.2
Bank of Beijing	China	0.1	6.1	6.0	n.a.	6.5	0.1
Sumitomo Mitsui Trust Holdings	Japan	0.1	6.8	5.7	n.a.	3.1	0.2
SunTrust Bank	United States	0.1	11.4	7.6	0.0	7.3	0.1
State Street Corporation	United States	0.1	9.7	5.7	0.0	10.6	0.1
American Express	United States	0.1	13.0	13.0	n.a.	44.8	0.4
BB&T Corp.	United States	0.1	10.3	6.3	0.0	12.1	0.1
Dexia	Belgium	-0.6	-0.6	-0.6	1.0	n.a.	n.a.

Note: Total equity capital (also known as total book value, shareholders equity or net assets) is the summation of common equity, minority interest, and preferred equity. Tangible common equity is total common equity minus intangible assets.

Sources: BankScope, Bloomberg, and Milken Institute.

Appendix 3. The world's 100 biggest banks: Assets and liabilities, Q2 2012

	Bank	Country	Total assets (\$billions)	Assets (% total assets)				Liabilities and equity (% total assets)					
				Net loans	Interbank lending	Securities	Other assets	Deposits	Short term borrowing	Long term borrowing	Derivatives and trading	Other	Equity
1	Deutsche Bank	Germany	2,822	18.3	6.5	63.8	11.4	34.3	2.8	9.2	41.2	10.0	2.5
2	Mitsubishi UFJ Financial Group	Japan	2,708	39.2	0.2	50.8	9.8	69.4	7.2	7.2	0.0	10.6	5.5
3	Industrial & Commercial Bank of China	China	2,699	48.1	25.7	23.5	2.7	86.1	1.9	1.4	2.4	2.3	6.0
4	HSBC	United Kingdom	2,652	36.8	7.3	45.9	10.0	53.3	3.9	6.0	25.1	5.5	6.2
5	Barclays	United Kingdom	2,545	27.9	3.1	59.7	9.3	46.0	0.0	9.0	40.7	0.7	3.5
6	BNP Paribas	France	2,480	33.4	2.5	51.6	12.5	43.5	4.3	7.2	28.1	12.8	4.2
7	JP Morgan Chase & Co.	United States	2,290	30.7	5.7	50.9	12.7	60.2	3.2	10.5	6.8	11.4	8.0
8	Crédit Agricole S.A.	France	2,269	22.3	22.3	46.9	8.5	40.2	0.0	9.7	29.0	18.3	2.8
9	Royal Bank of Scotland Group	United Kingdom	2,208	35.0	2.8	51.2	11.0	43.0	2.4	7.9	38.2	3.6	4.9
10	Bank of America Corp.	United States	2,161	40.5	1.0	38.2	20.2	61.1	1.8	14.0	6.4	6.7	10.1
11	China Construction Bank Corp.	China	2,135	50.9	25.6	21.1	2.4	88.7	1.4	1.0	0.4	2.1	6.4
12	Agricultural Bank of China	China	2,040	45.2	30.6	21.1	3.1	89.4	1.2	0.8	1.0	2.3	5.4
13	Mizuho Financial Group	Japan	2,034	39.6	0.2	52.7	7.5	65.2	9.2	12.2	7.5	1.9	4.1
14	Bank of China	China	2,028	51.5	27.5	16.5	4.5	86.3	3.0	1.6	0.0	3.0	6.2
15	Citigroup	United States	1,916	32.7	8.1	46.4	12.8	58.9	3.1	15.0	6.9	6.4	9.7
16	Sumitomo Mitsui Financial Group	Japan	1,598	47.5	0.6	39.6	12.3	68.5	15.3	3.4	0.0	8.7	4.2
17	Banco Santander S.A.	Spain	1,627	56.1	4.4	26.7	12.8	56.4	0.0	17.4	7.8	12.1	6.3
18	Société Générale	France	1,570	30.1	4.1	53.5	12.3	41.4	0.0	13.3	28.3	13.2	3.8
19	ING	Netherlands	1,558	49.3	3.8	36.5	10.3	43.0	1.6	13.5	0.0	37.8	4.2
20	Lloyds Banking Group	United Kingdom	1,500	55.6	3.3	13.3	27.8	48.7	0.0	24.6	10.0	11.9	4.9
21	UBS	Switzerland	1,478	19.4	2.7	68.0	9.8	40.8	6.6	8.4	36.0	4.3	3.9
22	Wells Fargo & Co.	United States	1,336	60.5	3.0	25.5	11.0	69.5	4.2	9.4	0.0	6.6	10.3
23	UniCredit	Italy	1,202	56.3	6.0	28.1	9.6	57.0	0.0	17.1	14.8	4.3	6.8
24	Credit Suisse Group	Switzerland	1,092	20.5	2.6	52.4	24.5	55.0	1.8	14.9	10.5	13.8	4.0
25	Goldman Sachs	United States	949	0.0	6.0	76.2	17.8	16.9	14.9	17.6	17.8	25.6	7.2
26	Nordea Bank	Sweden	892	49.4	5.2	38.8	6.6	36.1	0.0	27.7	0.0	32.4	3.8
27	Commerzbank	Germany	847	43.7	7.7	45.4	3.2	57.1	3.0	12.4	20.9	2.9	3.7
28	Intesa Sanpaolo	Italy	839	56.3	5.4	31.4	7.0	43.4	0.0	27.7	10.0	11.5	7.3
29	MetLife	United States	825	9.7	0.9	49.7	39.7	0.8	3.7	3.1	0.0	85.0	7.4
30	Bank of Communications	China	815	53.2	27.2	16.2	3.3	86.1	4.2	1.4	0.4	2.2	5.8
31	Royal Bank of Canada	Canada	810	45.3	1.5	45.1	8.1	68.8	6.3	1.1	0.0	19.0	4.8
32	National Australia Bank	Australia	787	64.0	7.2	14.1	14.7	49.4	12.6	14.2	0.0	18.8	5.0
33	Banco Bilbao Vizcaya Argentaria S.A.	Spain	784	57.6	3.4	28.4	10.6	63.3	1.4	13.1	9.8	5.5	6.9
34	Toronto Dominion Bank	Canada	782	51.0	2.4	40.5	6.1	65.6	3.8	5.2	14.1	5.6	5.5
35	Morgan Stanley	United States	749	2.9	4.0	76.3	16.9	25.9	6.7	22.4	16.4	19.2	9.4
36	Commonwealth Bank of Australia	Australia	717	76.5	1.6	14.6	7.3	54.9	15.2	14.3	5.7	4.4	5.4
37	Westpac Banking Corp.	Australia	680	77.4	1.0	15.3	6.3	50.3	8.8	25.4	5.6	3.0	6.9
38	Bank of Nova Scotia	Canada	667	52.3	9.2	30.9	7.6	78.1	3.4	1.4	0.0	12.3	4.9
39	Australia and New Zealand Banking Group	Australia	627	68.4	1.7	16.0	14.0	55.4	12.6	12.3	0.0	13.3	6.4
40	Standard Chartered	United Kingdom	624	43.8	11.9	28.6	15.7	63.5	0.0	11.9	12.9	5.3	6.4
41	Danske Bank	Denmark	590	56.4	4.4	27.9	11.3	39.3	1.1	27.0	18.6	10.3	3.7
42	Bank of Montreal	Canada	532	45.3	7.7	41.1	5.8	68.9	4.5	1.1	0.0	20.5	4.9
43	China Merchants Bank	China	525	52.5	29.7	15.6	2.2	87.2	3.7	1.5	0.4	1.7	5.5
44	Banco do Brasil S.A.	Brazil	520	41.8	11.6	32.3	14.4	62.9	4.9	10.0	0.0	16.3	5.9
45	Dexia	Belgium	518	38.1	11.6	17.4	32.9	27.5	0.0	25.6	9.3	38.2	-0.6
46	Resona Holdings	Japan	517	60.9	0.6	29.3	9.2	83.6	3.3	5.0	0.0	5.7	2.4
47	Shanghai Pudong Development Bank	China	480	46.8	38.1	13.5	1.6	88.0	0.9	2.1	0.0	3.7	5.4
48	China CITIC Bank Corp.	China	461	51.8	35.8	11.1	1.4	89.9	0.1	1.9	0.0	1.5	6.6
49	Nomura Holdings	Japan	445	6.0	0.0	83.0	11.1	41.3	3.5	23.4	0.0	25.0	6.8
50	Itau Unibanco Holdings	Brazil	440	37.1	11.2	35.7	16.0	48.5	6.6	10.6	1.4	24.2	8.7
51	Sumitomo Mitsui Trust Holdings	Japan	424	62.2	1.2	27.3	9.3	66.3	17.7	6.0	0.0	3.2	6.8
52	China Minsheng Banking Corp.	China	410	49.0	37.5	8.6	4.9	86.8	2.0	2.9	0.0	2.4	6.0
53	Shinkin Central Bank	Japan	402	17.7	2.2	72.6	7.4	80.4	0.1	14.5	0.0	1.6	3.4
54	DnB ASA	Norway	397	55.2	1.4	21.5	22.0	48.4	0.0	31.8	0.0	14.7	5.1
55	Canadian Imperial Bank of Commerce	Canada	392	62.6	1.0	30.0	6.4	65.8	2.6	15.4	0.0	12.5	3.7

Bank	Country	Total assets (\$billions)	Assets (% total assets)				Liabilities and equity (% total assets)						
			Net loans	Interbank lending	Securities	Other assets	Deposits	Short term borrowing	Long term borrowing	Derivatives and trading	Other	Equity	
56	Bankia S.A.	Spain	392	60.8	2.8	29.1	7.3	53.7	3.3	27.6	0.0	11.2	4.1
57	Banco Bradesco S.A.	Brazil	406	32.7	10.8	44.9	11.6	54.6	5.5	10.5	0.1	22.0	7.4
58	Sberbank of Russia	Russia	379	71.3	0.5	13.7	14.5	77.5	2.3	6.3	0.0	2.4	11.4
59	Svenska Handelsbanken	Sweden	365	64.1	8.0	12.7	15.2	38.8	0.0	46.8	6.1	4.4	3.8
60	KBC	Belgium	360	45.2	4.4	34.6	15.8	49.0	1.0	8.9	18.0	19.6	3.6
61	State Bank of India	India	369	61.1	1.3	25.4	12.2	76.2	5.6	3.1	0.0	9.9	5.2
62	US Bancorp	United States	353	62.2	0.0	20.9	16.8	68.3	8.7	8.2	0.0	5.2	9.7
63	Skandinaviska Enskilda Banken	Sweden	341	52.6	9.4	30.9	7.1	45.1	0.0	25.8	0.0	24.4	4.7
64	China Everbright Bank	China	331	45.3	36.9	10.7	7.0	87.7	1.7	2.5	0.0	3.1	5.0
65	Bank of New York Mellon Corp.	United States	330	13.6	35.1	36.9	14.3	69.7	4.9	5.9	4.5	4.4	10.6
66	PNC Financial Services Group	United States	300	60.0	1.3	25.5	13.2	70.5	3.2	10.0	0.0	4.0	12.4
67	Capital One Financial Corp.	United States	297	67.0	1.1	18.8	13.1	72.5	1.5	10.2	0.0	3.2	12.5
68	Banca Monte dei Paschi di Siena	Italy	292	62.2	7.2	22.9	7.7	52.3	0.0	24.9	13.7	5.7	3.4
69	Woori Finance Holdings	Korea	278	68.0	0.7	23.9	7.5	71.5	3.0	9.0	3.6	6.1	6.9
70	DBS Group Holdings	Singapore	277	58.1	9.7	22.5	9.7	74.1	3.8	3.5	0.0	10.1	8.6
71	Erste Group Bank	Austria	271	58.7	6.2	27.6	7.5	68.3	0.0	15.5	5.8	3.0	7.4
72	Swedbank	Sweden	263	67.0	5.1	12.8	15.1	37.5	6.6	37.2	6.3	7.0	5.4
73	Shinhan Financial Group	Korea	259	63.9	1.0	21.8	13.3	58.8	4.9	13.2	2.4	11.5	9.2
74	Hana Financial Group	Korea	257	57.1	1.4	23.9	17.6	62.2	6.9	11.1	1.1	12.1	6.6
75	Oversea-Chinese Banking Corp.	Singapore	227	47.4	12.5	15.0	25.1	62.7	3.8	2.5	2.2	19.5	9.2
76	Daiwa Securities Group	Japan	225	1.4	0.0	85.3	13.2	42.1	12.8	10.6	30.1	-0.8	5.2
77	Banco de Sabadell S.A.	Spain	210	65.3	2.6	17.7	14.4	45.2	3.9	39.9	1.5	5.2	4.3
78	VTB Bank	Russia	209	63.1	6.0	15.5	15.4	59.3	0.0	28.0	0.0	3.5	9.2
79	State Street Corporation	United States	201	6.1	15.5	64.0	14.3	76.0	2.3	3.5	0.0	8.4	9.7
80	Ping An Bank	China	200	48.5	19.2	16.2	16.2	83.1	2.1	1.3	0.0	7.5	6.0
81	Banco Popular Espanol S.A.	Spain	199	72.8	2.1	15.9	9.3	53.4	7.6	28.9	1.7	2.7	5.7
82	Bank of Ireland	Ireland	199	61.4	5.7	20.3	12.6	67.4	0.0	12.3	0.0	14.6	5.6
83	Raiffeisen Bank International	Austria	192	51.9	16.8	17.9	13.3	73.6	0.0	10.6	7.4	2.9	5.5
84	Standard Bank Group	South Africa	188	45.1	7.7	39.6	7.6	58.8	0.0	1.8	11.1	20.8	7.4
85	Cathay Financial Holdings	Taiwan	186	29.4	2.0	41.3	27.2	28.7	0.1	1.5	0.3	65.0	4.2
86	United Overseas Bank	Singapore	185	62.4	6.9	12.7	18.0	79.7	2.5	3.3	0.0	5.3	9.3
87	National Bank of Canada	Canada	179	44.0	2.3	45.9	7.7	63.7	11.4	1.4	0.0	19.2	4.2
88	BB&T Corp.	United States	179	62.6	1.3	21.5	14.7	70.6	2.4	12.1	0.0	4.7	10.3
89	SunTrust Bank	United States	178	70.3	0.0	17.8	11.9	72.9	4.5	7.3	2.1	1.8	11.4
90	Bank of Beijing	China	174	40.2	39.3	19.2	1.3	89.6	1.1	1.8	0.0	1.3	6.1
91	Industrial Bank of Korea	Korea	173	69.1	1.8	19.9	9.1	41.5	10.6	34.5	1.4	5.6	6.3
92	SNS Reaal	Netherlands	169	48.7	1.7	27.3	22.2	42.4	0.0	18.3	0.0	36.5	2.8
93	Banco Popolare	Italy	168	63.8	5.3	21.7	9.2	47.6	0.0	37.4	0.0	7.8	7.2
94	UBI Banca	Italy	168	71.4	3.1	17.9	7.7	53.7	0.0	33.8	2.6	2.3	7.6
95	Macquarie Group	Australia	164	30.3	6.7	46.6	16.5	36.1	0.0	28.9	16.1	11.6	7.3
96	Allied Irish Banks plc	Ireland	163	60.1	4.1	26.8	9.1	73.0	0.0	10.5	0.0	6.3	10.2
97	Fukuoka Financial Group	Japan	161	67.7	3.2	22.4	6.7	84.5	5.3	3.5	0.0	1.1	5.6
98	Malayan Banking Berhad	Malaysia	154	60.1	1.7	15.7	22.5	77.9	0.7	6.4	0.5	6.8	7.8
99	Bank of Yokohama	Japan	147	69.8	4.0	19.1	7.0	89.1	1.7	1.1	0.4	1.6	6.1
100	American Express	United States	148	40.4	12.7	4.4	42.4	24.3	2.4	37.8	0.0	22.5	13.0

Note: Deposit includes customer deposits (current, savings and term deposits) and deposits from banks. Data for certain composition are assumed to be zero if the data for that composition are not available.

Sources: BankScope and Milken Institute.

Appendix 4. The world's 100 biggest banks: Capital and revenues, Q2 2012

	Bank	Country	Tier 1 Regulatory Capital Ratio (%)	Revenue and profitability				
				ROA (%)	ROE (%)	Interest Income/ Gross Revenues (%)	Non-Interest Income/ Gross Revenues (%)	Net Gains (Losses) on Trading and Derivatives/ Gross Revenue (%)
1	Deutsche Bank	Germany	13.6	0.2	7.4	46.7	53.3	13.9
2	Mitsubishi UFJ Financial Group	Japan	13.0	0.4	7.5	44.9	55.1	23.0
3	Industrial & Commercial Bank of China	China	10.4	1.5	24.2	77.8	22.2	-0.1
4	HSBC	United Kingdom	12.7	0.7	10.6	55.2	44.8	13.8
5	Barclays	United Kingdom	13.3	0.1	1.5	39.5	60.5	29.3
6	BNP Paribas	France	12.7	0.5	11.3	53.1	46.9	12.7
7	JP Morgan Chase & Co.	United States	11.3	0.9	10.4	50.3	49.8	-1.9
8	Crédit Agricole S.A.	France	11.9	0.1	1.7	84.5	15.6	n.a.
9	Royal Bank of Scotland Group	United Kingdom	13.0	-0.3	-5.2	53.5	46.5	7.8
10	Bank of America Corp.	United States	13.8	0.5	4.2	44.2	55.8	8.2
11	China Construction Bank Corp.	China	11.2	1.6	24.5	74.6	25.5	0.9
12	Agricultural Bank of China	China	9.7	1.3	23.2	79.6	20.4	1.2
13	Mizuho Financial Group	Japan	12.7	0.5	12.5	46.2	53.8	25.5
14	Bank of China	China	10.2	1.2	18.9	70.9	29.1	3.0
15	Citigroup	United States	14.5	0.6	6.5	63.4	36.6	7.5
16	Sumitomo Mitsui Financial Group	Japan	12.5	0.5	8.3	52.6	47.4	9.5
17	Banco Santander S.A.	Spain	11.0	0.3	5.2	70.1	29.9	n.a.
18	Société Générale	France	11.6	0.2	5.4	49.3	50.7	17.1
19	ING	Netherlands	n.a.	0.3	7.2	26.7	73.3	n.a.
20	Lloyds Banking Group	United Kingdom	13.0	-0.1	-2.7	52.0	48.0	45.8
21	UBS	Switzerland	19.2	0.2	5.2	21.5	78.5	23.5
22	Wells Fargo & Co.	United States	11.7	1.4	12.7	52.4	47.6	1.2
23	UniCredit	Italy	10.9	0.3	3.8	57.2	42.8	5.9
24	Credit Suisse Group	Switzerland	16.5	0.2	5.0	28.8	71.2	17.5
25	Goldman Sachs	United States	15.0	0.4	5.3	16.4	83.6	71.5
26	Nordea Bank	Sweden	10.5	0.5	12.1	56.5	43.5	n.a.
27	Commerzbank	Germany	13.3	0.2	5.2	52.2	47.8	21.8
28	Intesa Sanpaolo	Italy	11.7	0.4	5.3	70.1	29.9	3.1
29	Metlife	United States	9.9	1.1	14.9	25.9	74.1	-3.0
30	Bank of Communications	China	9.6	1.2	21.2	79.4	20.6	1.8
31	Royal Bank of Canada	Canada	13.2	0.8	14.3	48.3	51.7	5.6
32	National Australia Bank	Australia	10.2	0.6	10.0	75.4	24.6	4.5
33	Banco Bilbao Vizcaya Argentaria S.A.	Spain	10.8	0.6	8.7	64.6	35.4	1.6
34	Toronto Dominion Bank	Canada	12.0	0.9	14.8	64.0	36.0	-0.8
35	Morgan Stanley	United States	17.2	0.4	4.2	-2.3	102.3	35.5
36	Commonwealth Bank of Australia	Australia	10.0	1.0	17.6	68.0	32.0	3.9
37	Westpac Banking Corp.	Australia	9.8	0.9	13.8	70.5	29.5	4.6
38	Bank of Nova Scotia	Canada	12.2	0.9	16.5	54.1	45.9	6.9
39	Australia and New Zealand Banking Group	Australia	11.3	1.0	15.7	69.2	30.8	2.6
40	Standard Chartered	United Kingdom	13.4	1.0	13.7	58.0	42.0	16.5
41	Danske Bank	Denmark	16.2	0.1	3.6	70.2	29.8	24.2
42	Bank of Montreal	Canada	12.0	0.8	14.4	53.5	46.5	5.8
43	China Merchants Bank	China	8.3	1.5	26.1	76.5	23.6	2.1
44	Banco do Brasil S.A.	Brazil	10.7	1.1	17.7	59.9	40.1	0.0
45	Dexia	Belgium	6.6	-0.6	-884.3	49.2	50.8	n.a.
46	Resona Holdings	Japan	9.5	0.4	10.1	70.5	29.6	4.2
47	Shanghai Pudong Development Bank	China	8.9	1.2	22.7	89.1	10.9	1.0
48	China CITIC Bank Corp.	China	10.1	1.4	20.6	83.4	16.6	3.0
49	Nomura Holdings	Japan	15.0	0.1	1.0	9.6	90.4	41.1
50	Itau Unibanco Holdings	Brazil	12.4	1.6	18.8	73.8	26.2	0.0
51	Sumitomo Mitsui Trust Holdings	Japan	12.1	0.6	8.5	32.5	67.5	26.3
52	China Minsheng Banking Corp.	China	8.4	1.6	27.8	73.7	26.3	1.2

Bank	Country	Tier 1 Regulatory Capital Ratio (%)	Revenue and profitability					
			ROA (%)	ROE (%)	Interest Income/Gross Revenues (%)	Non-Interest Income/Gross Revenues (%)	Net Gains (Losses) on Trading and Derivatives/Gross Revenue (%)	
53	Shinkin Central Bank	Japan	23.6	0.2	6.2	69.4	30.6	2.3
54	DnB ASA	Norway	9.9	0.5	10.6	68.7	31.3	n.a.
55	Canadian Imperial Bank of Commerce	Canada	14.1	0.8	19.8	57.3	42.7	1.3
56	Bankia S.A.	Spain	8.1	-1.0	-22.7	68.6	31.4	n.a.
57	Banco Bradesco S.A.	Brazil	12.4	1.6	21.3	71.5	28.5	0.0
58	Sberbank of Russia	Russia	11.2	2.9	25.1	74.6	25.4	2.6
59	Svenska Handelsbanken	Sweden	9.8	0.5	14.3	75.0	25.0	2.1
60	KBC	Belgium	13.6	-0.1	-1.7	63.1	36.9	n.a.
61	State Bank of India	India	8.0	0.7	13.0	57.3	42.7	3.7
62	US Bancorp	United States	10.7	1.6	14.5	52.6	47.4	n.a.
63	Skandinaviska Enskilda Banken	Sweden	12.8	0.5	10.4	44.7	55.3	5.6
64	China Everbright Bank	China	8.1	1.4	26.4	83.0	17.0	1.2
65	Bank of New York Mellon Corp.	United States	14.7	0.6	5.7	20.3	79.7	5.0
66	PNC Financial Services Group	United States	11.4	0.7	5.6	69.1	30.9	n.a.
67	Capital One Financial Corp.	United States	11.6	0.1	1.0	78.9	21.1	n.a.
68	Banca Monte dei Paschi di Siena	Italy	11.7	-1.4	-28.8	61.5	38.5	2.7
69	Woori Finance Holdings	Korea	n.a.	0.7	9.4	81.4	18.6	4.4
70	DBS Group Holdings	Singapore	12.8	1.1	10.8	64.9	35.1	11.3
71	Erste Group Bank	Austria	10.7	0.5	6.2	73.7	26.3	3.4
72	Swedbank	Sweden	11.4	0.7	13.6	59.2	40.8	n.a.
73	Shinhan Financial Group	Korea	n.a.	1.0	11.2	78.3	21.7	4.6
74	Hana Financial Group	Korea	8.3	1.1	15.4	55.7	44.3	4.0
75	Oversea-Chinese Banking Corp.	Singapore	14.1	1.1	12.0	58.7	41.3	n.a.
76	Daiwa Securities Group	Japan	24.4	-0.3	-4.6	5.6	94.4	37.3
77	Banco de Sabadell S.A.	Spain	9.9	0.1	1.7	63.2	36.8	5.6
78	VTB Bank	Russia	8.9	1.0	10.7	69.5	30.5	15.5
79	State Street Corporation	United States	19.9	1.0	9.8	27.7	72.3	n.a.
80	Ping An Bank	China	8.5	1.0	19.1	85.5	14.5	0.9
81	Banco Popular Espanol S.A.	Spain	10.5	0.2	3.6	69.2	30.8	3.2
82	Bank of Ireland	Ireland	14.1	-1.4	-28.5	82.2	17.8	-18.1
83	Raiffeisen Bank International	Austria	10.6	1.0	13.2	59.7	40.3	6.7
84	Standard Bank Group	South Africa	11.0	1.2	15.1	38.4	61.6	11.4
85	Cathay Financial Holdings	Taiwan	n.a.	0.2	4.6	181.0	-81.0	29.1
86	United Overseas Bank	Singapore	13.9	1.2	11.8	62.5	37.5	1.8
87	National Bank of Canada	Canada	13.0	1.3	27.7	38.7	61.3	3.5
88	BB&T Corp.	United States	10.2	1.2	11.7	60.2	39.8	n.a.
89	SunTrust Bank	United States	10.2	0.6	5.4	57.5	42.5	3.2
90	Bank of Beijing	China	11.0	1.2	19.2	88.4	11.6	0.8
91	Industrial Bank of Korea	Korea	9.0	0.8	11.6	93.0	7.0	3.4
92	SNS Reaal	Netherlands	12.2	0.2	5.1	40.0	60.0	n.a.
93	Banco Popolare	Italy	11.3	0.1	0.8	51.6	48.4	9.8
94	UBI Banca	Italy	10.8	0.3	3.4	60.8	39.2	1.9
95	Macquarie Group	Australia	13.3	0.4	6.2	24.0	76.0	18.6
96	Allied Irish Banks plc	Ireland	17.3	-1.9	-24.2	90.3	9.7	-5.2
97	Fukuoka Financial Group	Japan	6.7	0.2	4.5	80.2	19.8	0.1
98	Malayan Banking Berhad	Malaysia	11.6	1.2	15.5	59.2	40.8	1.5
99	Bank of Yokohama	Japan	10.1	0.4	6.5	75.3	24.7	3.1
100	American Express	United States	12.8	3.6	27.3	14.1	85.9	n.a.

Note: Data for certain composition are assumed to be zero if the data for that composition are not available. Tier 1 regulatory capital ratio is the ratio of Tier 1 capital to risk-weighted assets, where Tier 1 capital is common stockholders' equity, qualifying perpetual preferred stock, and minority interest in consolidated subsidiaries less goodwill and other disallowed intangibles.

Sources: BankScope, Bloomberg, Company's website and Milken Institute.

Appendix 5. The world's 100 biggest banks: Subsidiaries, 2011

Bank	Country	No. subsidiaries	No. domestic subsidiaries	No. domestic subsidiaries (%)	No. foreign subsidiaries	No. foreign subsidiaries (%)	Number of host countries
Deutsche Bank	Germany	1,259	297	24	962	76	57
Mitsubishi UFJ Financial Group	Japan	68	49	72	19	28	12
Industrial & Commercial Bank of China	China	19	5	26	14	74	13
HSBC	United Kingdom	69	22	32	47	68	27
Barclays	United Kingdom	27	10	37	17	63	11
BNP Paribas	France	843	239	28	604	72	61
JP Morgan Chase	United States	129	100	78	29	22	16
Crédit Agricole S.A.	France	543	334	62	209	38	49
Royal Bank of Scotland Group	United Kingdom	508	217	43	291	57	28
Bank of America Corp.	United States	1,988	1,439	72	549	28	53
China Construction Bank Corp.	China	38	26	68	12	32	4
Mizuho Financial Group	Japan	59	51	86	8	14	6
Bank of China	China	34	8	24	26	76	15
Citigroup	United States	1,490	708	48	782	52	86
Sumitomo Mitsui Financial Group	Japan	74	73	99	1	1	2
Banco Santander S.A.	Spain	286	99	35	187	65	29
Agricultural Bank of China	China	10	4	40	6	60	4
Société Générale	France	294	113	38	181	62	62
ING	Netherlands	3,308	428	13	2,880	87	69
Lloyds Banking Group	United Kingdom	22	21	95	1	5	2
UBS	Switzerland	164	10	6	154	94	40
Wells Fargo	United States	1,723	1,618	94	105	6	24
UniCredit	Italy	52	30	58	22	42	12
Credit Suisse Group	Switzerland	39	13	33	26	67	14
Goldman Sachs	United States	3,397	2,093	62	1304	38	60
Nordea Bank	Sweden	28	9	32	19	68	11
Commerzbank	Germany	658	386	59	272	41	35
Intesa Sanpaolo	Italy	76	58	76	18	24	14
Metlife	United States	293	154	53	139	47	42
Bank of Communications	China	23	5	22	18	78	2
Royal Bank of Canada	Canada	38	11	29	27	71	11
National Australia Bank	Australia	38	17	45	21	55	6
Banco Bilbao Vizcaya Argentaria S.A.	Spain	338	81	24	257	76	30
Toronto Dominion Bank	Canada	1,674	407	24	1,267	76	26
Morgan Stanley	United States	2,822	1,761	62	1,061	38	65
Commonwealth Bank of Australia	Australia	133	89	67	44	33	13
Westpac Banking Corp.	Australia	270	212	79	58	21	11
Bank of Nova Scotia	Canada	56	24	43	32	57	16
Australia and New Zealand Banking Group	Australia	97	55	57	42	43	21
Standard Chartered	United Kingdom	40	7	18	33	83	27
Danske Bank	Denmark	41	14	34	27	66	13
Bank of Montreal	Canada	30	15	50	15	50	8
China Merchants Bank	China	3	1	33	2	67	3
Banco do Brasil S.A.	Brazil	508	217	43	291	57	28
Dexia	Belgium	119	4	3	115	97	25
Resona Holdings	Japan	11	10	91	1	9	2
Shanghai Pudong Development Bank	China	6	6	100	0	0	1
China CITIC Bank Corp.	China	6	2	33	4	67	1
Nomura Holdings	Japan	2,187	1,778	81	409	19	35
Itau Unibanco Holdings	Brazil	114	95	83	19	17	10
Sumitomo Mitsui Trust Holdings	Japan	49	36	73	13	27	7
China Minsheng Banking Corp.	China	1	1	100	0	0	1
Shinkin Central Bank	Japan	13	12	92	1	8	2
DnB ASA	Norway	8	6	75	2	25	3
Canadian Imperial Bank of Commerce	Canada	21	13	62	8	38	5
Bankia S.A.	Spain	2	2	100	0	0	1
Banco Bradesco S.A.	Brazil	31	21	68	10	32	6
Sberbank of Russia	Russia	166	156	94	10	6	8
Svenska Handelsbanken	Sweden	35	13	37	22	63	12

Bank	Country	No. subsidiaries	No. domestic subsidiaries	No. domestic subsidiaries (%)	No. foreign subsidiaries	No. foreign subsidiaries (%)	Number of host countries
KBC	Belgium	83	24	29	59	71	21
State Bank of India	India	82	67	82	15	18	12
US Bancorp	United States	245	232	95	13	5	10
Skandinaviska Enskilda Banken	Sweden	71	20	28	51	72	20
China Everbright Bank	China	2	2	100	0	0	0
Bank of New York Mellon Corp.	United States	5,155	3,102	60	2,053	40	62
PNC Financial Services Group	United States	34	34	100	0	0	1
Capital One Financial Corp.	United States	20	18	90	2	10	3
Banca Monte dei Paschi di Siena	Italy	33	24	73	9	27	5
Woori Finance Holdings	Korea, Rep.	11	10	91	1	9	1
DBS Group Holdings	Singapore	13	4	31	9	69	9
Erste Group Bank	Austria	248	130	52	118	48	24
Swedbank	Sweden	34	19	56	15	44	10
Shinhan Financial Group	Korea, Rep.	14	14	100	0	0	0
Hana Financial Group	Korea, Rep.	12	10	83	2	17	2
Oversea-Chinese Banking Corp.	Singapore	13	7	54	6	46	3
Daiwa Securities Group	Japan	1,794	1,568	87	226	13	19
Banco de Sabadell S.A.	Spain	321	268	83	53	17	20
VTB Bank	Russia	199	163	82	36	18	20
State Street Corporation	United States	5,865	2,830	48	3,035	52	59
Ping An Bank	China	2	2	100	0	0	0
Banco Popular Espanol S.A.	Spain	71	54	76	17	24	6
Bank of Ireland	Ireland	17	10	59	7	41	0
Raiffeisen Bank International	Austria	138	43	31	95	69	25
Standard Bank Group	South Africa	74	25	34	49	66	27
Cathay Financial Holdings	Taiwan	92	81	88	11	12	4
United Overseas Bank	Singapore	22	10	45	12	55	11
National Bank of Canada	Canada	28	23	82	5	18	4
BB&T Corp.	United States	46	44	96	2	4	3
SunTrust Bank	United States	49	48	98	1	2	2
Bank of Beijing	China	2	2	100	0	0	0
Industrial Bank of Korea	Korea, Rep.	45	44	98	1	2	1
SNS Reaal	Netherlands	120	43	36	77	64	17
Banco Popolare	Italy	29	23	79	6	21	7
UBI Banca	Italy	44	29	66	15	34	7
Macquarie Group	Australia	66	33	50	33	50	12
Allied Irish Banks plc	Ireland	82	62	76	20	24	1
Fukuoka Financial Group	Japan	11	11	100	0	0	1
Malayan Banking Berhad	Malaysia	85	39	46	46	54	13
Bank of Yokohama	Japan	22	20	91	2	9	2
American Express	United States	24	14	58	10	42	11

Note: The number of subsidiaries indicated for the U.S. banks obtained from BankScope differs significantly from the number available from the Federal Reserve (see, for example, Avraham, Selvaggi and Vickery, 2012).

Sources: BankScope; Milken Institute