# 5

# A Comparative Analysis of Financial Sector Health in the United States, Europe, and Asia

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This chapter uses recent methodology for estimating capital shortfalls of financial institutions during aggregated stress to assess the evolution of financial sector health since 2007 in the United States, Europe, and Asia. Financial sector capital shortfalls reached a peak at the end of 2008 and in early 2009 for the United States and Europe; however, they declined thereafter steadily only for the United States, with Europe reaching a similar peak in the fall of 2011 during the southern periphery sovereign crises. In contrast, the financial sector in Asia had little capital shortfall in 2008–2009, but the shortfall has increased steadily since 2010, notably for China. These relative patterns can be explained based on the regulatory responses in the United States to improve the capitalization of the financial sector, the lack of such an adequate response to recapitalize the financial sector in Europe, and the undertaking of bank-leverage-based fiscal stimulus in China.

In particular, the chapter exploits a theoretically well-founded notion of the systemic risk contribution of financial firms—their *expected capital shortfall in a crisis*—and measures it using publicly available market and balance sheet data. This approach allows a comparative analysis of the global financial sector health since early 2007, focusing on similarities and differences among the United States, Europe, and Asia.

The reason for selecting capital adequacy as a measure of systemic risk is simply that undercapitalized financial sectors lead to significant loss of economic output through the withdrawal of efficient intermediation services and possibly the misallocation of resources. In particular, when a large part of the financial sector is funded with fragile, short-term debt (or conversely, is not funded with adequate equity capital) and is hit by a common shock to its long-term assets, there may be en masse failures

of financial firms. In such a scenario, it is not possible for any individual firm to reduce its leverage or risk without significant costs since other financial firms are attempting to achieve the same outcome. Since deleveraging and risk reduction are privately costly to owners of the financial firms, firms delay such actions, operating as undercapitalized firms that are averse to efficiently expanding the provision of intermediation to households and corporations and keen to pursue risky strategies (gambling for resurrection) that offer them some chance of recovering but at the cost of a greater chance of further stress. If further stress develops, there may be a complete disruption of payments and settlement services, which can cause trade and growth to collapse, as occurred for several years during the Great Depression as well as in the fall of 2008 during the global recession.

The adverse impact of undercapitalized financial sectors on the allocation of economic resources has been the focus of an important body of empirical research. This theme has been confirmed again in the European countries following the financial crisis of 2007–2009. The lack of adequate recapitalization and cleaning up of European banks' balance sheets prevented an efficient allocation of credit for an extended period of time. Popov and van Horen (2013) report that it has taken European banks much longer to recover in terms of their global syndicated lending than other banks. Acharya and Steffen (2015) demonstrated that undercapitalized European banks put on "carry trades" by using short-term funding to purchase risky government bonds of the southern periphery, a bet that did not pay off and resulted in a combined sovereign and banking crisis for Europe in the fall of 2011.

In light of these adverse consequences of undercapitalized financial sectors, it is natural to single out expected capital shortfall of the financial sector as a way of measuring its systemic risk or vulnerability to a future crisis. Section 1 introduces the measure we employ, *SRISK*, based on the work of Acharya, Pedersen, Philippon, and Richardson (2010a, 2010b, 2010c) and Acharya, Engle, and Richardson (2012). Section 2 assesses global financial sector health since 2007 using *SRISK* as the measure of systemic risk. Section 3 discusses the divergence observed in the United States, Europe, and Asia in terms of the evolution of financial sector health since 2007.

## 1. *SRISK*, a Measure of Financial Sector Health

Acharya (2009) and Acharya, Pedersen, Philippon, and Richardson (2010a, 2010b, 2010c) argue that systemic risk should be described in in the context of a firm's overall contribution to systemwide failure. The intuition is that when capital is low in the aggregate, it is not possible for other financial firms to step into the breach. This breakdown in aggregate financial intermediation is the reason why there are severe consequences for the broader economy, such as a credit crunch and fire sales of assets.

Acharya, Engle, and Richardson (2012) implement this intuition by proposing a measure of systemic risk contribution of a financial firm, called *SRISK* and measured as the expected capital shortfall of a firm in a crisis. In particular, the *SRISK* of firm $i$ at time $t$ is defined as the capital that the firm is expected to need (conditional on available information up to time $t-1$) to operate "normally," that is, not face a run of its creditors, should another financial crisis occur. Symbolically it can be defined as

$$SRISK_{i,t} = E_{t-1}(Capital\ Shortfall_i | Crisis). \quad (1)$$

To calculate *SRISK*, we first need to evaluate the losses that an equity holder would face if there is a future crisis. To do this, the volatilities and correlations of an individual financial firm's equity return and the global marketwide return are allowed to change over time, assuming the two return series are conditionally (i.e., each day) multivariate normal, and simulated for six months into the future many times. Whenever the broad index falls by 40 percent over the next six months, a rather pessimistic scenario that captures the kind of market collapse witnessed during the Great Depression in 1930s and the global recession in 2007–2009, this is viewed as a crisis, and the firm's equity return is drawn from the joint distribution assumptions described above. For the crisis scenarios, the expected loss of equity value of firm $i$ is called the long-run marginal expected shortfall, or *LRMES*. This is just the average of the fractional returns of the firm's equity in the crisis scenarios.

The capital shortfall can be directly calculated by recognizing that the book value of debt will be relatively unchanged during this six-month period while equity values fall by *LRMES*. Assume $k$ is a prudential capital ratio, which we take as 8 percent (and 5.5 percent for Europe, to adjust

for the differences between the European IFRS and US GAAP accounting standards in the treatment of netting of derivatives). Then we can define the *SRISK* of firm *i* at time *t* as

$$\begin{aligned} SRISK_{i,t} &= E_{t-1}\left((k(Debt + Equity) - Equity) | Crisis\right) \\ &= k(Debt_{i,t}) - (1-k)(1 - LRMES_{i,t})\, Equity_{i,t}, \end{aligned} \tag{2}$$

where $Equity_{i,t}$ is the market value of equity today, $Debt_{i,t}$is the notional value of nonequity liabilities today, and $LRMES_{i,t}$ is the long-run marginal expected shortfall of equity return estimated using available information today. This measure of the expected capital shortfall captures many of the characteristics considered important for systemic risk, such as size and leverage. These characteristics tend to increase a firm's capital shortfall when there are widespread losses in the financial sector. But a firm's expected capital shortfall also provides an important addition, most notably the *comovement* of the financial firm's assets with the aggregate market in a crisis.

Given the simple formulaic structure for *SRISK*, we can also understand changes in *SRISK* over time as coming from changes in its components, the book value of nonequity liabilities, the market value of equity, and the market value of equity times the *LRMES*, as follows:

$$\begin{aligned} \Delta SRISK_i &= SRISK_{i,t} - SRISK_{i,t-1} \\ &= \Delta Debt_i + \Delta Equity_i + \Delta Risk_i, where \\ \Delta Debt_i &= k(Debt_{i,t} - Debt_{i,t-1}), \\ \Delta Equity_i &= -(1-k)(Equity_{i,t} - Equity_{i,t-1}), and \\ \Delta Risk_i &= (1-k)(LRMES_{i,t} Equity_{i,t} - LRMES_{i,t-1} Equity_{i,t-1}), \end{aligned} \tag{3}$$

where the changes in *Debt, Equity,* and *Risk* are measured over the period from $t-1$ to $t$, and, together with the appropriate weights from the *SRISK* formula in (2), combine to explain the change in *SRISK* over the period from $t-1$ to $t$.

## 2. Assessing Global Financial Sector Health using *SRISK*

To operationalize *SRISK* and compare it across countries and regions, the NYU Stern School of BusinessVolatility LAB (VLAB) includes all publicly listed financial firms in a country with active trading in common equity

that are in the top 10 percent of firms in a year by size (see the appendix to this chapter for sample size distribution by year). To identify firms with capital shortfall, firms with positive *SRISK* are identified. All positive values of *SRISK* for a country or region in a given year are aggregated to obtain the overall *SRISK* for that country or region. In what follows, all references to the current or the present moment refer to October 10, 2014.

Figures 5.1–5.6 and table 5.1 summarize our overall findings for aggregate *SRISK* across the three regions (the United States, Europe, and Asia, with an emphasis on China):

1. Figure 5.1 plots the aggregate *SRISK scaled by the GDP* for the three regions and China and is the central figure of this chapter.

In the case of the United States, systemic risk appears to have peaked in the fall of 2008 and early 2009, with an estimated capital shortfall of the

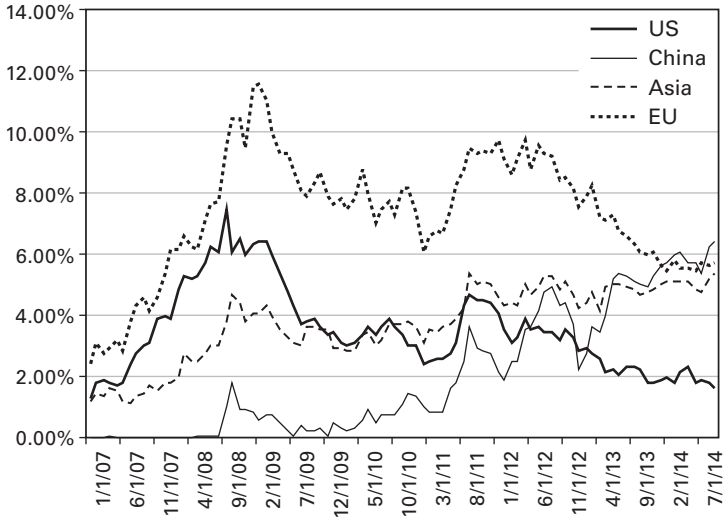


**Figure 5.1**
SRISK Normalized by GDP Comparison.
*Notes:* This figure plots the sum of *SRISK* for publicly traded financial firms (see inclusion criteria in the appendix to this chapter) in a given week, scaled by the country's (or sum of the countries') latest GDP figure available that week, for the United States, China, Asia (including China), and Europe. The *SRISK* data are from the NYU Stern Volatility Lab (http://vlab.stern.nyu.edu/welcome/risk) from January 1, 2007, until end of September 2014. The country GDP data are from Bloomberg.

financial sector at close to 8 percent of GDP (over $1 trillion). This is of the order of magnitude of the capital injections and other forms of federal support for the financial sector following the collapse of Lehman Brothers in the form of TARP legislation, FDIC guarantees, and Federal Reserve liquidity provision. Since then, the systemic risk appears to have steadily come down since the spring of 2009, with current levels (2 percent of GDP) being as low as in January 2007. The one exception is August 2011, when the systemic risk in the United States rises again around the debt-ceiling political crisis in the United States and the eurozone sovereign debt and financial sector crisis.

Similar to what is seen for the United States, the systemic risk of the European financial sector also reaches its peak in the fall of 2008 and early 2009 (12 percent of GDP, or about $2.25 trillion), but reveals an important difference: it reaches another peak of 10 percent of GDP ($2 trillion) in August 2011, coincident with the eurozone sovereign debt crisis. In other words, Europe appears to have witnessed serial episodes of dramatic capital shortfalls in the financial sector. While systemic risk has come down since this second peak, its current levels (6 percent) remain at more than twice those in January 2007 (2 percent of GDP), another striking difference with the United States. This illustrates well that the European financial sector is far less healthy at present than the US financial sector and also relative to itself prior to the global financial crisis of 2007–2008.

The picture of systemic risk estimate for Asia is, however, quite different from that for the United States and Europe. The estimated capital shortfalls for the Asian financial sector show a steady trend upward all the way from January 2007 to date, with some local peaks, but overall having risen by close to $1 trillion from a quarter trillion (2 percent of GDP) to currently around $1.25 trillion (6 percent of GDP). China, which, along with Japan, is the largest financial sector in Asia, mirrors this trend, as shown in figure 5.1. The Chinese financial sector shows little estimated capital shortfall until the middle of 2010, but since then it has had a meteoric rise, with present estimates putting it at over a half trillion dollars (6 percent of China's GDP).

2. Figure 5.2 helps us understand the diverging patterns of systemic risk for the United States, Europe, and Asia in terms of leveraging or

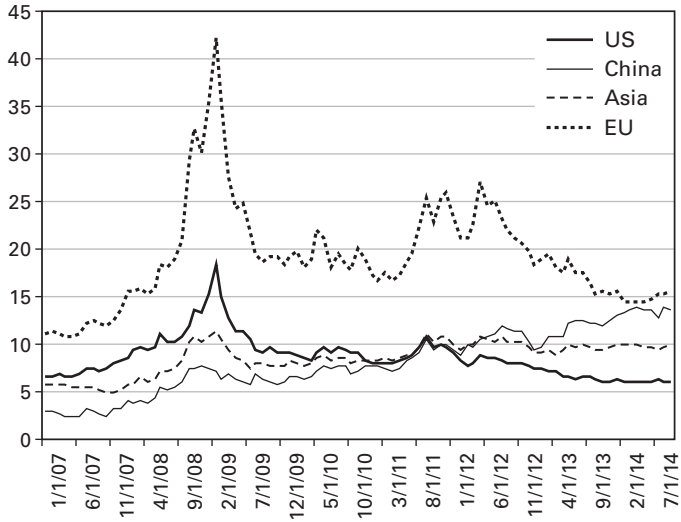


**Figure 5.2**
Aggregate Leverage Comparison.
*Notes:* This figure plots the aggregate (quasi-) leverage for publicly traded financial firms (see the inclusion criteria in the appendix to this chapter) for the United States, China, Asia (including China), and Europe. Quasi-leverage of a financial firm is its quasi-market assets (market value of equity + book value of nonequity liabilities) divided by the market value of equity. Quasi-leverage of financial firms in a region is weighted by the market value of equity of financial firms to obtain the aggregate quasi-leverage. The leverage data are from the NYU Stern Volatility Lab (http://vlab.stern.nyu.edu/welcome/risk) from January 1, 2007, until end of September 2014.

deleveraging of the financial sector by plotting the aggregate quasi-leverage of the respective financial sectors.[1] It illustrates succinctly that the leverage time series for these financial sectors tracks closely the evolution of the estimated systemic risk of these financial sectors. In other words, the financial sector in the United States experienced a significant leverage increase until the spring of 2009, and since then has been deleveraging at a rapid pace; the European financial sector experienced leverage rises until the summer of 2009, but also in the period close to and leading up to the fall of 2011, and has been deleveraging to some extent since then but not to January 2007 levels; in contrast, the Asian (and Chinese) financial sectors have been ramping up leverage at a steady pace all along from 2007 to date.

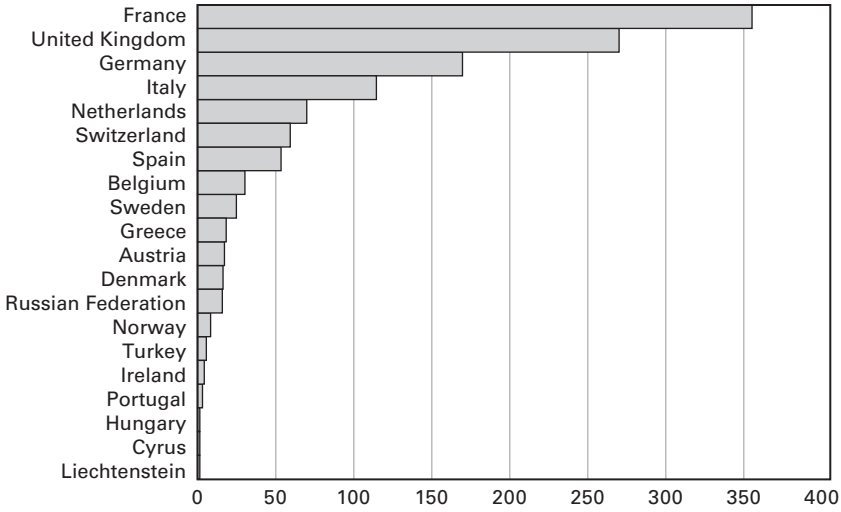


**Figure 5.3**
Global Systemic Risk by Country: Europe.
*Notes:* This figure plots the top twenty country-level values in Europe of the sum of *SRISK* in USD billion for publicly traded financial firms (see inclusion criteria in the appendix to this chapter) in a country as of October 10, 2014. The *SRISK* data are from the NYU Stern Volatility Lab (http://vlab.stern.nyu.edu/welcome/risk).

It is interesting that at present, the leverage in the US financial sector is down to 5 (i.e., five units of assets for one unit of market value of equity), lower than 10 for Asia, and around 15 for China and Europe. Equally interestingly, the leverage of the financial sector in Europe has been pervasively greater than that of the financial sectors in the United States and Asia.

Similarly, figures 5.3 and 5.4 help us understand the contributors (at country level) to current systemic risk assessment in Europe. In terms of absolute contributions to the estimated capital shortfalls (figure 5.3), France leads the way, at $350 billion, over a fourth of the current shortfall estimate for Europe. Even on a per GDP basis (figure 5.4), France leads the way, with its estimated capital shortfall being around 13 percent of its GDP, a rather sizable fraction of GDP to put aside to recapitalize the banking sector should future stress require public injections of capital.

While Switzerland and the UK are expected to rank high on a per GDP basis given the relatively large balance sheets of their financial

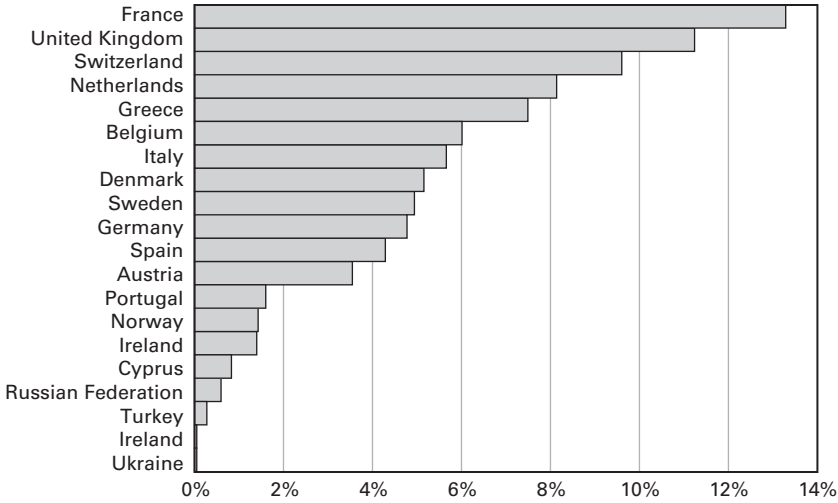


**Figure 5.4**
European *SRISK* Normalized by GDP.
*Notes:* This figure plots the top twenty country-level values in Europe of the sum of *SRISK* for publicly traded financial firms (see inclusion criteria in the appendix to this chapter) in a country, scaled by the country's latest GDP figure available as of October 10, 2014. The *SRISK* data are from the NYU Stern Volatility Lab (http://vlab.stern.nyu.edu/welcome/risk). The country GDP data are from Bloomberg.

sectors compared to the national balance sheets, France topping this list is somewhat surprising and highlights the relative undercapitalization of its banking sector (in terms of its quasi-market leverage). Notably, while Germany ranks high in figure 5.3 in terms of absolute size of estimated capital shortfalls, on a per GDP basis it looks much healthier than France.

And figures 5.5 and 5.6 help us understand countries that contribute to the systemic risk in Asia at the present date. China and Japan together account for most of the estimated capital shortfall in Asia (figure 5.5). On a per GDP basis, however, Japan is substantially higher, at over 11 percent shortfall relative to GDP, whereas China is somewhat smaller, at over 6 percent.

3. Finally, while China's systemic risk relative to its GDP appears manageable, particularly given its vast reserves, it is intriguing what explains its dramatic rise seen in figure 5.1, from practically zero to now half a trillion dollars, or 6 percent of GDP. Table 5.1 provides

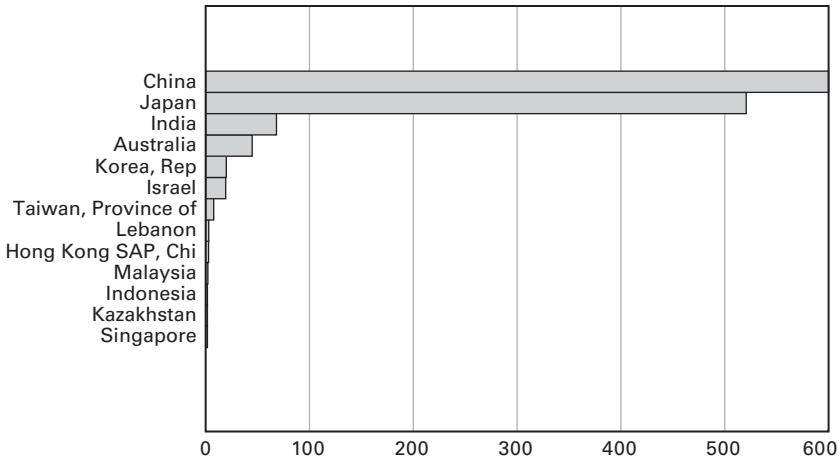


**Figure 5.5**
Global Systemic Risk by Country: Asia.
*Notes:* This figure plots the top thirteen country-level values in Asia (including Australia and New Zealand) of the sum of *SRISK* in USD billion for publicly traded financial firms (see inclusion criteria in the appendix to this chapter) in a country as of October 10, 2014. The *SRISK* data are from the NYU Stern Volatility Lab (http://vlab.stern.nyu.edu/welcome/risk).

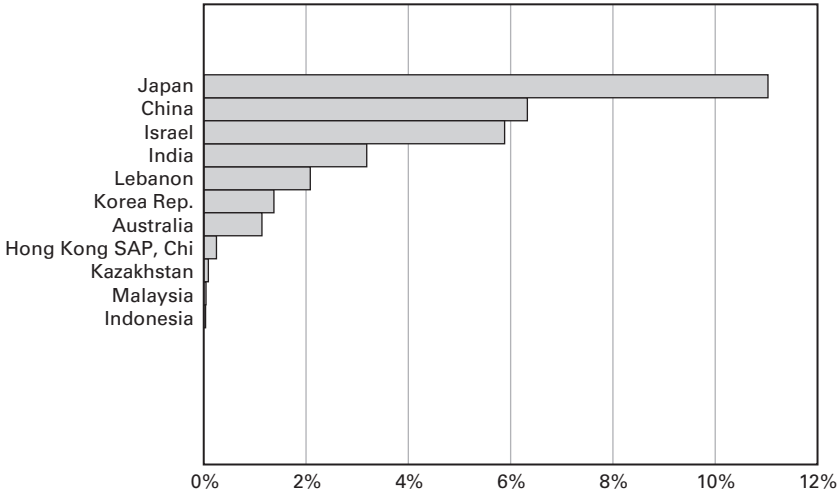


**Figure 5.6**
Asia *SRISK* Normalized by GDP.
*Notes:* This figure plots the top eleven country-level values in Asia (including Australia and New Zealand) of the sum of *SRISK* for publicly traded financial firms (see inclusion criteria in the appendix to this chapter) in a country, scaled by the country's latest GDP figure available as of October 10, 2014. The *SRISK* data are from the NYU Stern Volatility Lab (http://vlab.stern.nyu.edu/welcome/risk). The country GDP data are from Bloomberg.

**Table 5.1**
Decomposition of Change in *SRISK*

| Institution | *SRISK*($t$) | *SRISK*($t-1$) | Δ*SRISK* | Δ*Debt* | Δ*Equity* | Δ*Risk* |
|---|---|---|---|---|---|---|
| Bank of China Ltd. | 105,580.9 | –4,396.9 | 109,977.8 | 90,325.2 | 20,038.1 | –385.5 |
| China Construction Bank Corp. | 84,956.1 | –12,500.5 | 97,456.6 | 90,456.5 | 15,262.1 | –8,261.9 |
| Industrial and Commercial Bank of China Ltd. | 77,991.2 | –71,501.9 | 149,493.1 | 114,137.7 | 48,781.9 | –13,426.4 |
| Bank of Communications Co. Ltd. | 44,484.7 | –678.7 | 45,163.4 | 38,475.8 | 6,314.8 | 372.7 |
| China CITIC Bank Corp. Ltd. | 33,828.5 | –3,342.2 | 37,170.7 | 32,863.6 | 5,290.3 | –983.2 |
| China Merchants Bank Co. Ltd. | 29,608.3 | –14,607.5 | 44,215.8 | 38,062.1 | 5,430.3 | 723.4 |
| Shanghai Pudong Development Bank | 25,899.8 | –4,037.5 | 29,937.3 | 29,607.2 | –1,414.7 | 1,744.8 |
| Industrial Bank Co. Ltd. | 24,856.8 | –8,643.1 | 33,499.9 | 33,119.3 | –1,822.7 | 2,203.2 |
| China Minsheng Banking Corp. Ltd. | 17,584.8 | –4,891.7 | 22,476.5 | 27,422.5 | –6,765.6 | 1,819.6 |
| Huaxia Bank Co. Ltd. | 11,742.1 | 2,068.4 | 9,673.7 | 12,193.5 | –2,690.4 | 170.6 |

*Notes:* This table shows the change in *SRISK* between the beginning of 2010 ($t-1$) and October 10, 2014 ($t$), in USD billion for publicly traded financial firms (see inclusion criteria in the appendix to this chapter) in China, with the top ten values of *SRISK* as of October 10, 2014. The change in *SRISK* is decomposed further into change due to changes in book value of nonequity liabilities (*Debt*), in market value of equity (*Equity*), and in market value of equity times *LRMES*, the measure of downside beta of the firm's equity to a global market correction of –40 percent (*Risk*). The *SRISK* data and its component changes are from the NYU Stern Volatility Lab (http://vlab.stern.nyu.edu/welcome/risk).

an intuitive understanding of this rise using the decomposition of change in *SRISK* between the end of 2009 and October 10, 2014, for the highest *SRISK* contributors in the Chinese financial sector into its three components ($\Delta Debt, \Delta Equity, \Delta Risk$), as explained in the concluding remarks of section 3.

The top four banks in the list are the largest state-owned commercial banks in China. Together they contribute to over half of the estimated capital shortfall for China. However, all these banks had negative *SRISK* at the end of 2009; that is, they were in fact in capital surplus. What is remarkable in table 5.1 is that almost all of the change in *SRISK* can be attributed to the increase in debt liabilities ($\Delta Debt$) for these banks. Indeed, while their debt liabilities have increased, equity valuations have suffered, so that the increase in *SRISK* is also to the result of declines in equity (positive $\Delta Equity$). Interestingly, their downside risk on a per dollar of equity basis has improved, so that the risk contribution ($\Delta Risk$) is negative. Together, these observations suggest massive *financial* leveraging of the largest banks in China from 2010 to date, which has increased the systemic risk of the financial sector to nontrivial levels, and way beyond that for the United States on a per GDP basis.

## 3. What Explains the Divergence in the Evolution of the Global Financial Sector Health since 2007?

In summary, the financial sector capital shortfalls reached a peak around the end of 2008 and early 2009 for the United States and Europe; however, they declined thereafter steadily only for the United States, with Europe reaching a similar peak in the fall of 2011 during the sovereign debt crises in the southern periphery states of Europe. In contrast, the financial sector in Asia had little capital shortfall in 2008–2009 but the shortfall has increased steadily since 2010, notably for China and Japan. What explains these relative patterns? I argue below that these patterns can be explained based on the regulatory responses in the United States, the lack thereof in Europe, economic stagnation in Japan, and the bank leverage–based fiscal stimulus in China.

Following the collapse of Lehman Brothers, the United States put in place first a substantial rescue package in the form of TARP recapitalization of the financial sector up to $750 billion, FDIC deposit and loan

guarantee programs, and the Federal Reserve's liquidity support of the financial sector as well as of the markets at large, in addition to the government conservatorship of the mortgage agencies, Fannie Mae and Freddie Mac. While these measures were not adequate to calm the volatility in markets, which remained substantially high even in early 2009, the stress test–based recapitalization in spring 2009 (the Supervisory Capital Assessment Program, SCAP) ensured that banks injected a further $200 billion in capital into the balance sheets (required capital-raising by regulators was $75 billion). These measures significantly calmed worries over the health of the financial sector in the United States. Following this, the Dodd-Frank Act was enacted in 2010 and various measures were put in place to rein in systemic risk, again notably an annual stress test of the systemically important financial institutions identified by the newly created Financial Stability Oversight Council. All of these measures have ensured substantial deleveraging of the US financial sector balance sheets, as seen in figures 5.1 to 5.3, to the point that they appear to be among the healthiest in the global economy at present.

In contrast to the United States, the regulatory response in Europe to the financial sector meltdown of 2007–2008 was half-baked. While the governments and central banks were quick to assist the ailing financial sector with asset and liability guarantees as well as liquidity injection, there was no substantial recapitalization of the financial sector on a scale similar to the TARP recapitalization for the US financial sector. This lack of recapitalization, in the presence of massive guarantees, meant that the financial sector had poor incentives during the recovery phase. Many undercapitalized banks invested in risky assets to rebuild equity capital, transferring risks in the process to the government, by undertaking "carry trades" on the southern periphery states' sovereign debt funded with retail and wholesale deposits (Acharya and Steffen 2015). This created a rather unfortunate nexus between financial and sovereign credit risks in the eurozone, bringing about twin crises in the fall of 2011, with the deteriorating macroeconomic and financial health in Spain and Italy (Acharya 2014). This nexus of sovereign and financial sector credit risks—first, the undercapitalized financial sector taking leveraged exposures to risky sovereigns, and second, further distress of risky sovereigns' inflicting collateral damage on the financial sector—appears to have had significant real consequences. Acharya, Eisert, Eufinger, and Hirsch (2014) show

that even relatively large borrowers in Europe whose lead banks have been from the southern periphery countries have been hoarding cash and cutting back investment and employment, behaving as though they were financially constrained, an effect that is not seen for borrowers whose lead banks are from the core European countries, which are, in turn, relatively better capitalized.

The carry-trade strategies and the undercapitalization of banks that induced them were left unchecked, and in fact were encouraged, by regulators, who conducted stress tests with little bite compared to the SCAP exercise of the United States. As Acharya, Engle, and Pierret (2014) document, the European stress tests granted zero risk weights to risky southern periphery states' sovereign debt so that effectively not much capital was raised by banks in response, and in fact the worst banks, such as Dexia, in terms of risks were found to require the least capital on the stress tests. Acharya and Steffen (2014) document that the pattern was hardly different with the Asset Quality Review and Comprehensive Assessment of the European Central Bank in 2014. Nevertheless, there is some overall improvement in the health of the financial sector relative to the fall of 2011 owing to the extraordinary liquidity injection and the ECB's promises to purchase securities from the market starting in December 2011.

Finally, the case of Asia can be explained by the continuing economic malaise in Japan since the regulatory failure in 1990s to recapitalize the banking sector, and the debt-based stimulus in China to ensure high growth rates in the short run even as the global economy suffered in the wake of the crisis of 2007–2008. In the case of Japan, the financial sector leverage remains high or increasing despite the continued macroeconomic weakness, which has only had temporary relief from "Abenomics," explaining the continuing rise of systemic risk in Japan since 2007.

The case of China, in contrast, is relatively straightforward. After the global financial and economic crisis of 2007–2008, Chinese state-owned banks have leveraged massively, including through the use of off-balance-sheet liabilities (not captured in *SRISK* analysis), to fund real estate and infrastructure projects, many of which are at unsustainable price levels and subject to high nonperforming rates. From 2008 to 2013, total credit outstanding in the Chinese economy grew from 125 percent to 240 percent. Much of this increase came about from stimulus expenditures undertaken since 2008 by local municipal governments. These

local governments, being prohibited from raising debt directly, set up special-purpose financing vehicles, which raised debt from shadow banks ("trusts") in China to invest in infrastructure and real estate development. The local government debt is backed mainly by revenues from land sales, but with house prices inevitably slowing down in the past few years from their astronomical growth rate before, the shadow banks—many of which are implicitly supported by parent state-owned banks—are exposed to significant losses, which has created the possibility of runs as well as of undercapitalized banks.

While China appears to have the time and resources (a large quantity of reserves and a high domestic savings rate), in addition to tight control of its banks and housing markets, the question is whether, like the United States in the post-Lehman era, it will make the tough recapitalization decisions for its banks before its own crisis comes to fruition, or whether, like Japan in the 1990s and Europe since the global recession, it will let undercapitalized banks continue to operate as zombie banks engaged in the misallocation of economic resources.

## Appendix

**Table 5A.1**
Number of Total Firms per Region

| Year | USA | China | Asia | EU |
|---|---|---|---|---|
| 2007 | 155 | 30 | 336 | 353 |
| 2008 | 159 | 39 | 373 | 389 |
| 2009 | 148 | 52 | 409 | 395 |
| 2010 | 148 | 58 | 429 | 397 |
| 2011 | 156 | 66 | 453 | 405 |
| 2012 | 157 | 70 | 458 | 404 |
| 2013 | 156 | 70 | 457 | 394 |
| 2014 | 153 | 70 | 451 | 385 |

*Note:* Using publicly listed financial firms in each country with active trading in common equity that are also in top 10 percent of financial firms by size (market equity), the number of total firms included in SRISK calculations in each year and geography are as above.

## Note

1. Quasi-market leverage is the notion of leverage in *SRISK,* which is the quasi-market value of assets divided by the market value of equity. This is in contrast to the regulatory notion of leverage, which corresponds to risk-weighted assets divided by a measure of the book value of the equity of a financial firm.

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# Progress and Confusion

## The State of Macroeconomic Policy

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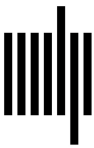

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