

Benchmarking the European Central Bank's Asset Quality Review and Stress Test – A Tale of Two Leverage Ratios

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Motivation

In an earlier assessment (Acharya and Steffen, 2014), we provided estimates that the capital shortfall of European banks might be as high as €750 billion using a bank's stock market valuation to measure leverage and by estimating losses to market value of equity in a global shock as severe as the 2008-2009 financial crisis. In November 2014, the European Central Bank (ECB) published its own assessment based on Asset Quality Review and Comprehensive Assessment (AQR) and provided capital shortfall estimates based on its stress test. Surprisingly, the two estimates are negatively correlated. This column argues that this striking divergence can be explained by the continued reliance on static risk-weights in the regulatory assessment. In fact, using the projected losses in the adverse scenario employed by the ECB and applying a different (non risk-weights based, i.e., simple) leverage ratio gives results much closer to ours.

Shortfall measures

We compare two measures of capital shortfall, the “Regulatory Shortfall Measure” as used by the ECB and “SRISK” as calculated by NYU Stern School of Business Volatility Lab. Both concepts are conceptually similar as they estimate losses in a stress scenario and determine the capital shortfall between a prudential capital requirement and the remaining equity after losses.

Regulatory shortfall measure: The stress scenario is the adverse scenario as described in ESRB (2014) at the end of 2016. The regulatory benchmark is the Common Equity Tier 1 (CET1) ratio that is defined as CET1 capital divided by risk-weighted assets (RWA). The ECB applies a hurdle rate of 5.5% in the adverse scenario. Note that the CET1/RWA ratio is the only benchmark (or leverage) ratio that has been applied in the comprehensive assessment of the ECB.

SRISK: The stress scenario is a systemic financial crisis with a global stock market decline of 40%. SRISK is our measure for a bank's capital shortfall in this scenario, assuming a 5.5% prudential capital ratio with losses estimated using the VLAB methodology to estimate the downside risk of bank stock returns.¹

¹ This capital shortfall measure has been implemented based on Acharya et al. (2012) and Brownlees and Engle (2013) and. The data are provided by New York University's VLAB (<http://vlab.stern.nyu.edu/welcome/risk/>). The theoretical motivation for the measure can be found in Acharya et al. (2010).

This scenario and the resulting SRISK measure use market data and market equity (instead of book equity) in determining leverage.

The following graphs always show SRISK (in million euros) on the vertical axis. Any changes are thus due to changes in the metric displayed on the horizontal axis. We use aggregate data at the country level, adding up the estimated shortfalls across all banks within each country. Our results are qualitatively similar if these graphs are displayed at individual bank level.

SRISK vs. Regulatory shortfall measure

Fig.1a plots SRISK against regulatory capital shortfalls from the 2014 comprehensive assessment. There is no correlation (in fact, the correlation is slightly negative) between the two capital shortfall estimates. Large banks in countries such as Germany, France or Spain had zero shortfalls in the regulatory assessment but show high SRISK. Interestingly, banks in France and Germany are among those with the lowest RWA/Asset ratios and Market-to-Book (MTB) ratios (see Table 1).

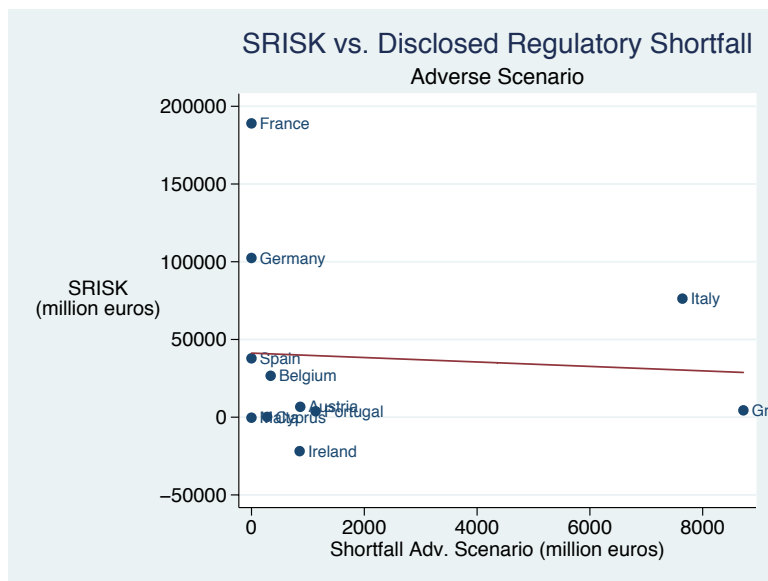


Fig.1a: SRISK vs. Regulatory shortfall measure

As can be seen in Fig.1a, there is a lower bound of zero associated with regulatory capital shortfalls. We effectively remove this lower bound by comparing SRISK with the *un-truncated* shortfall calculated using the CET1/RWA benchmark and a hurdle rate of 5.5% that has been applied in the adverse scenario. We use CET1 capital and RWA as of December 31, 2016.

Fig.1b plots the results. Banks in France and Germany now have even large negative shortfalls that can be interpreted as “surplus capital”. The correlation between SRISK and regulatory capital shortfalls now is large and negative. That is, those banks that have the highest SRISK also have the highest surplus capital under the regulatory capital framework.

Country	Market Equity/Assets	Equity/Assets	Market-to-Book	RWA/Assets	MarketCap	SRISK	ECB Shortfall Adverse Scenario
France	3.23%	4.24%	0.68	0.26	127,696	189,042	0
Germany	2.19%	3.83%	0.61	0.23	50,570	102,406	0
Italy	4.29%	6.49%	0.61	0.48	83,000	76,287	7,640
Spain	7.05%	7.22%	1.00	0.48	146,082	37,914	0
Belgium	6.89%	4.00%	1.18	0.31	17,305	26,616	339
Austria	5.31%	7.24%	0.72	0.49	11,453	6,677	865
Greece	8.26%	8.27%	0.95	0.58	26,945	4,360	8,721
Portugal	4.03%	4.48%	0.91	0.51	4,978	3,821	1,137
Ireland	6.11%	6.05%	0.98	0.43	9,816	3,053	855
Cyprus	3.75%	6.25%	0.57	0.69	229	167	277
Malta	11.97%	7.70%	1.58	0.49	1,557	0	0
Slovakia	9.20%	11.94%	0.70	0.59	964	0	0
Total	4.27%	5.27%	0.75	0.35	539,083	450,343	19,834

Table 1. Descriptive statistics

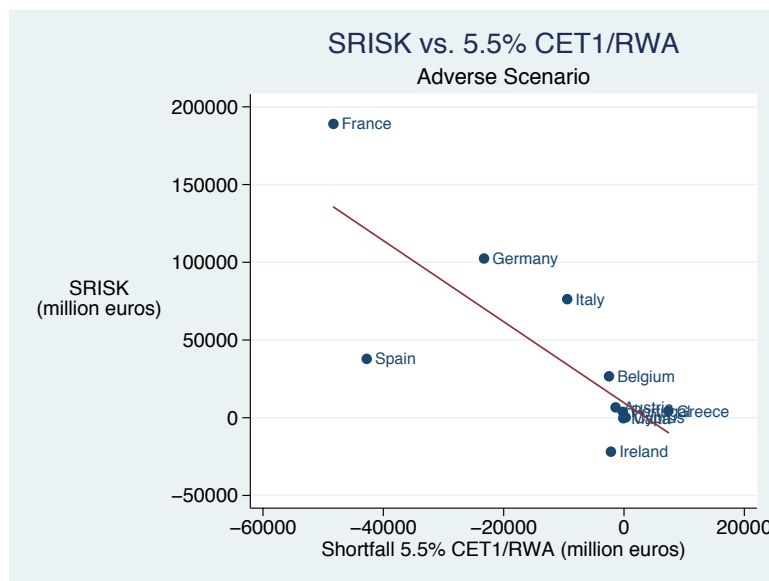


Fig.1b: SRISK vs. CET1/RWA

SRISK vs. Total Losses

We find that it is not necessarily the design of the adverse scenario and the associated losses that explain the negative correlation between our results and those of the ECB.² To see this, we calculate total losses in the adverse scenario as the sum of losses in the banking and trading book and plot SRISK against these losses (again on the country level) in Fig.2.

² In fact, the scenarios might even be more severe and comprise more risk factors compared to European Banking Authority (EBA) stress test of 2011. And even in 2011, reported losses were positively correlated with SRISK (Acharya, Engle and Pierret, 2014).

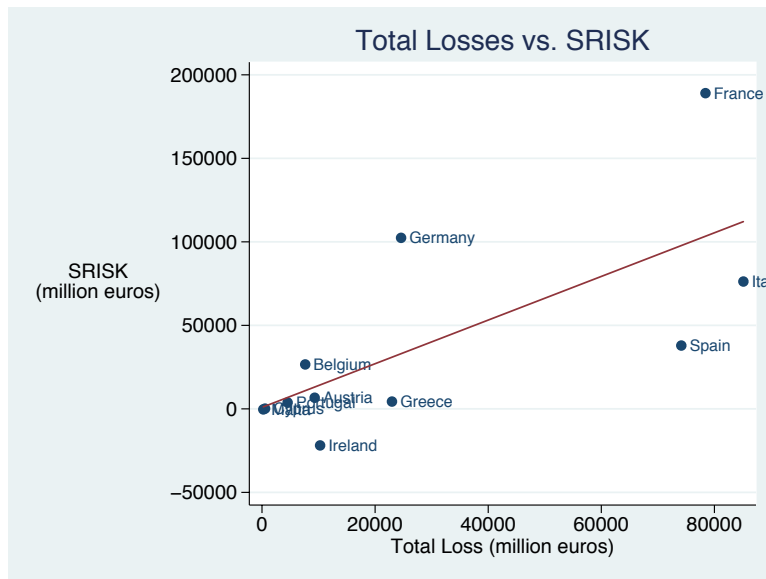


Fig.2: SRISK vs. Total Losses

SRISK is positively correlated with total losses incurred by banks in the adverse scenario. This result is reassuring given that regulatory losses are estimated with bottom-up asset-level loss calculations applied to book value of equity whereas VLAB losses that feature in SRISK calculation are estimated using a measure of downside risk of market value of equity in a market-wide equity downturn.

This suggests that it is not the actual losses but rather different ways of specifying prudential capital requirements that must be driving the negative correlation between SRISK and the results of the ECB. An important difference between the leverage ratio used in SRISK and the regulatory leverage ratio is the use of risk weights in the latter. These are static for banks using the standardized approach. But most banks, especially the large banks, use the internal ratings based approach (IRB) and calculate risk weights themselves. For example, Table 1 suggests that the average risk-weighted balance sheet of large German and French banks is only about 25% of its original size (measured by total assets).

SRISK vs. Book Equity/Assets LVG ratio

To make this point more explicit, we now use a different prudential capital requirement in the adverse scenario of ECB stress test after losses have been accounted for and that does not rely on risk-weighted assets. We calculate the realized Book Equity / Assets ratio in the adverse scenario (using the same losses that have been used by the ECB) and estimate shortfalls using a 5.5% benchmark. This capital requirement is akin to the 5.5% simple leverage ratio required by the Dodd Frank Act in the United States. We plot SRISK against this new shortfall measure in Fig.3.

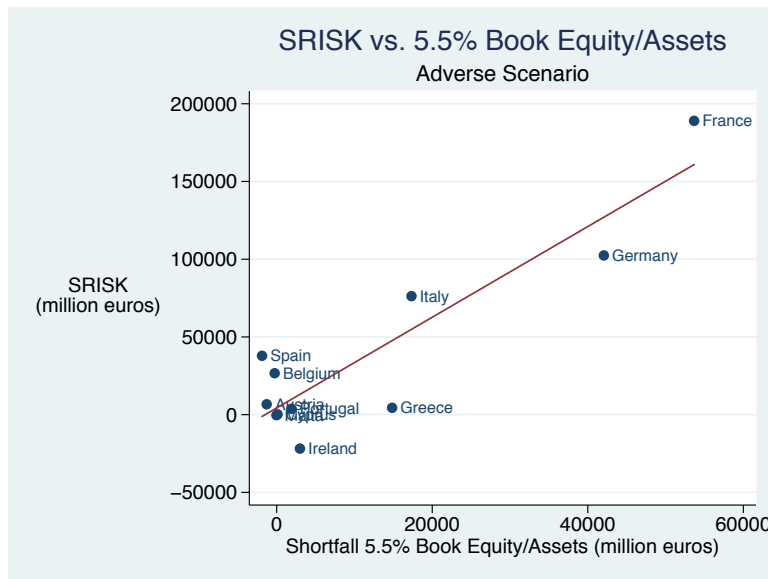


Fig.3: SRISK vs. Book Equity/Asset

The result is striking. We find a high and positive correlation between SRISK and shortfalls based on this leverage ratio. In other words, it is the use of risk weights in the regulatory benchmark that explains the shortfall differential between our and the ECB's assessment.

Implications

A crucial weakness of the previous stress tests in Europe has not been addressed this time around, in particular, the use of a single regulatory benchmark for capital adequacy that is based on static risk weights to assess the financial stability of the European banking system. Similar to 2011, the question whether a bank is adequately capitalized has two different answers using the same loss scenario but two different leverage ratios, a risk-weights based one and the non risk-based one. The latter corresponds to market-based estimates closely, highlighting that market assessments of risk are high precisely for those asset classes for which risk weights are zero (such as sovereign bonds in Eurozone) or low (such as residential mortgages and residential mortgage-backed securities).

Future stress tests should incorporate a robust approach that does not rely exclusively on risk-weighted assets but adopts multiple approaches (such as the simple leverage ratio and the one proposed in this column). Banks that do well on risk-weighted capital adequacy but poorly on other approaches are likely "arbitraging" the static nature of risk weights to lever up using zero or low risk-weight assets.

References

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