

Risk weighting and risk sensitivity

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Risk weighting, which has been the foundation of international capital regulation since the first Basel Accord, is increasingly attracting criticism, particularly in relation to the use of internal bank models [see Tallau 2014b]. On the one hand, critics claim that the selected risk weights have not proved to be risk sensitive ex post in many cases [see Hau et al 2013; Haldane 2012 for example]. On the other hand, in terms of the use of internal models, attention has been drawn to the significant differences in the results of the risk models used by different banks, as established in current studies on the trading and banking book by the Basel committee and the European Banking Authority (EBA) [see BCBS 2013a; BCBS 2013b]. This article analyses the extent to which regulatory risk weights reflect actual risk and the resulting consequences for the adequacy of capital resources.

Development of risk weights

If we look at the development of mean risk weights over time, a continuous reduction can be identified. ► Figure 01 shows the mean ratio of risk-weighted assets to total assets ("RWA density") over the last ten years for the 100 largest listed banks in OECD countries. The mean RWA density has fallen from 60.4 percent in 2003 to 50.6 percent in 2013. By contrast, the actual risk of bank assets – measured by the asset volatility derived from market prices [see Ronn/Verma 1986; Flannery 2014] – has hardly dropped at all. On the contrary, particularly during the financial crisis in 2008/09 a significant increase can be observed, which is not reflected in the slightest in the RWA density. This raises the suspicion that, for the banks analysed, the risk weights do not have a sufficient correlation with the actual risks of the assets.

Current risk sensitivity

What is the risk sensitivity for the current regulatory standard?

► Figure 02 illustrates the relationship between actual risk (measured using asset volatility) and RWA density for the 100 largest OECD banks in 2013. The regression line plotted demonstrates a high risk sensitivity of the current standard. Thus, on average an increase in asset volatility by one percentage point leads to a 16 percent rise in risk weightings. Deviations of individual points from the regression line can primarily be attributed to three factors.

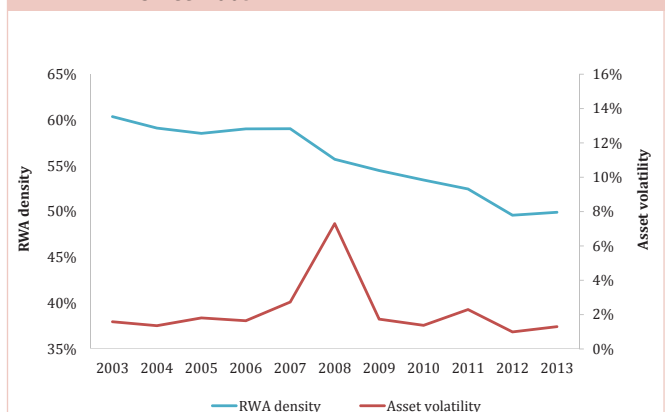
- The regulatory requirements are risk sensitive, but in some aspects a certain degree of standardisation is unavoidable. For example, correlations are not taken into account when adding together the risk weighted assets using the different risk classes.
- The regulatory requirements leave the banks with some scope. One area in which they enjoy a degree of freedom is the choice between standard approach, IRB foundation approach and advanced IRB approach. Particularly with the IRB approaches, there is further scope in estimation of the model parameters, which would even be deliberately used for manipulation purposes [see Hellwig 2010; Mariathanan / Merrouche 2014].
- Finally, asset volatility as a measure of „actual“ risk is also susceptible to estimating errors.

Taking these factors into account, the current standard appears to have sufficient risk sensitivity, satisfying the supervisory requirements for secure banks (from a micro prudential perspective). It can also be shown that the regression line corresponds almost exactly to the line that, according to the widespread Merton model [see Merton 1974], implies a (risk neutral) probability of default of 0.1 percent at a solvency coefficient of 8 percent, the value that is stipulated by the supervisory authorities as the target figure [see Gordy/Howells 2006]. As banks are also required to maintain a capital buffer, this target is apparently met by a majority of banks in 2013.

Risk sensitivity in crisis periods

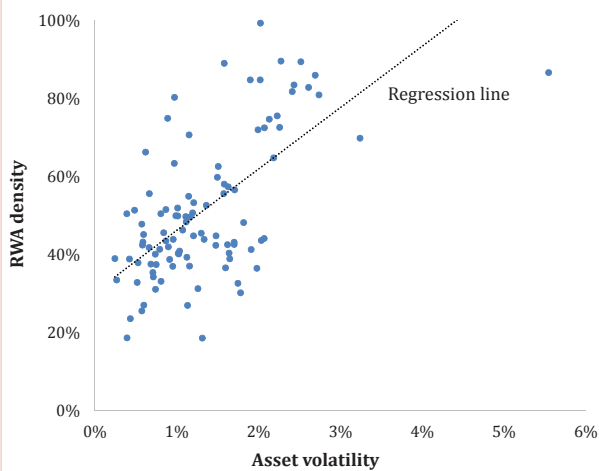
However, the picture changes dramatically when we look at crisis situations. ► Figure 03 shows the relationship between asset volatility and RWA density for 2008. Note the changed measure on the abscissa – for comparison, the regression line to be viewed as adequate

Figure 01: Development of RWA density and asset volatility for the 100 largest banks (OECD) since 2003



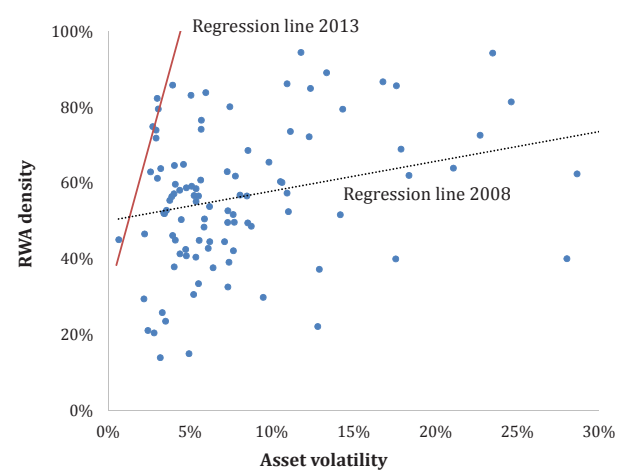
Source: Datastream/Worldscope, own calculations.

Figure 02: Empirical risk sensitivity for 2013
(RWA density depending on asset volatility)



Source: Datastream/Worldscope, own calculations.

Figure 03: Empirical risk sensitivity for 2008
(RWA density depending on asset volatility),



Source: Datastream/Worldscope, own calculations.

for 2013 is also plotted. While a certain level of risk sensitivity can be observed, it is significantly lower. On average an increase in asset volatility by one percentage point leads to a change in the risk weights of just over one percentage point. In addition, the relationship between RWA density and asset volatility has shifted. In this year, the actual risk increased drastically, while the RWA density only comes up marginally higher. Almost all banks are below the line viewed as adequate (2013 regression line) and thus had a higher (risk neutral) probability of default than 0.1 percent.

The risk sensitivity of the capital standard in its current form thus proves to be insufficient for crisis periods. In these phases, the risk weights clearly do not reflect the actual risk and are too low. A certain amount of stability in risk weights for a given portfolio over time (“through the cycle”) is desirable to avoid cyclically fluctuating capital requirements. However, risk weights should also adequately reflect the high uncertainty in crisis periods.

Consequences

There are two approaches that represent possible solutions to the dilemma outlined. On the one hand, the overall capital requirement could be further increased by raising the required solvency coefficient to protect against insufficient risk weights in crisis periods. However, this would call for a significant increase; similarly to the above analysis it is evident that the capital buffer for 2008 stipulated by Basel III would fall well short of being sufficient to achieve an appropriate probability of default for the majority of banks. Alternatively, the risk sensitivity could be increased for crisis periods, for example by calibrating the risk weights to market phases with significant stress. Thus, the risk weights would ex ante reflect the higher uncertainty in crisis periods. This method is currently being propagated by the Basel committee as part of their revision of trading book regulations for internal models [see Tallau 2014a].

Summary

The risk sensitivity of capital requirements should ensure that the capital to be maintained under the regulatory framework is tailored

to the risk of the bank assets. The current regulatory standards meet this requirement in normal times and guarantee a sufficient probability of default. However, regulatory mechanisms should also be effective in crisis periods. Here, it is clear that risk sensitivity declines considerably. Particularly when comparing normal years and crisis years, a very low risk sensitivity can be identified – in the crisis year 2008 the average risk weights were only slightly higher than in 2013, even though the actual risk was disproportionately higher. As a result, it appears questionable whether the reforms initiated by Basel III will be sufficient to prevent similar crisis in the future, or whether from a global perspective they actually represent cosmetic interventions and a significantly more far-reaching reform is needed.

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