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Capital after the first shock

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In many ways the crisis can be seen as having been enabled by Basel I because banks were able to play the game of pushing their risk “off balance sheet” with securitization. Basel II’s concept of holding capital relative to the risk of the individual assets is a great step forward from the simple leverage rules of Basel I, and the main pillars of i) risk-adjusted capital and ii) transparency to allow market discipline, force senior management to pay attention to risk because their investors can look over their shoulder.

There are far fewer places to ‘hide’ risk today. The principal of setting capital according to risk is a fundamentally good idea, however, the crisis has taught us all that some changes are needed, primarily in the way that we think about risk beyond the first shock.

In the frameworks of economic capital and Basel II, the practice of the risk profession has been to set capital in terms of the probability of the net asset value of the bank falling to zero within a year. In Basel II the stylized assumption is that the capital is set so that there is only a 0.1% chance of a bank failing per year. A one in a thousand chance of a bank failure seems quite conservative, but this crisis has illustrated to us that there several flaws in the assumptions.

The first flaw is that banks do not fail when the net asset value goes to zero; they fail when people stop lending them money. People stop lending to a bank when they are not confident that the bank’s value will remain high enough for the bank to still be in operation when it comes

time to be repaid. Taking this into consideration, the potential lender to a bank looks at the declared value of the bank today, subtracts the uncertainty caused by lack of transparency, and considers the possible evolution of the bank’s value from today until the end of the proposed loan.

One lesson from this consideration is that the target threshold for capital after the shock should not be zero, but a level sufficiently far above zero for lenders and depositors to be reasonably confident of getting their money back.

The second lesson is that the effective capital includes the perceived net present value of future income. A bank is a business. Even with a net asset value of zero, if the business is seen to be well run and have a positive franchise value, it will continue to be attractive to investors. To the extent that the future earnings are perceived as being stable, investors will also be prepared to give debt.

After a shock, and in times of crisis, a suitably conservative assumption for the value of these future earnings might be considered as part of the capital if management give a guarantee that the earnings will be locked-in to secure the debt and there will be no dividends until the net asset value has been rebuilt. The third lesson from considering when lenders lose confidence is that lack of transparency can

bring down the bank, even if the true underlying value of the bank is positive.

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assets, it is that the banks themselves do not know what they are worth because their systems and data are so fragmented. With such a fragmented picture, it is difficult to convince outside investors that the bank is safe; and the quality of internal information can determine whether a bank survives.

The second flaw that we have found in Basel II is that 0.1% is not just the probability of a bank failing over one year but it is also the probability of all banks failing in that year. One-tenth of a percent may be an acceptable risk to society for the failure of one bank, but it is an uncomfortably high probability when talking about the failure of the entire banking system.

The Basel II capital formula should have given us the clue to this phenomenon as it explicitly describes the failure of a bank as being due to a fall in a single systemic market factor. In that framework, when one bank fails, all banks fail, but risk professionals, collectively, didn't realize that systemic risk because the focus was on individual banks. Also, we did not realize the extent to which the market had become so homogeneous and tightly linked, with all financial institutions holding almost the same "diversified" asset mix.

The third flaw was to standardize everything to a one-year horizon. This applies to almost all risk measurement approaches that are in common use today, but it is most clearly illustrated by the Basel II capital formula. In Basel II the capital is set relative to a systemic shock whose size is 3.1 times the annual standard deviation of asset values. With the assumption of a normal distribution, a fall greater than 3.1 standard deviations has only a 0.1% chance of happening over one year. However, over two years there is a 1% chance of such a fall. The 1% chance assumes that there is no correlation in asset values from one year to the next.

However, factors such as GDP growth and stock market levels commonly have correlations of 0.5 to 0.7 from one year to the next. If there is

a 0.6 correlation in the level of the market from year to year, the probability of a 3.1 shock happening over two years rises to 4%. In other words, if a bank holds capital corresponding to a shock of 3.1 standard deviations, and is unable to replace it at the end of the first year, then there is a 4% chance of that capital being wiped out over the two years.



Practically, banks have a good chance of getting to the end of a year with a positive net value. However, by the end of that year, they are so depleted that they have very little chance of withstanding a continued downturn in Year 2. That is what we are witnessing today.

A fourth flaw discovered was the pro-cyclicality of the capital required under Basel II. As we entered the crisis, the financial ratios of the companies deteriorated therefore the risk models required greater capital at exactly the same time as capital became scarce.

Given the above simplified description of the problems with the economic capital and Basel II capital frameworks, what can we do to retain the link between a bank's risk profile and the capital that it holds? The problem of transparency has an obvious solution: better systems and more disclosure.

The problem of the systemic nature of all banks failing at once has a couple of potential

solutions. One is a blanket increase in required capital ratios, for example, from 8% to 12%. Another solution is to require an increase in capital for those banks whose net asset value is highly correlated with the national market. This is basically the principle of CAPM (the capital asset pricing model).

A more fundamental change in thinking is needed to tackle the problem of banks only being able to survive only one year. Banks and risk professionals need to look beyond the one year bonus horizon and adopt multi-year measurements of risk. For example, we could standardize to a three, five, or ten year horizon. Alternatively we could adopt an “investment capital” approach whereby we look at the distribution of the net asset value of the bank as if it just took the existing assets and liabilities and let them roll-off over their remaining lives. The risk metric would then be the probability that the bank will have a positive value at the end of its life. A 90% chance of surviving 10 years without capital injection is a much stricter standard than requiring a 99.9% chance of surviving one year.

The multi-year approach requires a view on how the economy may perform over multiple years: a downturn may be unlikely over the next year, but is almost certain over ten years. The multi-year approach also requires the calculation of the year-to-year correlation between market conditions. Another way to look at multi-year capital would be to move away from the statistical approach and use stress testing, whereby banks have to show they can survive a multi-year stress. The main danger with permanently basing capital on stress tests is that, over time, banks will develop products that avoid the prescribed stresses but are vulnerable to a set of real world stresses that have not been thought of.

This multi-year approach requires risk models that project out over the life of the assets they represent and includes mean reversion so that when the markets are above the long term average the models signal increased risk of a fall and, consequently, increased capital. This mean reversion, along with taking a long term view will smooth the capital requirements across the economic cycle and reduce the procyclicality of risk-based capital.

One last thing we can do is to loosen the link between capital and pricing. Many banks have adopted the concept of Risk Adjusted Return on Risk Adjusted Capital (RARRAC) to link their pricing models to their risk models. In most circumstances RARRAC works well, and it is a much better approach than having no risk adjustment, but there are several fundamental methodological problems with RARRAC that cause it to price assets wrongly in some circumstances. Linking pricing to capital also gives a strong incentive for every lending officer to try to drive down the capital associated with their transaction.

A more complete approach is to use a metric like CAPM, which is linked to the risk of the transaction and its correlation with the external market, rather than its correlation with the internal portfolio. This keeps risk as part of the determinant of pricing for the lending officer, but allows capital management to go back to being a central corporate function managed directly by the CFO.

These are interesting times, but they are only extraordinary when you look on a short horizon. In many ways, this crisis is teaching us that we must take the long view. □

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