

“Weaknesses in Regulatory Capital Models and Their Implications”

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Introduction

The global financial crisis in 2008 highlighted the importance of having an adequate level of capital to prevent a company from becoming bankrupt. Capital requirement can be in the form of regulatory capital (i.e. capital amount required by regulators). Whilst regulatory capital model has certain weaknesses with implications to different stakeholders, there are certain ways for regulators and/or companies to address these weaknesses.

Capital Requirement

Capital requirement is the determination of how much capital is needed to sustain operating losses while meeting liabilities demand. For instance, to guide the determination of capital amount, Basel Committee on Banking Supervision issued Basel II which includes recommendations on banking laws and regulations. Basel II set up capital management requirements to ensure that a bank has adequate capital for the risks it is exposed to through its lending and investment practices. In general, the higher the risk level, the greater the amount of capital required and this is the principle of risk-based capital management.

There were three levels of sophistication evolve over the years for capital requirements. At the simplest level, all companies can be required to maintain a minimum amount of capital expressed as a fixed percentage of income. An example would be Basel II's operational risk calculation under the Basic Indicator Approach. □The next level of development involves the use of company-specific minimum capital requirements through the use of fixed factors that are applied to various items of a company's reported balance sheet or financial statement. An example would be Basel II's operational risk calculation under the Standardized Approach. □The third level in the development of capital requirements puts increased focus on the use of company specific internal models to reflect a company's unique risk profile and corresponding capital requirements. An example would be Basel II's operational risk calculation under the Advanced Measurement Approach.

Purpose and importance of capital requirement

Capital is important because it is one way for companies to prevent it from being liquidated or bankrupt as it provides a buffer against insolvency. As capital is provided by shareholders, it is a source of fund and part of shareholders' equity which is not directly dependent on the company performance (e.g. profit of the company). It provides a good

defense against bad days for the entity. Without adequate capital, a company can be bankrupt or at the brink of collapse as demonstrated by large financial institutions (e.g. Lehman Brothers) during the global financial crisis in 2008. Hence, having adequate capital is important to prevent a company from bankruptcy.

Regulatory capital

Regulatory capital is the amount of capital required by regulation and/or regulator. For instance, for countries which adopted Basel II accord, Basel II's Pillar 1 establishes the minimum capital requirement and Pillar 2's Internal Capital Adequacy Assessment Process (ICAAP) will either determine no additional capital is needed, or additional capital is required above Pillar 1 levels. Basel II calculates a bank's overall minimum capital requirement as the sum of capital requirements for credit risk, operational risk, and market risk.

Examples of solvency regimes include European Union's Solvency Capital Requirement (SCR) under Solvency II, US Insurance Risk Based Capital (RBC) Solvency Framework which provides a capital adequacy standard that is related to risk and which provides a safety net for insurers, and Office of the Superintendent of Financial Institutions (OSFI)'s Minimum Continuing Capital and Surplus Requirements (MCCSR) guideline for Canada's life insurance companies, etc.

Economic capital

Economic capital is calculated by determining the amount of capital that the entity needs to ensure that its realistic balance sheet (stated in market value) stays solvent over a certain time period with a pre-specified probability. It is often parameterized as an amount of capital that a bank needs to absorb unexpected losses over a certain time horizon at a given confidence interval (i.e. calculated as Value At Risk (VAR)) and it can cover market risk, credit risk and operational risk. Economic capital can be seen as a tool developed and implemented by individual entity for internal risk management purpose. It allows companies to consistently assess risk and attribute capital to cover the economic effects of risk-taking activities. In particular, economic capital analysis typically involves an identification of the risks from certain activities or exposures, an attempt to measure and quantify those risks, the aggregation of those risks, and an attribution or allocation of capital to those risks.

Actual available capital

Actual available capital is the actual amount of capital maintained by the entity. Many banks' definitions of available capital are tangible equity, tier one capital or capital definitions used by rating agencies. Among the various items that can be included in the definition of available capital (some of them included in the regulatory definition of capital) are common equity, preferred shares, adjusted common equity, perpetual non-cumulative preference shares, retained earnings, intangible assets, surplus provisions, reserves, contributed surplus, current net profit, planned earnings, unrealized profits and mortgage servicing rights. In determining the actual capital amount to be maintained, management of an entity can consider regulatory capital requirement and economic capital (where exists), capital or solvency level perceived to be required to maintain a specific external rating assigned by credit rating agencies, levels set by peers and comparable competitors, shareholders' influence, etc.

Regulatory Capital Gains Prominence

Without regulatory capital requirement, companies may not have an incentive to keep a large amount of capital as companies can have alternative use of the fund to engage in risk-taking business initiative(s) with a view to create profits. Also, raising capital dilutes the return for existing shareholders and senior management of companies who have share options. This can create disincentive for senior management to raise capital. In June 2007, U.S. Federal Deposit Insurance Corporation Chair Sheila Bair explained the purpose of capital adequacy requirements for banks:

“There are strong reasons for believing that banks left to their own devices would maintain less capital—not more—than would be prudent. The fact is, banks do benefit from implicit and explicit government safety nets. Investing in a bank is perceived as a safe bet. Without proper capital regulation, banks can operate in the marketplace with little or no capital. And governments and deposit insurers end up holding the bag, bearing much of the risk and cost of failure. History shows this problem is very real ... as we saw with the U.S. banking and S & L crisis in the late 1980s and 1990s. The final bill for inadequate capital regulation can be very heavy. In short, regulators can't leave capital decisions totally to the banks. We wouldn't be doing our jobs or serving the public interest if we did.” (Source: Remarks By Sheila Bair Chairman, U.S. Federal Deposit Insurance Corporation; 2007 Risk Management and Allocation Conference, Paris, France, June 25, 2007, <http://www.fdic.gov/news/news/speeches/archives/2007/chairman/spjun2507.html>)

The global financial crisis in 2008 and the collapse of big financial institutions such as

Lehman Brothers illustrated the point that certain entities may not have sufficient capital if left to their own accord in determining the amount of capital required for the entity. As a result, regulators in different countries are re-examining regulatory capital requirements and capital adequacy. Basel 2.5, agreed in July 2009, enhanced the measurements of risks related to securitization and trading book exposures. Basel III, released in December 2010, set higher levels of capital requirements and introduced a new global liquidity framework. The reforms raise both the quality and quantity of the regulatory capital base and enhance the risk coverage of the capital framework. Also, a methodology is developed to identify global systemically important banks (SIBs) and there are additional loss absorbency requirements for SIBs. Basel 2.5 and Basel III is a response from regulators to the lessons learnt from the global financial crisis.

Weaknesses in Regulatory Capital Models and Their Implications

Whilst regulatory capital is very important in preventing company failures, there are certain weaknesses in regulatory capital models. Below describe the weaknesses and their implications.

The first weakness in regulatory capital model is regulatory capital amount can be significantly different from the actual desirable capital level that is determined by sophisticated risk-based capital methodology. This can lead to significantly undercapitalized or overcapitalized companies if the companies' actual capital is determined solely based on regulatory capital. There are different implications to different stakeholders if a company is undercapitalized or overcapitalized.

Undercapitalized companies can lead to company failures as companies may not have sufficient capital to meet its obligations. The failure of large financial institutions which are "too big to fall" can lead to widespread effect in the industry and/or economies and great impacts to many stakeholders. For investors and creditors around the globe, they have to suffer financial losses. For governments and taxpayers, government bail out of the nearly failed companies can be a big financial drain to the government and its taxpayers. For credit rating agencies, they have reputation and credibility loss as large financial institutions with high credit risk rating assigned by well-known credit rating agencies ended up being broke or on the brink of bankruptcy. For counterparties which have trades and/or services with the failed companies, they suffered losses of trades, profits, assets, services and/or risk protection. For instance, for individuals or companies that bought insurance or Credit Default Swap (CDS) protection from large global financial institutions that ended up being failed, they would have lost the protection they sought from the financial institutions.

Overcapitalized companies, on the other hand, can result in decreased competitiveness of the entity. For instance, if some potential competitors could provide the firm's products or services without having the same level of capital required, competitors can offer the products or services at a lower price and the firm would have a chance of losing business to them. Shareholders and investors may view companies in certain industry (e.g. financial industry) with decreased return to be less attractive than companies in other industries (e.g. non financial industries) which are less capitalized. Although the large regulatory capital requirement of financial institutions may decrease their attractiveness to shareholders and investors, the new regulatory requirements on increased regulatory capital hopefully can lead to increased stability in the financial industry and reduce the chance and impact of systemic risk in the financial industry. This stability may to a certain extent restore public and investors' confidence in financial institutions.

Another weakness in regulatory capital model is that regulatory capital is not as effective as economic capital in facilitating risk-based decision. Economic capital can be calculated based on the risk of the portfolio or exposure or project and this can facilitate risk-based decisions (e.g. risk-adjusted performance assessment and risk-based capital allocation). Regulatory capital, on the other hand, is determined at an aggregate level (e.g. company level) and cannot be assigned to portfolio or exposure or project level to facilitate risk-based decisions.

In addition, there is a weakness in regulatory capital model which relates to the timeliness of reporting and monitoring of regulatory capital. There can be untimely reporting and monitoring of regulatory capital which does not reflect up-to-date risk profile of the entity that can be affected by events such as financial crisis, significant default of counterparties, etc. Regulatory capital is reported to and monitored by regulators periodically on a specified frequency (e.g. capital ratios are reported quarterly to US regulator in Thrift Financial Report). During times of crisis (e.g. global or national financial crisis, bankruptcy of large financial institutions), the periodic capital reporting to regulator may not be timely enough to detect and/or prevent company failures or bankruptcies and this can have widespread impact as systemic risk is present in the financial industry.

Ways for Regulators and/or Companies to Handle Weaknesses in Regulatory Capital Models

During times of high risks (e.g. financial crisis or default of financial institutions), regulator can request more frequent update and reporting of capital and other financial figures and indicators for monitoring purpose. Examples of financial figures or indicators to be reported include capital amount, debt amount, solvency or insolvency ratios, liquidity ratios,

current ratios, leverage ratios, etc. This can allow regulators/governments/industry bodies to monitor and detect risks such as liquidity and insolvency risks and perform follow up actions accordingly. Even if there is no regulatory requirements, companies can also consider increased frequency of measurement, reporting and monitoring of capital and other financial figures and indicators to facilitate better and more timely monitoring and follow-up.

Ways for regulators to address weaknesses in regulatory capital models

Regulators can regularly revisit the method of determining regulatory capital. For instance, regulators can increase regulatory capital amount if past method of determining regulatory capital resulted in under capitalized companies as demonstrated by failures of companies. Also, regulators can perform reasonableness checks on capital determination method against method used by other countries with best practices. Furthermore, regulators can consider making good use of economic capital when determining the regulatory capital amount. As economic capital is risk capital that is determined based on economic risk that an entity is running or collecting as a going concern, regulator can consider setting regulatory capital amount or *minimum* regulatory capital amount as economic capital amount if the regulators think it is appropriate (e.g. if regulators assessed that the economic capital is not understated and hence provides good protection to the entity). Using economic capital to assess the adequacy of regulatory capital is in accordance with Basel II's Pillar 2's Internal Capital Adequacy Assessment Process (ICAAP).

Regulator can also explore ways to introduce granularity to regulatory capital requirements to better implement risk-based capital. Instead of applying a high percentage in determining regulatory capital amount as a response to global financial crisis, regulator can consider identifying and applying additional measures based on risks. For instance, for big financial institutions which are "too big to fail", additional capital can be required which can serve as additional protection against failure. Basel III already requires global systemically important financial institutions (SIFIs) to have higher loss absorbency capacity depending on the systemic importance of the financial institutions. As financial institutions which are too big to fail can pose systemic risk to the whole industry, the extra capital requirement can help to reduce systemic risk. Another example is for companies to create a pool or fund where it can be used to cover unexpected loss. The pool or fund amount can be determined based on risks faced by the company. Risks can be determined after taking into account of factors such as credit risk rating of the company, amount of regulatory fines and/or fraud (if any), litigation cases, internal loss events, number and significance of issues identified by various parties (e.g. regulator, external auditor), etc. By exploring ways to increase granularity in determining regulatory capital amount to better implement risk-based capital, the regulatory capital amount can better reflect the risk level of the company.

Ways for companies to handle weaknesses in regulatory capital models

Whilst companies should keep the regulatory capital amount at a minimum, companies can determine actual available capital amount for their companies by taking into account other factors such as economic capital (if any), risk level, capital or solvency level perceive to be required to maintain a specific external rating assigned by credit rating agencies, etc. This can lower the company's chance of bankruptcy as the actual available capital amounts take into consideration of other factors which reflect economic reality and the risks the company face.

Companies should proactively implement and improve risk management controls and/or economic capital modeling as they can improve the financial stability and public confidence in the company and the industry, which are the objectives of having regulatory capital. Companies can use economic capital as a tool to improve business decisions as it facilitates risk-based decisions such as risk-based pricing, risk-adjusted capital allocation and performance assessment. With risk-based performance assessment, everyone in the company is encouraged to manage risk and not take high level of risk which exceeds the company's risk appetite. Having good and effective risk management (e.g. effective liquidity risk management, asset liability management, etc.) is one way for companies to prevent the company from bankruptcy. In addition, when companies implement better economic capital modeling, this can have widespread benefit across the industry as various stakeholders (shareholders, government, industrial bodies, etc.) can benchmark companies in the same industry. Also, companies like banks tend to look to peers in choosing external credit ratings and targeting their capital ratios. Hence, financial institutions with good economic capital modeling can encourage their peers to adopt the same and this can benefits the industry as a whole with increased financial stability and public confidence in the financial industry.

Conclusion

After the global financial crisis in 2008, regulatory capital is gaining importance as an adequate level of capital is crucial in providing protection against company bankruptcy and restoring public confidence in the financial industry. Mandatory capital requirement can be brought about by regulatory requirements as companies may not maintain a sufficient level of capital if left to their own devices. However, regulatory capital model has weaknesses in that regulatory capital may not reflect the economic reality and risks an entity faces. In addition, regulatory capital is not as effective as economic capital in allocating capital within an entity, encouraging risk management and risk-based business decisions (including

risk-based capital allocation and risk-adjusted performance assessment). Moreover, regulatory capital reporting and/or monitoring may not be timely enough to detect and/or prevent company failures.

Although regulatory capital models may have weaknesses, there are certain ways for regulators and companies to handle these weaknesses. These include introducing granularity in the method of determining regulatory capital, regularly revisit regulatory capital requirement, determining actual available capital based on factors in addition to regulatory capital, reporting and monitoring of financial figures (including capital amount) on a timely basis, and adopting and improving economic capital modeling and risk management. Having effective risk management and risk-based capital determination are ways to prevent company failures and bankruptcies.

References:

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- 5) *"Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework— Comprehensive Version" (Basel Committee on Banking Supervision Publication, June 2006).*
- 6) *"Range of practices and issues in economic capital modeling" (Basel Committee on Banking Supervision Publication, March 2009).*
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Annex H "Stocktake of regulatory approaches to FinTech. Annex I "Members of the FSB FinTech Issues Group. Financial Stability Implications from FinTech Supervisory and Regulatory Issues that Merit Authorities' Attention. 27 June 2017. The Financial Stability Board (FSB) is established to coordinate at the international level the work of national financial authorities and international standard-setting bodies in order to develop and promote the implementation of effective regulatory, supervisory and other financial sector policies. Its mandate is set out in the FSB Charter, which governs the study of investment problems is constantly at the center of economic discipline. This situation is because investments affect the deep foundations of financial and economic activity, determining the growth of the economy as a whole. It follows from the history that the concept of "investment" originated from the Latin "investire" - to vest. In the period of the feudal system, the word Often a result of mathematical models undone by their weakest link: their assumptions or their statistical properties. In the case of the Gaussian copula such a weak link was the lack of tail dependency in Monte Carlo simulation studies. This paper is about modelling dependencies in economic capital models. We start with defining economic capital along with the more recent regulatory developments occurring under Basel II, Solvency II and the UK's current ICA regime. Each of these has greatly influenced the scope of the work currently undertaken by many insurance companies and groups worldwide in this area. We model the frictions affecting the relationship between borrowers and their lenders using the CSV framework of Townsend (1979) and Gale and Hellwig (1985) because it provides a rationale for the use of debt financing and for the deadweight losses associated with bankruptcy. In our work, the limit on banks' leverage comes from regulatory capital requirements that are put in place to reduce the overinvestment (or excessive risk taking) caused by limited liability and deposit insurance (Kareken and Wallace, 1978).¹⁰ In addition, to keep track of. Van den Heuvel (2008) analyzes bank capital regulation in a macroeconomic model without aggregate shocks in which deposits or liquidity services to households and bank leverage induces banks to get involved in risk shifting.