The Quarterly Review of Economics and Finance 57 (2015) 32–45

Contents lists available at ScienceDirect

The Quarterly Review of Economics and Finance

journal homepage: www.elsevier.com/locate/qref

# Capital and risk in commercial banking: A comparison of capital and risk-based capital ratios

Thomas L. Hogan*

*Johnson Center for Political Economy, Troy University, Bibb Graves Hall 137L, Troy, AL 36082, United States*

ARTICLE INFO

*Article history:*
Received 29 January 2013
Received in revised form 4 November 2014
Accepted 15 November 2014
Available online 10 December 2014

*JEL classification:*
G21
G28
G32

*Keywords:*
Banks
Capital
Risk-based capital
Regulation
Volatility
Insolvency

ABSTRACT

Recent changes in U.S. banking regulation have emphasized risk-based capital (RBC) as an indicator of bank soundness. This paper compares the RBC ratio to the standard capital ratio of equity over assets. We regress the capital and RBC ratios of bank holding companies from 1999 through 2010 against two measures of bank risk: the standard deviation of stock returns and the *Z*-score indicator of bank solvency.We find that the capital and RBC ratios are statistically significant predictors of both measures of risk. Comparing the capital and RBC ratios to each other, however, we find that the capital ratio is statistically significantly better than the RBC ratio as a predictor of risk, especially in the period since the recent financial crisis.

© 2014 Published by Elsevier B.V. on behalf of the Board of Trustees of the University of Illinois.

## 1. Introduction

Risk-based capital (RBC) regulation is an important component of U.S. banking regulation. The RBC ratio was adopted to improve the identification of risky banks, yet there is disagreement on whether the RBC ratio provides any added benefit over the standard capital ratio of equity over assets. This paper examines the capital and RBC ratios of bank holding companies (BHCs) as predictors of the banks' equity risk as measured by the standard deviation of their stock returns and their risk of insolvency as measured by their *Z*-scores. Although the capital and RBC ratios are correlated to both of these measures of risk, we find that the simple capital ratio is statistically significantly better than the RBC ratio as a predictor of both *Z*-scores and the standard deviation of stock returns. The difference is most evident in the period since 2007.

In 1991, the Federal Reserve adopted risk-based measures of regulatory capital for commercial banks based on the Basel Accords.[1] The Fed has since adopted revisions to these regulations based on Basel II and Basel III.[2] The Basel regulations are intended to "strengthen the soundness and stability of the international banking system" through standardized RBC requirements (1988, p. 1). However, many works have disputed theoretical and empirical the effectiveness of RBC regulations. As VanHoose (2007, p. 3695) describes, "the intellectual underpinnings for the proposed Basel II system are not particularly strong," and, as discussed later, there is evidence that RBC regulations have actually increased rather than decreased risk in the U.S. banking system.

Despite their goal of reducing bank risk, RBC regulations appear to be one of many factors that contributed to the recent financial crisis. Friedman (2011) and Dowd, Hutchinson, Ashby, and

---

* Tel.: +1 334 808 6283; fax: +1 334 670 3708.
*E-mail address:* tlhogan@troy.edu

[1] Although U.S. banks are regulated by several agencies including the Federal Reserve, the Office of the Comptroller of the Currency (OCC), and the Federal Deposit Insurance Corporation (FDIC), we will refer to these regulators simply as the Fed.

[2] The Basel Accords or "Basel I" refers to the policies recommended by the Basel Committee on Banking Supervision (1988). "Basel II" refers to the subsequently issued and superseding document Basel Committee on Banking Supervision (2004). "Basel III" refers to the revised rules and quantitative impact study issued by the Basel Committee on Banking Supervision (2010).

http://dx.doi.org/10.1016/j.qref.2014.11.003
1062-9769/© 2014 Published by Elsevier B.V. on behalf of the Board of Trustees of the University of Illinois.

Hinchliffe (2011) demonstrate that in the early the 2000s, RBC regulations caused U.S. banks to increase their holdings of risky assets such as mortgage-backed securities (MBS). On these grounds, many economists have called for repeal or reform of U.S. RBC regulations since they do not appear to have been effective at limiting bank risk. The U.S. government's official commission on the financial crisis (Financial Crisis Inquiry Commission, 2011) found that RBC regulations "accommodated the shift to increased leverage" (p. 49) and were one reason for "the popularity of mortgage securitization" (pp. 475–476). To curtail these issues, the Fed has begun implementing stricter RBC standards effective as of January, 2014. It remains to be seen, however, whether these new regulations will effectively limit bank risk.

We offer some evidence to this debate by examining the relationship between a bank's regulatory capital and its risk of insolvency. We analyze the capital and RBC ratios of U.S. BHCs as predictors of the standard deviation of their stock returns and their *Z*-scores from 1999 through 2010. Standard capital theory predicts that higher levels of capital and RBC will be associated with lower stock return volatility and higher *Z*-scores. We find evidence that the capital and RBC ratios are related to both measures of risk as expected. However, the RBC ratio is not found to be better than the capital ratio as a predictor of bank risk. The capital ratio is a significantly better predictor in the period from 2007 through 2010. There is no significant difference between the capital and RBC ratios in the period prior to 2007.

The next section discusses the literature on bank capital and risk of insolvency. Section 3 outlines the empirical model. Section 4 describes our sources of data. Results of our analysis are presented in Section 5, and robustness checks are discussed in Section 6. Section 7 concludes.

## 2. Capital and risk

Higher capital has long been known to reduce bank risk. Capital acts as a buffer against liquidity shocks (Diamond & Rajan, 2000, p. 2431) and against portfolio losses (Avery & Berger, 1991, p. 848; Cordell & King, 1995, p. 532). Formalized capital requirements were adopted by the Fed in 1981. The savings and loan crisis of the early 1980s demonstrated that capital requirements based on the simple capital ratio of equity over assets might not be sufficient to discourage banks from taking excessive risk. This was a major reason that drove the United States to join the international banking agreement known as the Basel Accords. In an effort to improve the monitoring of banks' risk-taking activities, RBC requirements were introduced in 1991.

Adoption of the Basel Accords has required the Federal Reserve to "completely overhaul bank capital requirements" (Furfine, 2000, p. 1). Every major BHC is now required to disclose its RBC ratio in quarterly reports to the Federal Reserve. The RBC ratio is calculated as total risk-based capital over risk-based assets. "Risk-based capital" is the sum of Tier 1 and Tier 2 capital adjusted for items such as intangible assets and unrealized gains or losses. "Risk-weighted assets" (RWA) is the sum of all bank asset categories multiplied by their designated risk weightings. Risky assets receive high risk weightings which lower the RBC ratio while safer assets are assigned low weightings which raise the RBC ratio. For example, holdings of subordinated debt with less than 1 year to maturity receive a rating of 0% while subordinated debt with five years or more to maturity receives a rating of 100%. All AAA-rated securities, including MBS, receive a risk weight of 0%.

All banks are required to maintain minimum RBC ratios of 6% risk-based capital as a portion of RWA. In addition, banks face two further requirements: Tier 1 capital must be at least 4% of RWA and 3% of total assets.[3] These supplemental requirements, however, are unlikely to be binding constraints on bank risk since for most banks, Tier 1 capital makes up most of total capital. Indeed, Avery and Berger (1991, p. 856) finds that banks, especially large banks, are much more likely to violate the requirement of total capital as a percentage of RWA than either Tier 1 requirement. In addition, Acharya, Engle, and Pierret (2013) finds that using a Tier 1 capital requirement as a secondary measure is not likely to improve risk identification. "[M]isguidance on the asset risk-return allocation is likely to hold in future stress tests, despite the new Basel III Tier 1 Leverage ratio" (Acharya et al., 2013, p. 22). Admati, DeMarzo, Hellwig, and Pfleiderer (2011) objects that revisions to the Basel Accords have not solved the underlying problems of leverage and risk in the banking sector. "The proposed Basel III requirements, while moving in the direction of increasing capital, still allow banks to remain very highly leveraged" (p. 1).

Capital regulation is only one component in the complex system of banking regulations. In addition to the requirements for bank capital as percentages of RWA and total assets, the implementation of Basel III includes "stress tests" of the firms stability in response to economic shocks and so-called "living wills" that dictate how a bank is to be resolved in the case of bankruptcy.[4] This study focuses on the RBC ratio alone for two reasons. First, sufficient data is not available to test the effectiveness of stress tests and living wills. Stress test are often based on the banks' own proprietary trading models which are not available to the public. Some preliminary living wills have been made publicly available, but their details are still being negotiated with the Fed, and their execution relies in many ways on managerial discretion. Second, the stress tests and living wills are only secondary measures that only become important when a bank's solvency is in question. If RBC regulation is effective at preventing bank failures, then stress tests and living wills may never be necessary.

It is widely accepted that higher levels of capital decrease bank risk. "Virtually every bank failure model finds that a higher equity-to-asset ratio is associated with a lower probability of failure" (Berger, Herring, & Szegö, 1995, p. 409). Models of RBC, however, show mixed results. On one hand, rating assets by their relative levels of risk may encourage banks with riskier assets to maintain higher levels of capital. On the other hand, assigning each type of asset a specific risk weight may give banks the incentive to acquire types of assets that are mis-rated by the regulator. Considering these effects, it is unclear whether stricter RBC standards should be theoretically expected increase or decrease risk at the individual bank level or overall risk in the banking system. "The theoretical banking literature is sharply divided about the effects of capital requirements on bank behavior and, hence, on the risks faced by individual institutions and the banking system as a whole" (VanHoose, 2007, p. 3681).

The empirical evidence on RBC is also mixed. Several early studies of RBC regulation find the RBC ratio to be an effective tool for monitoring bank risk. Avery and Berger (1991) estimates the Fed's RBC ratio for BHCs from 1982 to 1989. The study compares the capital and RBC ratios as predictors of several measures of bank performance: net income, the standard deviation of net income, nonperforming loans, loan charge-offs, and the probability of the bank's failure. It finds that "risk weights provide an improvement

---

[3] With the implementation of Basel III, these minimums have been raised such that Tier 1 capital must be 6% of RWA and 4% of total assets as of January 2014 ("Regulatory Capital" 2013).

[4] Details of these new regulations can be found in "Risk-Based Capital" (2010), "Banks and Banking" (2011), and "Regulatory Capital" (2013).

Download English Version:

https://daneshyari.com/en/article/982163

Download Persian Version:

https://daneshyari.com/article/982163

Daneshyari.com