



# Accounting for banks, capital regulation and risk-taking<sup>☆</sup>



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## ABSTRACT

This paper examines risk-taking incentives in banks under different accounting regimes in presence of capital regulation. In the model the bank jointly determines the capital issuance and investment policy. Given an exogenous minimum capital requirement, lower-of-cost-or-market accounting is the most effective regime that induces the bank to issue more excess equity capital above the minimum required level and implement less risky investment policy. However, the disciplining role of lower-of-cost-or-market accounting may discourage the bank from exerting project discovery effort ex-ante. From the regulator's perspective, the accounting regime that maximizes the social welfare is determined by a tradeoff between the social cost of capital regulation and the efficiency of the bank's project discovery efforts. When the former effect dominates, the regulator prefers lower-of-cost-or-market accounting; when the latter effect dominates, the regulator may prefer other regimes.

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## 1. Introduction

The recent financial crisis has raised a lot of debates about fair value accounting in banks and financial institutions.<sup>1</sup> Advocates for fair value accounting emphasize the benefits in terms of improved transparency and disclosure, promoting market discipline and providing relevant information for decision makers (Landsman, 2005; Laux, 2012; Laux and Leuz, 2010; Ryan, 2009). Criticisms of fair value accounting mainly focus on the unreliable value estimation for assets with illiquid markets and the systematic risk induced by excessive volatility under fair value accounting (Andrea and team, 2004; Landsman, 2005). Many financial institutions blame fair value accounting for aggravating the financial crisis at a time when markets are extremely illiquid and proper valuation models are unavailable; some even call on the FASB to reassess the new fair value standard.

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<sup>1</sup> Research on limitations and potential problems of market value accounting dates back to the early 1990s, for example, Berger et al. (1991); Robert (1992); Shaffer (1994) etc.

Given the ongoing debate amid the financial crisis, it is crucial to have a better understanding of the desirability of different accounting regimes for banks so as to provide guidance for policymakers and regulators in the post-crisis regulatory reform. To that end, this paper examines theoretically how different accounting regimes affect the effectiveness of minimum capital regulation in disciplining banks' risk-taking behavior, and how the regulator may optimize the choice of accounting measurements and minimum capital requirements to improve social welfare.

Banks have incentives to engage in excessive risk-taking as a result of high leverage, as shown by Jensen and Meckling (1976). The incentives for risk-taking are greater when banks' investment decisions are not observable or verifiable to outsiders. While debtholders in other industries may protect themselves through various instruments such as covenants and close monitoring, the uninformed small investors with deposits insured by the government lack both the capability and incentives to monitor banks' investment decisions.<sup>2</sup> Therefore banks are subject to prudential regulation where the regulator serves as the representative of small investors (Dewatripont and Tirole, 1994). An important aspect of the current regulatory system is the explicit minimum capital requirement, which was introduced in the Basel Accords as part of the

<sup>2</sup> The deposit insurance is assumed as an inherent feature of the banking sector in this paper. Diamond and Dybvig (1983) model the bank's function as a liquidity provider in the economy; thus they rationalize the deposit insurance as an instrument to prevent bank runs. John et al. (1991) point out that even though banks' deposits are insured, the root of banks' risk-taking incentives is not in the deposit insurance (whether or not the insurance premium is risk based); but rather attributable to the convexity of levered equity payoff resulting from limited liability.

bank regulatory reform in the late 1980s in response to the Savings and Loans (S&L) crisis. By forcing banks to hold more equity capital, it is expected that risk-taking incentives can be reduced.<sup>3</sup> Ideally the inefficiency from risk-taking can be eliminated if the regulator requires banks to issue only safe deposits through a sufficiently high capital requirement. However, low levels of deposits are inconsistent with the regulator's social objective regarding bank's provision of liquidity services to the economy (John et al., 2000).<sup>4</sup> This paper focuses on the combination of accounting regimes and capital requirements as effective tools for the regulator to achieve the socially optimal investment level while still balancing the liquidity service function of banks.

Whether or not capital requirements can effectively restrict the risk-taking depends crucially on the extent to which the measure of capital is accurate and informative. Therefore capital regulation depends heavily on accounting methods that determine how the net worth (capital) is measured. Three accounting regimes are analyzed in this paper: historical cost accounting (HC), lower-of-cost-or-market accounting (LCM), and fair value accounting (FV). Different accounting regimes affect both the expected earnings to be recognized and the expected regulatory cost of violating the capital requirement. I assume in the model that LCM and FV are equivalent when economic losses are realized; the only difference between these two arises when economic gains are realized.

The basic model follows (John et al., 1991), capturing the key feature of banks' risk-taking incentives in a simple framework. The bank chooses between a safe investment and a risky investment, where the risky investment opportunity only appears after the bank exerts certain effort ex-ante. The project riskiness is privately observable to the bank manager before he makes the investment decision. The bank also simultaneously decides the amount of equity capital to be issued along with the investment policy, and raises the rest of the investment through deposits. The bank's objective is to maximize a weighted average of the long-run payoff to shareholders and the short-term earnings reported under the prevailing accounting system. This assumption is in line with the myopia literature which typically assumes that managers or current shareholders face short-term incentives (Bebchuk and Stole, 1993; Narayanan, 1985; Stein, 1989).<sup>5</sup>

I first consider the problem when the risky investment is always available. Under HC, no information is revealed in the interim period and thus there is no risk of violating the minimum capital

requirement ex-post. Therefore the bank will not issue more equity than the minimum capital required and the investment policy will be more risky than the first best policy, the well known risk-shifting problem due to debt financing. Under LCM, the bank may incur a regulatory cost in the face of loss realizations and hence is likely to issue equity capital in excess of the minimum requirement. The optimal investment policy is less risky under LCM than under HC. The bank also issues more capital than the minimum requirement under LCM than HC. FV also helps restrict the bank's risk-taking behavior similarly to LCM; however, the interest in short-term earnings induces more risk-taking than under LCM.

From the regulator's perspective, he can always adjust the capital requirement to influence the bank's capital and investment policy decisions under different accounting regimes. Therefore the regulator's preference for different accounting regimes depends on the social cost of such a capital requirement (e.g., restricting the liquidity provision function of banks as in Diamond and Rajan, 2000; Gorton and Winton, 1995 and the benefit of reducing ex-post risk-taking. If the capital requirement bears non-negligible social cost, LCM is the most favorable regime while HC is the least favorable. The regulator is able to set lower capital requirement under LCM than other regimes, while achieving the same effect in disciplining the bank's risk-taking incentive.

When the bank needs to actively exert effort to discover a risky investment opportunity, its ex-ante incentive to do so depends on the benefit from the ex-post risk-shifting. LCM, which is most effective in controlling excessive risk-taking, also most severely discourages ex-ante effort incentives. In this scenario, when the cost of ex-ante effort is non-negligible, the preference of accounting regimes may change. In particular, if the shadow cost of capital requirements is small, LCM may not be socially optimal. When the bank is highly short-term oriented, LCM may make its investment choice too conservative and thereby depress the ex-ante effort incentive.

Finally, I consider several extensions to examine the robustness of main results. First, I consider the mixed-attribute accounting regime in which banks are allowed to report some assets using fair value measurements and some using historical cost measurements simultaneously. The bank's decisions under the mixed-attribute accounting regime appear to be an weighted average of the pure accounting regimes. The more proportion of fair value assets over historical cost assets, the less risk-taking the bank's investment policy. Secondly, I consider the short-term funding of banks and its implication on banks' risk taking incentives under different accounting regimes without capital regulation. The short-term funding may also discipline the bank's risk taking incentive through its interim rollover decision based on informative accounting signals. Therefore, under FV regime the bank's risk-taking incentive with short-term funding is reduced when compared to the long-term deposit funding. But the short-term funding could not reduce the bank's risk taking incentive under HC. Lastly, I illustrate two cases of the endogenous cost of violation, in which the bank needs to liquidate some of its existing assets inefficiently, or issue new equity costly when the capital requirement is violated.

These results highlight the importance of incorporating the impact of accounting regimes when bank regulators set the capital rules. After the S&L crisis, the congress required bank regulators to use GAAP as the basis for capital rules. But standard setters of financial reporting have different objectives from the bank regulators and accounting measurements may not provide what the bank regulators desire to use in their regulation. Recently, due to pressure on the accounting standards setting during the financial crisis, the chairman of the FASB (Robert H. Herz) called for the "decoupling" of bank capital rules from normal accounting standards and asked bank regulators to use their own judgement in allowing banks to move away from GAAP. The regulators in fact

<sup>3</sup> Capital requirements can be regarded as a commitment from the regulator to represent depositors in disciplining and monitoring banks (Dewatripont and Tirole, 1994). In practice, when the capital requirement is violated, it is possible that the regulator may decide whether or not to strictly enforce the capital requirement. For example, during the financial crisis, the regulators may choose not to enforce bank recapitalization to meet the capital requirement. However, such loose enforcement practice also affects the regulator's reputation and may exaggerate banks' incentive to take on more risky investments to exploit the regulator's lack of commitment to regulation. Even though the violation of capital requirement may lead to some inefficiency ex-post, the capital requirement is ex-ante optimal to discipline the risk-taking incentive in the first place. Morrison and White (2005) demonstrate that a bank regulator actually sets tighter capital requirement than necessary in order to solve the moral hazard problem of "gambling" by undercapitalized banks. The role of capital requirement in reducing risk-taking in banks is modeled in John et al. (1991); Keeley and Furlong (1989); 1990; Rochet (1992).

<sup>4</sup> John et al. (1991) and John et al. (2000) propose other solutions for the regulator to induce optimal risk-taking through either an optimal tax structure or an FDIC insurance premium scheme that incorporates the firm level management compensation schedule in place. These proposals seem appealing in theory, but in practice they are hard to implement. Moreover, both assume that banks equity capital never exceeds the minimum required level, inconsistent with the empirical evidence of excess capital held by many banks.

<sup>5</sup> To the extent that the focus of the paper is the conflict of interests between the shareholders and the debtholders of the bank, I simplify the agency problem between the manager and the shareholders, assuming that the shareholders can design compensation contracts optimally to induce the manager making investment decisions consistent with the shareholders' objective.

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