



# Ownership structure, market discipline, and banks' risk-taking incentives under deposit insurance

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## ABSTRACT

The paper studies the effects of market discipline by creditors and ownership structure on banks' risk taking in the presence of partial deposit insurance. An agency-cost model explains how the effects of creditor discipline and shareholder control are interdependent, the non-monotonic effect of shareholder control, and the role of leverage. Panel regressions on several hundred banks worldwide 1995–2005 confirm a negative individual risk effect of creditor discipline and the expected convex effect of shareholder control. Increased shareholder control significantly strengthens the negative effect of market discipline on asset risk, but joint effects on overall default risk are limited.

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## 1. Introduction

The determinants of bank risk-taking and the optimal design of the safety-net arrangements relied upon to safeguard banking-system stability (such as deposit insurance) have been the objects of considerable research efforts within the banking literature. Progressively, the safety-net arrangements have themselves come to be widely recognized as important determinants of the risk-taking incentives of banks, particularly bank shareholders. But because different bank stakeholder groups are differently affected by safety-net arrangements, not only the arrangements as such, but also corporate governance factors (such as ownership structure and the control powers associated with different types of stake in the bank) matter for banks' risk-taking behavior. The purpose of this paper is to study the effect of two specific governance factors – market discipline by the bank's creditors and equity ownership structure – on the relationship between safety-net characteristics (as represented by deposit insurance coverage) and bank risk taking.

The moral hazard problem associated with deposit insurance (as originally analyzed by Merton, 1977) is usually interpreted in terms of an incentive for owners of a bank to increase the bank's

risk in search for higher profits, which occurs because the insurance will cover a large part of the bank's debts in case of default. In other words, deposit insurance limits the bank's downside risk and therefore encourages risk taking.

However, as noted by, e.g., Barth et al. (2006), the source of the moral hazard problem is the conflict of interest between owners and creditors induced by limited liability rather than deposit insurance *per se*. Limited liability is what gives shareholders the incentive to transfer wealth at the expense of creditors by increasing asset risk and leverage, and creates the option value of equity. What deposit insurance does is to remove depositors' incentives to discipline the bank by charging a risk premium commensurate with the bank's risk level, their own costs of monitoring, and other agency-related costs (Jensen and Meckling, 1976), thereby giving free(r) play to the risk-shifting incentives of the shareholders. The value to shareholders of deposit insurance is thus equivalent to the value of having creditor discipline lifted. Underpriced deposit insurance implies a wealth transfer to shareholders not from creditors (who are insured) but from the insurer (or tax payers).

More recent theoretical contributions to the study of the risk effects of deposit insurance are primarily concerned with factors which condition these effects, such as market structure and competition (e.g., Keeley, 1990), capital regulations (e.g., Besanko and Kanatas, 1996), or bankruptcy costs (Hwang et al., 2009). Corporate governance factors may similarly be viewed as factors conditioning the risk incentives created by deposit insurance.

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First, the extent of these risk incentives must depend on the scope (coverage) of the insurance. It is natural to view the reverse of this coverage as ‘residual’ creditor discipline: market discipline is exerted by those creditors who are *not* covered by deposit insurance.<sup>1</sup> However, a key insight in the related market discipline literature (see, e.g., Flannery and Sorescu, 1996; Covitz et al., 2004; or Gropp and Vesala, 2004) is that the extent to which uninsured bank creditors actually do discipline banks critically depends on these creditors’ beliefs regarding the prospects of being bailed out despite being formally uninsured (Angkinand and Wihlborg, 2010, call this the ‘credibility of non-insurance’). In other words, market discipline is exerted by creditors who do not perceive themselves to be covered by explicit or implicit guarantees, so that the extent of *de facto* creditor discipline is the reverse of the *expected* (rather than the formal) coverage of such guarantees.

Second, the extent of the moral hazard problem introduced by deposit insurance depends on the extent of shareholder control over the bank. This is because the risk-shifting incentive introduced by deposit insurance lies with the shareholders, whereas direct influence on the bank’s risk taking lies with the bank’s managers, who may have conflicting interests. Thus, the risk effects of deposit insurance are also influenced by the traditional owner-manager agency conflict. Assuming that bank managers with zero or small ownership stakes in the bank are more risk averse than outside owners for the traditional reasons,<sup>2</sup> Saunders et al. (1990) predict that increased managerial ownership should translate into increased bank risk taking, as managers’ interests become more aligned with those of outside equity holders (also see Knopf and Teall, 1996). Later empirical evidence (Gorton and Rosen, 1995; Cebenoyan et al., 1999; Dolde and Knopf, 2006) seem instead to indicate a U-shaped effect, usually motivated by the existence of management ‘entrenchment’ at intermediate levels of managerial ownership. Two things in particular are noteworthy about this literature. First, the argument that shareholder control conditions the effect of deposit insurance on risk suggests *interdependence* between deposit insurance coverage and shareholder control, but this has never been tested; existing empirical results refer to the stand-alone effect of shareholder control on risk.<sup>3</sup> Second, because this stand-alone effect is ambiguous, the argument that increased shareholder control strengthens the risk-increasing effect of deposit insurance may be too simplified.

In order to sort out the relationships between the governance factors that come into play in the determination of bank risk taking, this paper develops a simple agency-cost model along the lines of Jensen and Meckling (1976). It takes into account the main insights of the literature summarized above, according to the following. (i) The source of deposit-insurance-related moral hazard is identical to the source of the agency costs of debt in a traditional corporate governance sense, *viz.* the conflict of interest between owners and creditors. From this also follows (ii) the interpretation of creditor discipline as the reverse of *de facto* deposit insurance coverage. (iii) The effect of deposit insurance on bank risk taking is conditioned by ownership structure, *i.e.* creditor discipline and shareholder control are interdependent. (iv) The model also provides a simple rationale for a non-monotonic effect of insider ownership on risk.

<sup>1</sup> A number of recent empirical studies confirm that the coverage of deposit insurance determines its destabilizing potential (Demirgüç-Kunt and Detragiache, 2002; Demirgüç-Kunt and Huizinga, 2004; Hovakimian et al., 2003).

<sup>2</sup> They are more concerned with enjoying the perks of office than with exploiting the option value of equity, they have invested non-diversifiable human capital in the bank, etc.

<sup>3</sup> See, however, Laeven and Levine (2009), and Shehzad et al. (2010), who focus on ownership concentration and bank regulation, and Angkinand and Wihlborg (2010), who study interaction between governance and deposit insurance at the country level.

The empirical part of the paper makes use of a panel data set covering up to 331 banks from 47 countries worldwide, with observations between the years 1995 and 2005. This affords the opportunity to fully exploit variations in deposit insurance coverage as well as in ownership structure. The results indicate a negative stand-alone effect of creditor discipline on risk, as predicted, whereas the individual effect of shareholder control (measured as the share of insider financing) is convex, with the negative effect dominating. The results largely support the prediction that the effects of market discipline and ownership structure are interdependent, but the choice of risk proxy influences the estimated interaction effect. In particular, the effect of creditor discipline on *asset* risk is sensitive to the share of insider ownership, whereas the joint effect on overall default risk is limited. Finally, the results confirm the agency cost model’s prediction of leverage as a central conditioning factor.

The paper is structured in the following way. Section 2 presents the model, and derives a number of testable hypotheses. In Section 3, the data and empirical method are presented, whereas Section 4 contains the main empirical results. Section 5 reports the results of a number of alternative empirical specifications and robustness checks. Section 6, finally, concludes.

## 2. Analytics and hypotheses

In this section, I first develop a simple model of bank capital, which – in line with the arguments advanced in the introductory section – specifies the amount of market discipline exerted by creditors as the reverse of *de facto* deposit insurance coverage, and links creditor discipline with risk taking through equity ownership structure. In the second subsection, I analyze the implications of the model, briefly consider the effect of regulatory capital adequacy requirements in the context of the model, and derive testable hypotheses.

### 2.1. A simple model

#### 2.1.1. Capital structure choice and the effect of deposit insurance

Let  $E_I$  and  $E_O$  denote inside and outside equity, respectively, and let  $B$  denote debt. Moreover, let lower-case letters indicate scaling by the total amount of outside financing, so that  $b = B/(B + E_O)$ . Holding  $E_I$  and  $(B + E_O)$  constant, a firm’s agency costs of equity can – along the lines of Jensen and Meckling (1976) – be described by a function  $A_E$  on  $b$  such that  $A_E(1) = 0$ ,  $A_E'(b) < 0$ , and  $A_E''(b) > 0$ ,  $\forall b \in [0, 1]$ . Similarly, the agency costs of debt can be represented by a function  $A_{B_0}$  on  $b$  such that  $A_{B_0}(0) = 0$ ,  $A_{B_0}'(b) > 0$ , and  $A_{B_0}''(b) > 0$ ,  $\forall b \in [0, 1]$ . Optimal leverage,  $b_0^*$ , is determined by minimizing total agency costs,  $A_{T_0} = A_E + A_{B_0}$ .<sup>4</sup>

The agency cost structure given by  $A_{B_0}$ ,  $A_E$ , and  $A_{T_0}$ , with the resulting optimal leverage indicated by  $b_0^*$ , refers to any unregulated firm – it is the equilibrium solution for the general case. For simplicity, we might think of it as a bank *before* the introduction of deposit insurance. Holding also the asset risk of the bank constant for now, the agency cost curves can be interpreted as describing how the risk premia charged by the providers of outside financing vary with leverage. The premia are the spontaneous market solution to the agency problem because outside claimholders will adjust the premium charged in accordance with their perception of monitoring

<sup>4</sup> Jensen and Meckling (1976) make agency costs a function of capitalization rather than, as here, of leverage, which makes my model a ‘mirror image’ of theirs. It has no bearing on the model’s implications. The explicit assumptions about the functional form of agency costs that I make here are largely implicit in Jensen and Meckling. Equity agency costs decrease in  $b$  because with  $E_I$  and  $(B + E_O)$  held constant, an increase in  $b$  corresponds to an increase in the ratio of inside to outside equity ( $E_I/E_O$ ), and therefore decreased incentives of the insider to spend outside equity on non-value-maximizing benefits. Debt agency costs increase along  $b$  for apparent reasons.

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