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Moral hazard and the financial structure of banks☆

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ABSTRACT

This paper analyzes whether risk shifting took place in the European Union's banking sector in 2002–2009. We also identify the type of risk shifting, if any, in the sample. In addition, our method provides a way to determine which variables incentivize/disincentivize risk shifting. Our main findings suggest that banks shifted risk to non-depository creditors. As regards banking policy, the analysis indicates that (i) the three pillars of Basel II do not seem to be effective in controlling risk shifting incentives, (ii) generous deposit insurance schemes seem to incentivize risk shifting, and (iii) in tune with the new rules on conservation buffers in Basel III, incentives to shift risk seem to be weaker in banks with a capital buffer.

1. Introduction

According to the irrelevance proposition, in a perfect, frictionless economy, a firm's value does not depend on how its financial structure is partitioned (Modigliani and Miller, 1958). Although this proposition is a keystone of modern corporate finance theory, "financing clearly can matter" (Myers, 2001, p. 81). The presence of frictions or market imperfections can matter; for instance, in the presence of agency costs associated with conflicts between equity holders and debt holders (for surveys, see Harris and Raviv, 1991; Myers, 2001). These conflicts can arise because of the opportunity that shareholders have to exploit debt holders by substituting safer assets with riskier ones. The rationale behind this is that if a risky investment pays off, the shareholders keep the profits but, due to limited liability, the debt holders bear most of the losses in the event of failure (Jensen and Meckling, 1976). Therefore, shareholders have incentives to invest in risky, negative net present value projects with a low probability of generating high yields. To put it in terms of a standard moral hazard problem, after agreeing on a (debt) contract, agents (shareholders) could have incentives to take actions (investing in risky projects) that are aligned with their interests but not with those of the principal (debt holders). If this occurs, the amount of "skin" that shareholders keep in the game would not be proportional to the level of risk, that is, they would have managed to shift risk to debt holders.

Risk shifting can be particularly severe in the banking sector because leverage in this sector is systematically higher than that of any other (Berger et al., 1995). In addition, most of the liabilities of banks are in the form of deposits, whose owners mostly have only limited ability to monitor banks (Caprio and Summers, 1993). The safety net protecting depositors in particular and banking institutions in general could also exacerbate moral hazard conflicts between equity holders and debt holders (Bhattacharya and Anjan, 1993). Moreover, deposit insurance and what Acharya et al. (2011) call the "implicit bailout

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assurance of debt" enable banks to transfer the consequences of excessive risk taking to the taxpayer and weaken the market discipline expected of debt holders. Indeed, these moral hazard conflicts are essential for banking regulation, particularly in regard to minimum capital requirements. Raising the amount of capital forces shareholders to have more skin in the game and, thus, it helps to align the incentives of shareholders, creditors, and taxpayers.

Banking research has studied risk shifting extensively, focusing in particular on the effects of deposit insurance, solvency regulation, the lender of last resort, and market discipline over moral hazard incentives (for reviews, see Berger et al., 1995; Stolz, 2002; VanHoose, 2007; Freixas and Rochet, 2008Degryse et al., 2009). This paper is an empirical contribution to this literature, specifically, to the study of the types of risk shifting and the variables that incentivize or disincentivize it.

If a bank keeps its amount of capital and assets constant, any risk-increasing modification in its asset portfolio would imply that shareholders are shifting risk to debt holders: if these asset modifications are eventually profitable, the shareholders capture most of the gains, whereas potential losses are mainly borne by creditors. However, the incentives of shareholders to engage in risk shifting are stronger if their stakes are reduced. In this case, shareholders lose even less if risky investments turn out badly. It is the reverse of the argument supporting minimum capital regulation: the preference of shareholders to behave prudently is weakened if what they risk losing diminishes. Therefore, the moral hazard conflict between shareholders and creditors is intensified if risk-increasing investments take place jointly with decreases in the capital-to-assets ratio. Such situations are the target of our paper. Specifically, we focus on moral hazard scenarios in which risk increases as shareholder stakes decreases, i.e., the capital-to-assets ratio decreases.

Our empirical strategy allows us to determine whether such moral hazard behavior takes place in a banking system. In addition, if the empirical evidence suggests that banks engage in risk shifting, our method allows us to determine indications about its type. Based on the group of creditors to whom risk is shifted, four types of risk shifting can be differentiated: double sided, deposit based, other debt based, and unclassified. Finally, our econometric model makes it possible to analyze which variables incentivize/disincentivize risk shifting. This permits us to study whether aspects such as regulation, supervision, deposit insurance, market discipline, or profitability help to prevent risk shifting.

To carry out this analysis, we divide the financial structure of banks into three broad categories: equity, deposits, and non-depository funds. Banks do not have absolute control over changes in these funding sources or in risk; that is, part of those changes is due to discretionary decisions but another part is unexpected. We use a partial adjustment framework to model the discretionary component. In addition, we consider that changes in funding sources occur simultaneously with changes in risk. Thus, in tune with Duran and Lozano-Vivas (2014), we extend the standard analysis of the relationship between changes in capital and risk of Shrieves and Dahl (1992) to all the components of the financial structure of banks.

The empirical exercise focuses on the banking systems of the first 15 members of the European Union (EU15) in 2002–2009. Our main finding is that EU15 banks seem to have engaged in risk shifting during the sample period, particularly in the type called other debt based. Similar results are obtained when the sample is split to separately analyze banks without a capital buffer in excess of the minimum legal requirement. Since these banks are expected to be closely supervised, the latter results indicate that there seem to have been serious flaws in the EU15 banking institutional framework that resulted in supervision failing to properly underpin the resilience of the banking system (Delis and Staikouras, 2005). We also separately study the period before the 2007 crisis. The same type of risk shifting – other debt based – seems present in this subsample as well.

Since our 15-country sample provides some variability in the variables capturing banking regulation and supervision, a relevant contribution of this paper is that it sheds light on whether those variables incentivize/disincentivize moral hazard behavior. Our results suggest that implementing the three pillars of Basel II in more strictly does not seem to palliate risk shifting. However, the larger a bank's capital buffer, the weaker its incentives to engage in moral hazard behavior. This result is consistent with that found by Duran and Lozano-Vivas (2014) for the United States. It suggests that banks that behaved prudently in the past (in their capitalization level) will behave prudently in the future (by increasing the capital ratio when risk grows). Although seemingly obvious, this result could provide additional support to the agreement of the Basel Committee on Banking Supervision (2011) to introduce a framework in Basel III that forces banks to hold conservation capital buffers. Regarding deposit insurance schemes, the empirical analysis suggests that their generosity incentivizes risk shifting.

The rest of the paper is structured as follows. Section 2 sets up the model. Section 3 presents the types of moral hazard behavior. Section 4 describes the dataset and discusses the empirical results. Section 5 concludes the paper.

2. Model specification

Equity has the payoff structure of a call option on the value of a firm that is exercised if the value of the assets is larger than the value of the debt claim. Accordingly, losses would be mainly absorbed by creditors, whereas higher risk increases the chance of shareholders obtaining larger payoffs. Therefore, to maximize the value of equity, bank shareholders have incentives to increase risk and leverage (Jensen and Meckling, 1976).

Incentives for bank shareholders to increase the amount of risk that they take on but do not internalize could give rise to a risk shifting problem, that is exacerbated if shareholders manage to increase risk along with decreasing their stakes. This type of situation is our research objective: we analyze situations in which bank shareholders decrease the amount of wealth