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Bank capital regulation, loan contracts, and corporate investment☆

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ABSTRACT

This paper studies the link between bank capital regulation, bank loan contracts and the allocation of corporate resources across firms' different business lines. Credit risk is lower when firms write contracts that oblige them to invest mainly into projects with highly tangible assets. We argue that firms have an incentive to choose a contract with overly safe and thus inefficient investments when intermediation costs are increasing in banks' capital-to-asset ratio. Imposing minimum capital adequacy for banks can eliminate this incentive by putting a lower bound on financing costs.

1. Introduction

To obtain external finance for corporate investments, non-financial firms often rely on banks. These financial institutions are special in two respects. First, they lower agency costs associated with financial relationships, and thus improve the allocation of capital and risks. They do so by offering loan and deposit contracts, which in essence represents a transformation of the financial contract in a direct financial relationship (Diamond, 1984; Diamond & Dybvig, 1983). Second, banks are subject to specific rules of regulation, especially with respect to bank capital.

Both aspects have been subject to extensive research on their own. Their interactions, however, are relatively unexplored. The regulation literature typically derives the need to regulate bank capital from agency problems at the banks' level; a particular focus lies on banks' incentive to take excessive risks via asset substitution and risk shifting.[2] This incentive stems from the debt-like nature of bank liabilities in combination with limited liability, or from a lack of market discipline due to the existence of an implicit or explicit safety net provided for banks and bank creditors. Accordingly, this research considers bank capital regulation as an instrument to improve the stability of banks by fostering an efficient allocation of risks, putting the incentives for banks right, and providing for optimal buffers against losses (Repullo & Suarez, 2013). With its focus on banks' incentives, these studies largely abstract from the function of banks to transform contracts and thus from potential effects of minimum capital requirements on the agency problems at the firms' level, i.e. on the behavior of bank-financed firms.

The objective of this paper is to explore how the behavior of bank-financed firms is linked to bank capital regulation. It focuses on the influence of minimum capital requirements on the terms of the loan contract between a bank and its corporate customers and how the latter use financial resources. To this end, we combine insights into the determinants of the cost and availability of bank credit from two distinct angles. One is that they are affected by bank capital regulation. The other is that they are also linked to the liquidity of assets held by firms.

To understand the influence of bank capital regulation on corporate investment and financing decisions, we study a model in which a firm with two investment projects faces a trade-off between allocative efficiency and financing costs. This trade-off emerges because the projects differ with respect to their liquidation values. By directing more resources to where they have a higher liquidation value, the firm can lower credit risk. This allows the banker to issue less bank capital as a protection against credit defaults; she can refinance a larger part of the loan with deposits. If borrowing from a bank is cheaper the less (more) the loan is refinanced by bank capital (deposits), a higher investment share in business lines with high liquidation value will lower the firm's financing costs. This induces the firm to deviate from an efficient resource

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[2] See the surveys of Santos (2001) and VanHoose (2007).

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allocation and to forgo investment returns in order to save on financing costs. A minimum capital-to-asset ratio for banks can mitigate this inefficiency by putting a lower bound on financing costs. We shall emphasize that, although pointing out an additional aspect for designing capital regulation, its normative implications are rather limited because of the paper's narrow focus.

Our analysis has several empirical implications which have not been tested yet. Among them, one is that banks with a larger capital basis should be expected to lend to customers with fewer tangible assets. Furthermore, in absence of a suitable bank capital regulation scheme, investments of bank financed firms will tend to be more biased towards highly liquid assets than possibly needed to secure access to external finance. This pattern should translate into a lower expected liquidation value of corporate assets the tighter capital standards are.

The theoretical backbones of our argument are taken from two complementary branches of the literature. Both are born out of the incomplete financial contracting approach based on the inalienability of human capital, relying on the notion that asset returns are non-verifiable and that firms cannot commit to contribute their human capital to their assets (Hart & Moore, 1994). According to this view, the willingness of financiers to lend out funds is a function of the value of physical assets when the firm actually withdraws the human capital so that the assets have to be liquidated. The first branch of the literature explores the link between corporate finance and investment in assets of different liquidation values. It argues that firms, who face a financial constraint, have a preference to commit themselves to invest primarily in assets with higher liquidation values as doing so eases their financial constraint (Almeida, Campello, & Weisbach, 2011; Dietrich, 2007). We put this insight into perspective of a second branch, which delivers a microfounded theory of banks as financial intermediaries. It argues that the liquidation value of a firm can be improved when a bank with specific monitoring skills is deployed. However, these potential improvements are associated with a delegation cost. This cost arises because a bank can extract rents from investors by threatening to withdraw its specific skills. Unlike bank shareholders, depositors will punish any attempt to extract such a rent by running on the bank. Therefore, the delegation cost is the lower the more the bank is refinanced by deposits which implies, however, a higher vulnerability towards risks (Diamond & Rajan, 2000, 2001).

This approach is not the only possible way to account for the well established effect of capital regulation on the cost of financial services provided by banks. Equity capital for banks can have higher costs for several reasons (cf. Kashyap, Rajan, & Stein, 2008). Among them are measures taken by governments which discriminate equity finance against debt. Examples are tax systems and deposit insurance schemes that subsidize banks issuing deposits instead of equity capital. As argued in Peura and Keppo (2006) and Zhu (2008), raising equity capital can also be more costly than issuing debt because it takes more time and requires additional resources. Equity capital can also be more expensive when financial markets are subject to limited participation as in Holmström and Tirole (1997).[3] Although it is not crucial for our results why exactly the costs of financial services of banks are the larger the higher is their capital to asset ratio, our approach allows to investigate the link between banking and corporate finance in a consistent way. It is worth pointing out that the notion of higher cost of finance does not refer to the social cost of bank capital. Instead, our argument shares the view that the social cost of bank capital is smaller than the private cost, which justifies the regulation of banks' capital structure (Admati, DeMarzo, Hellwig, & Pfleiderer, 2010).

As for the proposed link between the value of assets to financiers and loan contract terms and volumes, recent empirical research confirms that this link is prevalent and relevant. First, external borrowing constraints are the tighter the less liquid the assets of firms are (Almeida & Campello, 2007; Almeida, Campello, & Weisbach, 2004; Campello & Giambona, 2013). A second branch of empirical research shows that asset liquidation values determine not only investment, loan volumes and capital structure but even the terms of loan contracts. This refers to debt maturity (Benmelech, 2009), interest rates, duration and number of creditors (Benmelech, Garmaise, & Moskowitz, 2005), credit ratings, yield spreads, and loan-to-value ratios (Benmelech & Bergman, 2009) as well as overall cost of capital (Ortiz-Molina & Phillips, 2013). Most interestingly, Benmelech and Bergman (2009) provide indicative evidence that firms actively influence their terms of contracts by varying assets in a way that affects the overall asset valuation to financiers. They show that firms with higher default risk do not systematically pledge collateral of greater redeployability. This implies that lower default-risk firms possibly choose to have more deployable assets than required. Put differently, there seems to be leeway for firms to vary asset values to their own benefit.[4]

Our contribution to this literature is to show that the regulation of bank capital can have a distinct effect on firms' asset structure decisions. We also contribute to the literature on bank regulation by providing a new argument for why minimum capital requirements can be beneficial. As argued above, the majority of the banking literature focuses on how regulation affects banks' default probabilities or banks' incentives to assume excessive risks via asset substitution and risk shifting. Our analysis explicitly abstracts from financial stability issues. Although there is no doubt on the relevance of these issues, turning them off sharpens the focus on the effects of bank regulation on the efficiency of firm-internal allocation decisions.[5] With our focus being different, we deliver an argument for why the effect of bank capital regulation on the cost and availability of funds to firms does not need to cause just worries about firms losing access to finance.

The paper is organized as follows. Section 2 discloses the assumptions that feed into the analysis. In section 3, we analyze the link between bank loan contracts, corporate investment, and bank capital structure, and how contracts will look like in absence of bank capital regulation. Section 4 shows that these contracts are associated with allocative inefficiencies and how bank regulation affects them. In Section 5, we further discuss our results and their empirical implications. The final section summarizes our findings.

2. The model

Agents, endowments, and preferences. We consider an entrepreneur who is endowed with internal funds. They comprise any assets owned and controlled by the entrepreneur to be used for investment finance. Their total value is exogenous and denoted by $W > 0$. External funds can be provided by a large number of external financiers whose endowments sum up to at least 1 unit. There is also a banker who possesses no funds on her own. The banker serves as a financial intermediary between the entrepreneur and

[3] See Repullo (2004), and Allen, Carletti, and Marquez (2011), among others, for further applications of (privately) costly bank capital in analyzing bank capital regulation.

[4] This conclusion is furthermore supported by Graham (2000) and Graham and Harvey (2001) who find that firms – although possibly facing financial constraints – are typically underleveraged.

[5] With its focus on firm-internal allocation processes our paper is furthermore related to studies of internal capital markets (e.g. Almeida & Wolfenzon, 2006; Gertner, Scharfstein, & Stein, 1994; Hellwig, 2001; Stein, 2002).