PRIVATELY HELD OR PUBLICLY OWNED? THE ROLE OF DEBT FINANCING

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1. INTRODUCTION

In economics, the behavior of firms can be characterized as that of profit maximization: the managers of a firm make those choices that maximize the firm’s profits or more accurately its present value. Our paper helps explain how the conflicting objectives of the individual participants (shareholders, debtholders, and managers) are brought into equilibrium to yield this result. Specification of individual rights determines how costs and rewards will be allocated among the participants in the firm. Since the specification of rights is generally affected through contracting, individual behavior in organizations, including the behavior of managers, will depend upon the nature of these contracts.

Castillo and Skaperdas (2005) examine how the legal protection of outside shareholders and the appropriative costs that they induce influence the incentives for private firms to go public. They model the conflict between the owner/manager and outside shareholders as a contest to secure part of the value of the public firm. Their findings indicate that owners are more likely to go public when outside shareholders are better protected with the share of ownership retained by the owner/manager being non-monotonic in the variable that measures increased protection of outside shareholders.

We are proposing a game-theoretic analysis like Castillo and Skaperdas (2005), with the exception that in a levered firm the game-theoretic problem will involve three groups: shareholders, debtholders, and managers. In stage one of the game, the original
founders will contemplate whether to take their privately held company public. In stage two of the game and upon deciding to take their company public, the initial owners/managers will choose the optimal debt ratio and the optimal ownership structure that maximizes their wealth. In stage three of the game, agency costs will be incurred due to the conflicting objectives of debtholders, shareholders, and owners/managers. Shareholders will choose their optimal efforts based on maximal return on equity while debt holders will choose their optimal efforts based on their guaranteed return on debt.

Glushkov, Khorana, Rau, and Zhang (2018) examine characteristics of firms that choose to go public through debt rather than equity. The authors compare these firms to contemporaneous IPO (initial public offering) firms to understand why these firms choose to go public through the debt market. Firms that choose the debt market route are larger, more likely to be backed by a financial sponsor such as venture capital or private equity firm, and less likely to face information asymmetry than traditional IPO firms. Meluzin, Zinecker, Balcerek, and Pietrzak (2018) surveyed sixty-five chief financial officers (CFOs) at non-financial and non-public at public firms in the Czech Republic and Poland that are considered candidates for an IPO to document their propensity to delay to launch an IPO and maintain private ownership. The authors found that the majority of the managers do not see the capital market as a source of cheaper and more flexible financing compared to bank loans and other sources.

Kazierska-Jozwik, Marszalek, and Sekuta (2015) analyze the determinants of the capital structure of Polish enterprises. Their results indicate that there is evidence of a significant negative relationship between growth rate and the level of total debt. Cole and Sokolyk (2018) find that high-growth, high-quality start-up firms with better performance prospects are more likely to use debt and, in particular, business debt. Compared to all-equity firms, firms using debt at the initial year of operations are significantly more likely to survive and achieve higher levels of revenue three years after the firm's start-up. Ratih (2019) analyzes and evaluates the impacts of equity market timing on corporate capital structure policies in Indonesia. The author's findings are consistent with equity market timing theory where the results suggest that firms tend to issue equities when their market valuations are relatively higher than their book values and their past market values are high.

Jovanovic and Rousseau (2004) study the relation between IPO investment and the rate of interest and they find that at low rates of interest firms delay their IPOs. This happens because during the pre-IPO period the firm forgoes earnings that do not matter as much at low-interest rates. Braun, Francis, and Kohers (2003) investigate external factors that can influence the relative attractiveness of IPOs for private firms and they conclude that there is a positive relation between the nominal interest rate and IPO volume.

Our results indicate that entrepreneurs operating in industries displaying decreasing returns to scale (or slower growth industries) prefer the issuance of debt to equity when external financing is required while entrepreneurs operating in industries displaying increasing returns to scale (or high growth industries) are less likely to take their company public and will rely on debt financing when the cost of debt is low and are more likely to take their company public and will rely on equity financing when the cost of debt is high.

The remainder of this paper is organized as follows. Section 2 reviews the related literature. Section 3 describes the model, Section 4 reports the results, Section 5 discusses the results, Section 6 concludes with concluding remarks, research limitations, and implications for future research.

2. LITERATURE REVIEW
companies, depends on the particular combination of majority control and dispersed ownership which maximizes the incumbent’s wealth.

Jensen (1986) argues that debt can be an effective substitute for dividends. By issuing debt in exchange for stock, managers are bonding their promise to pay out future cash flows in a way that cannot be accomplished by simple dividends. These effects are especially important in organizations that have low growth prospects and are not as important for rapidly growing organizations with large and highly profitable investment projects. Pagano, Panetta, and Zingales (1998) find that the main factor affecting the probability of an IPO is the market-to-book ratio at which firms in the same industry trade. Their results indicate that a one-standard-deviation increase in the market-to-book ratio raises the odds of an IPO by 25%. They argue that this positive relationship may reflect a higher investment need in sectors with high growth opportunities (and correspondingly high market-to-book ratios). They also show that IPOs tend to involve companies that believe the IPO grew faster and were more profitable. Jovanovic and Rousseau (2004) study the relation between IPO investment and the rate of interest and they find that at low rates of interest firms delay their IPOs. This happens because during the pre-IPO period the firm forgoes earnings that do not matter as much at low-interest rates. Brau et al. (2003) investigate external factors that can influence the relative attractiveness of IPOs for private firms and they conclude that there is a positive relation between the nominal interest rate and IPO volume.

Kazmierska-Jozywiak et al. (2015) analyze the determinants of the capital structure of Polish enterprises. Their results indicate that there is evidence of a significant negative relationship between growth rate and the level of total debt. Cole and Sokolyk (2018) find that high-growth, high-quality start-up firms with better performance prospects are more likely to use debt and, in particular, business debt. Compared to all-equity firms, firms using debt at the initial year of operations are significantly more likely to survive and achieve higher levels of revenue three years after the firm’s start-up. Ratih (2019) analyzes and evaluates the impacts of equity market timing on corporate capital structure policies in Indonesia. The author’s findings are consistent with equity market timing theory where the results suggest that firms tend to issue equities when their market valuations are relatively higher than their book values and their past market values are high.

Glushkov et al. (2018) study the characteristics of firms that choose debt financing rather than equity financing when deciding to go public. The authors compare the characteristics of those firms to other IPO firms to analyze why these firms choose to go public through debt financing. Their results show that firms that choose debt market financing are larger. Meluzin et al. (2018) examined non-public and non-financial companies in the Czech Republic and Poland that are candidates for an IPO to analyze their decision whether to go public or remain private. The authors concluded that most of the managers do not consider the capital market as a source of cheaper and more flexible financing compared to bank loans and other sources.

3. RESEARCH METHODOLOGY

The owners/managers decide to take their privately held firm public and raise funds through issuing debt and through selling a share of the company to outside shareholders (we do not make the distinction between large and dispersed shareholders). After the company goes public, managers, outside debtholders, and outside shareholders will engage in an appropriative struggle to receive/maintain a share of the firm’s value. Because this struggle is costly, the sum of the payoffs of the outside shareholders will, in general, be lower than the gross value of the public firm. Managers will undertake costly actions to the appropriate part of the value of the firm, whereas outside shareholders and outside debtholders will exert costly efforts to protect their investment in the firm.

Assumption 1: Similar to Castillo and Skaperdas (2005), founders of the private firm will also act as managers of the public firm due to their unique expertise in running the firm. Castillo and Skaperdas (2005) assume that the owner retains managerial control of the firm because he may have expertise that is indispensable to the functioning of the firm. They argue that even when outside shareholders acquire the majority of the firm, the incumbent owner often retains some prominent managerial position within the firm due to him having first-hand knowledge of the daily operations of the firm. The share of equity owned by the managers do play the role in this model. The shareholders include the manager himself who keeps a share of the firm.

Assumption 2: All funds raised from selling equity will be reinvested in the firm.

Assumption 3: Absence of corporate tax-shields.

Assumption 4: There exists an exogenous probability of financial distress as a result of the destruction of firm assets due to natural disasters, acts of vandalism, or political instability.

There are three stages to the game:

Stage 1: Owners decide whether to take their company public through an initial public offering, an initial public debt offering, or some combination of the two.

Stage 2: In the case of going public, owners/managers decide on the optimal value of debt, the optimal fraction $1-a$ of the shares to sell to shareholders, and the optimal fraction $a$ of the shares to keep.

Stage 3: Agency costs incurred due to divergent shareholders’, debt holders’ and managers’ objectives. According to the principal-agent problem, managers have an incentive to further their own interest at the expense of stakeholders who include both shareholders and debtholders. Shareholders will incur costs in monitoring the management to make sure that they act in a manner that maximizes shareholders’ value in the long run while debtholders also incur costs in monitoring the management to protect their investment in the firm. Debtholders and stockholders do not necessarily share the same objectives for the firm since debtholders’ claims have seniority over equity holder’s claims. If a financially strong firm is wasting money on executive perks, they will still be able to pay debtholders, therefore, debtholders may be less active in monitoring than stockholders.
The going public decision is modeled as a three-stage game. The three stages of the game are shown in Figure 1 below.

**Figure 1.** The going public decision modeled as a three-stage game

| Stage 1: |
|------------------|
| Private firm     |

**Stage 2:**

- Ownership structure
- Equity financing
- Debt financing

**Stage 3:**

- Agency costs incurred due to divergent management - shareholders - debt holders' objectives

The outcome of the distributional struggle is modeled as a contest in which the participants exert costly efforts to increase their probability of winning part of the value of the public firm (Derek & Rii, 1997; Skaperdas, 1996; Tullock, 1980). The share of the gross value of the public firm received by the owners/managers is a function of the two kinds of effort:

\[ q(e_m, e_s) = \frac{(1-\theta)e_m}{(1-\theta)e_m + \theta e_s} \]  

with \( e_m \) representing costly actions taken by owners/managers to expropriate part of the value of the public firm while \( e_s \) represents costly actions taken by large shareholders to protect their investment in the public firm. \( 1 - q(e_m, e_s) \) represents the share of the gross value of the public firm received by shareholders (including the owners/managers who keep a share of the firm).

\( \theta \) represents the efficiency of the judiciary and law enforcement system in a country (or the degree of legal protection of outside shareholders from expropriation or "tunneling" by the insiders) and it varies between 0 and 1. An increase in \( \theta \) towards 1 would indicate stronger law enforcement or a more efficient legal system. Conversely, a movement of \( \theta \) toward 0 would indicate weaker law enforcement or a less efficient legal system. Based on the outcome of the struggle, the owners/managers decide on the optimal value of debt and the optimal ownership structure that maximize their payoff.

Equation (2) below represents the sources of value to bondholders:

\[ V_B = \begin{cases} (1-\theta)(1+r)D - e_B - D, & \text{if} (1-q_m)V_p \geq (1+r)D \\ (1-\theta)(1-q_m)V_p - e_B, & \text{if} (1-q_m)V_p < (1+r)D \end{cases} \]  

where \( e_B \) represents costly actions exerted by bondholders to protect their investment in the firm; \( \bar{P} \) represents the exogenous probability of destruction of firm assets; \( r \) represents the return on debt to bondholders; \( D \) represents the amount of debt owed to bondholders; \( V_B(S+D) \) represents the gross value of the public firm and is increasing in the amount of both debt and equity financing with \( V_B(S+D) \geq 0; \) \( q_m \) represents the share of the gross value of the public firm expropriated by the owners/managers; \( (1 - \bar{P})(1 + r)D - e_B - D \) represents the expected return to bondholders when the amount of debt plus interest is less than or equal to the value of the expropriated firm; and \( (1 - \bar{P}) - q_m \) represents the expected return to bondholders when the amount of debt plus interest is greater than the value of the expropriated firm.

With complete information, bondholders will not allow the amount of debt plus interest to exceed the value of the expropriated firm. This implies that bondholders do not need to exert any effort monitoring the managers (\( e_s = 0 \) and the payoff to bondholders can be represented by:

\[ V_B = (1-\bar{P})(1+r)D - D \]  

with bondholders exerting zero effort in monitoring the owners/managers, the share of the net value\(^1\) of the public firm expropriated by the owners/managers is a function \( q(e_m, e_s) \) of two kinds of effort, with \( e_m \) representing costly efforts exerted by the owners/managers to expropriate part of the value of the public firm, while \( e_s \) represents costly efforts exerted by shareholders to protect their investment in the firm. Obviously, \( q(e_m, e_s) \) is increasing in \( e_m \) and decreasing in \( e_s \). \( 1 - q(e_m, e_s) \) represents the share received by shareholders (including the owners/managers who keep a share of the firm).

Equation (4) below represents the two sources of value to the owners/managers minus costly efforts \( (e_s) \) exerted by the owners/managers to expropriate part of the value of the public firm. \( q(e_m, e_s)V_B(S+D) - (1+r)D \) represents the value gained from expropriating part of the net value of the public firm while \( (1 - q(e_m, e_s))V_B(S+D) - (1+r)D \) represents the value gained from being shareholders where \( \alpha \in (0,1) \) is the share of the firm retained by the owners/managers.

Equation (5) below represents the source of value to shareholders \( (1-\alpha)(1-q(e_m, e_s))V_B(S+D) \) minus their costly efforts \( (e_s) \) exerted to protect their investment in the firm.

Shareholders and owners/managers choose their equilibrium efforts simultaneously and in a manner that maximizes their total payoffs in stage three of the game. Given values of the owners/managers share in the public firm \( (a) \) and the value of the public firm to shareholders \( (S) \) we solve for the owners/managers and shareholders equilibrium efforts \( e_m^* \) and \( e_s^* \) respectively by taking the first-order conditions with respect to \( e_m^* \) (equation (4) above) and with respect to \( e_s^* \) (equation (5) above). Substituting the equilibrium efforts \( e_m^* \) and \( e_s^* \) into equations (4) and (5) above, we get the equilibrium payoffs to the owners/managers \( V_m^* \) and to shareholders \( V_s^* \).

\(^1\) Net value of the public firm equals the gross value of the public firm minus debt and interest liabilities to bondholders.
\[ V_m = (e_m, e_s; \alpha, S, D) = (q(e_m, e_s) + \alpha(1 - q(e_m, e_s))(V_p(S + D) - (1 + r)D) - e_m \] (4)

\[ V_s = (e_m, e_s; \alpha, S, D) = (1 - \alpha)(1 - q(e_m, e_s))(V_p(S + D) - (1 + r)D) - e_s \] (5)

**The expected payoff to owners/managers**

The expected payoff to the owners/managers from taking their private firm public equals the equilibrium payoff \( V_m^* \). The expected payoff to shareholders (S) equals the equilibrium payoff to shareholders (\( V_s^* \)) or how much shareholders value their share in the public firm. The proceeds from the sale of equity equal the value that the prospective shareholders expect to receive, so that:

\[ S = V_s^*(\alpha, S, D) \] (6)

**Choosing the optimal ownership structure to owners/managers**

Owners/managers choose the optimal debt value \( D \) and the proportion of shares to sell to shareholders (1 - \( \alpha \)) in a manner that maximizes their expected payoff from taking their company public.

\[ \max_{a, D} V_m^*(\alpha, S, D) \] (7)

**First-order conditions**

We solve for the owners/managers equilibrium efforts by differentiating equation (4) above with respect to \( e_m \) and setting it equal to zero:

\[ \frac{\theta(1 - \theta)e_m^*}{((1 - \theta)e_m^* + \theta e_s^*)^2}(1 - \alpha)(V_p(S + D) - (1 + r)D) = 1 \] (8)

In order to solve for shareholders' equilibrium efforts, we differentiate equation (5) above with respect to \( e_s \) and we set it equal to zero:

\[ \frac{\theta(1 - \theta)e_s^*}{((1 - \theta)e_m^* + \theta e_s^*)^2}(1 - \alpha)(V_p(S + D) - (1 + r)D) = 1 \] (9)

Dividing equations (8) and (9) above, we get:

\[ e_s^* = e_m^* \] (10)

Plugging equation (10) back into equations (8) and (9) above, we can solve for the owners'/managers' and shareholders' equilibrium efforts as given by equations (11) and (12) below:

\[ e_m^* = \theta(1 - \theta)(1 - \alpha)[V_p(S + D) - (1 + r)D] \] (11)

\[ e_m^* = \theta(1 - \theta)(1 - \alpha)[V_p(S + D) - (1 + r)D] \] (12)

Substituting equations (11) and (12) above we get the equilibrium payoffs to the owners/managers and to shareholders respectively:

\[ V_m^*(\alpha, S, D) = [(1 - \alpha)(1 - \theta)^2 + \alpha][1 - \frac{1}{\bar{P}}]V_p(S + D) - (1 + r)D \] (13)

\[ V_s^*(\alpha, S, D) = [\theta^2(1 - \alpha)(1 - \bar{P})][V_p(S + D) - (1 + r)D] \] (14)

**Choosing the optimal debt value and ownership structure to owners/managers**

We assume that the value of the public firm is determined through a Cobb-Douglas-like form:

\[ V_p(\alpha, S, D) = K(S + D)^{0.5}, \text{ where } y > 0, K > 0 \] (15)

\( K \) represents the firm’s production technology.

**4. RESEARCH RESULTS**

**4.1. Case 1: Decreasing returns to scale**

\[ V_p(\alpha, S, D) = K(S + D)^{0.5}, \text{ where } K > 0 \] (16)

The proceeds from the sale of equity equal the discounted value that the prospective shareholders expect to receive (the zero-profit condition for shareholders imply that they are willing to pay a share price \( S \) equal to the market value of their share in the firm divided by one plus the risk-free return they can get in the open market), so that:

\[ (1 + r)S = V_s^*(\alpha, D) = [\theta^2(1 - \alpha)(1 - \bar{P})][K(S + D)^{0.5} - (1 + r)D] \] (17)

Solving for \( S \), we get:

\[ S = \frac{K^2\theta^2(1 - \alpha)^2(1 - \bar{P})^2}{2(1 + r)^2} - \theta^2(1 + r)D(1 - \alpha)(1 - \bar{P}) + \frac{K^2\theta^2(1 - \alpha)(1 - \bar{P})}{2(1 + r)^2} \sqrt{\frac{K^2\theta^2(1 - \alpha)^2(1 - \bar{P})^2 + 4D(1 + r)^2(1 - \theta^2(1 - \alpha)(1 - \bar{P}))}{(1 + r)^2}} \] (18)

To determine the optimal values of \( \alpha^* \) and \( D^* \) that maximize the expected payoff to the owners/managers, we plug equations (18) and (16) into the maximization problem shown in equation (7) above. Taking the derivative \( \frac{\partial V_m^*(\alpha, S, D)}{\partial \alpha} \) and setting it equal to zero, we can solve for the optimal value of debt \( D \) that maximizes the expected payoff to the owners/managers:

\[ D^* = \frac{K^2[1 - 2\theta^2(1 - \alpha)(1 - \bar{P})]^2}{4(1 + r)^2[1 - \theta^2(1 - \alpha)(1 - \bar{P})]} \] (19)

To determine the optimal value of \( \alpha^* \), we plug in the value of \( D^* \) into the maximization problem shown in equation (14) above. Taking the derivative \( \frac{\partial V_s^*(\alpha, S, D^*)}{\partial \alpha} \), we can solve for the optimal value of \( \alpha^* \)
Equation (20) above implies that \( a^* = 1 \) and \( D^* = \frac{k^2}{4(1+r)^2} \).

Our results indicate that entrepreneurs operating in industries displaying decreasing returns to scale (or slower growth industries) prefer the issuance of debt to equity when external financing is required. The optimal value of debt is increasing in the production technology \( K \) and decreasing in the cost of debt \( r \).

4.2. Case 2: Increasing returns to scale

\[ V_p(a, S, D) = K(S + D)^2, \text{ where } K > 0 \]  

Due to the increasing returns to scale, the rate of return on equity is increasing in the price that shareholders pay for their shares which implies an optimal value of \( S \) close to infinity (corner solution). Assume \( F \) equals \( (S + D) \). Owners/managers maximization problem then becomes, \( \max_{a, r} \left[(1-\alpha)(1-\delta)+\alpha(m)\left(K(F)^2-(1+r)D\right)\right] \), which implies that as long as the firm is solvent\(^3\), the owners will choose an optimal value of \( F \) close to infinity (corner solution). To obtain a solution that is characteristic of what is observed, we assume an upper bound on the value of \( (S + D) \) to equal \( \bar{F} \) which results in the maximum potential value of the firm. In accordance with their maximization problem shown in equation (13) above, owners/managers will choose the value of \( (S + D) \) to equal the upper bound value of \( \bar{F} \).

Similar to the case of decreasing returns to scale above, the proceeds from the sale of equity equal the discounted value that the prospective shareholders expect to receive (the zero-profit condition for shareholders imply that they are willing to pay a share price \( S \) equal to the market value of their share in the firm divided by one plus the risk-free return they can get in the open market), so that:

\[ (1+r)S = V'_p(a, D) = (\theta^2(1-\alpha)\left((1-\bar{F})\right)K(F)'^2-(1+r)(\bar{F}-S)] \]

Solving for \( S \), we get:

\[ S = \frac{\theta^2(1-\alpha)(1-\bar{F})K(F)'^2-(1+r)\bar{F}}{(1+r)(1-\theta^2(1-\alpha)(1-\bar{F}))} \]  

To determine the optimal values of \( a^* \) that maximizes the expected payoff to the owners/managers, we plug equations (21) and (23) into the maximization problem shown in equation (7) above. Taking the derivative \( \frac{\partial V'_m(a)}{\partial a} \) and setting it equal to zero, we can solve for the optimal value of debt \( a^* \) that maximizes the expected payoff to the owners/managers:

\[ \frac{\partial V'_m(a)}{\partial a} = \frac{[2\theta(1-\theta)+\theta^2(1-\bar{F})K(F)'^2-(1+r)\bar{F}]}{[1-\theta^2(1-\alpha)(1-\bar{F})]^{\frac{1}{2}}} \]  

Our results show that in industries displaying increasing returns to scale (or high growth industries), a positive relationship obtains between the nominal interest rate and the numbers of IPOs. Entrepreneurs operating in such industries are less likely to take their company public and will rely on debt financing when \( r \leq (K\bar{F} - 1) \). The same entrepreneurs are more likely to take their company public and will rely on equity financing when \( r > (K\bar{F} - 1) \). The share retained by the owner/manager is non-monotonic in the rate of interest or the cost of debt \( r \), increasing for low values and decreasing for high values.

5. DISCUSSION

Our findings show that in industries displaying increasing returns to scale (or slower growth industries), it is always preferred to raise funds through the issuance of debt rather than equity while in industries displaying increasing returns to scale (or high growth industries) it is more likely that firms will raise funds through the issuance of equity. Our findings are consistent with Jensen (1986), who argues that debt can be an effective substitute for dividends. By issuing debt in exchange for stock, managers are bonding their promise to pay out future cash flows in a way that cannot be accomplished by simple dividend increases. These effects are especially important in organizations that have low growth prospects and are not as important for rapidly growing organizations with large and highly profitable investment projects. Our results are also consistent with Pagano et al. (1998), who find that the main factor affecting the probability of an IPO is the market-to-book ratio at which firms in the same industry trade. Their results indicate that a one-standard-deviation increase in the market-to-book ratio raises the odds of an IPO by 25%. They argue that this positive relationship may reflect a higher investment need in sectors with high growth opportunities (and correspondingly high market-to-book ratios). They also show that IPOs tend to involve companies that before the IPO grew faster and were more profitable. Our findings are also consistent with Kazmierska-Jozwiak et al. (2015), who analyze the determinants of the capital structure of Polish enterprises. Their results indicate that there is evidence of a significant negative relationship between growth rate and the level of total debt. Our results are also consistent with Rathi (2019), who analyzes and evaluates the impact of equity market timing on corporate capital structure policies in Indonesia. The author’s findings are consistent with equity market timing theory where the results suggest that firms tend to issue equities when their market valuations are relatively higher than their book values and their past market values are high.

Our results are partially consistent with the findings of Cole and Sokolyk (2018), who find that high-growth, high-quality start-up firms with better performance prospects are more likely to use debt and, in particular, business debt. In our
findings, firms in high-growth industries were more likely to raise funds through the issuance of debt when the interest rate is low and through the issuance of equity when interest rates were high. The authors also found that compared to all-equity firms, firms using debt at the initial year of operations are significantly more likely to survive and achieve higher levels of revenue three years after the firm’s start-up.

Our findings show that in industries displaying increasing returns to scale (or high growth industries) a positive relationship obtains between the interest rate (cost of debt) and the issuance of debt. Our findings are consistent with Jovanovic and Rousseau (2004) who study the relation between IPO investment and the rate of interest, and they find that at low rates of interest firms delay their IPOs. This happens because during the pre-IPO period the firm forgoes earnings that do not matter as much at low-interest rates. Our findings are also consistent with Brau et al. (2003), who investigate external factors that can influence the relative attractiveness of IPOs for private firms and they conclude that there is a positive relation between the nominal interest rate and IPO volume.

6. CONCLUSION

The results reached in the analysis above are driven by the assumption that debt holders have access to complete information and will not allow the amount of debt plus interest to exceed the value of the appropriated firm. This implies that debt holders do not need to exert costly efforts in monitoring management and agency costs are only incurred due to monitoring by shareholders. The asymmetry in monitoring implies that in industries displaying decreasing returns to scale (or slower growth industries) it is always preferred to raise funds through the issuance of debt rather than equity while in industries displaying increasing returns to scale (or high growth industries) a positive relationship obtains between the interest rate (cost of debt) and the issuance of equity. We acknowledge some limitations of our study. First, we do not allow for debt holders to monitor management, and agency costs are only incurred due to monitoring by shareholders. Second, we assume an exogenous probability of financial distress as a result of the destruction of firm assets due to natural disasters, acts of vandalism, or political instability. Future analysis is planned where both debt holders and shareholders incur agency costs in monitoring managers. Future work is also planned to endogenize the probability of financial distress and examine its effect on the choice of the optimal debt ratio and the optimal ownership structure.

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