Product Market Competition and Debt Choice[♣]

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Abstract

Motivated by prior research on the informational and monitoring role of product market competition, we examine how competitive pressure affects firms' choice between bank debt and public debt. Using a sample of 3,831 U.S. firms over the period spanning 2001-2013, we find that competitive pressure from the product market leads a firm to rely less on bank debt financing. In a natural experiment setting, we also find that there is a significant decrease in firm reliance on bank debt after large import tariff reductions. In additional analyses, we show that the effect of competitive pressure on debt choice is more pronounced for firms with a greater exposure to competition, a better monitoring quality, and higher financial constraints. Taken together, our study provides important insights that the external governance pressure of the product market and bank debt monitoring may act as alternate governance mechanisms.

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Product Market Competition and Debt Choice

1. Introduction

A perennial subject of debate in financial economics literature, since Modigliani and Miller (1958), is capital structure decisions, and more specifically debt heterogeneity. Since debt has become the major source of external funds for U.S. firms, researchers have been giving much emphasis on firms' debt composition, confirming that firms use multiple types of debt to fill their external financing needs (Rauh and Sufi, 2010; Colla et al., 2013).[1] More importantly, several papers have paid attention to how cross-sectional heterogeneity determines the choice between public and private debt, throwing more lights on the role of firm-level informational asymmetries and agency problems. *First*, with respect to information asymmetry, prior studies show that a lower information quality is associated with a greater reliance on private debt financing, highlighting the role of private lenders in alleviating information problems (Krishnaswami et al., 1999; Hadlock and James, 2002). *Second*, with respect to agency problems, the existing evidence documents that the severity of agency problems is likely to influence the monitoring benefit of private lenders, thus driving debt choice decisions (Houston and James, 1996; Lin et al., 2013). While most of prior research goes deeply into the understanding of firm-level determinants of debt composition, little attention has been paid to the industry dynamics effects.[2] In this paper, we aim to fill this gap in the literature by shining new light on a much less studied factor, namely product market competition.

Our paper is largely based upon advances gleaned from prior research on the disciplinary and informational role of product market competition. A growing body of literature establishes that competition is considered as a deterring force against transparency (e.g., Verrecchia, 1983; Verrecchia and Weber, 2006; Dedman and Lennox, 2009; Lin and Wei, 2014). This is explained by the fact that firms operating in competitive industries prefer to obfuscate

[1] Corporate debt markets have been expanding since the early 1990s. Indeed, previous studies report that firms' use of corporate bonds and syndicated loans is more rapidly increasing than equity issues (e.g., Henderson et al., 2006).

[2] Prominent examples of debt choice determinants include firms' growth opportunities (e.g., Houston and James, 1996), credit quality (e.g., Denis and Mihov, 2003), corporate ownership structure (e.g., Lin et al., 2013; Boubaker et al., 2016), accruals quality (e.g., Garcia-Teruel et al., 2014), among others.

information available as a way to maintain their competitive positions. For example, Lin and Wei (2014) show that firms in competitive markets opt to disclose less information. The authors argue that such a decision is driven by the fear that firm-specific information conveyed to the public might be observed by other competing firms. This is particularly consistent with the existence of proprietary costs arising from the adverse impact of disclosure (Verrecchia, 1983).

Another stream of literature highlights that product market competition performs an important governance role by mitigating agency problems (e.g., Hart, 1983; Shleifer and Vishny, 1997; Tian and Twite, 2011). Since firms in competitive industries share a large proportion of their profits with rivals, they have a lower ability to realize high earnings, which increases their bankruptcy risk.[3] Hence, competition raises managerial career concerns and, thus, leads managers to run the firm in an efficient way by reducing wasteful expenditures and self-serving behaviors (Hart, 1983; Schmidt, 1997). For instance, Giroud and Mueller (2010, 2011) point to a substitution effect between the competitive pressure and the quality of corporate governance, consistent with the fact that competition acts as an external disciplinary tool. In this study, we expand these arguments to the possibility that industry competition influences debt choice through its impact on firms' information and governance environment.

Our paper brings together two distinct bodies of literature, the industrial organization and the capital structure literature. It attempts to further our understanding of the determinants of debt choice by looking beyond the firm-level factors and exploring industry dynamics effects, particularly the intensity of product market competition. The theoretical literature offers competing views regarding the relation between competition and debt choice. On the one hand, product market competition could exacerbate informational asymmetry caused by the fear of giving away sensitive information to competitors. To the extent that competitive industries are characterized by product substitutability, the revelation of private information would be beneficial to rivals and harmful to firms' competitive advantage, thus creating proprietary costs of disclosure (Verrecchia, 1983). Such disclosure-related costs have been considered as a key factor in the explanation of why firms with proprietary information rely on bank debt. Since bank lenders maintain a close relationship with their borrowers, they can access inside private

[3] In conctrast, firms with a strong market power are better able to pass on idiosyncratic shocks to their customers, consistent with Hick's (1935) hypothesis that "The best of all monopoly profits is a quiet life."

information that is not publicly available (e.g., Fama, 1985). In this case, they require less disclosure of firm-specific information, thus keeping proprietary information confidential (e.g., Yosha, 1995). From this perspective, bank debt should increase with firms' incentives to conceal their private information. Consequently, we expect a *greater* reliance on bank debt financing for firms facing intense competitive pressure.

Furthermore, product market competition is likely to act as an external governance mechanism by inducing insiders to make financing decisions maximizing shareholders' wealth. One of the main rationales behind this idea is that, due to the higher bankruptcy risk associated with intensified competition, managers are pressured to behave efficiently (Bloom and van Reenen, 2006) consistently with shareholders' interests. In this case, they might have fewer incentives to insulate themselves from bank control, as bank lenders are endowed with a superior monitoring advantage relative to public lenders (e.g., Berlin and Loyes, 1988). This monitoring advantage is largely due to the ability of banks to access private information, which enables them to detect insiders' opportunistic behavior and to punish distressed firms through efficient liquidation decisions (e.g., Fama, 1985; Diamond, 1991; Park, 2000). Following this line of reasoning, Lin et al. (2013) find that entrenched controlling owners are less likely to rely on bank debt financing so as to protect their private benefits of control. Since competitive pressure performs an effective governance role, we expect it to reduce insiders' incentives to avoid bank control, thus *increasing* the proportion of bank debt in total debt.

On the other hand, another view, which is also based on the governance role of competition, predicts a *negative* association between product market competitive pressure and firm reliance on bank debt. The underlying premise is that the disciplinary power of competition may reduce the monitoring benefit of bank lenders, leading thus to a lower bank debt reliance. To the extent that competition acts as a natural constraint to insiders' diversion activities, it is effective in reducing firm monitoring needs. Indeed, Giroud and Mueller (2010) provide evidence that competition substitutes for corporate governance by mitigating the detrimental effects of Business Combination laws that reduce takeover threats. Accordingly, firms operating in competitive markets would exhibit less need for the strict monitoring provided by bank lenders. This idea has been proposed in Houston and James (1996) and Denis and Mihov (2003) who provide evidence that high quality firms borrow more from arm's length public lenders.

Consequently, given that competition reduces firm monitoring needs, we expect firms to rely less heavily on bank debt financing upon increased competitive pressure.

In this paper, we test the above hypotheses on the role of industry competition in explaining the choice of debt source, using product market fluidity, *FLUIDITY*, as the main measure of competition. Constructed by Hoberg et al. (2014), *FLUIDITY* is a text-based measure that captures competitor product similarity based on the product descriptions found in firms' 10-K filings. The higher the similarity between a firm and its rivals' products, the higher the competitive pressure. Our empirical analysis is based on a sample of 3,831 U.S. listed firms for the period spanning 2001 to 2013. We find compelling evidence that firms operating in more competitive industries, where the external market discipline is most potent, tend to rely less on bank loans. This evidence lends support to the monitoring role of product market competition, since we argue that firms facing higher competition have lower monitoring needs, and therefore rely less on the strict monitoring provided by bank lenders. To further test the soundness of our findings, we perform a battery of robustness checks using alternative product market competition proxies, additional control variables, and alternative estimation techniques.

One major factor that could severely damage the credibility of the uncovered causal relation is the endogeneity of product market competition. We address this potential concern using two approaches. *First*, we use an instrumental variable (IV) approach to check whether our results are driven by the reverse causality running from bank debt reliance to competitive pressure. Indeed, the debt contracting literature has relevance to the fact that banks have a bargaining power over borrowers' profits (e.g., Rajan, 1992; Houston and James; 1996), which in turn discourages investment and weakens firms' aggressiveness in the product market. Therefore, this may result in a lower intensity of product market competition. In the spirit of Waisman (2013), we use, as an instrument for industry competition, the competition proxy of each firm one year prior to the beginning of our period of study. Additionally, we follow Xu (2012) and use the import tariff rates as an instrumental variable for the foreign competitive pressure. *Second*, we test whether our results are driven by unobserved common factors that could be simultaneously correlated with corporate financing decisions and product market competition. We therefore design a quasi-natural experiment using large tariff rate reductions as an exogenous shock that radically increases foreign competition (e.g., Fresard, 2010, Valta, 2012; Fresard and Valta, 2016). We also conduct a placebo test to ensure that the results of our quasi-

natural experiment setting do not reflect the effect of some factors that are captured by the tariff reduction dummy variable. Overall, our two approaches yield consistent results with our findings that competition decreases the fraction of bank debt in total debt.

A careful examination of the cross-sectional variation in the competition-debt choice relation allows us to further understand the mechanisms through which competitive pressure influences bank debt financing. We begin by testing the role of exposure to competition given that it captures the risk due to firms' inability to cope with the competitive pressures (Valta, 2012; Li and Zhan, 2016). The intuition is that the competitive pressure is more likely to shape firm financing decisions, particularly when firms have disadvantaged positions in the product market. In line with this intuition, our results show that the relation between competition and bank debt is stronger for firms with a higher market share, firms operating in concentrated industries and firms with less diversified business and geographic segments.

Additionally, since we have built our story on the disciplinary power of competition, we examine the conditioning role of the quality of firms' monitoring environments. On the one hand, when firms are well-monitored, they are more likely to be influenced by the disciplinary power of competition, consistent with the complementary effect of different governance mechanisms. On the other hand, when firms are poorly-monitored, competition may act as a substitute source of discipline (Giroud and Mueller, 2010, 2011), impacting more significantly the need to bankers' tight control. The results show that the role of product market competition in decreasing the fraction of bank debt in total debt is more pronounced in well-governed firms, confirming the view that the improved quality of firms' governance mechanisms is likely to reinforce the disciplinary power of competition.

Finally, besides testing the role of firms' exposure to competition and their monitoring incentives, we consider the impact of financial constraints on firms' debt choice response to competitive pressure. Financial constraints capture the competitive risk that makes a firm more vulnerable to the aggressive competitive behavior of financially-stronger rivals (Bolton and Scharfstein, 1990). Consistent with the idea that firms with more binding financial constraints are subject to predation risk, we find that the impact of intense industry competition on the reliance on bank debt is more pronounced for financially-constrained firms. These findings

suggest that debt financing decisions are more likely to react to the dynamics of the product market environment when firms have tighter financial constraints.

This study contributes to the literature in two important ways. With respect to the literature on debt choice, it adds new insights on the determinants of corporate debt financing choice by looking beyond firm-level attributes. Extant research sheds lights on the role of informational asymmetries as measured by firm-specific uncertainty (Krishnaswami et al., 1999), stock return volatility (Hadlock and James, 2002), reduction in analyst coverage (Li et al., 2015), among others. Other studies emphasize the role of the internal governance practices ((e.g., Lin et al., 2013; Boubaker et al., 2016) and external governance environment (Bharath and Hertzel, 2016)[4], highlighting the impact of agency conflicts on the monitoring benefit of bank lenders. More importantly, our findings pin down the importance of product market competition in explaining the choice between public and bank debt. To the best of our knowledge, our paper is the first to address this issue.

In addition, the evidence presented in the current study adds to the research that investigates how the degree of product market competition impacts corporate decisions. For instance, it complements previous work that links a firm's product market environment with its disclosure policy (e.g., Li, 2010), financing decisions (e.g., Xu, 2012), payout policies (e.g., Hoberg et al., 2014), corporate venture capital investments (Kim et al., 2016), among others. Our paper attempts to broaden our understanding of the role of competition in driving firm debt financing decisions. For this aim, we shed new lights on how firms choose between public and bank debt placement when faced with competitive pressure from the product market.

The remainder of the paper is structured as follows. In Section 2, we present an overview of the background literature followed by the development of our main hypotheses. Section 3 describes the sample and variables definitions. Sections 4 and 5 discuss the empirical results and the robustness checks. The last section summarizes and concludes the paper.

[4] Bharath and Hertzel (2016) examine the type of debt that firms issue in the face of external governance pressure provided by the product market competition. The authors show that the improved quality of the external governance environment lowers the probability that firms monitor managers through bank debt issuance. Our paper differs from Bharath and Hertzel (2016) in that, country to debt issuance, we investigate firm reliance on bank debt using the S&P Capital IQ database which provides a comprehensive coverage of debt structure data for a large sample of U.S. firms.

2. Related literature and hypotheses development

2.1. Background literature

The theoretical financial contracting research stresses the importance of the comparative advantages of bank debt over other types of debt. *First*, banks are endowed with a comparative information advantage that arises from their ability to evaluate borrowers without causing private information to be leaked. Proprietary information models predict that the disclosure of valuable private information is essential to show creditworthiness, but harmful since such information loses value once disseminated (e.g., Bhattacharya and Ritter, 1983; Yosha, 1995). Since bank lenders maintain a close touch with borrowers, they are better informed than lenders in the public debt markets (Hadlock and James, 2002). Hence, they require less disclosure of firm-specific information, thus mitigating adverse selection costs related to public debt financing. According to the pecking order theory that suggests that firms use costly financing only as a "last resort", firms with more sensitive information would prefer bank debt as bank lenders are better able to keep proprietary information confidential, contrary to public lenders that require the disclosure of verifiable information as a way to grant loans at favorable terms.

Second, banks are endowed with a superior ability to monitor and to detect insiders' diversion of firm resources at the expense of other shareholders (e.g., Fama, 1985; Berlin and Loeys, 1988). This superiority is generally attributed to the ability of bank lenders to gather private information about their customers. Unlike public lenders, who rely on publicly available information, banks get direct access to borrowers' private information and transaction accounts (Fama, 1985; Rajan, 1992). In this case, they are better able to exert pressure on corporate insiders and punish distressed firms through efficient liquidation or renegotiation of debt agreements (e.g., Chemmanur and Fulghieri, 1994). According to Park (2000), bank monitoring activities induce borrowers to make appropriate decisions, thus reducing moral hazard problems. Moreover, the comparative advantage of bank debt in monitoring corporations stems from its concentrated ownership structure relative to arm's length public debt. In this case, bank lenders

are more willing to engage in costly and effective information production activities, and thus facing fewer free-rider problems of monitoring (e.g., Houston and James, 1996).[5]

The value of these comparative advantages of bank debt in monitoring and in keeping proprietary information confidential may be highly dependent on the changes of the borrowing firms' environment. An emerging debate paid attention to the effects of product market competition on the quality of firms' information and governance environments. In particular, two competing theoretical views contribute to this debate. *First*, the proprietary cost theory developed by Verrecchia (1983) predicts that competition exacerbates informational asymmetries since firms avoid to give away their private information for fear that it might be strategically used by existing rivals. *Second,* countrary to its unfavorable information effect, competition has been shown to mitigate agency problems as it acts as an external governance mechanism. The underlying presmise is that, since profit margins are reduced in more competitive industries, managers have less of an incentive to divert profits to their own use, thus reducing their managerial slack (Hart, 1983; Schmidt, 1997).[6] [7] Taken together, to the extent that competition might influence the quality of the information and the governance environment, we expect it to be significantly related to the bank debt reliance. In the next section, we develop the testable hypotheses on the effect of industry competition on the choice of debt financing source.

2.2. Hypotheses development

There are two lines of reasoning which imply that product market competition has a positive effect on bank debt financing. The first is based on theoretical work highlighting the role of competitive pressure in discouraging firms to give away their private information (Verrecchia, 1983). A variety of empirical evidence lends support to this view. For example, Verrecchia and Weber (2006) empirically find that, when competition intensifies, firms redact proprietary information from their material contract filings so as to limit the flow of information to the public. Similarly, Li (2010)'s study suggests that the higher the level of

[5] Prior reseach provides evidence on the uniqueness of bank loans in adding value to the borrowing firm by showing the positive market reaction to bank loan agreements (e.g., James, 1987).

[6] Schmidt (1997) sheds lights on managerial career concerns that increase managers' willingness to reduce the likelihood of firm liquidation in order to retain their jobs.

[7] Holmström (1982) posits that competition improves managerial incentives by providing shareholders with more information for relative performance evaluation.

competitive pressure from existing rivals, the lower the level of information disclosure. When firms in competitive markets are concerned about information leakage problems, they should have strong incentives to rely on external financing sources that offer the privilege of a private channel of communication. Previous empirical studies provide evidence that firms with a greater degree of information asymmetry place more reliance on private debt (Krishnaswami et al., 1999; Denis and Mihov, 2003; Dhaliwal et al., 2011). Relying on these arguments, we propose that greater competitive pressure induces firms to rely more on bank debt as a way of protecting their proprietary information.

The second argument is based on the view that product market competition performs a corporate governance role which restricts insiders' opportunistic behavior (Hart, 1983; Scmidt, 1997). In support of this theoretical view, a considerable body of emprical research has emerged which is devoted to explaining how product market competition acts as an external disciplinary mechanism. For instance, Dyck and Zingales (2004) highlight the effectiveness of competition in curtailing the consumption of private benefits of control. Additionally, Baggs and Bettingies (2007) show that competition induces efficiency and mitigates agency conflicts through its pressure effect. A resulting implication from this line of research is that firms in highly competitive industries are likely to make optimal decisions with regard to the best interests of shareholders. The crux of this argument is that the disciplinary role of competition helps curb insiders' incentives to avoid external monitoring as a way to preserve their private benefits, and therefore leads them to choose bank debt financing (Lin et al., 2013). In short, we propose that product market competition increases the proportion of bank debt in total debt.

H_{1a}: Greater product market competition leads to more reliance on bank debt.

However, there is another line of reasoning which suggests that product market competition negatively affects the monitoring benefit of bank debt. This line contends that the governance role of competitive pressure reduces firms' monitoring needs and thus substitutes for other governance mechanisms. Indeed, recent empirical studies shed lights on the substitution effect between the disciplinary power of competition and the quality of corporate governance, such as the market for corporate control (Giroud and Mueller, 2010) and the internal governance mechanisms (Giroud and Mueller, 2011; Chaochharia et al., 2016). It is well documented that bank lenders are more effective monitors than arm's-length public debtholders

due to their ability to screen borrowers and to make efficient renegotiation of debt contracts. Therefore, bank-monitored debt would be more beneficial to firms with greater monitoring needs (e.g., Denis and Mihov, 2003).[8] In light of this logic, one might expect that the monitoring benefits of bank debt would be lower in firms operating in more competitive industries. In this case, we hypothesize that there is a negative relation between competitive pressure and the proportion of bank debt in firm's total debt.

H_{1b}: Greater product market competition leads to less reliance on bank debt

The relative difference in bank debt reliance between firms in competitive and concentrated industries is not necessarily uniform across all firms. Initially, we consider whether the level of firm exposure to competition alters the relation between competitive pressure and firm reliance on bank debt. Indeed, firms that are less able to cope with competition are more likely to be severely impacted by the increase in competitive pressure. In comparison, firms with more sustainable moats around them are more protected from the threats of rivals, and therefore might not be influenced by the intense competitive pressure. Consistent with this argument, Li and Zhan (2016) find that firms facing severe rivals' threats are more likely to be subject to stock crash risk, especially when they have disadvantaged positions in the product market. Additionally, Valta (2012) show that the negative impact of competition on the cost of debt is more pronounced in industries with more strategic interactions, where firms have more similar operations to those of their industry peers. Accordingly, we argue that when firms are exposed to competitive pressure, their debt structure reacts more significantly to the hightened of competition. This perspective leads to our second hypothesis:

H_2: The impact of product market competition on debt choice is larger for firms with a greater exposure to competition.

Besides testing the exposure to competitive pressure, it is worth investigating whether the effectiveness of the governance role of competition is influenced by the quality of firms' monitoring mechanisms. On the one hand, if the existing governance mechanisms in the firm are deeply flawed, competition may act as a substitute source of monitoring, thus having a more

[8] According to the reputation-based model of Diamond (1991), low-quality firms (i.e. those with greater monitoring needs) have less to losse when they are monitored by bank lenders, and thus rely more on bank loans.

pronounced disciplinary effect on firms with weak governance quality. This substitutability has been highlighted in a number of empirical studies examining the joint impact of competition and governance practices on firm efficiency (Giroud and Mueller, 2010; Giroud and Mueller, 2011; Tian and Twite, 2011). On the other hand, the role of competition in aligning managerial interests with those of shareholders may be further reinforced by the efficiency of firms' governance structures. Indeed, Grosfeld and Tressel (2001) find that the disciplinary role of competition has a more significant effect on firm performance for firms with a better governance quality. In the same vein, Januszeweski et al. (2002) provide evidence that the tight control of the ultimate owner complements the role of competition in influencing firm productivity growth. Based on the aforementioned arguments, we propose the following hypothesis:

H_3: The relation between product market competition and firm reliance on bank debt is larger for firms with stronger (weaker) monitoring mechanisms.

Finally, we evaluate the role of firms' financial constraints in moderating the relation between product market competition and firm reliance on bank debt. Financial constraints are commonly recognized to have important impacts on the severity of rivals' threats. Indeed, predation models, based on the long-purse view, explain that the "deep-pocket" rivals have incentives to target the prey that has a vulnerable financial structure. Bolton and Scharfstein (1990) argue that cash-rich and lowly-levered firms can drive their financially-constrained competitors out of the market by taking actions to under-cut market prices. Therefore, unlike firms with binding financial constraints, financially-superior firms are endowed with the ability to fend off competition, which decreases their sensitivity to competitive pressure. For example, Valta (2012) provides evidence that the positive relation between competition and loan spreads is stronger when the difference between the incumbent firm and its rivals' financial strength is larger. More related to our context, bank debt financing is expected to be more significantly related to competitive pressure for financially-constrained firms. We, therefore, propose the following hypothesis:

H_4: The impact of product market competition on debt choice is larger for firms with higher financial constraints.

3. Sample, variable definitions, and summary statistics

3.1. Sample

To examine the effect of product market competition on debt choice, we consider a sample of U.S. firms appearing in the Compustat database during the period of 2001 through 2013.[9] We confine our analysis to publicly listed firms since they are often faced with the choice between public and private debt. Our sample selection procedure starts by removing firm-year observations with missing and zero total debt and total assets, and also excluding firms operating in the financial industry (SIC codes 6000-6999) and regulated utilities (SIC codes 4900-4999). We then merge the resulting sample with the debt structure data from the Capital IQ database, yielding a final sample comprising 26,703 firm-year observations for 3,831 U.S. firms.

3.2. Regression variables

3.2.1. Debt structure

In this study, we use, as a dependent variable, the proportion of bank debt in a firm's debt structure. Following previous studies on the determinants of debt choice (e.g., Lin et al., 2013; Boubaker et al., 2016), we employ the ratio of bank debt to total debt to measure the firm's reliance on bank debt.

3.2.2. Product market competition

We proxy for the intensity of competition in product markets using product market fluidity, *FLUIDITY,* which is developed by Hoberg et al. (2014).[10] F*LUIDITY* is based on product descriptions found in firms' 10-K filings and captures the degree to which a firm's products are changing due to the evolution of rivals' products. More specifically, it is defined as the similarity between a firm's vocabulary and the change in the overall use of vocabulary by rivals in a given industry. A greater similarity in the business descriptions between rivals implies that a firm faces higher competitive threats and thus a higher intensity of product market competition. The use of *FLUIDITY* as a measure of competition is interesting in that it is highly representative of

[9] The sample period covered in this study ends in 2013 because the data on product market competition constructed by Hoberg et al. (2014) is only available up to 2013.

[10] We download the data from http://hobergphillips.usc.edu/.

the competitive pressure imposed by rivals' threats, which are likely to expose firms to potentially large losses, and therefore disciplining firms' managers and improving governance quality. Additionally, *FLUIDITY* is considered as an ideal proxy of competition to overcome endogeneity issues (Hoberg et al., 2014). Unlike traditional measures of product market competition (e.g., Herfindahl-Hirschman Index, Firm-concentration ratios, Price-cost margins, among others), *FLUIDITY* is a competitive pressure measure which pertains to the movement of firms' rivals and, therefore, is exogenous to the actions taken by firms. Recently, a number of empirical studies have used *FLUIDITY* as a proxy for the competitive threats that a firm faces. For instance, Hoberg et al. (2014) show that firms with higher fluidity tend to decrease dividend payouts and increase cash holdings as a way of managing the predation risk arising from rivals' predatory behavior. Alimov (2014) employs fluidity as an additional measure of firms' product market dynamics and report that competition increases the value of cash holding. Therefore, in our analysis, we consider *FLUIDITY* as a proxy for the intensity of competition in a product market.

3.2.3. Control variables

Relying on prior studies, we control for a wide range of firm characteristics that are deemed to affect firms' choice between bank loans and publicly traded debt (e.g., Houston and James, 1996; Denis and Mihov, 2003; Lin et al., 2013). The inclusion of these controls aims to assess the incremental effect of product market competition on debt choice.

(i) *LEVERAGE* is measured as the ratio of total liabilities to total assets. On the one hand, since highly-leveraged have acquired reputation credit markets, they exhibit a lower demand for bank-monitored debt (Diamond, 1991). On the other hand, since leverage may act as an internal disciplinary device, firms with higher leverage are likely to issue more bank debt since firms' insiders have less incentives to insulate themselves from creditors control. Hence, the effect of leverage on bank debt use is expected to be positive or negative.

(ii) *TANGIBILITY* is equal to the ratio of net property, plant and equipment to total assets. Tangible assets serve as a collateralization for debt, which mitigates lenders' risk. Therefore, firms with more fixed assets have a better credit quality (Denis and Mihov, 2003) and exhibit preference for public debt. Consistent with models based on borrower reputation, we expect firms with tangible assets to issue more public debt than bank loans.

(iii) *ROA* measures firm profitability to proxy for project and credit quality (Denis and Mihov, 2003). It is the ratio of operating income before depreciation to total assets. More profitable firms have a better reputation on credit markets and are, therefore, more inclined to issue public debt. Diamond (1991) argues that a decrease in profitability leads firms with a high credit rating to borrow from banks. As a consequence, profitability is expected to be negatively associated with firm's reliance on bank debt.

(iv) *Q* measures firm growth opportunities and is defined as the sum of market value of equity plus book value of debt divided by total assets. Firms with higher growth opportunities are likely to be more successful and profitable in their business activities. Diamond (1991)'s model predicts that successful firms with more investment opportunities rely less on bank-monitored debt. Therefore, we expect a negative relationship between Tobin's Q and bank debt.

(v) *SIZE* is defined as the natural logarithm of total assets. Large firms have a lower level of information asymmetry, which reduces their need to private lenders' monitoring (Houston and James, 1996). Moreover, larger firms have a higher debt capacity, which enables them to reduce transaction costs of public debt by realizing economies of scale (Blackwell and Kidwell, 1988). Accordingly, we expect *SIZE* to be negatively associated with bank debt.

(vi) *RATED* is a dummy variable that indicates whether a firm has an S&P long-term debt rating. Previous research on the choice of debt financing sources pointed to a strong positive relation between issuing public debt and having a credit rating (e.g., Cantillo and Wright, 2000) since rated firms have a better access to public debt markets. Consequently, we expect *RATED* to be negatively associated with bank debt use.

(vii) *INVGRADE* is a dummy variable that takes 1 if the firm has an investment-grade S&P long-term debt rating. According to Diamond (1991), credit quality is a major factor that determines firms' choice of debt source. Indeed, high quality firms have more to lose in case of default on debt repayment, and therefore they rely primarily on arm's length debt rather than costly bank-monitored debt (Rauh and Sufi, 2010). Consistently, *INVGRADE* is expected to have a negative relation with the fraction of bank debt in a firm's total debt.

3.3. Descriptive statistics

In Table 1, we present descriptive statistics for the main variables used in our empirical work. The reported statistics show that all the firm characteristics are within reasonable levels and are largely in line with previous studies in terms of magnitude (e.g., Hoberg et al., 2014; Colla et al., 2013). For example, we find that bank debt use is largely prevalent in the U.S. context since 42.2% of U.S. firms' total debt is borrowed from banks. Additionally, we find that the average value of product market fluidity for our sample firms is 6.778, which is close to the average value reported by Hoberg et al. (2014) (6.932), with a standard deviation of 3.742 (3.362 as reported in Hoberg et al. (2014)'s study).

Additionally, Table 1 presents the descriptive statistics for the control variables that we include in our study. As shown in this table, our sample comprises firms having different levels of leverage, varying from less than 0.4% to more than 62%, which makes it a good sample to study firms' debt structures. Moreover, our sample is characterized by an average profitability ratio of 7.9%, average firm size of 6.387, average value of Tobin's Q of 1.888, and an average level of tangibility of 0.534.

[Insert Table 1 about here]

Table 2 provides Pearson's correlation coefficients between the explanatory variables that we use in our main regression. From this correlation matrix, it is evident that multicollinearity between the independent variables is unlikely since the correlation coefficients are relatively small. In addition, after computing the variance inflation factors (VIFs) for each of our regressions (unreported), we can surmise with some assurance that we do not have harmful multicollinearity since the VIFs do not exceed the critical value of 10.

[Insert Table 2 about here]

4. Main analysis: The effect of product market competition on the debt choice

4.1. Model specification

In this section, we conduct a multivariate analysis to better gauge the effect of product market competition on debt choice. We regress the ratio of bank-to-total debt on product market fluidity and other control variables using the following model:

$$BANK\_DEBT/TOTAL\_DEBT = a_0 + a_1\, FLUIDITY + a_2\, SIZE + a_3\, Q + a_4\, LEVERAGE + a_5\, ROA + a_6\, TANGIBILITY + a_7\, RATED + a_8\, INVGRADE + Industry\ dummies + Year\ dummies + \varepsilon \quad (1)$$

where *BANK_DEBT/TOTAL_DEBT* is the fraction of bank debt in a firm's total debt, *FLUIDITY* is the proxy of product market competition. Control variables are a set of firm characteristics that have been shown in previous research to be important determinants of debt choice. This set of variables includes *SIZE, Q, LEVERAGE*, *ROA, TANGIBILITY*, *RATED,* and *INVGRADE*. We finally include industry dummies and year dummies to control for determinants of debt choice that are fixed across industries and over time.

4.2. Results

Table 3 presents our main evidence on the relation between product market competition and firm reliance on bank debt. We start our analysis by running an OLS regression of the ratio of bank-to-total debt against product market fluidity (*FLUIDITY*) and firm size (*SIZE*), by adjusting standard errors for heteroskedasticity and clustering at the firm-level. The coefficient on our main variable of interest, *FLUIDITY*, identifies whether the fraction of bank debt in a firm's total debt is determined by product market competition. The results displayed in column (1) find support to our prediction in H_{1b}. Specifically, the coefficient on *FLUIDITY* is negative and statistically significant at the 1% level, suggesting that firms value the role of product market competition as an external governance mechanism, evident in them exhibiting a lower demand for bank lenders' monitoring. As for the variable *SIZE*, the results in column (1) show that smaller firms rely more bank debt. This is particularly attributable to the fact that such firms have higher monitoring needs due to their exacerbated informational asymmetries (Houston and James, 1996), and also have less gain from the reduced transaction costs of public debt due to their lower debt capacity (Blackwell and Kidwell, 1988).

[Insert Table 3 about here]

In specification (2), we augment our regression analysis by including the control variables in order to help address the previously documented factors that might influence firms' choice of debt instruments. From estimating equation (1), we find that *FLUIDITY* continues to load negatively at the 1% significance level, providing evidence that firms facing stiffer competition rely less on bank debt financing. However, OLS coefficient estimates may be inconsistent since our dependent variable is bounded by 0 and 1. We tackle this issue in specification (3) by estimating a tobit regression. The results indicate that *FLUIDITY* enters negatively and statistically significantly at better than the 1% level, implying that the intensification of competition decreases firm reliance on bank debt.

All the of control variables, except for *ROA* and *TANGIBILITY*, enter the regression with the hypothesized signs at the 1% significance level. Not surprisingly, we record evidence for the fact that a high proportion of bank debt in firms' total debt is observed in smaller firms, firms with lower growth opportunities, firms with no S&P long-term debt rating, and firms for which this rating is beyond BBB-. These findings are consistent with the predictions of previous research on the determinants of the choice of debt sources (e.g., Diamond, 1991; Houston and James, 1996; Rauh and Sufi, 2010; Lin et al., 2013). We also find that highly leveraged firms tend to rely more on bank debt, as indicated by the positive and significant coefficient on *LEVERAGE*. This is consistent with the disciplinary effect of leverage which is likely to reduce managers' incentives to avoid bank debt as a way of insulating themselves from bank monitoring.

Overall, our results lend support to the disciplinary view of product market competition (Hart, 1983; Shleifer and Vishny, 1997). To the extent that the competitive pressure plays a prominent governance role in mitigating managerial expropriation, it acts as a substitute for the monitoring provided by bank lenders, who are well positioned to access firms' private information (e.g., Fama, 1985; Berlin and Loeys, 1988). Our findings are corroborated in previous empirical studies that point to a substitution effect between product market competition and other governance mechanisms such as takeover threats (Giroud and Mueller, 2010) and board efficiency and CEO stock-based compensation (Tian and Twite, 2011).

4.3. Robustness checks

4.3.1. Endogeneity: Instrumental variable approach

Notwithstanding the available evidence, it is worth noting that our results could be driven by potential concerns pertaining to the endogeneity of product market competition. In this section, we attempt to mitigate the endogenous nature of our relation arising from reverse causality between firms' financing decisions and product market competition. Indeed, it is highly likely that the strict debt covenants imposed by bank lenders restrict corporate activity, which in turn implies a less aggressive behavior in product markets and, thus, softer competition. The debt contracting literature has relevance to the fact that banks exert more pressure on borrowers' investment decisions compared to public lenders. For instance, Rajan (1992) and Houston and James (1996) argue that banks' informational advantage creates hold-up problems that may distort firms' investment incentives. Accordingly, firms would behave less aggressively in the product market in case they choose bank debt over public debt.

To address this issue, we adopt an instrumental variable approach. In the spirit of Waisman (2013), we first instrument for product market competition using *FLUIDITY* one year prior to the beginning of our sample period (*FLUIDITY2000*). Indeed, the historical measure of product market competition reasonalbly satisfies both the relevance and exclusion conditions. On the one hand it is positively related to the intensity of competition in a given firm's industry. But on the other hand, it is not likely to be directly related to a firm's preference for private debt financing, unless through its impact on the current level of competition that the incumbent firm faces.

Second, we supplement our IV approach with another instrument measuring the importance of entry barriers for foreign rivals, namely tariff rates (e.g., Xu, 2012; Li and Zhan, 2016). Previous research suggests that when import tariff rates are low, foreign rivals have more incentive to enter the product market of the incumbent firm, thus intensifying foreign competitive pressure (Bernard et al., 2006). This suggestion implies that our instrument meets the relevance criterion. However, since these tariff rates reflect moves made by foreign rivals rather than by the firm itself, a direct relation between tariff rates and firm financial policies would not arise except through the channel of rivalry threats that the firm considers when

choosing between bank and public debt. As a consequence, this intuition confirms that our instrument satisfies the exclusion criterion. To calculate the tariff rates, we use the international trade data available on *Schott's International Economics Resource Page* (Schott, 2010).[11] The ad valorem tariff rate is defined as the ratio of the duties collected from each industry to the dutiable value of imports using the 3-digit SIC industry classification (*Tariff Rate*).

The results of the instrumental variable regression are presented in Table 4.[12] [13] In the first-stage regression, we show that *FLUIDITY2000* is positively related to *FLUIDITY*. On the other hand, the import tariff rates are negatively related to *FLUIDITY*, suggesting that the increase in trade barriers is likely to lower the threats of potential foreign entrants. The statistically significant coefficients corroborate that our instruments are good predictors of the intensity of product market competition. Other noteworthy results in Table 4 include the Sander-Windmeijer F-statistics (1770.97 and 40.97 for *FLUIDITY2000* and *Tariff Rate* respectively), which reject the null hypothesis that the endogenous regressors are unidentified, providing thus a strong statistical support for the validity and relevance of our instruments. In the second stage, we further confirm the significant and negative effect of competitive pressure on the ratio of bank debt to total debt. Indeed, the coefficients on both instrumented variables of competition are negative and statistically significant. Overall, these findings are consistent with our hypothesis in H_{1b}, suggesting that the disciplinary role of product market competition reduces firms' monitoring needs, resulting in firms relying less on bank lenders' strict control.

[Insert Table 4 about here]

4.3.2. Endogeneity: The quasi-natural experiment

Although the instrumental variable approach is efficient in solving endogeneity issues, we also use a quasi-natural experiment setting to further establish the causal effect of product market competition on bank debt reliance. In particular, we examine the reaction of firms' choice

[11] http://faculty.som.yale.edu/peterschott/sub_international.htm

[12] The drop in the sample size (21,190 for *FLUIDITY2000* and 11,922 for *Tariff Rate*) is attributable to two main reasons. First, the data on product market fluidity in 2000 is missing for some firms. Second, the tariff data covers only firms operating in the manufacturing industries for the years until 2012.

[13] In untabulated tests, we show that all the results reported in Table 3 continue to hold when we use the smaller sample for which we have data on *FLUIDITY2000* and *Tariff Rate*.

between bank and public debt to the exogenous event of a large reduction in import tariff rates. The international trade literature offers arguments consistent with the idea that trade openness reduces the cost of entering domestic product markets, thus causing disruption for domestic firms (e.g., Bernard et al., 2006). For example, Bernard et al. (2006) provide empirical evidence that a decline in trade costs, as measured by industry-level tariff rates, is associated with a significant increase in foreign competitive pressure. Therefore, the large reductions in import tariff rates would offer an ideal setting to capture major changes in market structure and their effect on firm financing decisions. The significant impact of tariff rate reductions on firms has been well established in the literature by examining the link between competition and cash holdings (Fresard, 2010), capital structure decisions (Xu, 2012), investment decisions (Fresard and Valta, 2016), among others.

We follow prior studies in measuring reductions in import tariff rates which are considered as a proxy for the intensification of foreign competition. To this end, we use U.S. tariff data available at the Harmonized System (HS) level. We also employ Schott's (2010) *Trade Data and Concordances* which provide a matching of 10-digit HS codes with SIC codes. We finally update tariff data up to 2012 using data on imports and exports available on *Schott's International Economics Resource Page*.[14] After merging tariff data with our sample firms, we obtain a final sample of 1,798 firms operating in 107 3-digit manufacturing industries. Following Fresard (2010) and Valta (2012), we characterize an industry-year experiencing an event of large tariff reduction through a dummy variable that takes 1 if the negative yearly change in tariff rates exceeds three times the industry median tariff reduction. Out of the 107 3-digit industries, we identify 43 3-digit industries experiencing at least once a large tariff reduction.

We evaluate the reaction of the choice between bank and public debt to a large import tariff rate reduction using Valta (2012)'s difference-in-difference approach. In particular, we replicate our baseline regressions using a dummy variable that takes the value of 1 if there is a large reduction in import tariff rates, and 0 otherwise. This method allows us to compare the responses of a treatment group (i.e., firms experiencing a large tariff reduction in year t) to those of a control group, which includes all firms that do not experience any competitive shock event

[14] Because 2012 is the last year of data on imports and exports in *Schott's International Economics Resource Page*, we stop the updating procedure in 2012.

in year t. The results of the difference-in-difference analysis are displayed in Table 5. Column 2 shows that the reduction in tariff rates has a considerable impact on firms' financial decisions, particularly the choice between bank and public debt. We find that firms affected by a large tariff drop experience a more significant decrease in the proportion of bank debt in their total debt compared to firms operating in unaffected industries.

We also supplement our analysis with an alternative measure for large tariff declines. Particularly, we construct a variable that is set equal to 1 for the tariff reduction year as well as for five years later. This measure aims to account for the persistent effect of the large tariff reductions on the intensity of competition in product market environments. Similarly, we show, in column 4, that there is a negative link between the intensification of competition following tariff declines and the fraction of bank debt in total debt. Specifically, we find that firms respond to tariff reduction events by decreasing their bank debt by approximately 4%. Overall, our results are consistent with our main hypothesis stating that the disciplinary power of competition substitutes for the strict control provided by bank lenders, which in turn leads firms to rely less on bank debt.

[Insert Table 5 about here]

4.3.3. Falsification test

Since our exogenous shock consists of large tariff reductions that occur in different industries at different time periods, the fact that our results are driven by unobserved factors which coincide with the tariff reduction shocks is not a serious concern. Nevertheless, we perform a random placebo test to completely rule out this possibility. Specifically, we create a new dummy variable that represents a pseudo tariff reduction event by randomly assigning a placebo treatment to each 3-digit SIC industry, assuming that this treatment also increases the competitive threats of rivals. We then replicate our baseline regressions using our new dummy variable to examine firms' responses to the pseudo-event. The results of this random placebo test are displayed in Table 6. Not surprisingly, we find that the coefficients on pseudo-event dummy are all statistically insignificant and have a lower magnitude compared with those reported in Table 5. Consequently, these results reject the possibility that our previous findings may be driven by unobserved shocks.

[Insert Table 6 about here]

4.3.4. Alternative competition-related variables

To further explore the reliability of our results, we re-estimate our original regression using alternative proxies for product market competition. We first use measures that capture a different dimension of competition other than the predatory threats of rivals, i.e. industry concentration. More specifically, we use the Herfindahl-Hircshman Index (*HHI*) calculated as the sum of the squared market shares of all firms operating in the same industry. We specifically use the time varying Text-based Network Industry Classification (TNIC) developed by Hoberg and Phillips (2016).[15] In column (1) of table 7, we find that the coefficient on *TNIC_HHI* is positive and statistically significant at the 1% significance level, suggesting that the fraction of bank debt in total debt is higher for firms operating in concentrated industries.[16] The results in column (2) remain qualititavely the same using the concentration ratio (*CR*) which is intended to capture the power of the largest firms operating in an industry. *CR* is calculated as the sum of the market shares of the 4 largest firms competing in each industry based on the 3-digit industry classification. Consistently, we find, in column (2), that the increase in industry concentration leads firms to rely more on bank debt control, as a response to the lack of efficient external governance from the product market.

So far, the alternative measures used in this section capture industry-specific attributes. We supplement our analysis by using other firm-specific proxies of market power, which measure the extent to which a firm is able to price above its marginal costs (Datta et al., 2011). We therefore compute the Excess Price-Cost Margin (EPCM), also called the Lerner Index (LI), which is based on the profit-to-sale ratio calculated as the operating income divided by firm sales. We first define *EPCM* as the industry-adjusted price-cost margin, computed as the profit-to-sales ratio minus the sales-weighted profit-to-sale ratio of all firms operating in the same industry (Datta et al., 2011). Second, we use *TNIC_LI* defined as one minus the average profit-to-sales ratio of all firms operating in each TNIC industry based on the TNIC industry classification of Hoberg and Phillips (Kim et al., 2016). As an additional firm-level proxy of competition, we

[15] TNIC is better able to capture industry changing dynamics over time than the traditional SIC or NAICS because the industry assignment of each firm is based on the change of firms' 10-Ks over time.

[16] In unreported results, we find consistent estimates using *HHI* based on the Fixed Industry Classification developed by Hoberg and Phillips (2016) and the *HHI* based on the traditional 3-digit SIC.

use the logarithm of the number of firms operating in a given firm's TNIC industry (Kim et al., 2016). The regression results using *EPCM*, *TNIC_LI* and *LOG_NUM_FIRMS* as competition measures are reported in columns (3), (4) and (5), respectively. We continue to find support for the negative relation between competition and bank debt reliance.[17] All in all, these findings indicate that our reults are robust to the use of alternative proxies of industry competition.

[Insert Table 7 about here]

4.3.5. Additional control variables

The results presented so far in our analysis show that firms are less likely to rely on private bank debt when they face higher predatory threats from rivals. In this section, we address the question of whether our results are driven by other dimensions of product market competition. For this purpose, we include in our baseline regression additional control variables that proxy for industry concentration. Particularly, we focus on the Herfindahl-Hirschman Index (HHI), which is an entropy measure that stresses the importance of larger firms by assigning them a greater weight. In columns (1) and (2) of Table 8, we report the results using *HHI* based on the fixed industry classfication developed by Hoberg and Phillips (2016). We also present the results using *HHI* based on the traditional industry classifications, including 2-digit SIC, 3-digit SIC, and NAICS in columns (2), (3), and (4), respectively. Overall, we find that controlling for industry concentration measures does not alter the governance role of the competitive pressure on the choice between bank and public debt.

[Insert Table 8 about here]

5. Additional analysis: Cross sectional heterogeneity

Notwithstanding the robustness of our findings so far, we perform additional tests in order to go deeply into the understanding of the nature of the competition-debt choice relationship. Arguably, competition affects the decision to choose bank debt since it has a direct influence on firms' risk as well as on the quality of corporate governance. We therefore compare

[17] We also use an additional firm-specific proxy, similarity index, which measures the similarity between a firm's product decsriptions and those of industry peers using the TNIC industry classification (*TNIC_TSIMM*). The untabulated tests show that the results remain the same as those reported in Table 7.

the changes in bank debt reliance between firms with different levels of risk and different governance quality. Specifically, we account for three firm-specific characteristics, namely the exposure to competition, the monitoring quality, and the severity of financial constraints.

5.1. The role of exposure to competition

The impact of the competitive pressure on firms' decisions and strategies should depend on how sensitive a firm is to product market swings. In this section, we test the prediction in H_2 that the effect of product market fluidity on the proportion of bank debt in total debt is stronger in firms that are more exposed to competition. We argue that, since firms with a greater exposure to competition are more vulnerable to any unanticipated increase in competitive pressure, their debt structure would be more influenced by product market competition. Particularly, we are interested in the role of a firm position in the product market and its degree of diversification in mediating the competition-bank debt relationship.

We consider the effect of two main features that characterize the exposure to competition, i.e. the competitive position and the degree of diversification. To proxy for a firm competitive position, we *first* use a firm-level measure, *MARKET SHARE*, calculated as the fraction of firm sales in total industry sales. *Second*, we use an industry-level measure, *TNIC_HHI*, defined as the Herfindahl-Hircshman Index based on the *TNIC* industry classfication. To capture the degree to which a firm is diversified, we code two dummy variables for industrial and geographic diversification, which are drawn from Compustat's Business Segment files and Compustat's Geographic Segment files, respectively. *Business Diversification* takes the value of one if a firm has only one business segment for a particular year. *Geographic Diversification* takes the value of one if a firm has non-zero export sales for a particular year.

The results of our subsample analysis reported in table 9 provide consistent support for our predictions. Specifically, we find that, only for the subsample of firms having a stronger position (column 2) and operating in more concentrated industries (column 4), the negative relation between competition and the fraction of bank debt continues to hold. This is consistent with the fact that, unlike firms that already face high competition, firms facing a lower competition are more likely to react to any increase in competitive pressure. Additionally, column (6) and column (8) show that the competition-bank debt relationship is more significant

for the subsample of undiversified firms, consistent with the prediction that stand-alone firms are more subject to the competitive pressure. Overall, our findings corroborate the notion that firms' reaction to intensified competitive pressure increases with their exposure to competition.

[Insert Table 9 about here]

5.2. The role of governance quality

As competition plays a major governance role that decreases the need to bankers' tight control, it is worth noting that this governance effect might be influenced by the effectiveness of firms' monitoring mechanisms. The crux of the argument here is that firms with different governance structures should react differently to the disciplinary effect of competition. If the monitoring mechanisms within a firm are sufficiently effective in mitigating agency problems, they would reinforce the governance role of competition, thus increasing its impact on firms. In contrast, if the monitoring mechanisms are deeply flawed, competition may act as a substitute source of monitoring, thus having a more pronounced disciplinary effect on poorly-governed firms. In this section, we aim to analyze our research hypothesis H_3, pertaining to the effect of the monitoring quality on the relation between competition and debt choice.

To capture the quality of the monitoring environment, we employ two specific proxies: (1) the level of institutional ownership (*Institutional ownership*); and (2) the number of analyst following (*Analyst following*). As documented in the previous literature, institutional investors and financial analysts have been shown to be active in monitoring managerial behavior and providing value-added services to their firms (e.g., Hartzell and Starks, 2003; Dyck et al., 2010; Chen et al., 2015). We proxy for institutional ownership using the percentage of shares held by institutions. We also measure *Analyst following* using the average number of I/B/E/S financial analysts following a firm.

Table 10 presents the results of our empirical analysis which involves re-estimating our baseline model for two subsamples divided according to their monitoring quality. Importantly, we find in columns (1) and (2) that the negative coefficient on *FLUIDITY* is only statistically significant for firms with higher institutional ownership. Consistently, we find in columns (3) and (4) that the negative relation between product market competition and bank debt ratio is only significant in the subsample of firms with higher number of analyst following. These

results imply that the improved monitoring quality enhances the disciplinary role of competition. Overall, our findings lend support to the complementary effect between the disciplinary power of competition and the quality of monitoring in driving the choice between bank and public debt.

[Insert Table 10 about here]

5.3. The role of financial constraints

It has long been recognized that firms with a higher financing risk (i.e. financially-constrained firms) are more subject to the predation threats (e.g., Bolton and Scharfstein, 1990). This would imply that, unlike unconstrained firms, financially-constrained firms are more sensitive to the predatory threats of rivals, which may in turn affect more significantly their capital structure decisions. In this section, we aim to test our hypothesis H_3, which is related to whether the choice of the debt source is influenced by the increased financing risk associated with the intensification of competitive pressure.

To better gauge the effect of firms' financing risk on the relation between competition and debt choice, we bisect our sample at the median values of a variety of measures that proxy for financial constraints. First, we classify our sample firms according to their payout policy (*Payout Ratio*) since firms that pay dividends have a lower need to external financing. Second, we use the market-to-book ratio (*MTB*) as another indicator of firms' financing risk as growth firms are riskier than mature firms. In addition, we follow Almeida et al. (2004) and capture financing constraints using firms' credit rating. The idea is that firms with a better credit quality, i.e. those receiving credit ratings, are considered as financially-unconstrained. Finally, based on the results of Kaplan and Zingales (1997), we construct an additional index (*Kaplan-Zingales Index*) that measures the severity of financial constraints faced by a firm.

Table 11 reports the results of the subsample analysis for firms with high and low levels of financial constraints. Consistent with the arguments above, we find that, across all proxies, *FLUIDITY* loads only negatively and statistically significant for the subsample of firms with more binding financial constraints, i.e. firms with a lower payout ratio, higher growth opportunities, no credit ratings, and lower values of Kaplan-Zingales index, suggesting that the financing risk magnifies firms' reaction to competitive pressure. However, in sharp contrast

with what we observe for financially-constrained firms, we find that the coefficient on *FLUIDITY* is statistically indistinguishable from zero for the subsample of financially-superior firms. Overall, this evidence suggests that financially-constrained firms are more likely to react to the intensification of competitive pressure by reducing their reliance on bank-monitored-debt.

[Insert Table 11 about here]

6. Conclusion

A large literature in accounting and finance has highlighted the role of product market competition in driving corporate decisions and policies, such as disclosure decisions (Li, 2010), financing decisions (Xu, 2012), payout policies (Hoberg et al., 2014), corporate venture capital investments (Kim et al, 2016). Some studies argue that competitive pressure impinges on firms' information environments by discouraging them to disclose their private information to rivals (Verrecchia, 1983; Li, 2010). However, other studies imply that competition plays an effective governance role by increasing the likelihood of bankruptcy, since it forces managers to work hard and to reduce self-serving expenditures (Hart, 1983; Shleifer and Vishny, 1997; Giroud and Mueller, 2010, 2011). The objective of this study is to extend this line of research by focusing on the impact of industry competition on the choice between bank and public debt.

To address this question, we use a sample of 26,703 observations covering 3,831 U.S. firms over the 2001-2013 period. We find that firms in competitive industries have a lower propensity to rely on bank debt than firms operating in concentrated industries, suggesting that the disciplinary power of competition substitutes for the tight control provided by bank lenders. These results stand up to a battery of robustness checks, including addressing endogeneity issues through an IV approach and a difference-in-difference analysis, using alternative proxies of product market competition and additional control variables. Our additional analysis further reveals that the role of competitive pressure in decreasing the need to bank-monitored debt is more pronounced for firms that are more likely to be exposed to competition, firms with a better monitoring quality, and firms with more binding financial constraints.

In a nutshell, our results suggest that the disciplinary power of competition and bank lenders' strict control may act as alternate governance mechanisms. In other words, firms substitute away from the tightened control of bank lenders to the loosened control of bonds

when they benefit from the external governance pressure of the product market. Our inferences about this substitution effect between competitive pressure and bank control provides a potential explanation as to why bond markets are expanding more rapidly than bank loan markets, which is the continuous intensification of competitive pressure in product market landscapes.

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APPENDIX

Variable definitions and sources

Variable	Definition	Source
Dependent variable		
BANK DEBT/TOTAL DEBT	The ratio of bank debt to total debt	Capital IQ
Competition variables		
FLUIDITY	Cosine Similarity between a firm's own words vector and the change in rivals' words vector.	Hoberg and Philips Data Library
TNIC_HHI	The Herfindahl-Index calculated as the sum of the squared market shares using firm sales, based on TNIC industry classification of Hoberg and Phillips.	As above
TNIC_TSIMM	The sum of parwise similarity between a firm and its industry peers based on TNIC industry classification.	As above
LOG_NUM_FIRMS	The number of firms operating in each firm's industry, based on TNIC industry classification of Hoberg and Phillips.	Authors' calculation based on Hoberg and Phillips Data Library
FIC_HHI	The Herfindahl-Index calculated as the sum of the squared market shares using firm sales, based on FIC industry classification of Hoberg and Phillips.	As above
TNIC_LI	The Lerner Index calculated as one minus the average profit-to-sales ratio of all firms operating in the same TNIC industry of Hoberg and Phillips.	Authors' calculation based on Hoberg and Phillips Data Library
HHI3	Herfindahl-Hirschman Index calculated as the sum of the squared market shares using firm sales, based on 3-digit (SIC) Industry classification.	Authors' calculation based on Compustat data
CR	Concentration ratio measured as the sum of market shares of the four largest firms in terms of net sales in each industry (based on 3-digit industry classification).	Authors' calculation based on Compustat data
EPCM	The excess price-cost margin or industry-adjusted price-cot margin calculated as the profit-to-sale ratio minus the sales-weighted price-cost margin of all firms operating in the same industry.	As above
Control variables		
SIZE	Firm size measured as the natural logarithm of total assets.	Compustat data
Q	Tobin's Q defined as the sum of market value of equity plus book value of debt divided by total assets.	As above
LEVERAGE	Firm leverage measured as the ratio of total liabilities to total assets.	As above
ROA	Firm profitability defined as the ratio of operating income before depreciation to total assets.	As above
TANGIBILITY	Asset tangibility calculated as the ratio of net property, plant and equipment to total assets.	As above
RATED	Dummy variable that takes one if for firms having an S&P long-term debt rating.	Capital IQ
INVGRADE	Dummy variable that takes one for firms having an investment grade S&P long-term rating.	Capital IQ

Variables used in robustness tests		
Tariff Rate	The ad valorem tariff rate calculated as the ratio of the duties collected from each industry to the dutiable value of imports using the 3-digit SIC industry classification.	Schott's International Economics Resource Page
Tariff-Reduction	Dummy variable that takes one if the 3-digit SIC industry has experienced a large tariff reduction that is larger than 3 times the median reduction, and 0 otherwise.	Schott's International Economics Resource Page
HHI2	Herfindahl-Hirschman Index calculated as the sum of the squared market shares using firm sales, based on 2-digit (SIC) Industry classification.	Authors' calculation based on Compustat data
HHInaics	Herfindahl-Hirschman Index calculated as the sum of the squared market shares using firm sales, based on NAICS Industry classification.	As above
MARKET SHARE	Firm market share defined as firm sales divided by industry sales.	Authors' calculation based on Compustat data
Geographic Diversification	Dummy variable that takes one if a firm has non-zero export sales for a particular year.	Compustat's geographic segment files
Business Diversification	Dummy variable that takes one if a firms has only one business segment for a particular year.	Compustat's business segment files
Payout Ratio	Payout ratio calculated as the ratio of the sum of common dividend, preferred dividend, and purchase of common and preferred stock to total assets.	Authors' calculation based on Compustat data
MTB	Market-to-book ratio calculated as total assets minus common equity plus market value of equity, divided by total assets.	As above
LT Bond Rating	Dummy variable that indicates whether a firm has a long-term bond rating.	Compustat's Ratings file
Commercial Paper Rating	Dummy variable that indicates whether a firm has a commercial paper rating.	Compustat's Ratings file
Whited-Wu Index	Whited and Wu (2006) financial constraint index calculated as follows: -0.091*CashFlow – 0.062*Dummy-Dividend + 0.021*Leverage – 0.044*log(Assets) + 0.102IndustrySalesGrowth + 0.035*FirmSalesGrowth	Authors' calculation based on Compustat data
Kaplan-Zingales Index	Kaplan and Zingales (1997) financial constraint index calculated as follows: -1.001909* CashFlow + 3.139193*Long-termDebt – 39.36780*Dividend – 1.314759*Cash + 0.2826389*Q	Authors' calculation based on Compustat data
CEO Ownership	The percentage of shares held by the CEO.	Authors' calculation based on Execucomp data
Institutional Ownership	The percentage of shares held by institutions.	Thomson Reuters
Analyst Following	The I/B/E/S number of financial analysts following a firm.	I/B/E/S

Table 1
Summary Statistics

Variable	N	Mean	STD	5th percentile	25th percentile	50th percentile	75th percentile	95th percentile
BANK_DEBT/TOTAL_DEBT	26,703	0.422	0.411	0	0	0.290	0.917	1
FLUIDITY	26,703	6.778	3.742	2.159	4.057	5.993	8.655	14.349
SIZE	26,703	6.387	1.954	3.198	4.957	6.400	7.706	9.748
Q	26,703	1.888	1.247	0.833	1.146	1.500	2.155	4.301
LEVERAGE	26,703	0.243	0.193	0.004	0.086	0.212	0.354	0.622
ROA	26,703	0.079	0.181	-0.278	0.058	0.113	0.164	0.262
TANGIBILITY	26,703	0.534	0.395	0.069	0.217	0.432	0.774	1.285
RATED	26,703	0.363	0.481	0	0	0	1	1
INVGRD	26,703	0.159	0.366	0	0	0	0	1

Notes: This table presents summary statistics for the variables used in our regressions. The sample comprises 26,703 observations covering 3,831 unique firms for the period spanning 2001 through 2013. The list of variables definitions and sources are provided in the Appendix.

Table 2
Correlations

	FLUIDITY	*SIZE*	*Q*	*LEVERAGE*	*ROA*	*TANGIBILITY*	*RATED*	*INVGRD*
FLUIDITY	1.000							
SIZE	-0.070***	1.000						
Q	0.215***	-0.154***	1.000					
LEVERAGE	0.036***	0.244***	-0.136***	1.000				
ROA	-0.355***	0.374***	-0.172***	0.063***	1.000			
TANGIBILITY	-0.077***	0.064***	-0.160***	0.204***	0.194***	1.000		
RATED	-0.073***	0.687***	-0.128***	0.358***	0.227***	0.113***	1.000	
INVGRD	-0.113***	0.574***	0.011	0.023***	0.186***	0.036***	0.577***	1.000

Notes: This table presents correlation coefficients between product market competition and other control variables. The sample comprises 26,703 observations covering 3,831 unique firms for the period spanning 2001 through 2013. The list of variables definitions and sources are provided in the Appendix. *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 3: The impact of product market competition on debt choice

Variables	OLS	OLS	Tobit
FLUIDITY	-0.007***	-0.004***	-0.007***
	(5.08)	(2.64)	(2.80)
SIZE	-0.068***	-0.045***	-0.063***
	(26.01)	(11.06)	(9.25)
Q		-0.025***	-0.048***
		(6.80)	(6.83)
LEVERAGE		0.123***	0.260***
		(4.59)	(5.75)
ROA		0.247***	0.387***
		(8.09)	(6.69)
TANGIBILITY		-0.013	0.014
		(0.80)	(0.53)
RATED		-0.162***	-0.236***
		(11.09)	(10.11)
INVGRADE		-0.080***	-0.072***
		(5.69)	(3.06)
Intercept	0.976***	0.903***	1.063***
	(9.94)	(9.31)	(6.77)
Year_FE	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes
Observations	26,703	26,703	26,703
Adjusted R²	0.130	0.172	
Pseudo R2			0.070

Notes: This table provides the results of the OLS and tobit regressions of the bank debt ratio on product market competition and other firm characteristics. All reported t-values in parentheses are based on robust standard errors adjusted for heteroskedasticity and clustered by firm. The list of variables definitions and sources are provided in the Appendix. *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 4: Addressing endogeneity : Instrumental Variable approach

Variables	*FLUIDITY2000*		*Tariff Rate*	
	First stage	**Second Stage**	**First Stage**	**Second Stage**
INSTR. FLUIDITY		-0.017***		-0.130**
		(5.44)		(2.43)
SIZE	0.166***	-0.042***	0.419***	0.002
	(6.60)	(8.97)	(8.18)	(0.07)
Q	0.157***	-0.022***	0.441***	0.037
	(6.45)	(4.82)	(9.64)	(1.50)
LEVERAGE	0.264	0.056	-0.332	-0.004
	(1.49)	(1.87)	(0.96)	(0.07)
ROA	-2.446***	0.212***	-6.526***	-0.598*
	(11.10)	(5.32)	(17.22)	(1.69)
TANGIBILITY	-0.270**	0.011	-2.206***	-0.237*
	(2.57)	(0.59)	(9.68)	(1.90)
RATED	-0.182*	-0.160***	-0.704***	-0.218***
	(1.90)	(9.66)	(3.40)	(4.31)
INVGRADE	-0.249**	-0.080***	-1.475***	-0.257***
	(2.18)	(5.28)	(6.46)	(3.11)
IV of FLUIDITY	0.659***		-10.193***	
	(42.08)		(2.92)	
Constant	0.441	0.965***	4.913***	1.376***
	(0.60)	(9.14)	(9.97)	(5.50)
Year_FE	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes
Sample Size	21,190	21,190	11,922	11,922
Adjusted R^2	0.637	0.197	0.508	0.160
F-statistic	1,7770.97	53.81	40.97	9.11

Notes: This table provides the regression results of the two stages of the instrumental variable approach of the relation between product market competition and bank debt ratio. All reported t-values in parentheses are based on robust standard errors adjusted for heteroskedasticity and clustered by firm. The list of variables definitions and sources are provided in the Appendix. *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 5: Addressing endogeneity : The quasi-natural experiment

Variables	(1)	(2)	(3)	(4)
	Tariff reduction for year t		Tariff reduction for 5 years later	
Tariff-Reduction	-0.033**	-0.031**	-0.036***	-0.039**
	(2.28)	(2.17)	(2.22)	(2.49)
SIZE	-0.062***	-0.047***	-0.062***	-0.046***
	(17.33)	(7.96)	(17.22)	(7.95)
Q		-0.022***		-0.022***
		(4.39)		(4.37)
LEVERAGE		0.030		0.030
		(0.77)		(0.75)
ROA		0.256***		0.258***
		(6.86)		(6.95)
TANGIBILITY		0.040*		0.042*
		(1.71)		(1.79)
RATED		-0.138***		-0.136***
		(5.98)		(5.93)
INVGRADE		-0.075***		-0.076***
		(3.61)		(3.63)
Intercept	0.819***	0.790***	0.817***	0.788***
	(19.62)	(16.37)	(19.63)	(16.39)
Year_FE	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes
Observations	12,657	12,629	12,657	12,629
Adjusted R²	0.110	0.155	0.110	0.156

Notes: This table provides the results of the difference-in-difference analysis. The dependent variable is the ratio of bank debt to total debt. The independent variable is *Tariff-Reduction* which is equal to one if the industry has experienced a large tariff reduction that is larger than 3 times the median reduction, and 0 otherwise. All reported t-values in parentheses are based on robust standard errors adjusted for heteroskedasticity and clustered by firm. The list of variables definitions and sources are provided in the Appendix. *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 6: Placebo test

Variables	(1)	(2)	(3)	(4)
	Pseudo-event for year t		Pseudo-event for 5 years later	
PlaceboTreatment	-0.024	-0.018	-0.029	-0.029
	(1.30)	(1.03)	(1.58)	(1.64)
SIZE	-0.062***	-0.047***	-0.061***	-0.045***
	(17.34)	(7.97)	(17.28)	(7.69)
Q		-0.022***		-0.022***
		(4.42)		(4.44)
LEVERAGE		0.030		0.037
		(0.77)		(0.94)
ROA		0.255***		0.255***
		(6.84)		(6.90)
TANGIBILITY		0.039*		0.035
		(1.69)		(1.53)
RATED		-0.138***		-0.143***
		(5.98)		(6.30)
INVGRADE		-0.075***		-0.076***
		(3.59)		(3.70)
Intercept	0.819***	0.791***	0.815***	0.783***
	(19.63)	(16.39)	(19.52)	(16.27)
Year_FE	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes
Observations	12,657	12,629	12,657	12,629
Adjusted R^2	0.109	0.154	0.109	0.155

Notes: This table provides the results of the falsified difference-in-difference analysis. The dependent variable is the ratio of bank debt to total debt. The independent variable is placebo-treatment that represents the pseudo-event. All reported t-values in parentheses are based on robust standard errors adjusted for heteroskedasticity and clustered by firm. The list of variables definitions and sources are provided in the Appendix. *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 7: Alternative PMC-related variables

Variable	Alternative PMC-related variables				
	(1)	(2)	(3)	(4)	(5)
TNIC_HHI	0.090***				
	(4.47)				
CR		0.095***			
		(3.05)			
EPCM			0.001**		
			(2.29)		
TNIC_LI				-0.001***	
				(2.66)	
LOG_NUM_FIRMS					-0.027***
					(6.48)
SIZE	-0.043***	-0.045***	-0.046***	-0.046***	-0.041***
	(10.72)	(11.35)	(11.07)	(11.03)	(10.27)
Q	-0.026***	-0.026***	-0.029***	-0.029***	-0.023***
	(6.90)	(6.95)	(7.16)	(7.23)	(6.10)
LEVERAGE	0.119***	0.123***	0.150***	0.148***	0.112***
	(4.44)	(4.59)	(5.32)	(5.26)	(4.18)
ROA	0.256***	0.259***	0.318***	0.315***	0.217***
	(8.58)	(8.62)	(9.46)	(9.43)	(7.23)
TANGIBILITY	-0.009	-0.008*	-0.008	-0.011	-0.011
	(0.54)	(0.53)	(0.49)	(0.64)	(0.71)
RATED	-0.162***	-0.162***	-0.170***	-0.170***	-0.165***
	(11.09)	(11.03)	(11.20)	(11.23)	(11.28)
INVGRADE	-0.078***	-0.078***	-0.076***	-0.076***	-0.082***
	(5.61)	(5.59)	(5.35)	(5.34)	(5.93)
Constant	0.835***	0.802***	0.898***	0.899***	0.918***
	(8.59)	(8.05)	(9.17)	(9.18)	(9.48)
Year_FE	Yes	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes	Yes
Sample Size	26,690	26,690	24,720	25,085	26,690
Adjusted R^2	0.173	0.172	0.180	0.181	0.176
F–value	68.87***	68.57***	67.39***	68.78***	70.46***

Notes: This table provides the regression results of our baseline model using alternative proxies for product market cometition. All reported t-values in parentheses are based on robust standard errors adjusted for heteroskedasticity and clustered by firm. The list of variables definitions and sources are provided in the Appendix. *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 8: Additional control variables

Variable	Concentration variables			
	FIC_HHI	*HHI2*	*HHI3*	*HHInaics*
FLUIDITY	-0.003**	-0.004***	-0.003**	-0.003**
	(2.25)	(2.61)	(2.30)	(2.15)
SIZE	-0.044***	-0.045***	-0.044***	-0.044***
	(10.92)	(11.06)	(11.03)	(10.99)
Q	-0.025***	-0.025***	-0.025***	-0.025***
	(6.78)	(6.80)	(6.78)	(6.71)
LEVERAGE	0.122***	0.123***	0.125***	0.122***
	(4.57)	(4.60)	(4.67)	(4.57)
ROA	0.246***	0.247***	0.245***	0.244***
	(8.04)	(8.08)	(8.01)	(8.00)
TANGIBILITY	-0.013	-0.013	-0.012	-0.012
	(0.79)	(0.79)	(0.74)	(0.75)
RATED	-0.162***	-0.162***	-0.162***	-0.161***
	(11.05)	(11.04)	(11.07)	(11.02)
INVGRADE	-0.081***	-0.080***	-0.081***	-0.081***
	(5.80)	(5.70)	(5.79)	(5.78)
FIC_HHI	0.060**			
	(2.55)			
HHI2		0.224**		
		(1.98)		
HHI3			0.093**	
			(2.42)	
HHInaics				0.053**
				(2.37)
Constant	0.884***	0.825	0.876***	0.859***
	(8.96)	(7.82)**	(9.01)	(8.66)
Year_FE	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes
Sample Size	26,667	26,690	26,690	26,690
Adjusted R^2	0.172	0.172	0.172	0.172
F–value	67.55***	67.59***	67.86***	67.86***

Notes: This table presents the impact of the use of additional control variables on the relation between product market competition and debt choice. All reported t-values in parentheses are based on robust standard errors adjusted for heteroskedasticity and clustered by firm. The list of variables definitions and sources are provided in the Appendix. *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 9: The impact of product market competition on debt choice – The role of exposure to competition

Variables	Market Share		TNIC_HHI		Geographic Diversification		Business diversification	
	Low	High	Low	High	Diversified	Focused	Diversified	Focused
FLUIDITY	-0.002	-0.006***	-0.002	-0.005**	-0.002	-0.005***	-0.002	-0.006***
	(0.88)	(3.22)	(1.03)	(2.06)	(0.46)	(2.94)	(0.91)	(2.64)
SIZE	-0.026***	-0.060***	-0.047***	-0.039***	-0.032***	-0.049***	-0.046***	-0.043***
	(3.96)	(10.06)	(9.11)	(7.73)	(3.71)	(11.02)	(8.53)	(6.90)
Q	-0.025***	-0.024***	-0.021***	-0.028***	-0.022***	-0.028***	-0.028***	-0.027***
	(5.67)	(4.01)	(4.67)	(5.24)	(3.28)	(6.53)	(3.88)	(6.16)
LEVERAGE	0.184***	0.033	0.018	0.208***	0.130**	0.115***	0.142***	0.098***
	(5.07)	(0.93)	(0.52)	(5.95)	(2.50)	(3.86)	(3.83)	(2.61)
ROA	0.242***	0.301***	0.190***	0.355***	0.188***	0.281***	0.364***	0.182***
	(6.82)	(4.55)	(5.09)	(8.49)	(3.64)	(7.93)	(6.31)	(4.94)
TANGIBILITY	0.028	-0.075***	0.004	-0.027	0.029	-0.020	-0.039*	0.003
	(1.31)	(3.60)	(0.21)	(1.30)	(0.95)	(1.13)	(1.81)	(0.14)
RATED	-0.251***	-0.092***	-0.154***	-0.174***	-0.159***	-0.158***	-0.168***	-0.164***
	(11.34)	(5.14)	(8.24)	(9.15)	(4.94)	(10.00)	(8.87)	(7.07)
INVGRADE	-0.038	-0.085***	-0.064***	-0.104***	-0.103***	-0.074***	-0.086***	-0.074***
	(0.97)	(5.41)	(3.68)	(5.49)	(3.48)	(4.83)	(4.89)	(2.78)
Intercept	0.872***	0.915***	0.915***	0.872***	0.576*	0.944***	0.990***	0.524***
	(7.31)	(16.24)	(6.75)	(8.25)	(1.84)	(9.51)	(9.65)	(3.08)
Year_FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,412	13,278	13,385	13,305	5,521	21,169	12,490	12,041
Adjusted R²	0.117	0.196	0.165	0.181	0.143	0.186	0.207	0.141

Note : This table reports regression results on the impact of a firm's exposure to competition on the relation between product market competition and debt choice. In columns (1) through (4), we test the impact of the concentration of market shares using the variables *MARKETSHARE* and TNIC_*HHI,* and in columns (5) through (8) we consider the influence of firms' diversification using *Geographic Diversification* and *Business Diversification*. All reported t-values in parentheses are based on robust standard errors adjusted for heteroskedasticity and clustered by firm. The list of variables definitions and sources are provided in the Appendix. *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 10: The impact of product market competition on debt choice – The role of governance quality

Variables	Institutional ownership		Analyst Following	
	Low	High	Low	High
FLUIDITY	-0.001	-0.008***	-0.002	-0.006***
	(0.51)	(3.57)	(1.15)	(3.24)
SIZE	-0.025***	-0.052***	-0.043***	-0.050***
	(4.01)	(7.14)	(6.60)	(8.24)
Q	-0.023***	-0.022***	-0.029***	-0.011*
	(4.22)	(3.17)	(5.80)	(1.92)
LEVERAGE	0.180***	0.055	0.172***	0.012
	(4.30)	(1.25)	(4.71)	(0.30)
ROA	0.235***	0.263***	0.276***	0.133**
	(5.58)	(3.80)	(7.14)	(2.37)
TANGIBILITY	-0.007	-0.070***	-0.006	-0.047**
	(0.32)	(2.67)	(0.26)	(2.14)
RATED	-0.249***	-0.102***	-0.212***	-0.064***
	(10.28)	(4.81)	(10.47)	(3.19)
INVGRADE	-0.060**	-0.089***	-0.067**	-0.092***
	(1.98)	(4.52)	(2.30)	(5.63)
Intercept	0.967***	0.989***	0.787***	0.772***
	(11.46)	(5.82)	(7.84)	(13.46)
Year_FE	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes
Observations	9,654	9,683	11,599	11,380
Adjusted R²	0.154	0.174	0.128	0.161

Note : This table reports regression results on the impact of governance quality on the relation between product market competition and debt choice. In columns (1) through (4) we test the influence of external monitoring mechanisms using *Institutional ownership* and *Analyst following*. All reported t-values in parentheses are based on robust standard errors adjusted for heteroskedasticity and clustered by firm. The list of variables definitions and sources are provided in the Appendix. *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 11: The impact of product market competition on debt choice – The role of financial constraints

Variables	Payout Ratio		MTB		LT Bond Rating		Kaplan Zingales Index	
	High	Low	High	Low	Unrated	Rated	High	Low
FLUIDITY	-0.002	-0.006***	-0.005***	-0.001	-0.006***	-0.001	-0.008***	0.000
	(1.02)	(2.89)	(2.85)	(0.77)	(2.87)	(0.71)	(6.84)	(0.36)
SIZE	-0.053***	-0.035***	-0.042***	-0.045***	-0.048***	-0.038***	-0.046***	-0.039***
	(9.84)	(6.43)	(8.18)	(9.11)	(8.90)	(6.50)	(17.16)	(13.30)
Q	-0.029***	-0.026***	-0.021***	-0.070***	-0.029***	-0.006	-0.028***	-0.041***
	(4.85)	(5.37)	(5.20)	(2.92)	(6.76)	(0.74)	(11.23)	(9.94)
LEVERAGE	0.162***	0.112***	0.047	0.176***	0.094***	0.067*	-0.125***	0.387***
	(4.21)	(3.32)	(1.41)	(5.05)	(2.61)	(1.77)	(6.37)	(11.97)
ROA	0.412***	0.187***	0.181***	0.446***	0.248***	0.323***	0.260***	0.243***
	(8.10)	(4.77)	(5.15)	(9.53)	(6.77)	(4.38)	(13.20)	(8.76)
TANGIBILITY	-0.014	-0.013	-0.002	-0.024	0.030	-0.079***	-0.042***	0.028**
	(0.65)	(0.66)	(0.08)	(1.25)	(1.35)	(3.60)	(4.14)	(2.26)
RATED	-0.138***	-0.193***	-0.107***	-0.201***	-0.090	0.062	-0.154***	-0.227***
	(7.03)	(10.48)	(5.28)	(11.65)	(1.04)	(1.15)	(17.08)	(15.50)
INVGRADE	-0.086***	-0.036	-0.111***	-0.075***	-0.358***	-0.107***	-0.097***	-0.056***
	(4.83)	(1.42)	(5.40)	(4.61)	(3.02)	(6.94)	(7.74)	(3.67)
Intercept	0.834***	0.944***	0.944***	0.874***	1.017***	0.544***	1.094***	0.795***
	(7.56)	(6.55)	(6.01)	(15.98)	(8.12)	(6.43)	(16.71)	(10.64)
Year_FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,244	12,306	13,381	13,309	15,579	9,709	12,651	12,603
Adjusted R²	0.230	0.129	0.143	0.210	0.100	0.166	0.201	0.174

Note : This table reports regression results on the impact of a firm's financial constraints on the relation between product market competition and debt choice. As proxies for a firm's financial constraints, we use *PayoutRatio, MTB, LT credit rating, and Kaplan-Zingales Index*. All reported t-values in parentheses are based on robust standard errors adjusted for heteroskedasticity and clustered by firm. The list of variables definitions and sources are provided in the Appendix. *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.