Competition and the Cost of Debt*

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Abstract

This paper empirically investigates how the intensity of product market competition affects the cost of debt. Using a large sample of loans to publicly traded US manufacturing firms, I provide evidence that an intensification of product market competition among firms significantly increases the cost of bank loans. The analysis reveals that the effect is strongest in industries with a high illiquidity and specificity of assets. Moreover, I find that loans to firms that operate in more competitive industries contain more covenants restricting the firms' financing and dividend policies. Overall, the results suggest that banks explicitly take into account the risk arising from product market competition when pricing and designing debt contracts.

Keywords: Product Market Competition, Bank Loans, Financing Costs, Financial Contracts

JEL Classification: G32, G34

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I Introduction

High costs of debt can threaten firms' survival. The recent financial crisis provides evidence for this fact and emphasizes the vital role of bank debt for firms' operations. Besides this negative shock to the financial industry, firms are also facing a significant intensification of product market competition. The past two decades have witnessed a widespread globalization and deregulation of economic activities that led to substantial changes in the competitive configuration of industries. Surprisingly, the economic link between product market competition and the pricing and design of financial contracts has so far remained unexplored.[1] This paper aims to fill this gap by empirically investigating the cross-sectional relation between the intensity of product market competition and the cost of debt. Using a sample of loan contracts issued to publicly traded US manufacturing firms, I provide strong evidence that a more intense product market competition increases the cost of debt and reduces firms' financial flexibility.

The economic mechanism relating product market competition and the cost of debt is as follows. Firms make operating decisions that may affect the riskiness of their cash flows. These operating decisions arise from an equilibrium in the product market that potentially reflects strategic interactions among market participants. For instance, companies must decide on a competition strategy and invest accordingly. Clearly, this decision critically depends on the industry structure and on the rivals' behavior. Alternatively, new competitors can enter an industry and increase the pressure on product prices. As a consequence, the product prices may decrease. Hence, an intensification of product market competition may decrease profit margins and increase firms' probability of default and the cost of debt. By contrast, if competition reduces agency problems and acts as a substitute for corporate governance, it may actually reduce the cost of debt. Moreover, a larger number of competitors in an industry raises the likelihood that a defaulted firm's assets can be sold at high prices, increasing firms' liquidation value of assets and hence reducing the cost of debt. However, if

[1] Recent research suggests that industry structure and product market competition are important determinants of firms' financing decisions, cash flows, and stock returns [MacKay and Phillips (2005); Hou and Robinson (2006); Hoberg and Phillips (2009)].

an industry has a high concentration of specific and illiquid assets, industry peers may not be able to acquire the defaulted firm's assets. The banks' loss given default is higher in this case, increasing the cost of debt.

Overall, theory suggests that product market competition may have both positive and negative effects on the cost of debt. To shed light on the potential economic mechanisms relating industry structure to financial contracts, this paper empirically explores the link between the intensity of product market competition and the cost of bank loans. More precisely, I argue that the intensity of product market competition affects the cost of debt. I further argue that banks also adjust loan contracts along non-pricing dimensions. In particular, they impose tighter restrictions on the financing and dividend policy of firms by including covenants in the debt contracts.

To test these hypotheses, I build a large sample of loans to publicly traded US manufacturing firms over the years 1995 to 2007 and study the impact of the intensity of product market competition on expected loan spreads. I proxy for the intensity of product market competition with two measures. First, I use the Herfindahl-Hirschman Index provided by the US Census of Manufacturers.[2] Consistent with the idea that product market competition relates to financial contracting, I find strong evidence that banks charge higher loan spreads for loans to firms in more competitive industries. Specifically, a one standard deviation increase in product market competition increases loan spreads by about 13 basis points for an average loan in my sample. This difference translates into an additional cost of debt of USD 440'000 per year. In the estimations, I control for other determinants of loan spreads, including firm-specific and loan-specific controls, macroeconomic conditions, and time and industry effects.

Second, in order to mitigate endogeneity concerns that financing choices impact industry structure, I follow Frésard (2009) and take advantage of exogenous reductions of industry-

[2]This is a widely used, independent and reasonably timely measure of industry concentration that the Department of Justice and other regulatory agencies use to set and enforce competition policy. In a recent article, Ali, Klasa, and Yeung (2009) provide evidence that the Herfindahl-Hirschman Index provided by the US Census of Manufacturers is a better proxy for the intensity of product market competition than concenration ratios only based on COMPUSTAT data.

level import tariffs as a proxy for the intensification of product market competition. The idea is that the reduction of trade barriers facilitates the penetration of foreign rivals into local markets and triggers an intensification of firms' competitive environment [Bernard, Jensen, and Schott (2006)]. In line with this argument, I find that a reduction of import tariffs increases the expected loan spreads by 21 basis points after controlling for other determinants loan spreads.

To demonstrate the robustness of the results, I estimate additional versions of the baseline specification and control for alternative explanations. More specifically, I control for firms' governance structure, for the expected default frequency and asset volatility, for industry's asset illiquidity, for the firms' market share, for firms' diversification, and for self-selection. Across all of these specifications, I uncover a substantial positive relation between the intensity of product market competition and loan spreads. These findings corroborate the main result and cast doubt on potential alternative explanations for my findings. Importantly, the results suggest that competition risk is a source of uncertainty that banks price.

Next, I explore in more detail the potential channels through which product market competition may affect loan spreads. In particular, I examine how firms' probability of default, and industry's asset specificity and illiquidity (proxy for firms' liquidation value of assets), change the impact of product market competition on loan spreads. Surprisingly, I find that product market competition has the strongest impact for firms with a *low* probability of default. Moreover, and consistent with theoretical models that predict a connection between asset liquidity and financing choices [Shleifer and Vishny (1992); Myers and Rajan (1998); Morellec (2001)], I find that an industry's asset specificity and illiquidity magnify the effect of product market competition on loan spreads. These findings lend support to the idea that competition risk impacts the cost of debt through a channel that relates to firms' liquidation value of assets.

Finally, I exploit the non-pricing information about bank loans in my sample to explore the relation between the intensity of product market competition and loan covenants. Since cash flows in more competitive industries tend to be more risky [Gaspar and Massa (2006); Irvine and Pontiff (2009)], theory suggests that loans to firms in more competitive industries

contain more restrictions for the firms' financing and dividend policies [Gârleanu and Zwiebel (2009)]. In my sample, I find strong evidence supporting this hypothesis. Loans to firms in competitive industries tend to have significantly more financial and general covenants than loans to firms in concentrated industries. Moreover, the likelihood that a loan contains dividend restrictions and security provisions is significantly higher in competitive industries. Finally, banks tend to form smaller syndicates for loans to firms operating in competitive industries. This findings is consistent with the conjecture that these firms need more intense monitoring.

This paper contributes to two main areas. First, by providing evidence that the intensity of product market competition has an effect on loan spreads and other loan characteristics, my results support the view that product and financial markets have important linkages. While previous studies focus on aggregate financial leverage [MacKay and Phillips (2005)], corporate governance [Giroud and Mueller (2008)], private benefits of control [Guadalupe and Perez-Gonzales (2006)], cash holdings [Morellec and Nikolov (2008)], dividend policy [Grullon and Michaely (2007)], idiosyncratic volatility [Gaspar and Massa (2006); Irvine and Pontiff (2009)], and stock returns [Hou and Robinson (2006); Hoberg and Phillips (2009)], my findings reveal that the intensity of product market competition also relates to financial contracting. As such, I provide evidence that banks rationally take into account the industry structure and product market competition when pricing and designing financial contracts.

Second, my study contributes to the literature analyzing the determinants of loan contracts.[3] Recent empirical research devotes much effort to studying the determinants of loan contracts along pricing and non-pricing dimensions. These papers investigate how loan contracts are affected by firm and risk characteristics [Strahan (1999); Bradley and Roberts (2004)], the level of creditor protection [Bae and Goyal (2009); Qian and Strahan (2008)], bankruptcy codes [Davydenko and Franks (2008)], asset liquidation values [Benmelech, Garmaise, and Moskowitz (2005)], corporate governance [Chava, Livdan, and Purnanandam

[3]The rationale for focusing on bank loans is two-fold. The first rationale emanates from banks' economic importance. Banks are the dominant suppliers of external finance for firms. Second, bank loans provide multi-dimensional information about debt and therefore allow to investigate the effect of product market competition on loan contracts along various dimensions.

(2009); Waisman (2009)], accounting quality [Bharath, Sunder, and Sunder (2008)], and corporate mis-reporting [Graham, Li, and Qiu (2008)]. Although these studies shed light on important determinants of financial contracts, my paper is the first to provide systematic evidence on how the intensity of product market competition influences loan spreads and the covenant structure of loans.

The rest of the paper proceeds as follows. The next section develops the main hypotheses. Section III describes the empirical implementation, identification, and the sample. Section IV presents the main results. Section V characterizes potential channels through which product market competition impacts the cost of debt. Section VI analyzes the effect of product market competition on non-pricing loan characteristics. Section VII concludes.

II Hypotheses

Banks face several questions when they provide capital to firms and decide how to price loans. Two central questions are: First, what is the likelihood that a firm defaults while a loan is active? Second, how much of the loan face value can be recovered if a firm defaults? As such, the risk premium on debt is primarily a function of firms' probability of default and the loss that banks incur when a firm defaults:[4]

$$\text{Risk premium on debt} = \text{Probability of default} \times \text{Loss given default}$$

Indeed, recent research documents that firms pay higher loan spreads when the probability of default is high [Strahan (1999); Bradley and Roberts (2004)]. Furthermore, Benmelech, Garmaise, and Moskowitz (2005) provide evidence that the liquidation value of assets is an important determinant of the risk premium on debt. More specifically, they show that a lower redeployability of firms' assets (higher loss given default) increases the cost of debt.

[4]This view is consistent with the predictions of recent dynamic corporate finance models [Fries, Miller, and Perraudin (1997); Zhdanov (2007). In particular, Zhdanov (2007) shows that a more intense product market competition increases the firms' probability of default in any given period of time. Furthermore, a more intense product market competition decreases the firms' value at default. Banks rationally anticipate these effects arising from the strategic interaction among firms and will demand higher loan spreads.

Product market competition may therefore affect the risk premium on debt mainly through two distinct channels. The first channel is the firms' probability of default. An intensification of product market competition may decrease profit margins and thus increase firms' probability of default.[5] Hence, an intensification of product market competition *increases* firms' cost of debt primarily because it increases firms' probability of default. By contrast, an intensification of product market competition may reduce managerial slack [Hart (1983)], increase firms' operational efficiency, and improve corporate governance. Consistent with this conjecture, Guadalupe and Perez-Gonzales (2006) find that the intensity of product market competition correlates negatively with private benefits of control. In a similar spirit, Giroud and Mueller (2008) argue that firms benefit relatively more from good governance when lack of competitive pressure fails to enforce discipline on managers. They document that good corporate governance only affects stock returns in concentrated industries. In competitive industries, however, the positive effect of corporate governance on stock returns disappears [Gompers, Ishii, and Metrick (2003)]. In this case, corporate governance and product market competition may act as substitutes. By implication, an intensification of product market competition may *reduce* firms' cost of debt because the disciplining forces of competition reduce agency and governance problems within firms.

The second channel is the banks' loss given firms' default. The impact of product market competition on the risk premium on debt through this channel is ambiguous. Given a firm's default, a larger number of competitors increases the chances that the defaulted firm's assets can be sold at a high price. In this case, an intensification of product market competition decreases the loss given firms' default and hence may *reduce* the risk premium on debt. By contrast, industry peers of defaulted firms and potential buyers of assets may themselves be in distress. This illiquidity may lead to asset sales at prices below value in best use and to an increase of creditors' loss given default [Shleifer and Vishny (1992)]. Hence, in industries with highly illiquid and specific assets, an intensification of product market competition may *increase* the risk premium on debt.

[5] This mechanism is the rationale to use the excess price-cost margin as a proxy for the intensity of product market competition [see Nickell (1996); Gaspar and Massa (2006); Morellec and Nikolov (2008)].

This discussion shows that the strategic interactions among firms within industries have implications for the firms' cost of debt. I therefore state the following hypothesis. Other things equal:

H1. *The intensity of product market competition affects the cost of debt.*

The effect may go primarily through the firms' probability of default and the liquidation value of assets. In my empirical analysis, I identify the magnitude of the effect and the channel through which the effect operates.

The intensity of product market competition may not only impact financial contracts along the pricing dimension, but also along non-pricing dimensions. For instance, Gârleanu and Zwiebel (2009) show that covenants should be stricter in firms and industries where cash flows are volatile and uncertain, and loser in industries where they are stable and predictable. They argue that volatile cash flows are likely to be related to asymmetric information, and that covenants may mitigate asset substitution.[6] Cash flows in more competitive industries are more volatile and uncertain than cash flows in concentrated industries [Raith (2003); Gaspar and Massa (2006); Irvine and Pontiff (2009)]. A direct implication of their analysis is therefore that the intensity of product market competition increases the likelihood of covenants in loan contracts restricting the financing and dividend policies of firms. I summarize this idea in the following hypothesis. Other things equal:

H2. *An increase in the intensity of product market competition increases the likelihood that loans contain covenants.*

Taken together, the discussion in this section suggests that the intensity of product market competition may impact the cost of bank loans and the presence of loan covenants. While some papers provide evidence of a connection between product markets and financing decisions, they remain silent about the implications of product markets on financial contracts.

[6] Consistent with this idea, Bradley and Roberts (2004) and Malitz (1986) find that the presence of debt covenants is more likely when the borrower is small, has high growth opportunities, or is highly levered. They do not, however, consider the effect of the intensity of product market competition.

In this paper, I take a step in that direction and empirically investigate whether and how the intensity of product market competition affects loan spreads and covenants.

III Empirical Implementation and Data

A The Impact of Product Market Competition on Loan Spreads

To explore the relation between industry structure and the cost of debt, I examine the effect of the intensity of product market competition on expected loan spreads. To do so, I follow Chava, Livdan, and Purnanandam (2009), and Graham, Li, and Qiu (2008) and specify the following baseline model,

$$y_{i,t} = \delta(Competition_{i,t-1}) + \boldsymbol{\beta}'\mathbf{X}_{i,t-1} + \alpha_t + \eta_k + \gamma_l + \varphi_p + \varepsilon_{i,t}, \quad (1)$$

where the subscripts i and t represent the firm and the quarter at loan issue, respectively. The dependent variable, $y_{i,t}$, is the logarithm of the loan spread.[7] My primary interest is in the marginal effect of product market competition on loan spreads (δ). Since bank loans vary by loan type and purpose, it is important to control for loan type and purpose in the analysis. For instance, lines of credit tend to be larger, less likely secured than term loans, and may be priced differently. Loans thus vary by loan type and purpose along pricing and non-pricing dimensions. I therefore include dummies for loan type (γ_l) and purpose (φ_p) in the estimations. I also include time (α_t) and Fama-French industry fixed-effects (η_k).

To proxy for the intensity of product market competition, I follow the literature and collect six-digit NAICS industry concentration ratios (Herfindahl-Hirschman Index) and the Four-Firm ratios from the US Census of Manufacturers for 1997 and 2002.[8] The US Census Bureau reports these indexes measuring the degree of concentration in an industry every five years for manufacturing firms. It is an independent and reasonably timely measure

[7] I use the logarithm of the loan spreads because the loan spreads are positive and (potentially) large integer values.

[8] In an earlier draft of this paper I used the excess price-cost margin as a proxy for the intensity of product market competition [Nickell (1996); Gaspar and Massa (2006); Morellec and Nikolov (2008)]. This measure captures to what extent firms are able to price above costs. I get very similar results to the ones I present in this draft when I use the excess price-cost margin as a proxy for the intensity of product market competition.

of industry concentration. The Department of Justice and other regulatory agencies use this measure to set and enforce competition policy. Importantly, the Census Herfindahl-Hirschman Index (HHI) is based on data from all public and private firms in an industry. Ali, Klasa, and Yeung (2009) provide evidence that the Census concentration measure is better at capturing actual industry competition than measures that are solely based on COMPUSTAT firms. The Census HHI is my main explanatory variable, and in all estimations I use the HHI as of the quarter prior to the loan start date. The results remain unchanged when I use lags of two, three, or four quarters instead.

The vector $\mathbf{X}_{i,t-1}$ includes control variables capturing other direct and indirect sources that may correlate with loan spreads. These include variables that control for firm risk and financial distress (cash flow volatility, Altman's zscore, asset volatility), investment opportunities (market-to-book ratio), firm's access to financing (leverage, firm size, asset tangibility, profitability), and macroeconomic conditions (credit and term spread, GDP growth).[9] I adjust all of the realizations of the firm-specific control variables by removing their mean industry effect in each year-quarter (at the six-digit NAICS level). I de-mean the control variables in order to eliminate any industry effects that may correlate with loan characteristics. Finally, I adjust the estimates' standard errors for within-firm clustering since deals to the same firm may be dependent. I measure all control variables as of the quarter prior to the loan start date.

B Identification Strategy

There are two main issues regarding the identification of the effect of product market competition on loan spreads. First, do I really capture the effect of product market competition on loan spreads, or is it simply a spurious correlation? Second, product market competition may be jointly determined with firms' financing choices [see, for instance, Brander and Lewis (1986); Bolton and Scharfstein (1990)].

To address the first issue, I include in equation 1 control variables that should help

[9] Throughout my analysis, I use book leverage as a proxy for financial risk. The results remain virtually unchanged when I instead use market leverage.

capture a wide range of unobservable effects such as default risk, cash flow volatility, and potential agency conflicts. In particular, there is empirical evidence [Bradley and Roberts (2004)] that banks design loan contracts in such a way as to mitigate conflicts of interest between bondholders and shareholders [Jensen and Meckling (1976); Myers (1977); Smith and Warner (1979)]. For instance, small, highly levered, and volatile firms with significant information asymmetries and growth options are more likely to have covenants in their loan contracts, which then might affect loan spreads. I control for variables that proxy for risk, information asymmetry, agency problems, and aggregate risk in order to isolate the effect of product market competition on loan characteristics. Moreover, I include industry, time, loan type and loan purpose fixed-effects to help capture unobservable effects that may affect financial contracts.

To address the second issue of endogeneity, I follow Frésard (2009) and use reductions of industry-level import tariffs to estimate the effect of product market competition on loan spreads. Reductions of import tariffs decrease the cost of entering US product markets and therefore increase the competitive pressure on domestic producers. Since changes in tariffs occur in different industries at different times, the panel structure of my data set allows me to exploit this variation and to identify the effect of product competition on financial contracts. As such, I look at whether loans made *after* a reduction of import tariffs have a higher cost compared to loans to firms in industries which did not experience a reduction of import tariffs, all else equal. Given the exogeneity of tariff reductions to firms' financing decisions, these events represent a quasi-natural experiment and should help identify the causal effect of product market competition on loan spreads and other loan characteristics [Frésard (2009)].[10]

C Data

I start the sample construction with the quarterly merged CRSP-COMPUSTAT database for manufacturing firms (NAICS codes 311111-339999). I then merge the CRSP-COMPUSTAT

[10] A potential drawback of only investigating reductions of import tariffs is the fact that tariff reductions often occur bilaterally. Hence, export oriented firms may actually benefit from reductions of import tariffs.

data with a July 2008 extract of Loan Pricing Corporation's (LPC) Dealscan database. The database contains detailed loan information for US and foreign commercial loans made to government entities and corporations [see Chava and Roberts (2008) for a detailed description of the data]. I restrict my sample of loans to start dates between 1995 and 2007 because information on contractual provisions is fairly limited prior to 1995.

Credit agreements, packages or deals, often consist of one or more loans or facilities. Since most firms enter into multiple loans at the same time, many deals consist of more than one loan. For instance, a deal or package can contain two loans: a term loan and a revolving line of credit. I drop all loans without borrower ID (GVKEY) and with no information on the pricing, the maturity, and the loan amount. Importantly, when merging the package level information with the quarterly CRSP-COMPUSTAT data, I assume that any new deal replaces an existing deal in every way. Finally, I also drop deals if they do not contain any information on financial covenants.[11] Financial covenants are restrictions placed on accounting variables and ratios that firms must maintain while a loan is active.[12]

I then merge these data by six-digit NAICS codes and year with the Census concentration data. I match the years from 1995 through 1999 with the 1997 Census data, and the years from 2000 through 2007 with the 2002 Census data. Furthermore, I use data on import tariffs, imports, exports, and domestic production compiled by Feenstra (1996) and Feenstra, Romalis, and Schott (2002). This data is only available until 2001. I match the data with my sample by four-digit SIC codes and year. The match results in 116 four-digit SIC industries

[11] I acknowledge that the data does not represent a random sample of bank loans, largely because LPC's data collection procedure is skewed towards bigger firms. There is, however, no reason to believe why the sample selection should be any different for firms of the same size in competitive industries versus firms in concentrated industries. Moreover, given that the firms in my sample are mostly large and established firms, they are unlikely to have entered the industry recently because of competitive reasons. Finally, product market competition may affect small firms more severely. Thus, the results are likely to understate the findings compared with a random sample of bank loans.

[12] More specifically, I require that a loan has a financial covenant restricting at least one of the following accounting variables: net worth, tangible net worth, capital expenditures, debt to EBITDA ratio, debt to tangible net worth ratio, interest coverage ratio, EBITDA, current ratio, quick ratio, fixed charge coverage, leverage, debt service coverage, senior debt to EBITDA ratio, cash interest coverage, senior leverage, debt to equity ratio, or the loan value.

over seven years (2000-3999 SIC range). Finally, I also merge the data with macroeconomic data that I obtain from the US Bureau of Economic Analysis and the Federal Reserve Bank in St. Louis.

The final data set results in 2,505 deals for 1,172 distinct firms between 1995 and 2007. This sample covers 301 six-digit NAICS and 200 four-digit SIC industries. I perform the analysis at the deal level and not at the loan level for at least two reasons. First, while the maturity and pricing of the deal tranches can vary within a deal, banks draft most deals at the deal level, and covenants and restrictions usually apply to all tranches within a deal. Second, because I cannot treat multiple tranches of the same deal as independent observations, such an analysis produces standard errors that are improperly small [see Sufi (2007)]. In the following, I use the terms deal and loan interchangeably.

D Summary Statistics

I have an unbalanced loan-quarter panel data set and winsorize all ratios at the 1st and 99th percentile to mitigate the impact of outliers. Panel A of Table I presents means, medians, and standard deviations for deal characteristics in my sample.

<INSERT TABLE I ABOUT HERE>

The cost of the bank borrowing, the loan spread, is the Dealscan data item all-in-spread drawn, which is the amount the borrower pays in basis points over LIBOR or LIBOR equivalent for each dollar drawn. This measure adds to the borrowing spread any annual fees paid to the bank group. Since I perform the analysis at deal level, the loan spread represents the average loan spread for each deal. In my sample, the average loan spread is 178 basis points over LIBOR and comparable to related studies [Bradley and Roberts (2004); Graham, Li, and Qiu (2008)]. The average deal maturity is approximately five years, the average deal amount USD 342 millions, and there are on average seven banks participating in a loan syndicate. The majority of loans in my sample is secured (66 percent) and contains restrictions for dividend payments (80 percent). Restrictions for capital expenditures (24 percent) and

leverage (50 percent) are less frequent. Finally, there are on average 2.69 financial covenants in a deal, and the covenant index has an average value of 2.51. I construct the covenant index following Bradley and Roberts (2004). This index aggregates covenants of four distinct groups (prepayment, financial, dividend, and secured) by adding the binary variables representing the presence of a covenant in the loan contract.

Panel B of Table I shows summary statistics for the borrower firms in my sample. The average book leverage is 28 percent, the average market-to-book ratio is 1.47, and the mean asset volatility is 54 percent. Overall, my sample is comparable to the samples used in related studies [Chava and Roberts (2008); Chava, Livdan, and Purnanandam (2009)].

Panel C of Table I presents summary statistics for the proxies of the intensity of product market competition in my sample. The average six-digit NAICS Census HHI is 0.072, with a minimum value of 0 and a maximum value of 0.3. A high value for the Census HHI indicates a high industry concentration, or equivalently, a low intensity of product market competition. The Four-Firm ratio is the sum of the market shares of the four largest firms in terms of market shares in a six-digit NAICS industry as defined by the Census of Manufacturers. The Four-Firm Ratio has an average value of 41 percent and a median value of 41 percent. The numbers for the Census HHI and the Four-Firm Ratio are comparable to statistics of related studies using the four-digit SIC industry classification [Ali, Klasa, and Yeung (2009)]. The average number of firms in a six-digit NAICS industry is substantially larger when the counting includes private firms (810 firms) compared to only counting COMPUSTAT firms (29 firms).

Next, Panel D of Table I shows the distribution of deals across the Fama-French industries. The largest number of deals are in the "Manufacturing" (33 percent) and "Business Equipment" (20 percent) industries. Fewer deals are in the "Consumer Nondurables" (13 percent) and in the "Healthcare, Medical Equipment & Drugs" (12 percent) industries.

Finally, Panel E of Table I shows the pairwise correlation coefficients between the proxies for the intensity of product market competition and the loan spread. The loan spread correlates negatively with the Census HHI and the Four-Firm Ratio, and positively with the number of firms per industry. This suggests that firms operating in more competitive

industries pay, on average, higher loan spreads.

E Differences in Loan Characteristics Across Subsamples

Table II shows means, medians, and differences between means and medians for various loan characteristics. In each calendar quarter, I group loan observations into three groups based on a proxy for the intensity of product market competition. For instance, in Panel A of Table II, I make terciles based on the Census HHI. Observations with a low Census HHI fall into the group of firms that operate in a competitive environment. Observations with a high Census HHI fall into the group of firms operating in concentrated industries. In the last two columns of each panel I compare the means and medians of loan characteristics in groups one and three.

From Panel A in Table II we see that there are substantial differences in loan characteristics between loans issued to firms operating in competitive environments compared to loans issued to firms operating in concentrated industries. For instance, the median loan spread is 175 basis points for firms that operate in a competitive environment. By contrast, the median loan spread is only 150 basis points for firms in industries with low competition. The difference in medians of 25 basis points is statistically and economically significant. For a median loan size of USD 120 millions, this difference translates into an additional cost of debt of USD 300'000 per year. The difference in means is 13 basis points and hence a little bit smaller than for loan spread medians, but still statistically significant.

<INSERT TABLE II ABOUT HERE>

Similarly, there are significant differences in the frequency of covenants between loans to firms operating in competitive and concentrated industries. More specifically, firms in more competitive industries face more financial covenants, dividend restrictions, and security provisions than firms in concentrated industries. The average covenant index and the average number of financial covenants are significantly higher for firms in the high competition group. Likewise, the likelihood that a loan contains dividend restrictions and security provisions

is significantly higher for loans issued to firms operating in competitive industries. These observations are in line with the hypothesis that loans to firms in more competitive industries contain more and tighter covenants.

As expected, the average total assets of firms are much larger in concentrated industries (USD 3,043 millions) than in competitive industries (USD 1,007 millions). Moreover, the average loan amount is larger in concentrated industries (USD 474 millions) than in competitive industries (USD 213 millions). The difference is statistically significant. The average and median loan amount to total assets, however, is larger in competitive industries. Furthermore, there are not large differences between the high and low competition group for the loan maturity, financial leverage, and market-to-book ratio. This suggests that banks take into account product market competition by charging a higher loan spread and by including covenants, but not by decreasing the loan amount and maturity.

Finally, firms in competitive industries are less likely to have a credit rating. On average, 23 percent of firms have a rating in competitive industries, and 35 percent of firms have a rating in concentrated industries. A potential explanation for this observation could be that firms in concentrated industries tend to be larger. Larger firms are more likely to have a credit rating.

A similar picture emerges when I make terciles based on the Four-Firm Ratio (Panel B of Table II). Notably, the loan spread is significantly higher for firms operating in competitive industries compared to firms operating in more concentrated industries. Furthermore, the likelihood of containing covenants is significantly larger for loans to firms in more competitive industries. Finally, the likelihood of having a credit rating is much larger for firms in concentrated industries. Overall, this analysis across subgroups shows that, on average, loans to firms in more competitive industries have higher loan spreads and contain more restrictions in the form of covenants.

IV Product Market Competition and Loan Spreads

A The Real Effects of Product Market Competition

I study the impact of the intensity of product market competition on the cost of debt by estimating equation 1. To draw meaningful inferences, I control for firm characteristics, loan features, and macroeconomic conditions that may influence a bank's decision to charge a higher or lower loan spread. In this section, I present the main results using the Census HHI and the Four-Firm ratio as proxies for the intensity product market competition. In later sections, I attempt to provide more evidence in support of a *causal* link between product market competition and loan spreads using reductions of import tariffs as a quasi-natural experiment.

Table III displays the estimates of the effect of product market competition on loan spreads. In column **1**, the coefficient on Census HHI is significantly negative at the one percent confidence level, suggesting that the intensity of product market competition has a positive effect on loan spreads. This result is consistent with hypothesis 1. The effect is economically large. All else equal, a one standard deviation increase in product market competition increases financing costs by 7 percent, which is equivalent to 13 basis points (significant at 1 percent).[13] This order of magnitude is similar to the effect of changes in shareholders' rights on loan spreads [Chava, Livdan, and Purnanandam (2009)]. In columns **2** and **3**, I add additional control variables and include industry, loan type, loan purpose, and year-quarter fixed-effects. Although the coefficient on Census HHI decreases slightly, it remains significant at the 1 percent confidence level, supporting the idea that firms in more competitive industries have higher costs of debt.

<INSERT TABLE III ABOUT HERE>

[13] The standard deviation of the Census HHI is 0.058. Multiplying this value with the coefficient of -1.281 in column 1 gives approximately -7 percent. Multiplying this value with the average loan spread of 178 basis points yields approximately 13 basis points.

Note that the estimated coefficients of the control variables have the expected signs. I include firm characteristics, variables capturing macroeconomic conditions, and loan characteristics as control variables. The market capitalization of a firm measures firm size. Larger firms have easier access to external finance and hence are likely to borrow from banks on better terms. I use the market-to-book ratio to proxy for firms' growth opportunities. The marginally negative coefficient may be due to the fact that the market-to-book value represents the additional value over book assets that debt holders can access in the event of default [Graham, Li, and Qiu (2008)]. I also control for leverage, profitability, tangibility, cash flow volatility, and Altman's zscore. The signs of the estimated coefficients are in line with related studies [Chava, Livdan, and Purnanandam (2009); Graham, Li, and Qiu (2008)]. Overall, the results suggest that small, volatile, highly levered firms with few tangible assets and few growth opportunities have higher costs of bank financing.

Further, I also control for macroeconomic conditions. More specifically, I include the credit and term spread as additional control variables. The credit spread is the difference between the yields of BAA and AAA corporate bonds, and the term spread is the difference between yields of 10-year Treasury bonds and 3-months T-Bills. Credit spreads and loan spreads are positively related, suggesting that the individual loan rate reflects market wide default risk. The term and loan spread also relate positively, indicating that banks do not take into account good economic prospects when they decide on the loan rate.

Finally, I also control for the size of the loan as the proportion of firms' assets and for the maturity of the loan. The loan amount relates positively and the loan maturity negatively to loan spreads. A potential explanation for the negative coefficient on loan maturity could be that banks grant shorter maturity loans to riskier firms [Strahan (1999)]. I also include loan type and loan purpose dummies because banks may price loans with different types and purposes differently. In addition, I include Fama-French industry dummies to control for the potential differences in risks and debt pricing across industries. Finally, I include year-quarter fixed-effects to capture unobserved time effects that may influence the pricing of bank loans.

To give additional support for these results, I use an alternative proxy for the intensity

of product market competition. I use the Four-Firm Ratio, which is the sum of the market shares of the four largest firms in terms of market shares in a six-digit NAICS industry as defined by the Census of Manufacturers. The higher is the Four-Firm Ratio, the more concentrated is an industry. Therefore, a low Four-Firm Ratio for an industry indicates that the industry is more competitive. Columns **4** through **6** show the baseline estimation results using the lagged Four-Firm Ratio as the proxy for product market competition. In all three columns, the estimated coefficient on the Four-Firm Ratio is negative and significant. The economic magnitude of the effect similar to the effect using the Census HHI. These results corroborate the findings using the Census HHI and suggest that a more intense product market competition increases the cost of bank loans.

To reinforce the interpretation of the results, Table IV presents additional versions of the baseline specification. In particular, I control for firms' governance structure. Giroud and Mueller (2008) investigate whether product market competition and corporate governance are substitutes and find that firms in competitive industries benefit relatively less from good corporate governance than firms in concentrated industries. Moreover, Chava, Livdan, and Purnanandam (2009) show that firms relying too much on the corporate control market as governance device have a higher cost of debt financing. Hence, the governance structure may play an important role for the link between product market competition and loan spreads. Column **1** of Table IV reveals that the inclusion of a proxy measuring the quality of corporate governance (dummy variable equal to one if the GIM index is bigger than 10, and zero otherwise) does not alter the effect of product market competition on loan spreads.[14] In line with the findings of Chava, Livdan, and Purnanandam (2009), the coefficient on the governance dummy variable is negative and significant, suggesting that firms with a weaker corporate governance pay lower spreads on bank loans. The coefficient on Census HII remains, however, statistically and economically significant.

<INSERT TABLE IV ABOUT HERE>

[14]The results remain unchanged when I instead use the continuous version of this index.

Another important issue relates to Altman's zscore as proxy for default risk. Actually, this accounting based variable may not capture properly firms' default risk. Therefore, I follow Bharath and Shumway (2008) and Duffie, Saita, and Wang (2007) and compute the market based expected default frequency (EDF). Roughly speaking, this proxy for default risk is the number of standard deviations of asset growth by which a firm's market value of assets exceeds the face value of debt. Duffie, Saita, and Wang (2007) find that the EDF is economically important for explaining the term structure of default probabilities. In column **2** of Table IV I include the EDF and asset volatility as additional control variables. As expected, the coefficients on both variables, EDF and asset volatility, are positive and significant, suggesting that firms with higher default risk and more volatile assets pay higher spreads for bank loans. The coefficient on Census HII remains virtually unchanged and is significantly negative. It seems that traditional measures of default risk (Altman's zscore, leverage, EDF, asset volatility) do not subsume the risk of competition. The intensity of product market competition continues to have a significantly positive effect on the cost of debt.

The loss given firms' default is an important determinant of the risk premium on debt. In all specifications, I therefore include net PPE as a proxy for firms' tangible assets. This measure should partly capture banks' loss given default. In particular, a lower tangibility of the firm's assets may decrease the expected recovery rates for creditors and increase the cost of debt. Moreover, depending on the security provisions contained in debt contracts, asset liquidity may increase or decrease the cost of debt. Hence, asset liquidity may play a potentially important role for capital structure and for the pricing of debt [Shleifer and Vishny (1992); Morellec (2001); Myers and Rajan (1998)]. In column **3**, I thus include industry's asset illiquidity as an additional control variable. I follow Acharya, Bharath, and Srinivasan (2006) and use the inverse of the quick ratio (cash and short term investments plus receivables divided by current liabilities) as a proxy for illiquidity. In each calendar year and three-digit NAICS industry, I compute the median industry's asset illiquidity. Next, I define a dummy variable (Asset Illiquidity) that equals one if the industry's illiquidity is above the median, and zero otherwise. The coefficient on the Census HHI remains virtually unchanged

and is significantly negative when I include this additional control variable. Interestingly, the coefficient on Asset Illiquidity is negative and significant. This suggests that a higher asset illiquidity decreases the cost of debt.

Column **4** contains proxies for the firms' default probability and for the asset illiquidity in the same specification. Again, the coefficient on the Census HHI remains negative and significant, despite these additional control variables. This finding supports hypothesis 1 and suggests that the intensity of product market competition increases the cost of debt. Below I explore in more detail two potential channels through which competition may affect the cost of debt.

Next, in column **5** of Table IV, I include lagged market share as an additional control variable. Firms with larger market shares may be industry leaders and have easier access to financing, be more prone to withstand fierce product market competition, and hence obtain loans at more favorable conditions than firms with small market shares (followers). I measure market share as the proportion of firm i's sales to total industry sales in the six-digit NAICS industry. The coefficient on market share is negative and insignificant, suggesting that a large market share is not an important determinant of the loan spread. The coefficient on Census HHI remains negative and statistically and economically significant.

Further, in column **6** of Table IV, I control with a dummy variable whether or not a firm is diversified. The dummy variable equals one if a firm operates in more than on segment, and zero otherwise. More diversified firms may have easier access to financing because of less volatile cash flows and less exposure to negative shocks to their core business. Indeed, the coefficient on diversification is negative and significant, suggesting that more diversified firms have, on average, lower financing costs. The coefficient on the Census HHI remains, however, negative and statistically significant.

Finally, in column **7** of Table IV, I address the important issue of self-selection. Since I only observe loan spreads when a firm actually chooses to issue a bank loan, I estimate the baseline specification with an explicit correction for self-selection. I therefore specify a selection equation in which I model the choice of a firm to issue bank debt as a function of firm characteristics. Following Julio, Kim, and Weisbach (2008), these firm characteristics

include the size, market-to-book ratio, leverage, profitability, tangibility, liquidity, a dummy variable indicating whether the firm has a debt rating, a dummy variable taking the value of 1 if the firm's Altman Zscore is below the sample median, and quarterly dummy variables. I then estimate this selection equation jointly with equation 1 using a Heckman two-step procedure.

Column **7** shows that correcting for self-selection has no bearing on the conclusion. The coefficient on the Census HHI is still negative and significant at the 1 percent level. I also report the inverse Mills-ratio, which can be viewed as a control for and test for the significance of private information [Li and Prabhala (2007)]. Private information held by the issuer or the bank could affect the choices made by firms. If such information has value, it affects the prices at which firms can raise debt. In column 6, the inverse Mills-ratio is positive and significant. This suggests that private information possessed ex-ante has a positive effect on debt prices ex-post. The main conclusion that the intensity of product market competition relates positively and significantly to loan spreads, however, remains unchanged.

In addition, I re-estimate the baseline equation 1 for subsamples based on the sample period. I also include lagged capital expenditures as a control for industry entry costs, and real GDP growth as an additional control for the state of the economy. Finally, I estimate median regressions. These additional estimations do not change my conclusion, and the intensity of product market competition continues to relate positively and significantly to loan spreads.

Overall, the results in this section suggest that firms in more competitive industries have a higher cost of debt. This effect of competition is robust to alternative explanations and estimation techniques, and suggests that competition risk is a separate factor affecting the pricing of corporate debt.

B The Effect of Reductions of Industry-Level Import Tariffs

The preceding section has shown that a more intense product market competition relates to a higher cost of debt. To examine the robustness of this result, I follow Frésard (2009) and examine the response of loan spreads to unexpected variations of industry-level import tariffs.

Frésard (2009) investigates the effect of cash holdings on product market share gains and argues that changes of import tariffs represent exogenous real-side shocks to the competitive environment that modify the relative benefits of cash holdings. The main argument relies on the fact that trade openness and internationalization substantially change the competitive environment of firms, and that lower trade barriers trigger significant intensifications of competitive pressures from foreign rivals [Bernard, Jensen, and Schott (2006)].

Using product-level U.S. import data compiled by Feenstra (1996) and Feenstra, Romalis, and Schott (2002), I follow Frésard (2009) and characterize tariff reductions in terms of the deviations of the yearly changes in tariffs from their median or mean level across all industries in my sample.[15] More specifically, a tariff reduction occurs in a specific industry-year when a negative change in the tariff rate is 2 or 2.5 times larger than its median or mean change. I exclude tariff reductions that are followed by equivalently large increases in tariffs over the two subsequent years in order to make sure that the tariff reductions reflect non-transitory changes in the competitive environment (see Frésard (2009) for a more detailed discussion on the data and method).

I then estimate equation 1 and I replace the Census HHI proxy for the intensity of product market competition with a dummy variable that equals one if an industry has experienced a large tariff reduction in the previous year and zero otherwise. Importantly, the coefficient on this dummy variable identifies the effect of an intensification of competition on the pricing of loans, since tariff reductions occur in different industries at different times. As a result, and consistent with the prediction, we should observe a positive and significant effect of tariff reductions on the pricing of loans. Table V presents the estimation results using various specifications for the magnitude of the tariff reduction (2 and 2.5 times the median and mean change in tariffs).

<INSERT TABLE V ABOUT HERE>

[15] For each industry-year, I define the ad-valorem tariff rate as the duties collected at the US custom divided by the Free-On-Board customs value of imports.

The estimation results in Table V show that the estimates of the dummy variables are positive and significant at the 1 or 5 percent level across the four measures of tariff reductions. For instance, column **1** of Table V shows the results for the dummy variable equal to one if the decrease in tariffs is 2 times larger than its median change (dTARIFF $>$ 2$\times$median). The estimated coefficient has a value of 0.108 and suggests that loan spreads increase by almost 11 percent, or 21 basis points, after a tariff reduction. This effect is statistically significant and economically large. The effect is almost identical for the dummy variable equal to one if the decrease in tariff rates is 2.5 times larger than its median change (column **2**). In columns **3** and **4** I report the results for dummy variables that I construct using mean changes in industry tariffs. Both coefficient estimates are positive and significant. The estimate in column **4** of Table V suggests that loan spreads increase by 20 basis points after a tariff reduction larger than 2.5 times its mean value (dTARIFF $>$ 2.5$\times$mean). These results strongly support the idea that an intensification of product market competition causes the cost of debt to rise.

V Product Market Competition and Loan Spread: Potential Channels

To shed further light on the relation between the intensity of product market competition and the cost of debt, I investigate through which channel competition risk may affect loan spreads. More specifically, I explore whether the impact of the intensity of product market competition on loan spreads depends on the firms' probability of default and on the firms' liquidation value of assets.

A The Probability of Default Channel

An increase in the intensity of product market competition may on one hand increase the risk premium on debt because it reduces firms' profit margins and increases firms' probability of default. On the other hand, competition may act as a disciplining force for managers and as a substitute for good corporate governance. In this case, an increase in the intensity

of product market competition may reduce the firms' probability of default and the risk premium on the firms' debt.

To examine whether the effect of the intensity of product market competition depends on the firms' probability of default, I interact the Census HHI variable with firms' EDF and asset volatility.[16] Table VI reports the estimation results.

<INSERT TABLE VII ABOUT HERE>

Column **1** contains the estimation results with the EDF as an additional control variable. As expected, the coefficient on EDF is significantly positive. In column **2**, I interact the Census HHI variable with the EDF. The coefficient on the interaction term is positive and significant, while the coefficient on EDF is small and insignificant. For a given intensity of product market competition, an increase in EDF increases the cost of debt. Or to put it differently, an increase in the intensity of product market competition increases the cost of debt strongest for firms with a *low* EDF. This suggests that the probability of default does not reinforce the positive effect of competition on the cost of debt. Note, however, that the inclusion of the interaction term between the Census HHI and the EDF has no bearing on the positive direct effect of competition on the cost of debt. The coefficient on the Census HHI is negative and significant at the one percent confidence level.

In column **3** I replace the EDF with the firms' asset volatility as a control variable. Asset volatility has a positive and significant effect on the cost of debt. In column **4** I interact the Census HHI variable with asset volatility. The coefficient on the interaction term is negative but insignificant. The effect of asset volatility is still positive and significant, while the coefficient on the Census HHI remains negative and significant.

Overall, the results in this section suggest that the probability of default is not the main channel through which the intensity of product market competition impacts the cost of debt. The positive effect of product market competition on loan spreads seems to be most important for firms with a low, and not high, probability of default.

[16] The EDF and asset volatility are both reasonable proxies for firms' probability of default [Duffie, Saita, and Wang (2007)].

B The Asset Liquidation Value Channel

A second potential channel through which product market competition may impact the cost of debt is through the liquidation value of firms' assets (loss given default). In particular, a lower liquidation value of the firms's assets decreases the expected recovery rates for creditors and may increase the cost of debt. Moreover, asset illiquidity and specificity may play a potentially important role for capital structure and for the pricing of debt [Shleifer and Vishny (1992); Morellec (2001); Myers and Rajan (1998)]. Consistent with this idea, Benmelech, Garmaise, and Moskowitz (2005) find that more redeployable assets receive loans with lower rates, using commercial zoning regulation to capture the redeployability of assets. Similarly, Sibilkov (2009) documents that leverage relates positively to asset liquidity, and that this relation becomes curvilinear when the debt is not secured. Moreover, Ortiz-Molina and Phillips (2009) find that asset liquidity is an important determinant of firms' cost of capital and that firms in industries with high asset liquidity have a lower cost of capital. By contrast, a larger number of competitors may increase the chances that the defaulted firm's assets can be sold at a high price. Hence, an intensification of product market competition may reduce the risk premium on debt. In view of these results, the effect of product market competition on loan spreads may depend on firms' liquidation value of assets.

To examine whether the effect of the intensity of product market competition depends on the firms' liquidation value, I interact the Census HHI variable with variables indicating whether or not an industry's assets are specific or illiquid. I measure asset illiquidity with the inverse of the quick ratio and define the variable in Table IV. I follow Berger, Ofek, and Swary (1996) and Stromberg (2001) and use the book value of machinery and equipment divided by the book value of total assets as a proxy for asset specificity. In each calendar year and industry (three-digit NAICS), I compute the median industry specificity. Then, I define a dummy variable (Asset Specificity) that equals one if the asset specificity is above the industry median, and zero otherwise. Table VII shows the estimation results.

<INSERT TABLE VII ABOUT HERE>

In columns **2** and **4** of Table VII, the interaction term between the Census HHI and asset specificity or illiquidity is negative and statistically significant. These interaction results reveal that banks charge significantly higher loan spreads to firms operating in competitive industries with specific or illiquid assets. This finding suggests that the positive effect of the intensity of product market on the cost of debt is most important for industries with illiquid and specific assets. In columns **1** and **3**, I include asset specificity and illiquidity as additional control variables, but do not include the respective interaction terms. Interestingly, the coefficients of the direct effects of asset specificity and illiquidity are negative. This suggests that a higher asset specificity or illiquidity decreases the cost of debt. Note, however, that in these specifications the direct effect of the Census HHI remains negative and statistically significant at the one percent confidence level (-1.209 in column **1**, and - 1.137 in column **3**).

Overall, this analysis provides evidence that product market competition is especially important for the cost of debt in industries with specific and illiquid assets. Importantly, this finding suggests that an intensification of product market competition increases the cost of debt through a channel that relates to firms' asset liquidation value.

VI Non-Pricing Loan Characteristics

If intense product market competition renders firms' cash flows more risky, banks may incorporate this risk into debt contracts by altering not only the loan spread but also other contract terms, such as the number of covenants, the collateral, and the syndicate size. In this section, I focus on how the intensity of product market competition impacts the total number of covenants, the collateral, and the size of the syndicate.

Theory suggests that loans to firms in more competitive industries contain more restrictions on the firms' financing and dividend policy. We should therefore observe that loans to firms in more competitive industries contain more covenants, controlling for other factors that may correlate with covenants (hypothesis 2). Column **1** of Table VIII shows coefficient estimates from poisson regressions and reveals that this is indeed the case. The dependent variable is the number of financial covenants. The coefficient on the Census HHI is signifi-

cantly negative. This finding indicates that a higher intensity of product market competition relates to more financial covenants in loan contracts. Similarly, in column **2**, the dependent variable is the covenant index as defined by Bradley and Roberts (2004). Again, the coefficient on the Census HHI is significantly negative, suggesting that loan contracts to firms in competitive industries contain more restrictions on financing and dividend policy than comparable firms in concentrated industries.

<INSERT TABLE VIII ABOUT HERE>

Next, column **3** of Table VIII reports probit estimates in which the dependent variable is a dummy variable equal to one if the loan contract contains a restriction on dividend payments and zero otherwise. The Census HHI coefficient is significantly negative and translates into a an economically important marginal effect of -0.58 in the probit model. This coefficient suggests that the probability that a loan contract contains restrictions on dividend payments increases by approximately 14 percent when the intensity of product market competition increases by one standard deviation (significant at 1 percent).

Furthermore, column **4** shows probit estimates in which the dependent variable is a dummy variable equal to one if the loan contract is secured and zero otherwise. Since security provisions relate directly to debt holders' cash flows, we would expect that the coefficient on the Census HHI is negative. Indeed, the coefficient on the Census HHI is negative and statistically significant. It seems therefore that the intensity of product market competition is a determinant of whether or not a loan is secured.

Finally, column **5** of Table VIII reveals that the intensity of product market competition affects significantly the number of lenders in the loan syndicate. An increase in the intensity of product market competition by one standard deviation decreases syndicate size by about 13 percent (significant at 1 percent), which is equivalent to almost one lender. This result is economically large and consistent with the idea that firms in more competitive industries need more intense monitoring, and that smaller syndicates may be better able at coping with loans to distressed firms.

The estimated coefficients on the control variables provide ambiguous evidence on the relation between syndicate size and loan spreads. On one hand, larger firms have loans with more lenders, possibly because larger firms need larger loans and more lenders to provide the capital. Leverage also correlates positively with the number of lenders, probably because lenders want to diversify their lender portfolio and decrease the credit risk. This is consistent with the diversification motive of syndication. On the other hand, cash flow volatility relates negatively to the syndicate size. Since firms with more volatile cash flows require closer monitoring, banks may forms smaller syndicates. This is consistent with the monitoring motive for syndication [Holmstrom and Tirole (1997)]. Deal amount and maturity relate positively to the syndicate size. Banks form larger syndicates for larger and longer maturity loans.

Taken together, the results in Table VIII suggest that banks incorporate the risk that arises from more intense product market competition by including more financial and dividend covenants. This finding is consistent with hypothesis 2 that covenants should be stricter in firms and industries where cash flows are volatile and uncertain [Gârleanu and Zwiebel (2009)].

VII Conclusions

In this paper I empirically explore whether and through which channel the intensity of product market competition affects the cost of debt. First, I provide evidence that banks charge significantly higher loan spreads for loans to firms operating in more competitive industries. In particular, by taking advantage of exogenous reductions of industry-level import tariffs, I document an average increase in loans spreads of 21 basis points after reductions of import tariffs. My findings are robust to alternative explanations, such as firms' governance structure, firms' probability of default, firms' diversification, and self-selection. The results suggest that banks take into account competition risk when they price loan contracts.

Second, I investigate through which channel the intensity of product market competi-

tion impacts the cost of debt. My investigations reveal that the effect of product market competition is strongest for firms in industries with specific and illiquid assets. This finding suggests that an important channel through which product market competition impacts the pricing of corporate debt is through the firms' liquidation value.

Finally, I show that loans to firms in competitive industries contain more financial covenants, dividend restrictions, and security provisions. Moreover, on average, loan syndicates are smaller for loans to firms in more competitive industries. In sum, these results suggest that banks incorporate competition risk also along non-pricing dimensions.

My results emphasize the importance of taking into account the linkages between product and financial markets. As such, the findings point to interesting avenues for future research. For instance, in recent papers Julio, Kim, and Weisbach (2008) and Erel, Julio, Kim, and Weisbach (2009) show that the security issuance depends on the business cycle. In the light of my results, the intensity of product market competition may be an important determinant of firms' choices to issue equity, bank debt, or public debt.

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Table I: Summary Statistics

This table presents loan and borrower summary statistics, as well as summary statistics for proxies for the intensity of product market competition. Panel A presents means, medians, and standard deviations of loan characteristics. N is the number of deals in the sample. Panel B shows summary statistics of borrower characteristics. All ratios are winsorized at the 1st and 99th percentile to address outliers. Panel C presents summary statistics of the product market competition proxies. Panel D shows the distribution of loans across the 12 Fama-French industries. Finally, Panel E shows correlation coefficients between the proxies for product market competition and loan spreads. The sample period is from 1995 to 2007. Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively.

Panel A: Loan Characteristics

Variable	N	Mean	Median	Std. Dev	Min	Max
Loan Spread (BP)	2,505	178.40	150.00	129.69	14.00	1,180.00
Loan Maturity (months)	2,505	61.19	38.00	680.70	2.00	24,144.00
Loan Amount (Mio. USD)	2,505	342.00	120.00	691.00	0.14	10,000.00
Loan Amout to Total Assets	2,501	0.28	0.22	0.19	0.02	1.00
Syndicate Size	2,505	7.21	4.40	8.62	1.00	141.00
Secured Dummy	2,195	0.66	1.00	0.47	0.00	1.00
Dividend Restriction	2,251	0.80	1.00	0.40	0.00	1.00
Nb. of Financial Covenants	2,505	2.69	3.00	1.17	1.00	7.00
Covenant Index	2,505	2.51	2.00	1.80	0.00	6.00
Max. Capital Expenditures	2,406	0.24	0.00	0.43	0.00	1.00
Max. Debt to EBITDA	2,406	0.50	1.00	0.50	0.00	1.00

Panel B: Borrower Characteristics

Total Assets	2,501	2,124.33	488.89	5,099.44	3.13	60,058
Cash to Total Assets	2,501	0.08	0.04	0.11	0	0.83
Tangible Net Worth	2,499	733.94	173.73	1,670.18	−1,680.5	17,021.1
Debt to Total Assets	2,490	0.28	0.27	0.19	0	1.04
Debt to Operating Income	2,447	9.08	7.09	18.08	−78.38	94.4
Market-to-Book Ratio	2,488	1.47	1.13	1.2	0.32	14.5
Net PPE	2,501	0.27	0.23	0.16	0	0.75
Cash Flow to Total Assets	2,458	0.03	0.03	0.04	−0.41	0.12
Net Working Capital	2,478	0.27	0.26	0.14	−0.09	0.7
Capex to Total Assets	2,473	0.01	0.01	0.01	0	0.09
R&D to Sales	2,504	0.05	0	0.31	0	13.13
Cash Flow Volatility	2,505	0.02	0.01	0.02	0	0.2
Asset Volatility	2,331	0.54	0.46	0.32	0.11	4.66
Expected Default Frequency	2,331	0.15	0	0.29	0	1

Table I: continued

Panel C: Product Market Competition Proxies

Variable	N	Mean	Median	Std. Dev	Min	Max
Census HHI	2,436	0.072	0.057	0.059	0.001	0.3
Four-Firm Ratio	2,505	41.097	40.7	18.375	0	99.5
Nb. of Firms	2,505	809.897	491	1,261.935	8	18,015
Comp. Nb. Firms	2,505	29.062	10	45.199	1	219

Panel D: Distribution across Fama-French Industries

Fama-French Industry	Frequency	Percent	Cum. Percent
Consumer Nondurables	321	12.81	12.81
Consumer Durables	184	7.35	20.16
Manufacturing	935	37.33	57.49
Oil, Gas, & Coal	51	2.04	59.52
Chemicals & Allied Products	175	6.99	66.51
Business Equipment	512	20.44	86.95
Wholesale Retails & Some Services	2	0.08	87.03
Healthcare, Medical Equipment & Drugs	297	11.86	98.88
Everything Else	28	1.12	100.00
Total	2,505	100.00	

Panel E: Correlation Coefficients

	Log(Spread)	Census HHI	FF-Ratio	Log(Nb. firms)
Log(Spread)	1.000			
Census HHI	-0.094^{***}	1.000		
Four-Firm Ratio	-0.077^{***}	0.914^{***}	1.000	
Log(Nb. Firms)	0.048^{***}	-0.537^{***}	-0.660^{***}	1.000

Table II: Loan and Firm Characteristics Across Subsamples

This table presents means, medians, and differences in means and medians of loan characteristics across two subsamples with different levels of product market competition. In Panel A, I group firm observations into three groups according to the six-digit NAICS Herfindahl-Hirschman Index provided by the Census of Manufacturers (Census HHI). Each calendar quarter, I rank all sample firms based on their Census HHI value and assign the firms in the bottom and top tercile to high competition and low competition industries respectively. The last two columns report the differences of means and medians between these two subsamples. I compute the statistical significance of the difference in means with a mean comparison t-test, and the significance of the difference in medians with the Wilcoxon rank-sum test. In Panel B, I make terciles according to the Four-Firm Ratio and assign the firms in the bottom and top tercile to high competition and low competition industries respectively. The Four-Firm Ratio is the sum of the market shares of the four largest firms in terms of market shares in a six-digit NAICS industry as defined by the Census of Manufacturers. The sample period is from 1995 to 2007. Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively.

	High competition		**Low competition**		**Difference**	
	Mean	Median	Mean	Median	Mean	Median
Panel A: Census HHI						
Loan Spread	185.24	175.00	171.83	150.00	13.41**	25.00***
Nb. of Financial Covenants	2.76	3.00	2.66	3.00	0.10*	
Covenant Index	2.65	2.00	2.42	2.00	0.23**	
Dividend Restriction	0.84	1.00	0.76	1.00	0.08***	
Secured Dummy	0.70	1.00	0.63	1.00	0.07***	
Syndicate Size	6.07	4.00	8.55	5.00	−2.48***	
Loan Amount (Mio. USD)	213.00	100.00	474.00	150.00	−261.00***	−50.00***
Loan Amount to Total Assets	0.30	0.26	0.28	0.21	0.02**	0.05***
Loan Maturity	42.73	39.00	72.77	37.00	−30.04	2.00
Total Assets (Mio. USD)	1,006.69	340.92	3,043.30	634.81	−2,036.61***	−293.89***
Debt to Total Assets	0.28	0.26	0.29	0.29	−0.01	−0.03***
Market-to-Book Ratio	1.45	1.16	1.42	1.10	0.03	0.06
Rating Dummy	0.24	0.00	0.36	0.00	−0.12***	
Average Number of Deals	826.00	826	768	768		
Panel B: Four-Firm Ratio						
Loan Spread	185.53	175.00	169.62	150.00	15.91**	25.00***
Nb. of Financial Covenants	2.78	3.00	2.64	3.00	0.14**	
Covenant Index	2.68	2.00	2.39	2.00	0.29***	
Dividend Restriction	0.84	1.00	0.75	1.00	0.09***	
Secured Dummy	0.70	1.00	0.62	1.00	0.08***	
Syndicate Size	6.08	4.00	8.64	5.00	−2.56***	
Loan Amount (Mio. USD)	217.00	100.00	477.00	155.00	−260.00***	−55.00***
Loan Amount to Total Assets	0.29	0.25	0.27	0.21	0.02**	0.04***
Loan Maturity	42.69	39.00	41.84	37.00	0.85	2.00
Total Assets (Mio. USD)	1,032.70	342.70	3,080.32	687.79	−2,047.62***	−345.09***
Debt to Total Assets	0.28	0.26	0.29	0.29	−0.01	−0.03***
Market-to-Book Ratio	1.45	1.16	1.41	1.10	0.04	0.06*
Rating Dummy	0.24	0.00	0.36	0.00	−0.12***	
Average Number of Deals	853	853	801	801		

Table III: Product Market Competition and the Cost of Debt

This table reports coefficient estimates of regressions examining the effect of the intensity of product market competition on loan spreads (equation 1). The dependent variable is the logarithm of the loan spread. In columns 1 through 3, I use the six-digit NAICS Herfindahl-Hirschman Index provided by the Census of Manufacturers (Census HHI) as a proxy for the intensity of product market competition. In columns 4 through 6 I alternatively use the Four-Firm ratio. The Four-Firm Ratio is the sum of the market shares of the four largest firms in terms of market shares in a six-digit NAICS industry as defined by the Census of Manufacturers. I de-mean all firm-secific variables by their six-digit NAICS industry mean. I measure all independent variables as of the quarter prior to the loan start date. The sample period is from 1995 to 2007. Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively. I report the estimates' standard errors adjusted for within-firm clustering in parentheses below the coefficient estimates.

	(1)	(2)	(3)	(4)	(5)	(6)
Census HHI	-1.281^{***}	-1.281^{***}	-1.186^{***}			
	(0.495)	(0.436)	(0.391)			
FF-Ratio				-0.375^{***}	-0.384^{***}	-0.359^{***}
				(0.130)	(0.108)	(0.101)
Log(marketcap)	-0.257^{***}	-0.232^{***}	-0.201^{***}	-0.259^{***}	-0.231^{***}	-0.201^{***}
	(0.012)	(0.011)	(0.011)	(0.012)	(0.011)	(0.011)
Market-to-Book	-0.031	-0.016	-0.032^{*}	-0.030	-0.016	-0.033^{*}
	(0.021)	(0.019)	(0.019)	(0.021)	(0.019)	(0.018)
Leverage	0.676^{***}	0.449^{***}	0.520^{***}	0.680^{***}	0.449^{***}	0.521^{***}
	(0.114)	(0.100)	(0.096)	(0.114)	(0.100)	(0.096)
Profitability	-0.464	-1.497^{***}	-1.473^{***}	-0.463	-1.571^{***}	-1.524^{***}
	(0.360)	(0.330)	(0.321)	(0.356)	(0.327)	(0.318)
Net PPE	-0.149	-0.242^{*}	-0.208	-0.169	-0.251^{*}	-0.220^{*}
	(0.155)	(0.132)	(0.131)	(0.153)	(0.130)	(0.130)
Cash Flow Volatility	-0.824	-0.432	-0.633	-0.922	-0.506	-0.651
	(0.939)	(0.843)	(0.789)	(0.940)	(0.839)	(0.780)
Zscore	0.002	0.005	0.009^{**}	0.002	0.005	0.009^{**}
	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
Credit Spread		0.512^{***}	0.337^{*}		0.512^{***}	0.288
		(0.064)	(0.176)		(0.064)	(0.178)
Term Spread		0.043^{***}	0.129^{***}		0.044^{***}	0.122^{***}
		(0.013)	(0.039)		(0.012)	(0.039)
Deal Amount			0.225^{***}			0.229^{***}
			(0.081)			(0.079)
Deal Maturity			-0.178^{***}			-0.181^{***}
			(0.031)			(0.030)
Industry fixed-effects	No	Yes	Yes	No	Yes	Yes
Loan type dummies	No	Yes	Yes	No	Yes	Yes
Loan purpose dummies	No	Yes	Yes	No	Yes	Yes
Year-quarter fixed-effects	No	No	Yes	No	No	Yes
N	2,436	2,436	2,432	2,505	2,505	2,501
Adjusted R^2	0.33	0.48	0.54	0.33	0.47	0.53

Table IV: Product Market Competition and the Cost of Debt: Alternative Explanations

This table reports coefficient estimates of regressions examining the effect of the intensity of product market competition on loan spreads (equation 1). The dependent variable is the logarithm of the loan spread. I use the six-digit NAICS Herfindahl-Hirschman Index provided by the Census of Manufacturers (Census HHI) as a proxy for the intensity of product market competition. The GIM Index Dummy is a dummy variable equal to one if the GIM Index is larger than 10, and zero otherwise. EDF is the expected default frequency, and Asset Volatility the volatility of total assets estimated along the lines of Bharath and Shumway (2008) and Duffie, Saita, and Wang (2007). I measure asset illiquidity with the inverse of the quick ratio. Asset illiquidity is a dummy variable equal to one if the median industry illiquidity (at the three-digit NAICS level) is above the median, and zero otherwise. I measure Market Share as the proportion of firm i's sales to total industry sales in the six-digit NAICS industry. Diversification is a dummy variable equal to one if a firm operates in more than one segment, and zero otherwise. In column 7, the inverse Mills Ratio refers to the inverse Mills ratio computed from the first step (not reported) probit estimation where the dependent variable equals one if a firm issues a bank loan in a specific calendar quarter, and zero otherwise. I de-mean all firm-secific variables by their six-digit NAICS industry mean. I measure all independent variables as of the quarter prior to the loan start date. The sample period is from 1995 to 2007. Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively. I report the estimates' standard errors adjusted for within-firm clustering in parentheses below the coefficient estimates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Census HHI	−1.850***	−1.265***	−1.209***	−1.284***	−1.184***	−0.901**	−0.932***
	(0.476)	(0.396)	(0.390)	(0.396)	(0.388)	(0.457)	(0.199)
Log(marketcap)	−0.163***	−0.178***	−0.201***	−0.178***	−0.201***	−0.197***	−0.154***
	(0.020)	(0.013)	(0.011)	(0.013)	(0.012)	(0.013)	(0.010)
Market-to-Book	−0.082**	−0.041**	−0.032*	−0.041**	−0.033*	−0.013	−0.083***
	(0.035)	(0.020)	(0.019)	(0.020)	(0.019)	(0.020)	(0.015)
Leverage	0.770***	0.451***	0.514***	0.443***	0.520***	0.485***	0.874***
	(0.186)	(0.120)	(0.096)	(0.119)	(0.096)	(0.113)	(0.090)
Profitability	−1.922**	−1.579***	−1.494***	−1.595***	−1.474***	−1.506***	−0.890***
	(0.800)	(0.360)	(0.320)	(0.358)	(0.321)	(0.364)	(0.326)
Net PPE	0.122	−0.142	−0.217*	−0.145	−0.208	−0.288**	−0.375***
	(0.266)	(0.136)	(0.131)	(0.136)	(0.131)	(0.142)	(0.112)
Cash Flow Volatility	−2.876	−1.723**	−0.511	−1.569*	−0.631	−0.070	−0.430
	(1.843)	(0.856)	(0.787)	(0.852)	(0.791)	(0.854)	(0.653)
Zscore	0.017**	0.008	0.009**	0.009*	0.009**	0.008*	0.008**
	(0.008)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)
Term Spread	−0.037	0.134***	0.109***	0.128***	0.115***	0.103*	0.182***
	(0.058)	(0.044)	(0.040)	(0.044)	(0.040)	(0.055)	(0.039)
Deal Amount	0.213	0.256***	0.226***	0.257***	0.225***	0.163*	0.268***
	(0.153)	(0.086)	(0.081)	(0.086)	(0.082)	(0.096)	(0.068)
Deal Maturity	−0.191***	−0.155***	−0.175***	−0.153***	−0.178***	−0.190***	−0.148***
	(0.053)	(0.031)	(0.031)	(0.031)	(0.031)	(0.040)	(0.025)

(continued on next page)

Table IV: continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GIM Index Dummy	−0.120**						
	(0.047)						
EDF		0.151**		0.153**			
		(0.076)		(0.076)			
Asset Volatility		0.236***		0.232***			
		(0.063)		(0.063)			
Asset Illiquidity			−0.137***	−0.113**			
			(0.050)	(0.050)			
Market Share					−0.003		
					(0.067)		
Diversification						−0.078*	
						(0.042)	
Inverse Mills Ratio							0.684***
							(0.06)
Industry fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Deal type dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Deal purpose dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1148	2248	2432	2248	2432	1602	2370
Adjusted R^2	0.53	0.54	0.54	0.54	0.54	0.49	
P-value (chi-square)							0

Table V: Reductions of Import Tariffs and the Cost of Debt

This table reports coefficient estimates of regressions examining the effect of the intensification of product market competition on loan spreads (equation 1). The dependent variable is the logarithm of the loan spread. I use reductions of import tariffs to proxy for the intensification of product market competition. I define tariff reductions along the lines of Frésard (2009). dTARIFF equals one if one year prior to the loan start date in an industry-year (four-digit SIC industry) the change in tariffs is negative and 2 or 2.5 times larger than its median (columns 1 and 2) or mean (columns 3 and 4) value. I de-mean all firm-secific variables by their six-digit NAICS industry mean. I measure all independent variables as of the quarter prior to the loan start date. The sample period is from 1995 to 2001. Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively. I report the estimates' standard errors adjusted for within-firm clustering in parentheses below the coefficient estimates.

	(1)	(2)	(3)	(4)
dTARIFF $>$ 2×median	0.108***			
	(0.040)			
dTARIFF $>$ 2.5×median		0.113**		
		(0.044)		
dTARIFF $>$ 2×mean			0.098**	
			(0.043)	
dTARIFF $>$ 2.5×mean				0.106**
				(0.047)
Log(marketcap)	−0.220***	−0.221***	−0.220***	−0.221***
	(0.015)	(0.015)	(0.015)	(0.015)
Market-to-Book	−0.000	0.001	0.002	0.002
	(0.023)	(0.023)	(0.024)	(0.024)
Leverage	0.382***	0.381***	0.376***	0.377***
	(0.136)	(0.137)	(0.137)	(0.138)
Profitability	−2.095***	−2.100***	−2.099***	−2.074***
	(0.394)	(0.390)	(0.387)	(0.383)
Net PPE	−0.283*	−0.289*	−0.274*	−0.282*
	(0.155)	(0.156)	(0.155)	(0.156)
Cash Flow Volatility	−0.715	−0.790	−0.754	−0.783
	(0.999)	(1.001)	(0.991)	(0.996)
Zscore	0.005	0.005	0.004	0.004
	(0.005)	(0.005)	(0.005)	(0.005)
Term Spread	−0.022	−0.023	−0.022	−0.022
	(0.028)	(0.028)	(0.029)	(0.029)
Deal Amount	0.076	0.076	0.077	0.073
	(0.111)	(0.111)	(0.111)	(0.111)
Deal Maturity	−0.108**	−0.108**	−0.111**	−0.111**
	(0.047)	(0.047)	(0.047)	(0.047)
Industry fixed-effects	Yes	Yes	Yes	Yes
Deal type dummies	Yes	Yes	Yes	Yes
Deal purpose dummies	Yes	Yes	Yes	Yes
Year-quarter fixed-effects	Yes	Yes	Yes	Yes
N	1,002	1,002	1,002	1,002
Adjusted R^2	0.56	0.56	0.56	0.56

Table VI: Product Market Competition and the Cost of Debt: The Probability of Default Channel

This table reports coefficient estimates of regressions examining the effect of the intensity of product market competition on loan spreads (equation 1). The dependent variable is the logarithm of the loan spread. I use the six-digit NAICS Herfindahl-Hirschman Index provided by the Census of Manufacturers (Census HHI) as a proxy for the intensity of product market competition. EDF is the expected default frequency that I estimate using a Merton's structural model. Asset volatility is the volatility of the firms' assets also estimated using a structural model. I de-mean all firm-secific variables by their six-digit NAICS industry mean. I measure all independent variables as of the quarter prior to the loan start date. The sample period is from 1995 to 2007. Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively. I report the estimates' standard errors adjusted for within-firm clustering in parentheses below the coefficient estimates.

	(1)	(2)	(3)	(4)
Census HHI	-1.268^{***}	-1.182^{***}	-1.267^{***}	-1.324^{***}
	(0.398)	(0.405)	(0.394)	(0.423)
EDF	0.218^{***}	0.068		
	(0.074)	(0.091)		
Census HHI × EDF		2.087^{**}		
		(1.047)		
Asset Volatility			0.278^{***}	0.328^{***}
			(0.062)	(0.095)
Census HHI × Asset Volatility				−0.837
				(1.293)
Log(marketcap)	-0.192^{***}	-0.193^{***}	-0.181^{***}	-0.181^{***}
	(0.012)	(0.012)	(0.012)	(0.012)
Market-to-Book	−0.033	−0.033	-0.047^{**}	-0.046^{**}
	(0.020)	(0.020)	(0.020)	(0.020)
Leverage	0.418^{***}	0.435^{***}	0.546^{***}	0.543^{***}
	(0.119)	(0.118)	(0.104)	(0.104)
Profitability	-1.645^{***}	-1.628^{***}	-1.626^{***}	-1.638^{***}
	(0.355)	(0.356)	(0.357)	(0.358)
Net PPE	−0.150	−0.144	−0.130	−0.130
	(0.136)	(0.135)	(0.138)	(0.138)
Cash Flow Volatility	−1.360	-1.397^{*}	-1.791^{**}	-1.798^{**}
	(0.848)	(0.848)	(0.850)	(0.853)
Zscore	0.007	0.008	$0.009*$	0.009^{*}
	(0.005)	(0.005)	(0.005)	(0.005)
Term Spread	0.132^{***}	0.134^{***}	0.133^{***}	0.133^{***}
	(0.044)	(0.045)	(0.044)	(0.044)
Deal Amount	0.240^{***}	0.240^{***}	0.255^{***}	0.255^{***}
	(0.086)	(0.087)	(0.086)	(0.086)
Deal Maturity	-0.156^{***}	-0.156^{***}	-0.157^{***}	-0.156^{***}
	(0.031)	(0.031)	(0.031)	(0.031)
Industry fixed-effects	Yes	Yes	Yes	Yes
Deal type dummies	Yes	Yes	Yes	Yes
Deal purpose dummies	Yes	Yes	Yes	Yes
Year-quarter fixed-effects	Yes	Yes	Yes	Yes
N	2,248	2,248	2,248	2,248
Adjusted R^2	0.54	0.54	0.54	0.54

Table VII: Product Market Competition and the Cost of Debt: The Asset Liquidation Value Channel

This table reports coefficient estimates of regressions examining the effect of the intensity of product market competition on loan spreads (equation 1). The dependent variable is the logarithm of the loan spread. I use the six-digit NAICS Herfindahl-Hirschman Index provided by the Census of Manufacturers (Census HHI) as a proxy for the intensity of product market competition. In each calendar year and industry (three-digit NAICS), I compute the industry's median asset specificity and illiquidity. I then define illiquidity (specificity) as a dummy variable equal to one if the median industry illiquidity (specificity) is above the median, and zero otherwise. I de-mean all firm-secific variables by their six-digit NAICS industry mean. I measure all independent variables as of the quarter prior to the loan start date. The sample period is from 1995 to 2007. Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively. I report the estimates' standard errors adjusted for within-firm clustering in parentheses below the coefficient estimates.

	(1)	(2)	(3)	(4)
Census HHI	-1.209^{***}	-0.071	-1.137^{***}	-0.043
	(0.390)	(0.476)	(0.380)	(0.466)
Asset Illiquidity	-0.137^{***}	-0.025		
	(0.050)	(0.064)		
Census HHI × Illiquidity		-1.688^{**}		
		-0.67		
Asset Specificity			-0.118^{***}	0.007
			(0.046)	(0.060)
Census HHI × Specificity				-1.714^{***}
				-0.658
Log(marketcap)	-0.201^{***}	-0.203^{***}	-0.203^{***}	-0.203^{***}
	(0.011)	(0.011)	(0.011)	(0.011)
Market-to-Book	-0.032^{*}	-0.032^{*}	-0.034^{*}	-0.033^{*}
	(0.019)	(0.019)	(0.019)	(0.018)
Leverage	0.514^{***}	0.515^{***}	0.524^{***}	0.518^{***}
	(0.096)	(0.097)	(0.096)	(0.096)
Profitability	-1.494^{***}	-1.493^{***}	-1.479^{***}	-1.473^{***}
	(0.320)	(0.318)	(0.323)	(0.318)
Net PPE	-0.217^{*}	-0.217^{*}	-0.212	-0.208
	(0.131)	(0.131)	(0.131)	(0.131)
Cash Flow Volatility	-0.511	-0.439	-0.535	-0.466
	(0.787)	(0.768)	(0.779)	(0.762)
Zscore	0.009^{**}	0.009^{**}	0.009^{**}	0.009^{**}
	(0.004)	(0.004)	(0.004)	(0.004)
Term Spread	0.109^{***}	0.104^{**}	0.116^{***}	0.110^{***}
	(0.040)	(0.041)	(0.040)	(0.041)
Deal Amount	0.226^{***}	0.210^{***}	0.209^{***}	0.202^{**}
	(0.081)	(0.080)	(0.081)	(0.080)
Deal Maturity	-0.175^{***}	-0.174^{***}	-0.175^{***}	-0.173^{***}
	(0.031)	(0.030)	(0.031)	(0.030)
Industry fixed-effects	Yes	Yes	Yes	Yes
Deal type dummies	Yes	Yes	Yes	Yes
Deal purpose dummies	Yes	Yes	Yes	Yes
Year-quarter fixed-effects	Yes	Yes	Yes	Yes
N	2,432	2,432	2,432	2,432
Adjusted R^2	0.54	0.54	0.54	0.54

Table VIII: Product Market Competition and Non-Pricing Loan Characterisitcs

This table reports coefficient estimates of regressions examining the effect of the intensity of product market competition on non-pricing loan characteristics. I estimate the specifications in columns 1 and 2 with poisson regressions, the specifications in columns 3 and 4 with probit regressions, and specification 5 with OLS. The dependent variables are the number of financial covenants (column 1); the covenant index constructed along the lines of Bradley and Roberts (2004) (column 2); a dummy variable equal to one if the loan contains restrictions on dividend payments and zero otherwise (column 3); a dummy variable equal to one if the loan is secured and zero otherwise (column 4); the logarithm of the number of lenders in the loan syndicate (column 5). In all specifications, I use the six-digit NAICS Herfindahl-Hirschman Index provided by the Census of Manufacturers (Census HHI) as a proxy for the intensity of product market competition. I demean all firm-secific variables by their six-digit NAICS industry mean. I measure all independent variables as of the quarter prior to the loan start date. The sample period is from 1995 to 2007. Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively. I report the estimates' standard errors adjusted for within-firm clustering in parentheses below the coefficient estimates.

	(1) Fincov	(2) Covindex	(3) Dividend	(4) Collateral	(5) Log(Syndicate)
Census HHI	-0.499^{**}	-0.796^{**}	-2.542^{***}	-1.885^{**}	2.136^{***}
	(0.198)	(0.316)	(0.792)	(0.812)	(0.537)
Log(marketcap)	-0.034^{***}	-0.054^{***}	-0.243^{***}	-0.382^{***}	0.361^{***}
	(0.007)	(0.012)	(0.037)	(0.035)	(0.016)
Market-to-Book	-0.008	-0.056^{***}	0.051	-0.003	-0.105^{***}
	(0.011)	(0.017)	(0.047)	(0.048)	(0.022)
Leverage	0.069	0.549^{***}	0.826^{***}	1.645^{***}	0.697^{***}
	(0.066)	(0.086)	(0.314)	(0.336)	(0.128)
Profitability	0.634^{**}	-0.911^{***}	-1.279	-2.849^{**}	-1.851^{***}
	(0.250)	(0.319)	(1.095)	(1.178)	(0.462)
Net PPE	-0.146^{*}	-0.178	-0.645	-0.506	-0.334^{*}
	(0.088)	(0.127)	(0.396)	(0.403)	(0.178)
Cash Flow Volatility	-1.183^{**}	-1.176	-4.110^{*}	0.455	-0.935
	(0.582)	(0.778)	(2.218)	(2.320)	(1.100)
Zscore	0.006^{**}	0.010^{**}	$0.029**$	0.018	-0.004
	(0.003)	(0.004)	(0.012)	(0.011)	(0.005)
Credit Spread	0.169	-0.189	0.042	1.260^{**}	-0.516^{**}
	(0.146)	(0.187)	(0.604)	(0.588)	(0.253)
Term Spread	0.013	0.046	0.156	0.061	-0.082
	(0.031)	(0.038)	(0.107)	(0.092)	(0.084)
Deal Amount	0.203^{***}	0.530^{***}	0.531^{**}	0.539^{**}	0.791^{***}
	(0.050)	(0.068)	(0.250)	(0.235)	(0.130)
Deal Maturity	0.049^{***}	0.054^{*}	-0.035	-0.265^{***}	0.333^{***}
	(0.018)	(0.028)	(0.084)	(0.086)	(0.058)
Industry fixed-effects	Yes	Yes	Yes	Yes	Yes
Deal type dummies	Yes	Yes	Yes	Yes	Yes
Deal purpose dummies	Yes	Yes	Yes	Yes	Yes
Year-quarter fixed-effects	Yes	Yes	Yes	Yes	Yes
N	2433	2433	2137	2075	2433
Adjusted R^2			0.25	0.35	0.51
Log-Likelihood	-3876.4118	-4145.62			