Product Market Competition and Financing Costs*

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Abstract

This paper empirically investigates how the intensity of product market competition impacts the firms' financing costs. Using a large sample of loans to publicly traded US manufacturing firms, I find evidence that an intensification of product market competition among firms significantly increases the cost of bank loans. Further investigations reveal that this effect is strongest for firms in industries with low asset liquidation values. This finding is consistent with the prediction of recent models which show that a more intense product market competition increases loan spreads by decreasing the firms' liquidation values. Moreover, I find that loans to firms that operate in more competitive industries contain more covenants restricting the firms' financing and dividend policies.

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

JEL Classification: G32, G34

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I Introduction

The globalization and deregulation of economic activities trigger substantial changes in the competitive configuration of industries and lead to an intensification of product market competition. A more intense product market competition, in turn, has implications for firms' financing and investment policies.[1] Recent research has advanced the understanding of the interplay between financial and product markets. The economic link between the intensity of product market competition and the pricing of corporate debt, however, has so far remained unexplored. This paper aims to fill this gap and empirically investigates the cross-sectional relation between the intensity of product market competition and financing costs. Using a sample of loan contracts issued to publicly traded US manufacturing firms, I find strong evidence that an intensification of product market competition increases financing costs and reduces firms' financial flexibility.

Product market competition can affect financial contracts in several ways. 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. In both scenarios, industry structure ultimately impacts the firms' collateral and cash flow risk. If banks rationally anticipate this "competition risk", the design and pricing of bank loans should reflect this source of uncertainty.

Theory suggests that product market competition has direct implications for financial contracting. To shed light on the potential economic mechanisms relating industry

[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)].

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 because a higher intensity of product market competition decreases the firms' liquidation values, banks will price this competition risk rationally by charging higher interest rates. I further argue that banks will not limit themselves to the pricing of this risk through higher interest rates. Banks will 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 predictions, 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. More specifically, a one standard deviation increase in product market competition increases financing costs by about 13 basis points for an average loan in my sample. For an average loan size of USD 340 millions, this difference translates into an additional financing cost 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-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

[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 (2008) 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.

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 of debt pricing. This result reveals an economically important effect of product market competition on 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 the firms' market share, for firms' diversification, for GDP growth, 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 separate source of uncertainty that banks price into bank loans.

Next, I explore in more detail a potential channel through which product market competition may affect loan spreads. In particular, I examine how asset specificity and illiquidity change the impact of product market competition on loan spreads. Consistent with theoretical models that predict a connection between asset liquidity and financing choices [Shleifer and Vishny (1992); Morellec (2001); Myers and Rajan (1998)], 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 financing costs through a channel that is related to an industry's asset liquidity.

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 prediction. Loans to firms in competitive industries tend to have significantly more financial covenants, more general covenants, and more restrictions on dividend payments than loans to firms in concentrated industries. Moreover, banks tend to form smaller syndicates for firms operating in competitive industries. This findings is consistent with the idea 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); Malitz (1986)], the level of creditor protection [Bae and Goyal (2008); Qian and Strahan (2008)], bankruptcy codes [Davydenko and Franks (2008)], asset liquidation values [Benmelech, Garmaise, and Moskowitz (2005)], corporate governance [Chava, Livdan, and Purnanandam (2008); Waisman (2009)], accounting quality [Bharath, Sunder, and Sunder (2008)], and corporate mis-reporting

[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.

[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 directly 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 a potential economic mechanism. Section VI analyzes the effect of product market competition on non-pricing loan characteristics. Section VII discusses implications. Section VIII concludes.

II Hypotheses

I derive the main empirical prediction from a recent strand of dynamic corporate finance models that relate product markets to firms' decisions.[4] These models emphasize important feedback effects from product markets to financing and investment decisions. Specifically, they investigate the effect of product market competition on bond pricing and optimal capital structure [Fries, Miller, and Perraudin (1997)], firm entry, foreclosure, and capital structure [Lambrecht (2001)], firms' financing and exit decisions [Miao (2005)], financial leverage and credit spreads [Zhdanov (2007)], financing and takeover activity [Morellec and Zhdanov (2008)], and firms' investment decisions and asset dynamics [Aguerrevere (2009)].[5]

[4] This paper also relates to the industrial organization literature. For instance, these papers study the optimal entry and exit strategies of firms facing uncertain profits [Dixit (1989); Leahy (1993)], and optimal investment strategies in oligopolies [Grenadier (2002)]. In these papers, the firms are all equity financed, and therefore do not allow to study the effects of competition on debt pricing. A related strand of papers investigates the strategic effect of debt on product market performance [see, for instance, Brander and Lewis (1986); Bolton and Scharfstein (1990)]. These models cannot, however, be used to derive predictions for the pricing of corporate debt.

[5] In a related article, Peress (2009) investigates how competition in firms' product markets influences their behavior in equity markets using a noisy rational expectations model. He shows that more competitive firms yield more risky profits, even though they face the same amount of technological

I follow Fries, Miller, and Perraudin (1997) and Zhdanov (2007) to outline the main economic mechanism that relates the intensity of product market competition to loan spreads. Suppose there is a positive demand shock in an industry and product prices increase. Potential new firms may enter the industry (after paying a fixed investment cost) because they anticipate an increase in firm value. As a result, a larger number of firms operates in a given industry. An increased number of competitors increases the intensity of product market competition and causes the equilibrium output price to fall (or not to rise any further). Hence, the entry of new firms into an industry places an upper bound on output prices. Similarly, a negative demand shock lowers prices and causes some firms to default on their debt obligations. In this event, the ownership and control transfer to debtholders which continue to operate the firm as an all-equity financed entity [Zhdanov (2007)]. If prices decrease even further, firms will find it optimal to leave the industry.

This mechanism of the strategic interaction among firms on the price process has important implications for loan spreads. In particular, a more intense product market competition increases the firms' probability of default in any given period of time. The reason for this effect is an increase in the likelihood that firms hit the default boundary. Furthermore, a more intense product market competition decreases the firms' value at default, because the presence of a reflecting barrier rules out some "good" states of the demand shock. Banks rationally anticipate these effects arising from the strategic interaction of firms and will demand higher loan spreads. The main empirical prediction is as follows:

Prediction 1: Everything else equal, banks charge higher average loan spreads for loans to firms operating in more competitive industries.

The intensity of product market competition impacts loan spreads through two distinct channels. First, product market competition increases firms' probability of default. Second, it decreases the firms' value in default. In view of these effects, and

uncertainty.

everything else equal, the positive effect of product market competition on loan spreads should be strongest for distressed firms and in industries with low liquidation values of assets (high asset specificity and illiquidity).

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 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. The second empirical prediction is as follows:

Prediction 2: Everything else equal, loans to firms in competitive industries contain on average more covenants restricting the financing and dividend policy.

In the following sections I test these predictions and provide strong supportive evidence.

III Empirical Implementation and Data

A The Impact of Product Market Competition on Loan Spreads

To explore the relation between industry structure and financing costs, I examine the effect of the intensity of product market competition on expected loan spreads. I argue that if product market competition increases firms' probability of default and decreases

[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.

firms' default value, then bank loans will ultimately reflect this competition risk along the pricing dimension.

To do so, I follow Chava, Livdan, and Purnanandam (2008), 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 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 (2008) 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

[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 [Nickel (1996); Gaspar and Massa (2006)]. This measure captures to what extent firms are able to price above costs.

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 bank loans. 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). 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 industry effects that may correlate with industry concentration. 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 bank loans. 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 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 loans 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 direct 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 contracting. 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)].[9]

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 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.

[9] 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.

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.[10] Financial covenants are restrictions placed on accounting variables and ratios that firms must maintain while a loan is active.[11]

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 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

[10] 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.

[11] 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.

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 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); Roberts and Sufi (2008); Chava, Livdan, and Purnanandam (2008)].

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 (2008)]. 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 supports the idea 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 financing cost of USD 300'000. 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 second prediction 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 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 loan spread and on other loan characteristics 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 the theoretical prediction. 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).[12] This order of magnitude is similar to the effect of changes in shareholders' rights on loan spreads [Chava, Livdan, and Purnanandam (2008)]. 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 bank financing.

<INSERT TABLE III ABOUT HERE>

[12] The average value 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 (2008); 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. 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 (2008) 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 competition on loan spreads.[13] In line with the findings of Chava, Livdan, and Purnanandam (2008), 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,

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

statistically and economically significant.

<INSERT TABLE IV ABOUT HERE>

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. Below I explore in more detail why this could be the case by relating the findings to firms' asset liquidity [Shleifer and Vishny (1992); Myers and Rajan (1998); Morellec (2001)].

Next, in column 3 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 4 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.

In column 5 of Table IV I include lagged real GDP growth as an additional control variable. The recent credit crisis and economic downturn have shown that the state of the economy has important implications for banks' willingness to provide financing to firms. The coefficient on real GDP growth is negative and significant. The inclusion of this additional control variable, however, does not change the role and importance of the proxy for the intensity of product market competition.

Finally, in column 6 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 6 shows that correcting for self-selection has no bearing on the conclusion. The coefficient on 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 by banks 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 entry costs, and I estimate median regressions. These additional estimations do not change my conclusion, and product market competition continues to relate positively and significantly to loan spreads.

Overall, the results in this section are consistent with the prediction that firms in more competitive industries have higher bank financing costs. 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 Reductions of Import Tariffs

The preceding section has shown that a more intense product market competition relates to higher financing costs. This suggests that firms operating in competitive industries have a higher cost of debt compared to firms in concentrated industries. To examine the robustness of this result, I follow Frésard (2009) and examine the response of financing costs 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. 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>

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 financing costs to rise.

V Product Market Competition, Asset Liquidation Values, and Loan Spread

To shed further light on the relation between the intensity of product market competition and financial contracts, I investigate how the impact of competition risk on loan spreads differs across industries. More specifically, I explore whether the impact of the intensity of product market competition on loan spreads depends on the specificity and illiquidity of an industry's assets.

A potential channel through which product market competition may impact financing costs is by lowering the post-default value of firms [Zhdanov (2007)]. In particular, a lower post-default value of the firms's assets decreases the expected recovery rates for creditors and may increase financing costs. Moreover, depending on the security provisions contained in debt contracts, asset liquidity may increase or decrease financing costs. Hence, asset specificity and illiquidity 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) employ commercial zoning regulation to capture the redeployability or value of assets and find that more redeployable assets receive loans with lower rates. 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 firms in industries with high asset liquidity have a lower cost of capital. In view of these results, the effect of product market competition on loan spreads may depend on the industry's specificity and liquidity of assets.

To examine this conjecture, I interact the Census HHI variable with variables indicating whether or not an industry's assets are specific or illiquid. In so doing, I follow Stromberg (2001) and 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, and 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 asset specificity and illiquidity. Next, I define a dummy variable (Illiquidity) that equals one if the industry illiquidity is above the median, and zero otherwise. Similarly, industry asset specificity (Specificity) equals one if the asset specificity is above the industry median, and zero otherwise. Table VI shows the estimation results.

<INSERT TABLE VI ABOUT HERE>

In columns 2 and 4 of Table VI, the interaction of Census HHI with asset specificity and illiquidity is negative and statistically significant. These interaction results reveal that banks charge a significantly higher loan spread to firms operating in competitive industries with specific or illiquid assets. This finding is consistent with the asset liquidation value channel outlined before. In columns 1 and 3, I include asset specificity and illiquidity as additional control variables, but do not include the 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 financing costs. Note, however, that the direct effect of the Census HHI remains negative and statistically significant.

Overall, this analysis provides evidence that product market competition is especially important for financing costs in industries with specific and illiquid assets. Importantly, this finding supports the conjecture that an intensification of product market competition increases financing costs through a channel that is related to an industry's asset liquidity.

VI Non-Pricing Loan Characteristics

If intense product market competition renders firms' cash flows more risky, banks might incorporate this risk into debt contracts by altering not only the interest rate 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. Column 1 of Table VII reveals that this is indeed the case. The dependent variable is the logarithm of the number of financial covenants. The coefficient on Census HHI is significantly 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 logarithm of the covenant index as defined by Bradley and Roberts (2004). Again, the coefficient on 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.[14]

<INSERT TABLE VII ABOUT HERE>

Next, column 3 of Table VII 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 0.60 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

[14] Results are very similar when I instead use poisson regressions to estimate the effect of product market competition on the number of covenants.

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 debtholders' 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 VII 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 10 percentage points (significant at 1 percent). 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 credit risk. 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 VII suggest that banks incorporate the risk that arises from more intense product market competition by including more financial and dividend covenants. This is consistent with the prediction that covenants should

be stricter in firms and industries where cash flows are volatile and uncertain [Gârleanu and Zwiebel (2009)].

VII Discussion

The results in this paper suggest that an intensification of product market competition increases financing costs. It therefore seems that banks rationally price the risk of product market competition by charging higher interest rates. I identified the industry's asset liquidation values as a potential channel through which product market competition affects loan spreads.

What is remarkable, however, is that the effect of competition risk on loan spreads is not subsumed by traditional accounting and market determinants of spreads. More specifically, even after controlling for Altman's zscore, for financial leverage, or for the market value based expected default frequency and asset volatility, the intensity of product market competition remains a significant determinant of loan spreads. A potential explanation for this finding is that information about rivals and about optimal financing and investment policy is difficult and costly to gather when a large number of firms exists as in a competitive industry. As a consequence, in these industries market participants may not be able to fully internalize the negative externality of industry competition on the riskiness of cash flows and firms' collateral and hence on the pricing and structure of bank loans.

By contrast, loan officers with in-depth knowledge of the company may have another layer of information available which the average investor does not have. As a result, banks might be better at estimating what matters most for them: will a firm generate enough future cash flows to service debt payments and to fully repay debt? The average market participants may fail to fully anticipate the effect of product market competition on cash flows, asset prices, and financial contracts.

This interpretation is in line with the findings of Schenone (2009), who investigates lending relationships of banks prior and after firms' IPOs. She finds evidence that banks

exploit their information advantage prior to an IPO by charging higher interest rates. This interpretation is also consistent with the results of Hoberg and Phillips (2009), who investigate how product market competition affects firms' cash flows and stock returns in industry booms and busts. Whereas Hoberg and Phillips (2009) provide evidence consistent with the notion that market participants in competitive industries do not fully internalize the negative externality of industry competition on cash flows and stock returns, my findings in this paper provide evidence that the same may be true for the pricing and design of financial contracts.

VIII Conclusions

In this paper I empirically explore the relation between the intensity of product market competition and financing costs. I provide evidence that banks charge 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 after reductions of import tariffs.

Further investigations reveal that the effect of product market competition is strongest for firms in industries with specific and illiquid assets. These findings suggest that an important channel through which product market competition impacts the pricing of corporate debt is through the firms' liquidation value. This interpretation is consistent with recent models showing that a more intense product market competition increases loan spreads by decreasing firms' liquidation value.

Finally, I show that banks include more covenants and form smaller loan syndicates for loans to firms in more competitive industries. These results suggest that banks incorporate competition risk along the pricing and non-pricing dimension.

Overall, 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 loan across the 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)	2505	178.40	150.00	129.69	14.00	1180.00
Loan Maturity (months)	2505	61.19	38.00	680.70	2.00	24144.00
Loan Amount (Mio. USD)	2505	342.00	120.00	691.00	0.14	10000.00
Loan Amout to Total Assets	2501	0.28	0.22	0.19	0.02	1.00
Syndicate Size	2505	7.21	4.40	8.62	1.00	141.00
Secured Dummy	2195	0.66	1.00	0.47	0.00	1.00
Dividend Restriction	2251	0.80	1.00	0.40	0.00	1.00
Nb. of Financial Covenants	2505	2.69	3.00	1.17	1.00	7.00
Covenant Index	2505	2.51	2.00	1.80	0.00	6.00
Max. Capital Expenditures	2406	0.24	0.00	0.43	0.00	1.00
Max. Debt to EBITDA	2406	0.50	1.00	0.50	0.00	1.00

Panel B: Borrower Characteristics

Total Assets	2501	2124.33	488.89	5099.44	3.13	60058
Cash to Total Assets	2501	0.08	0.04	0.11	0	0.83
Tangible Net Worth	2499	733.94	173.73	1670.18	−1680.5	17021.1
Debt to Total Assets	2490	0.28	0.27	0.19	0	1.04
Debt to Operating Income	2447	9.08	7.09	18.08	−78.38	94.4
Market-to-Book Ratio	2488	1.47	1.13	1.2	0.32	14.5
Net PPE	2501	0.27	0.23	0.16	0	0.75
Cash Flow to Total Assets	2458	0.03	0.03	0.04	−0.41	0.12
Net Working Capital	2478	0.27	0.26	0.14	−0.09	0.7
Capex to Total Assets	2473	0.01	0.01	0.01	0	0.09
R&D to Sales	2504	0.05	0	0.31	0	13.13
Cash Flow Volatility	2505	0.02	0.01	0.02	0	0.2
Asset Volatility	2331	0.54	0.46	0.32	0.11	4.66
Expected Default Frequency	2331	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	2436	0.072	0.057	0.059	0.001	0.3
Four-Firm Ratio	2505	41.097	40.7	18.375	0	99.5
Nb. of Firms	2505	809.897	491	1261.935	8	18015
Comp. Nb. Firms	2505	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. 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*	0.00
Covenant Index	2.65	2.00	2.42	2.00	0.23**	0.00
Dividend Restriction	0.84	1.00	0.76	1.00	0.08***	0.00
Secured Dummy	0.70	1.00	0.63	1.00	0.07***	0.00
Syndicate Size	6.07	4.00	8.55	5.00	−2.48***	−1.00**
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)	1006.69	340.92	3043.30	634.81	−2036.61***	−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***	0.00
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**	0.00
Covenant Index	2.68	2.00	2.39	2.00	0.29***	0.00
Dividend Restriction	0.84	1.00	0.75	1.00	0.09***	0.00
Secured Dummy	0.70	1.00	0.62	1.00	0.08***	0.00
Syndicate Size	6.08	4.00	8.64	5.00	−2.56***	−1.00***
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)	1032.70	342.70	3080.32	687.79	−2047.62***	−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***	0.00
Average Number of Deals	853	853	801	801		

Table III: Product Market Competition and Financing Costs

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, and 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	2436	2436	2432	2505	2505	2501
Adjusted R-squared	0.33	0.48	0.54	0.33	0.47	0.53

Table IV: Product Market Competition and Financing Costs: 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 Market Share as the proportion of firm i's sales to total industry sales in the six-digit NAICS industry. Real GDP Growth is the quarterly GDP growth. Diversification is a dummy variable equal to one if a firm operates in more than one segment, and zero otherwise. In column 6, Mills 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)
Census HHI	−1.850***	−1.265***	−1.184***	−0.901**	−1.186***	−0.932***
	(0.476)	(0.396)	(0.388)	(0.457)	(0.391)	(0.199)
Log(marketcap)	−0.163***	−0.178***	−0.201***	−0.197***	−0.201***	−0.154***
	(0.020)	(0.013)	(0.012)	(0.013)	(0.011)	(0.010)
Market-to-Book	−0.082**	−0.041**	−0.033*	−0.013	−0.032*	−0.083***
	(0.035)	(0.020)	(0.019)	(0.020)	(0.019)	(0.015)
Leverage	0.770***	0.451***	0.520***	0.485***	0.520***	0.874***
	(0.186)	(0.120)	(0.096)	(0.113)	(0.096)	(0.090)
Profitability	−1.922**	−1.579***	−1.474***	−1.506***	−1.473***	−0.890***
	(0.800)	(0.360)	(0.321)	(0.364)	(0.321)	(0.326)
Net PPE	0.122	−0.142	−0.208	−0.288**	−0.208	−0.375***
	(0.266)	(0.136)	(0.131)	(0.142)	(0.131)	(0.112)
Cash Flow Volatility	−2.876	−1.723**	−0.631	−0.070	−0.633	−0.430
	(1.843)	(0.856)	(0.791)	(0.854)	(0.789)	(0.653)
Zscore	0.017**	0.008	0.009**	0.008*	0.009**	0.008**
	(0.008)	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)
Term Spread	−0.037	0.134***	0.115***	0.103*	0.201***	0.182***
	(0.058)	(0.044)	(0.040)	(0.055)	(0.049)	(0.039)
Deal Amount	0.213	0.256***	0.225***	0.163*	0.225***	0.268***
	(0.153)	(0.086)	(0.082)	(0.096)	(0.081)	(0.068)
Deal Maturity	−0.191***	−0.155***	−0.178***	−0.190***	−0.178***	−0.148***
	(0.053)	(0.031)	(0.031)	(0.040)	(0.031)	(0.025)

continued on next page

Table IV: continued

	(1)	(2)	(3)	(4)	(5)	(6)
GIM Index Dummy	-0.120^{**}					
	(0.047)					
EDF		0.151^{**}				
		(0.076)				
Asset Volatility		0.236^{***}				
		(0.063)				
Market Share			-0.003			
			(0.067)			
Diversification				-0.078^{*}		
				(0.042)		
Real GDP Growth					-0.058^{***}	
					(0.018)	
Mills						0.684^{***}
						(0.06)
Industry fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Deal type dummies	Yes	Yes	Yes	Yes	Yes	Yes
Deal purpose dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
N	1148	2248	2432	1602	2432	78667
Adjusted R2	0.53	0.54	0.54	0.49	0.54	
P-value (chi-square)						0

Table V: Reductions of Import Tariffs and Financing Costs

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	1002	1002	1002	1002
Adjusted R-squared	0.56	0.56	0.56	0.56

Table VI: Product Market Competition, Asset Liquidation Values, and Financing Costs

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	−1.206***	0.029	−1.134***	0.041
	(0.391)	(0.467)	(0.380)	(0.449)
Illiquidity	−0.114**	0.006		
	(0.048)	(0.062)		
Census HHI × Illiquidity		−1.825***		
		(0.646)		
Specificity			−0.117**	0.014
			(0.046)	(0.058)
Census HHI × Specificity				−1.833***
				(0.629)
Log(marketcap)	−0.201***	−0.202***	−0.202***	−0.202***
	(0.011)	(0.011)	(0.011)	(0.011)
Market-to-Book	−0.032*	−0.032*	−0.034*	−0.033*
	(0.019)	(0.018)	(0.019)	(0.018)
Leverage	0.517***	0.519***	0.525***	0.522***
	(0.097)	(0.097)	(0.096)	(0.096)
Profitability	−1.490***	−1.491***	−1.480***	−1.480***
	(0.319)	(0.318)	(0.324)	(0.319)
Net PPE	−0.219*	−0.222*	−0.213	−0.211
	(0.132)	(0.131)	(0.131)	(0.131)
Cash Flow Volatility	−0.541	−0.469	−0.554	−0.481
	(0.789)	(0.769)	(0.779)	(0.761)
Zscore	0.009**	0.009**	0.009**	0.009**
	(0.004)	(0.004)	(0.004)	(0.004)
Term Spread	0.110***	0.105**	0.116***	0.109***
	(0.040)	(0.041)	(0.040)	(0.041)
Deal Amount	0.225***	0.214***	0.210***	0.207***
	(0.081)	(0.080)	(0.080)	(0.080)
Deal Maturity	−0.176***	−0.175***	−0.175***	−0.174***
	(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	2432	2431	2432	2431
Adjusted R-squared	0.54	0.54	0.54	0.54

Table VII: 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 various loan characteristics. The dependent variables are the logarithm of the number of financial covenants (column 1); the logarithm of 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 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) Log(Fincov)	(2) Log(Covindex)	(3) Dividend	(4) Collateral	(5) Log(Syndicate)
Census HHI	−0.415***	−0.709***	−2.542***	−1.885**	2.136***
	(0.146)	(0.251)	(0.792)	(0.812)	(0.537)
Log(marketcap)	−0.023***	−0.064***	−0.243***	−0.382***	0.361***
	(0.006)	(0.010)	(0.037)	(0.035)	(0.016)
Market-to-Book	−0.007	−0.023*	0.051	−0.003	−0.105***
	(0.009)	(0.013)	(0.047)	(0.048)	(0.022)
Leverage	0.033	0.438***	0.826***	1.645***	0.697***
	(0.052)	(0.077)	(0.314)	(0.336)	(0.128)
Profitability	0.511***	−0.382	−1.279	−2.849**	−1.851***
	(0.192)	(0.260)	(1.095)	(1.178)	(0.462)
Net PPE	−0.102	−0.144	−0.645	−0.506	−0.334*
	(0.070)	(0.108)	(0.396)	(0.403)	(0.178)
Cash Flow Volatility	−0.855*	−0.790	−4.110*	0.455	−0.935
	(0.446)	(0.615)	(2.218)	(2.320)	(1.100)
Zscore	0.005**	0.008**	0.029**	0.018	−0.004
	(0.002)	(0.003)	(0.012)	(0.011)	(0.005)
Credit Spread	0.083	−0.134	0.042	1.260**	−0.516**
	(0.106)	(0.159)	(0.604)	(0.588)	(0.253)
Term Spread	0.013	0.034	0.156	0.061	−0.082
	(0.021)	(0.034)	(0.107)	(0.092)	(0.084)
Deal Amount	0.167***	0.429***	0.531**	0.539**	0.791***
	(0.040)	(0.063)	(0.250)	(0.235)	(0.130)
Deal Maturity	0.041***	0.018	−0.035	−0.265***	0.333***
	(0.014)	(0.022)	(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-squared	0.21	0.36	0.25	0.35	0.51