

# Bank Information and Firm Growth: Microeconomic Evidence from the US Credit Market

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## Abstract

We investigate the impact that banks' information on borrowing firms has on firm-level growth using matched bank-firm data from the U.S. credit market. Exploiting the structure of lending syndicates to construct proxies for banks' information acquisition, we find consistent evidence that banks' information spurs firms' tangible and intangible investments, promoting better growth outcomes. We find limited evidence of banks' exploitation of informational monopolies that could deter firms' investment, even when banks hold significant credit market power. Banks' information does not appear to bias firm growth towards capital-intensive investments, but rather fosters employment growth.

**Keywords:** Firm Growth, Banks, Information, Syndicates.

**JEL codes:** G21; L25

## 1 Introduction

Banks are important providers of external finance to firms. Through their monitoring activities, they can facilitate the access of businesses to external funding, thus enabling firms to undertake investment opportunities (King and Levine, 1993b; Boot, 2000; Ongena and Smith, 2000). Since the pioneering work of Diamond (1984), for example, several studies have stressed that banks can act as delegated monitors of dispersed stakeholders by acquiring information on their borrowers, and during their monitoring process they can also learn by lending, becoming important information producers about firms. Banks can also offer advice and consulting services to their client firms, helping firms to undertake more innovative and growth-enhancing strategies. On the

negative side, however, it is argued that banks can also exploit their superior information of client firms to extract rents from them, thus discouraging businesses from carrying out profitable but costly investments (Rajan, 1992; Santos and Winton, 2008; von Thadden, 2004).

In light of these contrasting forces, the influence of the banking system on firms' growth is intensely debated. A broad body of studies have focused on evaluating the empirical relation between the level of financial intermediary development and economic growth, total factor productivity growth, physical capital accumulation, and private savings rates (see, e.g., Beck et al., 2000; Guiso et al., 2004). Guiso et al. (2004), for instance, uncover a positive impact of financial development on firm entry, competition, and aggregate growth, while Benfratello et al. (2008) detect a beneficial effect of banking development on firm innovation. Most of these studies rely on detailed indicators of development of the banking sector, such as the diffusion of banks and the extension of their branch networks, the types of banking institutions involved, and the geographical and functional distance between banks and firms.

While the above evidence on the overall beneficial effects of banking development is quite established, few papers have investigated how banks' information collection affects firm growth. These observations lead to fundamental questions. Does banks' acquisition of information promote firms' growth through monitoring activities and the provision of consultancy services? Or rather it tends to depress firms' growth because of hold-up issues? Answering these questions can yield new insights about the "intensive margin" effects of banks' superior information on firm-level growth outcomes and help policy makers to design suitable interventions in the credit market.

The aim of this paper is to fill this gap in the literature by employing granular syndicated loan data matched with firm-level and bank-level data. We study the impact that (proxies for) banks' information on borrowing firms have on a variety of dimensions of firms' growth, including sales and employment growth, and R&D expenditures. Then, we try to establish under what conditions a more intense acquisition of information by banks facilitates or hinders the growth of a business.

As noted, the theoretical literature predicts contrasting effects of banks' information acquisition on firms' growth. On the one hand, through their monitoring activity banks could be able to mitigate misbehavior on the part of entrepreneurs, managers, or employees. By reducing

the cost of acquiring information, financial intermediaries improve the monitoring of investment projects, thereby increasing the efficiency of resource allocation and promoting growth. A related but distinct channel through which banks can positively influence borrowing firms' growth consists of the provision of consultancy services. Banks could have sophisticated knowledge about innovation and growth opportunities which they could transmit to their clients (King and Levine, 1993b; Herrera and Minetti, 2007). As shown by King and Levine (1993b), informed banks may help firms evaluate the best innovation strategies, by revealing more accurately the potentially large profits associated with uncertain innovation activities.

On the negative front, a large literature has stressed the possibility for banks to extract rents from their informational monopolies vis-à-vis borrowing firms. The proprietary information about borrowers that banks gather as part of their activities may induce them to charge (ex post) high loan interest rates (see Sharpe, 1990, and von Thadden, 2004). The threat of being "locked-in", or informationally captured, by its lending banks may then make a borrowing firm reluctant to undertake potentially valuable investment opportunities. This hold-up issue could be especially relevant for firms that plan to grow. Rajan (1992) and Thakor (1996) show that the returns to firm investments are eroded by the rent extraction associated with banks' hold-up power. More recently, Santos and Winton (2008) confirm this finding and show that rent extraction is particularly relevant during a crisis.<sup>1</sup>

In order to address our research question, we use detailed data on U.S. syndicated loans drawn from Thomson Reuters LPC DealScan. The DealScan database provides rich information on characteristics of the loans, including their maturity, amount, backing with collateral, and spread. It also offers detailed information on the banks involved in the lending syndicates, their roles, and the share of the loans that banks hold. Using the DealScan information, we are then able to construct proxies for the information acquisition effort of banks in the syndicates, as discussed below. We match the data in DealScan with detailed information on borrowing firms from the Standard and Poor's Compustat database and with information on banks' balance sheets from

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<sup>1</sup>Banks could also discourage growth by redirecting funds to firms with less ambitious investments. For example, informed lenders can inhibit innovation opportunities, and hence growth, when they are risk averse and their information is specific to an existing technology (Minetti, 2010).

the FDIC Call Reports. After the matching of the three databases, our data set covers about 23,500 loans extended to nearly 5,500 non-financial firms that operate in 64 industries (two-digit SIC) from 1987 until 2014. We then investigate the effects of banks' information acquisition on firms' growth effort and outcomes up to the year 2017.

Following a broad literature (see, e.g., Sufi, 2007; Giannetti and Laeven, 2012), as a proxy for banks' monitoring effort, we use the share of syndicated loans retained by lead arrangers. The larger its loan share, in fact, the higher the incentive for a lead arranger to actively monitor the borrowing firm (Sufi, 2007). The granularity and multilevel structure of our matched data set enables us to test the impact of (this proxy for) banks' monitoring on a firm's growth. We use several approaches to address the concern that alternative mechanisms could drive the results. First, we include a rich set of controls. Second, we saturate the specifications with granular bank-time, industry-time, and bank-firm fixed effects. These fixed effects control for a wide range of unobserved factors such as a bank's time-varying unobserved conditions (like credit supply), an industry's time-varying unobserved conditions (like fundamentals, including overall demand for credit), and bank-firm matching. We also contrast the effect of our proxy for banks' monitoring with that of proxies for the hold-up power associated with banks' information, using data on the exclusivity of bank-firm relationships. Finally, we take a step towards separating the possible effects of bank monitoring activities strictly intended from those driven by banks' consulting services.

Our results support the view that banks' monitoring positively influences firm-level growth, spurring both growth effort and growth outcomes. We find that a larger share of loans retained by lead arrangers, our proxy for banks' monitoring, is associated with higher growth of borrowing firms' employment, R&D expenses, and sales, though we find more limited evidence that banks' monitoring effort is associated with higher firm profitability. The results also suggest that the positive effect of bank monitoring on firm growth arises even when accounting for banks' consultancy services. Further, while hold-up issues appear to be present in our data, we find limited evidence that hold-up issues dilute the positive impact of banks' monitoring on firm growth.

The disaggregated nature of our data allows us to explore the differential effect of banks' information across different types of borrowers as well as different banks. First, we study whether

the positive effects of banks' monitoring are stronger for firms traditionally viewed to be more informationally opaque and more reliant on bank financing. Second, we differentiate firms based on specific characteristics of their lending banks. In particular, we focus on banks' financial health, measured by their capitalization, and on banks' market power. Third, as banks' monitoring may be more precise when firms produce relatively simple products, we distinguish sample firms on the basis of the complexity of their products. The results suggest that banks' monitoring especially promotes the growth of more informationally opaque businesses, particularly when banks are better capitalized (hence, plausibly less risk averse). We believe that overall these results can be relevant both for understanding the influence of the credit market on firm growth and for helping design banking policies that promote firm growth.

The remainder of the paper unfolds as follows. Section 2 relates the analysis to prior literature and lays out testable hypotheses. In Section 3, we describe data sources, measurement, and empirical strategy. In Section 4, we review sample properties and summary statistics. Section 5 presents the main results. In Section 6, we consider extensions and robustness tests. Section 7 concludes. Additional results are relegated to the Appendix.

## 2 Underpinnings and Hypotheses

In this section, we lay out testable hypotheses building on the findings and predictions of prior literature.

*Banks' monitoring and consultancy mechanisms.* Since the pioneering study of Diamond (1984), a broad literature has stressed that banks can act as delegated monitors on behalf of dispersed stakeholders. By reducing the costs of acquiring information, financial intermediaries improve the selection and monitoring of investments, possibly increasing the efficiency of resource allocation and growth. In this sense, banks serve as corporate monitors who pay the costs of becoming informed about their client firms and who try to ensure that firm managers undertake efficient actions to exploit growth opportunities. From an empirical viewpoint, there is substantial evidence that banks gather private information about their borrowers (Boot, 2000; Ongena and Smith, 2000), and that this information is crucial to determine firms' credit terms and availability.

Using U.S. data, Petersen and Rajan (1994) find that continuous, relationship-based proxies for banks' information, such as the length of the credit relationship, help to predict the availability of external finance. Using the same data, but restricting the attention to lines of credit, Berger and Udell (1995) find that the length of the credit relationship helps to predict the loan rate and the amount of collateral required. Similarly, Hellmann et al. (2003) document that U.S. banks that invest in venture capital to build relationships with potential banking clients grant loans to these clients at a lower interest rate. More recently, by relying on syndicated loan data, Botsch and Vanasco (2019) uncover evidence that banks acquire relevant information about borrowers through their lending activity and that this information is incorporated into loan contracts.

Despite the above evidence, the effects of banks' information on firm growth are far from being clear-cut. For samples of Japanese and German enterprises, Weinsten and Yafeh (1998) and Agarwal and Elston (2001) reject the hypothesis that main bank clients grow more rapidly than other firms. Similarly, Shin and Kolari (2004) cannot find any association between firm growth and banking relationships. By contrast, Gambini and Zazzaro (2013) suggest that long-lasting lending relationships, which can be associated with greater information acquisition, stimulate small firms' growth.

Besides the monitoring channel, banks can positively influence the growth of firms also through the provision of consultancy services. Banks could have sophisticated knowledge about markets to be explored, as well as innovation and growth opportunities, which they could transmit to their clients (Herrera and Minetti, 2007). As shown by King and Levine (1993b), informed banks may help firms to evaluate the best innovation strategies, by revealing more accurately the potentially large profits associated with uncertain innovation activities. In the same manner, banks could support firms' internationalization decisions, which are shown to be associated with productivity gains (Manova, 2013).

Based on the above evidence and theories, our first hypothesis can be summarized as follows:

*Hypothesis 1.* Banks' information acquisition can positively affect firms' growth. By improving the monitoring of investment projects, and by providing consultancy services to their borrowers, banks may increase the efficiency of resource allocation and growth.

*The hold-up mechanism.* A growing literature has stressed the possibility for banks to extract rents from their informational monopolies over firms. As first argued by Sharpe (1990), the proprietary information acquired during their monitoring processes may allow banks to charge high loan interest rates on their borrowers. Rajan (1992) and Thakor (1996) show that the returns of firm investments are eroded by the rent extraction associated with banks' hold-up power. Santos and Winton (2008) confirm this finding and show that rent extraction is particularly severe during a crisis. The threat of being informationally captured by its lending bank may then make a firm reluctant to borrow from banks. In addition, the informationally captured borrower may rationally anticipate that much of his investment surplus will be extracted by the bank. As a consequence, he can reduce his growth effort by deciding to engage in less dynamic technological processes and products (Rajan, 1992).

A related channel through which banks' information may discourage firms' growth is banks' incentives to redirect funds to firms with less ambitious investments. For example, as empirically tested by Minetti (2011), informed lenders can inhibit innovation opportunities, and hence growth, when they are risk averse and their information on an existing technology is not transferable to a new one.

Based on these theories, our second hypothesis can be stated as follows:

*Hypothesis 2.* Banks' information acquisition can negatively affect firms' growth because of hold-up problems. Informationally captured firms may be reluctant to invest in growth-enhancing projects. Moreover, banks' risk aversion may lead lenders to redirect funds to firms with less ambitious investments.

*The influence of firm and bank characteristics.* The impact of banks' information acquisition on firms' growth may vary depending on characteristics of the lender and the borrowing firm. For example, prior literature has demonstrated that banks' monitoring activities are more relevant for informationally opaque firms, which do not benefit from the discipline imposed by financial markets and auditors, and are not scrutinized by the financial press (Berger and Udell, 1995; 2006; Agarwal and Hauswald, 2010). As a result, the positive effect of banks' monitoring on firms' growth may be stronger for such firms. But informationally opaque businesses could also

be more exposed to capture on the part of banks, thus being more subject to hold up and rent extraction (Rajan, 1992). If this is the case, such firms could reap less benefits when investing in growth-enhancing opportunities, suggesting that a negative relationship between banks' information acquisition and firms' growth arises.

Another relevant firm-level dimension that could affect the impact of banks' information on firms' growth is the complexity of the activities that firms undertake. As for informational opacity, in this case we also expect an ambiguous effect on the link between banks' information and firms' growth. On the one hand, bank information is more accurate when the firm operates in relatively simple markets (Herrera and Minetti, 2007). Hence, the positive impact of banks' monitoring on firms' growth may be more pronounced for such businesses. Moreover, the degree of product complexity of the firm could also reinforce hold-up problems. Firms in complex sectors may encounter more difficulties in establishing relationships with other banks and could then be more exposed to be extracted rents from their main lenders. On the other hand, the consultancy role of banks may be more useful in sectors characterized by greater product complexity, where specialized information producers can provide more valuable insights to borrowing firms (King and Levine, 1993b; Manova, 2013).

As for bank-specific characteristics, the empirical literature has investigated how banks' financial conditions affected firms' investment decisions during the last financial crisis. By combining information on banking relationships and employment on 2,000 non-financial firms during the 2008-2009 crisis, Chodorow-Reich (2014) finds that firms that had pre-crisis relationships with less healthy lenders had a lower likelihood of obtaining a loan following the Lehman bankruptcy, and reduced employment by more compared to pre-crisis clients of healthier lenders. Similarly, by focusing on the solvency problems of Spain's weakest banks in the Great Recession, Bentolila et al. (2018) show that firms borrowing from weak lenders experienced a strong employment loss between 2006 and 2010, in comparison to firms borrowing from healthy banks. From our perspective, whether the effect of banks' information on firms' growth depends on the financial status of the banks is a priori ambiguous. On the one hand, a bank experiencing bigger solvency stress could be more inclined to carefully monitor client firms (Cingano et al., 2016). One could then expect banks' monitoring to be particularly conducive to firms' growth when banks are less



healthy. On the other hand, banks' risk aversion could be stronger when the banking institution is close to its minimum capital position. In this case, banks that monitor more intensely could be more inclined to deter firms from exploiting growth opportunities.

Finally, the relationship between banks' information and firms' growth may be driven by banks' market power. When banks have stronger power in the credit market, the hold-up problem and the resulting rent-extraction ability of banks could be more severe. Hence, the negative impact of banks' information acquisition on firms' growth may be amplified when banks have larger credit market shares.

Based on these considerations, we can formulate our third hypothesis as follows:

*Hypothesis 3.* The impact of banks' information acquisition on firms' growth may depend on the level of firms' informational opaqueness and their product complexity, and on banks' financial status and market power. In particular, it is a priori ambiguous how firms' opaqueness, product complexity, and banks' financial status affect the relationship between banks' information and firms' growth. As for banks' market power, this may amplify the negative impact of banks' information on firms' growth.

### **3 Data and Empirical Strategy**

#### **3.1 Data sources**

We combine information from various data sources to carry out our empirical investigation. Our main source of information consists of the Thomson-Reuter's LPC DealScan database. This database provides detailed information on characteristics of syndicated loans extended in the U.S. credit market, including their maturity, amount, backing with collateral, spread, etc. The DealScan database also offers detailed information on the banks involved in the syndicates, their roles, and the share of the loans held by banks. Using the DealScan information, we are then able to construct proxies for the participation of banks in the syndicates, as detailed below. We match the detailed information in DealScan with data from the Standard and Poor's Compustat database to recover rich information on firms and their growth. The matching is performed by

using the link in Chava and Roberts (2008). Further, we match the DealScan data with the FDIC Call Reports to expand the information on banks' balance sheets. We carry out the initial matching of DealScan with the Call Reports through a fuzzy merge algorithm based on names and locations. We next review manually all the matching results. This matching links the ID of a DealScan's lender with the commercial bank ID and provides a unique linkage for each lending bank.

We perform some cleaning of our matched data set to ensure that we do not include instances in which banks' information acquisition is bound to play no role in driving firm-level growth and performance. One such scenario regards loans that are sold in the secondary market after origination. Banks are unlikely to perform monitoring on loans that are expected to be sold after origination. We thus exclude term loans B because banks do not retain these loans after the syndication, as these loans are almost entirely sold in the secondary market (Ivashina and Sun, 2011). We also focus on lead arrangers that consist of banking institutions, excluding loans that are entirely extended by non-banks.

We finally apply a number of other adjustments to our data set. First, we focus on the package level instead of a facility level. Focus on a facility-loan level would generate a selection bias in the numbers of repeated interactions because we would sum the same bank members over multiple loan facilities within a loan package. Further, we exclude loan packages to financial firms and utilities (public services). Finally, in the same line of Roberts (2015), we exclude loans that are likely to be amendments to existing loans. DealScan misreports these loans as new loans though they do not involve new money.

After matching the three databases, and cleaning the data in the way detailed above, our data set covers about 23,500 loans extended to nearly 5,500 non-financial firms that operate in 64 industries (two-digit SIC) during the 1987-2014 period.<sup>2</sup> We investigate the effects on firms' growth for a period up to 2015 or 2017, depending on specifications of the empirical models.

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<sup>2</sup>The exact number of observations on which we perform our estimations depends on the data availability for the single variables used in the analysis.

## 3.2 Measurement

**A brief overview of the syndicated lending market.** The syndicated lending market constitutes a suitable testing ground to isolate the role of banks' acquisition of information. First of all, syndicated loans account for a substantial portion of the total credit granted by banks to non-financial businesses (Sufi, 2007). Second, the design and structure of syndicated loans provides a suitable way to construct proxies for banks' information acquisition effort.

The arrangement of a syndicated loan generally takes place in the following manner. A firm seeking external financing stipulates an agreement with a bank (or other financier) which acts as the lead arranger of the loan.<sup>3</sup> The contractual agreement specifies a range of features of the loan, including its size, the number and type of covenants associated with the loan, and whether there is collateral backing the loan. The lead arranger can then invite other financiers to cofinance the loan. While these participant lenders can offer suggestions on the syndication process and perform some information acquisition activities, the lead arranger maintains a critical role in the activity of information acquisition on the borrower.

**Measuring banks' information.** Our main independent variable of interest consists of a proxy for banks' information that primarily capture banks' *monitoring* role (although we do not exclude it can also capture other functions, as we elaborate below). A broad number of prior studies consider the structure of loan syndicates as a suitable proxy for banks' incentives to monitor borrowers. In particular, a frequently used proxy of bank monitoring in the literature is the share of the syndicated loan in the hands of the lead arranger of the loan. The larger the loan share retained by the lead arranger, the more the lead arranger will have "skin in the game" and, hence, the incentive to monitor actively the borrower to avoid loan losses. The underlying argument is that, while participant lenders can somehow contribute to the monitoring tasks, they are in a less suitable position to exert monitoring of the borrower. Thus, allocating a larger share to the lead arranger will leverage on its superior ability to monitor.<sup>4</sup> Specifically, the allocation of

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<sup>3</sup>The borrowing firm pays an up-front arrangement fee to the lead arranger for its role in coordinating the loan syndication.

<sup>4</sup>Clearly, if the monitoring effort were verifiable for third parties, this issue would not arise. However, monitoring is hardly verifiable in courts.

share to the lead arranger will trade off the higher monitoring incentive associated with a larger lead share with the lower diversification induced by higher loan concentration in the hands of the lead arranger. Consistent with these arguments, several empirical studies use the lead share as a proxy for the intensity of monitoring of the lead arranger (see, e.g., Dennis and Mullineaux, 2000; Mullineaux, 2004; Jones et al., 2005; Sufi, 2007; Focarelli et al., 2008; Lee et al., 2009; Ivashina, 2009; Amiram et al., 2016).

We are also interested in contrasting the effects of bank monitoring with the less benign consequences of banks' information accumulation possibly due to *hold-up* issues. Our second independent variable thus aims at capturing hold-up issues. Following Rajan (1992), we rely on a measure of relationship lending, namely the number of loans a bank has granted to the borrowing firm in the five years prior to the current loan. Exclusive credit relationships could accentuate hold-up issues, inhibiting firms' ability to tap external financiers (due to lock-in effects).

Finally, we consider proxies for the *consultancy services* that banks provide to firms.<sup>5</sup> To construct a first proxy, we consider variation at the loan level using the purpose of the loan. Loans aimed at financing mergers and acquisitions are plausibly associated with a more prominent role of banks in offering consultancy and advice to firms. To construct a second, alternative proxy, we consider bank activities outside the loan market. Specifically, we consider the banks' share of non-interest income, in which higher values indicate a higher involvement in non-lending activities (underwriting and advising revenues). We define a dummy that equals one if the bank's share of non-lending income is above the median of all banks and zero otherwise.<sup>6</sup>

**Measuring firms' growth.** Our key dependent variables consist of measures of firm growth, which capture both the input stage and the outcome of firms' growth efforts (see Table 1 for a description of all the variables). At the input stage, we consider the growth rate of R&D expenses and the growth rate of employment (number of employees) of the firm. At the outcome stage, we consider the growth rate of total assets and of the net sales (turnover). In all cases, in our main tests, to measure the growth rate we compute the percentage change from the year of origination

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<sup>5</sup>Later in the paper, we will also look at possible risk aversion measures.

<sup>6</sup>In the empirical analysis, to tease out the contribution of bank consultancy services, we will interact these loan-level and bank-level indicators for the relevance of consultancy services with our proxy for banks' monitoring.

of the loan to the following year. We further consider proxies for firms' performance, including the growth of the firm's return on assets (ROA) and (as an inverse indicator of performance) the growth of the book debt divided by total assets. In sensitivity analysis, we also consider the firm's earnings before interest, taxes, depreciation, and amortization (EBITDA). In additional tests, we expand the possible horizon of influence of banks' information, considering the growth rates of the above variables over a three-year horizon.

**Control variables.** We include a broad battery of control variables that could drive firms' growth and investment opportunities. We include several loan-level controls that could impact the investment and growth opportunities of the borrowing firm. These comprise the degree of collateralization of the loan (a dummy variable equal to one if the loan is backed by collateral, and zero otherwise), the loan duration (maturity), the number of general covenants associated with the loan, and a dummy variable taking the value of one if the loan has performance pricing provisions, and zero otherwise. We also control for firm-level characteristics that could influence the borrowing firm's investment and employment decisions and its growth outcomes. These include a proxy for the asset tangibility of the firm (fixed assets to total assets ratio), the firm's Z-score, and an indicator for the firm's current performance (return on equity).

As detailed below in the description of the empirical model, we further saturate the model with detailed fixed effects that capture time-invariant and time-varying characteristics of the industry in which the firm operates as well as time-invariant and time-varying characteristics of the lending bank.

### 3.3 The baseline empirical models

We estimate the following main empirical model to test the impact of banks' monitoring effort on firms' growth effort and growth outcomes (Hypothesis 1):

$$Growth_{bjt} = \alpha + \beta Bank\_Monit_{bit} + \gamma X_i + \delta Z_{jt} + \eta_{bt} + \nu_{kt} + \epsilon_{bjt}. \quad (1)$$

We also estimate an alternative model to test the impact of banks' hold-up issues (Hypothesis 2):

$$Growth_{bijt} = \alpha + \beta Bank\_Holdup_{bjt} + \gamma X_i + \delta Z_{jt} + \eta_{bt} + \nu_{kt} + \epsilon_{bijt}. \quad (2)$$

In the most comprehensive specification of (2), we also allow the hold-up proxy to be interacted with the bank's monitoring proxy.

In both empirical models,  $Growth_{bijt}$  stands for the (proxy for the) growth effort or growth outcome of the firm  $j$  granted a loan  $i$  arranged by bank  $b$  in year  $t$ ;  $Bank\_Monit_{bit}$  is the proxy for the monitoring of the lead bank  $b$ , as captured by the share of the loan  $i$  retained by the bank;  $Bank\_Holdup_{bjt}$  is the proxy for the lead bank's incentives to capture the borrower, as measured by the number of loans the bank has granted to the borrowing firm in the five years prior to the current loan;  $X_i$  denotes a vector of characteristics of the loan  $i$  that could affect the firm's investment, employment, and growth (including the collateralization of the loan and the number of general covenants associated with the loan); and  $Z_{jt}$  is a vector of relevant controls for firm characteristics. We saturate the empirical model with bank\*year fixed effects ( $\eta_{bt}$ ) and with industry\*year fixed effects ( $\nu_{kt}$ ) where  $k$  is the industry in which firm  $j$  is active.  $\epsilon_{bijt}$  denotes the error term. Throughout the analysis, for all the regressions, we report standard errors clustered at the firm level.

As the models show, to control for possible unobservables and assuage concerns of omitted variables, in our analysis we exploit the multilevel structure of our data set. This enables us to include various detailed fixed effects which isolate credit supply effects at the bank-firm level. In particular, we insert bank-year and industry-year fixed effects to take into account unobserved credit supply effects and possible time-varying shifts in borrower demand within the same sector. In robustness tests, to further address endogeneity concerns, we will also insert bank-firm fixed effects.

Next, we slice our data according to a variety of firm-level and bank-level dimensions to dig deeper into the forces underlying the baseline effects (Hypothesis 3). In all cases, the augmented

empirical model reads:

$$Growth_{bijt} = \alpha + \beta Bank\_Monit_{bit} + \zeta C_i + \theta(Bank\_Monit_{bit} \times C_i) + \beta X_i + \gamma Z_{jt} + \eta_{bt} + \nu_{kt} + \epsilon_{bijt}. \quad (3)$$

In this augmented model, we are particularly interested in the  $\theta$  coefficient on the interaction term between bank information and the relevant firm, bank or industry characteristic ( $C_i$ ).

The reader could wonder whether our empirical specifications precisely capture the lending banks' influence on the borrowing firm's growth. A first concern could be that in a fraction of loans there is more than one lead arranger. A second concern could be that, in a given year, a firm can obtain multiple loans from different pools of syndicate lenders. Our granular empirical specification effectively treats the impact on firm growth of the information acquisition effort of loan lead arrangers separately.<sup>7</sup> To address the first issue, we rerun our regressions after dropping syndicated loans with more than one lead arranger. To alleviate the second issue, in alternate tests, we repeat the analysis aggregating the loan-level data at the firm level. Specifically, we use a weighted sum approach, effectively summing the lead arrangers' shares of the syndicated loans extended to a firm in a given year, weighted by the ratios between the syndicated loan value and the total value of all syndicated loans granted to the firm in the year. Finally, as noted, in additional tests we also consider the (proxies for the) growth effort or growth outcome of the firm over a three-year horizon.

## 4 Summary Statistics and Sample Properties

Table 2 presents summary statistics for our sample, with an emphasis on the variables used in the empirical analysis. Consider first firm demographic characteristics. The firms have an average size, as measured by net sales, of 5.38 billions. The average age of a business is slightly above 15 years. The syndicated loans in the sample tend to feature a significant concentration in the hands of the lead arranger, with an average share of the lead bank (our main proxy for banks' monitoring incentives) equalling 41%. By comparison, the average share held by any bank in a

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<sup>7</sup>We isolate changes in the credit supply by including bank-year fixed effects.

syndicated loan equals roughly 20% (that is, each loan has five participant lenders on average). Importantly, there is significant variation in the lead lender share, with a coefficient of variation (standard deviation over the mean) of the lead share of roughly 0.9. The average maturity of a loan is 3.5 years. The loans appear to be often protected both by collateral and by covenants: roughly 45% are backed by collateral, while the average number of general covenants of a loan is 2.13.

The table also reports detailed information on the indicators of firm growth and performance used in the empirical analysis. For example, firms' employment growth equals 10% on average in the sample, while the mean growth of firms' nominal sales is 15%. The mean growth rate of R&D expenditures is approximately 16%. The average growth of the return on assets (ROA) equals 3%.

## 5 Main Results

In what follows, we present the main empirical results. We start from the baseline estimates and then exploit the rich cross-sectional heterogeneity of our data set to dissect the mechanisms driving our baseline findings.

### 5.1 Baseline estimates

Tables 3 and 4 present our baseline results for the effect of our proxies of banks' information on the different indicators of firm growth. Recall that, on the one hand, a more intense acquisition of information by banks could facilitate monitoring, providing discipline and guidance to borrowing firms. On the other hand, banks' more intense acquisition of information could generate hold-up problems, thus creating a scenario of information monopoly and rent extraction on the part of banks. This, in turn, could deter firms' investment in their long-term growth. In the following subsections, we discuss the baseline results related to the proxy for bank monitoring (Table 3), the proxy for bank hold-up (Table 4, Panel A), and the proxies for bank consultancy services (Table 4, Panels B and C).



### 5.1.1 Monitoring

The results displayed in Table 3, Panel A, tend to support the hypothesis of a positive impact of banks' information on firms' growth due to banks' monitoring activities. After controlling for a broad battery of firm- and loan-level control variables, and for a detailed set of fixed effects, the estimated coefficients on the lead arranger share in columns I-VI are generally positive and statistically significant (at the 1% or 5% level in most regressions). Interestingly, however, while in line with hypothesis 1 we uncover compelling evidence of a positive impact of banks' monitoring on the growth effort (employment and R&D expenses – columns I and II) and growth outcomes (sales and asset growth – columns III and IV), we do not obtain equally compelling evidence of a positive effect on the indicators of firm performance (in columns V and VI the estimated coefficients for ROA and book leverage are statistically insignificant or negative). The only exception regards the firm's EBITDA, which is used as the dependent variable in column VII. In that case, the estimated coefficient of the bank's monitoring proxy is positive and statistically significant.

Economically, the coefficient estimates in column I imply that a 4-percentage-point increase in the lead bank share, that is, roughly 10% of the mean share of a lead bank, is associated with a 1.5% rise in the firm's employment growth. The same 10% increase in the lead bank share would be associated with a 8% rise in the growth rate of R&D expenses (column II). Analogous computations performed using the estimates for growth outcomes in columns III and IV suggest that a 10% increase in the lead bank share is associated with about a 1% rise in the firm sales growth rate and in the asset growth rate.

The estimated coefficients for the firm-level and loan-level controls are in line with expectations about the direct effect of firm and loan characteristics on firms' growth. The tangibility of the firm's assets and the firm's Z-score turn out to be negatively related with the measures of firm growth. This can indicate that firms with less intangible capital (e.g., less patents, trademarks, and copyrights) and firms that are more stressed are less likely to grow. Conversely, the collateralization of the loan and the number of general covenants associated with the loan are positively and significantly associated with the indicators of firm growth in most of the regressions.

In Panels B, C, and D, we repeat the analysis using alternative specifications. We first con-

sider a specification in which we drop loans featuring multiple lead arrangers (Panel B). Next, we aggregate information at the firm level (Panel C). Finally, in Panel D we repeat the tests considering the impact on firm growth over a longer horizon (three years from the extension of the loan). The insights remain virtually unchanged. For example, Panel C shows that a higher average lead share held by the lead arrangers of a firm in a given year is associated with stronger growth effort and growth outcomes of the firm. And Panel D suggests that the positive effects of bank monitoring extend to a longer horizon after the loan is granted.

### 5.1.2 Hold-up

In Table 4, Panel A, we display the results for the impact of banks' hold-up issues on firm-level growth outcomes. The indicator of hold-up enters with a negative sign in the regressions suggesting a possible presence of hold-up issues, which could erode the positive effects of banks' information acquisition.<sup>8</sup> Observe, however, that after controlling for our proxy for hold-up issues, the estimated positive effect of (our proxy for) banks' monitoring carries through. This confirms that there can be a benign impact of bank monitoring on firm growth that materializes when banks retain a larger stake in the syndicated loans they arrange.

### 5.1.3 Consultancy services

The reader could wonder whether the uncovered positive impact of banks' monitoring on firms' growth is driven by the provision of consultancy services by the lead bank rather than reflecting bank monitoring strictly intended. In order to shed light on this point, we rely on bank-level and loan-level information, as detailed above.

In Table 4, Panel B, as a proxy for banks' consultancy services, we first use the purpose of the loan to capture instances in which banks' consultancy services can be more relevant to the borrowing firm. Following Sufi (2007), we consider loans for financing mergers, acquisitions and recapitalization as plausibly associated with a more prominent role of banks in offering consultancy and advice to firms. We find only limited evidence that the estimated effects of the lead share on

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<sup>8</sup>For related studies on the impact of lending relationships on firm performance, see also, e.g., Sufi (2007) and Delis et al. (2022) .

firm growth are stronger for loans that are plausibly characterized by a higher relevance of banks' consultancy services. In Panel C, we instead use the share of banks' income that is not accounted for by bank lending activities. Again, we find limited evidence that the effects of the lead share are more pronounced for banks featuring a higher share of non-lending income. Overall, the results in Panels B and C of Table 4 suggest that the positive impact of bank monitoring goes beyond possible advice or consultancy provided by banks.

## 5.2 Firm-level opaqueness

In Table 5, we study whether the effects of bank monitoring are stronger for firms traditionally viewed to be more informationally opaque and more reliant on bank financing. A priori, one could conjecture that whether the effects get stronger or weaker for more informationally opaque firms is ambiguous. On the one hand, banks' monitoring activities could be more relevant for such firms, which do not benefit from the discipline imposed by financial markets and auditors, and are not subject to the scrutiny of the financial press. Based on this argument, one could expect the positive effects of banks' monitoring to be stronger for informationally opaque businesses. On the other hand, the hold-up literature argues that opaque firms could be more exposed to capture on the part of banks, thus being more vulnerable to rent extraction. Based on these considerations, opaque firms could reap less benefits when investing in growth-enhancing opportunities. To the extent that our proxy for bank monitoring still reflects some hold-up issues, this could reduce its positive effect on firm growth. Consistent with a broad literature (e.g., Petersen and Rajan, 1994), as a proxy for firms' informational opaqueness we consider firms' age.

The estimates in Table 5 confirm a positive impact of a lead arranger's share on the input-based and outcome-based indicators of firm growth. They also show that in general older firms exhibit a less pronounced growth of sales and employment: the estimated coefficient on firm age is negative and statistically significant in most of the regressions. This is consistent with the broadly held view that younger businesses tend to be more dynamic and hence grow faster. Most importantly for our purposes, the estimated coefficients on the interaction term between firm age and our proxy for banks' monitoring reveal that the positive impact of banks' monitoring on growth is especially pronounced for younger firms, that is, allegedly the firms that are more

informationally opaque. For example, the estimates in column III suggest that a 10% increase in the lead bank share is associated with a 2.2% rise in the growth of sales at the average firm age (15 years), that is reduced to just 0.6% for a firm 10 years older. Similarly, the estimated coefficients in column I indicate that a 10% increase in the lead share is associated with a 2.96% rise in the employment growth of a firm with the mean age, which is reduced to 1.3% for a firm 10 years older. Interestingly, when allowing for heterogeneity in the effect across firms of different age, we also uncover some evidence of an impact on the indicators of firm performance: book leverage growth is now negatively associated with banks' monitoring, and especially so for young businesses.

Overall, these results tend to further support the hypothesis of a beneficial role of bank monitoring (see hypothesis 1): banks' monitoring is effective in promoting firms' sales and employment growth when firms are relatively young and hence more informationally opaque.

### **5.3 Banks' financial health and reputation**

It is largely an empirical question whether the effect of banks' information on firms' growth depends on the financial status of the banks. On the one hand, a bank that is in a bigger solvency stress could be more inclined to carefully monitor a client firm to minimize the risk that the firm engages in inefficient activities, with a subsequent increase in its probability of default. In this sense, one could then expect banks' monitoring to be particularly conducive to firms' accurate investments and growth when banks are more distressed. On the other hand, a bank's risk aversion could also be stronger when the bank is close to its minimum capital position. In this case, banks engaging in more intense monitoring might be more inclined to deter firms from exploiting growth opportunities.

To capture the health status of banks, in Table 6, Panel A we consider the bank's capital ratio. Observe that the bank\*year fixed effects inserted in the regressions effectively absorb the impact of the non-interacted bank capital ratio on the indicators of firm growth. Our primary interest is however in the interaction term (Bank\_Monit\*Capital ratio) between the proxy for banks' monitoring and the bank capital ratio. The estimated coefficients on the interaction term convey some evidence that the positive impact of banks' monitoring on the growth of firm assets and

employment is especially pronounced when banks have a stronger capital position. For example, the estimates in column IV suggest that a 10% increase in the lead share is associated with a 1.4% larger increase in the firm's sales growth when the bank capital ratio is 10 percentage points higher. Similarly, the estimated coefficients in column II indicate that a 10% increase in the lead share triggers a 2.3% larger rise in the firm's employment growth when the bank capital ratio is 10 percentage points higher. This result tends to support the hypothesis that banks could utilize their information more intensely, and hence steer firms' choice more effectively, when they are less distressed and hence less risk averse.<sup>9</sup>

An alternative dimension of banks' financial strength consists of banks' reputation in credit markets. To assess this reputation, we look at the regulatory sanctions previously experienced by the banks in our sample (Table 6, Panel B). To this end, we exploit information on regulatory actions taken against banks. We focus on actions that sanction banks when they do not fulfill capital requirements. In particular, we follow Delis et al. (2017) and use their data set from 1999 until 2010. Utilizing information from the three primary bank supervisors of the United States (the Federal Reserve, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency), Delis et al. (2017) group the formal enforcement actions by rationale. We include actions related to the Basel Committee Core Principles for Effective Banking Supervision and which specifically relate to capital adequacy. We find no compelling evidence that banks' credit market reputation, as proxied by the stigma associated with previous sanctions, influences the impact of banks' monitoring on firms' growth. In fact, the estimated coefficients on the interaction between (the proxy for) banks' monitoring and banks' sanctions are never statistically significant at conventional levels.

## 5.4 Product complexity

Another relevant dimension that could influence the link between banks' information acquisition and firms' growth is the nature of the activities that firms undertake. To the extent that bank information is more accurate when the firm operates in less complex sectors, we would expect any

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<sup>9</sup>In the case of other firm growth indicators the coefficients are estimated more imprecisely, although the signs are in line with those obtained for assets and employment.

positive effect of banks' monitoring to be more pronounced for firms operating in such sectors. By contrast, a firm involved in a complex sector could be harder to understand for a bank, and therefore any positive effect of bank monitoring could be diluted. On the other hand, one may conjecture that the marginal contribution of banks' monitoring could be stronger in sectors characterized by greater complexity, where specialized information producers, such as banks, can provide more valuable insights to borrowing firms.<sup>10</sup> The results in Appendix Table 1 suggest no significant difference in the effects of (our proxy for) bank monitoring across sectors characterized by different product complexity (measured according to the indicator put forward by Rauch, 1999).<sup>11</sup> One possibility is that our proxy is not adequately capturing the degree of complexity of firms' products. A more intriguing interpretation could however be that the aforementioned positive and negative effects of product complexity offset each other in our estimates, leading to insignificant coefficients on the interaction term.

## 5.5 Credit market power

The results in Tables 3-6 highlight a positive effect of banks' monitoring on firm-level growth, which is particularly strong for informationally opaque firms and when banks are in a more robust financial position. As noted, a mechanism working in an opposite direction may consist of banks' informational monopoly, and the associated ability of lenders to extract rents from firms. Plausibly, this hold-up problem, and the resulting rent-extraction ability of banks, could be more severe when banks have stronger power in the credit market. Put differently, there could be a complementarity between the market share of the bank and the bargaining power associated with its superior information on the borrowing firm (Cetorelli and Strahan, 2006). To the extent that our proxy for bank monitoring still reflects some hold-up issues, this could dilute its positive effect on firm growth.

In Table 7, Panel A, we then conduct tests by interacting (our proxy for) banks' monitoring

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<sup>10</sup>The degree of product complexity of the firm could also reinforce hold-up issues. Firms with complex products could find more difficult to establish relationships with other banks. Therefore, these firms could be more exposed to be extracted rents from their main banks.

<sup>11</sup>To measure the complexity of the products of a sector, Rauch (1999) computes the share of products that are heterogeneous, that is, neither reference priced nor sold on an organized exchange.

with an indicator of banks' power in the credit market, the share of loans in the sector of the firm that is granted by its lending bank. In various cases (see columns I and IV-VI), we do not detect significant differences in the effects of banks' monitoring across different levels of banks' credit market power. However, interestingly, when considering the growth of firm sales and the profitability of the firm, we uncover some evidence that, in the presence of a larger market share of the bank, stronger bank monitoring can indeed lead to lower sales growth and returns on assets. Therefore, while we do not find strong evidence of major hold-up issues, such issues appear to play some role in diluting the positive impact of banks' monitoring on firm growth (in line with hypothesis 2).<sup>12</sup>

## 6 Robustness and Extensions

**Further addressing endogeneity.** Our analysis could still be plagued by endogeneity issues. Banks might select or avoid specific borrowers based on a number of characteristics that may include their growth opportunities. Second, the same factors that cause individual banks to acquire information on certain types of loans and borrowers could affect firm growth simultaneously. To further address endogeneity concerns, in Table 8, Panels A and B, we include a new set of fixed effects. In particular, in Panel A, we add firm-bank fixed effects, to alleviate concern for time-invariant bank-firm matching omitted factors, while in Panel B we include industry-quarter fixed effects to control for borrower demand within the quarter. Almost all the estimated coefficients are consistent with our baseline findings.

**Further robustness and extensions.** In Table 8, Panel C, and in Appendix Tables 2 and 3, we subject our results to an additional battery of robustness checks and extensions. We first drop loans in which the lead arranger is one of the largest three U.S. banks (J.P. Morgan Chase, Bank of America, and Citigroup), based on the number of deals in which they participate (Table 8, Panel C). This allows us to verify that the results are not driven solely by the efficiency of very

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<sup>12</sup>In Table 7, Panel B, we also experiment with interacting our main proxy for hold-up issues, the number of loans a bank has granted to the borrowing firm in the five years prior to the current loan, with the proxy for credit market power. The estimated coefficients on the interaction term are generally not statistically significant at conventional levels.

large banks in originating large loan deals. The results remain virtually unchanged.

Next, in Appendix Table 2, we experiment with exploiting heterogeneity in loan characteristics. One might surmise that the effects of banks' information could be less sharp when loans are protected by collateral. Interestingly, we do not find compelling evidence that the degree of collateralization of a loan shapes the impact of banks' monitoring. A similar conclusion emerges when in untabulated tests we allow the effect of banks' monitoring to differ depending on the number of general covenants in the loan.

Finally, in Appendix Table 3 we carry out extensions by exploiting heterogeneity in firms' past performance. The reader could wonder whether the effects of banks' information acquisition on firms' growth depend on the occurrence of past shocks to firms' growth. In Appendix Table 3, we obtain some evidence that the positive effects of bank monitoring on firm growth are somewhat more pronounced for firms that experienced a lower (below the median) growth of sales in the year preceding the loan extension. Interestingly, the evidence for the indicators of performance is more nuanced and suggests that, in terms of performance, the firms with higher past growth could be those that benefit the most from banks' monitoring.<sup>13</sup>

## 7 Conclusion

This paper has studied the intensive margin impact of banks' information on firms' growth. We argued that this impact is ambiguous a priori. Banks could monitor firms, thereby promoting their growth-enhancing activities. They could however also exploit their information monopolies to extract rents from client businesses, thus discouraging investment and growth. The results yield a relatively benign prediction on the impact of banks' monitoring. We obtain consistent evidence that banks' monitoring spurs firms' tangible and intangible investments, without compromising firms' labor hiring incentives. When looking at the outcomes of firms' growth-enhancing activities, we detect a robust positive impact of banks' monitoring on firms' sales growth, although no clear-cut effect on firms' profitability. Exploiting the richness of the data, we then slice the data across

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<sup>13</sup>In further untabulated tests, we also obtain that our main findings carry through both in recessionary and in non-recessionary periods (where recessionary periods are captured by NBER recessions).



a variety of firm-level and bank-level dimensions. We uncover evidence that the positive impact of banks' monitoring is more pronounced for more informationally opaque firms and when banks exhibit a relatively less fragile financial status. On the other hand, we find limited evidence of banks' significant exploitation of informational monopolies that could deter firms' investment, even when banks hold significant credit market power. To be clear, such exploitation of hold-up power emerges in our analysis, but it turns out to be never strong enough to reverse the positive impact of banks' information acquisition on the growth of client firms.

The paper leaves open relevant questions. A first interesting question touched upon but not fully explored in the analysis regards the influence of banks' information on the allocative efficiency of bank funding across firms with heterogenous productivity. Our results suggest that not necessarily the positive impact of banks' information on the pace of firm growth is associated with a strengthening of firm profitability. This hints at the possibility that banks' information may not always help direct funds towards the most efficient firms. A second interesting question regards the possible differences in the intensive margin impact of banks' information on firms' growth between market-based and bank-based financial systems. Our analysis has focused on the case of the United States, which is traditionally considered to be a country with a relatively market-based financial system (that is, with relatively deep stock and bond markets). A reader could expect the positive effects of bank monitoring on firm growth to be even sharper in countries with bank-based financial systems. However, bank-based systems could also feature a stronger incidence of hold-up power on the part of banks. We leave this and other thorny questions to future research.

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## Tables

Table 1  
Variable definitions and sources

Name	Description	Source
<i>Dependent variables (growth rates):</i>		
Employment growth	Number of employees.	Compustat
R&D growth	R&D expenses.	Compustat
Sales growth	Sales/turnover (net).	Compustat
Size growth	Total assets.	Compustat
ROA growth	Return on assets.	Compustat
Book leverage growth	Book debt divided by total assets.	Compustat
EBITDA	Earnings before interest, taxes, depreciation, and amortization divided by total assets.	Compustat
<i>Explanatory variables:</i>		
Bank_Monit	The share (%) of the loan held by the lead arranger.	Dealscan
Bank_Holdup	The number of loans a bank lends to the same borrower in the five years prior to a current loan.	Own calculations
Consultancy_Loan	Dummy variable equal to one if the purpose of the loan is for recapitalization and M&A's projects and zero otherwise.	Call reports
Consultancy_Bank	Dummy variable equal to one if the share of the bank's interest income is beyond the average mean 4.5% and zero otherwise.	Dealscan
Maturity	The natural logarithm of loan duration in years.	Dealscan
Collateral	Dummy variable equal to one if the loan is secured with collateral and zero otherwise.	Dealscan
General covenants intensity	The number of general covenants (intensity), taking values from zero to nine.	Dealscan
Performance pricing	Dummy variable equal to one if the loan has performance-pricing provisions and zero otherwise.	Dealscan
Firm tangibility	Net fixed assets divided by total assets.	Compustat
Firm Z-score	The Z-score of the firm.	Compustat
Firm RoE	Return on equity	Compustat
Firm age	Firm age in years.	Compustat
Sector credit concentration	The amount (\$M) bank b lends to a firm classified on a two-digit SIC sector $s$ at time $t$ over the total credit of the sector ( $s$ ). This index ranges from zero to one, with higher values reflecting higher concentration.	Own calculations
Sanction	Dummy variable equal to one when an enforcement action is imposed on a bank and zero otherwise. Enforcement actions include all actions (penalties) against banks for breaches of laws and regulations in a number of cases. These cases include laws and regulations related to the Basel Committee Core Principles for Effective Banking Supervision (i.e., capital adequacy and liquidity).	Own calculations
Capital ratio	Total equity of bank divided by total assets.	Call reports
Top 3 arrangers	Dummy variable equal to one if the bank is one of the largest three U.S. banks (J.P. Morgan Chase, Bank of America, and Citigroup) and zero otherwise.	Own calculations

Table 2  
Summary statistics

	I	II	III	IV	V	VI
	N	Mean	SD	Median	P25	P75
Employment growth	20,008	0.103	0.330	0.044	-0.029	0.174
R&D growth	12,746	0.169	4.348	0.015	0.000	0.052
Sales growth	21,096	0.150	0.327	0.100	0.012	0.234
Size growth	21,142	0.181	0.370	0.094	-0.004	0.277
ROA growth	23,437	0.031	0.382	0.011	0.006	0.023
Book leverage growth	19,590	0.031	0.197	0.009	-0.036	0.074
EBITDA	23,437	0.028	0.155	0.000	0.000	1.000
Bank_Monit	23,437	0.409	0.369	0.240	0.111	1.000
Bank_Holdup	23,437	0.830	1.705	0.000	0.000	1.000
Consultancy_Loan	23,437	0.018	0.135	0.000	0.000	1.000
Consultancy_Bank	12,234	0.390	0.488	0.000	1.000	1.000
Maturity	23,437	3.510	0.779	3.738	2.833	4.094
Collateral	23,437	0.447	0.497	0.000	0.000	1.000
General covenants intensity	23,437	2.130	2.619	1.000	0.000	4.000
Performance pricing	23,437	0.405	0.491	0.000	0.000	1.000
Firm tangibility	23,437	0.319	0.233	0.259	0.134	0.455
Firm Z-score	23,437	1.821	5.830	1.892	1.142	2.642
Firm RoE	23,437	2.359	131.758	0.313	0.202	0.467
Firm age	23,437	15.252	10.304	14.000	6.000	23.000
Sector credit concentration	23,436	0.117	0.143	0.080	0.029	0.151
Sanction (Bank)	23,437	0.046	0.209	0.000	0.000	0.000
Capital ratio	23,437	0.138	0.046	0.131	0.113	0.159
Top 3 arrangers	23,437	0.456	0.498	0.000	0.000	1.000

The table provides descriptive statistics. The variables are defined in table 1.

Table 3  
Bank monitoring and firm growth

<b>Panel A: Baseline results</b>							
Dependent variable	Input stage		Outcome stage		Performance		
	Employment growth	R&D growth	Sales growth	Size growth	ROA growth	Book leverage	EBITDA growth
	I	II	III	IV	V	VI	VII
Bank_Monit	0.038*** (3.092)	0.348** (2.009)	0.028** (2.147)	0.045*** (3.524)	0.012 (0.810)	-0.008 (-1.171)	0.038*** (5.511)
Maturity	0.030*** (4.075)	0.376** (2.517)	0.029*** (3.651)	0.034*** (4.998)	0.004 (0.289)	0.005 (1.077)	-0.019*** (-5.024)
Collateral	0.010 (1.319)	-0.084 (-0.697)	0.016** (2.112)	0.009 (1.200)	0.036** (2.048)	0.010* (1.877)	0.021*** (5.587)
General covenants intensity	0.006*** (3.347)	0.012 (0.673)	0.002 (1.182)	0.005*** (2.913)	-0.006 (-1.440)	0.005*** (3.576)	0.010*** (9.029)
Performance pricing	0.000 (0.035)	-0.218 (-1.616)	-0.000 (-0.001)	0.009 (1.045)	0.010 (1.065)	-0.014*** (-2.770)	-0.017*** (-3.533)
Firm tangibility	-0.141*** (-3.871)	-1.585*** (-2.631)	-0.131*** (-3.269)	-0.020 (-0.671)	-0.028 (-1.211)	-0.013 (-0.834)	-0.016 (-1.445)
Firm Z-score	0.004 (1.172)	-0.021 (-1.215)	-0.004** (-2.178)	-0.008*** (-4.064)	-0.001 (-1.506)	-0.000 (-0.239)	-0.000 (-1.244)
Firm RoE	-0.000 (-1.246)	-0.002 (-1.572)	0.000 (0.154)	-0.000 (-0.752)	0.000 (1.395)	0.000 (0.050)	-0.000*** (-2.999)
Observations	17,794	10,938	18,872	18,912	21,143	17,360	21,156
Adjusted R-squared	0.448	0.345	0.439	0.514	0.178	0.447	0.172
Bank*Year FE	Y	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y	Y
<b>Panel B: Only one lead arranger</b>							
Bank_Monit	0.034*** (2.662)	0.342* (1.874)	0.027* (1.960)	0.043*** (3.262)	0.012 (0.761)	-0.009 (-1.285)	0.040*** (5.608)
+ Controls	Y	Y	Y	Y	Y	Y	Y
Observations	14,790	8,968	15,753	15,790	17,799	14,513	17,795
Adjusted R-squared	0.239	0.083	0.233	0.337	-0.056	0.248	0.143
Bank*Year FE	Y	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y	Y
<b>Panel C: Firm-level regressions</b>							
Bank_Monit	0.021* (1.701)	0.671** (2.480)	0.038*** (3.018)	0.027** (1.961)	0.010 (0.579)	-0.026*** (-3.338)	0.053*** (7.414)
+ Controls	Y	Y	Y	Y	Y	Y	
Observations	12,478	7,757	13,227	13,258	14,916	12,180	14,916
Adjusted R-squared	0.069	-0.151	0.105	0.118	-0.077	0.068	0.104
Industry*Year FE	Y	Y	Y	Y	Y	Y	Y
<b>Panel D: 3-years growth rate</b>							
Bank_Monit	0.090*** (4.041)	0.912 (0.657)	0.111*** (4.763)	0.106*** (4.460)	-0.006 (-0.327)	-0.013* (-1.855)	-0.008 (-0.360)
+ Controls	Y	Y	Y	Y	Y	Y	Y
Observations	15,831	10,616	16,918	16,955	16,938	17,369	16,938
Adjusted R-squared	0.279	0.222	0.315	0.318	0.949	0.238	0.101
Bank*Year FE	Y	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y	Y

The table reports coefficients and  $t$ -statistics (in parentheses). The dependent variable is reported at the top of each column. We estimate our regression on a loan-level sample originated from 1987 to 2017. All variables are defined in table 1. All specifications include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. Standard errors are robust and clustered at the firm level. The \*, \*\*, \*\*\* marks denote the statistical significance at the 10, 5, and 1% level, respectively.



Table 4  
Bank hold-up, consultancy, and firm growth

Panel A: Hold-up						
Dependent variable	Input stage		Outcome stage		Performance	
	Employment growth	R&D growth	Sales growth	Size growth	ROA growth	Book leverage growth
	I	II	III	IV	V	VI
Bank_Monit	0.040*** (3.049)	0.483** (2.295)	0.033** (2.367)	0.050*** (3.575)	0.018 (1.118)	-0.009 (-1.218)
Bank_Holdup	-0.003* (-1.682)	0.003 (0.142)	-0.001 (-0.324)	-0.005** (-2.214)	0.001 (0.864)	-0.003** (-2.095)
Bank_Monit * Bank_Holdup	-0.005 (-1.285)	-0.236* (-1.749)	-0.009* (-1.802)	-0.010** (-2.082)	-0.008* (-1.796)	-0.001 (-0.276)
Maturity	0.030*** (4.099)	0.379** (2.521)	0.029*** (3.683)	0.034*** (5.037)	0.004 (0.304)	0.004 (1.068)
Collateral	0.010 (1.312)	-0.094 (-0.774)	0.016** (2.073)	0.009 (1.176)	0.036** (2.032)	0.010* (1.885)
General covenants intensity	0.006*** (3.427)	0.016 (0.853)	0.002 (1.250)	0.006*** (3.030)	-0.006 (-1.424)	0.005*** (3.644)
Performance pricing	-0.001 (-0.083)	-0.226* (-1.657)	-0.001 (-0.075)	0.007 (0.865)	0.010 (1.040)	-0.015*** (-2.937)
Firm tangibility	-0.140*** (-3.835)	-1.569*** (-2.615)	-0.129*** (-3.234)	-0.017 (-0.569)	-0.026 (-1.157)	-0.012 (-0.768)
Firm Z-score	0.004 (1.178)	-0.021 (-1.211)	-0.004** (-2.175)	-0.008*** (-4.072)	-0.001 (-1.503)	-0.000 (-0.241)
Firm RoE	-0.000 (-1.223)	-0.002 (-1.587)	0.000 (0.150)	-0.000 (-0.759)	0.000 (1.399)	0.000 (0.082)
Observations	17,794	10,938	18,872	18,912	21,143	17,360
Adjusted R-squared	0.449	0.346	0.439	0.515	0.179	0.447
Bank*Year FE	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y
Panel B: Consultancy services (measured at the loan level)						
Bank_Monit	0.028** (2.197)	0.358* (1.939)	0.024* (1.846)	0.024* (1.804)	0.014 (0.942)	-0.016** (-2.388)
Consultancy_Loan	-0.186*** (-3.606)	0.143 (0.437)	-0.092** (-2.342)	-0.224*** (-3.925)	0.034 (0.882)	0.054 (0.941)
Bank_Monit * Consultancy_Loan	0.305*** (2.635)	-0.823 (-1.547)	0.103 (1.414)	0.466*** (4.118)	-0.217 (-1.303)	-0.044 (-0.504)
+ Controls	Y	Y	Y	Y	Y	Y
Observations	17,798	10,939	18,875	18,915	21,145	17,363
Adjusted R-squared	0.234	0.119	0.255	0.299	-0.044	0.240
Bank*Year FE	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y
Panel C: Consultancy services (measured at the bank level)						
Bank_Monit	0.047** (2.094)	0.723 (1.265)	0.048* (1.860)	0.076*** (3.139)	-0.032 (-0.596)	-0.004 (-0.315)
Consultancy_Bank	0.013 (0.660)	0.066 (0.249)	0.023 (1.276)	0.038* (1.885)	-0.018 (-0.711)	0.018* (1.698)
Bank_Monit * Consultancy_Bank	-0.005 (-0.160)	-0.532 (-0.746)	-0.053* (-1.734)	-0.041 (-1.311)	0.091 (1.365)	-0.028* (-1.728)
+ Controls	Y	Y	Y	Y	Y	Y
Observations	8,148	4,730	8,823	8,846	9,852	8,264
Adjusted R-squared	0.177	0.012	0.174	0.278	-0.201	0.249
Bank*Year FE	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y

The table reports coefficients and  $t$ -statistics (in parentheses). The dependent variable is reported at the top of each column. We estimate our regression on a loan-level sample originated from 1987 to 2014. All variables are defined in table 1. All specifications include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. Standard errors are robust and clustered at the firm level. The \*, \*\*, \*\*\* marks denote the statistical significance at the 10, 5, and 1% level, respectively.

Table 5  
Bank monitoring and firm growth: Heterogeneity with firm age

Dependent variable	Input stage		Outcome stage		Performance	
	Employment growth	R&D growth	Sales growth	Size growth	ROA growth	Book leverage growth
	I	II	III	IV	V	VI
Bank_Monit	0.074*** (3.334)	0.952** (2.226)	0.083*** (3.637)	0.118*** (5.337)	0.019 (0.908)	-0.025** (-2.069)
Firm age	-0.004*** (-7.776)	-0.000 (-0.056)	-0.004*** (-8.347)	-0.004*** (-6.738)	-0.000 (-0.597)	-0.001*** (-2.650)
Bank_Monit * Firm age	-0.004*** (-3.376)	-0.047* (-1.912)	-0.006*** (-4.756)	-0.007*** (-6.094)	-0.001 (-0.641)	0.001* (1.896)
Maturity	0.031*** (4.287)	0.374** (2.512)	0.029*** (3.785)	0.035*** (5.230)	0.004 (0.293)	0.004 (1.035)
Collateral	-0.001 (-0.124)	-0.116 (-0.942)	0.003 (0.351)	-0.005 (-0.621)	0.035** (2.081)	0.009* (1.691)
General covenants intensity	0.006*** (3.117)	0.012 (0.699)	0.001 (0.798)	0.005*** (2.629)	-0.006 (-1.425)	0.005*** (3.471)
Performance pricing	-0.002 (-0.253)	-0.220 (-1.637)	-0.002 (-0.213)	0.007 (0.854)	0.010 (1.058)	-0.014*** (-2.729)
Firm tangibility	-0.137*** (-3.769)	-1.521*** (-2.629)	-0.127*** (-3.245)	-0.016 (-0.553)	-0.027 (-1.177)	-0.014 (-0.937)
Firm Z-score	0.006* (1.895)	-0.021 (-1.216)	-0.003** (-2.267)	-0.007*** (-3.609)	-0.001 (-1.512)	-0.000 (-0.220)
Firm RoE	-0.000** (-2.376)	-0.002* (-1.729)	-0.000 (-0.476)	-0.000 (-1.133)	0.000 (1.324)	-0.000 (-0.095)
Observations	17,794	10,938	18,872	18,912	21,143	17,360
Adjusted R-squared	0.459	0.346	0.454	0.527	0.179	0.447
Bank*Year FE	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y

The table reports coefficients and  $t$ -statistics (in parentheses). The dependent variable is reported in the second line. We estimate our regression on a loan-level sample originated from 1987 to 2014. All variables are defined in table 1. All specifications include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. Standard errors are robust and clustered at the firm level. The \*, \*\*, \*\*\* marks denote the statistical significance at the 10, 5, and 1% level, respectively.

Table 6  
Bank monitoring and firm growth: Bank heterogeneity

Panel A: Heterogeneity with bank capital ratio						
Dependent variable	Input stage		Outcome stage		Performance	
	Employment growth	R&D growth	Sales growth	Size growth	ROA growth	Book leverage growth
	I	II	III	IV	V	VI
Bank_Monit	-0.047 (-1.123)	0.044 (0.079)	-0.032 (-0.748)	-0.049 (-1.246)	0.038 (1.099)	-0.033 (-1.429)
Bank_Monit * Capital ratio	0.587** (2.083)	2.139 (0.483)	0.413 (1.384)	0.654** (2.546)	-0.177 (-0.762)	0.174 (1.094)
Maturity	0.029*** (3.994)	0.373** (2.505)	0.029*** (3.603)	0.033*** (4.924)	-0.004 (0.297)	0.004 (1.041)
Collateral	0.011 (1.444)	-0.080 (-0.692)	0.017** (2.214)	0.010 (1.339)	0.036** (2.052)	0.010* (1.926)
General covenants intensity	0.006*** (3.232)	0.011 (0.632)	0.002 (1.088)	0.005*** (2.780)	-0.006 (-1.441)	0.005*** (3.530)
Performance pricing	0.000 (0.008)	-0.218 (-1.616)	-0.000 (-0.023)	0.008 (1.014)	0.010 (1.066)	-0.014*** (-2.782)
Firm tangibility	-0.140*** (-3.858)	-1.585*** (-2.630)	-0.130*** (-3.256)	-0.020 (-0.648)	-0.028 (-1.224)	-0.013 (-0.825)
Firm Z-score	0.004 (1.145)	-0.021 (-1.215)	-0.004** (-2.177)	-0.008*** (-4.082)	-0.001 (-1.505)	-0.000 (-0.243)
Firm RoE	-0.000 (-1.293)	-0.002 (-1.576)	0.000 (0.151)	-0.000 (-0.756)	0.000 (1.404)	0.000 (0.034)
Observations	17,794	10,938	18,872	18,912	21,143	17,360
Adjusted R-squared	0.449	0.345	0.439	0.514	0.178	0.447
Bank*Year FE	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y
Panel B: Heterogeneity with bank sanctions						
Bank_Monit	0.030** (2.554)	0.283* (1.873)	0.043*** (3.680)	0.046*** (3.876)	0.020** (2.017)	-0.007 (-1.032)
Bank_Monit * Sanction (Bank)	0.039 (0.503)	-0.107 (-0.703)	-0.064 (-1.495)	-0.026 (-0.400)	0.001 (0.113)	0.011 (0.308)
Maturity	0.025*** (3.568)	0.340** (2.525)	0.027*** (3.986)	0.030*** (4.409)	-0.000 (-0.037)	0.001 (0.278)
Collateral	0.017** (2.478)	0.024 (0.302)	0.033*** (4.813)	0.022*** (3.061)	0.031** (2.525)	0.007* (1.743)
General covenants intensity	0.005*** (2.745)	-0.006 (-0.429)	-0.001 (-0.414)	0.003 (1.536)	-0.004 (-1.616)	0.006*** (5.420)
Performance pricing	-0.003 (-0.318)	-0.168** (-2.098)	0.006 (1.010)	0.008 (0.949)	0.008 (1.116)	-0.014*** (-3.678)
Firm tangibility	-0.035* (-1.884)	-0.665*** (-3.270)	0.032* (1.775)	0.049*** (2.749)	0.009 (0.347)	-0.021*** (-3.007)
Firm Z-score	-0.001 (-0.428)	-0.026 (-1.364)	-0.005** (-2.110)	-0.007*** (-3.630)	-0.002 (-1.504)	-0.000 (-0.236)
Firm RoE	-0.000*** (-3.955)	-0.002 (-1.505)	0.000 (0.120)	0.000 (0.162)	0.000 (1.055)	-0.000 (-0.956)
Observations	19,281	12,057	20,354	20,400	22,671	18,860
Adjusted R-squared	0.211	0.289	0.205	0.297	0.0638	0.191
Bank*Year FE	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y

The table reports coefficients and  $t$ -statistics (in parentheses). The dependent variable is reported at the top of each column. We estimate our regression on a loan-level sample originated from 1987 to 2014. All variables are defined in table 1. All specifications include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. Standard errors are robust and clustered at the firm level. The \*, \*\*, \*\*\* marks denote the statistical significance at the 10, 5, and 1% level, respectively.

Table 7  
Bank monitoring and firm growth: Credit market power

<b>Panel A: Bank monitoring and credit market power</b>						
Dependent variable	Input stage		Outcome stage		Performance	
	Employment growth	R&D growth	Sales growth	Size growth	ROA growth	Book leverage growth
	I	II	III	IV	V	VI
Bank_Monit	0.044*** (2.732)	0.472* (1.827)	0.048*** (2.829)	0.058*** (3.565)	0.031 (1.563)	-0.004 (-0.360)
Sector credit concentration	0.003 (0.061)	0.192 (0.483)	0.059 (1.513)	-0.009 (-0.212)	0.080 (1.033)	0.002 (0.075)
Bank_Monit * Sector credit concentration	-0.053 (-0.751)	-0.998 (-1.190)	-0.174*** (-2.663)	-0.101 (-1.451)	-0.165* (-1.931)	-0.036 (-0.511)
+ Controls	Y	Y	Y	Y	Y	Y
Observations	17,794	10,938	18,872	18,912	21,143	17,360
Adjusted R-squared	0.449	0.345	0.439	0.514	0.179	0.447
Bank*Year FE	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y
<b>Panel B: Hold-up and credit market power</b>						
Bank_Holdup	-0.006 (-1.131)	-0.466 (-1.480)	-0.007 (-1.283)	-0.008 (-1.641)	0.003 (0.805)	-0.005*** (-3.281)
Sector credit concentration	-0.046 (-0.663)	9.698* (1.761)	-0.018 (-0.268)	-0.052 (-0.741)	-0.067 (-0.771)	-0.030 (-0.734)
Bank_Holdup * Sector credit concentration	-0.008 (-0.318)	-3.116 (-1.320)	-0.010 (-0.377)	-0.015 (-0.575)	-0.034 (-1.370)	0.014* (1.734)
+ Controls	Y	Y	Y	Y	Y	Y
Observations	15,821	10,607	16,908	16,945	16,928	17,360
Adjusted R-squared	0.306	0.231	0.339	0.354	0.949	0.277
Bank*Year FE	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y

The table reports coefficients and  $t$ -statistics (in parentheses). The dependent variable is reported at the top of each column. We estimate our regression on a loan-level sample originated from 1987 to 2014. All variables are defined in table 1. All specifications include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. Standard errors are robust and clustered at the firm level. The \*, \*\*, \*\*\* marks denote the statistical significance at the 10, 5, and 1% level, respectively.

Table 8  
Bank monitoring and firm growth: Further robustness

<b>Panel A: Addressing endogeneity with Bank*Firm FE</b>						
Dependent variable	Input stage		Outcome stage		Performance	
	Employment growth	R&D growth	Sales growth	Size growth	ROA growth	Book leverage growth
	I	II	III	IV	V	VI
Bank_Monit	0.028*	0.024	0.038***	0.031**	0.008	-0.012
	(1.956)	(1.018)	(2.933)	(2.085)	(1.399)	(-1.489)
+ Controls	Y	Y	Y	Y	Y	Y
Observations	14,229	8,809	15,056	15,073	16,498	13,728
Adjusted R-squared	0.381	0.527	0.401	0.508	0.094	0.478
Bank*Firm FE	Y	Y	Y	Y	Y	Y
<b>Panel B: Addressing endogeneity with Industry*Quarter FE</b>						
Bank_Monit	0.031**	0.310	0.021	0.044**	0.028	0.005
	(2.055)	(1.174)	(1.161)	(2.521)	(1.611)	(0.581)
+ Controls	Y	Y	Y	Y	Y	Y
Observations	14,573	8,844	15,552	15,592	17,667	14,149
Adjusted R-squared	0.365	0.105	0.295	0.409	0.006	0.462
Bank*Year FE	Y	Y	Y	Y	Y	Y
Industry*Quarter FE	Y	Y	Y	Y	Y	Y
<b>Panel C: Excluding top 3 arrangers</b>						
Bank_Monit	0.031	0.530	0.024	0.058***	0.014	-0.021*
	(1.559)	(1.428)	(1.098)	(2.840)	(0.397)	(-1.818)
+ Controls	Y	Y	Y	Y	Y	Y
Observations	8,428	4,954	9,091	9,112	10,284	8,508
Adjusted R-squared	0.507	0.382	0.483	0.571	0.180	0.513
Bank*Year FE	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y

The table reports coefficients and  $t$ -statistics (in parentheses). The dependent variable is reported in the second line. We estimate our regression on a loan-level sample originated from 1987 to 2014. In Panel C, we drop loans in which the lead arranger is one of the largest three U.S. banks (namely J.P. Morgan Chase, Bank of America, and Citigroup) based on the number of deals. All variables are defined in table 1. All specifications include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. Standard errors are robust and clustered at the firm level. The \*, \*\*, \*\*\* marks denote the statistical significance at the 10, 5, and 1% level, respectively.

## Appendix

Table A1  
Bank monitoring and firm growth: Product complexity

Dependent variable	Input stage		Outcome stage		Performance	
	Employment growth	R&D growth	Sales growth	Size growth	ROA growth	Book leverage growth
	I	II	III	IV	V	VI
Bank_Monit	0.032*** (2.856)	0.293* (1.733)	0.041*** (3.712)	0.047*** (4.098)	0.024** (2.344)	-0.008 (-1.314)
Bank_Monit * Product complexity	-0.006 (-0.309)	-0.061 (-0.125)	-0.036* (-1.743)	-0.028 (-1.495)	-0.015 (-0.828)	-0.010 (-0.892)
Maturity	0.025*** (3.711)	0.330** (2.338)	0.029*** (4.441)	0.031*** (4.937)	0.002 (0.187)	0.003 (0.756)
Collateral	0.011 (1.605)	0.005 (0.058)	0.023*** (3.796)	0.016** (2.369)	0.031*** (3.174)	0.008** (2.146)
General covenants intensity	0.005*** (3.368)	-0.000 (-0.022)	-0.000 (-0.092)	0.003** (2.168)	-0.004** (-2.082)	0.005*** (5.436)
Performance pricing	0.001 (0.093)	-0.180** (-2.106)	0.010* (1.675)	0.011 (1.603)	0.006 (1.103)	-0.014*** (-4.067)
Firm tangibility	-0.142*** (-4.652)	-1.191*** (-2.824)	-0.106*** (-3.313)	-0.007 (-0.293)	-0.044** (-1.960)	-0.001 (-0.099)
Firm Z-score	0.004 (1.443)	-0.026 (-1.343)	-0.004** (-2.209)	-0.007** (-2.558)	-0.001 (-1.437)	-0.000 (-0.385)
Firm RoE	-0.000*** (-3.687)	-0.003** (-2.247)	-0.000 (-0.579)	-0.000 (-0.438)	0.000 (0.581)	-0.000 (-0.849)
Observations	19,162	11,953	20,231	20,275	22,511	18,739
Adjusted R-squared	0.248	0.294	0.246	0.329	0.0739	0.217
Bank*Year FE	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y

The table reports coefficients and  $t$ -statistics (in parentheses). The dependent variable is reported in the second line. We estimate our regression on a loan-level sample originated from 1987 to 2014. All variables are defined in table 1. All specifications include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. Standard errors are robust and clustered at the firm level. The \*, \*\*, \*\*\* marks denote the statistical significance at the 10, 5, and 1% level, respectively.

Table A2  
Bank monitoring and firm growth: Collateral

Dependent variable	Input stage		Outcome stage		Performance	
	Employment growth	R&D growth	Sales growth	Size growth	ROA growth	Book leverage growth
	I	II	III	IV	V	VI
Bank_Monit	0.044*** (3.209)	0.480* (1.879)	0.034** (2.303)	0.053*** (3.774)	0.003 (0.159)	-0.006 (-0.668)
Collateral	0.016 (1.398)	0.055 (0.606)	0.022** (2.080)	0.017 (1.473)	0.027 (1.057)	0.012 (1.629)
Bank_Monit * Collateral	-0.014 (-0.707)	-0.307 (-1.018)	-0.014 (-0.678)	-0.017 (-0.851)	0.021 (0.738)	-0.005 (-0.462)
Maturity	0.030*** (4.070)	0.376** (2.516)	0.029*** (3.648)	0.034*** (4.990)	0.004 (0.294)	0.005 (1.074)
General covenants intensity	0.006*** (3.161)	0.005 (0.273)	0.002 (0.984)	0.005*** (2.649)	-0.006 (-1.229)	0.005*** (3.336)
Performance pricing	0.001 (0.088)	-0.209 (-1.571)	0.000 (0.054)	0.009 (1.106)	0.010 (0.972)	-0.014*** (-2.707)
Firm tangibility	-0.141*** (-3.872)	-1.584*** (-2.631)	-0.131*** (-3.273)	-0.021 (-0.686)	-0.027 (-1.206)	-0.013 (-0.844)
Firm Z-score	0.004 (1.157)	-0.021 (-1.217)	-0.004** (-2.177)	-0.008*** (-4.072)	-0.001 (-1.505)	-0.000 (-0.241)
Firm RoE	-0.000 (-1.279)	-0.002* (-1.649)	0.000 (0.137)	-0.000 (-0.771)	0.000 (1.390)	0.000 (0.035)
Observations	17,794	10,938	18,872	18,912	21,143	17,360
Adjusted R-squared	0.449	0.345	0.439	0.514	0.179	0.447
Bank*Year FE	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y

The table reports coefficients and  $t$ -statistics (in parentheses). The dependent variable is reported in the second line. We estimate our regression on a loan-level sample originated from 1987 to 2014. All variables are defined in table 1. All specifications include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. Standard errors are robust and clustered at the firm level. The \*, \*\*, \*\*\* marks denote the statistical significance at the 10, 5, and 1% level, respectively.

Table A3  
Further robustness tests

Dependent variable	Input stage						Outcome stage						Performance								
	Employment growth		R&D growth		Sales growth		Size growth		ROA growth		Book growth		High performance		Low performance		High performance		Low performance		
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	High performance (>50)	Low performance (<50)	High performance (>50)	Low performance (<50)	High performance (>50)	Low performance (<50)	High performance (>50)	Low performance (<50)	
Low performance (<50)	0.036	0.019	1.187**	0.010***	0.046	0.006	0.054*	0.014	0.029	0.006***	0.032***	-0.015*									
(1.208)	(1.386)	(1.979)	(3.363)	(1.430)	(0.551)	(1.678)	(0.930)	(0.546)	(3.057)	(2.663)	(-1.827)										
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank_Monit	5.699	10.958	2.885	7.254	6.117	11.573	6.152	11.578	6.877	13.009	5.738	10.463									
Adjusted R-squared	0.444	0.325	0.125	0.514	0.397	0.350	0.436	0.424	0.280	0.221	0.612	0.311									
Bank*Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

The table reports coefficients and *t*-statistics (in parentheses). The dependent variable is reported at the top of each column. We estimate our regression on a loan-level sample originated from 1987 to 2014. In Panel C, we drop loans in which the lead arranger is one of the largest three U.S. banks (namely J.P. Morgan Chase, Bank of America, and Citigroup) based on the number of deals. All variables are defined in table 1. All specifications include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. Standard errors are robust and clustered at the firm level. The \*, \*\*, \*\*\* marks denote the statistical significance at the 10, 5, and 1% level, respectively.