

Managerial Overconfidence and Access to Funding: Do Banks Help Managers to Avoid Investment Mistakes? *

Falko Fecht[†] Regina Opaleva[‡]

This Version: January 2021

First Version: December 2019

Abstract

Using unique data on German small and medium-sized enterprises (SMEs), we show that banks' lending decisions help their corporate clients to correct investment distortions associated with managerial overconfidence. We find a strong positive relation between CEO overconfidence measure inferred directly from the SME managers' sales forecasts and the banks' propensity to reject a loan application. We show that SMEs with overconfident managers performed better when their loan applications were rejected than comparable firms with overconfident managers who were granted a loan. We conclude that banks' information incorporated in lending decisions provide valuable guidance to their corporate borrowers' investment policy. These findings complement studies examining the merits of banks as financial consultants as well as the literature highlighting the role of banks in overcoming informational asymmetries between lenders and corporate borrowers.

Keywords: financial advice, overconfidence, SME finance

JEL Classification: G41, G20, D22

*We thank Kreditanstalt für Wiederaufbau for providing access to the data and, in particular, Dr. Michael Schwartz for valuable explanations concerning the process of data collection. Besides, we would like to thank the participants of the 26th Annual Meeting of the German Finance Association in 2019, the Young Economist Conference in Belgrade 2019, and the International Symposium on Finance in Greece 2019 for valuable comments. We also benefited from comments and discussions with Tobias Berg, Kornelia Fabisik, Yigitcan Karabulut, Peter Limbach (discussant) and Carsten Sprenger (discussant).

[†] Frankfurt School of Finance and Management. E-Mail: f.fecht@fs.de.

[‡] Frankfurt School of Finance and Management. E-Mail: r.opaleva@fs.de.

1 Introduction

Banks' role in corporate lending is widely perceived as mitigating lenders' informational disadvantages regarding borrowers' credit risks (Campbell & Kracaw, 1980; Diamond, 1984; Leland & Pyle, 1977). In retail banking banks are also seen as financial consultants and advisers to their retail customers. Given large resources, high financial competence and superior market knowledge, banks were natural candidates to fulfill the needs for financial advice of private investors. However, massive misselling episodes and associated portfolio losses that became evident during the global financial crisis gave a rise to heated policy and research debates on the merits of banks as financial advisors for retail customers (Fecht et al, 2018; Hoechle et al, 2018; Karabulut, 2013). In the meantime, the importance of financial advice provided by banks to their corporate clients has been overlooked. In this paper we provide evidence that the merits of banks as financial consultants extend beyond advising retail customers and comprise guiding corporate borrowers and preventing them from investment mistakes.

One of the main tasks of professional advisors while working with retail investors is to mitigate the detrimental effects of behavioral and cognitive biases on investment portfolio decisions. The list of these biases is extensive and includes among others present-biased preferences (Bertrand & Morse, 2011), excessive extrapolation (Benartzi, 2001), and insufficient or naive diversification (Benartzi & Thaler, 2001; Von Gaudecker, 2015). At the same time, corporate investment decisions proved to be far from bias-free as well. Firms' investments are highly dependent on the beliefs of their managers and CEO cognitive distortions often find reflection in the corporate strategies (Malmendier & Tate, 2005, 2008; Malmendier et al., 2011). Bank employees should be well equipped to detect such biases in the course of the loan granting process and refuse to fund projects planned on the basis of distorted managerial views. Moreover, an agency conflict that drives banks' inefficiencies while advising retail customers or misselling credit products suitable for securitization to retail borrowers (such as mortgages) is irrelevant for corporate clients. Loans to corporates are held primarily on the bank's balance sheet and losses incurred by a borrowing firm due to distorted managerial beliefs are most likely to hit bank profits as well.

In this paper we present empirical evidence that banks help their corporate clients to correct distortions in investment decisions associated with managerial overconfidence. In general, overconfidence was acknowledged as one of the most robust phenomenon in the psychology of judgment (De Bondt & Thaler, 1995, p.389). Although this phenomenon was documented in different social groups and seems to be inherent in human nature (Alicke, 1985; Malmendier & Taylor, 2015), it appears to be especially

prevalent among managers and entrepreneurs (Ben-David et al., 2013; Bernardo & Welch, 2001; Forbes, 2005; Goel & Thakor, 2008). We reveal the effect of managerial overconfidence inferred directly from the managers' sales forecasts on the probability of a failure in the loan negotiations with a bank. Our finding suggests that bank employees detect the tendency to overinvest caused by the overoptimistic managerial judgment in the proposed projects and curtail funding for affected firms. Thus, we show that managers who tend to overestimate future business outcomes are more likely to face difficulties in attracting bank funding and leave the table of negotiations without a loan contract.

We interpret our results as evidence that bank employees by detecting overconfidence bias and curtailing the funding help managers to avoid value destroying investments. Nevertheless, we recognize that the real effects of these decisions demand a closer scrutiny. In this paper we performed two exercises that hint towards the validity of our interpretation. First, we link failures in loan negotiations with the disruptions in actual investments and, not surprisingly, find that difficulties in raising bank funding results in investments' delay, cancellation or downscale.

Second, we merge our sample with the data on firm revenue from Amadeus (Bureau van Dijk) and examine whether the consequences of loan granting for revenue development differ between overconfident and unbiased managers. We find that the real effects of bank funding are fundamentally different for firms with overconfident and unbiased managers. While the lack of funding and a consequent inability to pursue planned investments suppress the revenue growth of firms run by unbiased CEOs, the effect is opposite for overconfident managers. Overoptimistic CEOs whose bias remained overseen by bank employees showed a remarkably lower revenue growth than their peers whose distortions in beliefs were detected. Overall, these empirical tests support our view that bank employees by contracting funding for overoptimistic SME managers correct their distortions in business plans and help them to avoid overinvestment and its detrimental effects.

We base our analysis on the data from a unique longitudinal survey KfW SME Panel that contains detailed information on micro, small and medium-sized enterprises (SMEs) in Germany supplemented with the Creditreform index on the firms' creditworthiness. This dataset offers outstanding opportunities to study the consequences of managerial overconfidence for the interactions between SMEs and banks.

First, its longitudinal nature permits us to derive a direct measure of overconfidence instead of inferring managers' beliefs from their personal portfolio choices as proposed by Malmendier & Tate (2005, 2008) or business press portraits implemented by Malmendier & Tate (2008). To identify overconfident

CEOs, we follow Betzer et al. (2017) and compare managers' forecasts of future sales with the actual outcomes one year later. We identify as overconfident those respondents whose positive expectations did not materialize controlling for economic sector and region specific shocks.¹ As additional variables of high optimism, we draw upon similar measures based on the forecasts of future employment.

Second, the dataset contains proprietary information on the SME managers' investment plans, negotiations with the banks, firm financial needs and the final outcomes of the negotiations. This information enables us to disentangle the effects of credit demand and supply by identifying firms that had investment plans and intended to finance them using bank credit but faced difficulties in receiving bank funding.

Third, the KfW SME Panel contains a wide range of data on SMEs and therefore permits us to saturate our model with a broad set of control variables including rarely available manager-specific characteristics and firm location. Merging this data with the information on the firm's creditworthiness from Creditreform strengthens our analysis even further by enabling us to reliably control for the firms' credit risk. Moreover, by saturating our model with the region, economic sector and time fixed effects as well as their interactions we are able to absorb region and sector specific shocks that might also lead to a deviation of actual firms' outcomes from the forecasts.

Fourth, unlike most papers studying finance-related implications of managerial overconfidence we have an opportunity to base our analysis on the sample of SME firms. Due to high opaqueness and a limited presence in public databases, this segment remains a black box for researchers interested in the financial consequences of distorted managerial beliefs. Given the utmost importance of SMEs for many economies, particularly in terms of employment (Kaya & Schildbach, 2014), better understanding of this segment is crucial to foster economic development and avoid disruptions that can otherwise impose immense economic and social costs. At the same time, the manager's overconfidence bias and his interactions with banks are particularly relevant for SMEs. SMEs are more likely to be constrained in receiving financial advice via other channels and banks as investors play a crucial role. Very few SMEs have access to funding from other agents that can have sufficient expertise to detect wrong managerial views and

¹We use the terms overconfidence and overoptimism interchangeably. In general, overconfidence can manifest itself in different forms such as better-than-average effect, overprecision or overestimation of the probability of a positive outcome (Malmendier & Taylor, 2015), while overoptimism refers primarily to the last mentioned form. However, in the finance literature a more general definition of overconfidence that is indistinguishable from overoptimism is adopted. In finance studies overconfidence is viewed as overestimation of the future performance (Ahmed and Duellman, 2013; Deshmukh et al, 2013; Hirshleifer et al., 2012; Malmendier & Tate, 2005, 2008; Malmendier et al., 2011). A most probable reason for this simplification is the lack of finance data that could allow researchers to disentangle between various underlying mechanisms of overconfidence. Given the structure of our data, we follow this tradition and define overconfidence as overestimation of future business outcomes.

resist erroneous decisions (Berger & Udell, 1998). Besides, in case of SMEs distorted managerial judgment can be particularly detrimental for business development. In contrast to big corporations, SMEs often lack governance mechanisms that are propagated as remedies against managerial misjudgment (Malmendier & Tate, 2005). Moreover, many SMEs are managed by their sole owners. In such cases, the manager possesses full decision making power and a destructive effect of wrong managerial perceptions cannot be limited by a feedback from other owners (Betzer et al., 2017).

We find a strong positive relation between managerial overconfidence and the probability of failure in loan negotiations: according to our baseline model, overconfident CEOs are around 6 pp more likely to fail with their loan requests and leave the bank without a loan agreement. As the average probability of failure corresponds to 31 pp, the disadvantage of overoptimistic managers is economically sizable (19.35%). To put these figures in perspective, a detrimental effect of overconfidence is comparable to the firm downgrade from the first to the third risk class of Creditreform.

The relation between overconfidence measure and loan negotiation failures could be driven by a reverse effect of failures in interactions with banks on the forecast error. To rule out this possibility, we replace overconfidence measure with its lags and find an even stronger effect of managerial overoptimism. Furthermore, we strengthen the validity of our interpretation by showing that a relation between overconfidence and loan negotiation failures is relevant particularly for SME managers operating in shrinking economic industries, while overestimation of future returns in booming industries remains mostly undetected by bank employees. Besides, we address the issue of endogenous selection of overoptimistic managers at the level of loan application submission. Specifically, we correct for the selection bias associated with a stronger tendency of overconfident managers to seek for bank funding. To do that, we enlarge the sample with firms that planned investments but refrained from applying for bank credit and apply a two-stage selection model initially developed by Heckman (1979). The results revealed the selection effect but at no point undermined the negative relation between managerial overconfidence and loan negotiation success. Finally, we proof checked the robustness of baseline results by using overconfidence measures based on the managers' forecasts of future employment and alternative variables proxying for failures in loan negotiations. Besides, we estimated the baseline probability model using non-linear techniques.

Our analysis complements the work showing the importance of financial advice for decision making and investment outcomes. Research studies on household finance point towards the necessity to

support households in their investment decisions and correct their behavioral and cognitive biases (Benartzi, 2001; Benartzi & Thaler, 2001; Bertrand & Morse, 2011; Von Gaudecker, 2015). Bank financial advisors were shown to be successful in attenuating core cognitive distortions such as underdiversification, home bias and portfolio churning (Karabulut, 2013). Besides, professional financial advice offers other benefits such as easing the effects of financial illiteracy (Von Gaudecker, 2015) and high risk aversion (Gennaioli et al., 2015) as well as planning retirement savings (Lusardi & Mitchel, 2011) and optimizing taxes (Amromin, 2008; Bergstresser & Poterba, 2004). However, a recent strand of literature sheds light on the dark sides of banks as financial advisors. Fecht et al. (2018) show that universal banks do not miss an opportunity to exploit their uninformed retail investors and tend to sell illiquid and subsequently underperforming stocks held in the proprietary portfolio to retail clients. This evidence was coupled with a deeper analysis of the quality of financial advice that suggested a lack of customization and poor net-of-fee performance (Foerster et al., 2017; Hackethal et al., 2012).

We show that a bright side of banks as financial consultants finds a reflection in their interactions with corporate borrowers. We believe that implicit financial guidance provided by banks in the loan application process plays a critical economic role. Unlike private investors, firm managers are constrained in receiving financial advice regarding the investments, since their projects are not standardized and require detailed analysis of the underlying business model. Hiring external financial consultants or dedicating sufficient resources to information production within the firm, e.g. by employing financial or business analysts, is often prohibitively costly. As a result, the process of decision making cannot be supported with extensive data analysis and to a large extent relies on the manager's judgment and intuition. With this respect, SMEs are likely to be particularly disadvantaged.

Furthermore, our research is related to studies emphasizing the crucial role of banks in information production. Information production is viewed as the core function of financial intermediaries (Diamond, 1984; Ramakrishnan & Thakor, 1984). Traditional finance literature emphasizes reduction of information asymmetries and prevention of adverse selection and moral hazard issues as primary value adding tasks of loan officers. With a rapid development of credit scoring methods, loan officers' contribution seems to shift towards processing of soft information that is hard to quantify, communicate or transfer. Recently Berg (2015) provided empirical evidence that careful assessment of soft information by bank employees achieved with risk management involvement leads to a better credit quality of the loan portfolio.² Besides, it is well known that soft information production performed during bank-

²This study is based on the analysis of the bank organisational design and emphasizes the differences in the roles of loan offi-

borrower interactions brings benefits for the borrower as well. Petersen & Rajan (1994) showed that soft information production performed by banks in the course of relationship lending has positive influence on business funding such as better availability and terms of credit. Cotugno et al. (2013) confirmed that accumulation of soft information in relationship lending mitigated the consequences of credit crunch in 2007 - 2009. Our research shows that the valuable contribution of loan officers comprises not only client's screening and monitoring but also provision of financial guidance beneficial for corporate borrowers, since the result of communication with the banks incorporates professionals' opinion regarding the planned investment projects.

Finally, our paper contributes to the broad literature studying finance-related implications of overconfidence (e.g. Ahmed & Duelman, 2013; Andriasopoulos et al., 2013; Campbell et al., 2011; Deshmukh et al., 2013; Graham et al., 2013; Malmendier & Tate, 2005, 2008; Malmendier et al., 2011). In particular, we complement the work initiated in Malmendier & Tate (2005, 2008) and Malmendier et al. (2011) by investigating the consequences of managerial overoptimism on firm financial structure and investment outcomes. While these papers showed the effects of overconfidence from the finance demand side, we explore the supply side of manager-investor interactions. Besides, we reveal that communicating with banks is another mechanism of reducing cognitive distortions apart from strong corporate governance and external capital markets. Our analysis also extends the work of Betzer et al.(2017) who showed how cognitive biases, namely overconfidence and cognitive dissonance, can reinforce each other in the business context and drive investment policy.

The remainder of the paper is structured as follows. Section 2 describes the data we base our analysis on, defines the variables, and explains our empirical strategy. In Section 3 we report descriptive statistics. The results of the baseline model and its extensions are presented in Section 4. We proceed with Section 5 by examining the real effects of banks' lending decisions and overconfidence and check the robustness of our results in Section 6. Section 7 concludes.

2 Data and Empirical Strategy

This section introduces the sources of data we base our analysis on, the variables we include in the model and our empirical strategy.

cers and risk managers in the analysis of loan applicants' creditworthiness. In our study we abstract from banks' organisational peculiarities and refer to all bank employees who analyze loan applications as loan officers.

2.1 Data

In this study we employ a unique longitudinal dataset that contains detailed information on micro, small and medium-sized enterprises (SMEs) in Germany. This dataset is the result of KfW SME Panel, representative survey conducted by the German national development bank KfW (Kreditanstalt für Wiederaufbau) on an annual basis starting from 2003.

The survey aims at providing a comprehensive overview of various aspects of German SMEs' economic activity and contains firm general characteristics (sector of operations, location, legal form, year of foundation, etc.), employment and financials (number of employees and active owners, revenue, export activities, assets, etc.), investments and their financing (planned and actual investments, negotiations with banks, investment financing, etc.), innovation (R&D activity, etc.) as well as the enterprise owner's attributes (socio-demographic information, education, founder status, etc.). The survey is sent out to a sample of firms with an annual turnover not exceeding 500 mln Euro. The number of firms responded to the survey ranges from 8,937 in 2006 to 14,962 in 2003 with an average response rate of 21%. In order to maintain the size and representativeness of the sample, the KfW replenishes the pool of contacted firms every 2 years.³

We retrieve managerial overconfidence by comparing respondents' sales forecasts with the actual sales outcomes (interchangeably revenue) one year later and investigate the effect of the manager's overconfidence on the probability that he reports a denial of a loan request. We perform the analysis by using a broad list of further characteristics collected in the survey. We focus on the outcomes of negotiations between SMEs and banks from 2004 until 2012. The time period of our analysis ends in 2012 (wave 2013), since our main question of interest containing the respondent's expected changes in the future revenue was reformulated and starting from this wave implied a longer forecasting horizon of 3 years.⁴

We append the KfW SME dataset with the Creditreform Default Index (Creditreform Bonitaetsindex) measuring creditworthiness of individual enterprises⁵. Creditreform Default Index measures the

³The survey is sent out in the beginning of each year and refers to economic and financial outcomes achieved over the past year (in some cases complemented with a comparable enquiry for previous years). In general, the survey follows a unified structure. However, the formulations of some questions can vary from one wave to another. In some cases additional sections referring to special topics were added.

⁴However, we extend the analyzed time period until 2017 while checking the robustness of our results with regard to alternative overconfidence measures based on the employment forecasts. The first wave conducted in 2003 and reflecting participants' answers for 2002 is fully omitted from our analysis, since the questions were fundamentally refined after this wave. Besides, since our main overconfidence measure links revenue forecasts to the actual outcomes and we use the first lag of this variable in the analysis of SMEs' negotiations with the banks, we analyze firms' negotiations outcomes starting from 2004.

⁵Creditreform is a German financial company focusing on solvency checks, debt collection and direct marketing. Conduct-

enterprise creditworthiness based on a wide range of up to date firm's information including its financial performance, development, assets, liquidity, mode of payment etc. The resulting index ranges on a scale from 100 (excellent creditworthiness) to 600 (insolvency).

We use the individual firm's Creditreform Default Index at the beginning of the respective year. Default Index was available for almost half of the enterprises in the sample (48%). In order to allow for non-linear effects of this index, we use 6 risk classes based on the mapping of index values to the rating systems of major financial institutions⁶.

We refine our sample by introducing additional adjustments. First, we exclude firm observations with zero values of the number of employees (which refers to 4.53 % of the sample) and set lower bounds of 1,000 Eur for revenue (0.67 %) and total assets (2.81 %) as well as 500 Eur for investment volume and credit needs (0.33 %). Second, we keep only responses filled by enterprise owners or managers and omit answers of regular employees or other persons, which results in an exclusion of 14.6 % of the sample. Third, we exclude few observations indicated as non SMEs (0.03 % of the sample) and winsorize the revenue growth at the values of the 1st and 99th percentiles (1.2%).⁷

As a result, our final sample consists of 84,944 firm-year observations referring to 32,448 firms over the time period from 2004 until 2012.

2.2 Variables and the Model

This section describes variables that form the basis for our panel analysis. The list of all variables used and respective definitions are presented in Table 1.

[Insert Table 1 around here]

ing solvency analysis for SMEs across Germany is an important part of the Creditreform business. The data was provided by the KfW.

⁶The mapping of Creditreform Default Index and other financial institutions' ratings is provided by Creditreform on its web-site. The mapping might change from one year to another. The version used in this paper was retrieved from <https://www.creditreform.de/microsites/creditreform-ratingmap-deutschland.html>

⁷Besides, as the first data preparation step we have cleaned the sample by replacing inconsistent or implausible values with missing values for each question or each related set of questions. With regard to these changes, 12.6% of the sample were affected. For brevity, these basic data quality checks are not reported here, but available at request.

2.2.1 Overconfidence

As stated above, the KfW SME Panel allows us to derive the measure of managerial overconfidence directly from managers' beliefs regarding future development of the firm. Survey respondents were asked to provide qualitative forecasts of future sales (interchangeably revenue); specifically, they were asked whether they expect an increase, decrease or no change in the firm's sales in the upcoming year. The longitudinal nature of the survey enables us to identify whether managers' forecasts realized one year later. To be precise, we follow Betzer et al. (2017) and define managerial overconfidence in the following way. An enterprise manager is marked as overconfident in a particular year if he expected a sales' increase in the following year, but when contacted in the next survey wave (one year later) did not report a higher actual sales' level or reported a negligible sales' increase not exceeding German CPI change.⁸

Unlike alternative approaches of inferring managers' beliefs from their personal portfolio choices as proposed by Malmendier & Tate (2005, 2008) or business press portraits implemented by Malmendier & Tate (2008), we detect overconfidence bias directly from CEO forecasts of future business outcomes. While CEO failure to reduce personal exposure to firm-specific risk can be driven by higher risk appetite or insider information, overestimation of future business performance is related purely to managers' beliefs. Besides, using option-based overconfidence measures implies an endogenous selection of firms that established an option-based compensation scheme for their executives. A complementary way of defining overconfidence by analyzing CEO business press portraits, although being more transparent, is also susceptible to capturing the effect of risk taking, since CEOs with higher risk tolerance are likely to behave more confident and optimistic in public in order to justify excessive risk in their corporate strategies. Moreover, we can rule out that managers' forecasts we use are formed strategically, as the KfW stresses for the respondents that all the information received in the survey is held anonymously and strictly confidentially. Therefore, participants can rule out the possibility that their responses can be used in lending operations or transferred to other financial institutions.

Malmendier & Taylor (2015) raise a concern that overoptimism measures based on the comparison of forecasts and actual outcomes might capture not only the CEO bias but also simple mistakes. To prove the relevance of our overconfidence measure, we conduct two additional tests⁹. First, we followed

⁸While generating a measure of overconfidence, we do not consider observations with an actual change in revenue exceeding 100%, since in cases when business growth or decline is so rapid our measure is more likely to capture a result of a rational expectations error associated with extraordinary events rather than managerial overconfidence. This refinement is marginal and affects only 2.11% of the sample.

⁹The tables reporting the results of these exercises are not provided here for brevity and are available at request.

the idea if Betzer et al. (2017) and analyze of the persistence of our overconfidence measure over time in our sample and confirmed a high persistence of CEO upward forecast errors over time. It implies that an overconfident manager is more likely to remain overconfident in the next years, which contradicts the nature of unbiased rational expectations error but rather confirms the view that overconfidence is a structural characteristic of a manager. Second, we generate an opposite measure of overoptimism by marking cases when CEO expressed pessimism with regards to future sales but turned out to be wrong and replace overconfidence with its counter-variable in our analysis. The results suggest that the core analyzed effect of our overconfidence measure is not present in case of downward biased forecasts. These tests assure that our overconfidence measure indeed captures CEO behavioral bias and is fundamentally different from simple forecasting errors that are made by rational agents as well.

As a robustness check, we use similar measures based on the forecasts of future employment. These forecasts are quantitative, i.e. the respondents were asked to indicate a number of employees they expect to register in the firm at the end of the next year. Following the same approach of comparing forecasts and actual realizations, we generate two alternative overconfidence variables. The first one (named Version 1) is fully analogous to the sales-based measure. An enterprise manager is considered overconfident in a particular year if he expected a positive change in the total number of employees in the following year, but when contacted in the next survey wave (one year later) did not report an increase in employment. The second one (named Version 2) is based on the direct comparison of the expected number of employees with its actual realization. It defines a manager as overconfident in year t if his expected number of employees exceeded the actual employment one year later (year $t+1$). While using these measures, we extend the time period of analysis to 2017, since questions referring to employment forecasts remained unchanged.

2.2.2 Financing Difficulties

We measure firm's financing difficulties on the basis of the survey questions that refer to the interactions between SMEs and the banks. First, the manager was asked whether he planned any investments in the past year. Second, he could indicate whether he was engaged in any negotiations with banks with the purpose to receive funding for these investments. Besides, he was asked to specify the respective credit demand. Third, the respondent could indicate whether bank negotiations at least once, always or never led to a loan contract. In case the response implied that the negotiations did not at least once lead to

a credit agreement, i.e. failed, the respondent was asked whether negotiations at least once ended with a loan offer from the bank's side. Until Wave 2016, the survey contained an additional question on the reasons of negotiations' failure, i.e. how the bank employee justified the rejection of the loan application and what were the reasons for firm's decline of the loan offer.

Our main proxy for financing difficulties is a binary variable indicating at least one failure of negotiations between the firm and the bank. This variable equals to one if the firm at least once was engaged in the negotiations with the bank that did not lead to a loan agreement.

As a robustness check, we use two alternative proxies for financing difficulties. The first one is a binary variable indicating that bank negotiations never led to a loan offer. This measure defines financing difficulties as complete credit rationing of the firm. The second proxy is a binary indicator that equals to one if negotiations with the bank either never ended with a loan offer or resulted in a loan offer with the terms unacceptable for the firm. Unacceptable terms include prohibitively high interest rate, insufficient credit volume or stringent collateral requirements that could not be fulfilled. This variable implies that cases when the terms of the loan offer are prohibitively stringent represent financing difficulties.

2.2.3 Control Variables

Since the KfW SME Survey contains questions on various aspects of SMEs' activity, we are able to saturate our model with a broad set of control variables.

First, we include general firm characteristics in order to take into account the differences in business models and enterprise development. We control for the firm size (measured by the revenue), prior revenue growth and effects of the business life stages reflected in the firm age. Other control variables capture the peculiarities of enterprise business model, specifically the presence of export and R&D activities. Moreover, we append this list with a measure of firm opaqueness tracing enterprises obliged to follow German or international accounting standards. An important set of further firm characteristics refers to the enterprise ownership and management structure. We take into account whether the owner is an active manager as well as the overall number of active managers and owners in the enterprise. We also mark SMEs that are owned at least by 25% by another legal entity. Given that managerial forecast errors might be driven by regional or sector specific shocks, we identify firm economic sector and location (6 sectors and 16 German regions were considered) as well as the enterprise legal form in order to apply

fixed effects in our regressions and thereby improve the identification of managerial overconfidence and its impact on credit availability.

Second, along with the general firm attributes, we consider the enterprise's credit risk which is captured by the Creditreform Default Index. The index was split into 6 binary risk classes. Risk Class 1 comprises enterprises with the best creditworthiness and the lowest probability of default, while Risk Class 6 contains firms that are close to insolvency (or already insolvent). This control variable plays a crucial role in our analysis, since credit risk forms the basis for the loan officers' loan granting decisions and overconfidence might be driven by high creditworthiness. Third, we control for the size of the firm's credit demand and prior experience of the enterprise in such negotiations. Fourth, we consider owner characteristics that are relevant in cases when the enterprise is managed directly by the main owner (84% of the sample). Prior studies on overconfidence have shown that this bias is correlated with the person's characteristics such as socio-demographic status, education and experience (Berger et al., 2017; Forbes, 2005). However, such traits might simultaneously drive the success of the negotiations with the banks. As an example, higher education might enable the manager to communicate his investment plans in a more structured and concise manner, while a firm founder may be more convincing in describing the peculiarities and advantages of the firm's business model. Our set of control variables comprises the managing owner's gender, age, level of education, and the type of firm acquisition, i.e. status as founder or successor.

2.2.4 Model Structure

We identify the effect of overconfidence on loan negotiation outcomes with the following panel model:

$$\begin{aligned}
 Prob(Negotiations\ Failure_{i,t} = 1) &= Overconfidence_{i,t} + Credit\ Needs_{i,t} + Firm\ Controls_{i,t} \\
 &+ Firm\ Creditworthiness_{i,t} + Negotiations\ Experience_{i,t} \\
 &+ Managing\ Owner\ Controls_{i,(t)} + \gamma_j + \gamma_r + \gamma_t + \epsilon_{i,t} \quad (1)
 \end{aligned}$$

Here, i refers to the responding firm, t refers to the respective year, γ_j and γ_r represent fixed effects for the economic sector of the firm's operations and the region of the firm's location, while γ_t refers to the year fixed effects. In order to improve the identification of the overconfidence effect, we stepwise include interactions of year, economic sector and region fixed effects that absorb variation associated with the

business uncertainty in the local markets and economic sectors as well as its changes. Since our model contains multiple fixed effects, especially when the interactions of region, year and sector fixed effects are used, we apply linear probability model and use non-linear methods as a robustness check.

The overconfidence measure ($Overconfidence_{i,t}$) is constructed by using sales forecasts for year t given in the survey taken at the beginning of the year. This forecast for t is then compared to the actual sales growth reported by the same firm in the subsequent survey wave taken in the beginning of the year $t + 1$. On the left-hand side we use an indicator variable $Negotiations Failure_{i,t}$ reflecting the outcome of negotiation between the SME manager and his bank that took place in t and were reported at the survey wave in the beginning of $t + 1$. Thus, we regress the loan negotiations outcome in year t on managers' overconfidence at the beginning of t . In subsequent analyses we also use the lagged overconfidence measure to deal with endogeneity concerns.

3 Descriptive Statistics

Descriptive statistics (Table 2) reveal that our sample consists primarily of micro and small enterprises with the average yearly revenue of 6.5 mln Eur. The presence of micro businesses is remarkable, given that half of the sample firms have a turnover below 1.5 mln Eur.

[Insert Table 2 around here]

However, despite the moderate firm size, the survey participants are far from being occasional business ventures. The majority of them are well established and have a long history in the market; the median firm age is almost 20 years (18). Most of these enterprises (82%) are obliged to follow German or even international accounting standards, while every third firm expanded its business beyond local geography (33% of firms have exports). Furthermore, our data supports a widely spread view that entrepreneurship plays a crucial role in driving innovation, since almost every fifth enterprise in the sample (18%) pursues R&D activities.

In general, SMEs participating in the survey are highly ranked borrowers. Almost 90% (87%) of them belong to the top three risk classes, while 29% are assigned to the rating class with the highest creditworthiness.

The sample consists primarily of growing firms. Besides, our data suggests that German SMEs

strive for growth, which is reflected in a strong intention of managers to invest. 68.7% of firms in the sample planned investments, while the planned amounts constituted on average almost 30% (29%) of the revenue. Nonetheless, constant financing needs among SMEs were coupled with a limited choice of financing options. As a result, ambitious plans often had to be adjusted. Given that 45% of firms in the sample applied for a bank loan, our data confirms the view that bank credit remained the core funding source in the SME segment (Kaya & Schildbach, 2014). Despite a high average creditworthiness of the sample enterprises, many of them were not successful with their loan applications. Almost a third of them (31%) experienced at least one failure in the negotiations with the bank. In approximately the same percentage of cases (28%) managers had to give up on their business plans and canceled, delayed or downscaled investments.

Our data confirms that the overconfidence bias among SME managers is a widely spread phenomenon. In this sense, they are not different from their peers in larger enterprises. Almost 10% (9%) of the survey respondents were classified as overconfident. Furthermore, our data supports the view that managerial judgment plays a particularly important role in the SME segment and Germany is not an exception with this respect. In the vast majority of cases SME firms are managed by their owners (84%). More than a third of the cases (34%) are sole proprietorships. Only in 38% of cases there are other partners, owners or managers who are actively running the firm and could timely respond to the manager's plans and decisions. However, the lack of professional feedback could be compensated by the managing owner's education (only 2% of respondents have no degree) and experience (the average managing owner is 48 years old).

The comparison of the mean values for overconfident and non-overconfident managers reported in Table 3 suggests that firms run by overconfident managers are indeed different from those managed by non-overconfident CEOs.

SMEs run by overconfident managers are on average larger, more export and R&D active and characterized with faster growth. Furthermore, they often have a more diversified ownership and managerial structure, reflected in a larger average number of active owners and managers. However, firms managed by overconfident CEOs are more likely to receive worse credit risk scores. At the same time overconfident CEOs seem to be more aggressive in their investment strategies aiming for larger investment volumes. This shows that it is important to control for firms' credit worthiness, as overconfidence also impairs firms' credit quality which in itself affects the firms' ability to obtain credit. As a consequence,

they slightly more often approach banks to finance their investments, which allows them to collect more experience in loan negotiations.

We extend the comparison of the differences between overconfident and unbiased managers by analyzing the variables that cannot be used in our regression models, as they were included in the survey only in specific years, but shed light on the nature of bank-firm relationships. These variables are analyzed in Table 4 and include the number (year 2013) and type (2004-2005) of banks the firm approached with a loan application and general relationship lending characteristics referring to the Hausbank (2017). As for most of the years covered by these variables we do not observe our main overconfidence sales-based measure, we use alternative overconfidence proxies based on the employment forecasts. The results of this analysis reveal that overconfident managers do not differ from their unbiased peers with respect to strategies in raising bank funding. They approach on average 2 banks preferring savings and cooperative banks and as a rule establish long-lasting relationship with the Hausbank, although being not fully dependent on its funding. The only statistically significant difference between unbiased and overconfident managers is reported for the number of banks providing credit, but this significance is only weak and disappears if an alternative overconfidence proxy is used.

Therefore, we can conclude that despite the differences in the firm characteristics and more ambitious investment plans, overconfident managers do not follow different strategies while raising bank funding.

4 Results

4.1 Baseline Results

The results of the baseline model are reported in Table 5.

[Insert Table 5 around here]

The first column refers to the simplest specification when managerial overconfidence is the only independent variable in the regression (apart from the general fixed effects). In columns (2) – (5) we build up the model stepwise by adding further control variables. We start with the credit needed and firm revenue in column (2), add further general firm characteristics in column (3) and credit risk classes in column (4), and finally append the model with a measure of firm prior experience in bank negotiations

(column (5)). In addition model (6) considers owner's characteristics that are relevant only in cases when the owner manages the enterprise.

In the subsequent models we saturate the estimates step by step with fixed effects. We add interactions of economic sector and year fixed effects (columns 7 - 8) to control for sector-specific shocks that might simultaneously affect both the deviation of actual revenue from forecasts and the credit availability. Similarly, in columns 11-12 we consider time-varying regional fixed effects. Finally, we fully saturate the model with interactions between sector, year and region fixed effects that account for local sector specific shocks (columns 13 - 14).

The results are robust across these variations and support our main hypothesis: overconfident managers are more likely to face difficulties while seeking bank credit for investment financing. In all the specifications, overconfidence measure is positive and statistically significant at least at the 5% level. Estimates suggest that overconfident managers are about 5.3 – 6.4 pp more likely to leave bank negotiations without a loan agreement (see final specifications 13 and 14). Given that the average probability of failure is 31 pp, this effect is not only statistically but also economically highly significant. Extending the list of control variables and applied fixed effects has little impact on the size and significance of the overconfidence coefficient, while R-squared shows a remarkable increase from 4.4% to 19.8%.

The estimated effects of the control variables are intuitive. Smaller firms are less likely to leave the negotiations with a loan contract. A one deviation increase in revenue from the mean value is associated with an increase in the negotiations' success probability by 5.6 pp (given the coefficient estimate in the final specification 14). Faster growing firms attract funding easier, even though the magnitude of the effect is moderate (10% increase in the revenue results in 0.5 pp increase in the probability to succeed with a loan application, see specification 13). R&D active firms are 11.5 pp more likely to fail the negotiations than their peers refraining from R&D spending (see specification 14). Enterprises owned by a legal entity have lower chances to succeed, while several owners managing the firm (2 or more) are more likely to agree on a loan (albeit the coefficients are not robust and only weakly significant in most specifications). Very persistent effects are found with regard to the credit risk classes. The signs and magnitudes of coefficients follow the expected pattern: firms with worse risk classes are more likely to fail in obtaining a loan. The difference in success probabilities between the best and the worst risk classes exceeds 40 pp (see specification 14). Surprisingly, prior experience with loan applications is associated with a higher probability to fail negotiations. The respective coefficient is statistically significant (at 5% level) with the

magnitudes of 2.7 pp – 3.6 pp. Besides, managing owner’s characteristics were not indicated as significant factors for the success in bank negotiations. Loan officers do not seem to differentiate between SME managers of different gender, age, education, or acquisition type.

4.2 Reversed Causality

A key concern when interpreting our results is that they might actually reflect a reverse causality: Ultimately SME managers might have based their revenue forecast on the assumption that they will be able to obtain a loan and expand their business. Those that did not receive external financing from their bank were restrained in their growth, could therefore not meet their sales forecast and ex-post appear to have been overconfident when applying for the loan. In order to show that our results are not subject to this issue, we replace the one-year lag of our overconfidence measure with its two- and three-year lags. Manager’s beliefs in the beginning of year $t-1$ regarding sales changes by the end of year $t-1$ could not be driven by his expectations on returns of investments planned to be implemented and financed in year t .

The results of this exercise are reported in Table 6. Specifications (1) and (2) simply include the two-year lag of the overconfidence measure with the two different sets of control variables and the most comprehensive set of fixed effects, i.e. the interactions between firm sector of operations, region and year fixed effects. For both specifications the results are similar to the baseline regression. While the key effect of our overconfidence measures is statistically slightly less significant, its economic magnitude remains unaffected. Also the estimated effects of the control variables remain largely the same.

[Insert Table 6 around here]

A further potential issues one might have with our baseline analysis is that in the literature overconfidence is mostly perceived as a structural characteristic of decision makers. While our identification comes not only from the cross-sectional but also from the intertemporal variation in overconfidence, we can consider whether the effect of a persistent overconfidence of the manager has a stronger effect. In order to do so we include in columns (3) and (4) we additionally also include the overconfidence measure of the previous year ($t-3$). As the results indicate the effect is indeed substantially stronger if we include both the one and the two period lagged overconfidence measure. Not only does the inclusion of this further lagged exogenous variable increase the statistical and economic significance of the key variable, it also improves substantially the goodness of fit of the model from 19.8% to 35.8%. The results suggest that managers whose optimistic expectations regarding firm sales development did not realize in both

preceding years are 16.7 pp more likely to fail in the negotiations with the loan officer in the current year (see column (4)).

Overall, the results support our interpretation of the baseline analysis implying that loan officers detect overconfidence bias in loan applications and by cutting the funding keep overconfident managers from overinvesting.

4.3 Overconfidence and Stock Market Growth

A key issue in our analysis is to properly identify managerial overconfidence. In this regard, a concern is that our overconfidence measure is blurred if sales forecasts are mostly not met because of some unforeseen shocks. Using time varying sectoral fixed effects for each regions we can account relatively granular for such shocks. However, the sectoral breakdown might not be sufficient to capture industry specific unexpected evolvment. Our sample size on the other hand does not allow for applying time varying industry fixed effects. As an alternative to contain such concerns we resort to aggregate stock price movements across the different industries in Germany. More precisely, we construct equal-weighted stock price indices for the different industrial sectors on a yearly basis and merge these indices with the KfW SME Panel data using a granular industry code.¹⁰ SIC codes for SMEs in the sample were obtained from the Amadeus Database Bureau van Dijk. The definition of economic sectors based on the two-digit SIC code is very refined and permits us to capture industry specific shocks on a granular level. The granularity also implies that we have for each sector only few stocks. In order to ensure that stock indices are representative for the industry we keep only sector-year observations with at least 3 stocks. After merging, the sample consists of SMEs from 48 industrial sectors with the average yearly stock price growth of 6.0 pp and standard deviation of 26.6 pp.

Too optimistic forecasts of SME managers might also simply reflect a positive or even exaggerated sentiment in a particular industry. Using industry specific stock price indices allows us to also capture

¹⁰The data on stock prices is retrieved from the DataStream. The advantage of this database as a source for the stock market information is the presence of delisted stocks, i.e. those of firms exited the stock exchange prior to the moment of the analysis. The dataset contains 659 active and 1,382 delisted equity stocks. 599 of them had to be omitted from our analysis due to unavailable industry code. This issue refers primarily to the delisted firms. The final sample contains 626 listed and 816 delisted equity stock prices starting from 1999. We drop the observations with price growth values lower than the 1st or higher than the 99th percentile, since extreme company's stock changes are more likely to be purely idiosyncratic and not grounded in the industry trends. The average individual stock price growth is 1.7 pp. In the second step we assign each individual company's stock to an industrial sector based on the first two digits of its SIC industry code. Finally, we calculate a equal-weighted average of stock price growth for each industrial sector in each year and merge the resulting variable to the KfW SME Panel on the industry-year level.

this effect. A large increase in the market value of firms' in a certain industry should be related to increased earnings expectations in this industry. To be more specific, we run our baseline regression including as a further control variable the same industry's average stock return *prior* up to the date when the respective SME manager gave his sales revenue forecast. This simply means that rather than using the contemporaneous stock market evolvement of the respective industry, we use the one year lagged stock price increase of the industry.

Table 7 presents the results to this exercise. Without accounting for characteristics of the SME owner we do not find any evidence that the previous year's stock price development in the same industry has an influence on the SME's difficulties of obtaining a bank loan (column (1)). In contrast, taking the full set of control variable into account (column (2)) we find that indeed a stronger stock price growth in an industry improved the chances of SMEs in the same industry to obtain bank financing. One standard deviation increase in the stock price growth (26.6 pp) is associated with 3.4 pp higher probability of a positive outcome in the bank negotiations. Most importantly, when including these additional control variable accounting for the industry-wide market sentiment, our key variable of interest remains highly significant. In fact, when controlling for industry sentiment in this way the effect of our key variable of interest on the loan negotiation outcome is economically substantially more significant suggesting a 10.2 pp disadvantage of overconfident SME managers in bank negotiations (compare column (2) in Table 7 and column (14) in Table 5). So our overconfidence measure and its effect on bank loan availability does not seem to be strongly correlated with a positive market sentiment.

[Insert Table 7 around here]

In order to shed further light on the interaction of market sentiment and the implications of SME managers' overconfidence on SME's access to bank loans, we next want to study whether managers' overconfidence has a different effect on loan negotiation outcomes when there prevail positive rather than negative market expectations of an industry's future earnings. This means we test whether overconfident SME managers in industries with poorer stock market development have lower chances to succeed in negotiations for a bank loan compared to overconfident SME managers in booming industries. To run a simple diff-in-diff approach, we transform our continuous measure of stock price growth into two binary indicators: one indicating industries that are particularly poorly performing. This indicator ("Weak stock price performance") is one for industries whose stock market index growth was in lowest quartile of annual growth rates over the entire sample period. The other one indicating particularly well performing industries ("Strong stock price performance") is one if the annual growth rates of the sectoral index

falls in the highest quartile.

[Insert Table 8 around here]

The results of this exercise are presented in Table 8. They show that the effect of managerial overconfidence on loan negotiation outcomes is particularly strong in situations when it is associated with a poor outlook for the respective industry. The reason might be that in those cases the managers' overconfidence is particularly evident, i.e. SME manager expects an increase in revenue while the outlook for the respective industry's earnings are deteriorating. The interaction between the overconfidence measure and the indicator for weak stock price performance is highly statistically significant in both specifications (column (1) and (2)) and with 12.6 pp economically stronger than for the average industry (compare column (2) in Table 8 and column (14) in Table 5). At the same time, overconfidence does not seem to influence the success probability in interactions with financiers for SMEs in sectors with a particularly positive growth perspectives. Overconfident managers from booming industries do not face difficulties in negotiations with loan officers. Respective regression coefficients, i.e. those of the interactions between strong stock price performance and managerial overconfidence, turn out insignificant.

These results are in line with our reasoning. The obtained estimates imply that loan officers cut funding for SMEs when detecting the overconfidence bias in business plans. A manager's overconfidence bias is blurred if the industry experiences a strong positive momentum. In contrast his overconfidence is evident if his positive outlook contradicts the expectations for the industry. Therefore, these results highlight that our baseline results are not driven by confounding factors, but rather support our interpretation, that loan officers deny credit or severely tighten credit standards when they find the loan applicant to be overconfident.

These results are also in line with the previous literature that argues that overconfidence can be coupled with the bias of cognitive dissonance (Malmendier & Taylor, 2015; Betzer et al., 2017) which forces individuals to ignore information contradicting their beliefs and restricts them in searching for additional information. As an example, Argentesi et al. (2011) show that non-professional investors avoid buying newspapers when stock prices are low. As a result, overconfident managers may tend to neglect details in the documentation of their investment plans and might be less willing to cooperate with loan officers if they request to fill such data gaps. This lack of relevant information in the submitted application as well as the applicant's unwillingness to provide further data might also decrease the probability of loan negotiations success.

4.4 Selection Model

Another potential concern refers to a selection bias created by the endogeneity of firm managers' decision to apply for bank credit. Specifically, the decision of the CEO to seek for bank funding might be related to his overconfidence.

It is reasonable to expect that the decision to apply for bank funding is influenced by the expectations of future success probability. Potential applicants, who assess their chances for success as low, are more likely to refrain from submitting a loan application in the first place. Presumably, overconfident CEOs tend to overestimate the probability of receiving bank credit and therefore are prone to apply for a bank loan in circumstances that other managers would consider unfavorable for approaching a bank.

We account for possible sample selection bias by using a two-stage selection model developed by Heckman (1979). In the selection equation we estimate a probit model which explains the application outcome, i.e. whether an SME manager has approached a bank to finance his investments. To this end, our sample size increased more than twofold, as only half of the firms in the sample applied for a bank loan in order to pursue their business plans (45%). As exclusion restriction we add in the selection equation the volume of planned investments, since the size of an investment plan is likely to be relevant for the decision to approach a bank, but unlikely to influence the negotiations' success as such after controlling for credit demand. The output of the selection equation allows us to derive the Inverse Mills ratio, capturing the selection bias. This ratio is then incorporated in the second in the second equation estimating as in the baseline the linear probability of bank negotiations' success with the SME managers' overconfidence.

The results of both stages of the selection model are reported in Table 9. We run four specifications that differ with respect to the inclusion of owner-specific attributes and additional interactions of fixed effects.

[Insert Table 9 around here]

The estimates reveal that the effect of overconfidence on the likelihood of a loan agreement is not driven by a selection bias. The Inverse Mills ratio is mostly insignificant with the exception of Specification 1 indicating that our baseline estimates are hardly influenced by selection. Most importantly, the coefficient of our overconfidence measure in the estimation equation remains positive and statistically significant (at 1% level) for all specifications, while its magnitude does not change much from the

baseline model. The estimates of other variables in the estimation equation are also not qualitatively different from the baseline results except for a weak gender effect in Model (2) implying a higher probability of failed bank negotiations among women.

However, managerial overconfidence is also significant in the selection equation confirming our expectations that overconfident managers are more likely to submit a loan application. The respective coefficient is significant at 5% level in all the model specifications, while its magnitude varying from 9.1 pp to 9.6 pp suggests its high economic relevance.

5 Real Effects of Failed Loan Negotiations and Overconfidence

In the following section we extend our analysis beyond investigating the link between managerial overconfidence and difficulties in loan negotiations. In particular, we test whether loan denials indeed have an influence on subsequent firm investments and performance. In doing so, we also analyze whether loan denials have a different effect on SMEs run by overconfident and unbiased managers.

5.1 Investment Outcomes

Although in the previous analysis we have shown the effect of overconfidence on the availability of bank credit, it remains unclear whether failures in loan negotiations with the banks indeed translate into inability of managers to pursue their investment plans. Despite failed bank negotiations, SME managers might obtain funding from alternative sources primarily using own funds and informal loans from friends and family. If so, a loan officer's decision to decline a loan application would not prevent an SME manager from pursuing negative NPV projects.

The availability of alternative financing can be different for overconfident and unbiased managers. From one perspective, it is reasonable to expect that overconfident managers might be more willing to approach alternative financiers. Unlike bank employees, informal closely-related financiers might not possess expertise necessary to detect SME managers' overconfidence and provide financing for business projects based on a biased planning. Besides, overconfident managers might be more persuasive. If this is the case, then even though overconfident managers are more likely to fail to obtain a loan, they are not more funding constraint and would still be able to pursue their planned investments.

To examine these effects, we use a survey question inquiring whether aimed investments could be pursued as planned or had to be cancelled, delayed or downscaled. We generate a binary variable indicating above-mentioned disruptions in investments and use it as a dependent variable in a regression model. The main explanatory variables are the indicator of failed negotiations with the banks that was a dependent variable in the baseline analysis, its interaction with managerial overconfidence and the overconfidence measure as such. Furthermore, we include all the control variables from the baseline model and the volume of planned investments as a percentage to the firm's revenue. We fully saturate the model with fixed effects to account for shocks across regions and sectors.

Table 10 reports the results of the model. We report four most comprehensive model specifications that differ with respect to the inclusion of owner-specific characteristics (Columns 2 and 4) and interactions of sector, region and year fixed effects (Columns 3 and 4). The results confirm that SME managers are heavily dependent on bank financing and failed loan negotiations are likely to result in investment disruptions.

[Insert Table 10 around here]

The variable of failed bank negotiations is highly statistically (at 1% level) and economically significant in all specifications. The estimates suggest that if an SME manager faces financing difficulties while interacting with banks, he will be around 50 pp (see Specification 4) more likely to adjust his business plan by reducing investments. This effect does not seem to be robustly different for overconfident managers. Although we observe a positive and weakly significant coefficient of the interaction term in the first specification, its significance vanishes after including managing owner's characteristics or more granular fixed effects. The overconfidence measure as such turned out insignificant. However, it does not mean that overconfidence is irrelevant for investment outcomes, as its effect on the probability of loan negotiations failures that we revealed in the precious sections is captured by the respective variable.

For control factors, we observe patterns that are similar to the baseline results. This similarity could imply that investments are typically funded by alternative financiers who assess the risk of enterprises based on comparable factors. First, we observe the effect of the firm size indicating that larger businesses have more chances for smooth implementations of their investment plans. Second, riskier enterprises are more likely to disrupt their investment projects, as the coefficients for risk classes 3, 5 and 6 are robustly positive and significant. Third, R&D active SMEs seem to be more likely to adjust their investment plans, although the respective coefficient loses its significance with the inclusion of owner-

specific characteristics.

However, in contrast to the baseline results, the estimates suggest an important role of managing owner's characteristics in investment plans' implementation. First, we find that CEOs who took over a firm or were shareholders prior to taking over managerial tasks are more successful in pursuing their investments than business founders. Second, younger managing owners are more likely to fail in implementation of planned investments. Third, the estimates reveal a gender effect implying that female owners seem to adjust their plans with higher probability. However, this effect vanishes in specifications with more granular fixed effects. In addition, the estimates point out that ambitious business plans are more likely to remain unrealized, given that the coefficient referring to the relative volume of planned investments is positive and highly significant in all the model specifications.

In general, the results confirm that SME managers are dependent on banks in investment financing and failed loan negotiations have direct effects on the firm's investment behaviour. This dependence on bank credit is prevalent both among overconfident and unbiased managers.

5.2 Revenue Growth

Our results thus far highlight a higher probability to face difficulties in attracting bank funding among overconfident SME managers and a link that appears to impede a smooth implementation of planned investment projects among biased CEOs. This does not necessarily imply, however, that loan officers add value by preventing the implementation of value-destroying projects via funding cuts. To address this question, we next focus on the real effects of funding cuts on the firm performance and their differences for overconfident and unbiased managers.

We classify the observed firms in four groups depending on the manager's overconfidence, availability of bank funding and subsequent disruptions while pursuing planned investments. Specifically, we first identify managers that

a) at least once over the observed time period were marked as overconfident in the beginning of the year when loan negotiations took place but successfully obtained funding from the bank and could pursue investments as initially planned (group A, "Overconfident, Loan received"). As an example, let us consider an SME manager who participated in the survey over the time period from 2005 until 2007. In the beginning of 2006 he gave an overoptimistic revenue forecast and was marked as overconfident,

while in 2005 and 2007 his forecasts were unbiased. Besides, he reported that he obtained a bank loan in 2006. In this case, the respective firm would be assigned to the group A and marked as "Overconfident, Loan received". 2006 would be treated as a year when the pattern was observed and the respective fixed effect would enter the regressions.

b) on the contrary to group A, while being overconfident could never attract bank funding and as a consequence had to adjust their investment plans (group B, "Overconfident, No loan received")

c) never showed a sign of overconfidence in the beginning of the years with loan negotiations while at least once managed to obtain bank funding and fully implement the investment plan (group C, "Not overconfident, Loan received")

d) were never marked as overconfident prior to loan negotiations but could never manage to convince bank employees to finance their investment plans and as a consequence had to adjust them (group D, "Not overconfident, No loan received")

This gives us 602 firms with overconfident managers who received a loan and could pursue the planned investments without disruptions (group A), 112 enterprises run by overconfident managers who did not receive a loan and had to adjust their investment plans (group b), 3,631 firms with unbiased managers successful in attracting bank funding and subsequent implementation of planned investments (group C) and 543 businesses with unbiased managers who were unsuccessful in attracting bank funding and pursuing planned investments (group D).

In order to trace the firms' performance in the subsequent years, we then merge these data with the information on the revenue achieved in the subsequent years provided in the Amadeus database. For this purpose, we used the firms' IP identification number and the (latest) year when the overconfidence-funding pattern described above was observed. Merging the datasets allowed us to calculate the cumulative revenue growth achieved three years after the firm's manager was engaged in the respective loan negotiations. After winsorizing the resulting growth rates (at 1st and 99th percentiles), we observed a median revenue growth of 13.9 pp and an average value of 20.1 pp, which indicates a remarkable positive revenue dynamics of the SMEs. However, these numbers are coupled with pessimistic evidence that almost a third of firms in the sample (353 out of 1,194) had to contract their operations.

We try to explain the observed variation in revenue growth rates with the same set of firm and CEO characteristics as in the analysis of the real effects on investment outcomes. However, in this model, we

replace a simple overconfidence measure with a set of dummy variables indicating to which of the above mentioned four groups the firm belongs. Stepwise we append the set of control variables with firm and manager characteristics and saturate the model with the interactions of sector and time as well as region and time fixed effects.

Table 11 presents the OLS estimation results of this model. The estimates reveal that the real effects of bank funding cuts are fundamentally different for firms with overconfident and unbiased managers. While the lack of funding and the resulting inability to pursue planned investments suppress the subsequent revenue growth of firms run by unbiased CEOs, the effect is opposite for overconfident managers. Overconfident CEOs who were - presumably because of their overconfidence - not able to obtain bank funding did not show a statistically different subsequent revenue increase in comparison to their non-overconfident peers with funding (in one specification the estimate of this difference is even positive, although only weakly significant). However, if the overconfident manager obtained a loan, the real effect of the granted loan is negative (-16 pp. in specifications 8 and 9) and highly statistically significant (at 5% level with few exceptions).

[Insert Table 11 around here]

The economically and statistically significant differences in real effects of bank funding cuts between overconfident and unbiased SME managers indicate that the manager's overconfidence bias, if remained undetected, impairs the firm growth, while a funding cut imposed by bank employees serves as a remedy against a destructive overconfidence effect. This finding leads us to conclude that loan officers indeed correct the overconfidence bias of SME managers by curtailing the available funding and as a consequence help them to avoid value destroying investment mistakes.

6 Robustness Checks

We run a series of robustness checks.

First, we use alternative proxies for managerial overconfidence based on the respondents' forecasts regarding the number of employees in their firm in the beginning of the next year ¹¹.

¹¹The survey specifies several categories of employees including full and part time workers as well as trainees. We use the total number of employees in order to eliminate the effects of transfer between different categories of employment. Since the formulation of the questions related to the employment forecasts remained unchanged, we can extend the period of analysis until 2017 (wave 2018).

Analogously to our main sales-based overconfidence measure, we compare managers' forecasts on future employment with the actual outcomes reported one year later. However, given that the respondents were asked to provide an exact number of employees they expect, we can define overconfidence in two different ways. First, we fully follow the baseline approach (version 1). An enterprise manager is considered overconfident in a particular year if he expected a positive change in the total number of employees by the beginning of the next year, but when contacted in the following survey wave (one year later) did not report an increase in employment. Second, we modify the definition of overconfidence and directly compare expected and actual numbers of employees (version 2). In this case, a manager is defined as overconfident in a particular year (year t) if his expected number of employees exceeded the actual employment reported one year later (year $t+1$). This approach implies a stricter definition of overconfidence, since managers whose positive expectations on future employment realized could still be marked as overconfident in case the realized increase was weaker than expected.

We rerun the baseline analysis replacing the sales-based overconfidence measure with two employment-based alternatives. The model outcome is reported in Table 12. In all specifications, both overconfidence measures are statistically significant at 1% level. Besides, the magnitudes of coefficients suggest that an economic effect of overconfidence ranges from 3.6 to 6.4 pp, which is close to our baseline estimates.

[Insert Table 12 around here]

Second, we test the robustness of our results with respect to alternative definitions of financing difficulties. Specifically, we rerun the baseline analysis using two alternative dependent variables. The first one is a binary variable indicating that bank negotiations never led to a loan offer. This measure defines financing difficulties as complete credit rationing of the firm. The second proxy is a binary indicator that equals to one if negotiations with the bank either never ended with a loan offer or resulted in a loan offer with the terms unacceptable for the firm. Unacceptable terms include prohibitively high interest rate, insufficient credit volume or prohibitively stringent collateral requirements. This variable implies that cases when the terms of the loan offer are prohibitively stringent refer to financing difficulties.

The results of this exercise are reported in Table 13. The estimates confirm that our results are robust to alternative definitions of financing difficulties. The overconfidence measure has a positive and significant coefficient in all the specifications, although in Column 2 the significance level drops to 10%. The magnitude of overconfidence effect is close to baseline estimates and varies from 2.8 to 5.5 pp.

[Insert Table 13 around here]

Third, we run non-linear binary response models to test the robustness of our results with respect to the used methodology. We estimate the baseline probability model using logistic and probit regressions.

The results are reported in Table 14. For brevity, we report average marginal effects that provide the ground for coefficients' interpretation. We report the model outcomes for specifications when year, region and economic sector fixed effects are included separately as well as interacted. The reason is the potential bias of the binary response models with multiple fixed effects as well as a significant reduction of the sample driven by the lack of variation in the outcome variable for specific values of fixed effects.

[Insert Table 14 around here]

The estimates confirm a positive effect of the overconfidence measure on the probability of financing difficulties. The overconfidence measure remains positive and highly statistically significant (at least at 5% level) in all the specifications. The estimated economic effect of overconfidence lies between 4.1 and 7.0 pp and is therefore comparable to the baseline estimates.

Overall, these exercises confirm the robustness of our baseline results to alternative definitions of managerial overconfidence and financing difficulties as well as changes in estimation techniques.

7 Conclusion

In this paper, we study the effect of SME managers' overconfidence on the probability of success in loan negotiations with the banks. To do so, we generate a direct measure of overconfidence by comparing yearly managers' forecasts of future sales with the actual outcomes one year later and link it to the probability of a failure in loan negotiations.

We provide strong evidence suggesting that loan officers tend to detect managerial overoptimism and curtail bank funding for affected firms. We show that the discovered pattern is not driven by the reversed causality; specifically, that the firm's performance might be impaired by a loan rejection. We are also able to deal with a potential selection problem that overconfident CEOs might be overrepresented in the sample of loan applicants. Our findings are particularly pronounced for SMEs operating in shrinking economic industries for which managers' overoptimism is particularly apparent. These results suggest that bank employees identify the tendency to overinvest associated with the overconfidence bias and

refuse to finance investment projects planned on the basis of distorted managerial views.

As regards to the real effects of failures in loan negotiations on the subsequent firm performance, we provide evidence that loan officers indeed help overconfident managers to avoid investment mistakes. When we analyze the consequences of failures in loan negotiations on subsequent business growth, we find that overoptimistic CEOs who were financially supported by the bank and could smoothly pursue planned investments performed subsequently worse than 1) SMEs with overconfident managers that did not obtain funding and could not pursue their planned investment and 2) SME's with unbiased managers that obtained funding. At the same time, overconfident CEOs whose loan application was rejected by the bank performed as good as their unbiased peers who received a loan.

Our findings suggest that banks' funding cuts provide valuable financial guidance to their corporate borrowers that helps them to correct distortions in investment decisions associated with behavioral and cognitive biases.

8 References

- Ahmed, A. S., & Duellman, S. (2013). Managerial overconfidence and accounting conservatism. *Journal of Accounting Research*, 51(1), 1-30.
- Alicke, M. D. (1985). Global self-evaluation as determined by the desirability and controllability of trait adjectives. *Journal of Personality and Social Psychology*, 49(6), 1621.
- Amromin, G. (2008). Precautionary savings motives and tax efficiency of household portfolios: An empirical analysis. *Tax Policy and the Economy*, 22(1), 5-41.
- Andriosopoulos, D., Andriosopoulos, K., & Hoque, H. (2013). Information disclosure, CEO overconfidence, and share buyback completion rates. *Journal of Banking & Finance*, 37(12), 5486-5499.
- Argentesi, E., Lütkepohl, H., & Motta, M. (2010). Acquisition of information and share prices: An empirical investigation of cognitive dissonance. *German Economic Review*, 11(3), 381-396.
- Benartzi, S. (2001). Excessive extrapolation and the allocation of 401 (k) accounts to company stock. *The Journal of Finance*, 56(5), 1747-1764.
- Benartzi, S., & Thaler, R. H. (2001). Naive diversification strategies in defined contribution saving plans. *American economic review*, 91(1), 79-98.
- Ben-David, I., Graham, J. R., & Harvey, C. R. (2013). Managerial miscalibration. *The Quarterly Journal of Economics*, 128(4), 1547-1584.
- Berg, T. (2015). Playing the devil's advocate: The causal effect of risk management on loan quality. *The Review of Financial Studies*, 28(12), 3367-3406.
- Berger, A. N., & Udell, G. F. (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *Journal of Banking & Finance*, 22(6-8), 613-673.
- Bergstresser, D., & Poterba, J. (2004). Asset allocation and asset location: Household evidence from the Survey of Consumer Finances. *Journal of Public Economics*, 88(9-10), 1893-1915.
- Bernardo, A. E., & Welch, I. (2001). On the evolution of overconfidence and entrepreneurs. *Journal of Economics Management Strategy*, 10(3), 301-330.

- Bertrand, M., & Morse, A. (2011). Information disclosure, cognitive biases, and payday borrowing. *The Journal of Finance*, 66(6), 1865-1893.
- Betzer, A., van den Bongard, I., Theissen, E., & Volkmann, C. (2017). All is not lost that is delayed: overconfidence and investment failure. Paris December 2017 Finance Meeting EUROFIDAI - AFFI. Available at SSRN 2893548.
- Campbell, T. C., Gallmeyer, M., Johnson, S. A., Rutherford, J., & Stanley, B. W. (2011). CEO optimism and forced turnover. *Journal of Financial Economics*, 101(3), 695-712.
- Campbell, T. S., & Kracaw, W. A. (1980). Information production, market signalling, and the theory of financial intermediation. *The Journal of Finance*, 35(4), 863-882.
- Cotugno, M., Monferrà, S., & Sampagnaro, G. (2013). Relationship lending, hierarchical distance and credit tightening: Evidence from the financial crisis. *Journal of Banking & Finance*, 37(5), 1372-1385.
- De Bondt, W. F., & Thaler, R. H. (1995). Financial decision-making in markets and firms: A behavioral perspective. *Handbooks in operations research and management science*, 9, 385-410.
- Deshmukh, S., Goel, A. M., & Howe, K. M. (2013). CEO overconfidence and dividend policy. *Journal of Financial Intermediation*, 22(3), 440-463.
- Diamond, D. W. (1984). Financial intermediation and delegated monitoring. *The Review of Economic Studies*, 51(3), 393-414.
- Fecht, F., Hackethal, A., & Karabulut, Y. (2018). Is proprietary trading detrimental to retail investors?. *The Journal of Finance*, 73(3), 1323-1361.
- Foerster, S., Linnainmaa, J. T., Melzer, B. T., & Previtiero, A. (2017). Retail financial advice: does one size fit all?. *The Journal of Finance*, 72(4), 1441-1482.
- Forbes, D. P. (2005). The effects of strategic decision making on entrepreneurial self-efficacy. *Entrepreneurship Theory and Practice*, 29(5), 599-626.
- Gennaioli, N., Shleifer, A., & Vishny, R. (2015). Money doctors. *The Journal of Finance*, 70(1), 91-114.
- Goel, A. M., & Thakor, A. V. (2008). Overconfidence, CEO selection, and corporate governance. *The Journal of Finance*, 63(6), 2737-2784.

- Graham, J. R., Harvey, C. R., & Puri, M. (2013). Managerial attitudes and corporate actions. *Journal of Financial Economics*, 109(1), 103-121.
- Hackethal, A., Haliassos, M., & Jappelli, T. (2012). Financial advisors: A case of babysitters?. *Journal of Banking & Finance*, 36(2), 509-524.
- Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica: Journal of the Econometric Society*, 153-161.
- Hirshleifer, D., Low, A., & Teoh, S. H. (2012). Are overconfident CEOs better innovators?. *The Journal of Finance*, 67(4), 1457-1498.
- Hoechle, D., Ruenzi, S., Schaub, N., Schmid, M. (2018). Financial advice and bank profits. *The Review of Financial Studies*, 31(11), 4447-4492.
- Karabulut, Y. (2013). Financial advice: an improvement for worse?. Available at SSRN 1710634.
- Kaya, O., & Schildbach, J. (2014). SME financing in the Euro Area. New solutions to an old problem. *EU Monitor–Global Financial Markets. Deutsche Bank Research*, 14, 2014.
- Leland, H. E., Pyle, D. H. (1977). Informational asymmetries, financial structure, and financial intermediation. *The journal of Finance*, 32(2), 371-387.
- Lusardi, A., & Mitchell, O. S. (2011). Financial literacy and planning: Implications for retirement wellbeing. *National Bureau of Economic Research* (No. w17078).
- Malmendier, U., & Tate, G. (2005). CEO overconfidence and corporate investment. *The Journal of Finance*, 60(6), 2661-2700.
- Malmendier, U., & Tate, G. (2008). Who makes acquisitions? CEO overconfidence and the market's reaction. *Journal of Financial Economics*, 89(1), 20-43.
- Malmendier, U., & Taylor, T. (2015). On the verges of overconfidence. *Journal of Economic Perspectives*, 29(4), 3-8.
- Malmendier, U., Tate, G., & Yan, J. (2011). Overconfidence and early-life experiences: The effect of managerial traits on corporate financial policies. *The Journal of Finance*, 66(5), 1687-1733.
- Petersen, M. A., & Rajan, R. G. (1994). The benefits of lending relationships: Evidence from small business

data. *The Journal of Finance*, 49(1), 3-37.

Ramakrishnan, R. T., & Thakor, A. V. (1984). Information reliability and a theory of financial intermediation. *The Review of Economic Studies*, 51(3), 415-432.

Von Gaudecker, H. M. (2015). How does household portfolio diversification vary with financial literacy and financial advice?. *The Journal of Finance*, 489-507.

9 Tables

Table 1: Variable definition

This table contains definitions of analyzed variables.

Variable name	Variable definition
<i>Bank - Firm negotiations</i>	
Negotiations failed	Binary variable indicating that negotiations with the banks at least once did not lead to a signed loan agreement in year t.
Negotiations failed, no offer	Binary variable indicating that negotiations with the banks never resulted in a loan offer from the bank's side in year t.
Negotiations failed, no acceptable offer	Binary variable indicating that negotiations with the banks in year t either never resulted in a loan offer from the bank's side or resulted in a loan offer that was declined by the firm due to unacceptable terms (high interest rate, insufficient credit volume or lack of collateral).
<i>Overconfidence measures</i>	
Overconfidence	Binary variable indicating that an increase in sales (revenue) was expected but did not materialize in year t.
Overconfidence, employment-based, version 1	Binary variable indicating that an increase in the number of employees was expected but did not materialize in year t.
Overconfidence, employment-based, version 2	Binary variable indicating that the expected number of employees exceeded the real outcome in year t.
<i>Credit needs</i>	
Bank financing needs, to Revenue	Firm's funding needs planned to be covered by banks in year t relative to the firm's revenue in year t-1.
<i>General firm characteristics</i>	
Revenue, ln	Firm's revenue in year t-1, logarithmed when used in regression analysis.
Revenue growth	Firm's revenue growth in year t-1 reported in the questionnaire (winsorized at the 1th and 99th percentiles).
Firm age	Age of the firm (number of years).
Export active	Binary variable indicating that the firm is active abroad (outside of Germany and the region of 50 km from the firm's headquarters).
R&D active	Binary variable indicating enterprises conducting own R&D activities in the last 3 years.
Mandatory accounting	Binary variable indicating enterprises obliged to prepare financial statements in line with German accounting standards (HGB) and/or IFRS.
Active owners and managers, (1,2 at least 3)	Number of enterprise owners and/or managers actively participating in the firm's management, coded in three binary indicators based on the variable's distribution, specifically 1) Active owners and managers, 1 - 1 active owner/manager (reference group), 2) Active owners and managers, 2 - 2 active owners/managers, 3) Active owners and managers, at least 3 - at least 3 active owners/managers.
Managing owner	Binary variable indicating cases when the survey was filled in by the owner. This variable serves as a proxy for firms with the owner actively engaged in the firm's management.
Owned by another firm	Binary variable indicating that at least 25% of the firm's capital or voting shares is in ownership of another firm.
Firm sector (FEs)	Binary variables indicating the economic sector of the firm's operations: 1) Manufacturing (reference group), 2) Construction, 3) Retail trade, 4) Wholesale trade, 5) Services, 6) Other.
Firm legal form (FEs)	Binary variables indicating the firm's legal form: 1) Sole proprietorship, 2) Partnership, 3) Limited liability, 4) Limited liability & Co, 5) Other (reference group).
<i>Firm Creditworthiness</i>	
Risk Class 1	Binary variable indicating firms belonging to Risk Class 1 measured by the Creditreform Default Index in the beginning of year t. The index lies in the range between 100 to 216 (reference group in the regression analysis).
Risk Class 2	Binary variable indicating firms belonging to Risk Class 2 measured by the Creditreform Default Index in the beginning of year t. The index lies in the range between 217 to 246.
Risk Class 3	Binary variable indicating firms belonging to Risk Class 3 measured by the Creditreform Default Index in the beginning of year t. The index lies in the range between 247 to 283.
Risk Class 4	Binary variable indicating firms belonging to Risk Class 4 measured by the Creditreform Default Index in the beginning of year t. The index lies in the range between 284 to 302.
Risk Class 5	Binary variable indicating firms belonging to Risk Class 5 measured by the Creditreform Default Index in the beginning of year t. The index lies in the range between 303 to 358.
Risk Class 6	Binary variable indicating firms belonging to Risk Class 6 measured by the Creditreform Default Index in the beginning of year t. The index lies in the range between 359 to 600.
<i>Experience in negotiations</i>	
Bank negotiations experience	Binary variable indicating that the firm has approached the bank applying for a credit in year t-1.
<i>Owner Characteristics</i>	
Owner's age	Age of the owner (number of years).
Female owner	Binary variable indicating female owners (male owners are a reference group).
Owner's education	Binary variable indicating the highest degree of professional education received by the owner: 1) No degree (reference group), 2) Level 1, 3) Level 2, 4) Level 3.
Owner's past	Binary variables indicating the past of the owner in the firm: 1) Founder (reference group), 2) Takeover, 3) Shareholder.
<i>Variables for Additional Analysis</i>	
Negotiations attempt	Binary variable indicating that the firm has approached the bank applying for a credit in year t.
Investment volume planned, ln	Total amount of investments planned by the firm in year t, logarithmed when used in regression analysis.
Failed investment plan	Binary variables indicating firms that could not fully implement investment plans in year t reflected by delayed or canceled investment projects and/or reduced scale of investments.
Investment volume planned, to Revenue	Total amount of investments planned by the firm in year t, relative to the firm's revenue in year t-1.

Table 2: Descriptive statistics

This table reports descriptive statistics of analyzed variables. All the variables are defined in Table 1.

Variable name	Obs	Mean	SD	Min	P25	Median	P75	Max
<i>Bank - Firm negotiations</i>								
Negotiations failed	23,727	0.31	0.46	0.00	0.00	0.00	1.00	1.00
<i>Overconfidence</i>								
Overconfidence	39,381	0.09	0.29	0.00	0.00	0.00	0.00	1.00
<i>Credit needs</i>								
Bank financing needs, thEur	10,356	555	1,831	1	50	150	450	80,000
Bank financing needs, to Revenue	10,356	0.18	1.48	0.00	0.03	0.06	0.13	111.11
<i>Firms characteristics</i>								
Revenue, thEur	45,186	6,544	20,043	1	500	1,500	5,000	512,844
Revenue growth	44,751	0.08	0.27	-0.46	-0.04	0.04	0.15	1.50
Firm age	73,357	30.27	30.96	0.00	10.00	18.00	40.00	163.00
Export active	83,455	0.33	0.47	0.00	0.00	0.00	1.00	1.00
R&D active	81,250	0.18	0.38	0.00	0.00	0.00	0.00	1.00
Mandatory accounting	71,588	0.82	0.38	0.00	1.00	1.00	1.00	1.00
Active owners and managers, 1	45,339	0.62	0.49	0.00	0.00	1.00	1.00	1.00
Active owners and managers, 2	45,339	0.28	0.45	0.00	0.00	0.00	1.00	1.00
Active owners and managers, at least 3	45,339	0.10	0.30	0.00	0.00	0.00	0.00	1.00
Managing owner	48,509	0.84	0.37	0.00	1.00	1.00	1.00	1.00
Owned by another firm	84,158	0.13	0.33	0.00	0.00	0.00	0.00	1.00
Firm sector - Manufacturing	84,944	0.22	0.41	0.00	0.00	0.00	0.00	1.00
Firm sector - Construction	84,944	0.19	0.39	0.00	0.00	0.00	0.00	1.00
Firm sector - Retail trade	84,944	0.18	0.39	0.00	0.00	0.00	0.00	1.00
Firm sector - Wholesale trade	84,944	0.15	0.36	0.00	0.00	0.00	0.00	1.00
Firm sector - Services	84,944	0.24	0.42	0.00	0.00	0.00	0.00	1.00
Firm sector - Other	84,944	0.02	0.15	0.00	0.00	0.00	0.00	1.00
Firm legal form - Sole proprietorship	84,585	0.34	0.47	0.00	0.00	0.00	1.00	1.00
Firm legal form - Partnership	84,585	0.08	0.27	0.00	0.00	0.00	0.00	1.00
Firm legal form - Limited liability	84,585	0.46	0.50	0.00	0.00	0.00	1.00	1.00
Firm legal form - Limited liability & Co	84,585	0.11	0.31	0.00	0.00	0.00	0.00	1.00
Firm legal form - Other	84,585	0.02	0.15	0.00	0.00	0.00	0.00	1.00
<i>Firm Creditworthiness</i>								
Risk Class 1	70,272	0.29	0.45	0.00	0.00	0.00	1.00	1.00
Risk Class 2	70,272	0.30	0.46	0.00	0.00	0.00	1.00	1.00
Risk Class 3	70,272	0.28	0.45	0.00	0.00	0.00	1.00	1.00
Risk Class 4	70,272	0.08	0.27	0.00	0.00	0.00	0.00	1.00
Risk Class 5	70,272	0.03	0.16	0.00	0.00	0.00	0.00	1.00
Risk Class 6	70,272	0.02	0.14	0.00	0.00	0.00	0.00	1.00
<i>Experience in negotiations</i>								
Bank negotiations experience	46,979	0.30	0.46	0.00	0.00	0.00	1.00	1.00
<i>Owner Characteristics</i>								
Owner's age	40,002	48.31	10.03	18.00	41.00	48.00	55.00	80.00
Female owner	40,061	0.13	0.34	0.00	0.00	0.00	0.00	1.00
Owner's education - No degree	39,949	0.02	0.12	0.00	0.00	0.00	0.00	1.00
Owner's education - Level 1	40,024	0.31	0.46	0.00	0.00	0.00	1.00	1.00
Owner's education - Level 2	40,062	0.31	0.46	0.00	0.00	0.00	1.00	1.00
Owner's education - Level 3	40,047	0.45	0.50	0.00	0.00	0.00	1.00	1.00
Owner's past - Founder	40,141	0.53	0.50	0.00	0.00	1.00	1.00	1.00
Owner's past - Takeover	40,141	0.39	0.49	0.00	0.00	0.00	1.00	1.00
Owner's past - Shareholder	40,141	0.08	0.28	0.00	0.00	0.00	0.00	1.00
<i>Variables for Additional Analysis</i>								
Negotiations attempt	53,307	0.45	0.50	0.00	0.00	0.00	1.00	1.00
Failed investment plan	47,841	0.28	0.45	0.00	0.00	0.00	1.00	1.00
Investment volume planned, thEur	53,905	490	2,350	1	30	100	300	180,000
Investment volume planned, to Revenue	28,599	0.29	21.94	0.00	0.02	0.04	0.11	3,700

* The analysis covers the time period from 2004 until 2012.

** In the regression analysis natural logarithms of the variables Revenue and Investment volume planned are used.

Table 3: Descriptive statistics for Unbiased and Overconfident Managers

This table reports means of analyzed variables separately for subsamples of overconfident and non-overconfident managers as well as the comparison of the means based on the standard T-tests. All the variables are defined in Table 1.

Variable name	Obs	Mean	Obs	Mean	Diff
	Non-Overconfident		Overconfident		
<i>Bank - Firm negotiations</i>					
Negotiations failed	9,334	0.28	1,077	0.31	-0.03*
<i>Credit needs</i>					
Bank financing needs, thEur	8,246	539.72	952	666.88	-127.17*
Bank financing needs, to Revenue	8,246	0.14	952	0.16	-0.02
<i>Firms characteristics</i>					
Revenue, thEur	35,737	6624.72	3,644	8406.54	-1781.82***
Revenue growth	35,491	0.08	3,608	0.12	-0.04***
Firm age	30,927	32.74	3,190	32.75	-0.01
Export active	35,429	0.35	3,593	0.41	-0.06***
R&D active	34,534	0.18	3,505	0.25	-0.07***
Mandatory accounting	31,296	0.85	3,287	0.86	-0.01*
Active owners and managers, 1	33,789	0.61	3,410	0.57	0.04***
Active owners and managers, 2	33,789	0.29	3,410	0.31	-0.02**
Active owners and managers, at least 3	33,789	0.10	3,410	0.12	-0.02***
Managing owner	35,737	0.83	3,644	0.82	0.01
Owned by another firm	35,484	0.13	3,620	0.16	-0.02***
<i>Firm Creditworthiness</i>					
Risk Class 1	31,016	0.31	3,128	0.32	-0.00
Risk Class 2	31,016	0.31	3,128	0.28	0.02**
Risk Class 3	31,016	0.27	3,128	0.27	0.01
Risk Class 4	31,016	0.06	3,128	0.08	-0.01**
Risk Class 5	31,016	0.03	3,128	0.03	-0.00
Risk Class 6	31,016	0.02	3,128	0.03	-0.01***
<i>Experience in negotiations</i>					
Bank negotiations experience	34,668	0.30	3,528	0.36	-0.06***
<i>Owner Characteristics</i>					
Owner's age	29,372	48.37	2,951	48.39	-0.02
Female owner	29,358	0.12	2,964	0.13	-0.01
Owner's education - No degree	29,324	0.02	2,949	0.02	-0.01**
Owner's education - Level 1	29,368	0.30	2,953	0.30	-0.00
Owner's education - Level 2	29,395	0.31	2,956	0.25	0.06***
Owner's education - Level 3	29,384	0.46	2,956	0.50	-0.04***
Owner's past - Founder	29,455	0.52	2,960	0.53	-0.01
Owner's past - Takeover	29,455	0.40	2,960	0.38	0.02
Owner's past - Shareholder	29,455	0.09	2,960	0.09	-0.01
<i>Variables for Additional Analysis</i>					
Negotiations attempt	22,436	0.42	2,386	0.45	-0.03**
Failed investment plan	20,578	0.25	2,218	0.28	-0.03**
Investment volume planned, thEur	22,806	475.98	2,442	650.69	-174.71***
Investment volume planned, to Revenue	22,806	0.12	2,442	0.15	-0.03**

Table 4: Descriptive statistics for Unbiased and Overconfident Managers

This table reports means of additional variables separately for subsamples of overconfident and non-overconfident managers as well as the comparison of the means based on the standard T-tests.

Variable name	Years	Sales-based					Employment-based, Version 1					Employment-based, Version 2				
		Obs	Mean	Obs	Mean	Diff	Obs	Mean	Obs	Mean	Diff	Obs	Mean	Obs	Mean	Diff
		Non-Overconfident		Overconfident		Non-Overconfident		Overconfident		Non-Overconfident		Overconfident				
<i>Bank - Firm negotiations</i>																
Number of banks in loan negotiations	2013	N/A					1,095	1.97	157	2.06	-0.09	857	1.99	406	1.96	0.03
<i>Type of banks in loan negotiations</i>																
	2004-2005															
Savings banks (binary)	2004-2005	1,820	0.58	173	0.57	0.01	1,881	0.57	275	0.61	-0.04	1,509	0.57	682	0.61	-0.04
Cooperative banks (binary)	2004-2005	1,820	0.42	173	0.46	-0.04	1,881	0.41	275	0.44	-0.03	1,509	0.41	682	0.42	0.00
Private banks (binary)	2004-2005	1,820	0.31	173	0.29	0.02	1,881	0.30	275	0.31	-0.01	1,509	0.31	682	0.30	0.00
Other (binary)	2004-2005	1,820	0.09	173	0.12	-0.02	1,881	0.10	275	0.09	0.00	1,509	0.10	682	0.09	0.01
<i>Relationship lending characteristics</i>																
	2017															
Number of banks with credit relations	2017	N/A					3,487	2.22	317	2.56	-0.33*	2,837	2.22	998	2.34	-0.12
Presence of the Hausbank (binary)	2017	N/A					3,398	0.96	306	0.94	0.01	2,761	0.96	970	0.96	0.00
Length of the relationship with the Hausbank (years)	2017	N/A					3,058	23.03	271	23.24	-0.21	2,480	22.84	875	23.63	-0.79
Credit volume provided by the Hausbank (%)	2017	N/A					2,927	61.37	267	62.63	-1.26	2,363	61.36	860	61.93	-0.57

Table 5: Baseline Results

This table reports OLS estimation of the linear probability model for the probability of failure in loan negotiations. All the variables are defined in Table 1. Owner specific variables are included only in cases when the business is managed by the owner.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed
Overconfidence	0.043*** (0.015)	0.041*** (0.016)	0.049*** (0.018)	0.047** (0.018)	0.044** (0.019)	0.057*** (0.022)	0.045** (0.019)	0.059*** (0.022)	0.046** (0.019)	0.058*** (0.022)	0.047** (0.019)	0.060*** (0.022)	0.053*** (0.019)	0.064*** (0.023)
Bank financing needs, to Revenue		0.041*** (0.011)	0.029*** (0.010)	0.023 (0.017)	0.020 (0.017)	0.020 (0.018)	0.019 (0.017)	0.020 (0.017)	0.021 (0.018)	0.021 (0.019)	0.020 (0.017)	0.021 (0.019)	0.027 (0.019)	0.026 (0.020)
Revenue, ln		-0.046*** (0.005)	-0.047*** (0.006)	-0.036*** (0.006)	-0.038*** (0.006)	-0.040*** (0.008)	-0.038*** (0.006)	-0.039*** (0.008)	-0.038*** (0.006)	-0.040*** (0.008)	-0.038*** (0.006)	-0.039*** (0.008)	-0.038*** (0.007)	-0.040*** (0.008)
Revenue growth			-0.062*** (0.023)	-0.076*** (0.024)	-0.070*** (0.024)	-0.059** (0.028)	-0.074*** (0.025)	-0.064** (0.028)	-0.069*** (0.025)	-0.061** (0.029)	-0.073*** (0.025)	-0.064** (0.029)	-0.050* (0.026)	-0.046 (0.030)
Firm age			0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Export active			0.007 (0.014)	0.006 (0.014)	0.009 (0.014)	-0.001 (0.017)	0.010 (0.014)	0.008 (0.017)	0.008 (0.014)	-0.001 (0.017)	0.010 (0.014)	0.000 (0.017)	0.009 (0.015)	0.001 (0.018)
R&D active			0.115*** (0.016)	0.117*** (0.017)	0.119*** (0.017)	0.109*** (0.019)	0.119*** (0.017)	0.109*** (0.020)	0.120*** (0.017)	0.114*** (0.020)	0.120*** (0.017)	0.115*** (0.020)	0.119*** (0.017)	0.115*** (0.020)
Mandatory accounting			-0.009 (0.025)	-0.011 (0.025)	-0.011 (0.025)	-0.014 (0.026)	-0.014 (0.025)	0.021 (0.027)	-0.010 (0.025)	0.023 (0.027)	-0.013 (0.026)	0.021 (0.027)	0.006 (0.027)	0.037 (0.029)
Active owners and managers, 2			-0.016 (0.014)	-0.020 (0.015)	-0.023 (0.015)	-0.033* (0.018)	-0.025* (0.018)	-0.034* (0.015)	-0.022 (0.018)	-0.034* (0.015)	-0.024 (0.015)	-0.035** (0.018)	-0.025 (0.016)	-0.033* (0.019)
Active owners and managers, at least 3			-0.035* (0.020)	-0.033 (0.021)	-0.035* (0.021)	-0.039 (0.025)	-0.036* (0.021)	-0.041 (0.025)	-0.037* (0.021)	-0.045* (0.026)	-0.038* (0.021)	-0.048* (0.026)	-0.033 (0.022)	-0.039 (0.026)
Owned by another firm			0.062*** (0.017)	0.056*** (0.018)	0.058*** (0.022)	0.052** (0.018)	0.056*** (0.022)	0.050** (0.018)	0.058*** (0.022)	0.048** (0.018)	0.056*** (0.022)	0.047** (0.018)	0.061*** (0.019)	0.048** (0.023)
Risk Class, 2				0.020 (0.016)	0.018 (0.016)	0.018 (0.019)	0.019 (0.016)	0.020 (0.019)	0.019 (0.016)	0.024 (0.019)	0.020 (0.016)	0.025 (0.019)	0.025 (0.017)	0.024 (0.020)
Risk Class, 3				0.069*** (0.018)	0.064*** (0.018)	0.053*** (0.020)	0.066*** (0.018)	0.056*** (0.020)	0.067*** (0.018)	0.058*** (0.021)	0.069*** (0.018)	0.060*** (0.021)	0.071*** (0.019)	0.057*** (0.022)
Risk Class, 4				0.075** (0.030)	0.071** (0.030)	0.062* (0.034)	0.072** (0.030)	0.064* (0.034)	0.070** (0.030)	0.059* (0.035)	0.072** (0.030)	0.061* (0.035)	0.079** (0.032)	0.061* (0.037)
Risk Class, 5				0.267*** (0.049)	0.267*** (0.049)	0.243*** (0.056)	0.267*** (0.049)	0.250*** (0.056)	0.267*** (0.048)	0.247*** (0.055)	0.267*** (0.048)	0.253*** (0.055)	0.306*** (0.049)	0.294*** (0.056)
Risk Class, 6				0.361*** (0.064)	0.365*** (0.065)	0.434*** (0.069)	0.361*** (0.066)	0.433*** (0.070)	0.368*** (0.066)	0.431*** (0.067)	0.364*** (0.066)	0.429*** (0.069)	0.359*** (0.067)	0.404*** (0.070)
Bank negotiations experience				0.028** (0.012)	0.036** (0.014)	0.029** (0.012)	0.029** (0.012)	0.035** (0.014)	0.027** (0.012)	0.036** (0.014)	0.028** (0.012)	0.035** (0.014)	0.028** (0.012)	0.035** (0.015)
Owner's age						-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)
Female owner						0.044 (0.029)		0.045 (0.030)		0.047 (0.029)		0.047 (0.030)		0.043 (0.031)
Owner's education - Level 1						-0.012 (0.028)		-0.012 (0.028)		-0.008 (0.028)		-0.008 (0.028)		-0.026 (0.031)
Owner's education - Level 2						0.019 (0.031)		0.017 (0.031)		0.015 (0.031)		0.013 (0.031)		-0.005 (0.034)
Owner's education - Level 3						0.030 (0.029)		0.029 (0.030)		0.029 (0.029)		0.028 (0.030)		0.013 (0.032)
Owner's past - Takeover						-0.028 (0.019)		-0.028 (0.019)		-0.028 (0.019)		-0.027 (0.020)		-0.023 (0.020)
Owner's past - Shareholder						0.000 (0.028)		-0.000 (0.028)		0.004 (0.029)		0.003 (0.029)		0.001 (0.030)
Managing owner							-0.003 (0.017)		-0.006 (0.017)		-0.006 (0.017)		-0.016 (0.018)	
Constant	0.333*** (0.047)	0.664*** (0.065)	0.513*** (0.075)	0.380*** (0.083)	0.374*** (0.084)	0.438*** (0.121)	0.363*** (0.087)	0.418*** (0.123)	0.303*** (0.115)	0.382*** (0.148)	0.286** (0.123)	0.363** (0.156)	1.076*** (0.070)	1.143*** (0.119)
Observations	9,765	8,638	6,507	6,085	5,909	4,458	5,909	4,458	5,909	4,458	5,909	4,458	5,909	4,458
R-squared	0.044	0.051	0.058	0.075	0.077	0.083	0.082	0.088	0.094	0.105	0.099	0.111	0.165	0.198
Legal form FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No
Sector FEs	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	No
Region FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Sector * Year FEs	No	No	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No
Region * Year FEs	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No
Sector * Region * Year FEs	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes

Standard errors clustered at the firm level in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Table 6: Overconfidence lags

This table reports OLS estimation of the linear probability model for the probability of failure in loan negotiations. All the variables are defined in Table 1. Owner specific variables are included only in cases when the business is managed by the owner. Two and three year lags of the overconfidence measure are used.

VARIABLES	(1) Negotiations failed	(2) Negotiations failed	(3) Negotiations failed	(4) Negotiations failed
Overconfidence, (-1)	0.046* (0.024)	0.057* (0.029)	0.089*** (0.031)	0.087** (0.037)
Overconfidence, (-2)			0.080** (0.033)	0.080** (0.036)
Bank financing needs, to Revenue	0.043** (0.020)	0.041* (0.021)	0.012 (0.020)	0.008 (0.019)
Revenue, ln	-0.024*** (0.008)	-0.022** (0.009)	-0.033*** (0.010)	-0.023* (0.012)
Revenue growth	-0.113*** (0.039)	-0.119** (0.048)	-0.133** (0.053)	-0.168** (0.066)
Firm age	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Export active	0.015 (0.017)	0.012 (0.021)	0.001 (0.022)	0.001 (0.028)
R&D active	0.118*** (0.021)	0.123*** (0.025)	0.127*** (0.027)	0.135*** (0.033)
Mandatory accounting	-0.008 (0.033)	0.031 (0.036)	0.017 (0.042)	0.070 (0.047)
Active owners and managers, 2	-0.032* (0.018)	-0.033 (0.022)	-0.020 (0.022)	-0.043 (0.029)
Active owners and managers, at least 3	-0.052** (0.025)	-0.053* (0.031)	-0.073** (0.030)	-0.085** (0.040)
Owned by another firm	0.065*** (0.022)	0.060** (0.027)	0.067** (0.028)	0.068* (0.038)
Risk Class, 2	0.030 (0.019)	0.034 (0.023)	-0.007 (0.024)	-0.017 (0.030)
Risk Class, 3	0.081*** (0.022)	0.068*** (0.026)	0.071** (0.029)	0.062* (0.035)
Risk Class, 4	0.032 (0.037)	0.026 (0.044)	-0.042 (0.049)	-0.044 (0.062)
Risk Class, 5	0.365*** (0.056)	0.401*** (0.067)	0.398*** (0.073)	0.411*** (0.090)
Risk Class, 6	0.375*** (0.082)	0.456*** (0.088)	0.432*** (0.100)	0.489*** (0.106)
Bank negotiations experience	0.018 (0.014)	0.027 (0.017)	0.042** (0.018)	0.053** (0.022)
Owner's age		-0.002* (0.001)		-0.003** (0.001)
Female owner		0.025 (0.037)		0.044 (0.049)
Owner's education - Level 1		0.006 (0.037)		0.007 (0.050)
Owner's education - Level 2		0.014 (0.041)		-0.029 (0.055)
Owner's education - Level 3		0.041 (0.038)		0.018 (0.052)
Owner's past - Takeover		-0.025 (0.025)		-0.026 (0.031)
Owner's past - Shareholder		-0.001 (0.036)		-0.015 (0.045)
Managing owner	-0.017 (0.021)		-0.024 (0.027)	
Constant	1.045*** (0.084)	1.104*** (0.146)	1.091*** (0.097)	1.155*** (0.180)
Observations	4,488	3,362	2,820	2,129
R-squared	0.204	0.244	0.303	0.358
Legal form FEs	Yes	Yes	Yes	Yes
Sector * Region * Year FEs	Yes	Yes	Yes	Yes

Standard errors clustered at the firm level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Sector stock market growth as a control variable

This table reports OLS estimation of the linear probability model for the probability of failure in loan negotiations. Variables are defined in Table 1. Owner specific variables are included only in cases when the business is managed by the owner. The variable Stock price growth is added.

VARIABLES	(1) Negotiations failed	(2) Negotiations failed
Overconfidence	0.067** (0.026)	0.102*** (0.034)
Stock price growth	-0.039 (0.054)	-0.129* (0.067)
Bank financing needs, to Revenue	0.025 (0.028)	0.017 (0.031)
Revenue, ln	-0.040*** (0.009)	-0.037*** (0.012)
Revenue growth	-0.059 (0.037)	-0.093** (0.047)
Firm age	0.000 (0.000)	0.000 (0.000)
Export active	0.029 (0.020)	0.022 (0.025)
R&D active	0.109*** (0.022)	0.114*** (0.026)
Mandatory accounting	0.036 (0.051)	0.083 (0.053)
Active owners and managers, 2	-0.028 (0.020)	-0.010 (0.024)
Active owners and managers, at least 3	-0.032 (0.027)	-0.021 (0.033)
Owned by another firm	0.058** (0.024)	0.044 (0.032)
Risk Class, 2	0.050** (0.021)	0.060** (0.027)
Risk Class, 3	0.079*** (0.025)	0.070** (0.032)
Risk Class, 4	0.081* (0.045)	0.107** (0.054)
Risk Class, 5	0.332*** (0.070)	0.279*** (0.080)
Risk Class, 6	0.428*** (0.129)	0.624*** (0.098)
Bank negotiations experience	0.007 (0.016)	0.006 (0.021)
Owner's age		-0.001 (0.001)
Female owner		0.008 (0.043)
Owner's education - Level 1		-0.026 (0.047)
Owner's education - Level 2		0.005 (0.052)
Owner's education - Level 3		-0.039 (0.047)
Owner's past - Takeover		0.006 (0.028)
Owner's past - Shareholder		-0.002 (0.038)
Managing owner	-0.025 (0.022)	
Constant	1.031*** (0.103)	1.057*** (0.170)
Observations	3,427	2,380
R-squared	0.221	0.281
Legal form FEs	Yes	Yes
Sector * Region * Year FEs	Yes	Yes

Standard errors clustered at the firm level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Overconfidence in interaction with the sector stock market growth

This table reports OLS estimation of the linear probability model for the probability of failure in loan negotiations. Variables are defined in Table 1. Owner specific variables are included only in cases when the business is managed by the owner. The variables Weak stock price growth (Strong stock price growth) and its interactions with the overconfidence measure are added.

VARIABLES	(1) Negotiations failed	(2) Negotiations failed
Overconfidence * Weak stock price performance	0.094** (0.038)	0.126*** (0.049)
Overconfidence * Strong stock price performance	0.027 (0.041)	0.063 (0.053)
Weak stock price performance	0.003 (0.025)	0.021 (0.032)
Bank financing needs, to Revenue	0.029 (0.028)	0.020 (0.032)
Revenue, ln	-0.036*** (0.010)	-0.030** (0.012)
Revenue growth	-0.063 (0.038)	-0.082* (0.048)
Firm age	0.000 (0.000)	0.000 (0.000)
Export active	0.029 (0.021)	0.027 (0.026)
R&D active	0.098*** (0.022)	0.104*** (0.027)
Mandatory accounting	0.015 (0.056)	0.062 (0.058)
Active owners and managers, 2	-0.031 (0.020)	-0.016 (0.025)
Active owners and managers, at least 3	-0.031 (0.027)	-0.017 (0.034)
Owned by another firm	0.053** (0.026)	0.020 (0.033)
Risk Class, 2	0.047** (0.022)	0.059** (0.028)
Risk Class, 3	0.085*** (0.027)	0.089*** (0.032)
Risk Class, 4	0.097** (0.046)	0.132** (0.055)
Risk Class, 5	0.353*** (0.071)	0.302*** (0.081)
Risk Class, 6	0.443*** (0.127)	0.635*** (0.103)
Bank negotiations experience	0.002 (0.017)	0.005 (0.022)
Owner's age		-0.001 (0.001)
Female owner		0.008 (0.043)
Owner's education - Level 1		-0.023 (0.049)
Owner's education - Level 2		0.006 (0.053)
Owner's education - Level 3		-0.026 (0.049)
Owner's past - Takeover		0.014 (0.029)
Owner's past - Shareholder		-0.000 (0.040)
Managing owner	-0.040* (0.023)	
Constant	1.052*** (0.111)	1.042*** (0.177)
Observations	3,162	2,220
R-squared	0.228	0.290
Legal form FEs	Yes	Yes
Sector * Region * Year FEs	Yes	Yes

Standard errors clustered at the firm level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Selection model

This table reports estimation results of the two-stage selection model introduced by Heckman (1979). Variables are defined in Table 1. Owner specific variables are included only in cases when the business is managed by the owner.

VARIABLES	(1)		(2)		(3)		(4)	
	Negotiations attempt	Negotiations failed	Negotiations attempt	Negotiations failed	Negotiations attempt	Negotiations failed	Negotiations attempt	Negotiations failed
Overconfidence	0.092** (0.042)	0.049*** (0.019)	0.096** (0.049)	0.062*** (0.022)	0.091** (0.042)	0.055*** (0.019)	0.096** (0.049)	0.066*** (0.023)
Bank financing needs, to Revenue		0.026 (0.018)		0.020 (0.018)		0.032 (0.020)		0.027 (0.021)
Revenue, ln	-0.278*** (0.016)	-0.036*** (0.006)	-0.270*** (0.018)	-0.039*** (0.008)	-0.278*** (0.016)	-0.035*** (0.007)	-0.270*** (0.018)	-0.037*** (0.008)
Revenue growth	0.036 (0.051)	-0.068*** (0.024)	-0.004 (0.058)	-0.058** (0.028)	0.036 (0.051)	-0.047* (0.026)	-0.004 (0.058)	-0.044 (0.030)
Firm age	0.000 (0.000)	0.000 (0.000)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.001)	0.000 (0.000)
Export active	-0.075** (0.031)	0.006 (0.014)	-0.103*** (0.036)	-0.005 (0.017)	-0.075** (0.031)	0.005 (0.015)	-0.103*** (0.036)	-0.003 (0.018)
R&D active	-0.144*** (0.034)	0.119*** (0.017)	-0.136*** (0.041)	0.111*** (0.020)	-0.144*** (0.034)	0.118*** (0.017)	-0.136*** (0.041)	0.116*** (0.020)
Mandatory accounting	0.044 (0.046)	-0.011 (0.026)	-0.002 (0.050)	0.020 (0.027)	0.044 (0.046)	0.007 (0.027)	-0.002 (0.050)	0.037 (0.029)
Active owners and managers, 2	0.058* (0.029)	-0.025* (0.015)	0.026 (0.035)	-0.035** (0.018)	0.058* (0.029)	-0.027* (0.016)	0.026 (0.035)	-0.036* (0.019)
Active owners and managers, at least 3	-0.039 (0.045)	-0.041** (0.021)	-0.017 (0.054)	-0.043* (0.025)	-0.039 (0.045)	-0.040* (0.022)	-0.017 (0.054)	-0.042 (0.027)
Owned by another firm	-0.156*** (0.039)	0.053*** (0.018)	-0.111** (0.048)	0.051** (0.022)	-0.156*** (0.039)	0.058*** (0.019)	-0.112** (0.048)	0.048** (0.023)
Risk Class, 2	0.016 (0.034)	0.022 (0.016)	-0.008 (0.039)	0.025 (0.019)	0.016 (0.034)	0.029* (0.017)	-0.008 (0.039)	0.029 (0.020)
Risk Class, 3	0.075** (0.036)	0.067*** (0.018)	0.076* (0.041)	0.055*** (0.020)	0.075** (0.036)	0.073*** (0.019)	0.075* (0.041)	0.058*** (0.022)
Risk Class, 4	0.078 (0.058)	0.074** (0.030)	0.062 (0.065)	0.065* (0.035)	0.079 (0.058)	0.085*** (0.032)	0.062 (0.065)	0.064* (0.037)
Risk Class, 5	0.155* (0.092)	0.264*** (0.049)	0.197* (0.107)	0.243*** (0.056)	0.155* (0.091)	0.304*** (0.049)	0.197* (0.107)	0.293*** (0.057)
Risk Class, 6	-0.031 (0.110)	0.362*** (0.067)	-0.075 (0.128)	0.431*** (0.071)	-0.031 (0.110)	0.360*** (0.068)	-0.075 (0.128)	0.411*** (0.072)
Bank negotiations experience	0.883*** (0.027)	0.050*** (0.016)	0.825*** (0.031)	0.045** (0.018)	0.883*** (0.027)	0.046*** (0.017)	0.825*** (0.031)	0.042** (0.020)
Owner's age			-0.003 (0.002)	-0.001 (0.001)			-0.003 (0.002)	-0.001 (0.001)
Female owner			-0.043 (0.054)	0.049* (0.029)			-0.043 (0.054)	0.048 (0.031)
Owner's education - Level 1			0.035 (0.058)	-0.014 (0.028)			0.035 (0.058)	-0.028 (0.031)
Owner's education - Level 2			0.040 (0.063)	0.017 (0.031)			0.040 (0.063)	-0.009 (0.034)
Owner's education - Level 3			-0.026 (0.061)	0.027 (0.029)			-0.026 (0.061)	0.008 (0.032)
Owner's past - Takeover			0.063 (0.040)	-0.028 (0.019)			0.064 (0.040)	-0.023 (0.020)
Owner's past - Shareholder			0.025 (0.060)	-0.003 (0.028)			0.025 (0.060)	-0.004 (0.030)
Managing owner	0.215*** (0.035)	-0.001 (0.017)			0.215*** (0.035)	-0.014 (0.018)		
Investment volume planned, ln	0.486*** (0.015)		0.533*** (0.016)		0.486*** (0.015)		0.533*** (0.016)	
Inverse Mills ratio		0.036* (0.021)		0.011 (0.024)		0.031 (0.021)		0.010 (0.025)
Constant	-0.875*** (0.139)	0.312*** (0.089)	-0.824*** (0.179)	0.411*** (0.126)	-0.875*** (0.139)	1.011*** (0.079)	-0.824*** (0.179)	1.119*** (0.129)
Observations	14,153	5,825	10,536	4,386	14,153	5,825	10,536	4,386
R-squared		0.078		0.084		0.166		0.199
Legal form FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Sector FEs	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Region FEs	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Sector * Region * Year FEs	No	No	No	No	No	Yes	No	Yes

Standard errors clustered at the firm level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Real investment effects

This table reports OLS estimation of the linear probability model for the probability of failed investment plans. All the variables are defined in Table 1. Owner specific variables are included only in cases when the business is managed by the owner.

VARIABLES	(1) Failed invest- ment plan	(2) Failed invest- ment plan	(3) Failed invest- ment plan	(4) Failed invest- ment plan
Negotiations failed	0.452*** (0.016)	0.485*** (0.018)	0.452*** (0.017)	0.495*** (0.019)
Overconfidence	0.016 (0.018)	0.013 (0.021)	0.015 (0.019)	0.008 (0.023)
Negotiations failed * Overconfidence	0.070* (0.040)	0.043 (0.045)	0.066 (0.042)	0.044 (0.047)
Bank financing needs, to Revenue	-0.101* (0.058)	-0.066 (0.053)	-0.095* (0.057)	-0.068 (0.054)
Investment volume planned, to Revenue	0.140*** (0.044)	0.102** (0.042)	0.139*** (0.044)	0.110*** (0.042)
Revenue, ln	-0.013** (0.006)	-0.016*** (0.006)	-0.015** (0.006)	-0.019*** (0.007)
Revenue growth	-0.044** (0.022)	-0.036 (0.026)	-0.035 (0.024)	-0.037 (0.028)
Firm age	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Export active	0.013 (0.013)	0.014 (0.015)	0.016 (0.013)	0.011 (0.016)
R&D active	0.037*** (0.014)	0.020 (0.016)	0.039** (0.015)	0.018 (0.017)
Mandatory accounting	-0.003 (0.022)	0.017 (0.023)	-0.000 (0.023)	0.017 (0.025)
Active owners and managers, 2	-0.010 (0.013)	-0.008 (0.015)	-0.008 (0.014)	-0.007 (0.016)
Active owners and managers, at least 3	-0.013 (0.018)	0.007 (0.022)	-0.016 (0.020)	-0.000 (0.023)
Owned by another firm	-0.020 (0.016)	-0.024 (0.019)	-0.017 (0.017)	-0.017 (0.021)
Risk Class, 2	0.027* (0.014)	0.017 (0.016)	0.026* (0.015)	0.015 (0.017)
Risk Class, 3	0.050*** (0.015)	0.039** (0.017)	0.048*** (0.016)	0.038** (0.019)
Risk Class, 4	0.039 (0.026)	0.014 (0.029)	0.032 (0.028)	0.009 (0.032)
Risk Class, 5	0.160*** (0.038)	0.148*** (0.044)	0.168*** (0.041)	0.154*** (0.048)
Risk Class, 6	0.165*** (0.049)	0.187*** (0.055)	0.157*** (0.047)	0.177*** (0.059)
Bank negotiations experience	0.015 (0.011)	0.027** (0.012)	0.019* (0.011)	0.031** (0.013)
Owner's age		-0.001** (0.001)		-0.001* (0.001)
Female owner		0.052** (0.024)		0.039 (0.026)
Owner's education - Level 1		-0.004 (0.023)		-0.004 (0.025)
Owner's education - Level 2		0.002 (0.024)		-0.008 (0.026)
Owner's education - Level 3		0.021 (0.024)		0.025 (0.025)
Owner's past - Takeover		-0.033** (0.016)		-0.030* (0.018)
Owner's past - Shareholder		-0.060*** (0.022)		-0.057** (0.024)
Managing owner	-0.014 (0.015)		-0.014 (0.016)	
Constant	0.056 (0.070)	0.123 (0.093)	0.551*** (0.070)	0.598*** (0.102)
Observations	5,793	4,365	5,793	4,365
R-squared	0.267	0.300	0.339	0.386
Legal form FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	No	No
Sector FEs	Yes	Yes	No	No
Region FEs	Yes	Yes	No	No
Sector * Region * Year FEs	No	No	Yes	Yes

Standard errors clustered at the firm level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11: Real effects on Revenue growth

This table reports OLS estimation of the linear model for the firm's cumulative revenue growth achieved three years after the firm's manager was engaged in the loan negotiations (Revenue growth 3y). Variables are defined in Table 1. Owner specific variables are included only in cases when the business is managed by the owner. Panel dataset is transformed into the quasi cross-sectional sample. The observed firms are classified in four groups depending on the managerial overconfidence, availability of bank funding and subsequent disruptions while pursuing planned investments. For more details refer to Section 5.2.

VARIABLES	(1) Revenue growth 3y	(2) Revenue growth 3y	(3) Revenue growth 3y	(4) Revenue growth 3y	(5) Revenue growth 3y	(6) Revenue growth 3y	(7) Revenue growth 3y	(8) Revenue growth 3y	(9) Revenue growth 3y
Overconfident, Loan received	-0.154** (0.064)	-0.134** (0.054)	-0.125* (0.066)	-0.133** (0.047)	-0.111* (0.058)	-0.167** (0.058)	-0.172** (0.071)	-0.158** (0.054)	-0.157** (0.073)
Overconfident, No loan received	-0.006 (0.120)	0.078 (0.112)	0.161 (0.125)	0.050 (0.139)	0.116 (0.168)	0.135 (0.124)	0.247* (0.132)	0.103 (0.153)	0.208 (0.180)
Not overconfident, No loan received	-0.123* (0.059)	-0.202*** (0.063)	-0.254*** (0.062)	-0.168** (0.064)	-0.202*** (0.058)	-0.179** (0.067)	-0.250*** (0.070)	-0.157** (0.064)	-0.210*** (0.059)
Bank financing needs, to Revenue		0.047 (0.083)	0.187 (0.330)	0.057 (0.078)	0.161 (0.335)	0.039 (0.096)	0.211 (0.376)	0.027 (0.098)	0.251 (0.373)
Bank financing needs, to Planned Investments		-0.000 (0.000)	-0.003 (0.007)	-0.000 (0.000)	-0.003 (0.007)	-0.000 (0.000)	-0.005 (0.008)	0.000 (0.000)	-0.007 (0.008)
Investment volume planned, to Revenue		0.301*** (0.096)	0.238 (0.313)	0.297*** (0.097)	0.275 (0.317)	0.319*** (0.106)	0.224 (0.349)	0.332** (0.116)	0.226 (0.349)
Revenue, ln		-0.031** (0.015)	-0.033 (0.019)	-0.030* (0.016)	-0.030 (0.021)	-0.019 (0.012)	-0.013 (0.011)	-0.019 (0.016)	-0.009 (0.018)
Revenue growth		0.023 (0.138)	0.113 (0.144)	0.012 (0.131)	0.111 (0.129)	0.033 (0.150)	0.095 (0.146)	0.009 (0.136)	0.074 (0.134)
Firm age		-0.002*** (0.000)	-0.001 (0.000)	-0.002** (0.001)	-0.001 (0.000)	-0.001** (0.001)	-0.000 (0.000)	-0.001** (0.001)	-0.001 (0.001)
Export active		0.041 (0.044)	0.060 (0.050)	0.039 (0.040)	0.053 (0.051)	0.028 (0.050)	0.044 (0.056)	0.029 (0.047)	0.032 (0.059)
R&D active		0.005 (0.033)	0.000 (0.030)	0.006 (0.031)	-0.000 (0.028)	0.014 (0.040)	0.029 (0.028)	0.018 (0.041)	0.034 (0.030)
Mandatory accounting		0.131 (0.079)	0.072 (0.103)	0.127 (0.078)	0.079 (0.101)	0.063 (0.096)	0.000 (0.129)	0.045 (0.097)	-0.033 (0.127)
Active owners and managers, 2		-0.043 (0.035)	-0.057* (0.032)	-0.030 (0.039)	-0.049 (0.032)	-0.029 (0.039)	-0.027 (0.035)	-0.015 (0.043)	-0.023 (0.036)
Active owners and managers, at least 3		-0.048 (0.072)	-0.057 (0.062)	-0.050 (0.069)	-0.057 (0.053)	-0.051 (0.083)	-0.045 (0.071)	-0.052 (0.082)	-0.058 (0.063)
Owned by another firm		0.004 (0.044)	0.029 (0.075)	0.003 (0.042)	0.034 (0.066)	-0.004 (0.046)	0.054 (0.086)	-0.010 (0.041)	0.052 (0.076)
Risk Class, 2		-0.100** (0.037)	-0.075* (0.035)	-0.114*** (0.037)	-0.088** (0.035)	-0.105** (0.038)	-0.068 (0.039)	-0.114*** (0.038)	-0.086* (0.041)
Risk Class, 3		-0.079* (0.038)	-0.061* (0.033)	-0.094** (0.038)	-0.078** (0.035)	-0.075 (0.043)	-0.034 (0.031)	-0.081* (0.042)	-0.055 (0.038)
Risk Class, 4		-0.102 (0.103)	-0.091 (0.123)	-0.098 (0.101)	-0.086 (0.130)	-0.083 (0.117)	-0.049 (0.144)	-0.076 (0.107)	-0.050 (0.140)
Risk Class, 5		0.061 (0.109)	0.085 (0.123)	0.038 (0.115)	0.060 (0.138)	0.035 (0.132)	-0.097 (0.165)	0.047 (0.136)	-0.109 (0.128)
Risk Class, 6		-0.259 (0.194)	-0.376 (0.269)	-0.255 (0.206)	-0.389 (0.289)	-0.229 (0.220)	-0.354 (0.314)	-0.208 (0.238)	-0.409 (0.324)
Bank negotiations experience		-0.014 (0.043)	-0.008 (0.042)	-0.023 (0.046)	-0.016 (0.051)	-0.012 (0.048)	0.005 (0.053)	-0.019 (0.053)	-0.007 (0.062)
Owner's age			-0.004** (0.002)		-0.004* (0.002)		-0.004* (0.002)		-0.003 (0.002)
Female owner			-0.009 (0.097)		-0.033 (0.080)		0.016 (0.114)		-0.027 (0.101)
Owner's education - Level 1			-0.090 (0.053)		-0.067 (0.077)		-0.056 (0.081)		-0.002 (0.093)
Owner's education - Level 2			-0.119* (0.057)		-0.076 (0.065)		-0.085* (0.041)		-0.021 (0.063)
Owner's education - Level 3			-0.073 (0.064)		-0.036 (0.084)		-0.045 (0.071)		0.019 (0.087)
Owner's past - Takeover			-0.064** (0.030)		-0.054 (0.034)		-0.086** (0.036)		-0.075* (0.040)
Owner's past - Shareholder			-0.001 (0.040)		0.010 (0.045)		-0.037 (0.050)		-0.013 (0.061)
Managing owner		-0.007 (0.035)		-0.001 (0.037)		-0.012 (0.037)		0.002 (0.039)	
Constant	0.611*** (0.119)	0.511** (0.180)	0.642** (0.260)	0.509** (0.225)	0.572 (0.342)	0.257 (0.204)	0.297 (0.296)	0.328 (0.488)	0.407 (0.565)
Observations	1,186	888	637	888	637	888	637	888	637
R-squared	0.063	0.110	0.151	0.149	0.195	0.195	0.261	0.232	0.307
Legal form FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector FEs	Yes	Yes	Yes	No	No	Yes	Yes	No	No
Region FEs	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Sector * Year FEs	No	No	No	Yes	Yes	No	No	Yes	Yes
Region * Year FEs	No	No	No	No	No	Yes	Yes	Yes	Yes

Standard errors clustered at the regional level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Alternative overconfidence measure

This table reports OLS estimation of the linear probability model for the probability of failure in loan negotiations. Variables are defined in Table 1. Owner specific variables are included only in cases when the business is managed by the owner. Overconfidence measures based on the employment forecasts are used. For more details refer to Section 6.

VARIABLES	(1)	(2)	(3)	(4)
	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed
Overconfidence, employment-based, version 1	0.054*** (0.016)	0.064*** (0.018)		
Overconfidence, employment-based, version 2			0.036*** (0.010)	0.043*** (0.012)
Bank financing needs, to Revenue	0.043*** (0.015)	0.050*** (0.018)	0.039*** (0.011)	0.040*** (0.012)
Revenue, ln	-0.034*** (0.005)	-0.034*** (0.007)	-0.031*** (0.005)	-0.030*** (0.007)
Revenue growth	-0.046** (0.023)	-0.038 (0.026)	-0.052** (0.023)	-0.048* (0.026)
Firm age	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Export active	0.018 (0.013)	0.014 (0.015)	0.013 (0.013)	0.007 (0.015)
R&D active	0.106*** (0.015)	0.115*** (0.018)	0.107*** (0.015)	0.114*** (0.018)
Mandatory accounting	-0.008 (0.022)	0.012 (0.023)	-0.008 (0.022)	0.010 (0.023)
Active owners and managers, 2	-0.018 (0.013)	-0.025 (0.016)	-0.020 (0.013)	-0.025 (0.016)
Active owners and managers, at least 3	-0.032* (0.018)	-0.037* (0.022)	-0.029* (0.018)	-0.034 (0.022)
Owned by another firm	0.075*** (0.016)	0.070*** (0.020)	0.070*** (0.016)	0.066*** (0.020)
Risk Class, 2	0.026* (0.014)	0.021 (0.017)	0.031** (0.014)	0.026 (0.017)
Risk Class, 3	0.073*** (0.015)	0.057*** (0.018)	0.074*** (0.015)	0.055*** (0.018)
Risk Class, 4	0.081*** (0.027)	0.056* (0.030)	0.099*** (0.027)	0.069** (0.030)
Risk Class, 5	0.289*** (0.040)	0.273*** (0.047)	0.294*** (0.040)	0.273*** (0.047)
Risk Class, 6	0.351*** (0.055)	0.356*** (0.059)	0.353*** (0.058)	0.369*** (0.061)
Bank negotiations experience	0.030*** (0.011)	0.036*** (0.013)	0.029*** (0.010)	0.032*** (0.013)
Owner's age		-0.002** (0.001)		-0.002** (0.001)
Female owner		0.038 (0.025)		0.031 (0.025)
Owner's education - Level 1		-0.003 (0.029)		-0.007 (0.028)
Owner's education - Level 2		-0.003 (0.031)		-0.002 (0.031)
Owner's education - Level 3		0.023 (0.030)		0.020 (0.030)
Owner's past - Takeover		-0.014 (0.017)		-0.015 (0.017)
Owner's past - Shareholder		-0.014 (0.025)		-0.009 (0.026)
Managing owner	-0.021 (0.015)		-0.023 (0.015)	
Constant	1.111*** (0.064)	1.191*** (0.107)	1.086*** (0.067)	1.180*** (0.108)
Observations	8,642	6,506	8,693	6,545
R-squared	0.173	0.208	0.168	0.202
Legal form FEs	Yes	Yes	Yes	Yes
Sector * Region * Year FEs	Yes	Yes	Yes	Yes

Standard errors clustered at the firm level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 13: Alternative dependent variables

This table reports OLS estimation of the linear probability model for the probability of financing difficulties. Financing difficulties are proxied with the variables No offer (Negotiations with no offer) and No acceptable offer (Negotiations with no acceptable offer). All the variables are defined in Table 1. Owner specific variables are included only in cases when the business is managed by the owner. For more details refer to Section 6.

VARIABLES	(1) No offer	(2) No offer	(3) No accept- able offer	(4) No accept- able offer
Overconfidence	0.028** (0.013)	0.028* (0.016)	0.055*** (0.017)	0.053** (0.021)
Bank financing needs, to Revenue	0.009 (0.011)	0.009 (0.013)	0.006 (0.014)	0.014 (0.017)
Revenue, ln	-0.027*** (0.005)	-0.032*** (0.006)	-0.039*** (0.006)	-0.042*** (0.007)
Revenue growth	-0.025 (0.017)	-0.017 (0.020)	-0.022 (0.023)	-0.018 (0.027)
Firm age	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Export active	0.017* (0.009)	0.007 (0.011)	0.024* (0.012)	0.009 (0.015)
R&D active	0.026** (0.011)	0.029** (0.013)	0.068*** (0.015)	0.073*** (0.017)
Mandatory accounting	-0.012 (0.020)	0.012 (0.021)	-0.019 (0.025)	0.015 (0.026)
Active owners and managers, 2	-0.017** (0.009)	-0.019* (0.011)	-0.024* (0.013)	-0.029* (0.015)
Active owners and managers, at least 3	-0.023** (0.011)	-0.030** (0.014)	-0.017 (0.016)	-0.016 (0.021)
Owned by another firm	0.031** (0.012)	0.042** (0.016)	0.040** (0.016)	0.045** (0.020)
Risk Class, 2	0.001 (0.010)	-0.002 (0.012)	0.012 (0.013)	0.014 (0.017)
Risk Class, 3	0.032*** (0.012)	0.035** (0.014)	0.059*** (0.015)	0.050*** (0.018)
Risk Class, 4	0.024 (0.020)	0.007 (0.022)	0.049* (0.027)	0.032 (0.031)
Risk Class, 5	0.194*** (0.042)	0.241*** (0.053)	0.255*** (0.052)	0.280*** (0.060)
Risk Class, 6	0.328*** (0.063)	0.387*** (0.075)	0.347*** (0.068)	0.420*** (0.076)
Bank negotiations experience	0.028*** (0.008)	0.033*** (0.009)	0.032*** (0.010)	0.039*** (0.013)
Owner's age		0.000 (0.001)		-0.000 (0.001)
Female owner		0.018 (0.020)		0.021 (0.026)
Owner's education - Level 1		0.002 (0.022)		-0.009 (0.026)
Owner's education - Level 2		-0.021 (0.024)		-0.014 (0.028)
Owner's education - Level 3		0.011 (0.022)		0.021 (0.027)
Owner's past - Takeover		-0.008 (0.013)		-0.016 (0.017)
Owner's past - Shareholder		0.018 (0.017)		0.003 (0.024)
Managing owner	0.010 (0.011)		-0.011 (0.015)	
Constant	0.094** (0.042)	0.093 (0.071)	0.499*** (0.129)	0.514*** (0.145)
Observations	5,905	4,456	5,477	4,118
R-squared	0.189	0.224	0.188	0.223
Legal form FEs	Yes	Yes	Yes	Yes
Sector * Region * Year FEs	Yes	Yes	Yes	Yes

Standard errors clustered at the firm level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 14: Alternative estimation techniques

This table reports estimation of the model for the probability of failure in loan negotiations. Logit and probit regressions are estimated. All the variables are defined in Table 1. Owner specific variables are included only in cases when the business is managed by the owner. For more details refer to Section 6.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Logit				Probit			
	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed	Negotiations failed
Overconfidence	0.041** (0.017)	0.052*** (0.019)	0.055*** (0.018)	0.070*** (0.021)	0.041** (0.017)	0.053*** (0.020)	0.054*** (0.018)	0.070*** (0.021)
Bank financing needs, to Revenue	0.014 (0.013)	0.015 (0.014)	0.024 (0.016)	0.024 (0.017)	0.017 (0.014)	0.018 (0.014)	0.025 (0.016)	0.025 (0.017)
Revenue, ln	-0.038*** (0.006)	-0.039*** (0.007)	-0.040*** (0.007)	-0.042*** (0.008)	-0.038*** (0.006)	-0.039*** (0.007)	-0.039*** (0.006)	-0.041*** (0.008)
Revenue growth	-0.069*** (0.024)	-0.058** (0.028)	-0.048* (0.025)	-0.042 (0.030)	-0.068*** (0.024)	-0.055** (0.027)	-0.051** (0.024)	-0.047 (0.029)
Firm age	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Export active	0.007 (0.014)	-0.003 (0.017)	0.006 (0.015)	-0.002 (0.018)	0.007 (0.014)	-0.003 (0.016)	0.007 (0.015)	-0.002 (0.017)
R&D active	0.114*** (0.015)	0.103*** (0.018)	0.121*** (0.016)	0.120*** (0.019)	0.115*** (0.015)	0.104*** (0.018)	0.119*** (0.016)	0.118*** (0.019)
Mandatory accounting	-0.007 (0.023)	0.024 (0.025)	0.008 (0.024)	0.037 (0.027)	-0.005 (0.023)	0.025 (0.025)	0.011 (0.024)	0.040 (0.027)
Active owners and managers, 2	-0.024 (0.015)	-0.033* (0.018)	-0.027* (0.015)	-0.035* (0.019)	-0.024 (0.015)	-0.033* (0.018)	-0.025* (0.015)	-0.034* (0.018)
Active owners and managers, at least 3	-0.038* (0.023)	-0.041 (0.027)	-0.039 (0.024)	-0.042 (0.029)	-0.039* (0.022)	-0.043 (0.027)	-0.037 (0.023)	-0.042 (0.028)
Owned by another firm	0.056*** (0.016)	0.049** (0.020)	0.068*** (0.017)	0.057*** (0.021)	0.057*** (0.016)	0.050** (0.020)	0.068*** (0.017)	0.055*** (0.021)
Risk Class, 2	0.021 (0.017)	0.022 (0.020)	0.029 (0.018)	0.029 (0.021)	0.021 (0.017)	0.022 (0.020)	0.032* (0.017)	0.032 (0.020)
Risk Class, 3	0.064*** (0.017)	0.055*** (0.020)	0.075*** (0.018)	0.063*** (0.022)	0.064*** (0.017)	0.055*** (0.020)	0.075*** (0.018)	0.064*** (0.021)
Risk Class, 4	0.067** (0.027)	0.060* (0.032)	0.079*** (0.029)	0.063* (0.034)	0.068** (0.027)	0.061* (0.032)	0.081*** (0.028)	0.063* (0.033)
Risk Class, 5	0.217*** (0.036)	0.202*** (0.043)	0.270*** (0.039)	0.276*** (0.048)	0.225*** (0.038)	0.209*** (0.045)	0.281*** (0.041)	0.283*** (0.049)
Risk Class, 6	0.285*** (0.051)	0.347*** (0.060)	0.302*** (0.055)	0.369*** (0.066)	0.298*** (0.053)	0.362*** (0.061)	0.314*** (0.055)	0.387*** (0.066)
Bank negotiations experience	0.027** (0.012)	0.035** (0.014)	0.028** (0.012)	0.036** (0.015)	0.025** (0.012)	0.033** (0.014)	0.028** (0.012)	0.036** (0.015)
Owner's age		-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)
Female owner		0.043 (0.027)		0.048* (0.028)		0.043 (0.027)		0.047* (0.028)
Owner's education - Level 1		-0.012 (0.027)		-0.020 (0.031)		-0.009 (0.027)		-0.017 (0.030)
Owner's education - Level 2		0.020 (0.030)		0.002 (0.034)		0.023 (0.030)		0.006 (0.033)
Owner's education - Level 3		0.031 (0.029)		0.022 (0.033)		0.034 (0.029)		0.025 (0.032)
Owner's past - Takeover		-0.027 (0.020)		-0.022 (0.021)		-0.026 (0.019)		-0.020 (0.020)
Owner's past - Shareholder		0.001 (0.029)		0.000 (0.031)		-0.001 (0.029)		-0.004 (0.030)
Managing owner	-0.003 (0.018)		-0.014 (0.018)		-0.003 (0.017)		-0.014 (0.018)	
Observations	5,909	4,458	5,504	4,007	5,909	4,458	5,504	4,007
R-squared	0,068	0,072	0,124	0,139	0,068	0,072	0,124	0,139
Legal form FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	No	No	Yes	Yes	No	No
Sector FEs	Yes	Yes	No	No	Yes	Yes	No	No
Region FEs	Yes	Yes	No	No	Yes	Yes	No	No
Sector * Region * Year FEs	No	No	Yes	Yes	No	No	Yes	Yes

Standard errors clustered at the firm level in parentheses
 *** p<0.01, ** p<0.05, * p<0.1