European Investment Bank

The EU bank

EIB Working Papers 2017 / 03

Loan characteristics, Firm Preferences and Investment: Evidence from a unique experiment

Philipp-Bastian Brutscher,
Jonas Heipertz,
Christopher Hols

Loan characteristics, Firm Preferences and Investment: Evidence from a unique experiment

June, 2017

Authors:

Philipp-Bastian Brutscher, European Investment Bank, p.brutscher@eib.org

Jonas Heipertz, Paris School of Economics, jonas.heipertz@psemail.eu

Christopher Hols, Rheinische Friedrich-Wilhelms-Universität Bonn, christopher.hols@uni-bonn.de

The mission of the EIB's Economics Department is to provide economic analyses and studies to support the Bank in its operations and in its positioning, strategy and policy. The Department, a team of 30 staff, is headed by Debora Revoltella, Director of Economics.

Acknowledgments: We thank participants of seminars at the EIB, the ECB and the OECD for their fruitful comments on early stage results of the project. The views expressed in this paper are ours and do not necessarily reflect those of the European Investment Bank.

Abstract

This paper uses a unique experiment conducted as part of the Investment Survey of the European Investment Bank (EIB) to provide novel evidence on firms' preferences over loan characteristics and the relation between terms of credit and investment decisions. The design of the experiment allows revealing firm's financing preferences and willingness-to-pay in a clean and straightforward manner. The results show that firms are especially sensitive to the loan amount, the collateral requirement and the interest rate. Results are heterogeneous between sectors, size classes and types of projects.

JEL classification: D22, D24, G11, G21, G30

Keywords: firm preferences, investment decision, corporate finance

1. Introduction

The question of how firms finance their business and investment activity is long-standing in the academic literature as well as in policy circles. Indeed, the availability of sufficient and adapted sources of funding is at the heart of a dynamics and the functioning of market economies. The stabilizing role of monetary policy relies on the transmission of lower costs of external funding into higher demand through increased consumption (Calvo (1983); Campbell and Mankiw (1989); Kaplan et al. (2016))) and investment activity (Bernanke and Blinder (1992), Bernanke and Gertler (1995) Kahyap and Stein (2000)). Classical theories on the optimal financing mix (Modigliani and Miller's (1958) capital-structure irrelevance, the trade-off theory (Kraus and Litzenberger (1973) and the pecking-order theory (Myers and Majluf (1984)) and the overwhelming majority of empirical analyses[1] attempt to explain the proportions of debt and equity instruments in a firm's total liabilities (see Myers (2001)). To the best of our knowledge, however, almost no empirical work exists that analyses preferences of firms over specific characteristics of debt financing, such as collateral requirements, maturity or fixed versus floating interest rate and on their pass-through to real investment decisions.

Understanding of how firms in a particular sector, of certain size and with a specific investment project value different financing options and how loan characteristics translate to real activity is of crucial relevance for various economic agents. Knowledge about firm's preferences is a valuable asset for central banking authorities. In the recent expansion, firms have borrowed far less than in past ones. However, results from EIB (2017) suggest that firms are fairly satisfied with the external financing they received. So the question remains whether further easing in financial condition can induce more investment at all. Knowing firms preferences would facilitate taking action that might still increase corporate borrowing. Further, this information is valuable for regulators. Using firm's preferences regulation can be designed in a way that productive investment is not harmed. Finally, the results are important for intermediaries. Knowing firms preferences makes it easier for banks to offer loans that are accepted by firms.

Our paper aims to address this major shortcoming of the existing literature by exploiting data obtained from a unique experiment conducted among firms with an investment project as part of the EIB Investment Survey of 2016. In this experiment, each participating firm is presented eight times with two hypothetical loan offers differing across seven loan characteristics. Each loan offer is generated through random draws from distributions of loan characteristic around an appropriate midpoint. This midpoint, in turn, depends on the amount and maturity that the respondent firm desires as well as on credit market conditions prevailing in the country of the firm's residency. The firm had to choose either loan offer A or loan offer B. Following up this question, the firm is asked to state the likelihood with which it would go ahead implementing its investment project given the preferred loan offer.

[1] E.g. Titman and Wessels (1988), Rajan and Zingales (1995), Hovakimian et al. (2001), Kayhan and Titman (2007), de Jong et al. (2008), Lemmon et al. (2008), Byoun (2008) and DeAngelo and Roll (2015)

Note that the randomness of the generation of loan offers also leads to loan offers that are likely not to be offered to a firm in reality, because banks disbursing loans have constraints of various types (risk management, profit etc.) on their own: A loan for instance with no collateral demand, but a very low interest rate at the same time is possibly included in the experiment. It is however the exact purpose of the experiment to abstract from supply side constraints and shed light on the pure demand side preferences of firms for loan characteristics.

Specifically, we set up two logit regressions models: In the first, we model the probability that a firm chooses loan offer A as a function of the difference of the characteristics of loan offer A from characteristics of loan offer B. From the coefficients of the firm's latent objective function, we obtain elasticities of substitutions (trade-offs) between loan characteristics and calculate the willingness-to-pay for a characteristic in terms of interest rate units. In the second, we explain the probability of project implementation as a function of the characteristics of the preferred loan offer. The estimated coefficients are the elasticities of investment which indicate how specific loan characteristics translate into investment activity. Furthermore, we exploit the heterogeneity between firms surveyed in EIBIS and investigate how financing preferences vary across firms of different size, sector of business activity and type of investment project planned.

Our results suggest that firms would pay sizable higher interest rates for preferable loan characteristics and the implementation probability varies dramatically over different terms of credit. Especially, a high loan amount, fixed interest rates and low collateral requirements seem to be valuable for the firm. On the other hand, firms are not willing to pay more interest rates for subordinated debt and shorter grace periods. Further, the value of certain characteristics seem to vary over different sectors, size classes and project types, e.g. manufacturing firms are willing to pay three times more for a fixed interest rate loan than firms in the service sector. Further, our results suggest that that the implementation probability of projects is influenced by changed in loan characteristics to a great extent and the coefficients have the expected sign. We observe that a higher loan amount, fixed interest rates, subordinated seniority status and the right loan maturity increase the implementation probability and higher interest rates and collateral requirements reduce it. Further, there is substantial heterogeneity in these coefficients over different size classes, sectors and project types e.g. investment projects in intangible assets have a lower implementation probability in general compared to projects that invest in tangible assets.

The paper is structured as follows: In the next section we describe in more detail the design of the experiment and the data. Section 3 sets up the analytical framework and introduces the concepts that we are interested in. In Section 4 we present the empirical results, first over the whole sample and then accounting for firm heterogeneity and section 5 concludes.

2. Experiment, data and descriptive statistics

The data we are using in this paper stems from an online experiment on firms' financing preferences and investment project implementation probability that was conducted as part of the annual EIB Group Survey on Investment and Investment Finance (EIBIS). EIBIS is an EU-wide survey that gathers quantitative information on investment activities by both, SMEs and larger corporates, their financing requirements and the difficulties they face in their business activity. A total of 12,483 firms have been interviewed by phone over the July to November 2016 period on a variety of issues. Interviews covered both, general questions on firm characteristics, but also more specific and detailed inquiries on current and planned investment activity, investment finance, obstacles to investment, the innovativeness as well as the internationalisation of business activity. The sampling of firms was designed such that EU population respresentativity and valid statistical inference are ensured at a broad sector classification (manufacturing, infrastructure, construction and service) and size class level (SMEs and large companies) within each of the 28 EU member countries.

The online experiment – on which this paper is based – targeted only the subgroup of firms that indicated to *have an investment priority over the next three year*[2]. Out of the 10,628 firms around three third (8,210 firms) agreed to and around one fifth (2,241 firms) actually did log-in to the website to answer to the questions of the online experiment. These firms were again filtered and only those firms *currently contemplating at least one concrete investment project* [3] took part in (1,569 firms) and 1,137 firms completed the experiment. Finally, we dropped firms in the first percentile of loan to total investment ratio to exclude firms whose external financing needs are small compared to the total investment project. The final sample contains therefore 1,126 firms.

Table 1 shows the breakdown of the number of firms by country, broad-4-level sector classification and for SMEs versus large companies and provides a comparison of proportions to the main module to give an idea on the representativity and the selection of firms into the online experiment. Keeping in mind that 1% corresponds to approximately 11 firms, we acknowledge that for most countries the number of firms does not permit to do robust statistical analysis at the country or even finer level. The country with the maximum number of firms interviewed is Spain with 88 firms (followed by Italy, 87 and Hungary, 82), whereas the country with the lowest number of firms interviewed is Cyprus with 8 firms (followed by Ireland, 16, Luxembourg and Austria, 17). Turning to the distributions of firms across size classes, we furthermore observe that large firms amount to a greater part of the sample in the online module for most countries (on average 21%)

[2] i.e. all firms that answered either A, B or C in the following question of the main module: "And looking ahead to the next three years, which of the following is your investment priority?" A. Replacing existing buildings, machinery, equipment and IT; B. Capacity expansion for existing products/services; C. Developing or introducing new products, processes or services, D. Or do you have no investment project planned.

[3] All firms that answered either "Yes, several" or "Yes, one" to the first question of the online module: "Is there a concrete investment project that you are currently contemplating?"

than they do in the EIBIS main module, which never exceeds 25% and is on average around 15%.[4] The over-representation of large firms in the online module compared to the representative main module is the most pronounced in Bulgaria, Romania and Lithuania, but also considerable in Germany, Czech Republic and Spain.

The experiment works as follows: First, firms are asked how much of their investment project they intend to finance through a loan, where the desired amount can be either in local currency or in euros, and over which maturity this loan should be disbursed. Second, given the desired amount and maturity, a sequence of pairs of hypothetical loan offers is generated through independent random draws from uniform distributions over seven loan characteristics (amount, maturity, amortisation, type of interest rate, interest rate, seniority, collateral requirements and fees for early repayment), one pair for each of eight screens. In each of these screens the firms is asked to choose the offer that it prefers. Third, given the preferred loan offer in each of the eight screens, the firm states the likelihood (on a scale from one to five) with which it would go ahead with the implementation of its investment project.

Table 2 shows in detail how the range of the uniform distributions over loan characteristics depends on the desired amount, the maturity and the country of firm's operations as well as the constraints that were put in place in order to rule specific loan offers that are internally contradictory or too extreme. In particular, a loan that is junior to existing creditors is not allowed to be over-collateralization. Moreover, pairs of loan offers where interest rate differences are too extreme are also discarded in order to prevent the interest rate characteristic to dominate all other loan characteristics.

Before analysing in detail firms' choice over financing options and the impact of loan characteristics on the probability of implementation, we look at the amount and maturity of the desired loan. We observe that firms desire with an average of 12 million euros a large amount of external financing for an average of 8 years. The rather low median of 500 thousand euros however suggests that this large average is driven by rather few firms planning very large investment projects. The vast majority of projects planned are in the areas of land, business buildings and infrastructure (69 % projects) as well as machinery and equipment (45 % of projects). Furthermore and as shown in Table 3, the desired loan offer varies across country, 4-level-sector classification and size class. In particular, we see that firms in Germany desire the largest loans (median: ~2 million euros) for the longest median maturity of ten years, whereas firms in the Baltics or in Eastern Europe seem to plan much smaller external financing contributions to their investment projects (medians generally below 500 thousand euros) for maturities of five to seven years. Turning to the breakdown by sector, we find that – in line with our intuition – firms active in the manufacturing and infrastructure business desire higher loan amounts (median of 800 and 800 thousand euros respectively) whereas desired amounts in the service and construction sector are around half. Finally, large firms desire larger loan amounts for longer maturity than SMEs do, which is as well in line with our priors.

[4] The distribution of firms in the main module is not reported, but available upon request.

3. Model and concepts

In this section, we lay out the analytical framework that we use to analyse both, the trade-off of firms between different loan characteristics, as well as the pass-through of loan characteristics to the implementation probability.

3.1. Firms' financing preferences

There are I firms indexed by i that choose in each of eight screens indexed by $s = 1, \dots, 8$, between two loan offers indexed by $j \in \{\mathrm{A}, \mathrm{B}\}$. We assume that firm *i*'s preferences satisfy the rationality conditions (transitivity, completeness) and that therefore it can be represented by a utility function. We also assume monotonicity of preferences, meaning that firms do not change the "direction of their assessment" of a given change in a characteristic over different ranges of that characteristic (i.e. more is always better, less is always worse). Monotonicity ensures that preferences are quasi-concave.

The utility $\mathrm{u_{is}}(j)$ of firm *i* choosing loan offer *j* in screen *s* is assumed to have the following form[5]

$$u_{is}(j) = \sum_{k=1}^{K} \beta_k x_{kis}(j) + e_{is}(j)$$

where $k = 1, \dots, K$ indexes loan characteristics x, $e_{is}(j)$ is unobserved utility derived by firm i from loan offer j and β_k is the coefficient determining the contribution of loan characteristic k to utility. Note that the utility does not have any option-specific part, i.e. we restrict the constant to be zero. This is because, loan offer A or loan offer B do not have any intrinsic value to the firm. It is plausible that the firm does not care about the naming of the options of being either "A" or "B".[6]

We cannot estimate equation (1) directly, since we do not observe the utility in the data. However, we observe firms' choice of financing options and can therefore link the utility function to the data in the following way. Let

$$y_{is} = \begin{cases} 1 & if \quad u_{is}(A) > u_{is}(B) \\ 0 & if \quad u_{is}(A) < u_{is}(B) \end{cases}$$

Furthermore, we assume that the unobserved part of utility, $\mathrm{e_{is}(j)}$ is type-I-extreme-value distributed, such that the probability of choosing option A, $\mathrm{P(y_{is} = 1)}$ is given by the logit model:

$$P(y_{is} = 1 | x_{is}) = \frac{\exp(\sum_{k=1}^{K} \beta_k x_{kis}(A))}{\exp(\sum_{k=1}^{K} \beta_k x_{kis}(A)) + \exp(\sum_{k=1}^{K} \beta_k x_{kis}(B))}$$

[5] In principle, it is possible to derive a linear utility as a first-order Taylor approximation from a general utility function specification.

[6] In that sense, the choice the firm has between option A and option B is NOT equivalent to a choice of a traveller faces between taking a bus or taking a car. Neither the less, results hold if a constant is included.

which is, defining $\Delta x_{kis} = x_{kis}(A) - x_{kis}(B)$, equivalent to:

$$P(y_{is} = 1|x_{is}) = \frac{\exp(\sum_{k=1}^{K} \beta_k \Delta x_{kis})}{1 + \exp(\sum_{k=1}^{K} \beta_k \Delta x_{kis})}$$

Therefore all information needed for the choice between option A and option B is comprised in the difference between loan characteristics.

Trade-offs & willingness-to-pay

We are primarily interested in the elasticities of substitution between different loan offers, i.e. the slope of the hyperplane on which the firm is indifferent between loan offers. In two dimensions, this can be obtained by total differentiation of the utility function and setting to zero of all changes in loan characteristics save two, let's say characteristics $l, h \in K$.

$$0 = \beta_l dx_l + \beta_h dx_h$$

We define the elasticity of substitution between these two characteristics a η_{lk} :

$$\eta_{lh} \equiv \frac{dx_h}{dx_l} = -\frac{\beta_l}{\beta_h}$$

If l is the interest rate, η_{lh} indicates the firm's willingness-to-pay in terms of units of interest rates for loan characteristic h.

3.2. Implementation probability

To analyse the relation between loan characteristics and the implementation of the investment project of the firm, we proceed in a similar fashion. Let i index firms that given their preferred loan offer choose in each of eight screens indexed by $s = 1, \dots, 8$, to implement their project or not to implement their project ($j \in \{implement, \neg implement\}$). Again we assume that firms aim to maximize a given utility function when choosing between the two alternatives.

The utility $v_{is}(j)$ of firm *i* choosing alternative *j* in screen *s* is assumed to take the following form

$$v_{is}(j) = \alpha_i(j) + \sum_{k=1}^{K} \gamma_k(j) x_{kis} + \epsilon_{is}(j)$$

where $k = 1, \dots, K$ indexes loan characteristics x, $\epsilon_{is}(j)$ is unobserved utility derived by firm i from alternative j, $\gamma_k(j)$ is the coefficient determining the contribution of loan characteristic k to utility and $\alpha_i(j)$ is a firm- and alternative specific fixed effect. Note that here – in contrast to above – the utility function is alternative-specific in coefficients. The reason is that loan

characteristics plausible have a different effect on the utility, when the firm implements the project versus when it does not implement the project. We introduce the firm- and alternative specific fixed effect in order to capture the average effect that the implementation of the project has on utility (for instance risk taking, entrepreneurial pride etc.).

We observe firms' choice and link the utility function to the data in the following way, let[7]

$$z_{is} = \begin{cases} 1 & if \quad v_{is}(implement) > u_{is}(\neg implement) \\ 0 & if \quad v_{is}(implement) < u_{is}(\neg implement) \end{cases}$$

Furthermore, we again assume that the unobserved part of utility, $\epsilon_{is}(j)$ is type-I-extreme-value distributed, such that the probability to implement the project, $P(z_{is} = 1)$ is given by the fixed-effects logit model:

$$P(z_{is} = 1|x_{is}) = \frac{\exp(\alpha_i(imp) + \sum_{k=1}^{K} \gamma_k(imp)x_{kis})}{\exp(\alpha_i(imp) + \sum_{k=1}^{K} \gamma_k(imp)x_{kis}) + \exp(\alpha_i(\neg imp) + \sum_{k=1}^{K} \gamma_k(\neg imp)x_{kis})}$$

which is only identifiable when normalizing the coefficients under one alternative. We proceed by setting the coefficient of the utility function under the alternative $j = \neg implement$ to zero, i.e. $\alpha_i(\neg implement) = \beta_k(\neg implement) = 0 \; \forall \; k \in K$, such that it can be shown

$$P(z_{is} = 1|x_{is}) = \frac{\exp(\alpha_i(implement) + \sum_{k=1}^{K} \gamma_k(implement)x_{kis})}{1 + \exp(\alpha_i(implement) + \sum_{k=1}^{K} \gamma_k(implement)x_{kis})}$$

Project implementation elasticities

Here we are mostly after the marginal effect that a change in a loan characteristic has on the probability to implement the project. We define $\rho_k(x)$ as the project implementation elasticity with respect to loan characteristic k, which is given by

$$\rho_k(x) \equiv \frac{\partial P(z = 1|x)}{\partial x_k} = \gamma_k(implement)P(z = 1|x)\big(1 - P(z = 1|x)\big)$$

[7] For simplicity, we redefined the project implementation likelihood (scaling from 1 to 5) into a dummy variable, that takes the value 1 for implementation when the project implementation likelihood is stated as being either "very likely" or "fairly likely" and the value 0 otherwise. Results still hold if the model is estimated using an ordered logit model.

4. Estimation and results

For the estimation of the models, we apply several transformations to loan characteristics. In particular, we normalize all continuous loan characteristics, i.e. amount, maturity, grace periods, interest rate and collateral requirement around an appropriate midpoint. We do so to take into account the fact that the domain of loan characteristics is specific to firms and since we are interested in how firms value loan characteristics in a domain that is in a realistic domain. For example, not all firms will choose from loan offers with amounts above 500 million euros, but rather from loan offers that vary around their stated desired amount.

Our loan characteristics are thus defined as follows: the amount takes the value 100 if the loan offer exactly matched the desired *amount* and measures the percentage difference to the desired amount if it is below. Similarly, *maturity* is measured as a percent of desired maturity, taking the value 100 if the proposed equals the desired maturity. *Grace period* is measured as percent of desired maturity, taking the value 100 for a loan with bullet repayment, i.e. repayment of the full loan amount at the end of loan period. The *interest rate* is scaled around the fixed rate market midpoint of a resident country of the firm corresponding to the desired amount and maturity, taking also the value 100 if the proposed interest rate is exactly equal to the former. *Collateral requirement* are used non-transformed in the following estimations, i.e. as percentage of value of the loan, where 100 corresponds to a fully collateralized loan.

For the factor characteristics, i.e. *type of interest rate*, *seniority* as well as *fee for early repayment*, we choose as reference category, fixed rates, pari-passu and no fees, respectively.

4.1. Firms' preferences

The estimation results for firms' preferences are given in Table 4. The results show in general the expected sign apart of the coefficient of seniority and amortisation. We will discuss the issues of both of these variables at a later stage. From the size of the coefficients we observe that the interest rate and the interest type, i.e. whether it is a floating or a fixed interest rate loan, are especially important. Further, the negative coefficient on collateral suggest that collateral is costly for borrowers supporting the theoretical view of Lacker (2001) and the empirical results of Vig (2013). In model (2) of Table we test the hypothesis that firms value maturity and loan amount above and beyond the desired. The coefficient of a dummy taking the value one if the loan offered a maturity or loan amount equal or above desired and zero otherwise is positive and significant for the maturity and insignificant for the loan amount, whereas the coefficients on the continuous maturity variable turns insignificant and the coefficient on the loan amount stays significant. In the case of the loan maturity, we interpret this as a rejection of our hypothesis, i.e. as soon as a loan hits the desired maturity, additional years of the loan duration are not of any further value. However, we can confirm that a greater loan amount increases utility even beyond the desired loan amount. In model (3) we only include the dummy for maturity above desired and drop the maturity coefficient. The results of the other coefficients are not harmed by this. Finally, in model

(4) we exclude seniority as the coefficient is showing an unanticipated sign. This does not alter coefficients in any substantial way as expected as the loan characteristics were drawn randomly and independently from their support and are therefore uncorrelated.

We now turn to one of our principle objects of interest, i.e. the percentage points of interest a firm is ready to pay to have a loan offer exhibiting more or less of a specific loan characteristic – in the notations above this corresponds to η_{lh}, with l being the interest rate and h any other characteristic. As Figure 1 illustrates firms' willingness-to-pay is highest for a loan to have a fixed interest rate instead of a floating one (with 1.2 interest rate percentage points). Also highly valued, with 0.83 interest rate percentage points are loans that meet at least the desired maturity. Furthermore, firms are ready to accept 0.28 percentage point higher interest rates for a loan with 10 percentage point less collateral demand.

In the next step we split the sample in three ways. First, the analysis is performed for our 4 different sectors (manufacturing, construction, services and infrastructure). The result of this exercise can be found in Table 5. The coefficients for the interest rate are comparable across industries with the only difference being the construction sector, which coefficient is a little lower. Further, we see that fees for early repayment reduce utility only significantly in the manufacturing and the construction sector. Additionally, large variation can be observed between the coefficients of the interest type. Firms from the manufacturing industry experience by far the largest utility losses from a floating interest rate loan, while the effect is the lowest in the service sector. This suggest that manufacturing firms have higher inflation expectations.[8] Figure 2 presents the willingness to pay for different loan characteristics in terms of percentage point of interest a firm would pay for it. As before, we observe some heterogeneity for the willingness to pay for fixed interest rate loans and fees for early repayment. But also the willingness to pay more for a loan with the right maturity differs markably between sectors. Firms from the manufacturing and infrastructure sector are willing to 78bp for a loan with the desired maturity, while firms from the service sector would pay 104bp and firms from the construction sector would even pay 114bp.

In the next step, we split the sample by size classes (SMEs and large firms) and investment types. The results of this exercise can be found in Table 6. Large firms and firms investing in R&D or IT show a larger utility decrease for increases in the interest rate than SMEs and firms wanting to implement other types of projects. Further, collateral requirements have more impact on the utility of firms that plan to invest in intangibles. Achieving the desired maturity increases the utility of SMEs to a greater extent as the utility of large companies which is in line with the findings of Barclay and Smith (1995) that large firms have more long-term debt and therefore deviations might be less costly for them. Figure 3 states the willingness to pay for different loan characteristics over the different size classes and investment types in percentage point of interest rate. The willingness to pay for floating vs. fixed interest rate loans varies modestly between the different categories with SMEs and firms investing in land being willing to pay around 130bp for a fixed interest rate loan and large firms and firms investing in R&D or IT would pay around 95bp

[8] Aggregate data indicates that the investment recovery in Europe is partially driven by higher investment in plants and equipment which constitutes a large chunk of the investment of manufacturing firms and the GDP deflator in the manufacturing sector is higher than in the overall economy.

more for a fixed interest loan. Further, we observe that SMEs would pay 30bp for a 10pp lower collateral requirement while large would only pay 23bp and the willingness to pay more for less collateral is around 30bp for all investment types.

4.2. Implementation probability

Let us now turn to the implementation probability. Table 7 presents the baseline specification. We observe that a higher loan amount, lower interest rates, subordinated, fixed interest rates, and lower collateral requirements increase the implementation probability. The grace period and Fees for early repayment turn to be insignificant. In line with Gan (2007), we observe that investment and collateral are inversely related. In model (2), we check whether maturity and amount above the desired amount increase the implementation probability. The results suggest that this is the case for the maturity as only the dummy is significant but the coefficient for the continuous maturity variable becomes insignificant, while the coefficient for the coefficient for the continuous loan amount stays significant. Model (3) is the final model that we will use to analyse the different sectors, size classes and investment types. It includes the loan amount, the interest type, the interest rate, the seniority status, the collateral requirement and a dummy that is 1 if the maturity is at or above the desired and 0 otherwise.

As we are ultimately interested in the implied implementation probability of the model, we plot the margins of the last model in Figure 4. The dashed line states the implementation probability of a loan with the desired loan amount, a collateral requirement of 80% loan to asset ratio and an interest rate corresponding to the ECB mean rate for the specific maturity and loan amount. It is around 52%. All other characteristics are chosen “unfavourable”, i.e. floating interest rate, pari-passu and below the desired maturity. Increasing the loan amount by 10% increases the implementation probability to 57.3%, having a fixed interest rate or a 10% lower interest rate increases the implementation probability to around 55%. A 10pp lower collateral requirement increases the implementation probability to around 54%. Finally, the implementation probability increases to around 58% if the loan has the desired maturity.

In the next step, we analyse how the effect of different loan characteristics differ over different sectors. The results can be found in Table 8. Apart of the service sector, the sectors show similar sensitivity the interest rate and the loan amount. For the service sector the sensitivity for both variables is generally lower. As firms operating in the service sector can substitute capital by labour more easily, the implementation probability of their projects might be influenced to a lesser extent by the loan amount and the interest rate. The collateral requirement is a less important driver of the implementation probability for the manufacturing sector. This could be driven by the high tangibility of assets in the manufacturing industry as a large share of the assets in this sector are machinery and land which is easily pledgeable. On the other hand, seniority is only relevant for the service sector while the maturity does not influence the implementation probability of the investment projects of the service sector. Further, achieving the right maturity is especially important for firms in the infrastructure sector. As the infrastructure sector has the greatest loan sizes (26mio€ on average), it is not surprising that it is more important for the

implementation of their projects that loans have the right maturity as maturity mismatch is more costly the larger the loan size is. The interest type is only relevant for the implementation probability for firms in the manufacturing sector. As stated earlier, this suggests that inflation expectation in the manufacturing sector might be larger than in the rest of the economy. This is not driven by longer maturity of loans as manufacturing firms have shorter maturities then firms from the service or infrastructure sector. But firms in the manufacturing industries might face less flexible prices and therefore might prefer to be able to plan with constant cost for interest payments. Further, we see that the implementation probability is in general 20% lower for firms in the service sector compared to firms in all other sectors (45% vs 65%). This might again be due to substitutability between capital and labour in the service sector.

Next, we split the sample by firm. Table 9 present the results. Our findings suggest that SMEs decision to implement an investment project differ quite remarkably from large companies in some characteristics. Only SMEs implementation probability increases if a loan is subordinated while this does not seem to play a role for large firms. This might be due to large firms possibilities to issue equity more easily which makes subordinated debt less favourable. Further, SME's implementation probability does not significantly change with the interest type. This is puzzling in the first instance as small firms should have more problems to hedge against changes in the interest rate but small firms desired maturities are on average smaller than the maturities large firms desire. Therefore, the possibility of changing interest rates might be a less severe fear for them. It is also worthwhile to mention that small firms have a 4pp higher implementation probability then large firm. This could be due to SMEs having higher NPV projects then large firms. SMEs and large firms have similar sensibility to collateral requirements, the interest rate and the loan maturity.

In the next step, the sample is split by the type of investment projects. The results can be found in Tale 9. The coefficients for the collateral requirement are comparable for all investment types. Firms planning to invest in land or in R&D and IT are more sensitive to higher interest rates then firms investing in machinery and training of employees. Further, only firms investing in land and R&D and IT are more likely to implement their projects if the loan has a fixed interest rate. In contrast, only investment projects in machinery and training are more likely to be implemented if the loan granted is subordinated to existing creditors. For training of employees this is intuitive as skills of employees are intangible and a form of financing more similar to equity might be better suited for this kind of investment. The case for machinery is puzzling as these kinds of investments are highly pledgeable. The loan amount is more important for implementation of land and machinery projects then for R&D and training projects. This is intuitive as investment and land and machinery might be not so easy divisible as investment in training of employees and R&D and these investment types have the highest desired loan amounts. Achieving the desired loan maturity only increases the implementation probability for investment projects in land and machinery. This is intuitive as investments in land have the highest maturity and the highest loan amount. Finally, the baseline implementation probability varies over different types. It is highest for investments in machinery (65%), followed by investment in land (48%), investment in training of employees (43%) and investment in R&D and IT (36%). This might reflect the different earnings

perspective of the different investment projects. If the return on sales is high, new machinery might lead to quite some cash flow. On the other hand, investment in land will bring a lower income stream and investments in R&D and training might be quite risky.

Finally, we are able to quantify the range of the break-even rate, i.e. the maximum interest rate on a loan for which the firm is indifferent to implement the investment project or not. We set this rate to the point where the probability to invest is just equal to 50% i.e. firms are just equally likely to invest or not. In other words, this corresponds to the interest rate for which the net present value of the investment project just breaks even. Figure 5 shows the mean of the rates given from ECB bank lending survey over our whole sample, which is 4.09% (dashed line), and the breakeven rates (blue dots) for the overall sample and all subgroups, that we have analysed before, as well as the 95% confidence interval (red dots). To calculate the break-even rate an ideal loan offer was assumed, i.e. fixed interest rate, subordinated, no collateral requirement, maturity at or above desired and the desired loan amount. First of all, the breakeven rate for the whole sample ranges between 7.36% and 10.43% with a midpoint of 8.79%. Further, the break-even rates for different sectors an investment projects differ remarkably. On the one hand, we observe that the break-even rate for the service sector and investment in intangible assets (R&D or IT and Training or Organisational Improvements) is not statistically greater than the mean rate, i.e. even with optimal financing conditions the implementation probability of projects is not statistically different from 50%. On the other hand, there is a great heterogeneity in the midpoint of the different break-even rates. It reaches 10.23% for the Infrastructure sector, but is only 7.77% in the manufacturing sector. Especially investments in R&D or IT show a particularly low break-even rate of 5.11%, which is just 1% higher than the mean rate of our sample that is 4.09%.

4.3. Robustness Checks

We encountered two anomalies during the analysis. First, the willingness to pay for subordinated loans is negative. Second, the willingness to pay for a longer grace period is negative. In this section, we will discuss the anomalies of the results on amortisation and seniority in more detail. Table 10 presents these results. We start with the negative coefficient for seniority in our analysis of the willingness to pay for different loan characteristics. Our naïve priors would have been that firms are willing to pay higher interest rates if a loan is granted subordinated to existing creditors. However, there are theoretical insights from Longhofer and Santos (2000) who claim that bank debt needs to be senior in order to incentivise the bank to build up a relationship with the firms. Therefore, firms that want to build up a relationship with a bank might have a negative willingness to pay for subordinated credit. To test this hypothesis, we split the sample by the median amount of debt burden. Debt burden is defined as interest paid divided by the EBITDA. Our prior would be that firms with a lower debt burden might not have a relationship with a bank yet and that they might want the bank debt to be senior in order to establish such a relationship. Further, firms with a high debt burden should not be so interested in building up such a relationship and therefore we don't expect them to have a higher willingness to pay for lower seniority status. Model (1) and (2) report the results. The coefficients for seniority have the expected signs, i.e. negative for firms

with a low debt burden and insignificant for firms with a high debt burden. Further, in model (4) and (5) we analyse how the implementation probability changes with seniority if we split the sample by high and low debt burden. We observe that firms with a high debt burden are more likely to implement projects if the loan is granted subordinated while there is no effect for firms with a low debt burden. This is a further indication that firms with a low debt burden are trying to establish a bank relationship and therefore want to avoid having subordinated debt, while subordinated debt help firms with existing bank relationships.

The other anomaly we observed is negative willingness to pay for a longer grace period, i.e. firms want to be paid for starting repaying a loan later. Our hypothesis is that this is the case because firms dislike bullet repayment because either they don't want to roll over the debt and would need to hold a lot of cash to repay the complete amount at the end of the loan contract. To test this, we run our standard model and include a dummy that is one if an offer included bullet repayment as amortisation characteristic and 0 otherwise. Model (3) presents the results. The bullet repayment dummy is highly significant and negative while the amortisation coefficient loses significance. This shows that firms are not harmed by shorter grace periods but just dislike repaying everything on spot.

5. Conclusion

In this paper, we have shown how the unique experiment conducted as part of EIBIS can contribute to our detailed understanding of firm's financing preferences over loan characteristics and how the latter translate into investment project implementation. The quantification of firms' willingness-to-pay for specific loan offers does not only allow banks to better adapt their loan offers but also to shed light on the implied costs that specific loan characteristic impose on firms. Our results on the relation between loan characteristics and project implementation probability provide a benchmark on how far specific terms of loans can go to foster investment activity given real conditions. Especially, we measure the elasticity of project implementation with respect to the interest rate – a key variable in the transmission of monetary policy – and offer at the same time alternative instruments (over collateral, maturities etc.) to further ease firms financing conditions. Further, we observe that a higher implementation probability does not necessarily lead to a higher willingness to pay. In case of the loan seniority, we observe that the willingness to pay for subordinated debt is even negative even through it increases the implementation probability. This might be a challenging fact from a policy perspective as subordinated debt might lead to higher investment on the one hand but firms are not willing to pay higher amounts of interest to compensate for the risk.

Further, the results presented in this paper show that there is large heterogeneity between different sectors, size classes and investment types. This indicates that different sectors of the economy might react differently to monetary policy and financial regulation. Our results suggest that firms in the service sector are especially insensitive to the interest rate. This indicates that in countries with a larger share of the tertiary sector to GDP monetary policy might be less effective as these sectors are affected to a lesser extent by changes in the interest rate. Further, we observe that investments in intangibles are especially sensitive to higher interest rates. Better financing conditions could still do a lot in investing in these areas with are especially beneficial from a global economic perspective. Additionally, collateral plays an important role. Firms would play significantly higher interest rates for lower collateral requirements. The willingness to pay for an uncollateralised loan compared to a fully collateralized loan is about 280bp. As investment in intangibles are not collateralizable in the first place, a policy mix that helps firms investing in intangible assets, which would lead to a higher NPV of the project and therefore higher break even rates and different regulatory treatment of loans in intangibles might help moving substantial amounts of investment in intangibles and increase banks incentive to explore these market segments.

However, our results only shed light on the demand of credit from the firm sight on the economy. The important supply-side counterpart, the banking sector, might have preferences that are shaped differently than those of firms. Further research on the preferences over different loan characteristics of loan officers in different banks might be fruitful and highlight where preferences of bankers and entrepreneurs and managers are compatible and where the differences lie and what regulation could do to improve excess of credit to most innovative projects.

References

Barclay, Michael J., and Clifford W. Jr. Smith. 1995. “The Maturity Structure of Corporate Debt.” *The Journal of Finance* 50 (2): 609–31.

Bernanke, Ben S., and Mark Gertler. 1995. “Inside the Black Box The Credit Channel of Monetary Policy Transmission.” *The Journal of Economic Perspectives* 9 (4): 27–48.

Bernanke, Ben S, and Alan S Blinder. 1992. “The Federal Funds Rate and the Channels of Monetary Transmission.” *The American Economic Review*, 901–21.

Byoun, Soku. 2008. “How and When Do Firms Adjust Their Capital Structures toward Targets?” *Journal of Finance* 63 (6): 3069–96.

Calvo, Guillermo. 1983. “Staggered Prices in a Utility Maximizing Framework.” *Journal of Monetary Economics* 12 (3): 383–98.

Campbell, John Y., and N. Grego Mankiw. 1989. “Consumption, Income and Interest Rates: Reinterpreting the Time Series Evidence.” *NBER Macroeconomics Annual* 4: 185–246.

DeAngelo, Harry, and Richard Roll. 2015. “How Stable Are Corporate Capital Structures?” *Journal of Finance* 70 (1): 373–418.

EIB. 2017. “EIBIS 2016/2017 Surveying Corporate Investment Activities, Needs and Financing in the EU.”

Gan, Jie. 2007. “Collateral, Debt Capacity, and Corporate Investment: Evidence from a Natural Experiment.” *Journal of Financial Economics* 85 (3): 709–34.

Hovakimian, Armen, Tim Opler, and Sheridan Titman. 2001. “The Debt-Equity Choice.” *The Journal of Financial and Quantitative Analysis* 36 (1): 1–24.

Jong, Abe de, Rezaul Kabir, and Thuy Thu Nguyen. 2008. “Capital Structure around the World: The Roles of Firm- and Country-Specific Determinants.” *Journal of Banking and Finance* 32 (9): 1954–69.

Kahyap, Anil, and Jeremy C. Stein. 2000. “What Do a Million Observations on Banks Say about the Transmission of Monetary Policy?” *The American Economic Review*, no. 1: 407–28.

Kaplan, Greg, Benjamin Moll, and Giovanni L Violante. 2016. “Monetary Policy According to HANK.” *NBER Working Paper*, no. No. 21897.

Kayhan, Ayla, and Sheridan Titman. 2007. “Firms’ Histories and Their Capital Structures.” *Journal of Financial Economics* 83 (1): 1–32.

Kraus, Alan, and Robert H. Litzenberger. 1973. “A State-Preference Model of Optimal Financial Leverage.” *The Journal of Finance* 28 (4): 911–22.

Lacker, Jeffrey M. 2001. “Collateralized Debt as the Optimal Contract.” *Review of Economic Dynamics* 4 (4): 842–59.

Lemmon, Michael L., Michael R. Roberts, and Jaime F. Zender. 2008. “Back to the Beginning: Persistence and the Cross-Section of Corporate Capital Structure.” *Journal of Finance* 63 (4): 1575–1608.

Longhofer, Stanley D, and João A C Santos. 2000. “The Importance of Bank Seniority for Relationship Lending.” *Journal of Financial Intermediation* 9: 57–89.

Modigliani, F, and M H Miller. 1958. “The Cost of Capital, Corporation Finance and the Theory of Investment.” *The American Economic Review* 48 (3): 261–97.

Myers, Stewart C. 2001. “Capital Structure.” *The Journal of Economic Perspectives* 15 (2): 81–102.

Myers, Stewart C., and Nicholas S. Majluf. 1984. “Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have.” *Journal of Financial Economics* 13 (2): 187–221.

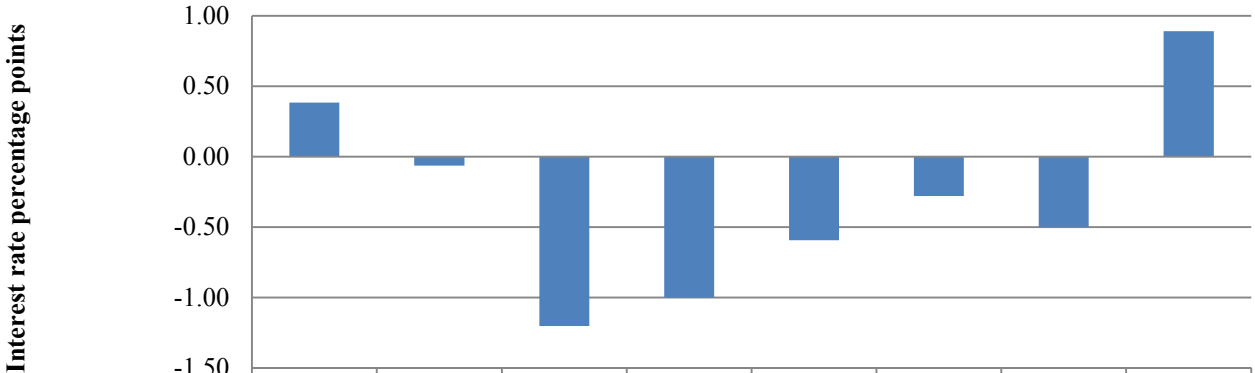
Rajan, Raghuram G., and Luigi Zingales. 1995. “What Do We Know about Capital Structure ? Some Evidence from International Data.” *The Journal of Finance* 50 (5): 1421–60.

Titman, Sheridan, and Roberto Wessels. 1988. “The Determinants of Capital Structure Choice.” *The Journal of Finance* 43 (1): 1–19.

Vig, Vikrant. 2013. “Access to Collateral and Corporate Debt Structure: Evidence from a Natural Experiment.” *Journal of Finance* 68 (3): 881–928.

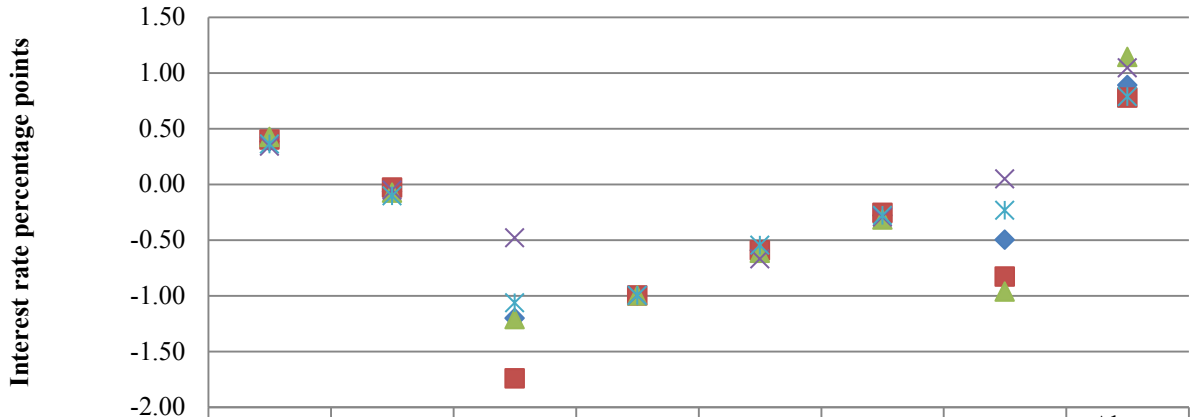
Annexes

A. Figures



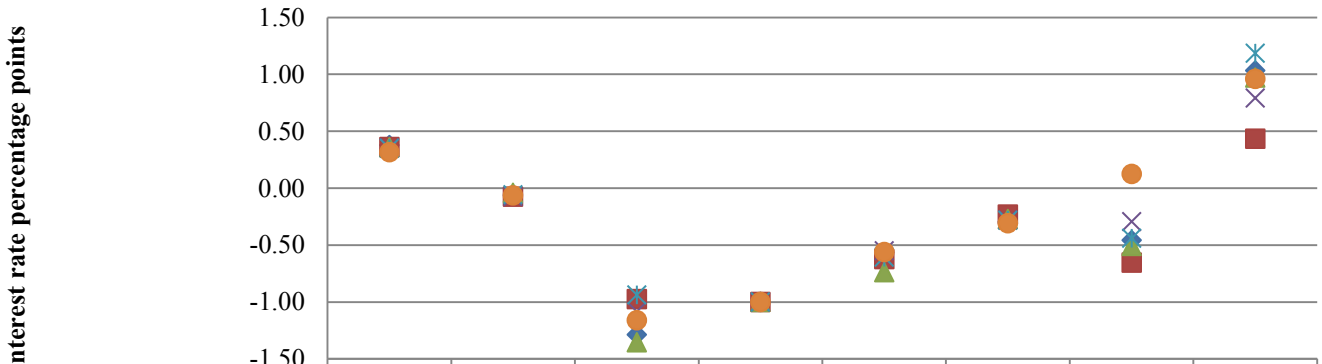
	Amount	Grace period	Interest rate type	Interest rate type	Seniority	Collateral	Fee	Above desired Maturity
Willingness-to-Pay	0.38	-0.06	-1.20	-1.00	-0.59	-0.28	-0.50	0.89

Figure 1: This figure states firms' willingness-to-pay in terms of interest rate percentage points over different loan characteristics. For continuous variables a 10 pp increase in the corresponding attribute is assumed.



	Amount	Grace period	Interest rate type	Interest rate	Seniority	Collateral	Fee	Above desired Maturity
Total	0.38	-0.06	-1.20	-1.00	-0.59	-0.28	-0.50	0.89
Manufacturing	0.40	-0.03	-1.74	-1.00	-0.59	-0.26	-0.83	0.78
Construction	0.42	-0.08	-1.21	-1.00	-0.62	-0.32	-0.97	1.14
Services	0.34	-0.05	-0.48	-1.00	-0.67	-0.29	0.05	1.04
Infrastructure	0.36	-0.11	-1.07	-1.00	-0.55	-0.28	-0.23	0.78

Figure 2: This figure states firms' willingness-to-pay in terms of interest rate percentage points over different loan characteristics for different sectors and the overall sample. For continuous variables a 10 pp increase in the corresponding attribute is assumed.



	Amount	Grace period	Interest rate type	Interest rate	Seniority	Collateral	Fee	Above desired Maturity
SME	0.38	-0.06	-1.29	-1.00	-0.56	-0.30	-0.46	1.03
Large	0.36	-0.08	-0.97	-1.00	-0.62	-0.23	-0.66	0.44
Land	0.36	-0.04	-1.35	-1.00	-0.74	-0.27	-0.51	0.97
Machinary	0.36	-0.07	-1.08	-1.00	-0.55	-0.28	-0.29	0.79
R&D and IT	0.35	-0.06	-0.94	-1.00	-0.61	-0.28	-0.44	1.19
Training and Organisation	0.32	-0.06	-1.16	-1.00	-0.56	-0.31	0.13	0.96

Figure 3: This figure states firms' willingness-to-pay in terms of interest rate percentage points over different loan characteristics for firms of different sizes and for firms with different types of investment projects. For continuous variables a 10 pp increase in the corresponding attribute is assumed.

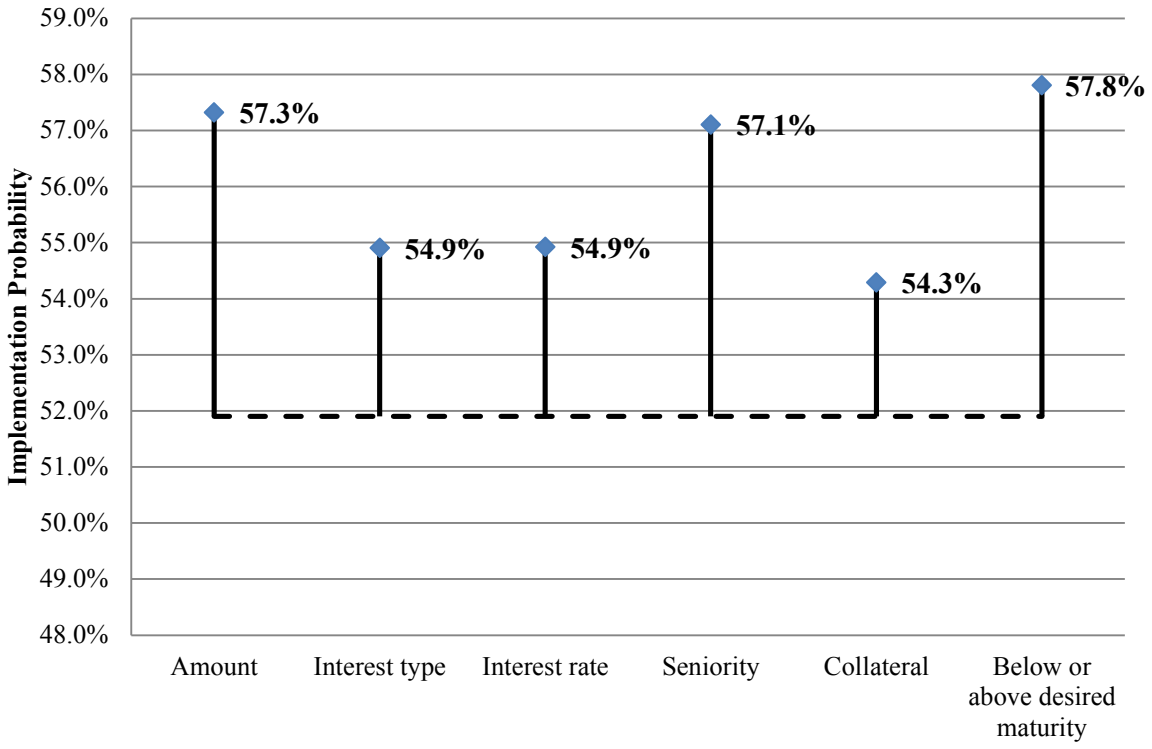


Figure 4: This Figure states the predicted implementation probabilities for a loan that has the desired amount, a collateral requirement of 80 % of loan to asset ratio, an interest rate corresponding to the ECB mean rate, pari–passu, floating interest rate and below desired maturity (dashed line). Further, the margins for the change in different loan characteristics are stated. For the categorical variables (Interest Type, Seniority and below or above desired Amount) the margin stated is the implementation probability of the same loan as before with the only difference that the categorical variable has changes. For the continuous variables, the margins describe the implementation probability of a loan that has a 10 pp improvement from the midpoint.

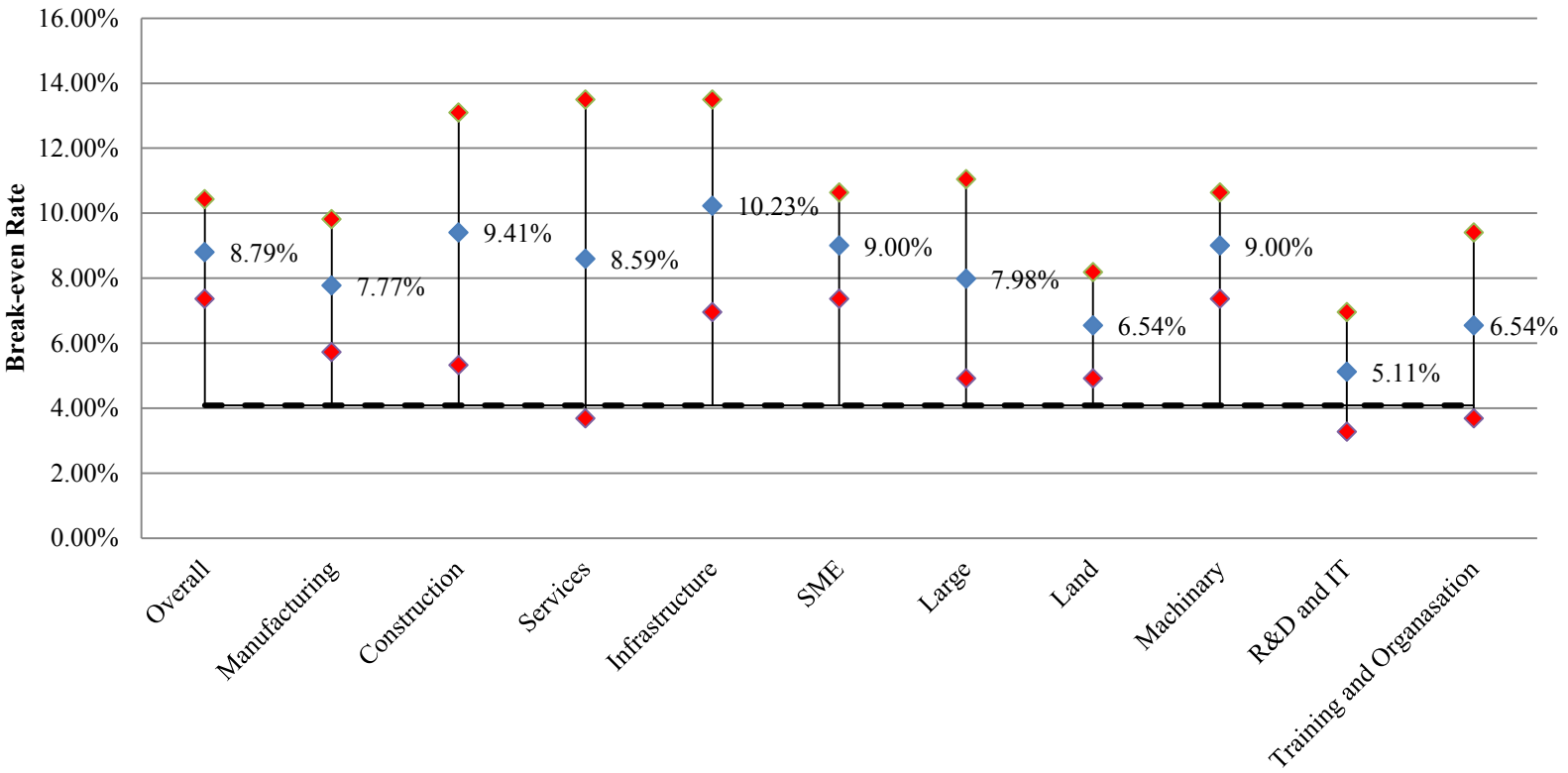


Figure 5: This Figure states the breakeven rate, i.e. the interest rate which brings the implementation probability of a project to 50% for an optimal loan offer that has a fixed interest rate, subordinated status, no collateral requirement, maturity at or above desired and the desired loan amount over different sectors, size classes and investment types (Blue dots). Further, the error bounds for each break even rate are given (red dots).

B. Tables

	Manufacturing	Construction	Services	Infrastructure	SME	Large	Total Online Module	Total Main Module
Austria	23.5	17.6	17.6	41.2	64.7	35.3	1.5	3.8
Belgium	27.3	11.4	9.1	52.3	75.0	25.0	3.9	3.8
Bulgaria	35.1	27.0	27.0	10.8	67.6	32.4	3.3	3.8
Croatia	28.0	26.0	24.0	22.0	82.0	18.0	4.4	3.9
Cyprus	37.5	12.5	37.5	12.5	100.0	0.0	0.7	1.2
Czech Republic	47.9	16.7	14.6	20.8	75.0	25.0	4.3	3.8
Denmark	38.9	19.4	8.3	33.3	80.6	19.4	3.2	3.8
Estonia	19.4	22.6	19.4	38.7	93.5	6.5	2.8	3.2
Finland	28.9	17.1	13.2	40.8	80.3	19.7	6.7	3.8
France	42.0	18.0	14.0	26.0	80.0	20.0	4.4	4.8
Germany	25.0	0.0	20.0	55.0	65.0	35.0	1.8	4.9
Greece	33.3	25.0	16.7	25.0	79.2	20.8	2.1	3.4
Hungary	36.6	20.7	24.4	18.3	80.5	19.5	7.3	3.8
Ireland	37.5	18.8	43.8	0.0	93.8	6.3	1.4	3.2
Italy	28.7	12.6	27.6	31.0	70.1	29.9	7.7	5
Latvia	27.6	13.8	31.0	27.6	96.6	3.4	2.6	3.2
Lithuania	40.0	5.7	25.7	28.6	74.3	25.7	3.1	3.3
Luxembourg	35.3	23.5	17.6	23.5	88.2	11.8	1.5	1.2
Malta	16.7	5.6	66.7	11.1	88.9	11.1	1.6	1.3
Netherlands	39.2	15.7	11.8	33.3	82.4	17.6	4.5	4.1
Poland	22.4	18.4	14.3	44.9	79.6	20.4	4.4	3.8
Portugal	25.0	20.8	18.8	35.4	79.2	20.8	4.3	3.8
Romania	50.0	23.3	10.0	16.7	70.0	30.0	2.7	3.8
Slovakia	51.3	7.7	23.1	17.9	94.9	5.1	3.5	3.1
Slovenia	41.2	15.7	17.6	25.5	86.3	13.7	4.5	3.3
Spain	40.9	12.5	21.6	25.0	64.8	35.2	7.8	4.1
Sweden	18.5	14.8	18.5	48.1	92.6	7.4	2.4	3.8
UK	33.3	5.6	22.2	38.9	72.2	27.8	1.6	4.8
Total	34.0	16.4	20.2	29.3	78.9	21.1	100.0	100

Table 1: This table states the proportions of firms over countries (in % of all firms) and sector and size classes (in % of country total). 1% corresponds to 11.37 firms.

	Levels	Unit	Constraints
1 Amount	30%, 47.5%, 60%, 82.5%, 100% of desired amount	Local currency or EUR	none
2 Maturity	50%, 75%, 100%, 125%, 150% of desired maturity	Years	none
3 Grace periods	0%, 20%, 40%, 60%, 100% of desired maturity	Years	none
4.i Fixed interest rate	1: Yield on German bunds of desired maturity 3: Midpoint of market interest rates for a given country (from ECB bank lending survey) 2,4,5: distributed with equal distances around level 3	percent	• 5 of one not with 1 or 2 of the other option, • 4 of one not with 1 of the other option
4.ii Variable interest rate	1: 3m-benchmark rate 2: 3m-br + 50% of bp for desired maturity 3: 3m-br + 100% of bp for desired maturity 4: 3m-br + 150% of bp for desired maturity 5: 3m-br + 200% of bp for desired maturity	percent	• 5 of one not with 1 or 2 of the other option, • 4 of one not with 1 of the other option
5 Collateral	0, 20%, 40%, 60%, 80%, 120%, 160% of assets to loan value	percent	• 6 and 7 not with 2 of seniority
6 Seniority	1: pari-passu with existing creditors 2: sub-ordinated with existing creditors	/	• 2 not with 6 or 7 of collateral
7 Type of interest rate	1: Fixed 2: Floating	/	none
8 Fee for early repayment	1: No fee 2: Linked to NPV of remaining interest payment on loan	/	none

Table 2: This table provides the design of loan offers, the levels of loan characteristics, and units and constraints of the variables used in the experiment.

	N	Desired Amount (in k EUR)		Desired Maturity (in years)		Type of Investment Project						
		mean	median	mean	median	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Austria	17	71,348.23	1,500.00	9.4	5	53	82	12	24	24	29	0
Belgium	44	21,123.14	1,550.00	8.6	7	43	73	11	16	9	16	5
Bulgaria	37	5,929.78	500.00	6.4	5	35	73	3	8	22	22	3
Croatia	50	5,374.11	395.78	7.0	5	50	76	14	16	32	30	2
Cyprus	8	773.75	350.00	9.3	6	88	75	25	50	13	25	0
Czech Republic	48	9,005.86	277.78	7.1	7	56	65	25	17	15	17	2
Denmark	36	8,288.37	1,340.48	11.6	8	42	64	17	14	6	6	0
Estonia	31	2,712.77	200.00	6.7	5	48	71	6	13	3	16	10
Finland	76	18,658.62	650.00	8.4	7	37	67	16	16	20	20	3
France	50	4,014.20	400.00	6.2	5	52	78	16	16	14	22	0
Germany	20	19,898.07	1,950.00	12.8	10	40	80	5	35	10	30	0
Greece	24	14,081.25	725.00	8.2	8	33	67	29	25	13	38	4
Hungary	82	1,649.40	321.54	8.1	5	67	79	6	18	20	18	1
Ireland	16	833.75	350.00	7.4	6.5	38	50	6	19	31	19	0
Italy	87	14,961.56	1,000.00	8.2	5	39	62	25	24	23	23	1
Latvia	29	846.21	210.00	7.5	5	45	52	14	10	21	17	0
Lithuania	35	1,394.83	500.00	7.2	5	37	71	9	9	14	17	6
Luxembourg	17	7,879.41	550.00	7.4	7	59	59	12	18	12	12	0
Malta	18	3,085.39	335.00	8.9	9	61	50	6	0	11	28	11
Netherlands	51	25,186.57	1,000.00	8.5	7	29	61	29	33	14	25	2
Poland	49	25,716.44	572.08	4.9	5	53	63	12	20	16	8	6
Portugal	48	9,845.32	750.00	9.0	8	52	69	17	31	29	29	2
Romania	30	6,660.26	368.16	9.8	6	43	77	13	20	20	17	0
Slovakia	39	925.28	300.00	7.2	5	46	64	21	15	5	8	0
Slovenia	51	1,648.05	350.00	8.3	7	55	69	25	20	22	24	0
Spain	88	18,975.79	1,097.50	8.0	6	27	74	20	22	16	19	5
Sweden	27	9,607.03	749.47	12.1	10	44	74	4	15	19	15	4
United Kingdom	18	53,648.52	696.20	7.3	5	28	56	6	33	28	33	6
Manufacturing	383	9,299.56	800.00	7.5	5	40	80	25	17	19	21	1
Construction	185	3,264.56	300.00	7.2	5	51	61	10	13	17	17	2
Services	228	3,702.03	372.89	8.5	7.5	57	55	12	26	22	29	5
Infrastructure	330	26,489.38	800.00	8.9	5	39	69	10	21	13	15	3
SME	888	4,815.29	400.00	7.8	5	45	67	16	18	17	19	3
large	238	39,812.00	5,000.00	9.0	7	47	76	16	24	19	24	2
Total	1,126	12,212.47	535.33	8.1	5	45	69	16	19	18	20	2

Table 3: This table provides the descriptive statistics over the desired amount, maturity and type of investment project (1: Land, business buildings and infrastructure, 2: Machinery and equipment, 3: Research and Development, 4: Software, data and website activities, 5: Training of employees, 6: Organisation and business process improvements, 7: None of these).

	(1) Baseline	(2) Above Maturity and Amount	(3) Above Maturity	(4) No seniority
Amount	0.0111***	0.0109***	0.0111***	0.0113***
	(0.000671)	(0.000915)	(0.000670)	(0.000669)
Maturity	0.00317***	0.000446		
	(0.000462)	(0.000939)		
Amortisation	-0.00181***	-0.00185***	-0.00185***	-0.00171***
	(0.000421)	(0.000423)	(0.000422)	(0.000420)
Type of interest rate	-0.347***	-0.349***	-0.349***	-0.351***
	(0.0382)	(0.0383)	(0.0383)	(0.0382)
Interest Rate	-0.290***	-0.290***	-0.290***	-0.293***
	(0.00940)	(0.00941)	(0.00940)	(0.00940)
Seniority	-0.157***	-0.172***	-0.172***	
	(0.0372)	(0.0376)	(0.0374)	
Collateral	-0.00818***	-0.00816***	-0.00816***	-0.00894***
	(0.000406)	(0.000407)	(0.000407)	(0.000372)
Fee for early repayment	-0.126***	-0.143***	-0.145***	-0.140***
	(0.0477)	(0.0480)	(0.0479)	(0.0477)
Above desired maturity		0.230***	0.258***	0.242***
		(0.0689)	(0.0340)	(0.0337)
Desired amount		0.0172		
		(0.0557)		
Observations	8,090	8,090	8,090	8,090
LR Chi^2	1375	1382	1383	1361
Prob > Chi^2	0.000	0.000	0.000	0.000

Table 4: This Table provides the results of logit regressions over firm preferences between the loan offer A and B on different loan characteristics. Column (1) presents the baseline specification, column (2) test for asymmetries at the desired amount and maturity, column (3) presents the results for asymmetries for the desired maturity only and column (4) presents the results without seniority. Standard Errors are given in Parenthesis. *, **, *** denote significance at the 1%, 5% and 10% level, respectively.

	(1) Manufacturing	(2) Construction	(3) Services	(4) Infrastructure
Amount	0.0120***	0.0110***	0.0104***	0.0104***
	(0.00115)	(0.00168)	(0.00154)	(0.00122)
Amortisation	-0.000958	-0.00196*	-0.00164*	-0.00303***
	(0.000730)	(0.00104)	(0.000965)	(0.000769)
Type of interest rate	-0.523***	-0.315***	-0.148*	-0.307***
	(0.0669)	(0.0931)	(0.0875)	(0.0698)
Interest Rate	-0.300***	-0.260***	-0.307***	-0.288***
	(0.0162)	(0.0212)	(0.0211)	(0.0185)
Seniority	-0.178***	-0.160*	-0.206**	-0.158**
	(0.0637)	(0.0921)	(0.0874)	(0.0682)
Collateral	-0.00776***	-0.00828***	-0.00902***	-0.00809***
	(0.000696)	(0.00103)	(0.000939)	(0.000737)
Fee	-0.249***	-0.251**	0.0147	-0.0676
	(0.0816)	(0.119)	(0.111)	(0.0880)
Above desired maturity	0.233***	0.297***	0.320***	0.226***
	(0.0587)	(0.0821)	(0.0791)	(0.0621)
Observations	2,781	1,323	1,585	2,377
LR Chi^2	498.8	214.5	295.2	382.5
Prob > Chi^2	0.000	0.000	0.000	0.000

Table 5: This Table provides the results of logit regressions over firm preferences between the loan offer A and B on different loan characteristics for different sectors using the final model from Table 4. Column (1) runs the logit model for Manufacturing firms only, column (2) presents the results using firms from the construction sector, column (3) analyses the service sector and column (4) takes into account only firms from the infrastructure sector. Standard Errors are given in Parenthesis. *, **, *** denote significance at the 1%, 5% and 10% level, respectively.

	(1) SME	(2) Large	(3) Land	(4) Machinery	(5) R&D and IT	(6) Training and Organisation
Amount	0.0104***	0.0136***	0.0105***	0.0109***	0.0117***	0.00939***
	(0.000753)	(0.00152)	(0.000996)	(0.000821)	(0.00127)	(0.00128)
Amortisation	-0.00167***	-0.00284***	-0.00120*	-0.00226***	-0.00195**	-0.00190**
	(0.000476)	(0.000936)	(0.000625)	(0.000513)	(0.000786)	(0.000795)
Type of interest rate	-0.354***	-0.367***	-0.397***	-0.332***	-0.314***	-0.346***
	(0.0431)	(0.0860)	(0.0574)	(0.0465)	(0.0725)	(0.0735)
Interest Rate	-0.275***	-0.377***	-0.293***	-0.306***	-0.335***	-0.298***
	(0.0101)	(0.0257)	(0.0142)	(0.0116)	(0.0187)	(0.0174)
Seniority	-0.155***	-0.235***	-0.216***	-0.168***	-0.203***	-0.167**
	(0.0421)	(0.0835)	(0.0558)	(0.0457)	(0.0702)	(0.0706)
Collateral	-0.00818***	-0.00872***	-0.00796***	-0.00848***	-0.00948***	-0.00915***
	(0.000458)	(0.000922)	(0.000597)	(0.000499)	(0.000776)	(0.000765)
Fee	-0.126**	-0.247**	-0.149**	-0.0896	-0.147	0.0376
	(0.0539)	(0.108)	(0.0712)	(0.0585)	(0.0896)	(0.0908)
Above desired maturity	0.284***	0.164**	0.285***	0.242***	0.397***	0.286***
	(0.0382)	(0.0763)	(0.0506)	(0.0413)	(0.0644)	(0.0645)
Observations	6,329	1,694	3,658	5,522	2,417	2,294
LR Chi^2	1067	316.7	631.2	977.2	462.1	415.1
Prob > Chi^2	0.000	0.000	0.000	0.000	0.000	0.000

Table 6: This Table provides the results of logit regressions over firm preferences between the loan offer A and B on different loan characteristics for size classes and investment types using the final model from Table 4. Column (1) runs the logit model for SMEs only, column (2) presents the results using large firms, column (3) analyses firms investing in Land, column (4) takes into account only firms investing in machinery and equipment, column (5) analysis firms investing in research and development separately, and finally column (6) only takes firms into account that invest in training and organisational improvements. Standard Errors are given in Parenthesis. *, **, *** denote significance at the 1%, 5% and 10% level, respectively.

	(1) Baseline	(2) Maturity and Amount	(3) Final
Amount	0.0218***	0.0186***	0.0219***
	(0.00156)	(0.00215)	(0.00155)
Maturity	0.00295***	0.000138	
	(0.00104)	(0.00197)	
Amortisation	-0.000105	-9.23e-05	
	(0.000963)	(0.000964)	
Type of interest rate	-0.157*	-0.158*	-0.123*
	(0.0878)	(0.0878)	(0.0725)
Interest Rate	-0.0122***	-0.0122***	-0.0122***
	(0.000712)	(0.000713)	(0.000710)
Seniority	0.214***	0.210***	0.213***
	(0.0744)	(0.0745)	(0.0744)
Collateral	-0.00965***	-0.00961***	-0.00965***
	(0.000902)	(0.000902)	(0.000900)
Fee for early repayment	-0.0717	-0.0664	
	(0.103)	(0.103)	
Above desired maturity		0.235*	0.242***
		(0.138)	(0.0732)
Desired amount		0.262**	
		(0.119)	
Observations	4,827	4,827	4,827
Pseudo R^2	0.153	0.155	0.154

Table 7: This Table provides the results of fixed effects logit regressions over the implementation probability of firm's investment project of different loan characteristics. Column (1) runs the baseline specification, column (2) presents the results testing for asymmetries at the desired loan amount and maturity, and column (3) is our final specification dropping insignificant variables. Standard Errors are given in Parenthesis. *, **, *** denote significance at the 1%, 5% and 10% level, respectively.

	(1) Manufacturing	(2) Construction	(3) Services	(4) Infrastructure
Amount	0.0246***	0.0249***	0.0169***	0.0216***
	(0.00275)	(0.00399)	(0.00339)	(0.00284)
Interest Type	-0.353***	-0.276	0.110	0.0727
	(0.125)	(0.184)	(0.164)	(0.133)
Interest Rate	-0.0143***	-0.0135***	-0.00897***	-0.0114***
	(0.00128)	(0.00179)	(0.00152)	(0.00129)
Seniority	0.0645	0.260	0.374**	0.218
	(0.129)	(0.187)	(0.167)	(0.137)
Collateral	-0.00830***	-0.0103***	-0.0100***	-0.0109***
	(0.00153)	(0.00232)	(0.00195)	(0.00173)
Above desired Maturity	0.234*	0.328*	-0.174	0.511***
	(0.126)	(0.184)	(0.165)	(0.137)
Observations	1,685	775	916	1,427
Pseudo R^2	0.175	0.176	0.120	0.162

Table 8: This Table provides the results of fixed effects logit regressions of the implementation probability of firm's investment project over different loan characteristics for different sectors. Column (1) uses only manufacturing firms, column (2) presents the using construction sector firms only, column (3) only takes into account firms from the service sector, and column (4) only analysis firms from the infrastructure sector.. Standard Errors are given in Parenthesis. *, **, *** denote significance at the 1%, 5% and 10% level, respectively.

	(1) SME	(2) Large	(3) Land	(4) Machinery	(5) R&D and IT	(6) Training and Organisation
Amount	0.0220***	0.0218***	0.0205***	0.0236***	0.0134***	0.0158***
	(0.00176)	(0.00339)	(0.00228)	(0.00188)	(0.00272)	(0.00270)
Interest Type	-0.0919	-0.284*	-0.325***	-0.135	-0.346***	-0.199
	(0.0815)	(0.163)	(0.109)	(0.0871)	(0.130)	(0.131)
Interest Rate	-0.0118***	-0.0136***	-0.0151***	-0.0126***	-0.0142***	-0.0114***
	(0.000801)	(0.00157)	(0.00116)	(0.000861)	(0.00133)	(0.00128)
Seniority	0.209**	0.211	0.128	0.150*	0.208	0.230*
	(0.0840)	(0.163)	(0.111)	(0.0890)	(0.131)	(0.132)
Collateral	-0.00951***	-0.00975***	-0.0100***	-0.00899***	-0.00903***	-0.00879***
	(0.00101)	(0.00198)	(0.00133)	(0.00108)	(0.00155)	(0.00160)
Above desired Maturity	0.236***	0.276*	0.218**	0.230***	0.204	0.0190
	(0.0826)	(0.161)	(0.108)	(0.0882)	(0.131)	(0.132)
Observations	3,731	1,064	2,256	3,356	1,508	1,410
Pseudo R2	0.149	0.176	0.174	0.160	0.142	0.123

Table 9: This Table provides the results of fixed effects logit regressions of the implementation probability of firm's investment project over different loan characteristics over different firm sizes and investment types. Column (1) uses only SMEs, column (2) presents the using large firms only, column (3) only takes into account firms that invest into Land, column (4) only analysis firms investing into machinery and equipment, column (5) analysis firms investing into R&D and IT, and column (6) takes into account only firms investing into training of employees and organisational improvements. Standard Errors are given in Parenthesis. *, **, *** denote significance at the 1%, 5% and 10% level, respectively.

	(1) Low Burden - Preferences	(2) High Burden - Preferences	(3) Bullet Repayment	(4) Low Burden - Implementation	(5) High Burden - Implementation
Amount	0.00785***	0.0151***	0.0111***	0.0190***	0.0273***
	(0.00123)	(0.00129)	(0.000671)	(0.00287)	(0.00298)
Amortization	-0.00162**	-0.00271***	0.000579		
	(0.000799)	(0.000792)	(0.000856)		
Interest Type	-0.390***	-0.240***	-0.363***	-0.0279	-0.269*
	(0.0735)	(0.0710)	(0.0385)	(0.135)	(0.138)
Interest Rate	-0.343***	-0.294***	-0.294***	-0.0139***	-0.0128***
	(0.0188)	(0.0180)	(0.00952)	(0.00137)	(0.00136)
Seniority	-0.238***	-0.0795	-0.163***	0.0681	0.294**
	(0.0708)	(0.0698)	(0.0374)	(0.136)	(0.144)
Collateral	-0.00792***	-0.00842***	-0.00800***	-0.0109***	-0.0118***
	(0.000752)	(0.000782)	(0.000409)	(0.00166)	(0.00173)
Fees for early repayment	-0.232**	-0.0408	-0.156***		
	(0.0922)	(0.0885)	(0.0480)		
Above desired maturity	0.249***	0.228***	0.240***	0.256*	0.186
	(0.0647)	(0.0629)	(0.0343)	(0.136)	(0.138)
Bullet repayment			-0.261***		
			(0.0800)		
Observations	2,347	2,346	8,090	1,406	1,433
LR Chi^2	431.6	405.8	1385	199.8	220.4
Prob > Chi^2	0.000	0.000	0.000	0.000	0.000

Table 10: This Table provides results on the anomalies found in the willingness to pay of firms. Column (1) reports our logit model for firms with a low debt burden only, column (2) reports the model for firms with a high debt burden only, column (3) reports our standard regression model with the complete sample but including a dummy for bullet repayment, column (4) reports the results from our fixed effects logit model of the implementation probability for low debt burden firms only, and column (5) reports the same model for high debt burden firms only. Standard Errors are given in Parenthesis. *, **, *** denote significance at the 1%, 5% and 10% level, respectively.

C. Questionnaires

Questionnaires both of the EIBIS main module as well as of the online experiment can be provided upon request.

Economics Department
economics@eib.org
www.eib.org/economics

Information Desk
+352 4379-22000
+352 4379-62000
info@eib.org

European Investment Bank
98-100, boulevard Konrad Adenauer
L-2950 Luxembourg
+352 4379-1
+352 437704
www.eib.org