THE SENSITIVITY OF SME'S
INVESTMENT AND EMPLOYMENT
TO THE COST OF DEBT FINANCING

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Diana Bonfim
Banco de Portugal
Católica Lisbon SBE

Cláudia Custódio
Imperial College Business School
CEPR, ECGI

Clara Raposo
ISEG Lisbon School of Economics and
Management
ADVANCE/CSG

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Abstract

We use variation in the access to a government credit certification program in Portugal to estimate the sensitivity of SMEs´ investment and employment to the cost of debt financing. Targeted firms have access to a credit certification and loan guarantees. We use a multidimensional regression discontinuity design to estimate real effects. Eligible firms increase borrowing and obtain bank loans at lower rates than non-eligible firms, allowing them to increase investment and employment during crises. Eligible firms also exhibit increased return on assets and default less. Industry-level analysis shows reduced heterogeneity in access to credit in more exposed industries.

Keywords: SME financing, Credit Rating, Credit Access, Credit Certification.

1. Introduction

Mutual guarantee programs, where governments offer a guarantee on bank loans, are common economic stimulus measures (Columba *et al.* 2010; Lelarge *et al.* 2010; Bach 2014; Beck 2014; Gonzalez-Uribe and Wang 2020). Through these programs, governments offer (partial) guarantees on loans granted by financial institutions to small firms for the purpose of subsidizing the cost of borrowing and alleviating financing frictions, which are known to be larger for firms that are small and more informationally opaque. These programs are often used to respond to financial crises, when the supply of credit is limited (Carpenter and Petersen 2002; Campello *et al.* 2010a; DeYoung *et al.* 2015; Brown and Earle 2017). [1] Nonetheless, some of these programs remain active during non-crisis periods. Despite their popularity among governments and policy-makers, the real effects of these programs remain understudied, including potential heterogeneous effects over the business cycle. Estimating their causal effects is challenging due to the endogenous selection of firms into these programs. Data availability also hinders the analysis of their effects, as medium and small firms are mostly private. Despite these challenges, understanding how investment and employment respond to changes in the cost of subsidized credit is of first-order importance given the resources devoted by governments around the world.

We exploit a stimulus program adopted in Portugal for small and medium enterprises (SMEs) to study the sensitivity of small firms investment and employment to the cost of borrowing. Through the *SME-Leader Program*, eligible firms have access to subsidized bank credit through government guarantees and to a public credit rating, which potentially reduces financing frictions. SMEs are typically opaque, which makes the process of collecting information and establishing a relationship with creditors long and expensive (Beck and Demirguc-Kunt 2006). Moreover, unlike large and public firms, these companies cannot benefit from the certification mechanism offered by the main credit rating agencies.

A relevant feature of the program, which started in 2008, is that certification and rating criteria are multiple and change on a yearly basis. This allows for the implementation of a multidimensional regression discontinuity design (MRDD) to estimate its real effects. The multidimensional and time-varying criteria generate exogenous variation in firms' costs of funding, which makes it possible to estimate its impact on the investment and employment decisions of SMEs. Because the program certifies eligible firms with one of two ratings, we also exploit variation around the top rating cutoff to estimate the impact of an additional credit rating notch for SMEs. The richness of the data on the population of Portuguese firms permits a detailed analysis of financing conditions and the usage of the borrowed funds.

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1. Government credit guarantee programs were also widely used as a response to the COVID19 pandemic (Core and Marco 2020).

Our analysis covers one decade, from 2008 to 2018, including a period of crisis and the period of expansion that followed. The size of the subsidy is likely to change with overall economic conditions and the severity of existing financing frictions, as are its real effects. For this reason, we analyse the two periods separately. We define the crisis period in Portugal as that between 2008 and 2013. In 2008, the Portuguese economy suffered the consequences of the failure of Lehman Brothers, which reverberated worldwide. The program was implemented precisely to mitigate the impacts of the ensuing crisis. When the economy was beginning to recover, a second and much larger shock hit the Portuguese financial system and, later, the economy. In the spring of 2010, Portuguese banks lost access to wholesale debt market funding, due to investors' concerns associated with the euro area sovereign debt crisis. Banks became largely reliant on European Central Bank funding and the government faced increased difficulties in accessing debt markets, leading up to an international request for financial assistance in the spring of 2011. Portugal successfully exited this assistance program in 2014. We thus define the post-crisis period as 2014–2018.

Eligibility for the program is based on financial information reported in the previous fiscal year. The criteria for eligibility are announced only after the financial information has been reported, which means that firms cannot be certain *ex ante* whether they will be eligible in a given year. If approved, certification is valid for a year. Because firms have discretion and endogenously choose whether to apply for the program, we estimate the intention to treat effect (ITT), i.e., we compare eligible firms' outcomes with those of non-eligible firms. To define a single running variable based on multiple criteria and thresholds, we follow Ferreira *et al.* (2018).[2] We first determine the binding criteria for each firm-year and then standardize the distance to threshold across criteria. For our baseline estimates, we follow Calonico *et al.* (2014) to choose the optimal bandwidth around the cutoff points and the order of polynomials for the functional form.

We first establish that firms that are eligible to participate in the program have access to significantly lower costs of debt financing and increase their bank borrowing. This effect is perhaps not surprising, as certified firms are offered subsidized loans through the government guarantee. However, it could also be that 1) unconstrained firms would simply substitute existing loans for loans at the subsidized rate; 2) firms would expand their borrowing beyond the credit offered through the program at a higher cost, and thus we would observe no change or even an increase in borrowing costs; or 3) banks participating in the program would capture this subsidy. When comparing firms around the cutoff point for the program, we find that eligible firms have access to loans that are 1.8 percentage points (pp) less expensive than non-eligible firms in the year of certification. We

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2. The multidimensional criteria design has the advantage of estimating the effect using different groups of firms around different cutoff points. This potentially improves the external validity of unidimensional regression discontinuity designs, which usually rely on a limited and small number of observations around a single cut-off point.

also document that eligible firms increase their borrowing by 8 pp more than non-eligible firms during the crisis period, when aggregate credit growth was decreasing. These effects are less pronounced during the post-crisis period.[3]

We then test whether eligible firms make use of borrowed funds during the crisis period for investment purposes. We find that during the crisis, eligible firms invest more in total assets, including fixed capital and working capital, and increase their employment by more than non-eligible firms. We find that eligible firms invest 1.8 pp more in fixed capital than non-eligible firms in the year of certification. Given the average take up rate of 36% during the crisis period this represents a treatment on the treated (TOT) effect of 5 pp. This effect persists for a year after certification with a similar magnitude, but is not persistent beyond that period. We find weaker effects for working capital: eligible firms invest 1.1 pp more than non-eligible firms, which represents a TOT effect of 3.1 pp. This is a non-persistent effect. The overall impact measured by the change in total assets is consistent with these measured effects: eligible firms increase their total assets by 1.2 pp in the certification year, for a TOT of 3.3 pp. For human capital investment, we find that eligible firms increase their employment by an additional 0.14 employees in the year of certification and by another 0.25 employees in the year after, which represents a TOT effect of 0.38 and 0.69 employees, respectively. Cumulatively, certified firms retain, during the crisis period, approximately 1 additional employee.[4]

In summary, our results show that a 1 percentage point (pp) decrease in the cost of debt financing is associated with contemporaneous increases of 0.7 pp in total asset growth, 1 pp. in fixed asset growth, and 0.6 pp. in working capital growth. A 1 pp decrease in the cost of debt financing is associated with a 0.22 pp contemporaneous increase in employment growth.

We also find a positive impact of the program on firm growth during the crisis period. Growth in sales is between 0.6 and 0.9 pp higher for eligible firms than non-eligible firms around the threshold in the two years after certification. These firms also increased their exports by significantly more than non-eligible firms around the eligibility threshold. This effect is positive and economically significant. Program-eligible firms export up to 8.6 percentage points more than others firms over the two years after becoming eligible. We do not find these effects in the post-crisis period. Overall, our results suggest that this program has a positive impact on firm growth, with real effects in terms of firm investment and employment. Notably, these are mostly observed during the crisis period and are much less salient in the post-crisis period.

To further inform the interpretation of the results, we conducted a survey of certified and non-certified firms for which we obtained 5,413 responses. The real effects of the program estimated using administrative data are corroborated by the

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3.   Because the program targets firms with low credit risk ex-ante, it is unclear whether there is an effective subsidy for eligible firms when economic conditions are better and probabilities of default are lower.

4.   The median firm in our sample has 19 employees.

perception of SME managers. SME managers confirm that the program allows them to lower their financing costs and boost investment and employment. Furthermore, the survey results allow us to gain insights not available in the financial data. More than one-third of the managers report an increase in the competitive advantage of the firm, 30% mention a positive effect on the firms' ability to innovate, and 19% cite improved relationships with clients.

The *SME-Leader Program* assigns two different credit ratings to SMEs *SME Leader* and *SME Excellence*), which allow us to study the role of credit certification. When comparing firms with different rating levels to evaluate the value of an additional notch in credit certification, we find no significant effects on financial outcomes, but we find significant results on sales growth. This result suggests that the overall impact of the program is not limited to the improved access to credit but is also due to the certification itself, which might be perceived as a positive signal by other stakeholders, including clients. This idea is supported by the evidence collected through the survey, as reputation benefits were considered a very important reason to apply for the program by more than half of the respondents that obtained a certification. Nevertheless, our quantitative results suggest that the effects arising from access to subsidized credit seem to dominate those arising from decreasing information asymmetries regarding firm quality during the crisis, as evidence of a credit rating effect is mostly observed in the post-crisis period.

Last, we study performance at the firm level, and potential improvements in credit allocation at the industry level. We find a positive intention to treat effect on return on assets but no significant improvement in firm-level productivity during the crisis period. We also find a decrease in default outcomes for eligible firms during the crisis period. We then follow the identification strategy in Bertrand *et al.* (2007) and Sraer and Thesmar (2021), who estimate the contribution of banking deregulation to changes in aggregate TFP, and exploit variation on treatment exposure at industry level. The estimated coefficient shows a reduction in cross sectional variance for more exposed industries, which is consistent with improved credit allocation. Overall these results also suggest that targeted firms do not engage in risk taking behavior, also taking into account the decrease in default events.

Our paper revisits a classical question in corporate finance, evaluating how sensitive firms' investment and growth decisions are to changes in the cost of capital. Using data on corporate bond prices, Gilchrist and Zakrajsek (2007) find that a 1 pp increase in the user cost of capital implies a decrease of 50 to 70 basis points in the investment rate. More recently, Sharpe and Suarez (2014) analyze a survey addressed to CFOs and find that most firms actually claim to be mostly insensitive to decreases in interest rates. However, these results are based mainly on large firms. Fazzari *et al.* (1998) show that information asymmetries can significantly increase the cost of funding for firms, thereby constraining investment. Graham and Harvey (2001) argue that investment decisions are often determined by the cost of funding rather than by the net present value of the project, notably for smaller firms. These constraints were more binding during the global financial

crisis, with 86% of financially constrained CFOs reporting having foregone attractive investment opportunities during this period (Campello *et al.* 2010b). We contribute to this literature by examining the sensitivity of investment to the cost of debt for a universe of firms that remains largely unexplored in this literature: SMEs. Further, our empirical design allows us to precisely estimate the elasticities of firms' financing costs on investment and employment, which is helpful in the calibration of macro-finance models (Chetty *et al.* 2011; Mian *et al.* 2019).

Relatedly, our paper contributes to the literature on credit constraints faced by small firms. Credit-constrained firms are limited in their ability to grow (Banerjee and Duflo 2014; Beck and Demirguc-Kunt 2006). Often small firms have limited access to capital markets, and thus their most important source of external finance is typically bank loans (Ferrando *et al.* 2015). During the global financial crisis, banks were forced to adjust their portfolios in response to negative shocks, implying that SMEs' access to credit became severely constrained (Blattner *et al.* 2021; Carbo-Valverde *et al.* 2016; DeYoung *et al.* 2015). Demirgüç-Kunt *et al.* (2020) show that small firms around the world were more severely affected by these constraints during the global financial crisis, especially in countries with weaker information-sharing mechanisms. This was not a unique feature of this crisis, as small firms are generally more exposed to cyclical fluctuations (Crouzet and Mehrotra 2020) and credit crunches (Gorton and He 2008; Dinlersoz *et al.* 2018). We contribute to this literature by showing that a targeted program designed to alleviate the financial constraints of SMEs had a positive impact on their investment and growth during a profound economic and financial crisis.

Last, our paper contributes to the literature examining how government interventions can address financial frictions that make SMEs financially constrained. These constraints can arise from vulnerability to information problems, as well as from the market power of banks (Carbo-Valverde *et al.* 2009; Ryan *et al.* 2014). Government and national financial structures affect credit availability mainly through lending technologies (Berger and Udell 2006; Behr *et al.* 2013; Kahn and Wagner 2021), so several measures have been developed to improve SMEs' access to finance through bank loans at different levels. Gonzalez-Uribe and Paravisini (2017) study the Seed Enterprise Investment Scheme in the UK, which consists of an exemption on capital gains and income tax relief offered to individual investors in small entrepreneurial firms. They find that this program had a positive impact on investment. Gonzalez-Uribe and Wang (2020) examine a loan guarantee program also implemented in the UK, during the Great Recession, and find positive effects on performance, survival and job retention. For the U.S., there is abundant evidence that Small Business Administration loans were helpful in eliminating constraints in the credit supply (Bachas *et al.* 2021), creating jobs (Brown and Earle 2017), and promoting economic growth (Denes *et al.* 2021). There is also evidence on the broadly positive effects of government guarantee programs in France (Lelarge *et al.* 2010; Bach 2014; Barrot *et al.* 2019), Italy (Columba *et al.* 2010; Bartoli *et al.* 2013; D'Acunto *et al.* 2018; D'Ignazio and Menon 2020), and Chile (Mullins *et al.* 2018). In a recent paper Crouzet and Tourre (2020) estimate a structural model

of investment, financing and default to examine the tradeoffs of credit support programs during crises and in their aftermath. They show that supporting firms' access to credit during crises may be helpful to avoid their liquidation, but that this support can create debt overhang problems during recoveries, slowing investment and growth. Our paper contributes to the literature on government interventions in credit markets by estimating the impact of access to subsidized bank credit on firm growth and performance, as well as documenting the real economic effects in terms of investment and employment. The program design allows for a more precise estimate of the real effects, as selection, manipulation, and anticipation effects that often hinder identification can be addressed by exploiting the features of the program. The program also differs from most government interventions because it targets SMEs with low credit risk as defined by the government. By focusing on a subset of firms, the fiscal costs of the program are necessarily smaller. Our results show that a targeted program can improve the outcomes for the treated firms. Given that the program has been operational for over a decade, we can also evaluate its effects both during a crisis and in the subsequent recovery period. The effects arising from improved access to credit prevail mainly during the financial crisis, as suggested by Crouzet and Tourre (2020).

Our results have relevant policy implications. SMEs represent an extremely large fraction of the European economy: according to the "Annual Report on European SMEs" by the European Union (EU), in 2016, they represented almost all (98%) non-financial enterprises and two-thirds (66%) of total EU employment, and accounted for almost three-fifths (57%) of the value added generated by the non-financial sector. Because of their importance in the economy, these firms are given particular attention by policy-makers, who recognize the challenges associated with SME access to credit. Our research design helps us to understand how relevant financial and informational frictions are in hampering firms' access to credit and growth, leading to different outcomes in terms of investment in physical and human capital. This allows policy-makers to understand the potential impacts of enacting policies to alleviate financial and informational constraints on SMEs, notably for the best performers. This can be particularly relevant during financial crises or other economic distress events such as the recent COVID-19 pandemic. While in the first wave of the pandemic, governments around the world hurriedly offered indiscriminate support to small firms to offset the impacts of lockdowns and demand shocks, as it became clearer that the pandemic would have lasting and uncertain effects, a consensus then emerged that support should be targeted (Bartik *et al.* 2020), to avoid the proliferation of zombie firms and unmanageable public finances imbalances and to promote the efficient reallocation of resources in the economy. This paper offers evidence that supporting targeted small firms during a financial crisis has positive and lasting effects on investment and growth.

The paper proceeds as follows. In section 2, we describe the institutional setting, the program and the data. In section 3, we explain the empirical strategy, and in section 4 we present the results. Section 5 presents robustness tests and extensions,

and section 6 discusses the main results making use of survey evidence. Finally, section 7 concludes the paper.

2. Institutions and Data

2.1. The SME-Leader Program

The *SME-Leader Program* offers SMEs a credit certification (rating) issued by a governmental agency (IAPMEI). The program was introduced in 2008 with the stated objective of ensuring that the best performing SMEs had access to financing during the global financial crisis. To achieve this goal, the program was designed to work through two channels. The first is the credit certification mechanism, which mimics the credit ratings by international rating agencies, but focuses on SMEs rather than on large companies.

The second channel more explicitly addresses the lending dimension. Once in the program, firms have access to credit lines with partial guarantees provided by mutual guarantee societies funded and secured by the Portuguese government. This allows firms to borrow at lower rates and in a more streamlined and standardized process for credit approval. The terms and conditions applied vary across credit lines and change throughout the sample period. For illustration purposes, the maximum spread that banks could place on credit lines granted to *SME-Leader firms* in 2015 ranged between 2.7 and 3 p.p. above the 6-month Euribor (banks can charge lower spreads).[5] Firms also had to pay a commission for access to the mutual guarantee, which was 0.65% for the most expensive credit lines. The maximum government guarantee and loan maturity also varies across credit lines. In 2015, the maximum guarantee was between 50% and 70%, while the maximum loan maturity allowed was 10 years.[6]

Although the program was originally designed to mitigate constraints in access to credit during the global financial crisis, the perceived success of the program lead to its continuation.[7] In 2021, the program was still active. However, the conditions under which firms can access the program changed materially over the years. To be eligible for *SME Leader* status, a firm has to satisfy a set of criteria based on its most recent financial and operational performance. To be eligible in a given

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5.   For reference, the average spread for new loans under 1 million euros was 3.8 p.p. in the same period.

6.   The program includes other stated benefits such as access to training and partnerships with service providers through IAPMEI.

7.   In 2016, the program was recognised at the European Enterprise Promotion Awards (EEPA), where it won the "Improving the Business Environment" award. The EEPA reward initiatives that promote entrepreneurship and business growth. According to IAPMEI, "this award reflects the strong impact that the *SME Leader* program had on companies awarded the statute, in terms of company financing, recognition of SMEs and in improving the flow of information".

year, a firm must satisfy the criteria with respect to the previous year's financial statements.

The eligibility criteria have changed every year since the creation of the program. Over time, the set of criteria included the following financial variables and ratios: total assets, number of employees, total sales, net income, EBITDA, net income/assets, net income/equity, equity/assets, EBITDA/assets, EBITDA/sales, debt/EBITDA, sales growth and EBITDA growth. The program criteria for each year in our sample are reported in Table B.1 in the Appendix.[8] Overall, the criteria have become more demanding over time.

In addition to the financial criteria, firms must meet a set of more general qualifying criteria that are the same every year. These include being officially classified as SME by IAPMEI (this is solely based on firm size measured by the number of employees, revenue and assets, according to EU recommendation 2003/361), have three consecutive years of complete financial statements, and have no conflicting situations (e.g. late payments) with the Portuguese tax authorities, IAPMEI or Social Security.[9]

To obtain certification, firms must apply through a Portuguese commercial bank that sponsors its application. There is no application fee. The bank has to assess whether the firm meets the eligibility criteria, performs credit screening, and submits the application to the government agency. The bank also negotiates the interest rate and other commercial fees with the firm and maintains its monitoring function.[10] The certification is valid for one year. To remain in the program, the firm must comply with the set of criteria defined for that year and submit an application through the sponsor bank.[11] Unlike credit rating agencies, IAPMEI does not screen the firms, it simply establishes the criteria for eligibility. The typical annual timeline of the program is as follows. Firms submit their annual financial reports from the previous fiscal year to the relevant authorities during April; eligibility criteria based on previous fiscal year financial statements are announced, and firms apply to the program during the summer; the list of certified firms is publicly announced by IAPMEI during the fall; and firms benefit from their certified status until September of the following year (see Figure B.1).

For a reference, in 2020, 9,955 firms were certified as *SME Leaders* (1,398 more than in the previous edition). These firms account for more than 40 million

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8. Firms in the tourism sector are subject to a different set of criteria. The program is managed by a different institution, Tourism Portugal. We exclude firms in this sector from our analysis.

9. According to EU recommendation 2003/361, for a firm to be classified as an SME it must have fewer than 250 employees and less than 50 million euros in turnover (or less than 43 million euros in total assets).

10. The program might imply a smaller margin on these loans for banks, but the sponsor bank might benefit from regulatory capital savings, given the partial government guarantees attached to these credit lines. The cap on the guarantee is intended to align incentives such that the bank performs sufficient monitoring of the loan (Chemla and Hennessy 2014).

11. Firms apply to the program through just one of the sponsor banks but can re-apply in the following year with a different bank.

euros in turnover and more than 325 thousand jobs. Most firms belong to the retail (34.4%), manufacturing (24.4%), food and accommodation (10.8%), and construction (10.8%) sectors. The majority are small firms (71.9%). Medium firms account for 22.2% of the total, and micro firms represent 6%.

A unique feature of the program is its two-tier credit certification (rating). While most eligible firms receive the *SME-Leader* certification, a smaller fraction are classified as *SME-Excellence* firms. To benefit from the top rating (*SME-Excellence*), firms have to meet a more demanding set of criteria, which also changes on an annual basis. The formal financial benefits of being in the program are identical for *SME-Leader* and *SME-Excellence* firms. As such, the additional benefits from being an *SME-Excellence* firm are expected to derive primarily from the certification effect. By being part of the program, the firms can publicize this certification on their websites and other communication platforms.

Table A.1 reports the number of eligible firms for each of the two certification categories and the number of *SME-Leader* and *SME-Excellence* firms in a given year. The program started in 2008 only with one level of certification, *SME-Leader*. The top rating certification (*SME-Excellence*) was added in the following year. The number of certified companies increased until 2012 possibly due to increased awareness about the program, and has been stable overall since then. The number of eligible, non-certified firms decreased over time as the program criteria became tighter and, possibly, awareness increased. The average take-up rate, measured as the number of certified firms as a percentage of the number of eligible firms, is 41.5%, being 30% during the crisis period and 63.4% after the crisis (post 2013). Figure 1 shows the number of firms entering the program for the first time, which decreases over time and is consistent with firms being certified for more than one year during the sample period. In section 6, we discuss the selection of firms into the program and present survey evidence on the costs and benefits of the program as perceived by firm managers.

2.2. Data

The government agency responsible for the program makes publicly available the list of firms that are certified in each year, as well as the criteria to be certified as *SME-Leader* and *SME-Excellence* firms. We collect data on certified firms and program criteria between 2008 and 2018 from IAPMEI. This allows us to determine whether a firm is certified as an *SME-Leader* or *SME-Excellence* firm in a given year.

We merge these data with detailed accounting data on the firms, using their unique fiscal identification number. The Portuguese Central Balance Sheet database covers all non-financial firms operating in Portugal. The data are sourced from *Informação Empresarial Simplificada* (IES), a joint project of the Ministry of Finance, Ministry of Justice, Statistics Portugal and Banco de Portugal. The aim of this project is to integrate most of the information that all Portuguese firms have to report for legal, fiscal and statistical purposes. This is the information used in the

program to confirm whether a firm meets the eligibility criteria. Banco de Portugal revises the data for economic and statistical analysis purposes (this revised version of the data is the Central Balance Sheet database). We collect this data from 2007 to 2018.

These data, together with detailed criteria data, allow to identify all firms that are eligible for the program. The granular and detailed information in the financial dataset also allows us to measure firm outcomes, including investment, employment and sales growth.

We merge these data with the Central Credit Register dataset, owned and managed by Banco de Portugal. This includes monthly information on all loans outstanding in Portugal, granted by resident credit institutions. The reporting threshold is among the smallest in the world (50 euros). This virtually universal coverage is key for the analysis of SME financing. Most credit registers worldwide typically have higher reporting thresholds, sometimes excluding smaller firms from the analysis. This dataset has information on the total outstanding bank loans of each firm and on the status of each loan (for instance, whether it has become overdue or was renegotiated). There is also information on unused credit lines, loan products, maturity and collateral.

Finally, we collect data on interest rates using a database on loan flows, available at Banco de Portugal. For each new loan originated, banks report the interest rate, maturity, existence of collateral and the loan amount. This dataset is available only since mid-2012, which implies that it cannot be used to fully assess the effects of the program in the entire period.

3. Empirical Strategy

We exploit eligibility for the "*SME-Leader Program*" as a source of variation in the cost of debt for SMEs. We exploit the variation around the different criteria thresholds of the program to define a counterfactual for changes in debt issues, investment and employment in the absence of the subsidy and credit certification. While we observe the firms that are certified and those that are not in a given year, we do not have information on applications and therefore cannot explicitly account for selection into the program. We thus estimate an ITT effect, i.e., we compare eligible firms with non-eligible firms around different cutoff points, defined by the multiple eligibility criteria.

We also exploit the eligibility for *SME-Excellence* as a source of variation in the credit certification level. We exploit the discontinuity between excellence-eligible and leader-eligible firms to estimate the effect of obtaining the top certification level.

3.1. Sample and Summary Statistics

Our main sample comprises 229,778 firm-years and 55,041 unique firms from the period 2007-2018 for which eligibility data are available. Table 1 reports summary statistics for all firms in our sample including criteria (Panel A) and outcome variables (Panels B and C). Non-SME firms are excluded from the sample. We also exclude financial firms, not-for-profit and state-owned firms, as well as firms in the tourism sector because this sector has its own stimulus program. The median firm in our sample has 19 employees, sales of 1.29 million euros, assets of 1.28 million euros and is 18 years old.

Table A.2 in the appendix shows the summary statistics for *SME-Leader* and *SME-Excellence* eligible, non-eligible and certified firms. Overall, Leader and Excellence certified firms are larger and better performing. This is consistent with the notion that firms become eligible for the program based on accounting performance, credit quality and size.

3.2. Methodology

We use a multidimensional regression discontinuity design (MRDD) to estimate differences in debt issuance, investment and employment between eligible and non-eligible firms. Therefore, the analysis is restricted to a set of firms that lie around the eligibility threshold. In other words, we compare firms that are eligible for the *SME-Leader Program* but only meet the criteria by a small margin with firms that are not eligible for certification by a small margin. The firms 'just below the threshold' are used as the counterfactual for firms that are 'just above the threshold'. Analogously, to estimate the top rating effect, we compare firms that are eligible for the SME-Excellence certification by only a small margin with the firms that were not eligible for the top rating by a small margin. In a one-dimensional regression discontinuity design, the sample bandwidth definition and distance to threshold are determined by a single criterion. In a multidimensional design, there are multiple criteria and multiple thresholds. Therefore, we need to define a single running variable and threshold. We define the distance to threshold of a given firm in a given year using the criterion that is the most binding.[12]. We follow the approach of Ferreira *et al.* (2018) to define the binding distance to threshold across criteria. We first calculate the distance to threshold for all criteria and standardize these distances. Second, we define the binding criterion as that with the greatest distance to threshold. Last, we aggregate the standardized distances to threshold across criteria to define the running variable (standardized distance to threshold). Figure 2 shows that the probability of being treated (certified as *SME-Leader* in

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12.   As an example, to be eligible for the program in a given year, firms must have positive net income and an equity-to-assets ratio greater than or equal to 25%. For a firm that has positive net income that is very close to zero and an equity-to-assets ratio of 100%, the most binding criterion is net income

this case) significantly increases at zero for our running variable. The econometrics literature on regression discontinuity design provides detailed guidance on the choice of the optimal bandwidth (Imbens and Kalyanaraman 2012); the choice of the local polynomial order to include in the regression (Pei *et al.* 2020); and the inclusion of covariates (Frölich and Huber 2019). We follow Calonico *et al.* (2014) regarding the choice of the optimal bandwidth and polynomial order.

Formally, we estimate the following model:

$$y_{it} = \beta v_{it} + \sum_{p=1}^{P}[\gamma_{p0} + \gamma_{p1}v_{it}]D^p + \epsilon_{it} \tag{1}$$

Where y_{it} is a firm outcome (e.g., the interest rate on new loans), v_{it} is an indicator variable that takes value 1 if a firm is eligible as *SME-Leader* in year t (i.e., $v_{it} = 1 \ if \ D_{it} \geq 0$) and $\sum_{p=1}^{P}[\gamma_{p0} + \gamma_{p1}v_{it}]^p$ is a polynomial of order P of the distance to threshold. The coefficients γ_{p0} and γ_{p1} can differ on the left- and right-hand sides of the threshold.[13]

The coefficient of interest is β, which measures the average difference in the outcome variable y_{it} between eligible and ineligible firms as determined by the program criteria in year t. A positive coefficient indicates that the average of the outcome variable for eligible firms is larger than for non-eligible firms. Because there is only partial take-up of the program, β is an ITT estimate. The TOT estimate is obtained by scaling up the ITT by the take-up rate.

An underlying assumption in the regression discontinuity design is that firms' assignment around the eligibility threshold is as good as random and that y_{it} would be a smooth function around threshold absent treatment (*local continuity assumption*). This implies that firms do not manipulate their financial statements to meet the program criteria. The design of the program arguably makes it difficult to manipulate eligibility for the following reasons: 1) the program is subject to multiple criteria, and these change on a yearly basis; 2) the eligibility criteria for a given year are always based on the financial statements of the previous year and only announced after the date on which firms have to file their financial reports with the authorities; 3) all SMEs must have a certified accountant who files and signs the financial reports; and 4) there are penalties for late filing of financial reports, and firms must pay fees to file for restatement.[14]

A second implication of this identifying assumption is that program thresholds are not standard restrictions to participate in other programs or subsidies. This is indeed the case, which reduces the concern of sorting around the cutoff points. Although the local continuity assumption cannot be formally tested, we study the distribution of eligibility criteria around each of the cutoff points using McCrary tests (McCrary 2008). Figure 3 shows the distribution of criteria around cutoff

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13.   In the estimation, we follow Calonico *et al.* (2017).

14.   In Portugal all firms, irrespective of size, must submit detailed financial statements (balance sheet, income statement and cash flow statement) to the authorities.

points for the year before their introduction into the program.[15] Overall, we do dot find significant discontinuities around the relevant thresholds except for *Net Income*. Earnings discontinuity has been extensively documented in the accounting literature (see, for instance Burgstahler and Dichev (1997) or Beaver and Nelson (2007), who show that discontinuity in earnings can be observed in the absence of discretion). This observed discontinuity in net income is thus plausibly unrelated to the program. Nevertheless, because firms above and below the cutoff for *Net Income* may systematically differ in other observable and unobservable characteristics, in section 5 we conduct robustness tests where we exclude *Net Income* as a criterion, as well as other criteria with the lowest p-values in the density tests.

Other potential bias in our estimates might arise from the choice of bandwidth and polynomial order. We discuss this possibility in greater detail in section 5 and perform robustness tests where we choose alternative bandwidths and polynomial orders.

4. Results

We use the *SME-Leader* program to estimate the sensitivity of investment and employment to the cost of debt financing. The first step in our empirical evaluation is to examine changes on the cost of debt financing to check whether firms have access to less expensive bank financing due to the government guarantees and credit certification that are offered by the program. Second, we consider financial responses: changes in debt and equity financing. Third, we analyze investment and employment effects, and sales growth. We perform this analysis during the crisis period and the post-crisis period and across sub-samples of firms expected to face different levels of financing frictions.

4.1. Cost of Debt Financing and Financial Responses

Firms that are eligible to participate in the program have significantly lower costs of debt financing during the crisis period. Table 2 shows the results from estimating equation (1) using loan flow data. Columns (1)-(2) show the impact of the program on the cost of new loans. The cost of debt for eligible firms is 1.8 pp lower than for non-eligible firms during the crisis period (Panel A, column 1). Figure 4 shows that this decrease corresponds to a drop from approximately 11 pp for non eligible firms to 9 pp for eligible firms around the eligibility threshold.[16] As the loan flow data are available since 2012 and the average take-up rate for the 2012-2013 period is 60%, the TOT effect is up to 3 pp. These effects are persistent and of similar

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15.   We also present p-values of Cattaneo *et al.* (2018) density tests for discontinuity around the thresholds in Table A.3 in the appendix.

16.   Figure 4 provides a visual representation of the RD estimates using a fixed bandwidth of 0.25 across all outcomes and a polynomial of order 2.

magnitude one year post-certification, but not during the post-crisis period (Panel B). Because firms may decide to increase borrowing with non-sponsor banks at market rates in addition to the subsidized credit through the program, the overall impact of the program on the cost of financing for firms is not trivial.[17]

In terms of the maturity of new loans, we find that eligible firms have shorter loan maturity. The estimated ITT coefficients are -0.213 for the year of eligibility and -0.124 the year after (columns (3)-(4)). This corresponds to a contemporaneous decrease in debt maturity of approximately 4 months. This effect is persistent over time.

Columns (5)-(6) report the results for collateral on new loans. We find that the use of collateral in bank loans is greater for eligible firms than non-eligible firms around the eligibility threshold. This is expected because all the loans granted through the program have an associated government guarantee, which makes them classified by the bank and in the data as having collateral.

Columns (7)-(8) show the impact on the probability of default. These probabilities are estimated in an internal credit risk model managed by the Banco de Portugal. We find that eligible firms show a significantly lower probability of default than in the counterfactual during the crisis (Panel A). The coefficient is -0.003 in the year of eligibility and -0.004 one year after. The TOT is thus between 0.005 pp and 0.007. We do not find an effect in the post-crisis period (Panel B).

To evaluate whether firms increase their borrowing, we examine changes in bank loans. Because firms can access other sources of financing such as equity, we also investigate changes in issued equity. Table 3 shows the results from estimating equation (1) using balance sheet data to measure financial responses. We estimate these effects in levels but also in logarithmic transformation to mitigate the impact of potential outliers.

Columns (1)-(4) report the results for changes in bank loans. We find that firms that are eligible for the program increase their borrowing relative to non-eligible firms during the 2008-2013 period (Panel A). The estimated ITT effect for contemporaneous variables is 6,784 EUR, which represents 2.9% of a standard deviation. The effect is stronger at 21,742 EUR one year after, representing 9.2% of a standard deviation. The TOT effect for an average take-up rate of 36% during the crisis period is 18,844 EUR for the eligibility year and 60,394 EUR one year after. The effects on the log-transformed variable are similar across the two periods. The estimated difference in growth rates is between 7.5 pp and 7.7 pp. From Figure 4, we see that the increase at the eligibility cutoff point is of similar magnitude. The TOT effect for the log-transformed variable is estimated at 0.21.[18]

The estimated effects are overall smaller for the period post-2013 (Panel B). The estimates in levels are statistically significant with a magnitude of 14,909 EUR

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17. Table A.4 shows that the estimated effect on the interest rate is similar when loan-level covariates are included in the estimation.

18. Figure A.1 shows similar regression discontinuity plots for the variables without the log transformation.

for the eligibility year and 9,755 EUR for one year after (columns (1) and (2)). The log-transformed variable results are reported in columns (3)-(4) and show an effect between 1.9 pp and 2.4 pp. One possible explanation for the smaller post-crisis effects is that target firms do not benefit as much from the subsidy, as their probability of default is low enough when the economy is doing well.

Last, we examine equity issues, as firms might also respond to this debt subsidy by issuing equity to readjust their capital structure or as a necessary complement to finance investment. Columns (5)-(8) report the results. We find modest effects on equity issues mostly during the crisis (Panel A). The estimated effects in levels are significant at 1% level and between 1,382 EUR and 1,630 EUR during the crisis, but mostly not significant for the log-transformed variable. These estimated effects are of an order of magnitude and significantly smaller than the loan effects. For this reason, and because only a small fraction of firms issue equity in a given year (less than 25%), we do not regard them as first-order effects.

Taken together, these results show that the program effectively changes targeted SMEs' access to credit, allowing them to borrow more and at significantly lower rates, but mostly during the crisis period.

4.2. Investment and Employment

In the previous section, we show that eligible firms increase their borrowing by more than non-eligible firms because they have access to significantly lower interest rates during the crisis period. In this section, we test whether eligible firms increase their investment and employment by more than non-eligible firms and calculate its sensitivity to the change in the interest rate.

Table 4 shows the results from estimating equation (1) using investment as the main outcome variable. The results for changes in total assets are shown in columns (1)-(4), those for changes in fixed capital appear in columns (5)-(8) and those for changes in working capital are in columns (9)-(12). Eligible firms invest significantly more in total assets than non-eligible firms during the crisis period (Panel A). The ITT estimate is 26,008 EUR when considering the year of eligibility and 32,777 EUR the year after, which represent 6% and 8% of a standard deviation change in total assets, respectively. The TOT effect for a take-up rate of 36% corresponds to 72,244 EUR and 91,047 EUR, respectively. When considering the log-transformed variable for changes in total assets, which mitigates the effect of potential outliers, we find that the effect is varies between 0.6 and 1.2 pp. A difference of 1.2 pp evaluated at the mean value of total assets corresponds to 58,041 EUR. The post-crisis estimates for changes in total assets presented in columns (1)-(2) in Panel B are not significant.

Next, we analyse investment in fixed assets. We find that eligible firms significantly increase their fixed assets during the crisis period by 3,521 EUR more than non-eligible firms (Panel A). This effect is similar in magnitude one year after eligibility is considered (3,376 EUR). These effects represent 3% of a standard deviation. The TOT effect is 9,781 EUR for contemporaneous variables and 9,378

EUR when the year after eligibility is considered. The results are robust to using the log transformation of the variable, with a significant coefficient of 1.8 pp in the year of certification and 1.9 pp one year after. A difference of 1.9 pp in fixed assets growth evaluated at the mean represents 12,875 EUR. The post-crisis estimates for fixed assets growth are presented in Panel B and, overall, are not statistically significant.

Last, we show the results for investment in working capital. We find that eligible firms increase their investment in working capital by more than non-eligible firms. The estimated ITT coefficient is 9,840 EUR when considering contemporaneous effects and 14,700 EUR when one year after eligibility is considered. This is admittedly small at only 1% of a standard deviation. The TOT is 27,333 EUR and 40,833 EUR, respectively. The results are only robust to using the log-transformed variable for the first year with an estimated coefficient of 1.1 pp, which represents 12,961 EUR evaluated at the mean value of working capital. Working capital is the only investment variable with post-crisis effects (Panel B). The effects are very similar in terms of magnitude to those obtained for the crisis period, but they are not persistent.

Overall, these results suggest that eligible firms increase their investment by more than non-eligible firms and that these effects are more pronounced during the crisis. The improved access to bank loans in a period of credit supply contraction ensured that targeted firms continued to invest during a prolonged crisis (or that, at least, they did not decrease investment as much as other firms that had a similar starting point but could not benefit from the support program).

Table 5 shows the results for employment. Column (1) shows that eligible firms increase their growth in number of employees compared to non-eligible firms by an additional 0.136 employees during the period of the crisis (in Panel A). This effect is persistent for one year after the award at 0.247 employees during the crisis. The magnitude of these effects ranges between 4% and 7% of a standard deviation. This represents a TOT effect of between 0.38 and 0.69 employees during the crisis for an average take-up rate of 36%. We do not find significant employment effects in the post-crisis period. Figure 4 shows that during the crisis this difference means that eligible firms are retaining more of their employees than non-eligible firms, as opposed to hiring more than non-eligible firms.[19] The regressions with the log-transformed variable show consistent results, with significant estimates between 0.004 and 0.01. These estimates represent between 0.12 and 0.31 employees evaluated at the mean.

Columns (5)-(8) show the effects for the wage growth rate. Wages per worker in eligible firms grow by up to 68 EUR one year after the award during the crisis. This represents 3.2% of a standard deviation change in wages per worker, and a TOT of 189 EUR. When using log transformed variables, we find that wages per

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19. Figure A.2 graphically displays this estimate in levels for a fixed bandwidth of 0.25 and suggests that at the cutoff, eligible firms keep their employee changes at zero while non-eligible firms reduce their number of employees by 1.

worker grow by up to 0.4 pp more during the crisis period than those of non-eligible firms (Panel A). This result is not significant during the period post-crisis (Panel B).

Overall, we find evidence that firms in the program make use of newly borrowed funds through the program to invest in fixed capital and working capital as well as retain employees during the crisis. Post-crisis period effects are negligible, and wage effects are modest. Our results show that a 1 pp decrease in the cost of debt financing is associated with contemporaneous increases of 0.67 pp in total asset growth, 1 pp in fixed asset growth, and 0.61 pp in working capital growth. A 1 pp decrease in the cost of debt financing is also associated with a contemporaneous increase in employment growth of 0.22 pp.

4.3. Sales Growth

One of the stated objectives of the program is to promote the growth of targeted firms. Table 6 shows evidence on sales growth and exports. Columns (1)-(4) show that eligible firms grow their sales by more than non-eligible firms. When using changes in sales, the effect is only significant one year after the certification and during the crisis period, and it corresponds to 33,230 EUR. When using the log transformation of sales growth, the effect is significant, with a magnitude of 0.9 pp in the first year and 0.6 pp one year after. The TOT effect during the crisis is thus between 1.7 and 2.5 pp. This effect is not observed during the post-crisis period as shown in Panel B.

Columns (5)-(8) report the findings of a similar test using export growth. During the economic crisis of 2008-2013, many Portuguese firms increased their exports as a way to overcome the contraction in domestic demand. We test whether exports grew more for eligible firms during this period. We find that eligible firms increased their growth in exports by 9,870 EUR more than non-eligible firms during the certification year and 12,451 EUR one year after. These represent changes of approximately 7% and 8% of a standard deviation, respectively. These effects are robust to using log transformations for the 1-year period after certification with a magnitude of 8.6 pp and a TOT effect of 24 pp. These magnitudes represent 54,664 EUR (ITT) and 152,550 EUR (TOT) evaluated at the mean value of exports. The delayed effects on exports seem reasonable because firms might have to invest or adapt to increase exports. Panel B shows these effects in the post-crisis period. We do no find significant post-crisis effects.

Overall, the support offered to targeted SMEs was helpful in promoting exports, most notably when domestic demand was hampered. It is plausible that firms used financial support to adapt their activities toward international markets (Kalemli-Ozcan *et al.* 2016). Moreover, the credit certification provided by the program possibly facilitated the entry into new international markets and segments, ensuring to new customers that the firm was among the best performing in its country of origin.

4.4. Persistence

Table 7 shows the result of estimating the ITT effect two years after eligibility. We find a smaller but significant negative coefficient for interest rates at 1.4 pp in column (1) of Panel A, suggesting that the effect on interest rates is persistent for at least two years during the crisis period. This might be related to the nature of the credit lines, which sometimes have maturities that go beyond the year of certification. However, we do not find a corresponding effect on loans on column (2). In fact, the coefficient is negative and significant, suggesting that firms decrease their borrowing two years after certification. The magnitude of this decrease is smaller than the previously estimated effects for the increase during the first two years. We do not find significant persistent effects on investment growth beyond two years post-certification (columns (3)-(5)). The effect on employment growth is also not persistent and there is actually some reversal (column (6)).

Panel B shows the results for the post-crisis effects. Consistent with the previous tests, we do not find significant impact of the program on interest rates or borrowing rates. Interestingly, we find a positive effect on total asset growth and working capital during the post-crisis period. Because we do not find significant results on interest rates and debt responses, these real effects are unlikely to be a result of the debt subsidy. In the next section we discuss potential effects of the credit certification beyond the interest rate subsidy.

4.5. Certification Effect

In this section, we test the impact of the certification as an *SME-Excellence* firm. Table 8 shows the results for financial outcomes. Top-rated firms benefit from the same formal conditions in terms of the credit guarantee, but they differ on the public rating. This may still affect the conditions offered by the sponsor bank if the rating is expected to have an impact. It may also impact borrowing conditions with other banks or the relation of firms with other stakeholders including clients and suppliers. Columns (1)-(2) show that there are no significant differences in the cost of financing around the threshold between leader-eligible and excellence-eligible firms during the crisis period (Panel A), even though financing costs are marginally smaller one year after certification in the post-crisis period (Panel B). We also find that excellence-eligible firms do not borrow more. If anything, there is some evidence that these firms borrow less (columns (3)-(4)) than non-eligible firms.

In Table 9 we examine the impact of the extra rating notch on firm growth. Given that we do not reject the null hypothesis for financial effects, we focus only on sales growth and export growth. The idea is that the credit certification might be a positive signal to clients and suppliers, which would allow firms to increase their sales by more. During the crisis period (Panel A), we do not find consitently significant credit certification effects. In Panel B, for the post-crisis period, we find

robust evidence that excellence-eligible firms grow their sales by more than non-eligible firms. The magnitudes are non-negligible at 108,334 EUR for the first year, and 99,107 EUR the year after. Using log-transformed variables, the magnitudes are at an additional 2.1 pp and 1.8 pp in the certification year and one year after, respectively. Regarding export growth, we find significant effects without the log-transformed variables, one year after the award. The effects correspond to 16,591 EUR.

We conclude that most of the impact of the credit certification program during the crisis period is associated with the financial subsidy and access to less expensive bank loans and less so to the attributed credit rating. Interestingly, we do find an impact on growth associated with having the top credit rating during expansion periods. We further discuss the possible mechanism for this effect in section 6.

4.6. Heterogeneous Effects

In this section, we study the heterogeneity of the impact of subsidized credit by examining subsamples of firms that are expected to be exposed differently to financial frictions. The size of the subsidy and the benefits from the credit certification are expected to be larger for firms that face more financing frictions. Firms that ex ante faced very little financial frictions are unlikely to derive considerable benefits from the program. Table 10 shows the results. We use default probability, size, tangibility and age to classify firms into groups facing high and low financial frictions. Smaller and younger firms and are expected to face more information asymmetry, while low tangibility firms have lower pledgeability of its assets.

Panels A and B show the results for firms with default probabilities above and below the median. We find that riskier firms experience a slightly larger improvement in financing conditions, with a larger decrease in interest rates and a larger increase in loans. However, the real effects of the program are larger for low-risk firms, which show a larger increase in investment and employment.

Panels C and D show the results for small and large firms as measured by total assets. Interestingly, we find that the effect on interest rates is more pronounced for larger firms, but that the increase in bank loans is more pronounced for smaller firms. This might be explained by banks still bearing some risk despite the guarantee or banks appropriating a larger fraction of the subsidy when negotiating with smaller firms. Regarding the use of the funds, we find that while larger firms seem to invest both in fixed capital and human capital, small firms seem to mostly invest mostly in human capital.

Panels E and F show the results for firms with high and low tangibility with respect to the sample median. Low-tangibility firms are expected to have less pledgeable assets and therefore to benefit more from the subsidy. Contrary to this idea, we find the negative impact on interest rates on new loans to be similar for both groups, and the growth rate in bank loans to be smaller for low-tangibility firms. However, low tangibility firms show greater sensitivity in terms of fixed asset

investment. These results suggest that the subsidy alleviates frictions related to a lack of pledgeable assets.

Panels G and H consider firms with ages above and below the median firm age in the sample. The median age in the sample is 18 years. We find similar results for firms above and below the median age in terms of interest rates, borrowing and investment. If anything, and consistent with the size results, older firms seem to have a larger decrease in interest rates, as well as greater investment growth in terms of fixed assets.

The evidence regarding heterogeneous effects is consistent with the idea that firms that lack other sources of collateral benefit the most from the subsidized credit. This is reasonable because the program offers SMEs the government guarantee as an alternative source of collateral. Interestingly, we do not find smaller firms to benefit the most in terms of the size of the subsidy. The estimated ITT effect on interest rates for the smaller firms in the sample is smaller than for large firms at 0.9 pp. Despite the modest effect in terms of interest rates, we do see the smaller firms increasing their borrowing at a higher rate (12.3 pp), which suggests that these firms were potentially financially constrained.

5. Identification and Robustness

In this section, we present a set of robustness checks to address concerns related to the main identifying assumptions, sample selection and methodological choices.

5.1. Identification Tests

Our main identifying assumption is the *local continuity assumption*. This implies that firm assignment around the different eligibility thresholds is as good as random and that firms' outcomes of interest, including interest rates, borrowing and investment, would all be a smooth function around thresholds absent treatment.

This also implies that firms do not manipulate their financial statements to meet the program criteria. Despite the design of the program making arguably difficult to manipulate eligibility for the reasons we discussed in sections 2 and 3, we conduct robustness tests where we exclude *Net Income* as a criterion, as well as the criterion with the lowest p-values in the density tests (see table A.3). Table 11 shows the results excluding *Net income* (in Panel A) and *Net Income, Equity/Assets* and *EBITDA growth* as criteria (Panel B). In these tests, we estimate our results only for firms that meet those criteria and therefore use only the variation around the remaining thresholds. The main results are robust to restricting the analysis around cutoff points of the criteria that were less likely to be manipulated. We find a decrease in interest rates on new loans between 1.4 and 1.5 pp., an increase in borrowing rates between 5.6 pp and 6.8 pp, an increase in fixed asset investment between 1.2 pp and 1.9 pp, and an increase in employment growth between 0.8 and 0.9 pp. These magnitudes are in line with our main estimates. Using all criteria

in our main estimates has the advantage of increasing the external validity of our results as more and different firms lie around different criteria thresholds.

5.2. Bandwidth Selection, Polynomial order and Inclusion of Covariates

In this section, we test whether our results are robust to using alternative bandwidths, which results in a different estimation sample, as well as polynomial order of the distance to threshold, and the inclusion of covariates. These results are presented in appendix A.

Table A.5 presents the results when using a fixed bandwidth of 0.2, 0.25 and 0.3 and a polynomial of order 2 of the distance to threshold. As a reference, one standard deviation in our running variable is 0.72. Overall, the results are robust to using alternative and fixed bandwidths across outcomes. The investment in working capital estimate is the only one that is not robust to alternative samples. The magnitudes for all of the other outcomes are similar to those estimated with the optimal bandwidth. Table A.6 shows the results of estimating the coefficients of interest with an optimal bandwidth and including a polynomial of order 1 (Panel A) or a polynomial of order 3 (Panel B) of the distance to threshold. Overall, the estimates are similar in magnitude to those previously estimated, except again for the investment in working capital.

Figure A.2 shows the regression discontinuity plots for a fixed bandwidth at -0.25 to +0.25 for all variables and an order of the polynomial of 1. The results are overall consistent with the previous estimates.

In Table A.7 we include firm-level covariates to mitigate the concern that firms around the threshold differ systematically. In Panel A, we control for firm size. In Panel B, we control for firm size and the net income to equity ratio, motivated by the fact that we observe a significant discontinuity of net income around zero. In Panel C, we control for size, leverage, EBITDA/assets and age. The results across panels in this table are overall similar in size and magnitude. Compared to our previous estimates, the effect on interest rates is smaller at approximately 1.1 pp, but so is the estimate for investment in fixed assets at about 1 pp, which suggests a similar sensitivity.

Last, Table A.8 shows the results of OLS estimation with a fixed bandwidth of 0.25 and an eligibility indicator. In this specification, we do not account for the distance to threshold in our estimation:

$$y_{i,t} = \alpha_0 + \beta_1 \times Eligible\ (0/1)_{i,t} + \epsilon_{i,t} \tag{2}$$

where i and t are firm and year indexes, respectively. The identifying assumption in this case is local random assignment of firms around the threshold. The effects are similar in signs and magnitudes to those previously estimated, supporting the idea that our estimates are not driven by a specific choice of RD specification or running variable.

5.3. Alternative Running Variables and Estimation Sample

In this section, we use alternative running variables to that used in our baseline results. First, we use the Euclidean distance of the criteria variables to threshold in the $\mathbb{R}^n$ space, where n corresponds to the number of criteria in each year. The Euclidean distance has the advantage of using all the criteria in a given year and does not requires the choice of a single criterion for each firm in a given year. Table A.9 reports the results. Overall, the results are consistent with our baseline estimates. The financial effects are mostly significant when considering contemporaneous effects, while the real effects are mostly observed one year after eligibility. The estimated effect on interest rates is approximately 1 pp, while the impact on fixed asset growth is as large as 2.3 pp one year after the firm is eligible. The impact on employment growth is 0.7 pp.

Second, we use a single accounting variable each year to determine the distance to threshold. The selected accounting variable corresponds to the criterion that the most firms fail to achieve in a given year. Table A.10 presents the results. The estimates are in line with the baseline results: for an average decrease in interest rates of 1.4 pp, investment in fixed assets increases by 3.3 pp and growth in employees increases by 1.9 pp.

Third, we exploit the introduction of new criteria into the program over time. Table A.11 shows the results. In Panel A we restrict the sample to firms that meet all the previous year's criteria and only use the newly introduced criteria to define the running variable. In Panel B, we only use the newly introduced criteria in each year to define the running variable but do not impose that firms have to meet existing criteria. Overall, the results are consistent with those previously estimated.

Last, we exclude firms that were previously treated but are no longer eligible in a given year. By doing so, our counterfactual includes only firms that were never treated. Table A.12 reports the results. Overall, the previously estimated results are not sensitive to excluding non-eligible previously treated firms from the estimation sample.

5.4. Firm Fixed Effects Estimates

In this section, we present firm fixed effects regressions using the full sample to estimate ITT effects. We want to ensure that the main results are not driven by methodological choices underlying the use of an MRDD. Because in firm fixed effects estimates we exploit within-firm variation, i.e., firms that become eligible/ineligible for the program, we use the full sample period to avoid limiting this variation. All variables are observed one year post eligibility for the award. In addition to firm fixed effects (δ_i), the regressions include year (δ_t), industry-year ($\delta_{j,t}$) and region (δ_r) fixed effects. The regressions include also a set of firm-level covariates ($X'_{i,t}$): size, age, leverage and profitability:

$$y_{i,t} = \alpha_0 + \beta_1 \times Eligible_{i,t} + \gamma X'_{i,t} + \delta_i + \delta_t + \delta_{j,t} + \delta_r + \epsilon_{i,t} \qquad (3)$$

where *i, t, j,* and *r* are firm, year, industry and region indexes, respectively. There are 11 administrative regions in Portugal.

The results from estimating equation (3) are shown in Table A.13. In column (1), we report the results for financing costs estimated using data from financial statements. We employ financial data instead of loan flows data to have information for the whole sample period, and not only for the years when the firm contracts a new loan. This is relevant because with firm fixed effects, we are using the firm as its own counterfactual. We find a negative and significant coefficient of -1.2 pp, which is consistent with our RDD estimate but of smaller magnitude. In columns (2)-(3) we report the impact on bank loan growth, which increases by 8,635 EUR or 0.013 pp. This result is also consistent with the RD estimate despite the smaller magnitude.

In columns (4)-(5), we estimate the impact on investment. We find a positive effect on changes in fixed assets of 6,447 EUR, and 1.2 pp when using the log-transformed variable. The estimated sensitivity of investment in fixed assets to the cost of debt financing is similar: for a 1 pp decrease in interest rates, we find an increase of 0.01 pp in fixed asset investment, which is of identical magnitude to our RD estimates.

Last, columns (6) and (7) report the results for employment. We find a positive impact on changes in the number of employees of 0.168 and 0.7 pp when using the log-transformed variable. The sensitivity of employment to the cost of debt financing is larger when using firm fixed effects.

These fixed effects estimates are overall consistent with the results obtained with the MRDD.

6. Discussion and Survey Evidence

In this section we discuss the previous findings, including the implications of the program for firm performance and efficiency of credit allocation, and we further inform this discussion with results from a survey directed at managers of Portuguese SMEs.

6.1. Do Eligible Firms Perform Better?

Our main empirical results focus on financial outcomes, investment, employment, and sales growth. In Table 12 we examine the effects on firms' risk and profitability. We find that eligible firms become less likely to default on their bank loans during the crisis period. Performance, measured by ROA, also increases for eligible firms during the crisis period when compared to non-eligible firms. Eligible firms also become more productive, when we consider the ratio of sales to the book value of assets (MRPK), but only in the post-crisis period. EBITDA does not grow more for eligible firms in any of the periods considered.

Taken together, these results support positive effects on firms' performance measured by default rates, return on assets, and productivity. The results on default rates contrast with those in Lelarge *et al.* (2010), who find an increase of 6 pp in the probability of bankruptcy for a non-targeted program in France.

6.2. Does Credit Allocation Improve?

In this section we study the effect of the program on aggregate total factor productivity (TFP). We follow the identification strategy in Bertrand *et al.* (2007) and Sraer and Thesmar (2021), who estimate the contribution of banking deregulation to change in aggregate TFP, and exploit variation on treatment exposure at industry level. Industry exposure corresponds to the share of eligible firms to the program in a given industry. We look at the industry mean and variance of *log-MRPK*, where *log-MRPPK* is the natural logarithm of the ratio of sales to the book value of assets. Table 13 shows the results. Our estimation sample includes firms within a bandwidth of [-0.25 ; 0.25], and the regressions include industry and year fixed effects.

In columns (1) and (2) we show the results for the cross-sectional variance in *log-MRPK* during the crisis period (Panel A) and the post crisis period (Panel B). The estimated coefficient shows a reduction in cross-sectional variance for more exposed industries in both periods, though the post crisis effects do not seem to be persistent beyond one year. Because our measure of exposure changes on an yearly basis, the underlying assumption is that the treatment effects occur fast enough, or that industry exposure moves slowly enough. As industry exposure is expected to change relatively fast, because eligibility thresholds also change on a yearly basis, the relevant assumption is that treatment effects occur fast enough. This seems plausible as we are analyzing small firms, for which credit allocation and investment decisions, being also smaller, can be implemented faster. We interpret these results as being consistent with improved credit allocation.

In columns (3) and (4) we estimate the impact of industry exposure on mean(*log-MRPK*) for the crisis (Panel A) and post crisis periods (Panel B). The estimated coefficients are not significant, overall. The expected effect on average *log-MRPK* is ambiguous (Sraer and Thesmar (2021)). On the one hand an expansion in credit supply and subsidized credit to previously unconstrained firms should lower average *log-MRPK*. On the other hand, an increase in credit supply for previously high productivity constrained firm would imply an increase in average *log-MRPK*.

Overall our these results are consistent with improved credit allocation in industries with greater exposure to the program.

6.3. What Happens When Firms Stop Being Eligible?

Previous results show that some of the effects of the program are long-lived (Table 6). On the one hand, this is consistent with the fact that the decrease in financing

costs takes time to be reflected in firms' investment and growth decisions. On the other hand, it may also reflect the fact that many firms are certified for more than one consecutive year. An important question is then to understand what happens when firms stop being eligible for the program.

In Table A.14 we report the results of a fixed-effects panel estimation where we examine outcomes in the year firms stop being eligible, for the entire sample period. In the exit year, financing costs do not change, possibly because firms lock-in most of their immediate financing needs before exiting the program. This is confirmed by the lack of significant growth in bank loans in this period. However, the real effects of the program persist for at least one year after the firm stops being eligible, as both investment and employment continue to increase. As mentioned above, this might reflect the protracted effect of relieving financing costs on firms' decisions. Nevertheless, as financing costs remain lower than they were before firms became eligible, firms may feel equipped to continue to pursue their growth strategies.

6.4. How do Firms Perceive the Program?

The design of the program and the richness of the data available allow for an encompassing and precise characterization of the financial and real effects of *SME-Leader* (and *SME-Excellence*) certification. However, not all the effects of the program may be measured by these outcomes. To further inform the discussion of the results, we complement the analysis based on our quasi-experimental setting with a survey directed at managers of Portuguese SMEs.

The aim of the survey was to collect managers' perceptions of the *SME-Leader Program* including the application process, benefits and costs. First, it includes questions to assess whether the firm applied for the program or has received any certification in the past and the motivation for doing so. This helps us understand the selection of firms into the program. Second, it includes questions on the respondents' perception of the application process, the advantages and disadvantages of the program, and the perceived impact on firms' access to and cost of credit.

The survey was distributed via email to all the firms with contact information (email address) in the ORBIS database, which includes information on the vast majority of Portuguese private firms.[20] A link to the online survey was emailed to all these firms.[21] Of the 189,135 firms invited to participate in the survey, we obtained 5,413 responses, of which 3,584 are complete surveys. This corresponds to a 3% response rate.

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20.   We conducted a web search for companies that had been certified in the past if a valid email address was not available in the ORBIS dataset to increase participation of certified firms. These cases amount to 4,372 firms.

21.   Due to quota constraints, the survey was distributed over four weeks starting in the first week of June 2020.

The sample of respondents is mostly composed of firms that have never been certified (78%). From those that were certified as an *SME-Leader* in the past (22%), 42% were also awarded *SME-Excellence* status (Figure C.1). [22]

Among the reasons that prompted application, managers highlight the *reputation benefits* of the program (considered *very important* by 50% of the managers) (Figure C.5). This confirms that the program is widely perceived to be a certification mechanism. The second most important reason to apply is related to *lower financing costs* (considered *very important* by 38% of the managers), which is consistent with our previous results. Banks play an important role in encouraging the firms to apply: 77% of the managers reported that the *bank's proposal* was *important* or *very important* for starting the application process.[23] The certification of firm's competitors is the least relevant factor in firms' decision to apply for the program, although it is still mentioned as being at least *important* by 44% of the firms.

When we ask firms that were certified about the impact on the cost of credit, 46% of the respondents confirm that there was a decrease in funding costs (Figure C.6), supporting the quantitative results obtained in the empirical estimations. However, 50% of the certified respondents report that financing costs *remained unchanged* after obtaining the certification. Out of the firms reporting a decrease in their financing costs, most report that this decrease comes from the partner bank, i.e., the bank that submitted the firms' application to the program and through which the firm can access loans with government guarantees. Nevertheless, nearly one-third of the certified firms also benefit from lower financing costs when borrowing from other banks.

When comparing the *SME-Leader* with the *SME-Excellence* certification, managers highlight *financing costs* as the main benefit of being certified as *SME-Excellence* (Figure C.7). However, only 26% of the managers mention this advantage, what might explain why this perception is not supported by our quantitative analysis. Managers perceive many other benefits attached to having the top quality certification: *relationships with customers* (19%), *relationships with suppliers* (19%), and *access to markets* (9%).

6.5. Why Do Not All Eligible Firms Apply?

Table A.1 shows that not all firms that are eligible are certified as *SME-leader* firms. In the early years of the program, take-up rates were below 20%, possibly

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22. Using data from ORBIS, we characterize the sample of respondents according to: 1) sector; 2) firm size; and 3) geographical distribution. The sample is primarily composed of micro and small firms operating in the services sector (Figures C.2 and C.3). Regarding the geographical distribution, we observe a concentration of respondents along the coast of Portugal, particularly around Lisbon and Porto, and the capital cities of the autonomous regions of Madeira and Azores (Figure C.4).

23. Banks granting loans to certified firms benefit from significant relief in the capital requirements associated with these exposures, as the component where the risk is ultimately borne by the sovereign has attached a zero risk-weight.

due to a lack of awareness about the program. Over time, take-up rates increased, with approximately two-thirds of eligible firms being certified in the most recent years.

One of the reasons why we conducted the survey was precisely to understand why not all eligible firms become part of the program. General awareness of the program in 2020, when the survey was implemented, was relatively high, with 70% of the managers of non-certified firms mentioning that they knew about the *SME-Leader Program* (Figure C.10). However, only 20% of these managers actively sought information about it, and even a smaller percentage (4%) had applied for certification in the past.

When asked about the reasons for not applying to the program, managers highlighted factors related to the application process. These include a lack of *compliance with the criteria* (16%), the *bureaucracy of the process* (15%) and limited *availability of manager's time* (14%) (Figure C.11). Several managers also mentioned that their firm does not need financing (13%). The percentage of respondents that claim to not have applied due to the perception that the financial and reputation benefits of the program are not relevant is smaller (8 to 9%)

Banks play an important role in the promotion of the program. Nearly two-thirds of the firms first heard about the program from their bank (Figure C.12). IAPMEI, the agency that administers the program, also has an important role in raising awareness about the program.

In most cases, the application process is initiated by the firm's main bank (44%) or one of the other banks of the firm (20%) (Figure C.13). For 27% of the respondents, the firm started the process.

6.6. Policy Implications and External Validity

Government guarantees on loans to small firms (or other forms of support for SMEs) were an important tool worldwide to help firms facing sudden liquidity shocks at the onset of the COVID-19 pandemic (Gourinchas *et al.* 2020; Granja *et al.* 2020). Our results on the *SME-Leader Program* may offer relevant insights for policy in this type of setting, notably when facilitating the recovery.

The program was implemented in 2008 to mitigate the effects of the global financial crisis. The initial goal of policymakers was to ensure that the best quality SMEs were not excluded from credit markets, against a background of tighter credit supply. Nevertheless, the program remained active even when the economy was recovering both from the global financial crisis and later from the euro area sovereign debt crisis. When the pandemic started, the access to loans with government guarantees was expanded substantially beyond the universe of *SME-Leader* firms, but the technology and institutional knowledge offered by the program were helpful in quickly rolling out the loans to firms in need.

However, our results show that the program was effective in improving firms' outcomes, notably investment and employment, only while credit supply remained tight and macroeconomic conditions challenging. Once the economy started to

recover, most of the effects of the program became more muted. As such, the program has a strong countercyclical effect mostly during recessions.

Although the effects of the program were smaller during the recovery period of the economy, that does not mean that it was useless. The results show that there were still some positive effects in terms of bank borrowing, asset growth, mostly through working capital, and growth in the number of employees. Moreover, during the economic recovery period, the benefits of the program accrued more from its certification component than from the subsidy (Table 9).

The targeted nature of the program is plausibly important in explaining this outcome. Most public support programs for SMEs are non-targeted, covering virtually all small firms in a country. This feature of the program allows it to offer a certification component, in a manner similar to that enjoyed by larger firms when rated by credit rating agencies. Moreover, by targeting firms with low credit risk, the design of the program seems to alleviate potential perverse incentives of banks when allocating the credit with government guarantees, mitigating excessive risk-taking, to the extent that these happen in periods of credit constraints.

Targeting firms has another crucial implication, allowing the program to remain operational even during the recovery period. Given that only SMEs with low credit risk have access to these government-guaranteed loans, the fiscal costs are much smaller than those underlying a universal access program, as these firms are significantly less likely to default in good times. This allows fiscal policy to act countercyclically, with higher costs attached to the program during crises and recessions but with negligible costs when aggregate default risk is low.[24]

Another important dimension of the program is that the allocation is determined both by the government, through IAPMEI, and the banks. Indeed, although the criteria are established by the government every year, banks also play an important role in the process. As shown in the survey results, banks are often those that initiate the process and invite firms to apply, thereby suggesting that banks exert further screening on which firms should be supported through the program (Figures C.12 and C.13).[25]

The relevance of this study for other economies and contexts can also be argued by the fact that the *SME-Leader* won the European Commission's 2016 EEPA (European Enterprise Promotion Award). This is a signal of the international visibility and interest by policy makers that the program has acquired. These awards have as objectives: identify and recognize successful activities and initiatives

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24. The need to focus on targeted support to SMEs during the COVID-19 pandemic has been emphasised both by academics (Elenev *et al.* 2020; Drechsel and Kalemli-Ozcan 2020; Bailey *et al.* 2021) and policymakers (Gopinath 2020; ESRB 2021). Raguram Rajan wrote that "governments and central banks responded to the pandemic with unprecedented economic support. Because of the urgent need, the help many provided to companies was quick and untargeted. Many firms obtained grants and access to credit was eased. However, as the pandemic drags on, that corporate support needs to become more targeted.", *Financial Times*, 27 December 2020.

25. Due to the selection problems arising from this, all the reported results are anchored on ITT estimates, as discussed in section 3.

undertaken to promote enterprise and entrepreneurship, showcase and share examples of best entrepreneurship policies and practices, create a greater awareness of the role entrepreneurs play in society, and encourage and inspire potential entrepreneurs. The SME-Leader Program won the award in the category "Improving the business environment", which recognizes initiatives that support enterprise start-up and growth, and simplify legislative and administrative procedures for businesses.

Portugal is representative of a significant part of the European countries in terms of macro indicators and the weight of SMEs in the economy, especially countries in the south of Europe. Because this project is quite unique in terms of it research design that is anchored in the design of the program itself, it is not possible do replicate the quasi-experimental setting in similar countries. But despite the differences across programs in other countries, the estimated financial effects of the *SME-Leader Program* are within the range obtained for other programs with government guarantees (Table B.2). As reference points, Lelarge *et al.* (2010) find that debt growth increases by 0.69 pp in the first two years for French firms with government guarantees and Gonzalez-Uribe and Wang (2020) find a 0.032 increase in the probability of external debt issuance . Mullins *et al.* (2018) document an increase of 2.6% in debt growth for Chilean firms, while de Blasio *et al.* (2018) find a 50% increase in debt growth for Italian firms over two years.

Although we do not aim at providing normative statements from the conclusions in this study as a welfare analysis is challenging and beyond the scope of our analysis, our results can still provide relevant insights for the design of policy to stimulate the growth of SMEs.

7. Conclusion

Small firms often face frictions in access to external financing that may limit their ability to invest. This is especially true during crisis periods, when these frictions may be more acute. In this paper, we estimate the sensitivity of small firms' investment and employment growth to the cost of bank financing. For this purpose, we exploit the variation in the cost of debt financing generated by eligibility for a stimulus program adopted in Portugal for small and medium enterprises (SMEs). The *SME-Leader Program* offers firms a loan guarantee and a credit certification (rating) issued by a government agency. An important distinctive feature of this program is that it targets SMEs with low credit risk. Eligible firms have thus access to subsidized bank credit, and to a public credit rating.

The rich design of the program allows for the use of a multidimensional regression discontinuity design. In this setting, we are able to establish a causal effect between access to finance through the program and firm-level outcomes, which has thus far proven difficult in the literature. The program design also allows us to estimate the effect of credit certification for small firms by exploiting variation in the level of ratings around the eligibility threshold for the top certification. The

importance of ratings is well established for large and listed companies but not for private and small firms.

Overall, we find that the program has a positive impact on SMEs' investment, employment and revenue growth. These effects are more pronounced during the crisis but modest in the post-crisis period. During the crisis, a 1 percentage point (pp) decrease in the cost of debt financing for SMEs is associated contemporaneous increases of 0.5 pp in total asset growth, 1 pp in fixed asset investment, and 0.5 pp in working capital investment. A 1 pp decrease in the cost of debt financing is also associated with a contemporaneous increase in employment growth of 0.25 pp. These estimates do not consider potential positive or negative externalities to non-eligible firms, nor the potential heterogeneity of these effects across firms that ex ante face different levels of financial frictions.

We find modest effects of being awarded the top credit rating by the program during the crisis, perhaps because most of the frictions are alleviated by the credit guarantee. This might leave little room for the effect of an additional credit rating notch. We conclude that most of the impact of the credit certification program during the crisis period is associated with the financial subsidy and access to less expensive bank loans and less so to the attributed credit rating. Nevertheless, we find a top rating effect on sales and export growth during the post-crisis period, which suggests that the top rating might signal quality to other stakeholders such as clients during expansion periods.

These results have relevant policy implications, as they suggest that government programs promoting access to credit during economic downturns can successfully help firms to continue to invest. Similar programs were implemented around the world at the onset of the COVID-19 pandemic. However, most of these programs are not targeted. This is important to avoid large fiscal costs, as well as to avoid the proliferation of zombie firms and promote an efficient reallocation of resources in the economy. Our paper offers causal evidence that supporting the best small firms during a financial crisis by providing them with subsidized credit has positive and lasting effects on firms' investment and growth.

Tables

	Mean	Std. Dev.	p25	p50	p75	p99	Obs.
Panel A: Criteria							
Assets (EUR)	4,836,760.95	56,910,086.44	535,932.97	1,275,276.88	3,186,986.25	40,685,064.00	314,148
Employees	30.92	32.56	13.00	19.00	34.00	181.00	314,148
Sales (EUR)	2,713,561.48	3,329,354.16	568,951.34	1,285,786.19	3,251,883.50	12,368,278.00	314,148
Net income (EUR)	100,148.06	4,140,377.86	537.38	13,827.35	73,379.99	2,084,028.88	314,148
EBITDA (EUR)	314,919.40	4,246,352.82	21,734.94	81,718.81	244,062.60	3,853,076.50	314,148
Net income-to-assets	0.01	0.08	0.00	0.01	0.05	0.17	314,148
Net income-to-equity	0.09	0.27	0.01	0.06	0.17	0.83	314,148
Equity-to-assets	0.33	0.26	0.17	0.32	0.51	0.79	314,148
EBITDA-to-assets	0.08	0.10	0.03	0.07	0.13	0.29	314,148
EBITDA-to-sales	0.07	0.10	0.03	0.06	0.12	0.28	314,148
Debt-to-EBITDA	3.05	4.77	0.33	1.96	5.06	15.17	278,658
Sales growth	0.03	0.24	-0.11	0.01	0.13	0.84	314,148
EBITDA growth	-0.11	1.08	-0.47	-0.07	0.29	2.54	314,144
Firm age	19.77	11.65	10.00	18.00	27.00	45.00	314,148
Distance to threshold (Leader)	-0.31	0.72	-0.51	-0.07	0.01	0.75	314,148
Distance to threshold (Excellence)	-0.77	0.79	-1.04	-0.56	-0.26	0.20	279,489
Eligible (0/1)	0.38	0.49	0.00	0.00	1.00	1.00	314,148
Panel B: Debt and equity							
Interest rate (new loans)	0.08	0.06	0.04	0.06	0.09	0.24	131,250
Loan maturity	4.64	1.40	3.73	4.51	5.44	7.36	101,974
Probability of default	0.04	0.07	0.00	0.01	0.04	0.36	288,375
Collateral (0/1)	0.80	0.40	1.00	1.00	1.00	1.00	131,250
Bank loans (EUR)	744,886.25	1,117,679.83	71,305.18	260,886.89	829,822.81	4,177,265.50	278,662
Δ Bank loans (EUR)	27,917.26	235,817.12	-51,768.11	-1,278.66	67,153.36	682,159.81	265,020
Issued capital (EUR)	816,256.72	1,213,043.82	89,553.87	286,342.72	900,630.38	4,495,807.50	314,148
Δ Issued capital (EUR)	9,140.34	29,153.32	0.00	0.00	0.00	120,001.41	314,148
Panel C: Other firm variables							
Δ Total assets (EUR)	66,913.84	413,649.21	-82,110.24	11,740.47	154,724.14	1,207,098.00	314,148
Fixed assets (EUR)	677,615.39	980,881.83	66,170.61	250,897.38	791,123.00	3,612,822.75	314,148
Δ Fixed assets (EUR)	3,163.87	112,342.54	-35,197.62	-7,047.73	15,037.27	332,044.22	314,148
Working capital (EUR)	1,178,338.66	1,525,526.84	211,604.21	542,378.25	1,406,523.75	5,692,936.50	314,148
Δ Working capital (EUR)	38,264.15	289,009.51	-58,614.89	13,309.93	113,089.30	790,215.50	314,148
Δ Employees	0.20	3.73	-1.00	0.00	2.00	9.00	314,148
Wage(EUR per worker)	17,609.59	11,363.23	11,444.12	15,103.22	20,430.17	57,390.84	314,146
Δ Wage (EUR per worker)	256.70	2,109.00	-854.00	237.54	1,365.85	4,797.97	314,146
Δ Sales (EUR)	37,834.96	528,988.52	-141,064.44	5,334.27	172,440.11	1,423,912.00	314,148
Exports (EUR)	635,625.76	2668,229.29	0.00	0.00	168,376.16	11,410,318.00	314,148
Δ Exports (EUR)	13,802.99	148,627.95	0.00	0.00	2,000.00	452,253.00	314,148
Default	0.16	0.36	0.00	0.00	0.00	1.00	298,535
MRPK	1.54	26.37	0.72	1.13	1.73	7.06	314,148

Table 1. Summary Statistics

This table shows the summary statistics for the full sample of firms. Variables in levels expressed in EUR or amounts. EBITDA is defined as earnings before interest, taxes, depreciation, and amortization. The distance to threshold is computed according to the methodology described in Section 3.2. Firm age in years. Eligible takes the value 1 if the firm meets the eligibility criteria for Leader in a given a year. Wages are averages per worker. Interest rate on new loans, loan maturity and collateral are computed with information available only from 2012 on-wards in the database on loan flows. The probability of default comes from Banco de Portugal's internal credit risk model. All other variables come from the Central Balance Sheet Database.

	Interest rate (new loans)		Loan maturity		Collateral (new loans)		Probability of default	
	T	T+1	T	T+1	T	T+1	T	T+1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: 2012-2013								
Eligible	-0.018***	-0.016***	-0.213***	-0.124**	0.070***	0.084***	-0.003***	-0.004***
	[0.002]	[0.002]	[0.060]	[0.045]	[0.014]	[0.010]	[0.001]	[0.001]
Obs.	17,662	26,200	13,117	21,659	17,326	30,271	95,604	92,967
Bandwidth	0.182	0.119	0.149	0.152	0.169	0.220	0.176	0.218
Panel B: 2014-2018								
Eligible	0.005***	0.002	-0.181***	-0.083	0.017	0.015	0.001	-0.001
	[0.001]	[0.001]	[0.045]	[0.045]	[0.009]	[0.009]	[0.001]	[0.001]
Obs.	40,922	34,729	31,784	26,782	46,728	36,886	41,202	34,569
Bandwidth	0.093	0.129	0.084	0.109	0.130	0.160	0.080	0.107

Table 2. Financing Conditions and Default Probability

This table shows the intention to treat estimates for the impact of firm certification as Leader/Excellence on the interest rate on new loans (columns (1)-(2)), loan maturity (columns (3)-(4)), the collateral on new loans (columns (5)-(6)) and the probability of default (columns (7)-(8)). Panel A reports results for the period 2012-2013 (except in columns (7)-(8), where the period is 2008-2013) and Panel B reports results for the period 2014-2018. Columns (1), (3), (5) and (7) show estimates where the dependent variable is observed at the year of award and columns (2), (4), (6) and (8) one year after the award. All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Δ Bank loans		Δ Log(Bank loans)		Δ Issued Equity		Δ Log(Issued Equity)	
	T	T+1	T	T+1	T	T+1	T	T+1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: 2008-2013								
Eligible	6,784	21,742***	0.075***	0.077***	1,630***	1,382***	0.003	0.005
	[3,747]	[3,506]	[0.011]	[0.009]	[347]	[375]	[0.005]	[0.005]
Obs.	70,792	76,605	72,272	80,027	110,188	103,666	36,291	35,000
Bandwidth	0.141	0.204	0.152	0.235	0.268	0.300	0.193	0.220
Panel B: 2014-2018								
Eligible	14,909***	9,755*	0.019*	0.024*	428	519	-0.009	0.015*
	[4,152]	[4,503]	[0.010]	[0.011]	[420]	[479]	[0.007]	[0.006]
Obs.	62,227	47,710	66,971	47,775	69,296	51,740	22,197	17,400
Bandwidth	0.142	0.179	0.203	0.181	0.156	0.155	0.122	0.159

Table 3. Financial Responses

This table shows the intention to treat estimates for the impact of firm certification as Leader/Excellence on bank loans growth (columns (1)-(4)) and issued equity growth (columns (5)-(8)). Panel A reports results for the period 2008-2013 and Panel B reports results for the period 2014-2018. Columns (1), (3), (5) and (7) show estimates where the dependent variable is observed at the year of award and columns (2), (4), (6) and (8) one year after the award. All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Δ Total assets		Δ Log(Total assets)		Δ Fixed assets		Δ Log(Fixed Assets)		Δ Working capital		Δ Log(Working Capital)	
	T	T+1	T	T+1	T	T+1	T	T+1	T	T+1	T	T+1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A:												
2008-2013												
Eligible	26,008***	32,777***	0.012***	0.006**	3,521**	3,376**	0.018***	0.019***	9,840**	14,700***	0.011**	-0.001
	[4,785]	[4,706]	[0.003]	[0.002]	[1,322]	[1,279]	[0.005]	[0.004]	[3,418]	[3,190]	[0.004]	[0.004]
Obs.	106,038	104,456	108,879	113,024	108,,322	108,573	103,168	109,613	104,355	108,937	114,192	116,816
Bandwidth	0.240	0.307	0.259	0.384	0.255	0.343	0.221	0.352	0.229	0.346	0.317	0.454
Panel B:												
2014-2018												
Eligible	-163	14,941	0.003	0.003	-750	2,450	-0.004	0.004	7,590	6,439	0.016**	0.006
	[7,123]	[7,881]	[0.003]	[0.004]	[2,130]	[2,451]	[0.006]	[0.006]	[4,633]	[5,557]	[0.005]	[0.005]
Obs.	67,307	52,043	63,708	49,924	68,210	51,327	69,319	51,370	70,401	51,566	67,827	52,215
Bandwidth	0.139	0.157	0.117	0.135	0.147	0.149	0.157	0.150	0.170	0.153	0.151	0.170

Table 4. Investment

This table reports the intention to treat estimates for the impact of firm certification as Leader/Excellence on total assets growth (columns (1)-(4)), fixed assets growth (columns (5)-(8)) and working capital growth (columns (9)-(12)). Panel A reports results for the period 2008-2013 and Panel B reports results for the period 2014-2018. Columns (1), (3), (5), (7), (9) and (11) show estimates where the dependent variable is observed at the year of award and columns (2), (4), (6), (8), (10) and (12) one year after the award. All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Δ Employees		Δ Log(Employees)		Δ Wages		Δ Log(Wages)	
	T	T+1	T	T+1	T	T+1	T	T+1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: 2008-2013								
Eligible	0.136**	0.247***	0.004*	0.010***	33	68*	0.003*	0.004*
	[0.045]	[0.044]	[0.002]	[0.002]	[27]	[27]	[0.002]	[0.002]
Obs.	115,530	115,264	114,434	110,721	113,914	107,818	115,838	113,071
Bandwidth	0.308	0.406	0.299	0.363	0.296	0.336	0.310	0.384
Panel B: 2014-2018								
Eligible	0.088	0.127	0.004	0.005	-48	-77	-0.003	-0.004
	[0.064]	[0.070]	[0.002]	[0.003]	[38]	[43]	[0.002]	[0.002]
Obs.	68,617	53,057	67,640	52,582	69,404	52,038	69,297	53,689
Bandwidth	0.151	0.175	0.141	0.166	0.157	0.157	0.156	0.186

Table 5. Employment

This table reports the intention to treat estimates for the impact of firm certification as Leader/Excellence on the evolution of the number of employees (columns (1)-(4)) and wage growth (columns (5)-(8)). Panel A reports results for the period 2008-2013 and Panel B reports results for the period 2014-2018. Columns (1), (3), (5) and (7) show estimates where the dependent variable is observed at the year of award and columns (2), (4), (6) and (8) one year after the award. All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Δ Sales		Δ Log(Sales)		Δ Exports		Δ Log(Exports)	
	T	T+1	T	T+1	T	T+1	T	T+1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: 2008-2013								
Eligible	80	33,230***	0.009**	0.006*	9,870***	12,451***	0.005	0.086***
	[5,220]	[5,663]	[0.003]	[0.003]	[1,624]	[1,459]	[0.021]	[0.024]
Obs.	125,034	113,584	111,148	127,215	116,593	129,193	153,015	127,466
Bandwidth	0.384	0.390	0.275	0.541	0.316	0.567	0.690	0.544
Panel B: 2014-2018								
Eligible	-5,673	-1,953	-0.001	-0.001	1,415	2,194	0.039	-0.012
	[8,734]	[9,947]	[0.003]	[0.004]	[2,569]	[2,861]	[0.035]	[0.039]
Obs.	68,354	52,175	69,037	52,314	71,969	54,321	71,599	54,617
Bandwidth	0.148	0.160	0.155	0.162	0.191	0.198	0.186	0.203

Table 6. Sales Growth

This table reports the intention to treat estimates for the impact of firm certification as Leader/Excellence on sales growth (columns (1)-(4)) and exports growth (columns (5)-(8)). Panel A reports results for the period 2008-2013 and Panel B reports results for the period 2014-2018. Columns (1), (3), (5) and (7) show estimates where the dependent variable is observed at the year of award and columns (2), (4), (6) and (8) one year after the award. All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Interest Rate (new loans) (T+2)	Δ Log(Bank loans) (T+2)	Δ Log(Assets) (T+2)	Δ Log(Fixed Assets) (T+2)	Δ Log(Working capital) (T+2)	Δ Log(Employees) (T+2)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: 2008-2013						
Eligible	-0.014***	-0.028**	-0.003	0.002	-0.009*	-0.006**
	[0.001]	[0.009]	[0.003]	[0.004]	[0.005]	[0.002]
Obs.	48,342	80,402	87,141	99,359	92,309	94,937
Bandwidth	0.358	0.277	0.237	0.348	0.302	0.305
Panel B: 2014-2018						
Eligible	-0.001	0.019	0.007*	0.004	0.017**	0.002
	[0.001]	[0.013]	[0.004]	[0.007]	[0.006]	[0.003]
Obs.	25,021	33,754	37,317	38,140	37,954	37,708
Bandwidth	0.140	0.196	0.166	0.186	0.194	0.175

Table 7. Persistence

This table shows the regression discontinuity estimates of the impact of firm certification as Leader/Excellence two years after the award (T+2). Panel A reports results for the period 2008-2013 (except in column (1), where the period is 2012-2013) and Panel B reports results for the period 2014-2018. The outcome variables are the interest rate on new loans (column (1)), loan growth (column (2)), assets growth (column (3)), fixed assets growth (column (4)), working capital growth (column (5)) and employment growth (column (6)). All regressions include a polynomial of order 2. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Interest rate (new loans)		Δ Log(Bank loans)	
	T	T+1	T	T+1
	(1)	(2)	(3)	(4)
Panel A: 2008-2013				
Excellence Eligible	0.005	0.009	-0.097*	-0.013
	[0.008]	[0.005]	[0.049]	[0.041]
Obs.	2,029	4,084	6,072	7,967
Bandwidth	0.205	0.244	0.233	0.289
Panel B: 2014-2018				
Excellence Eligible	-0.002	-0.004**	0.018	0.024
	[0.001]	[0.001]	[0.015]	[0.017]
Obs.	11,592	10,668	21,434	14,788
Bandwidth	0.250	0.300	0.421	0.340

Table 8. Credit Certification - Financial Effects

This table reports the intention to treat estimates for the impact of firm certification as Excellence when compared to Leader on the interest rate on new loans (columns (1)-(2)), bank loans growth (columns (3)-(4)) and probability of default (columns (5)-(6)). Panel A reports results for the period 2008-2013 (except in columns (1)-(2), where the period is 2012-2013) and Panel B reports results for the period 2014-2018. Columns (1), (3) and (5) show estimates where the dependent variable is observed at the year of award and columns (2), (4) and (6) one year after the award. All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Δ Sales		Δ Log(Sales)		Δ Exports		Δ Log(Exports)	
	T (1)	T+1 (2)	T (3)	T+1 (4)	T (5)	T+1 (6)	T (7)	T+1 (8)
Panel A: 2008-2013								
Excellence Eligible	10,822	-102,413*	-0.009	-0.020	22,285	-26,003	0.325	-0.069
	[45,593]	[45,027]	[0.012]	[0.013]	[13,566]	[13,922]	[0.171]	[0.130]
Obs.	7,151	6,657	9,276	7,845	5,990	6,301	5,857	10,291
Bandwidth	0.247	0.238	0.303	0.272	0.213	0.227	0.208	0.332
Panel B: 2014-2018								
Excellence Eligible	108,334***	99,107***	0.021***	0.018***	7,939	16,591**	-0.061	0.012
	[15,578]	[17,599]	[0.004]	[0.005]	[5,034]	[5,975]	[0.044]	[0.050]
Obs.	15,141	14,055	16,188	12,475	20,636	14,093	18,415	17,067
Bandwidth	0.245	0.302	0.269	0.263	0.356	0.303	0.316	0.373

Table 9. Credit Certification - Sales Growth

This table shows the intention to treat estimates for the impact of firm certification as Excellence on sales growth (columns (1)-(4)) and exports growth (columns (5)-(8)). Panel A reports results for the period 2008-2013 and Panel B reports results for the period 2014-2018. Columns (1), (3), (5) and (7) show estimates where the dependent variable is observed at the year of award and columns (2), (4), (6) and (8) one year after the award. All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Interest Rate (new loans) (T+1)	Δ Log(Bank loans) (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)
Panel A: High probability of default				
Eligible	-0.018***	0.092***	0.014**	0.006*
	[0.003]	[0.011]	[0.005]	[0.003]
Obs.	9,517	35,908	53,893	49,887
Bandwidth	0.133	0.314	0.602	0.508
Panel B: Low probability of default				
Eligible	-0.015***	0.063***	0.019***	0.011***
	[0.002]	[0.014]	[0.006]	[0.002]
Obs.	18,024	46,726	67,621	68,419
Bandwidth	0.174	0.208	0.351	0.366

	Interest Rate (new loans) (T+1)	Δ Log(Bank loans) (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)
Panel C: Larger				
Eligible	-0.014***	0.037**	0.018***	0.014***
	[0.002]	[0.013]	[0.005]	[0.003]
Obs.	18,677	48,441	66,696	67,499
Bandwidth	0.182	0.242	0.428	0.443
Panel D: Smaller				
Eligible	-0.007*	0.123***	0.005	0.008***
	[0.003]	[0.012]	[0.005]	[0.002]
Obs.	8,750	35,806	56,644	47,594
Bandwidth	0.086	0.330	0.589	0.359

	Interest Rate (new loans) (T+1)	Δ Log(Bank loans) (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)
Panel E: High Tangibility				
Eligible	-0.016***	0.104***	0.009*	0.012***
	[0.002]	[0.013]	[0.005]	[0.002]
Obs.	8,750	35,806	56,644	47,594
Bandwidth	0.148	0.208	0.285	0.370
Panel F: Low Tangibility				
Eligible	-0.016***	0.024*	0.021**	0.006*
	[0.002]	[0.011]	[0.006]	[0.002]
Obs.	14,886	43,076	55,132	53,239
Bandwidth	0.122	0.430	0.525	0.474

	Interest Rate (new loans) (T+1)	Δ Log(Bank loans) (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)
Panel G: Old				
Eligible	-0.018***	0.078***	0.020***	0.009***
	[0.002]	[0.011]	[0.005]	[0.002]
Obs.	16,100	45,870	60,392	62,005
Bandwidth	0.153	0.291	0.400	0.435
Panel H: Young				
Eligible	-0.012***	0.084***	0.017**	0.013***
	[0.003]	[0.013]	[0.006]	[0.003]
Obs.	10,799	39,169	54,678	52,800
Bandwidth	0.114	0.273	0.407	0.373

Table 10. Heterogeneous effects (period 2008-2013)

This table reports the heterogeneity of the regression discontinuity estimates for the impact of firm certification as Leader/Excellence in terms of: firm default probabilities, based on an internal credit risk model managed by Banco de Portugal (Panels A and B); firm size, given by total assets (Panels C and D); tangibility, defined as the ratio of tangible assets to total assets (Panels E and F); firm age (Panels G and H); firm age (panel D). The dependent variables are: interest rate on new loans (column (1)), loan growth (column (2)), fixed assets growth (column (3)), and employment growth (column (4)). All columns show estimates where the dependent variable is observed one year after the award. All regressions include a polynomial of order 2. No covariates are included in the estimation. The period considered for the estimation is 2008-2013. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Interest rate (new loans) (T+1)	Δ Log(Bank loans) (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)
Panel A:				
Net income>0				
Eligible	-0.015***	0.056***	0.012*	0.008***
	[0.002]	[0.012]	[0.005]	[0.002]
Obs.	22,126	64,369	93,284	94,713
Bandwidth	0.122	0.204	0.379	0.397
Panel B:				
Net income>0, Eq./Assets>0.25, EBITDA growth>0				
Eligible	-0.014***	0.068***	0.019*	0.009**
	[0.003]	[0.018]	[0.008]	[0.003]
Obs.	8,376	22,108	32,395	30,484
Bandwidth	0.109	0.248	0.472	0.369

Table 11. Robustness to discontinuity around eligibility threshold for selected criteria

This table reports the regressions discontinuity estimates for the impact of firm certification as Leader/Excellence imposing a set of restrictions (related to the eligibility criteria), namely: positive net income (Panel A); positive net income, equity/assets>0.25 and positive EBITDA growth (Panel B). The dependent variables are: interest rate on new loans (column (1)), loan growth (column (2)), fixed assets growth (column (3)) and employment growth (column (4)). The time period considered for estimation is 2008-2013. All columns show estimates where the dependent variable is observed one year after the award (T+1). All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Default T+1	ROA T+1	MRPK T+1	Δ Log(EBITDA) T+1
	(1)	(2)	(3)	(4)
Panel A: 2008-2013				
Eligible	-0.015**	0.007***	-0.129	-0.006
	[0.005]	[0.001]	[0.085]	[0.014]
Obs.	99,928	96,602	129,502	77,384
Bandwidth	0.310	0.244	0.572	0.209
Panel B: 2014-2018				
Eligible	-0.005	-0.001	0.182***	-0.005
	[0.006]	[0.002]	[0.033]	[0.015]
Obs.	46,408	44,632	52,643	48,108
Bandwidth	0.129	0.099	0.168	0.165

Table 12. Firm Performance

This table shows the intention to treat estimates for the impact of firm certification as Leader/Excellence on the firm's performance outcomes: Default, ROA, MRPK and Δ Log(EBITDA). *Default* takes the value of 1 if a firm has at least one credit overdue for more than 90 days in a given year, and 0 otherwise. MRPK corresponds to the ratio of sales to the gross book value of total assets. All columns show estimates where the dependent variable is observed one year after the award. All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Var(log-MRPK)		Mean(log-MRPK)	
	T (1)	T+1 (2)	T (3)	T+1 (4)
Panel A: Period 2008-2013				
Industry Exposure	-0.272* [0.144]	-0.237* [0.124]	0.091 [0.065]	0.065 [0.051]
Obs.	762	846	762	846
R-Squared	0.817	0.833	0.950	0.965
Panel B: Period 2008-2018				
Industry Exposure	-0.412** [0.168]	-0.191 [0.117]	0.155** [0.061]	0.051 [0.049]
Obs.	1,429	1,246	1,429	1,246
R-Squared	0.763	0.798	0.943	0.955

Table 13. Moments of log-MRPK distribution around eligibility thresholds

In columns (1) and (2), the dependent variable is the variance of the firm-level natural logarithm of the ratio of sales to the gross book value of total assets (log-MRPK). In column (3) and (4), the dependent variable is the mean of log-MRPK. Industry exposure equals the share of firms eligible to the program in each industry (CAE Rev.3 - 2 digit), in each year. The sample was restricted to the bandwidth [-0.25 ; 0.25]. All regressions include industry and year fixed effects. Standard errors clustered at the industry level are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figures
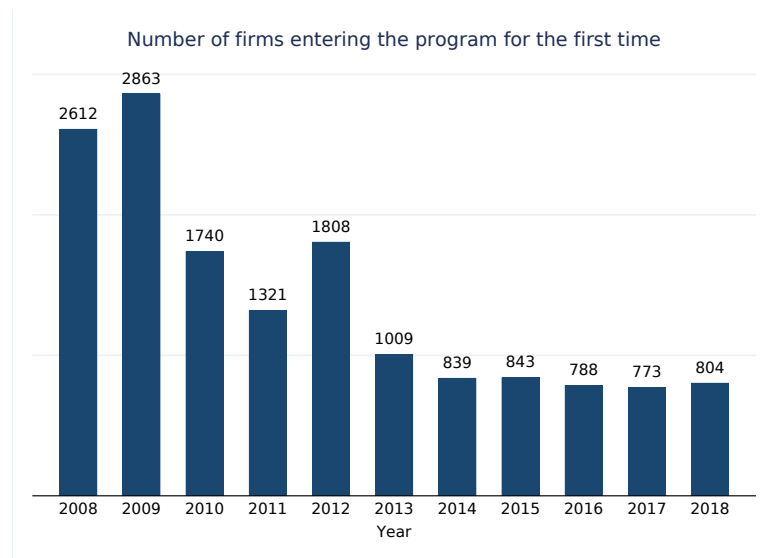
Figure 1

This figure shows the number of firms certified as Leader or Excellence for the first time in each year.
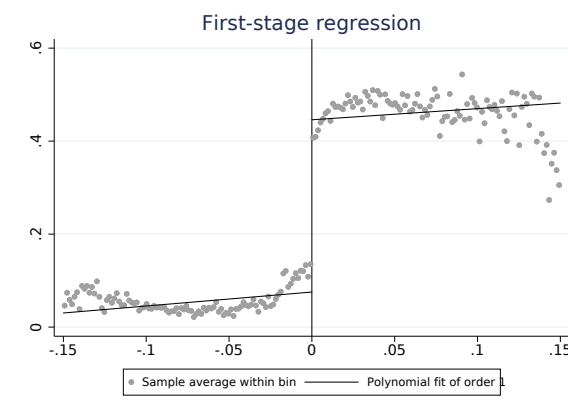
Figure 2

This figure shows the second order polynomial fit of regressing the treatment variable (certification as *SME-Leader* or *SME-Excellence*) on the distance to threshold.
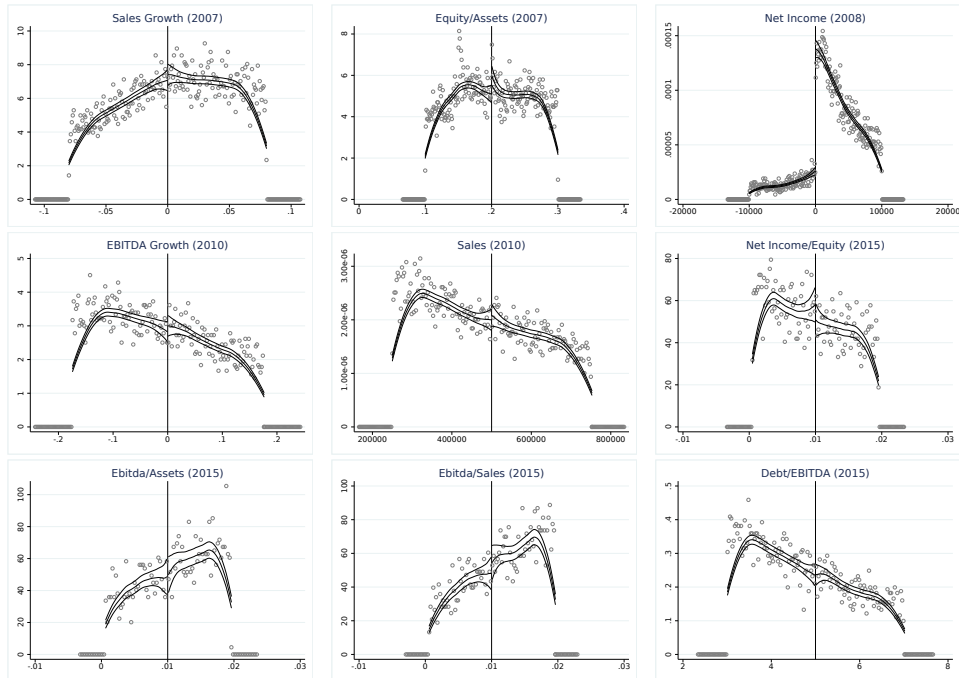
Figure 3

This figure shows the McCrary plots for the density test around the thresholds of eligibility criteria, on the year before the criteria is first introduced.
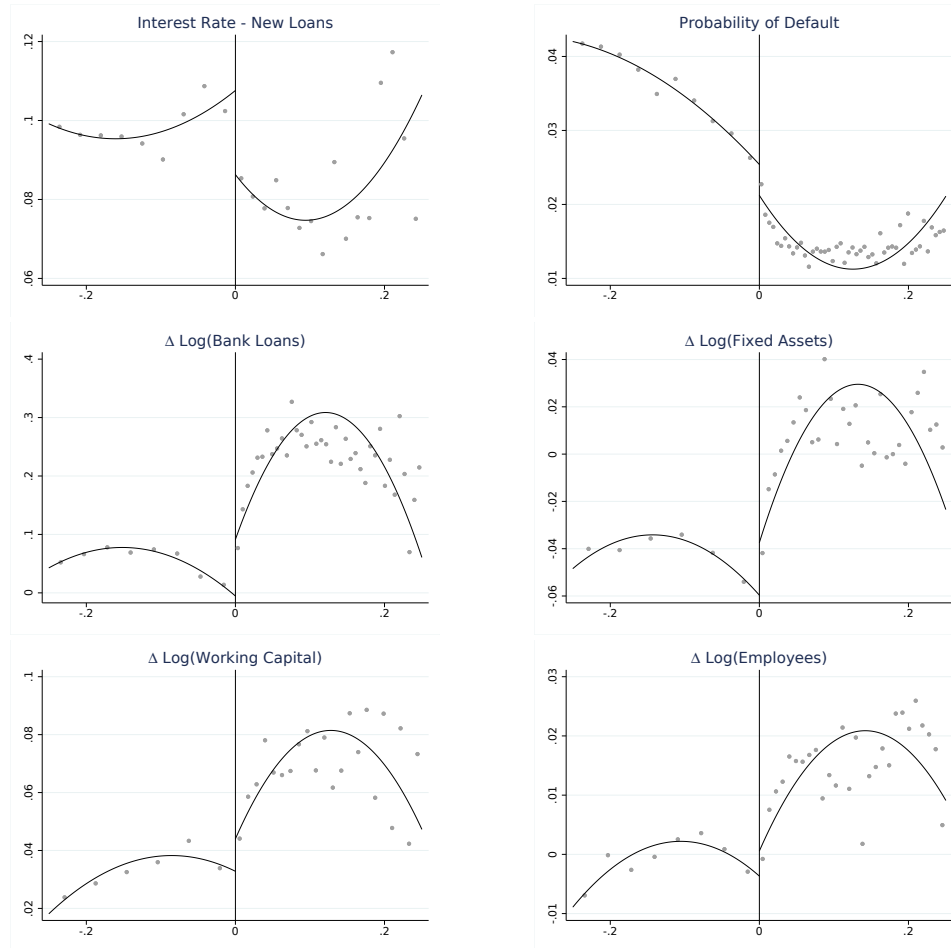
Figure 4

This figure shows RD plots for firm-level outcomes. The bandwidth is fixed at -0.25 to +0.25 for all variables. The order of the polynomial used is 2. The time-period considered for estimation is 2008-2013.

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Appendix A: For Online Publication

Year	Leader	Excellence	Leader Eligible, Non-Rated	Excellence Eligible, Non-Rated	Non-Eligible	Take Up	Obs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2007	0	0	0	0	40,035		40,035
2008	2,612	0	13,018	0	24,463	16.7%	40,093
2009	4,443	324	18,441	2,638	12,750	18.4%	38,596
2010	4,992	932	17,279	1,568	13,189	23.9%	37,960
2011	4,768	1,238	8,112	1,515	20,581	38.4%	36,214
2012	6,200	1,091	5,607	938	19,249	52.7%	33,085
2013	5,276	912	2,674	492	22,131	66.2%	31,485
2014	5,421	1,561	3,533	805	20,393	61.7%	31,713
2015	5,077	1,277	3,622	1,223	21,746	56.7%	32,945
2016	4,614	1,471	2,621	350	24,980	67.2%	34,036
2017	4,489	1,459	2,691	445	26,040	65.5%	35,124
2018	4,812	1,765	3,221	596	25,421	63.3%	35,815
Obs.	52,704	12,030	80,819	10,570	242,863	41.5%	427,101

Table A.1. Program take-up per year

This table shows the number of awards of *SME-Leader* and *SME-Excellence* certifications in each year. It also shows the number of firms in each year that meet the criterion for "Leader" certification and are not certified ("Leader eligible, non-rated"), and the number of firms in each year that meet the criterion for "Excellence" certification and are not certified ("Excellence eligible, non-rated"). All firms not included in these four categories are classified as non-eligible. Take-up corresponds to the percentage of eligible firms (columns 1 to 4) that are certified (columns 1 and 3). Firms for which eligibility data was not available were also considered as non-eligible in this table.

	Leader	Excellence	Eligible	Non-Eligible
Panel A: Criteria				
Assets (EUR)	4,301,957.49	4,316,869.04	4,259,545.66	4,597,387.74
Employees	38.20	40.93	29.15	27.83
Sales (EUR)	4,021,377.34	4,367,388.89	2,650,314.77	2,173,110.31
Net income (EUR)	153,186.32	423,884.31	167,829.63	,497.78
EBITDA (EUR)	399,215.55	723,633.69	370,585.97	185,669.73
Net income-to-assets	0.03	0.09	0.03	0.00
Net income-to-equity	0.08	0.17	0.12	0.09
Equity-to-assets	0.46	0.56	0.37	0.25
EBITDA-to-assets	0.10	0.17	0.10	0.06
EBITDA-to-sales	0.09	0.14	0.09	0.05
Debt-to-EBITDA	3.16	1.37	2.61	3.23
Sales growth	0.04	0.05	0.11	0.03
EBITDA growth	0.02	-0.01	-0.02	-0.15
Firm age	23.28	21.12	17.28	18.86
Panel B: Debt and Equity				
Interest rate (new loans)	0.06	0.05	0.07	0.09
Loan maturity	4.68	5.15	4.88	4.58
Probability of default	0.01	0.00	0.03	0.06
Collateral (0/1)	0.86	0.79	0.76	0.79
Bank loans (EUR)	932,390.41	703,890.86	627,455.58	717,302.34
Δ Bank loans (EUR)	60,100.42	57,469.30	55,289.73	10,579.70
Issued capital (EUR)	1,196,178.51	1,173,041.46	748,622.40	661,228.46
Δ Issued capital (EUR)	8,689.71	6,105.85	8,064.31	10,180.66
Panel C: Other firm variables				
Δ Total assets (EUR)	157,457.23	292,683.36	130,522.70	21,391.22
Fixed assets (EUR)	949,221.01	917,854.92	603,041.93	588,575.79
Δ Fixed assets (EUR)	19,559.90	48,851.52	14,241.79	-4,238.87
Working capital (EUR)	1,769,094.68	1,934,221.05	1,150,254.18	915,987.90
Δ Working capital (EUR)	88,228.57	171,367.35	73,909.35	12,258.96
Δ Employees	0.69	1.74	0.66	-0.04
Wage (EUR per worker)	18,750.71	20,091.19	17,326.78	16,781.10
Δ Wage (EUR per worker)	307.59	376.47	381.12	210.72
Δ Sales (EUR)	93,250.28	151,328.45	87,245.54	27,660.31
Exports (EUR)	1,015,250.63	1,410,452.52	637,786.86	456,570.47
Δ Exports (EUR)	28,607.93	36,195.35	17,549.08	9,995.37
Default	0.06	0.02	0.11	0.20
MRPK	1.36	1.45	2.76	1.62

Table A.2. Summary statistics by firm category

This table shows the variables' mean for subsamples of firms. Besides Leader and Excellence firms, the table also reports summary statistics for firms that meet the criterion for "Leader" (classified as Eligible), and non-eligible firms. EBITDA is defined as earnings before interest, taxes, depreciations, and amortization. Interest rate on new loans, loan maturity and collateral are computed with information available only from mid-2012 onwards.

	Year before the criteria is first introduced	P-value
Sales Growth	2007	.638
Equity-to-Assets $\geq 20\%$	2007	.115
Net Income > 0	2008	.000
EBITDA growth > 0	2010	.130
Business Turnover $\geq 500k$	2010	.164
Net Income-to-Equity $\geq 1\%$	2015	.000
EBITDA-to-Assets $\geq 1\%$	2015	.647
EBITDA-to-Sales $\geq 1\%$	2015	.353
Debt-to-EBITDA ≤ 5	2015	.273

Table A.3. P-value of the density tests around the thresholds

This table shows the p-value of the density tests around the thresholds for each criteria on the year before it was first introduced.

	Interest rate (new loans)		
	T (1)	T+1 (2)	T+2 (3)
Period 2008-2013			
Eligible	-0.012*** [0.001]	-0.015*** [0.002]	-0.013*** [0.002]
Obs.	15,665	12,705	11,585
Bandwidth	0.272	0.220	0.188

Table A.4. Interest rate on new loans including covariates (period 2012-2013)

This table shows the intention to treat estimates for the impact of firm certification as Leader/Excellence on the interest rate on new loans, controlling for loans' maturity, firm's probability of default and collateral. Columns (1), (2) and (3) show estimates where the dependent variable is observed at the year of award, one year after the award and two years after the award, respectively. All regressions include a polynomial of order 2. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Interest Rate (new loans) (T+1)	Δ Log(Bank loans) (T+1)	Δ Log(Assets) (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Log(Working capital) (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A:						
Bandwidth = 0.2						
Eligible	-0.019***	0.075***	0.009**	0.015**	0.005	0.011***
	[0.001]	[0.010]	[0.003]	[0.005]	[0.005]	[0.002]
Obs.	29,541	76,067	90,480	90,482	88,525	90,482
Panel B:						
Bandwidth = 0.25						
Eligible	-0.020***	0.078***	0.007**	0.019***	0.002	0.011***
	[0.001]	[0.009]	[0.003]	[0.005]	[0.005]	[0.002]
Obs.	31,411	81,728	97,443	97,445	95,256	97,445
Panel C:						
Bandwidth = 0.3						
Eligible	-0.021***	0.077***	0.007**	0.020***	-0.000	0.010***
	[0.001]	[0.009]	[0.003]	[0.004]	[0.004]	[0.002]
Obs.	33,312	86,834	103,657	103,659	101,257	103,659

Table A.5. Alternative bandwidth (period 2008-2013)

This table shows the regression discontinuity estimates of the impact of firm certification as Leader/Excellence for different levels of bandwidth (standardized distance to threshold). Panel A estimates are built with a bandwidth of 0.2, Panel B with 0.25, and Panel C with 0.3. The outcome variables are the interest rate on new loans (column (1)), loan growth (column (2)), assets growth (column (3)), fixed assets growth (column (4)), working capital growth (column (5)) and employment growth (column (8)). The time period considered for estimation is 2008-2013 (except in column (1), where the period is 2012-2013). All columns show estimates where the dependent variable is observed one year after the award (T+1). All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Interest Rate (new loans) (T+1)	Δ Log(Bank loans) (T+1)	Δ Log(Assets) (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Log(Working capital) (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: **Polynomial order=1**						
Eligible	-0.018***	0.077***	0.007**	0.019***	-0.001	0.009***
	[0.001]	[0.008]	[0.002]	[0.004]	[0.004]	[0.002]
Obs.	25,156	73,847	92,592	97,356	95,147	98,254
Bandwidth	0.096	0.183	0.215	0.249	0.249	0.256
Panel B: **Polynomial order=3**						
Eligible	-0.014***	0.076***	0.006*	0.019***	-0.001	0.010***
	[0.002]	[0.010]	[0.003]	[0.005]	[0.004]	[0.002]
Obs.	28,227	92,763	127,202	121,717	131,371	125,229
Bandwidth	0.169	0.365	0.541	0.475	0.655	0.515

Table A.6. Alternative polynomial order (period 2008-2013)

This table shows the regression discontinuity estimates of the impact of firm certification as Leader/Excellence for different polynomial orders. Panel A estimates are built with a polynomial of order 1, and Panel B with a polynomial of order 3. The outcome variables are the interest rate on new loans (column (1)), loan growth (column (2)), assets growth (column (3)), fixed assets growth (column (4)), working capital growth (column (5)) and employment growth (column (8)). The time period considered for estimation is 2008-2013. All columns show estimates where the dependent variable is observed one year after the award (T+1). No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Interest Rate (new loans) (T+1)	Δ Log(Bank loans) (T+1)	Δ Log(Assets) (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Log(Working capital) (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Size						
Eligible	-0.011***	0.089***	0.012***	0.009*	0.007	0.011***
	[0.002]	[0.010]	[0.002]	[0.004]	[0.004]	[0.002]
Obs.	27,378	78,684	107,666	117,267	112,533	110,009
Bandwidth	0.150	0.222	0.335	0.426	0.407	0.356
Panel B: Size, Net Income/Equity						
Eligible	-0.011***	0.088***	0.009***	0.007	0.005	0.008***
	[0.002]	[0.010]	[0.002]	[0.004]	[0.004]	[0.002]
Obs.	27,888	79,113	117,895	129,903	121,851	122,474
Bandwidth	0.162	0.226	0.432	0.577	0.515	0.483
Panel C: Size, Leverage, Ebitda/Assets and Firm age						
Eligible	-0.010***	0.082***	0.006**	0.010*	-0.001	0.008***
	[0.002]	[0.009]	[0.002]	[0.004]	[0.004]	[0.002]
Obs.	26,249	82,021	105,617	106,713	100,326	117,447
Bandwidth	0.139	0.253	0.488	0.503	0.453	0.678

Table A.7. Inclusion of covariates (period 2008-2013)

This table shows the regression discontinuity estimates of the impact of firm certification as Leader/Excellence with the inclusion of covariates. Panel A estimates are built controlling for firm size (defined as the natural logarithm of total assets); Panel B estimates are built controlling for firm size and net income/equity; Panel C estimates are built controlling for firm size, leverage (debt/assets), EBITDA-to-assets, and firm age. The outcome variables are the interest rate on new loans (column (1)), loan growth (column (2)), assets growth (column (3)), fixed assets growth (column (4)), working capital growth (column (5)) and employment growth (column (8)). The time period considered for estimation is 2008-2013 (except in column (1), where the period is 2012-2013). All columns show estimates where the dependent variable is observed one year after the award (T+1). All regressions include a polynomial of order 2. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

|	Interest Rate (new loans) (T+1)	Δ Log(Bank loans) (T+1)	Δ Log(Assets) (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Log(Working capital) (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)	(5)	(6)
Eligible (0/1)	-0.014***	0.065***	0.014***	0.021***	0.008***	0.010***
	[0.001]	[0.004]	[0.001]	[0.002]	[0.002]	[0.001]
Obs.	31,411	81,728	97,443	97,445	95,256	97,445
R-Squared	0.017	0.003	0.001	0.001	0.000	0.001

Table A.8. OLS with Fixed Bandwidth (period 2008-2013)

This table shows the OLS regression estimates for the impact of firm certification as Leader/Excellence, where the independent variable is a dummy variable = 1 if the distance to threshold is between]0;0.25] and = 0 if the distance to threshold is between [-0.25;0]. The period considered for the estimation is 2008-2013 (except in column (1), where the period is 2012-2013). The outcome variables are the interest rate on new loans (column (1)), loan growth (column (2)), assets growth (column (3)), fixed assets growth (column (4)), working capital growth (column (5)) and employment growth (column (8)). All columns show estimates where the dependent variable is observed one year after the award (T+1). Standard errors are reported in brackets. Significance Levels: * p < 0.10, ** p < 0.05, *** p < 0.01.

	Interest Rate (new loans)	Δ Log(Bank loans)	Δ Log(Assets)	Δ Log(Fixed Assets)	Δ Log(Working capital)	Δ Log(Employees)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: T						
Eligible	-0.006*	0.083***	0.011**	0.013*	0.010	-0.005
	[0.003]	[0.011]	[0.004]	[0.005]	[0.006]	[0.003]
Obs.	17,999	79,730	75,184	101,968	92,243	67,076
Bandwidth	1.353	1.311	1.070	1.406	1.328	0.974
Panel B: T+1						
Eligible	-0.011***	0.018	0.002	0.023***	-0.007	0.007***
	[0.002]	[0.010]	[0.003]	[0.004]	[0.006]	[0.002]
Obs.	31,349	78,379	81,528	139,012	95,172	106,635
Bandwidth	1.617	1.378	1.268	2.348	1.531	1.652

Table A.9. Alternative running variable: Euclidian distance (period 2008-2013)

This table shows the regression discontinuity estimates of the impact of firm certification as Leader/Excellence with an alternative running variable: the euclidian distance between the firm's accounting values (for each eligibility criteria) and the eligibility point in the $\mathbb{R}^n$ space, where n corresponds to the number of criteria in each year. The outcome variables are the interest rate on new loans (column (1)), loan growth (column (2)), assets growth (column (3)), fixed assets growth (column (4)), working capital growth (column (5)) and employment growth (column (8)). The time period considered for estimation is 2008-2013. Panel A shows estimates where the dependent variable is observed at the year of the award (T). Panel B shows estimates where the dependent variable is observed one year after the award (T+1). All regressions include a polynomial of order 1. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Interest Rate (new loans) (T+1)	Δ Log(Bank loans) (T+1)	Δ Log(Assets) (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Log(Working capital) (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)	(5)	(6)
Eligible	-0.014***	0.024**	0.025***	0.033***	0.029***	0.019***
	[0.001]	[0.008]	[0.002]	[0.004]	[0.004]	[0.002]
Obs.	40,305	78,066	117,634	110,630	108,744	112,696
Bandwidth	0.634	0.533	0.912	0.796	0.843	0.827

Table A.10. Alternative running variable: criteria that most firms *fail* per year (period 2008-2013)

This table shows the regression discontinuity estimates of the impact of firm certification as Leader/Excellence with an alternative running variable: the standardized difference to the threshold of the criteria that most firms *fail* to achieve, per year. The outcome variables are the interest rate on new loans (column (1)), loan growth (column (2)), assets growth (column (3)), fixed assets growth (column (4)), working capital growth (column (5)) and employment growth (column (8)). The time period considered for estimation is 2008-2013 (except in column (1), where the period is 2012-2013). All columns show estimates where the dependent variable is observed one year after the award (T+1). All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Interest Rate (new loans) (T+1)	Δ Log(Bank loans) (T+1)	Δ Log(Assets) (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Log(Working capital) (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Conditional Sample						
Eligible	-0.016***	0.068***	0.010**	0.031***	0.001	0.014***
	[0.003]	[0.015]	[0.004]	[0.006]	[0.006]	[0.003]
Obs.	11,848	30,905	45,549	49,130	48,416	50,782
Bandwidth	0.103	0.204	0.320	0.392	0.398	0.430
Panel B: Alternative distance variable						
Eligible		0.200***	0.028***	0.020***	0.030***	0.016***
		[0.006]	[0.002]	[0.003]	[0.003]	[0.001]
Obs.		68,480	90,072	95,284	85,334	97,566
Bandwidth		0.487	0.695	0.907	0.651	1.039

Table A.11. Alternative running variable: new criteria (period 2008-2013)

This table shows the regression discontinuity estimates of the impact of firm certification as Leader/Excellence exploiting the introduction of new criteria. Estimates in Panel A are built using only the subsample of firms that fulfill all eligibility criteria in the year *before* the introduction of new criteria. Panel B uses an alternative running variable, considering only the standardized difference to the threshold of the criteria that is introduced, in a given year. If more than one criteria is introduced in a given year, we consider the distance to the one that most firms *fail*. The outcome variables are the interest rate on new loans (column (1)), loan growth (column (2)), assets growth (column (3)), fixed assets growth (column (4)), working capital growth (column (5)) and employment growth (column (8)). The time period considered for estimation is 2008-2013 (except in column (1), where the period is 2012-2013). All columns show estimates where the dependent variable is observed one year after the award (T+1). All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Interest Rate (new loans) (T+1)	Δ Log(Bank loans) (T+1)	Δ Log(Assets) (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Log(Working capital) (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)	(5)	(6)
Eligible	-0.020***	0.070***	0.005	0.022***	-0.004	0.010***
	[0.002]	[0.010]	[0.002]	[0.004]	[0.004]	[0.002]
Obs.	24,851	77,533	109,433	106,044	111,828	106,917
Bandwidth	0.124	0.237	0.391	0.357	0.451	0.366

Table A.12. Excluding non-eligible previously treated firm-year observations (period 2008-2013)

This table shows the regression discontinuity estimates of the impact of firm certification as Leader/Excellence excluding firm-year observations that were treated (*Leader* or *Excellence*) at least once in the past and at time T are not eligible. The outcome variables are the interest rate on new loans (column (1)), loan growth (column (2)), assets growth (column (3)), fixed assets growth (column (4)), working capital growth (column (5)) and employment growth (column (8)). The time period considered for estimation is 2008-2013 (except in column (1), where the period is 2012-2013). All columns show estimates where the dependent variable is observed one year after the award (T+1). All regressions include a polynomial of order 2. No covariates are included in the estimation. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Bank financing costs (T+1)	Δ Bank loans (T+1)	Δ Log(Bank loans) (T+1)	Δ Fixed Assets (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Employees (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Period: 2008-2018							
Eligible	-0.012***	8,635***	0.013***	6,447***	0.012***	0.168***	0.007***
	[0.003]	[1,341]	[0.003]	[660]	[0.002]	[0.021]	[0.001]
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	196,516	224,849	224,849	232,039	232,039	232,039	232,039
R-Squared	0.562	0.311	0.338	0.280	0.275	0.287	0.264

Table A.13. Firm Fixed Effects

This table shows firm fixed effects estimates for the effect of being eligible to the program on bank financing costs (column (1)), loan growth (columns (2)-(3)), fixed assets growth (columns (4)-(5)) and employment growth (columns (6)-(7)). Bank financing costs are defined as total interest expense during year t divided by average total bank loans in years t-1 and t. All columns show estimates where the dependent variable is observed one year after the award (T+1). All regressions include the following covariates: firm size, firm leverage, EBITDA-to-assets and firm age. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Bank financing costs (T+1)	Δ Bank loans (T+1)	Δ Log(Bank loans) (T+1)	Δ Fixed Assets (T+1)	Δ Log(Fixed Assets) (T+1)	Δ Employees (T+1)	Δ Log(Employees) (T+1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Period: 2008-2018							
Eligible	-0.016***	10,363***	0.017***	9,413***	0.016***	0.219***	0.009***
	[0.004]	[1728]	[0.004]	[849]	[0.002]	[0.027]	[0.001]
Exit year	-0.006	2,884	0.008*	4,979***	0.006**	0.086**	0.003*
	[0.004]	[1819]	[0.004]	[896]	[0.002]	[0.029]	[0.001]
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	196,516	224,849	224,849	232,039	232,039	232,039	232,039
R-Squared	0.562	0.311	0.338	0.280	0.275	0.287	0.264

Table A.14. Exit Year

This table shows the effect of becoming non-eligible to the program (on the first year) on bank financing costs (column (1)), loan growth (columns (2)-(3)), fixed assets growth (columns (4)-(5)) and employment growth (columns (6)-(7)). Bank financing costs are defined as total interest expense during year t divided by average total bank loans in years $t-1$ and t. All columns show estimates where the dependent variable is observed one year after the award (T+1). All regressions include the following covariates: firm size, firm leverage, EBITDA-to-assets and firm age. Standard errors are reported in brackets. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
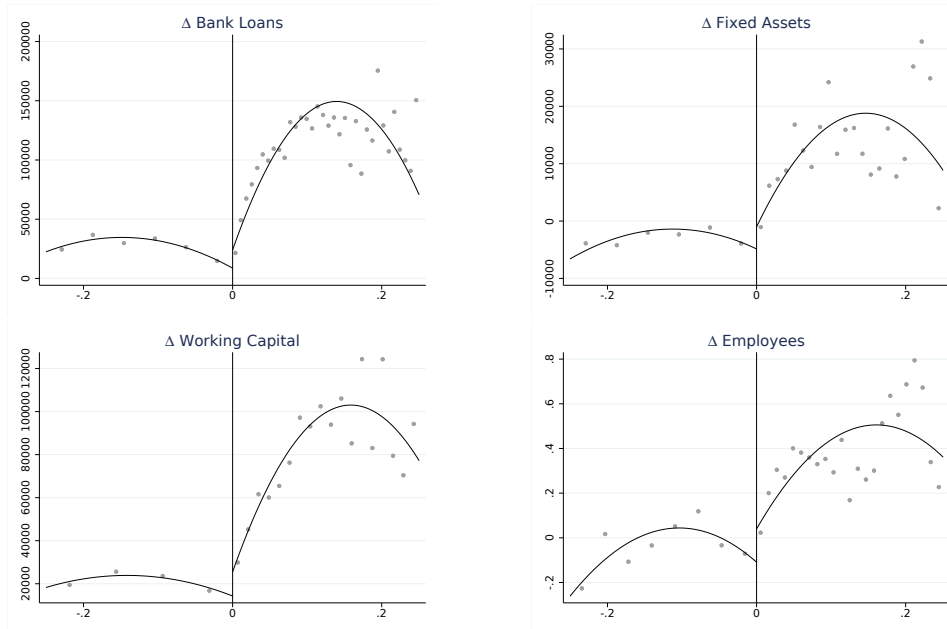
Figure A.1: Regression Discontinuity Plots (2008-2013)

This figure shows RD plots for firm-level outcomes, without the logarithm transformation. The bandwidth is fixed at -0.25 to +0.25 for all variables. The order of the polynomial used is 2. The time-period considered for estimation is 2008-2013.
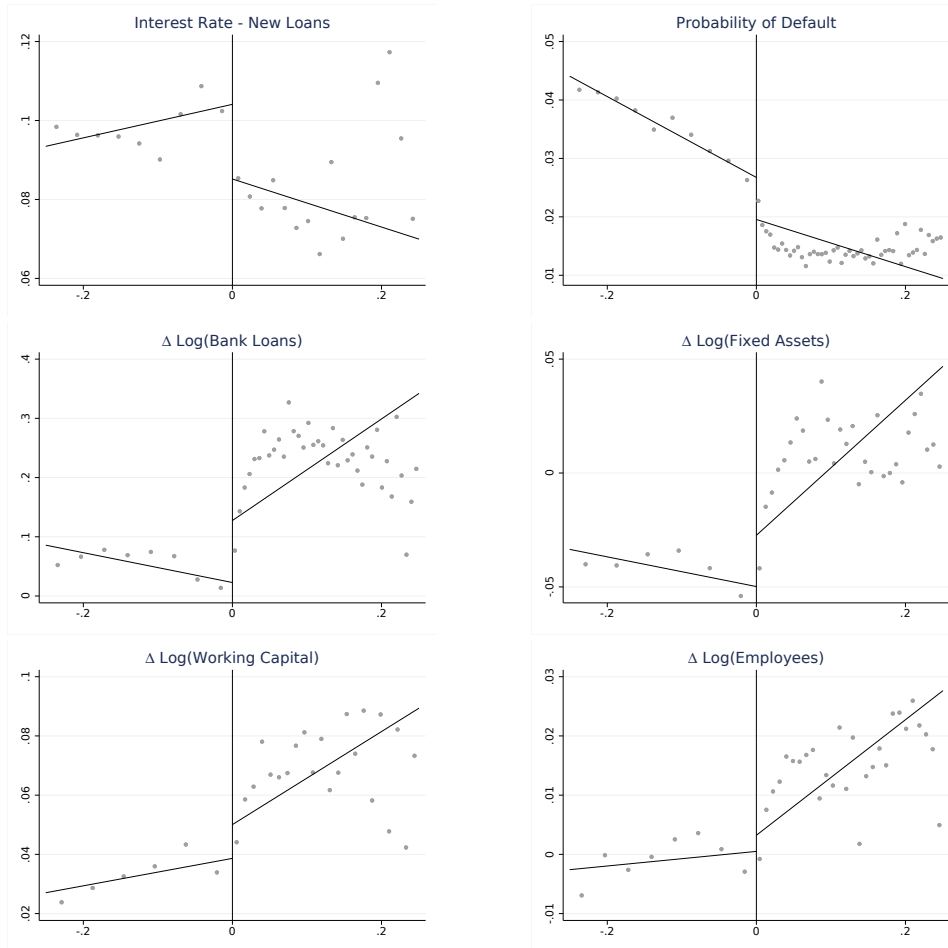
Figure A.2: Regression Discontinuity Plots (2008-2013): polynomial or order 1

This figure shows RD plots for firm-level outcomes. The bandwidth is fixed at -0.25 to +0.25 for all variables. The order of the polynomial used is 1. The time-period considered for estimation is 2008-2013.

Appendix B: For Online Publication

2008

	SME-Leader	SME-Excellence
Formal Requirements	- SME certification - Credit rating: AAA, AA and A	
Accounting Criteria	- Positive growth in business turnover - Equity/Net assets > 20%	

2009

	SME-Leader	SME-Excellence
Formal Requirements	- SME certification - Credit rating: AAA, AA and A - Regularized status with the fiscal authority, social security and IAPMEI	- Credit rating: AAA and AA
Accounting Criteria	- Net income > 0 **or** positive growth in business turnover - Equity/Net assets > 15%	- Equity/Assets $\geq$ 35% - Growth in business turnover $\geq$ 5% - Net income/Equity $\geq$ 10% - Net income/Net assets $\geq$ 3%

2010

	SME-Leader	SME-Excellence
Formal Requirements	- SME certification - Financial reports available for 1 fiscal year - Credit rating: AAA, AA and A - Regularized status with the fiscal authority, social security and IAPMEI	- Credit rating: AAA and AA
Accounting Criteria	- Net income > 0 **or** positive growth in business turnover - Equity/Net assets > 15%	- Equity/Assets $\geq$ 35% - Growth in business turnover $\geq$ 5% - Net income/Equity $\geq$ 10% - Net income/Net assets $\geq$ 3%

2011

	SME-Leader	SME-Excellence
Formal Requirements	- SME certification - Financial reports available for 3 fiscal years - Credit rating: AAA, AA and A - Regularized status with the fiscal authority, social security and IAPMEI	- Credit rating: AAA and AA
Accounting Criteria	- Net income > 0 - Positive growth in business turnover **or** EBITDA - Equity/Net assets $\geq$ 20% - Business turnover $\geq$ €500,000 - No. of employees (AWU) $\geq$ 5	- Equity/Assets $\geq$ 35% - Growth in business turnover $\geq$ 5% - Net income/Equity $\geq$ 10% - Net income/Net assets $\geq$ 3%

2012

	SME-Leader	SME-Excellence
Formal Requirements	- SME certification - Financial reports available for 3 fiscal years - Credit rating: AAA, AA and A - Regularized status with the fiscal authority, social security and IAPMEI	- Credit rating: AAA and AA
Accounting Criteria	- Net income > 0 - Positive growth in business turnover **or** EBITDA - Equity/Net assets ≥ 20% - Business turnover ≥ €500,000 - No. of employees (AWU) ≥ 5	- Equity/Assets ≥ 35% - Growth in business turnover ≥ 5% - Net income/Equity ≥ 10% - Net income/Net assets ≥ 3%

2013

	SME-Leader	SME-Excellence
Formal Requirements	- SME certification - Financial reports available for 3 fiscal years - Credit rating: AAA, AA and A - Regularized status with the fiscal authority, social security and IAPMEI	- Credit rating: AAA and AA
Accounting Criteria	- Net income > 0 **or** positive growth in business turnover **or** EBITDA (with positive EBITDA in 2011 and 2012) - Equity/Net assets ≥ 25% - Business turnover ≥ €750,000 - No. of employees (AWU) ≥ 10	- Equity/Assets ≥ 35% - Growth in business turnover ≥ 5% - Net income/Equity ≥ 10% - Net income/Net assets ≥ 3%

2014

	SME-Leader	SME-Excellence
Formal Requirements	- SME certification - Financial reports available for 3 fiscal years - Credit rating: AAA, AA and A - Regularized status with the fiscal authority, social security and IAPMEI	- Credit rating: AAA and AA
Accounting Criteria	- Net income > 0 **or** positive growth in business turnover **or** EBITDA (with positive EBITDA in 2012 and 2013) - Equity/Net assets ≥ 25% - Business turnover ≥ €750,000 - No. of employees (AWU) ≥ 10	- Equity/Assets ≥ 35% - Growth in business turnover ≥ 5% - Net income/Equity ≥ 10% - Net income/Net assets ≥ 3%

2015

	SME-Leader	SME-Excellence
Formal Requirements	- SME certification - Financial reports available for 3 fiscal years - Credit rating: 1, 2, 3, 4 and 5 - Regularized status with the fiscal authority, social security and IAPMEI	- Credit rating: 1, 2 and 3
Accounting Criteria	- Net income > 0 - Positive EBITDA in 2013 and 2014 - Equity/Net assets $\geq 30\%$ - Business turnover $\geq$ €1,000,000 - No. of employees (AWU) ≥ 8	- Equity/Assets $\geq 35\%$ - Positive growth in business turnover - Net income/Equity $\geq 10\%$ - Net income/Net assets $\geq 3\%$

2016

	SME-Leader	SME-Excellence
Formal Requirements	- SME certification - Financial reports available for 3 fiscal years - 2015 accounts closed and reported - Regularized status with the fiscal authority, social security and IAPMEI - Adequate risk profile (selected by the partner bank)	
Accounting Criteria	- Net income > 0 - Positive EBITDA in 2014 and 2015 - Equity/Net assets $\geq 30\%$ - Net income/Equity $\geq 1\%$ - EBITDA/Assets $\geq 1\%$ - EBITDA/Turnover $\geq 1\%$ - Net debt/EBITDA ≤ 5 - Business turnover $\geq$ €1,000,000 - No. of employees (AWU) ≥ 8	- Equity/Assets $\geq 37.5\%$ - Positive growth in business turnover - Net income/Equity $\geq 12.5\%$ - EBITDA/Assets $\geq 10\%$ - EBITDA/Turnover $\geq 7.5\%$ - Net debt/EBITDA ≤ 2.5

2017

	SME-Leader	SME-Excellence
Formal Requirements	- SME certification - Financial reports available for 3 fiscal years - 2016 accounts closed and reported - Regularized status with the fiscal authority, social security and IAPMEI - Credit rating: 1, 2, 3, 4, 5, 6 and 7	- Credit rating: 1, 2, 3, 4 and 5
Accounting Criteria	- Net income > 0 - Positive EBITDA in 2015 and 2016 - Equity/Net assets ≥ 30% - Net income/Equity ≥ 2% - EBITDA/Assets ≥ 2% - EBITDA/Turnover ≥ 2% - Net debt/EBITDA ≤ 4.5 - Business turnover ≥ €1,000,000 - No. of employees (AWU) ≥ 8	- Equity/Assets ≥ 37.5% - Positive growth in business turnover - Net income/Equity ≥ 12.5% - EBITDA/Assets ≥ 10% - EBITDA/Turnover ≥ 7.5% - Net debt/EBITDA ≤ 2.5

2018

	SME-Leader	SME-Excellence
Formal Requirements	- SME certification - Financial reports available for 3 fiscal years - 2017 accounts closed and reported - Regularized status with the fiscal authority, social security and IAPMEI - Credit rating: 1, 2, 3, 4, 5, 6 and 7	- Credit rating: 1, 2, 3, 4 and 5
Accounting Criteria	- Net income > 0 - Positive EBITDA in 2016 and 2017 - Equity/Net assets ≥ 30% - Net income/Equity ≥ 2% - EBITDA/Assets ≥ 2% - EBITDA/Turnover ≥ 2% - Net debt/EBITDA ≤ 4.5 - Business turnover ≥ €1,000,000 - No. of employees (AWU) ≥ 8	- Equity/Assets ≥ 37.5% - Positive growth in business turnover - Net income/Equity ≥ 12.5% - EBITDA/Assets ≥ 10% - EBITDA/Turnover ≥ 7.5% - Net debt/EBITDA ≤ 2.5

Table B.1. Program Criteria

Notes: *Regularized status with fiscal authority, social security and IAPMEI* means that the firm does not have an irregular situation (for instance overdue debt) with any of these institutions. *Credit rating* is credit rating attributed by the sponsor bank to the company that is not publicly available. *SME certification* is based on European Union size criteria for SMEs and it is obtained electronically through IAPMEI website.

April T
File for T-1 financial
statements

Fall T
Announcement of the results

September T+1
End of the *PME-Leader* status
(for year T)

Summer T
Application
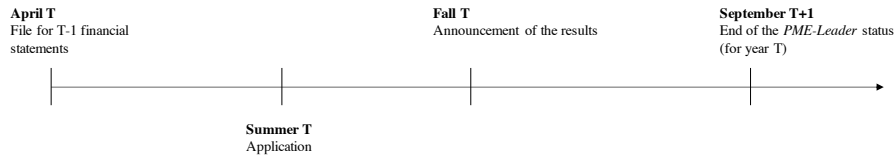
Figure B.1: Timeline

Lelarge *et al.* (2010)	Debt growth	+0.69 percentage points in the first two years
	Interest rate	-23 percentage points in the first two years
	Employment growth	+49 percentage points in the first two years
	Capital growth	+55 percentage points in the first two years
	Probability of Bankruptcy	+6 percentage points in the first two years
de Blasio *et al.* (2018)	Debt growth	+50% (two-year cumulative)
	Interest rate	No evidence of impact
Brown and Earle (2017)	Employment	+3 to +4 additional employees per million dollars of SBA Loan (in the first three post-loan years)
Mullins *et al.* (2018)	Debt growth	+2.6% in the focal month relative to non-eligible firms
	Employment	+4.8% employees following a 10% increase in bank debt
Gonzalez-Uribe and Wang (2020)	Debt growth	0.032 increase in the probability of external debt net issuance, relative to non-eligible firms
	Interest rate	No evidence of impact
	Issued equity	No evidence of impact
	Employment growth	+2.3 percentage points among eligible firms

Table B.2. Summary of main results in the most related literature

Appendix C: For Online Publication

C.1. Results of the survey
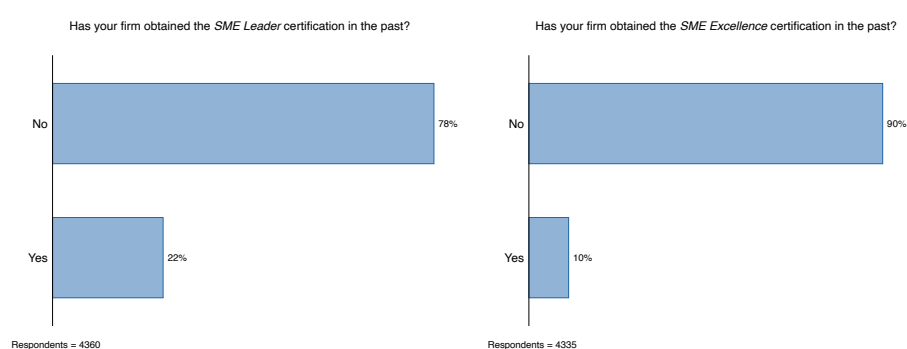
Figure C.1
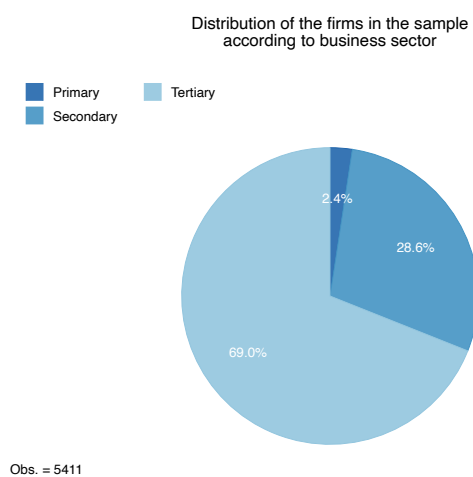
Figure C.2

Source: Survey data (June 2020) and ORBIS database

Distribution of the firms in the sample
according to size

Micro	3095
Small	999
Medium	146
Large	22

Obs. = 4262
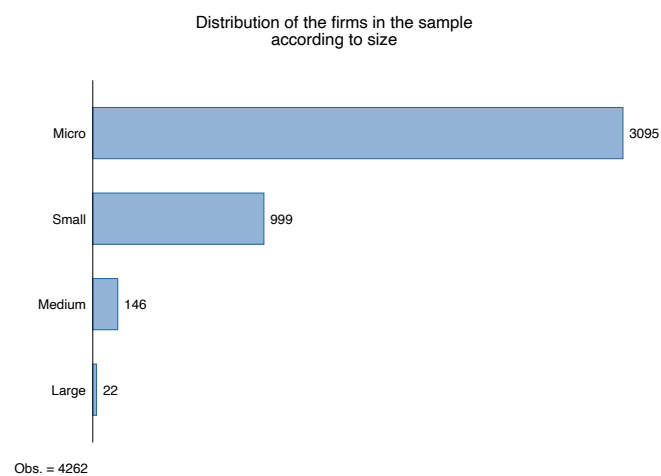
Figure C.3

Source: Survey data (June 2020) and ORBIS database
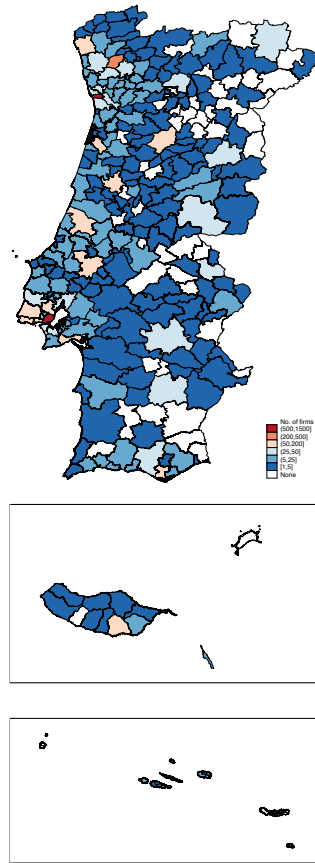
Figure C.4

Source: Survey data (June 2020) and ORBIS database

How important were the following reasons for applying for the program?
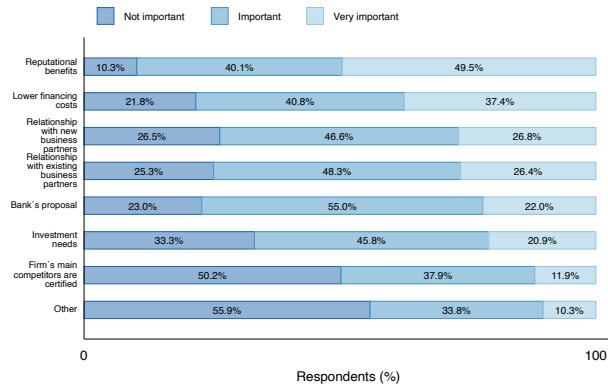
Figure C.5
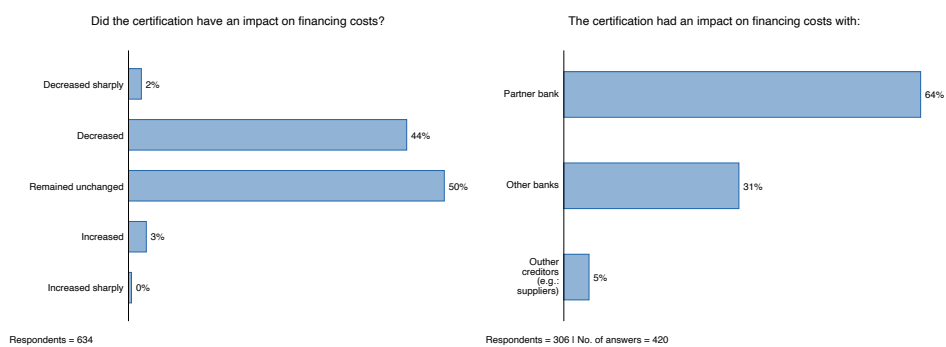
Figure C.6

What are the main benefits of the *SME Excellence* status compared to *SME Leader*?
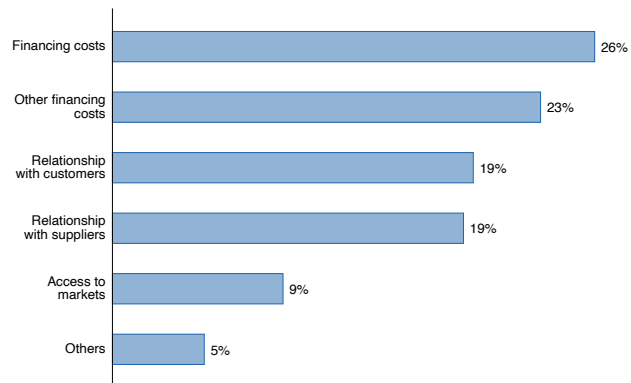
Respondents = 584 | No. of answers = 1149

Figure C.7

To what extent has the certification affected each of the following dimensions?

Figure C.8

How would you classify your firm's situation with regard to credit access in 2019?

Respondents = 3345

Figure C.9

Do you know the *SME Leader* program?

Respondents = 3293

Figure C.10

For what reasons has the firm never applied for the *SME Leader* or *SME Excellence* programs?

Reason	Percentage
Compliance with the criteria	16%
Bureaucracy of the process	15%
Availability of manager's time	14%
The firm does not need financing	13%
Lack of knowledge about the programs	11%
Reputational benefits not relevant	9%
Financial benefits not relevant	8%
Others	6%
Increased indebtedness	5%
Bank's availability	3%

Respondents = 1976 | No. of answers = 3672

Figure C.11

How did you find out about the program the first time your firm applied to it?

Source	Percentage
Bank	63%
IAPMEI	19%
Media (newspapers, magazines...)	6%
Don't know/Can't remember	5%
Association of undertakings and/or industries	3%
Other	3%
Supplier	1%
Customer	1%

Respondents = 806 | No. of answers = 994

Figure C.12

Who suggested to start the application process the first time
your firm applied to the program?

Firm's main bank	44%
The firm	27%
One of the firm´s other banks	20%
Don't know/Can't remember	5%
A new bank	2%
Other entity	2%

Respondents = 803 | No. of answers = 888

Figure C.13

Working Papers

2018

2019

2020

2021