Credit Access and Market Access: Evidence From a Portuguese Credit Guarantee Scheme*

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Abstract

We show that credit access is a key barrier to exporting. We analyze a government scheme that provided credit guarantees to Portuguese SMEs. Regression discontinuity estimates, based on program eligibility criteria, indicate that qualifying firms are more likely to export and to expand their export activity. Credit access has persistent effects, disproportionately impacting not-yet exporters and smaller firms. Our results support international trade models in which credit allows firms to overcome sunk entry costs, leading to hysteresis in trade. We propose two sources of these costs — trust-building and quality upgrading — and show that government guarantees promote access to foreign markets.

Keywords: Exports, Trade, Small Firms' Financing, Credit Guarantee Schemes

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1 Introduction

There is a long-held notion that financial frictions can distort trade dynamics and inhibit economic growth (Kletzer and Bardhan, 1987; Kohn et al., 2022). Standard theories of international trade, in which firms face fixed or sunk costs of exporting, emphasize an extensive margin impact of credit access (Caggese and Cuñat, 2013; Chaney, 2016; Kohn et al., 2016). While firm-level studies using proxies for financial constraints largely support this emphasis,[1] well-identified shock-based work has found primarily intensive margin effects (Paravisini et al., 2015).

In this paper, we show that credit access acts as meaningful driver of firms' export activities on the extensive margin. To do so, we implement a regression discontinuity approach that exploits the eligibility criteria for a Portuguese credit support scheme that provided government guarantees on loans to small and medium sized enterprises in the years following the great recession. Our evidence indicates that access to the scheme sharply increases a firm's probability of exporting, the number of exported products and destinations, and the total value of exports.

Our findings highlight the importance of—and challenges of financing—sunk entry costs in export markets. In a dynamic setting with sunk costs, we expect an asymmetric impact of shocks to credit access, echoing the literature on hysteresis and exchange rates in international trade.[2] A positive shock, like the one we study, may enable a new set of firms to incur the entry costs necessary to export. Conversely, a negative shock, like those studied in Amiti and Weinstein (2011) and Paravisini et al. (2015), may have little extensive margin impact on incumbents, who cannot recoup the cost by exiting. Indeed, we show that an expansion of credit has persistent effects on export activity, and that the effects are concentrated in not-yet exporters.

The Portuguese context is ideal for studying the relationship between credit and export activity for at least three reasons. First, the implementation of the credit guarantee scheme generated sharp variation in access to credit at the firm-level (Bonfim et al., 2023). Second, we are able to link rich data on firm financials to detailed transaction level international trade data, which includes quantities, prices, destinations, and fine-grained (8-digit) product categories. Third and finally,

[1] A growing empirical literature documents a consistent relationship between financial development and export activity across countries (e.g. Beck, 2002) and industries (e.g. Svaleryd and Vlachos, 2005; Manova, 2013). Studies at the firm level similarly document a correlation between extensive margin export activity and financial constraints, proxied via balance sheets (Bellone et al., 2010; Berman and Héricourt, 2010), surveys (Minetti and Zhu, 2011), or credit scores (Muûls, 2015).

[2] See, e.g. Baldwin (1988); Baldwin and Krugman (1989); Dixit (1989).

we study a major period of export expansion. A drop in domestic demand in the post-financial crisis period led firms to shift to external markets. Between 2009 and 2014, exports as a fraction of GDP grew by roughly 13 percentage points (see Figure 1). This allows us to focus on a period during which the returns to entering export markets were particularly high.

Our analysis focuses on the *SME-Leader Program*, a credit support scheme implemented in 2008. This program provided qualifying firms with access to credit lines backed by a partial government guarantee. These credit lines featured below market interest rates, a streamlined approval process, and guarantees of up to 70%. Firms qualified for the program if their recent financial and operating performance exceeded fixed thresholds for each of a set of eligibility criteria. The set of variables considered (and qualifying thresholds) changed from year to year, but included net income, total sales, equity/assets, and more. The multidimensional nature of the eligibility criteria generated a series of discontinuities across different variables. We convert these to a one-dimensional index following the methodology of Ferreira et al. (2018) and Bonfim et al. (2023) and compare firms that marginally qualify to the program to those that just fail to qualify. Consistent with Bonfim et al. (2023), we find that surpassing the eligibility criteria sharply increases the probability of program take-up and the quantity of firm borrowing.

We begin with our central empirical finding: program eligibility led to increases in export activity in our sample period (2008-2014). Our regression discontinuity estimates suggest a large impact on the extensive margin: qualifying firms were roughly 12% more likely to export compared to similar non-qualifying firms. We also show that these firms exported in a more diverse set of 8-digit product categories and reached a larger number of export markets. The impacts are not limited to the extensive margin, as we find a greater total value of exports. The guarantee is particularly effective at promoting trade, as we find that eligibility has a more pronounced impact on exports compared to domestic sales. The results are not sensitive to particular bandwidth, kernel, or other specification choices, and hold when measuring export activity in an alternative data source. We confirm our findings using a complementary staggered difference-in-difference approach that exploits variation in the timing of initial qualification to the program across firms. This allows us to consider the impacts in a sample that includes firms outside of a local neighborhood around the eligibility threshold.

We next show that our findings reflect the challenges of financing sunk entry costs in export

markets. The simplest evidence is the persistent impact of credit access. Firms continue to be more likely to export for years after initially qualifying for the credit guarantee, and do so even after losing access to the program. There is a similar persistence in the number of exported products and destinations. For example, our RD estimates indicate that three years after the initial qualification firms that received a credit guarantee export at a rate that is 3.5 percentage points higher than non-qualifying firms, reach 0.15 more export destinations, and export 1.2 additional products.

Heterogeneity across firms provides further support for the importance of entry costs. The extensive margin effects we estimate are concentrated in firms that were not yet exporters (of a given product, or to a given destination) in the year prior to receiving the guarantee. This suggests that the guarantee allowed new firms to incur the up-front costs necessary to become exporters, rather than enabling current incumbents to continue exporting. The impact on entry is also concentrated in small firms, consistent with large firms more easily self-financing the sunk costs of entering an export market. This is natural if the costs are constant or concave in scale.[3] Finally, we estimate larger extensive margin impacts for firms that are more dependant on trade credit—defined as those with high ex-ante payables-to-sales ratios. These firms may find it harder to cover upfront costs if counterparties are reluctant to extend credit for new international ventures.

Our results show that government guarantees help alleviate the barriers posed by fixed-entry costs, and that credit access impacts more than just the variable costs of production. This suggests that the combination of sunk costs and credit constraints can generate hysteresis in international trade, consistent with models of international trade in the vein of Caggese and Cuñat (2013).

What are the challenges and costs that credit allows prospective entrants to overcome? In the final section of our paper we consider two potential channels through which credit access enables export activity. First, we use measures of trade credit to highlight trust-building as a crucial barrier to entering a new export market.[4] If the key counter-parties in a supply chain for a new export destination are unwilling to extend credit to a firm that has yet to establish a reputation, entrants may be forced to bear substantial up-front costs. Indeed, we show that credit guarantees have a positive impact on the amount of trade credit a firm receives from its suppliers, but only gradually,

[3] See Manova et al. (2015) on the related comparison of multinational and domestic producers.

[4] This follows the literature documenting positive effects of trust on trade dynamics (e.g. Guiso et al., 2009; Xing and Zhou, 2018) as well as previous work in relational contracting that measures trust using trade credit (e.g. McMillan and Woodruff, 1999; Fisman and Raturi, 2004; Wu et al., 2014).

appearing at a lag of 2 to 3 years. The eventual emergence of trade credit suggests that access to bank credit allows firms to establish themselves within a new market. In support of this notion, we find that the credit guarantee increases the average length of a firm's trading relationships.[5]

The second channel we consider is quality upgrading. That is, we ask whether credit access enables firms to make the investments necessary to deliver the high-quality goods typically demanded by wealthy countries. While a growing literature has documented the role of organizational and input-market frictions as barriers to upgrading quality,[6] there is little evidence on the importance of credit access in the decision to produce and export high quality goods (Verhoogen, 2021). We show several pieces of evidence that are indicative of a quality upgrading mechanism. Qualifying firms are more likely to import intermediate goods, pay higher unit-prices for these imports, and appear to pay higher prices for their inputs more generally. This suggests that they are sourcing higher quality inputs for their production processes (Kugler and Verhoogen, 2011; Bastos et al., 2018). Furthermore, we find suggestive evidence that qualifying firms are able to charge higher unit prices within narrow product-destination-year categories. We also show that, within a small set of vertically differentiated product categories for which quality is directly observable (wine, olive oil and cork), firms seem to export higher quality goods. While explicitly measuring quality is challenging, these results provide initial evidence that credit may be a meaningful barrier to exporting high quality goods.

Our work is most directly related to the literature on the role of financial frictions in international trade. In particular, to the theoretical work that emphasizes an extensive margin effect of credit access using Melitz (2003) style models with fixed or sunk export costs (e.g. Alessandria and Choi, 2007; Manova, 2013; Chaney, 2016; Leibovici, 2021), and to the empirical work that examines the relationship between financial frictions, credit shocks, and export behavior. This includes Beck (2002); Berman and Héricourt (2010); Amiti and Weinstein (2011) and many more. We provide a partial summary of related empirical work in Appendix Table A1. Kohn et al. (2022) provides an excellent overview of both the theoretical and empirical literature. Our key contribution is to provide causal, firm-level evidence that increases in credit access impact the extensive margin of

[5] We define an export relationship as exporting a given product (defined at the 4- or 6-digit code level) to a particular export destination.

[6] This includes Bas and Strauss-Kahn (2015) and Fan et al. (2015) on import tariffs, Hornbeck and Naidu (2014) and Imbert et al. (2018) on the supply of skilled labor, and Atkin et al. (2017) and Hansman et al. (2020) on organizational frictions.

export activity. The contrast with earlier work that examines negative credit supply shocks (e.g. Paravisini et al., 2015) indicates the central relevance of one-off sunk costs of entry in theoretical models of trade. We also contribute by proposing two potential sources of entry costs in export markets and studying how access to finance may help firms in overcoming these costs.

Of course, the work on financial frictions and trade is itself a part of a much broader body of research on the relationship between financial development and economic growth (Schumpeter, 1911; Rajan and Zingales, 1998). An extensive literature has focused on studying the relationship between financial development, the health of financial institutions, business cycles, and international trade (Chor and Manova, 2012; Becker et al., 2013; Antras and Foley, 2015; Xu, 2022). We show direct evidence that increases in access to credit have persistent impacts on the ability of firms to access export markets. Given the growing evidence that access to foreign markets and buyers can improve firm performance and productivity (Atkin et al., 2017; Alfaro-Urena et al., 2022), our evidence suggests that an important mechanism through which financial development promotes growth is by allowing individual firms to access foreign markets.

Finally, we add to the expanding literature on the role and efficacy of government backed loan guarantee programs. This includes companion work on the SME-Leader Program in Portugal (Bonfim et al., 2023), analyses of similar programs in the UK after the great recession and during the COVID crisis (Gonzalez-Uribe and Wang, 2020) and of related schemes across international contexts (Lelarge et al., 2010; Bach, 2014; Bachas et al., 2021; Columba et al., 2010). We show that these guarantee schemes have impacts beyond the domestic market, and provide an effective means of promoting export activity. Despite the vast literature on the impact of government credit guarantee schemes, the effect on firms' export dynamics has been significantly understudied. Government guarantees, by substantially reducing lending risks for banks, enable SMEs to finance export projects and establish themselves in foreign markets. This has very implications for firms' sustainability and growth, as many of these programs are implemented during periods of domestic demand contraction.

Outline Our paper is organized as follows. In Section 2 we introduce the details of the SME Leader Scheme and describe the data used in our analysis. In Section 3 we introduce our empirical strategy. In Sections 4 and 5 we present our results and discuss the mechanisms underlying our

main findings, respectively. We conclude in Section 6.

2 Data and the Portuguese Credit Guarantee Scheme

2.1 The Portuguese Credit Guarantee Scheme: The SME-Leader Program

The *SME-Leader Program* is a credit guarantee scheme in Portugal run by a government agency (IAPMEI). The scheme began in the aftermath of the financial crisis with the stated goal of ensuring that the best performing small and medium sized enterprises (SMEs) had access to financing during the downturn. Since 2008, this program has provided qualifying firms with an official certification and access to credit lines backed by a partial government guarantee. The guarantee allows firms to borrow at subsidised rates and leads to a more streamlined and standardized process for credit approval. The allowable terms on credit guaranteed by the scheme have varied over time and across industries. For example, 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,[7] and the maximum loan maturity allowed was 10 years. The maximum guarantee was between 50% and 70%.

To be eligible for *SME-Leader* status in a given year, a firm has to satisfy a set of criteria based on financial and operational measures. These requirements form the basis of our regression discontinuity strategy. The specific eligibility criteria have changed every year since the creation of the program, but at various points they have used different combinations of the following financial variables and ratios: total assets, number of employees, total sales, net income, EBITDA, net income/assets, equity/assets, sales growth and EBITDA growth. For example, in 2008, firms were required to have a ratio of equity-to-net assets above 20% and a positive growth rate of business turnover. The qualifying thresholds for these variables have also changed over time. Table B1 shows the exact set of criteria for each year from 2008 to 2014, our sample period.

To access the scheme, firms must submit an application through a participating Portuguese commercial bank (the set of participating institutions includes all major Portuguese lenders). There is no application fee. The bank evaluates whether the firm meets the eligibility criteria, completes its own credit screening, and submits the final application to IAPMEI. The bank also

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

negotiates the interest rate and other commercial fees with the firm and maintains its monitoring function. The official certification is valid for one year and must be renewed every year under the new set of eligibility criteria, although both loans and guaranties can have longer maturity.

Unlike credit rating agencies, IAPMEI does not screen firms, it simply defines a set of criteria for eligibility. If conditions are met, firms qualify automatically. Figure 2 shows the stock of certified firms and the inflow of firms certified for the first time between 2008 and 2014. The number of certified firms was increasing in our sample period, from around 2600 in 2008 to approximately 7100 in 2014. In contrast, the number of newly certified firms was decreasing over time. The typical timeline of the program is summarized in Figure B1. Firms submit their annual financial reports in April to the tax authorities and other relevant bodies; eligibility criteria based on the filed financial statements are announced, and firms apply to the program during the summer; the list of certified firms is publicly announced by IAPMEI early in the fall; firms benefit from their certified status until September of the following year. Over the years the announcement of the list of certified firms has shifted slightly later in the fall, but the application period has never preceded the filing date for financial reports. This reduces firms' ability to manipulate financial data to access the scheme.

2.2 Sample Period

Our analysis considers data from 2008 to 2014. We focus on this period for two primary reasons. First, this is a period of major export expansion in Portugal. A drop in domestic demand during the 2008-2014 period led firms to shift to external markets. Between 2009 and 2014, exports as a fraction of GDP grew by roughly 13 percentage points (See Figure 1). This allows us to focus on a period during which exports significantly contributed to the health and sustainability of Portuguese firms. Second, according to Bonfim et al. (2023), the guarantee scheme had strong impacts on the availability of finance in the crisis period, but had little impact on financing conditions after the market recovered in 2015. Focusing on the pre-2015 portion of the sample allows us to target the period in which the scheme meaningfully shifted access to finance.

2.3 Data

We use data from four administrative sources:

Data on Enrollment and Qualification for the Guarantee Scheme (IAPMEI). We use data on the program criteria and the identity of certified firms from IAPMEI, the government agency responsible for the *SME-Leader* program.

Balance Sheet Data (SCIE). We use unique fiscal identification numbers to merge these data to detailed firm-level accounting records collected by *Sistema de Contas Integradas das Empresas* (SCIE), a joint project of the Ministry of Finance, Ministry of Justice, Statistics Portugal and Banco de Portugal. SCIE attempts to integrate the information that Portuguese firms are required to report for legal, fiscal, and statistical purposes. This accounting data is used by Banks and IAPMEI to confirm that firms meet the eligibility criteria for the guarantee scheme. We analyze a version of this data that is revised by *Banco de Portugal* (the Bank of Portugal) for economic and statistical analysis. The revised version is referred to as the Portuguese Central Balance Sheet database. We use this data for three purposes. First, the fact that we have access to firms' accounting data and to the eligibility criteria defined by IAPMEI allows us to reconstruct the criteria for each firm and identify firms that are eligible for the program in each year. Second, balance sheet data allows us to consider key dimensions of heterogeneity. Third, the SCIE database includes the total export volume of goods and services by firm in each year, as well as the value domestic sales. This gives us a complementary measure of export activity to use in our analysis beyond the trade flows discussed below.

Trade Flows (FTS). We combine these data with granular transaction level data on export flows. The Foreign Trade Statistics (FTS) database records virtually all flows of goods between Portuguese firms and international trade partners. This database includes detailed information on the product, the market, and the value and quantity for both exports and imports. These data are collected by the *Instituto Nacional de Estatística (INE)* (Portuguese national statistics institute) and serve as the official Portuguese source of information on trade with EU and non-EU trade partners. Data on trade transactions with non-EU countries (*Estatísticas Correntes do Comércio Ex-*

tracomunitário) are obtained from the customs clearance system, covering the universe of external trade transactions. Data on transactions with EU members (*Estatísticas Correntes do Comércio Intracomunitário*) are recorded through *Instrastat*. This system requires firms whose annual value of total exports exceeds a predetermined threshold to provide information on all its exports and imports. The threshold is determined to assure that at least 97% of the total value of intra-EU trade transactions is reported.

Products are classified at an eight-digit level according to the *Nomenclatura Combinada* (Combined Nomenclature). This system of classification is standardized for all EU members. For each recorded export or import, the database contains the destination (or origin) country, the quantity (in kilograms) and the corresponding total value (in euros). Export and import values in these data are *free-on-board*, and therefore exclude any duties or shipping charges. For an illustrative example, Figure A1 in the appendix shows the top 10 exported products between 2008 and 2014 by destination country, with product descriptions. Among the most exported products by Portuguese SMEs in this period are clothing and footwear, wine, and cork. The main destination countries include France, Spain, Germany, Italy, Angola and the United Kingdom.

Input Data (IAPI) Finally, we analyze input data from the *Inquérito Anual à Produção Industrial (IAPI)* (Annual Survey on Industrial Production). This dataset combines survey data on the value and physical quantity of firms' outputs and inputs, as well as their energy sources. This survey is only applied to a restricted set of Portuguese manufacturing firms. The input classification uses a twelve-digit code.

Summary Statistics

Table 1 presents summary statistics. Given the set of firms targeted by the guarantee, we focus on small and medium sized enterprises and require firms to have at least 5 employees.[8] Panel A displays the cross-section of firm financial and operational characteristics in 2010, the first year in which all variables are available in our sample period.[9] The median firm in our sample has 18 employees, sales of 1.13 million euros and around 1.13 million euros in total assets. Median net

[8] We define SMEs following EU recommendation 2003/361. For example, a medium sized firm must have a staff headcount below 250 and either turnover below €50 million or a balance sheet total below €43 million.

[9] Variables related to trade credit, namely Payable and Receivable Accounts, are only available from 2010 onwards.

income is 11.3 thousand euros. Panel B shows statistics on export and import variables from the FTS data. In our sample period, the average firm exported a total of 243 thousand euros in goods per year. 25% of firms are exporters in a given year, although, as Panel A of Figure A2 shows, this percentage was increasing over our sample period. Panel B shows the time series patterns of exports for program recipients and non-recipients. On average, recipients of the program are almost twice as likely to export as non-recipients. As Panel C shows, the average value of exports is also roughly twice as large.

The average firm in our sample exports just under 4.5 unique products to roughly 1.2 countries. Appendix Figure A3 shows the distribution of the number of export destinations, number of products and number of product-destination pairs for both program recipients and non-recipients. The distribution of each of these variables among program recipients is shifted slightly to the right, when compared to non-recipients, indicating that certified firms tend to export a greater variety of products to a broader range of destination markets. The average relationship duration in our sample of firms is approximately 2 years.[10] The exports data provides information on the quantity exported and imported (in kilograms) and the corresponding total value (in euros) allowing us to compute the export and import price per kilogram (Panel C). The average export price is 97 euros, with a standard deviation of 12,198 euros. The average price of imported goods is 171 euros. For imports, the average price is 98 euros.[11]

3 Empirical Strategy

Our basic approach is a regression discontinuity design that compares export-related outcomes for firms that qualified for the SME-Leader program against outcomes for ineligible firms. We focus specifically on comparing firms that met the criteria for eligibility by a small margin against those that failed to meet the criteria by a small margin. Because theses criteria were multidimensional (and varied from year to year), implementing a regression discontinuity requires a clear definition of what it means to meet the criteria "by a small margin."

[10] Here, we define an export relationship as exporting a 6-digit product code to a given destination country.
[11] In Table A2, we present summary statistics for our secondary source of export data from the SCIE dataset.

3.1 Defining the Running Variable r_{it}

We follow the strategy implemented in Ferreira et al. (2018) and Bonfim et al. (2023) and transform the multidimensional criteria into univariate running variable for firm i in year t: r_{it}. The approach is as follows. Suppose there is a set of K criteria, where firm i qualifies for the program in year t if financial or operating variable c_{it}^k exceeds threshold T^k ($c_{it}^k > T_k$) for all k in K.

Our first step is to create a standardized version of each criterion c_{it}^k.

$$\tilde{c}_{it}^k = \frac{c_{it}^k - T_k}{\sigma_k}.$$

Where σ_k represents the standard deviation of c_{it}^k. We then define the running variable as the *most binding* across the full set of criteria. Formally, this is just the minimum: $r_{it} = \min_{k \in K} \tilde{c}_{it}^k$.

The intuition is relatively straightforward. r_{it} represents the variable that most directly determines the eligibility status of firm i. In principle, if $r_{it} > 0$ the firm is eligible, and if $r_{it} < 0$ it is not. For r_{it} below 0, this represents the c_{it} that is furthest below the threshold. For r_{it} above 0, this represents the c_{it} closest to the threshold. In either case, if r_{it} is in a small neighborhood around 0, a small change in the relevant c_{it} could cause an eligible firm to become ineligible (or vice-versa). With this r_{it} defined, we can then implement a standard regression discontinuity design.

3.2 Implementing the Regression Discontinuity

Our primary focus is on the local impact of program eligibility, the intention-to-treat (ITT) effect, at the eligibility threshold $r_{it} = 0$. Formally, for outcome y_{it}, we define $y_{it}(1)$ and $y_{it}(0)$ as the potential outcomes observed if firm i were eligible or ineligible, respectively, for the credit guarantee scheme at time t. Our parameter of interest is

$$\tau = E[y_{it}(1) - y_{it}(0) | r_{it} = 0].$$

We take a non-parametric local linear (or, in robustness tests, local polynomial) approach to estimating this parameter following Cattaneo et al. (2019). Given a bandwidth h, we estimate separate weighted least squares regressions of y_{it} for observations with $r_{it} > 0$ and $r_{it} < 0$, weighting each observation according to some kernel function $K\left(\frac{r_{it}}{h}\right)$. We then recover the intercepts α_+ (us-

ing observations with positive values of r_{it}) such that $\hat{y}_{it} = \hat{\alpha}_+ + \hat{\beta}_+ r_{it}$, and α_- (using observations with negative values of r_{it}) such that $\hat{y}_{it} = \hat{\alpha}_- + \hat{\beta}_- r_{it}$. Our estimate is then

$$\hat{\tau} = \hat{\alpha}_+ - \hat{\alpha}_-.$$

Our baseline approach uses a triangular kernel, although we consider alternative kernels for robustness. When considering a rectangular kernel, the above simplifies to estimating the following linear regression (for observations with $r_{it} \in [-h, h]$):

$$y_{it} = \alpha_- + \beta_- r_{it} + \tau \mathbb{1}\{r_{it} > 0\} + (\beta_+ - \beta_-)\mathbb{1}\{r_{it} > 0\} \times r_{it} + \varepsilon_{it}.$$

Our key identifying assumption is continuity in average potential outcomes functions across the threshold. In other words, that both $E[y_{it}(1)|r_{it}]$ and $E[y_{it}(0)|r_{it}]$ are continuous at the point $r_{it} = 0$. We select symmetric MSE-optimal bandwidths following Calonico et al. (2014) and Calonico et al. (2019) and compute standard errors clustered at the firm level using the plug-in residual approach outlined in Calonico et al. (2019). We report both conventional standard errors and robust bias corrected confidence intervals.

3.3 Manipulation Tests

To evaluate the main identifying assumption in our RD methodology, that average potential outcomes are continuous at the threshold $r_{it} = 0$, we conduct tests in the spirit of McCrary (2008). Specifically, we ask whether the density of the running variable r_{it} is continuous at the threshold by implementing the tests outlined in Cattaneo et al. (2018) based on local polynomial density estimators.

The null hypothesis for these tests is a lack of bunching, implying continuity of the density function at $r_{it} = 0$. We begin by considering what we call our *Exact* running variable, which incorporates all program criteria. We plot the density of this running variable above and below the threshold in Panel A of Figure 3. A clear mass is present to the right of the threshold, violating the null of no bunching. The test-statistic from this manipulation tests is over 33 (see Panel A of Table A3).

While this pattern is potentially problematic, it does not appear to be the result of manipulation. Instead, it is the consequence of a natural bunching in one of the underlying criteria. Specifically, in a large fraction of years, program qualification required firms to have positive *net income* in the past year. Because there tends to be a mass of firms just above 0 in the distribution of net income, there is a corresponding large mass in the distribution of the running variable r_{it}. Figure A4 shows individual density tests for all program criteria considered between 2008 and 2014. Net income is the only variable for which we see bunching that is meaningful or statistically significant.[12]

To address this concern, we construct an alternative version of r_{it}, which we refer to as our *Preferred* running variable. The *Preferred* running variable considers all program criteria except positive net income. Panel B of Figure 3 shows the density of this simplified measure, displaying a smooth distribution through the threshold. Our estimated manipulation test for this running variable is insignificant, with a t-statistic of 0.85 (see Panel A of Table A3). While this version of r_{it} does not fully determine eligibility, we should still expect a sharp increase in program eligibility and uptake for firms above the threshold (and should expect firms below the threshold to be ineligible). We test and confirm this formally in Section 4.

3.4 Panel Regressions

We complement our regression discontinuity with a set of panel regressions that exploit the timing of enrollment in the scheme within firms. These regressions reinforce our RD approach and provide insight into the impacts of the credit guarantee in a sample that includes firms outside of a local neighborhood around the eligibility threshold.

We take two approaches. First, we consider a two-way fixed effects estimator. Specifically, we estimate linear regressions of export related outcomes on an indicator ($Certified_{it}$) that is equal to one if firm i is certified—enrolled in the government guarantee scheme—in year t.

$$y_{it} = \theta Certified_{it} + \gamma_i + \delta_t + \varepsilon_{it}.$$

Here, γ_i and δ_t represent firm and year fixed effects, respectively. We cluster standard errors at

[12]Bunching in net income above zero is natural because firms often report small positive earnings. We observe this pattern consistently even in the years before the *SME-leader* program was introduced.

the firm level throughout. Our parameter of interest in these regressions is θ, which is intended to capture the impact of enrolling in the program itself (versus the ITT captured by our regression discontinuity).

Second, we estimate a staggered difference-in-difference specification following Sant'Anna and Zhao (2020). We define the treatment variable as equal to one beginning the first year in which a firm receives the certification. Under a parallel trends assumption, this allows us to estimate the group and year specific ATTs using never treated firms as controls, given by:[13]

$$ATT(g,t) = \mathbb{E}[y_t(g) - y_t(0)|G_g = 1].$$

Here $G_g = 1$ represents firms treated at time period g. This corresponds to the average treatment effect for the group of firms treated at time period g, in year t. We then aggregate the $ATT(g,t)$'s by taking weighted averages across g following Callaway and Sant'Anna (2021a).

4 Results: Credit Access Impacts Export Activity

In this section we present evidence for our main empirical finding: credit access increases export activity on the extensive margin. We begin by validating that our regression discontinuity approach captures a sharp change in credit access. We show that firms just above the threshold are substantially more likely to enroll in the credit guarantee, and that this corresponds to an expansion of credit. We next demonstrate that access to the guarantee increases the probability that a firm exports, the number of export products and destinations, and the total value of exports. We conclude this section by presenting various robustness tests supporting our analyses.

4.1 The Impact of Eligibility on Program Enrollment and Credit Access

As a preliminary step, we show that our regression discontinuity captures a meaningful change in program take-up. To do so, we run our regression discontinuity approach, considering a binary

[13] Formally, the parallel trends assumption in Callaway and Sant'Anna (2021a) is given by:

$$\mathbb{E}[Y_t(0) - Y_{t-1}(0)|X, G_g = 1] = \mathbb{E}[Y_t(0) - Y_{t-1}(0)|X, C = 1]$$

Where $C = 1$ identifies never treated firms.

outcome y_{it} equal to 1 if firm i is officially certified as an SME-Leader in year t. We present our results in Figure 4 and Panel B of Table A3.

Panels A and B of Figure 4 confirm that being above the threshold corresponds to a sharp jump in the probability of enrollment using both our *Exact* and *Preferred* running variables. The point estimates for $\hat{\tau}$ in Panel B of Table A3 suggest that firms with a value of r_{it} just above the threshold were roughly 16 percentage points more likely to enroll based on our *Exact* measure, and roughly 15 percentage points more likely to enroll based on our *Preferred* measure. Both estimates are statistically significant at any conventional level. In Figure A5, we perform the same tests using a second-order local polynomial approximation on either side of the threshold instead of a local linear approximation. The point estimates are virtually unchanged. These results support the validity of our regression discontinuity approach.

While both versions of our running variable predict program enrollment, the *Exact* running variable clearly displays a bunching mass to the right of the threshold shown in Figure 3. For this reason, we conduct our regression discontinuity analysis using the *Preferred* running variable for the remainder of the paper.

Eligibility for the credit guarantee program leads to sharp increases in credit access. Table A4 shows that firms just above the eligibility threshold have, on average, 11.3% higher total debt and an 18.4% greater loan balance, compared to those just below. For more detail, we direct readers to the results found in a companion paper (Bonfim et al., 2023), which uses granular credit-registry and loan data to show that the guarantee program reduces the costs of borrowing and generates increases in the quantity of borrowing for eligible firms.

4.2 RD Evidence on the Impact of Credit Access on Export Activity

The Extensive Margin Export Choice

We next show our main result: a change in credit access generates a sharp increase in the probability that a firm exports. The first column of Table 2 shows the intention to treat estimates from our RD approach. The dependent variable is an indicator equal to one if firm i exports to any destination in year t. We measure this variable in the FTS data, and define a year as July-July to reflect the 12 month period immediately following the annual certification process.

We see a positive, economically meaningful, and statistically significant estimate of 0.029. Firms that marginally exceed the eligibility criteria are roughly 3 percentage points more likely to export, as compared to those just below the threshold. This corresponds to a 12% increase relative to the mean of this variable. Panel A of Figure 5 presents this same result graphically, displaying a distinct and economically meaningful jump at the threshold. A positive shock to access to credit increases export activity on the extensive margin for small and medium sized enterprises.

The Number of Exported Products and Destinations

Access to credit allows new entrants into the export market. Does it also help firms expanding the scope of their exporting activity? Our evidence suggests so. We count the number of export destinations of a firm and the number of products it exports (unique 8 digit-code level products) in a given year. Note that at this granular level, very similar products are given distinct codes, so a firm exporting an additional product might simply reflect a slight expansion of variety within a broader product class (this granularity is illustrated in the product description of Figure A1). We measure both variables in the FTS data.

Columns 2 and 3 of Table 2 show statistically and economically significant positive estimates for both measures. Firms that marginally exceed the eligibility criteria export to 0.2 more countries each year, and export just under 1.3 more products, on average. These represent a 17% and 29% increase, respectively, compared to the mean values of the variables. Robust, bias-corrected 95% confidence intervals do not contain 0. Panels B and C of Figure 5 again show distinct jumps at the eligibility threshold. These results capture expansions by both new entrants and established exporters. Nevertheless, this evidence suggests that access to credit allows firms to reach new destinations and to expand the diversity of the products they offer.

The Value of Exports

The previous results show that access to credit increases the probability of exporting and broadens the scope of exporting activities. Next, we test whether access to credit also impacts firm total export value. We measure total export value at the yearly level in the FTS data in 1000s of euros.

The last column of Table 2 shows that an shock to credit access increases the total value of

exports. The ITT estimates suggest a sharp jump in the total value of exports at the threshold, equivalent to just over 50,000 euros. This is more than 20% of the mean value of exports across firms in our sample. Panel D of Figure 5 shows the corresponding graphical evidence. Once again, robust, bias-corrected 95% confidence intervals do not contain 0.

The increase in the value of exports may represent a combination of pure-extensive margin shifts, of an expansion to new destinations or products among existing exporters, and of pure shifts along the intensive margin (i.e. increasing the value of exports within a given product and destination). Taken together, the estimates in Table 2 suggest that access to credit increases export activity, and that a meaningful portion of this increase operates on the extensive margin. These findings underscore the importance of government-provided credit guarantee schemes. Such programs can boost firms' exporting activity, serving as an important means to sustain and boost business activity amidst challenging economic conditions.

4.3 Robustness

We conduct a series of tests that support the robustness of our findings and provide additional evidence on the impact of credit access on export activity.

RD Specification

First, we show that our results are robust to alternative specification choices for the regression discontinuity design. Table A5 repeats our the main results while allowing for higher-order local polynomial regressions (Panel A), different kernel choices (Panel B), and for different bandwidth choices (Panel C). The point estimates and their corresponding statistical significance closely resemble the benchmark estimates in Table 2. This suggests that the results are not sensitive to the particular choices used in our implementation.

Placebo Tests

Third, we conduct a placebo exercise to support the validity of our regression discontinuity approach. In this exercise, we simulate the introduction of the SME-Leader Program in 2007, one year prior to its actual implementation. If our results are the consequence of credit guarantees,

we should expect no change in our main outcome variables across the threshold prior to the introduction of the scheme. We define the *Preferred* running variable for 2007, assuming the same criteria as in 2008. We then apply our regression discontinuity specification. Figure A6 shows that the estimated coefficients are small and not statistically significant. These results support the validity of our RD approach, as they suggest that our running variable does not capture any other discontinuity besides SME-Leader program enrollment.

Alternative Data Source

Second, we measure export activity using the SCIE data. This allows us to examine the robustness of our findings using an alternative data source. Variables in the SCIE data are recorded yearly, so we examine outcomes in the calendar year after eligibility. Table A6 shows our results. Whether focusing on exports of goods, services, or total exports, the result on the extensive margin is statistically and economically significant, reinforcing our baseline findings. The estimated impact on export values is also large and statistically significant, again in line with our earlier results.

A natural question is whether export activity serves as a substitute for domestic sales. Leveraging the SCIE data, Table A7 shows that the access to credit provided by the government guarantee allowed firms to significantly increase their domestic sales as well. During this period, eligible firms' domestic sales were approximately 294,000 euros (or 13%) higher compared to firms just below the threshold. This result shows that firms do not simply substitute the domestic market for external ones, as access to credit enabled firms to expand their sales in both markets during the crisis. Nonetheless, there is a positive impact on the ratio of exports to total sales, indicating that credit access has more pronounced consequences for export activity versus domestic sales.

4.4 Panel Evidence on the Impact of Credit Access on Export Activity

Our complementary panel regressions support the findings of the RD approach. These specifications consider the change in export activity before versus after a firm enrolls in the credit guarantee (using firms who do not experience a change in enrollment status as a control group). Panel A of Table A8 presents the results from the two-way-fixed effects estimator described in Section 3.4. Given the alternative approach, the coefficients we recover represent a slightly different impact

than the local ITT estimates in our regression discontinuity approach. Specifically, they capture the average impact of program enrollment (rather than eligibility) in a broader set of firms. Despite these differences, our panel estimates (shown in Table A8) are consistent with our regression discontinuity approach. Across all four measures, we see positive estimates that are statistically significant at any conventional level.

The results from a staggered difference-in-difference approach following Sant'Anna and Zhao (2020) are similar. Panel B of Table A8 displays our estimates. The aggregate ATTs are close to, but slightly larger than, our baseline two-way fixed effects approach. We present dynamic versions of these estimates in Figure A7. There are two valuable takeaways that emerge from the dynamic effects. First, across all four outcome variables, there is evidence that the parallel trends assumption may be violated, at least to a modest degree. This indicates that our RD approach may provide more reliable estimates of the causal impacts of the credit guarantee scheme. Second, the estimated ATTs appear to be growing over time. This suggests that there may be some meaningful persistence in the impacts of the scheme. We consider this possibility in greater detail in the next section.

5 Mechanisms: Sunk Entry Costs, Trust, and Quality

We next ask why the expansion of credit access generated by the guarantee program led to an extensive margin impact on export activity. A natural explanation is the presence of sunk entry costs. Standard models of international trade, in the vein of Melitz (2003), feature fixed costs of entering an export market. Firms must develop a new network of buyers, deal with destination specific regulatory barriers, set up a supply chain to deliver goods, and adjust the product to meet local demand (Roberts and Tybout, 1997; Domínguez et al., 2023). These sunk costs may be considerable, particularly for small firms (Das et al., 2007; Eaton et al., 2011).[14]

There are a variety of reasons why firms, especially the SMEs we study, may find it difficult to finance fixed entry costs. Traditional domestic lenders (such as banks) may be unwilling to

[14] Das et al. (2007), using plant-level data on three Colombian manufacturing industries, estimates that among small producers, average entry costs range from 64 million 1986 pesos ($430,000; U.S. dollars throughout) for leather producers to 61 million 1986 pesos ($412,000) for knitting mills. For larger producers, the average cost of foreign market entry is lower, ranging from an average of 51 million 1986 pesos ($344,000) for basic chemical producers to 59 million 1986 pesos ($402,000) for knitting mills. Eaton et al. (2011) estimates that the initial fixed costs dissipate 59% of gross profit in any destination on average.

finance an unproven venture in a new market, particularly if there are concerns about the foreign contracting environment and the challenges of seizing collateral. Regulatory, monitoring, and cultural barriers may inhibit bank borrowing in the destination country. In addition, counterparties along the supply chain (including shipping and distribution intermediaries, as well as domestic and foreign suppliers) may be hesitant to extend trade credit to firms with whom they have yet to establish a relationship. Despite this theoretical argument, well-identified empirical work has found evidence of an intensive margin effect of credit supply without a corresponding impact on the extensive margin. Accordingly, Paravisini et al. (2015) argue that reductions in credit primarily impact variable rather than fixed costs of exporting.

We reconcile this literature with our own findings by highlighting the asymmetry that arises between positive and negative shocks in a realistic dynamic model with sunk costs (See, e.g. Caggese and Cuñat, 2013). If firms must pay one-time sunk entry costs (rather than reoccurring fixed costs paid period-by-period) a form of hysteresis may arise. A positive credit supply shock, like the one we study, may allow a large mass of previously constrained firms to overcome the entry cost and enter the market, generating a noticeable extensive margin effect. Alternatively, the negative shocks examined in past work may have little immediate impact on the extensive margin. While new entrants are deterred, the mass of incumbents who have already paid the sunk cost will not be impacted.

In this section, we show evidence that sunk entry costs help explain the impact of credit access on becoming an exporter, entering new export markets, and introducing new products. We then explore two mechanisms through which these sunk costs may arise: trust building and quality upgrading.

5.1 Persistence and Sunk Entry Costs

A key implication of dynamic models that feature sunk entry costs is persistence.[15] Firms that enter an export market due to a one-off positive shock to credit will continue to export even after the shock dissipates, as they have already incurred any sunk costs.

[15]The presence of hysteresis in export markets was proposed by Baldwin and Krugman (1989) and Dixit (1989) to explain the unexpected persistence of the U.S. trade deficit during the mid-1980s. A large temporary rise in the exchange rate induces foreign firms to enter the domestic market. However, since entry costs are sunk, not all entrants exit the domestic market when the exchange rate returns to its original level. This phenomenon results in persistent impacts on trade.

We test for persistence by examining the longer-run impacts of qualifying for the credit guarantee scheme. While enrolling in the scheme only grants access to credit guarantees for one year, we test whether impacts continue one, two, and three years after qualification. In particular, we apply our regression discontinuity approach using a one-, two-, or three-year lagged running variable to capture past eligibility (allowing the corresponding lagged year to be at most 2014, and considering outcomes through 2017). In other words, we estimate the dynamic intention to treat effects of program eligibility in the 2008-2014 period. To test for the persistence of an initial shock—as distinct from auto-correlation in access itself—we control for eligibility (a binary variable equal to 1 if $r_{it} > 0$ and 0 otherwise) in all years between the treatment year (t) and the year in which we measure the outcome ($t+1$, $t+2$ or $t+3$).

We find that program enrollment has a persistent impact on export activity well beyond the treatment year. Table 3 presents the results. The first three columns of Panel A show that the effects of credit on the probability of being an exporter last for at least three years, and if anything increase marginally over time. Three years after initially becoming eligible, firms just above the threshold are 3.5 percentage points more likely to be exporters, compared with those just below the threshold. Similarly, the next three columns show that the number of export destinations is higher for firms that just qualify, versus those that just fail to qualify, even three years after qualification. We also see an impact for at least three years for both the number of exported products and the value of exports (Panel B).

Crucially, because we control for eligibility in the years after t, our results suggest that a one-time shock to credit allows firms to enter export markets and continue to export for a sustained period, including after the credit expansion has receded.[16] If a positive shock to credit access primarily reduces the variable costs of exporting, one would expect a firm's export activity to revert after the program benefits end. Our results instead suggest that access to finance allows firms to overcome the sunk costs required to enter a new export market. Furthermore, the persistence of our results underscores the efficacy of government credit guarantees—and presumably other well targeted credit subsidies—in meaningfully boosting the export activity of SMEs.

[16] We find qualitatively similar results when we take other approaches to account for auto-correlation in eligibility, for example by excluding firms that qualify for more than one year. We also find persistent and large effects when we do not control for treatment status after time t.

5.2 Heterogeneity and Sunk Entry Costs

Heterogeneity in our RD estimates across different subsets of firms further reinforces the importance of credit access for overcoming sunk entry costs. We examine three dimensions of heterogeneity.

Prior Export Status

The first dimension we examine is past export status. Specifically, we compare firms that were exporters in the year prior to qualification to those who were not exporters. We consider export status at both the destination and product level.

We begin with destinations. We estimate the impact of credit access on the probability that a firm exports to country c in year t separately for firms that exported to c in $t-1$ and those that did not. This approach is motivated by the theory suggesting that firms must incur sunk costs for each new export destination. If sunk costs are a key mechanism underlying the impact of credit access, the extensive margin effects should be concentrated in firms that were not prior exporters to destination c, and had therefore had not yet paid the relevant fixed cost. We do not expect a corresponding impact on exit for firms that were already exporting, and received a (relatively) negative shock to credit.

The first two columns of Table 4 show that the impact of credit access on the probability of exporting to country c is indeed concentrated among firms that were not prior exporters to c. The estimate in column 1 indicates that, among firms that did not export to c in year $t-1$, the probability of exporting in year t is 0.04 percentage points higher for firms above the threshold compared to those immediately below. Among firms that exported to c in $t-1$, the estimated effect is small and is not statistically significant.

We next repeat the exercise focusing on within-product (defined at the 4-digit level) differences in exporter status. While theory does not offer as clear a view on the structure of the cost of exporting new products, our empirical estimates provide some insight into the presence of fixed costs. The last two columns of Table 4 suggest a pattern similar to the one for destinations. Among firms not exporting product j in $t-1$, those that are eligible for the credit guarantee in t are 0.05 percentage points more likely to export j versus non-eligible firms. This suggests that access to

credit also allows firms to overcome the costs of entering a new product market.

Firm Size

The next dimension we consider is firm size. We hypothesize that large firms will be better able to overcome fixed entry costs compared to smaller firms, particularly if those costs do not vary by firm size or are at least concave in scale. This follows the findings of Manova et al. (2015), which compares domestic to multinational firms in China.[17]

If our hypothesis is true, the extensive margin impacts of the credit guarantee should be concentrated in small firms. We test this by comparing firms with assets above versus below the median in $t-1$. We present our estimates in Panel A of Table 5. The RD estimates among larger firms are virtually zero (column 1), while the estimates among smaller firms are close to our benchmark estimates and statistically significant (column 5). These findings once again reinforce the idea that access to credit allows firms that struggle to finance entry costs to become exporters.

Reliance on Trade Credit

The third and final dimension of heterogeneity that we explore is the impact of credit access by firms' ex-ante reliance on trade credit. This analysis sheds light on the interplay between credit from suppliers and firms' export activity. Panel B of Table 5 splits the sample of firms at the median payables-to-sales ratio. Accounts payable represent the amount a firm owes to its suppliers for goods and services purchased on credit, which we observe in the SCIE dataset. The mean payable-to-sales ratio is 0.21, indicating that the average firm in our sample owes 21% of its total sales to its suppliers (Table 1).[18]

We find larger extensive margin impacts of access to finance for firms with a greater reliance on trade credit (a high ratio of payables-to-sales). The RD estimate of the probability of exporting for firms above the median payables-to-sales ratio is nearly 6 percentage points, compared to roughly 2 percentage points for those below the median. We also observe large differences for the number of exported products and the total value of exports, although not for the number of destination markets.

[17] Manova et al. (2015) argues that multinational subsidiaries are less liquidity constrained because they can access foreign capital markets or funding from their parent company.

[18] Note that data on *Payables* are only available starting in 2010.

There are at least two related interpretations of these results. First, reliance on trade credit may reflect firms who have difficulty accessing traditional financing (Wilner, 2000; Nilsen, 2002; Cunat, 2007; Casey and O'Toole, 2014). A firm who cannot get loans through a bank (or who is charged relatively high interest rates) may turn to suppliers or distributors for credit. This interpretation is consistent with, e.g. Casey and O'Toole (2014). In this view, our estimates show that the impacts of the credit guarantee are concentrated among firms who may not be able to finance the costs of entering an export market through traditional channels. Of course, the payables-to-sales ratio measures both demand for and the supply of finance, so it may be the case that many firms above the median are not constrained.

Second, counterparties along the supply chain may be reluctant to extend credit to firms aiming to start exporting in a new destination. Given the uncertainty and the risk of starting new ventures abroad, a firm's suppliers may be reluctant to extend credit to support such projects (Eaton et al., 2021). This is particularly so if it is difficult to seize collateral abroad. Furthermore, a firm that relies on credit from its downstream distributors domestically may have trouble finding trade partners willing to extend credit in a new country. In other words, the information asymmetry may be more severe in a new setting (Smith, 1987). Thus, firms that heavily rely on trade credit to maintain their operations, even if not financially constrained, may benefit more from a positive shock to bank credit (like the one we study). We explore the importance of trade credit and trust in more detail in the next section.

5.3 Trust-building and Trade Credit as a Source of Entry Costs

Trade Credit

We next turn to the sources of entry costs in export markets, and to why access to finance may help firms overcome these barriers. While there are likely an array of different types of costs across countries, products and industries, we consider two particular channels here. The first is the role of trust and relationship building when entering a new market. We examine this barrier through the lens of trade credit. Trade credit is a fundamental source of short term financing (Petersen and Rajan, 1997), particularly for small and constrained firms (Nilsen, 2002). A sizeable literature has noted that high trust environments enable the provision of trade credit (Levine et al., 2018; Wu

et al., 2014), and that inter-firm trust and relationship length are key factors allowing firms to offer trade credit (McMillan and Woodruff, 1999; Fisman and Raturi, 2004).[19] This evidence suggests that trade credit serves as a reasonable measure of trust between counterparties.

We show that access to bank credit allows firms to establish themselves in new markets and build the relationships necessary to receive trade credit. To do so, we run our RD analysis with measures of trade credit as the dependent variable. We consider both accounts payable and accounts receivable. We scale these variables by firm sales and consider the dynamic effects up to three years after eligibility, to allow for the possibility that building the trust necessary to receive credit takes time.[20]

Table 6 shows our estimates. We find that access to credit increases a firm's payables-to-sales, but that the increase comes primarily after two or three years. There is a marginally significant impact of roughly 70 basis points the year a firm becomes eligible for the credit guarantee. However, three years out the effect grows to 2.1 percentage points, which represents roughly 10% of the mean payables-to-sales ratio. We find smaller, and only weakly statistically significant effects on receivables to sales. The impacts are similar whether we consider only the subset of exporters (Panel A), or the full sample of all firms (Panel B).

Our results suggest that relationship and trust-building act as a meaningful part of the entry costs a firm must pay to access a new export market. Access to bank credit backed by government guarantees allows a firm to finance the initial costs of entering a market, and to strengthens its supply-chain relationships over time. Just as banks may be reluctant to finance new export ventures without credit guarantees, firm's supply-chain partners may need to trust the firm or the export project before they do so. However, once trust and relationships are established, that same firm may be able to sustain export activity through trade credit even if bank or other traditional forms of finance dry up.

[19] More broadly, bilateral trust between countries and institutions has been shown in the literature to have an impact on trade (Guiso et al., 2009; Xing and Zhou, 2018).

[20] Once again, we control for eligibility (a binary variable equal to 1 if $r_{it} > 0$ and 0 otherwise) between treatment year (t) and the year in which we measure the outcome ($t+1$, $t+2$ or $t+3$) to account for auto-correlation in eligibility. We find qualitatively similar results if we do not include these controls.

Relationship Duration

Trust is associated with longer trading relationships (Morisset et al., 2003; Araujo and Ornelas, 2007; Katsikeas et al., 2009; Monarch and Schmidt-Eisenlohr, 2023). Sustaining export relationships depends, for example, on trust from foreign buyers, who must rely on a firm to deliver orders on time, maintain product quality and customer service, and comply with regulations of the destination market.[21] Therefore, if access to credit allows firms to build trust, we should expect an increase in relationship duration among eligible firms.

We test whether the credit guarantee increased the length of trading relationships in *specific product-country pairs*—above and beyond the persistent impact on export activity we document in Table 3. We define a relationship k as the export of a given product (defined at the 4 or 6 digit level) to a particular export destination.[22] For each export relationship k of firm i in year t, we build a relationship duration variable equal to the number of years the relationship lasts. We then consider both the export-value weighted and equal weighted relationship duration across k at the firm-year level (*Weighted Relationship Duration* and *Mean Relationship Duration*, respectively). Because relationship duration is mechanically truncated by our sample period, we include indicator variables for each year in our regression discontinuity specification.

Table A9 shows the intention to treat estimates from our RD specification. The findings suggest that program eligibility significantly extends firms' average export relationship duration by approximately 0.11 years (roughly 1.3 months), an approximately 5% increase relative to the mean. This result indicates that access to credit helps firms establish longer exporting relationships, suggesting trust-building is a barrier to export activity. Our estimates are particularly relevant given the typically short duration of export relationships, especially for smaller firms (See, e.g. Albornoz et al., 2012).

[21] Trust is even more important to sustain trade relationships when contract enforcement is lenient. For example, Egan and Mody (1992), through a series of interviews with U.S. entrepreneurs in the bicycle and footwear industries, find that "buyers consider trust an essential adjunct to formal legal agreements, and some even use trust as a substitute."

[22] It is important to note that this definition does not guarantee that the trade partner firm remains the same throughout the entire duration of the relationship. Nevertheless, it captures the degree to which a firm can fulfill the demand for a particular product in a particular destination market.

5.4 Quality Upgrading as Source of Entry Costs

As a second source of entry costs, we consider the role of quality upgrading. This analysis is partially motivated by the results in Table 4, which suggest the existence of fixed costs of exporting new products. To compete in a new market, a firm must ensure that its product meets the standards and tastes of local demand. Because high-income countries tend to demand high quality goods (Khandelwal, 2010), the ability to produce these goods to sell abroad is seen as crucial component of economic development (Kremer, 1993; Amiti and Khandelwal, 2013). Consequently, a large literature has developed exploring the barriers that prevent firms from producing and exporting the products high-income countries demand (see Verhoogen, 2021, for a review).

We ask whether access to credit acts as an important hurdle preventing firms from upgrading quality to reach new export destinations. The key empirical challenge is that quality is often difficult to observe and quantify. As a starting point, we consider a measure based on the unit prices of exports sold within narrow (8-digit) product$\times$ destination $\times$ year categories. Specifically, we examine the deviation of the log price charged by firm i for good j in destination c and year t (p_{ijct}), relative to the average log price for the same product $\times$ destination $\times$ year. We focus on the residuals $\hat{\varepsilon}_{ijct}$ from the following regression:

$$y_{ijct} = \delta_{jct} + \varepsilon_{ijct}.$$

Where y_{ijct} corresponds to $Log(Export\ Price)$. The basic intuition is that differences in prices within narrow product categories should reflect vertical quality differentiation, all else equal. However, there are several potential issues with this measure, as output price might reflect factors such as mark-ups, horizontal differentiation, or other relationship-or-location specific factors.

An alternative approach, following Kugler and Verhoogen (2011) and Bastos et al. (2018), looks at the *input* prices paid by exporters. If higher output prices reflect market power (or other sources of markups), we would expect firms to pay *lower* prices in input markets. On the other hand, if higher quality outputs require higher quality inputs, we should expect high-quality exporters to pay more for inputs. We consider two sources of inputs, import unit prices paid by exporting SMEs within narrow import product $\times$ origin country $\times$ year categories, and IAPI survey data on

manufacturing input prices at the input-year level.[23] We once again focus on the residuals of unit prices relative to the product-country-year, product year, or product mean. For both import and input prices, we restrict our analysis to exporting firms, although the results are similar when we consider the sample of all firms (See Table A10).

We report our results in Table 7. We condition our sample on the set of firms that export (or import/use as an input) the product in question in 2007. Columns 1 and 2 show that credit access induces a modest increase in the quality of exported goods. The point estimates indicate that eligibility increases average unit prices by 3-4% (depending on whether we consider product-year or product-country-year residuals). These estimates are not precisely estimated—column 2 is significant at 10% level. However, in the third and fourth columns, we show that eligibility significantly increases import unit prices (by 6-10%, again depending on the residualization). The last two columns report the effect on $Log(Input\ Price)$. We find that eligibility is associated with a roughly 11% increase in the price of inputs (although these estimates are imprecise and not statistically significantly different from 0).[24]

As an alternative case-study on the role of quality upgrading, Appendix C considers the impact of credit guarantees on a set of major Portuguese exports — Wine, Olive Oil, and Cork — that have well established metrics of quality observable in our export data. We focus specifically on transactions with relatively wealthy North American destinations. We find suggestive evidence that credit access is associated with an increase in the probability that transactions are high quality, particularly for wine.

Together, these results provide suggestive evidence that access to credit enables firms to improve the quality of goods they produce and export. While more research is necessary to examine the connection between credit access, financial frictions, and product quality, our results indicate that the need to alter production processes to match demand in foreign markets may form a portion of the entry costs firms pay to access a new destination.

[23]Note that this survey is only applied to a restricted set of Portuguese manufacturing firms, so our sample size and statistical power are limited. As a result, while the sample of imported goods cover both intermediary and finished inputs, the bulk of inputs in the sample of manufacturing firms are most likely intermediary inputs for production.

[24]Furthermore, Table A11 indicates that access to credit increases the probability a firm is an importer, suggesting that the access to credit widens the range of input sources of the firm.

6 Conclusion

In this paper we show that credit access is a driver of a firm's decision to export, and of the scope and scale of the firm's export activity. We focus on the implementation of a unique credit guarantee scheme, the SME-Leader program, for small and medium sized enterprises in Portugal between 2008-2014. We implement a regression discontinuity design to compare firms that barely qualified for the program to similar firms that just failed to qualify. In this setting, we are able to establish the causal effect of access to finance through the program. Our setting differs from past empirical work on the role of financial frictions in international trade as we study a *positive* shock to credit provided by the government guarantee scheme.

We find that access to the credit guarantee scheme increases the probability of exporting, the number of export destinations, and the total value of a firm's exports. Furthermore, it also increases the variety of products a firm sells abroad. We reconcile our findings with the previous literature, which has found mostly intensive margin effects of credit constraints, by highlighting the asymmetry of credit supply shocks in a context with sunk entry costs. A positive shock enables a new set of firms to incur the entry cost necessary to export. Conversely, a negative shock may have little extensive margin impact on incumbents, who cannot recoup the cost by exiting.

To reinforce this interpretation, we provide further evidence of the challenges of financing sunk entry costs in export markets. We find that the impacts of credit are persistent, and concentrated in smaller and not-yet exporting firms. We show new evidence for two mechanisms through which sunk costs may arise: trust building and product quality upgrading.

In addition to highlighting the importance of credit access for export activity, our paper indicates that government guarantees are an effective policy tool for promoting trade. By substantially reducing lending risks for banks, government guarantees enable SMEs to fund export projects and establish themselves in foreign markets.

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Tables

TABLE 1. Summary Statistics

	Panel A: Unique Firm Characteristics (SCIE)						
	Mean	Std. Dev.	p25	p50	p75	p99	Obs.
Assets (€, in thousands)	2,078	2,423	505	1,135	2,633	11,429	33,126
Employees	24.06	16.62	13.00	18.00	29.00	84.00	34,539
Sales (€, in thousands)	2,079	2,352	531	1,136	2,638	10,904	33,043
Net Income (€, in thousands)	34.36	98.18	0.73	11.34	49.31	416.70	32,660
EBITDA (€, in thousands)	146	202	23	72	192	924	32,666
Net Income-to-Assets	0.01	0.06	0.00	0.01	0.04	0.16	33,541
Net Income-to-Equity	0.09	0.20	0.01	0.06	0.16	0.82	32,912
Equity-to-Assets	0.31	0.21	0.16	0.28	0.45	0.77	33,493
EBITDA-to-Assets	0.08	0.08	0.03	0.07	0.12	0.28	33,621
Debt-to-EBITDA	3.05	4.61	0.00	1.73	4.74	20.71	34,010
Sales growth	0.04	0.19	-0.08	0.02	0.14	0.56	32,163
EBITDA growth	-0.20	0.77	-0.55	-0.19	0.16	1.95	31,972
Payables-to-Sales	0.21	0.31	0.07	0.15	0.26	1.24	32,327
Receivables-to-Sales	0.32	0.39	0.11	0.26	0.42	1.52	32,328

	Panel B: Exports and Imports (FTS)						
	Mean	Std. Dev.	p25	p50	p75	p99	Obs.
Exports Value (€, in thousands)	243	946	0	0	0	5,446	244,880
Exporting Firm	0.25	0.44	0.00	0.00	1.00	1.00	244,880
Number of Export Destinations	1.17	3.76	0.00	0.00	1.00	20.00	244,880
Number of Export Products	4.41	22.16	0.00	0.00	1.00	92.00	244,880
Value-Weighted Avg. Relationship Duration (Years)	2.74	2.49	0.25	2.42	4.49	8.86	64,184
Avg. Relationship Duration (Years)	2.02	1.96	0.25	1.60	3.11	8.00	64,184
Exporting Firms:							
Import Volume (€, in thousands)	513	1,325	0	0	322	7,222	127,332
Importing Firm	0.42	0.49	0.00	0.00	1.00	1.00	127,332
Number of Origin Countries	2.18	3.92	0.00	0.00	3.00	18.00	127,332
Number of Imported Products	14.39	55.07	0.00	0.00	8.00	224.00	127,332

	Panel C: Export, Import and Input Prices (FTS and IAPI)						
	Mean	Std. Dev.	p25	p50	p75	p99	Obs.
Export Price (€)	97	12,198	3	10	30	343	5,009,733
Log(Export Price)	2.26	1.61	1.18	2.28	3.41	5.84	5,009,731
Exporting Firms:							
Import Price (€)	171	9,413	4	15	50	967	9,353,828
Log(Import Price)	2.71	1.78	1.45	2.71	3.90	6.87	9,353,828
Input Price (€)	98	3,168	1	2	5	853	72,577
Log(Input Price)	0.82	2.08	-0.30	0.63	1.66	6.75	72,577

This table displays summary statistics for the variables used in the paper. Panel A displays unique firm financial and operational characteristics for 2010, the first year in which all variables are available for all firms in the sample. For all the remaining panels, the time period considered is 2008-2014.

TABLE 2. Impact of Eligibility on Export Activity

	Ext. Margin Export Choice	Export Destinations	Number of Exported Products	Export Value
Program Eligibility	0.029***	0.206***	1.272***	51.731***
	(0.006)	(0.051)	(0.315)	(11.442)
Robust CI	[.013 ; .04]	[.08 ; .301]	[.661 ; 2.042]	[24.986 ; 74.788]
Bandwidth	0.312	0.389	0.416	0.494
Kernel Type	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.254	1.168	4.409	242.925

This table shows the intention to treat estimates for the impact of firm certification on Extensive Margin Export Choice, Export Destinations, Number of Exported Products and Export Value, respectively, based on our regression discontinuity design. *Extensive Margin Export Choice* is a binary variable that takes the value of 1 if a firm registered a positive value of exports in a given year, and 0 otherwise. *Export Destinations* corresponds to the number of countries for which a firm exports, per year. *Number of Exported Products* equals the Number of Exported Products (eight-digit code) that each firm exports, per year. *Export Value* corresponds to the total value of exports of each firm by year. All outcome variables are retrieved from the FTS database. This table shows estimates where the outcome variables are observed in the 12 months following the official certification announcement. The estimates refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE 3. Persistence of the Impact of Eligibility on Export Activity, Export Destinations and Number of Exported Products

	Panel A					
	Ext. Margin Export Choice			Export Destinations		
	T+1	T+2	T+3	T+1	T+2	T+3
Program Eligibility	0.033***	0.034***	0.034***	0.160***	0.156***	0.148**
	(0.006)	(0.006)	(0.007)	(0.055)	(0.058)	(0.066)
Robust CI	[.017 ; .045]	[.021 ; .048]	[.022 ; .051]	[.031 ; .269]	[.026 ; .28]	[.013 ; .302]
Bandwidth	0.393	0.526	0.485	0.470	0.536	0.473
Kernel Type	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.276	0.291	0.300	1.332	1.466	1.555

	Panel B					
	Number of Exported Products			Export Value		
	T+1	T+2	T+3	T+1	T+2	T+3
Program Eligibility	0.982**	0.780*	1.179***	36.339***	39.925**	20.654
	(0.388)	(0.398)	(0.387)	(12.129)	(16.498)	(17.445)
Robust CI	[.271 ; 1.945]	[.024 ; 1.779]	[.468 ; 2.138]	[8.601 ; 60.826]	[8.977 ; 80.736]	[-12.121 ; 63.506]
Bandwidth	0.360	0.375	0.436	0.590	0.321	0.313
Kernel Type	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	4.951	5.316	5.359	274.252	302.091	310.373

This table shows the intention to treat estimates for the impact of firm certification on the Extensive Margin Export Choice, Export Destinations, Number of Exported Products and Export Value, based on our regression discontinuity design. We control for eligibility (binary variable equal to 1 if $r_{it} > 0$ and 0 otherwise) between treatment year (t) and the year in which we measure the outcome ($t+1$, $t+2$ or $t+3$). *Export Value* corresponds to the total value of exports of each firm by year. *Extensive Margin Export Choice* is a binary variable that takes the value of 1 if a firm registered a positive value of exports in a given year, and 0 otherwise. *Export Destinations* corresponds to the number of countries for which a firm exports, per year. *Number of Exported Products* equals the Number of Exported Products (eight-digit code) that each firm exports, per year. All outcome variables are retrieved from the FTS database. This table shows estimates where the outcome variables are observed one (t+1), two (T+2) and three (t+3) years after the official certification announcement. The estimates are based on *Program Eligibility* in the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE 4. Impact of Eligibility on the Extensive Margin of Exports: Heterogeneity by Prior Exporters Status

	Ext. Margin Export Choice			
	Within-Country		Within-Product	
	Non-Exporters in $t-1$	Exporters in $t-1$	Non-Exporters in $t-1$	Exporters in $t-1$
Program Eligibility	0.00039***	-0.00432	0.00046***	-0.00716
	(0.00008)	(0.00845)	(0.00009)	(0.01426)
Robust CI	[0 ; .001]	[-.026 ; .012]	[0 ; .001]	[-.042 ; .022]
Bandwidth	0.51060	0.50755	0.31910	0.53282
Kernel Type	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.002	0.732	0.001	0.540

This table shows the intention to treat estimates for the impact of firm certification on the Extensive Margin Export Choice based on our regression discontinuity design, for prior exporters and non-exporters. The outcome variables are retrieved from the FTS database. This table shows estimates where the outcome variables are aggregated for the 12 months following the official certification announcement. The estimates refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE 5. Heterogeneous Effects of Eligibility

	Panel A: Firm Size							
	Larger Firms				Smaller Firms			
	Ext. Margin Export Choice	Export Destinations	Number of Products	Export Value	Ext. Margin Export Choice	Export Destinations	Number of Products	Export Value
Program Eligibility	0.005	0.036	0.995*	5.284	0.034***	0.028	0.039	3.631
	(0.009)	(0.087)	(0.587)	(23.129)	(0.006)	(0.040)	(0.188)	(4.899)
Robust CI	[-.014 ; .023]	[-.169 ; .214]	[-.065 ; 2.467]	[-39.09 ; 62.643]	[.02 ; .046]	[-.07 ; .096]	[-.432 ; .377]	[-8.662 ; 11.933]
Bandwidth	0.581	0.510	0.418	0.393	0.562	0.284	0.284	0.245
Kernel Type	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.380	1.816	6.775	378.581	0.121	0.341	1.143	38.821

	Panel B: Payables-to-Sales							
	High Payables-to-Sales				Low Payables-to-Sales			
	Ext. Margin Export Choice	Export Destinations	Number of Products	Export Value	Ext. Margin Export Choice	Export Destinations	Number of Products	Export Value
Program Eligibility	0.058***	0.279***	2.088***	59.361**	0.019*	0.275***	1.024**	40.145**
	(0.012)	(0.103)	(0.684)	(25.578)	(0.011)	(0.076)	(0.420)	(15.887)
Robust CI	[.032 ; .084]	[.051 ; .509]	[.847 ; 3.766]	[7.916 ; 120.561]	[-.008 ; .037]	[.105 ; .445]	[.129 ; 2.03]	[9.256 ; 78.738]
Bandwidth	0.413	0.405	0.303	0.372	0.259	0.415	0.418	0.339
Kernel Type	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.356	1.670	6.478	318.300	0.195	0.941	3.204	173.591

This table shows the intention to treat estimates for the impact of firm certification on the Extensive Margin Export Choice, Export Destinations, Number of Products and Export Value based on our regression discontinuity design. Panel A presents the heterogeneous results for firms of different size. Larger firms are defined as those with total value of assets above the median. Smaller firms are those with total value of assets below the median. Panel B presents the results for firms with payables-to-sales ratio above and below the median. Panel C splits the sample according to firm productivity, defined as total sales per employee. *Extensive Margin Export Choice* is a binary variable that takes the value of 1 if a firm registered a positive value of exports in a given year, and 0 otherwise. *Export Destinations* corresponds to the number of countries for which a firm exports, per year. *Number of Products* equals the number of products (eight-digit code) that each firm exports, per year. *Export Value* corresponds to the total value of exports of each firm by year. All outcome variables are retrieved from the FTS database. This table shows estimates where the outcome variables are aggregated for the 12 months following the official certification announcement. The estimates refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE 6. Impact of Eligibility on Trade Credit

	Panel A: Exporters							
	Payables-to-Sales				Receivables-to-Sales			
	T	T+1	T+2	T+3	T	T+1	T+2	T+3
Program Eligibility	0.007*	0.007	0.017***	0.021***	-0.009*	-0.003	0.009	0.013**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)
Robust CI	[-.002 ; .015]	[-.005 ; .015]	[.008 ; .025]	[.011 ; .03]	[-.022 ; .001]	[-.019 ; .008]	[-.005 ; .02]	[-.002 ; .025]
Bandwidth	0.483	0.361	0.489	0.462	0.430	0.301	0.412	0.473
Kernel Type	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.220	0.217	0.215	0.211	0.348	0.350	0.351	0.349

	Panel B: Full Sample							
	Payables-to-Sales				Receivables-to-Sales			
	T	T+1	T+2	T+3	T	T+1	T+2	T+3
Program Eligibility	0.014***	0.015***	0.020***	0.024***	0.004	-0.001	0.015**	0.032***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.006)	(0.007)	(0.006)	(0.007)
Robust CI	[.005 ; .021]	[.005 ; .022]	[.011 ; .028]	[.014 ; .033]	[-.012 ; .014]	[-.019 ; .011]	[-.001 ; .026]	[.017 ; .048]
Bandwidth	0.432	0.372	0.439	0.393	0.353	0.235	0.312	0.501
Kernel Type	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.208	0.205	0.203	0.198	0.319	0.321	0.323	0.320

This table shows the intention to treat estimates for the impact of firm certification on Payable-to-Sales and Receivables-to-Sales, based on our regression discontinuity design. We control for eligibility (binary variable equal to 1 if $r_{it} > 0$ and 0 otherwise) between treatment year (t) and the year in which we measure the outcome ($t+1$, $t+2$ or $t+3$). All outcome variables are retrieved from the SCIE database. *Payables-to-Sales* corresponds to the ratio of account payables to total sales. *Receivables-to-Sales* corresponds to the ratio of account receivables to total sales. This table shows estimates where the outcome variables are measured at the year of certification (T), as well as one (T+1), two (T+2) and three (T+3) years after the award. The estimates are based on *Program Eligibility* being in the period 2010-2014. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

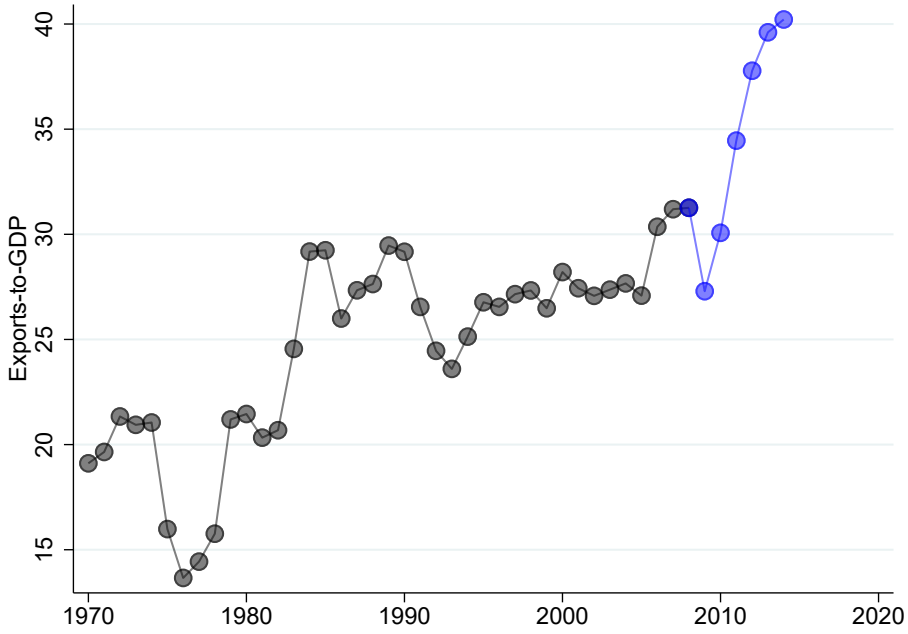
TABLE 7. Impact of Eligibility on Export, Import and Input Prices

	Log(Export Price)		Log(Import Price)		Log(Input Price)	
	Within Product-Year	Within Product-Country-Year	Within Product-Year	Within Product-Country-Year	Within Input	Within Input-Year
Program Eligibility	0.038	0.029*	0.099**	0.061**	0.113	0.115
	(0.024)	(0.018)	(0.049)	(0.030)	(0.099)	(0.100)
Robust CI	[-.005 ; .096]	[-.004 ; .072]	[.005 ; .213]	[.002 ; .133]	[-.106 ; .359]	[-.106 ; .361]
Bandwidth	0.506	0.509	0.360	0.499	0.384	0.379
Kernel Type	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.014	0.017	0.147	0.128	-0.035	-0.034

This table shows the intention to treat estimates for the impact of firm certification on Export, Import and Input prices, based on our regression discontinuity design. In columns 1 and 3, the estimates correspond to within Product-Year estimates. In columns 2 and 4, the estimates presented correspond to within Product-Country-Year estimates. In columns 5 and 6, the estimates presented correspond to within Input and within Input-Year estimates, respectively. Export and Import prices are retrieved from the FTS database. Input prices are retrieved from IAPI database. This table shows estimates where the outcome variables are observed in the 12 months following the official certification announcement. Our sample is restricted to firms for which the minimum of the year-product combination equals 2007. The estimates refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figures

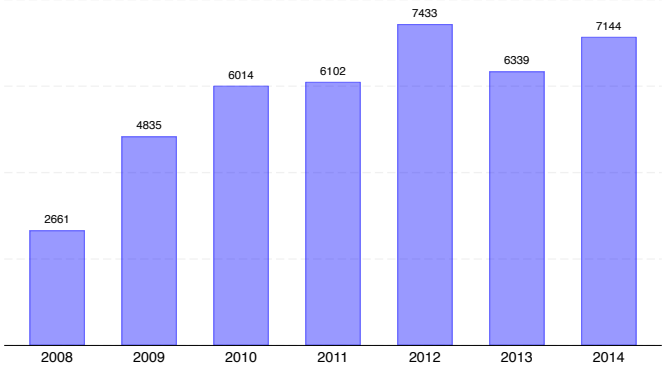
FIGURE 1. Portuguese Export Value-to-GDP



Source: World Bank, World Development Indicators (Portugal)

FIGURE 2. Program Participation

(a) Number of Certified Firms



(b) Number of Certified Firms for the First Time

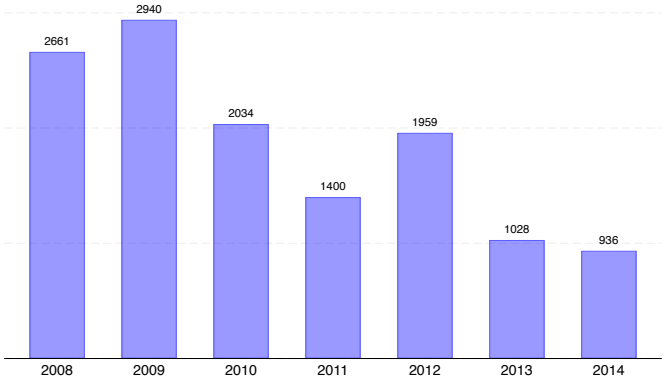
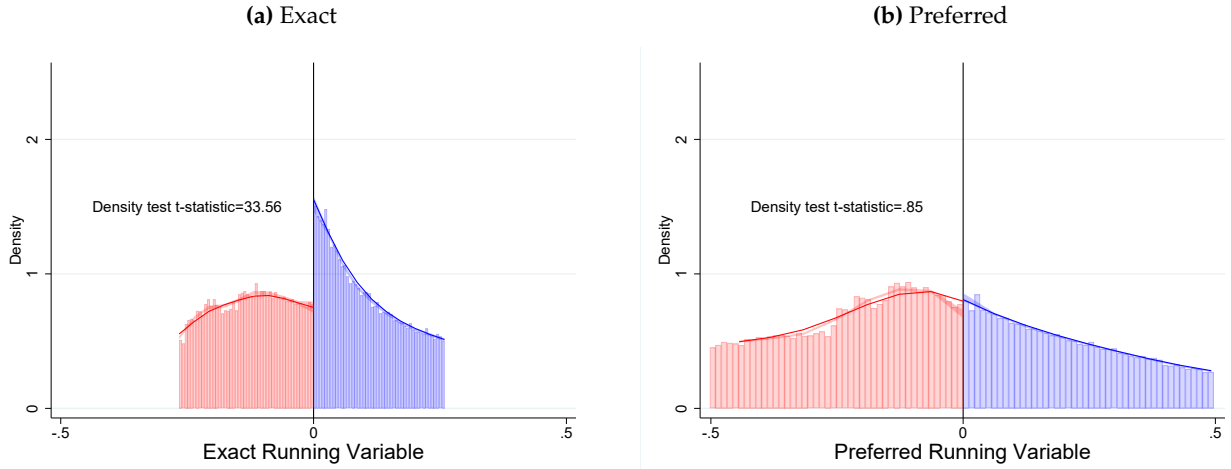
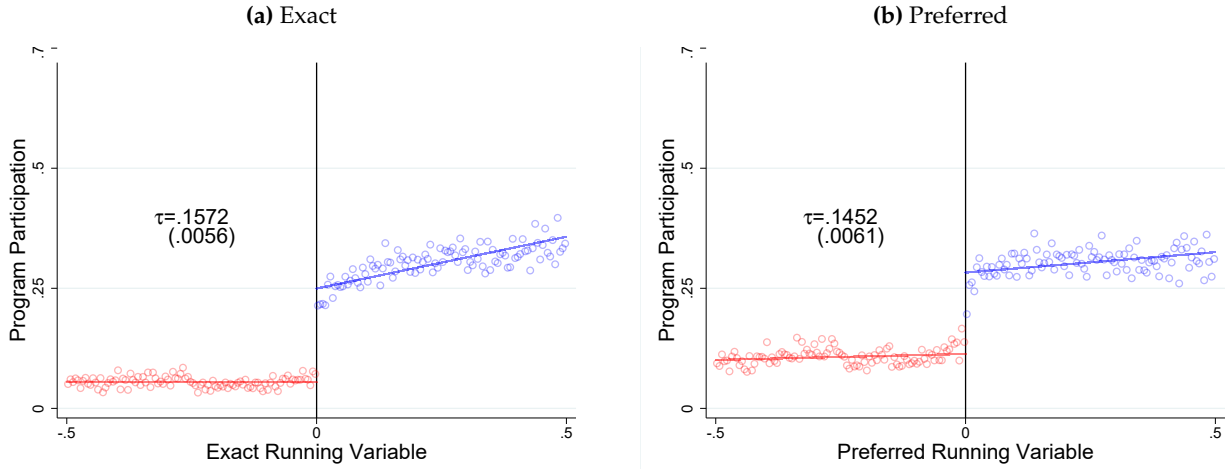


FIGURE 3. Density Tests for Multivariate Scores



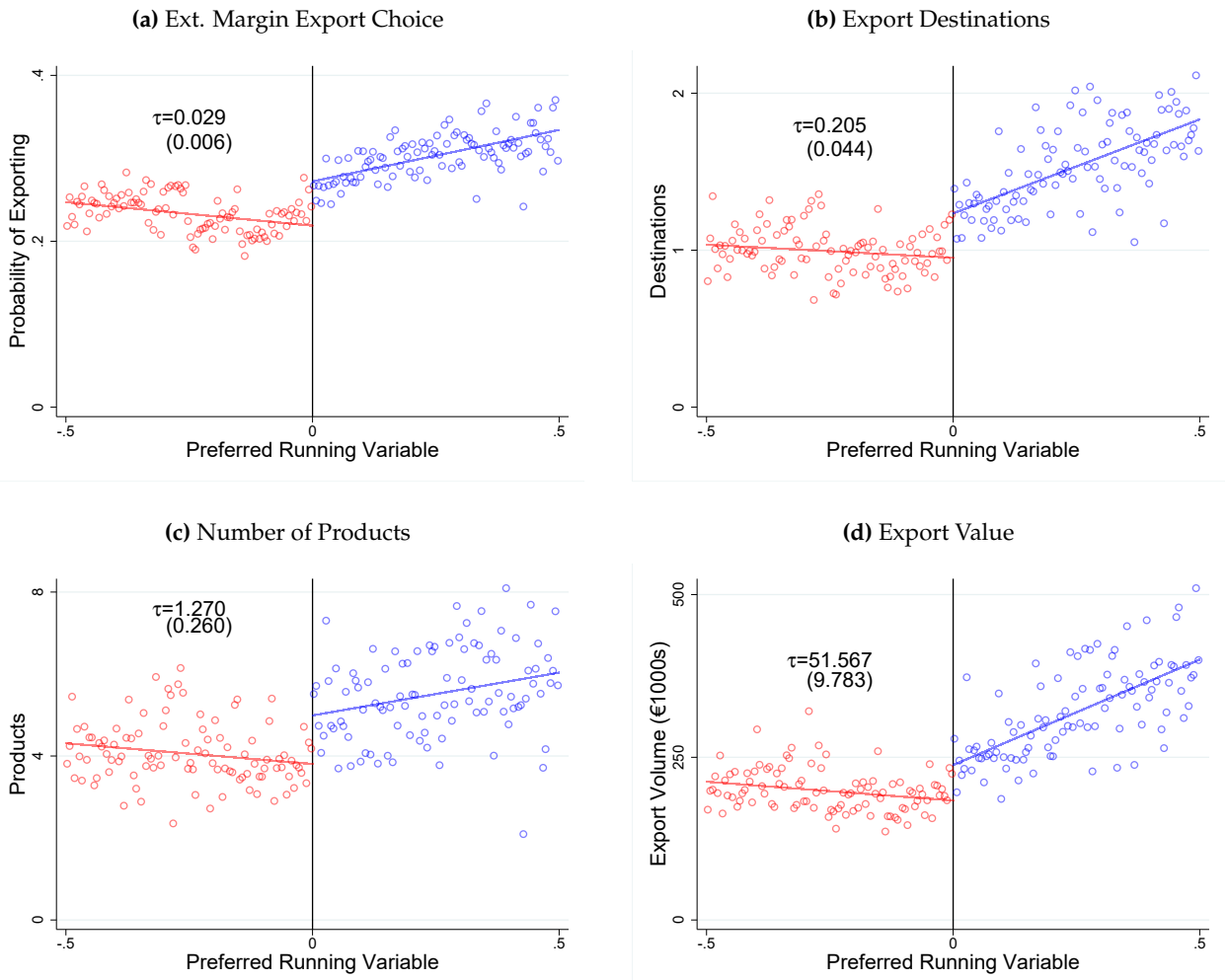
This figure shows Cattaneo et al. (2018) density tests around the threshold for the two running variables presented in section 4. The *Exact* running variable incorporates all criteria. The *Preferred* running variable considers all criteria except positive net income. The time period considered is 2008-2014.

FIGURE 4. Impact on Certification



This figure shows the intention to treat estimates for the impact of firm certification on the program take-up, based on our regression discontinuity design. The *Exact* running variable incorporates all criteria. The *Preferred* running variable considers all criteria except positive net income. The time period considered is 2008-2014.

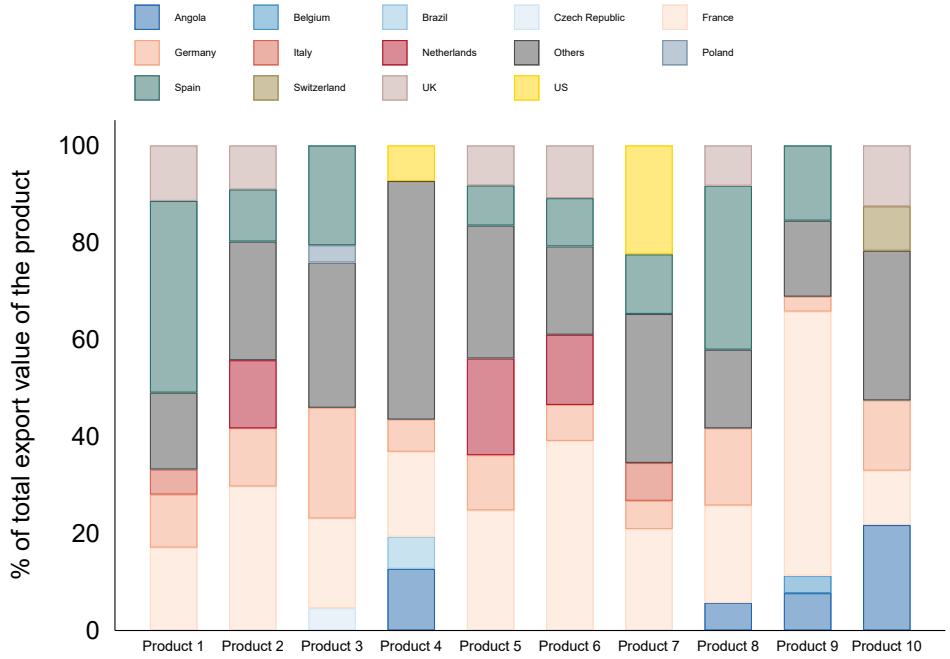
FIGURE 5. Impact of Eligibility on Export Activity



This figure shows the intention to treat estimates for the impact of firm certification based on our regression discontinuity design. This figure shows estimates where the outcome variables are observed in the 12 months following the official certification announcement. The estimates refer to the 2008-2014 period.

A Appendix: Tables and Figures

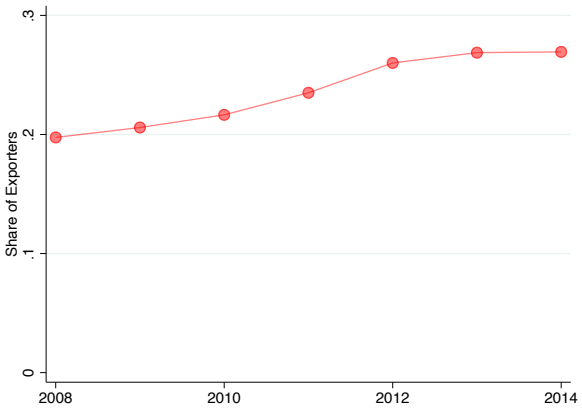
FIGURE A1. Top 10 exported products between 2008 and 2014, by destination country



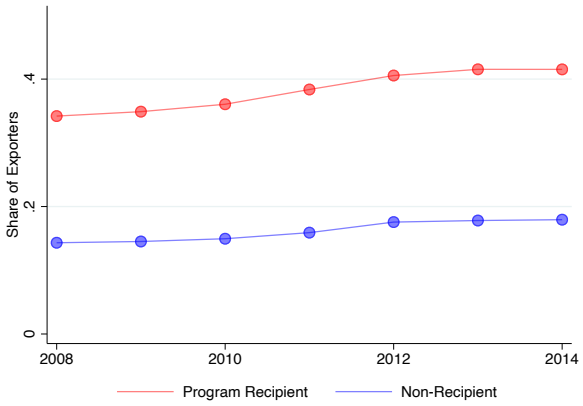
	Product Description
Product 1	T-shirts, undershirts, and similar knitted articles - *Made of cotton*
Product 2	Footwear with an outer sole of rubber, plastic, natural leather, or reconstituted leather and an upper part made of natural leather - *Other*
Product 3	Casting boxes; bottom plates for molds; mold patterns; molds for metals (excluding ingot molds), metallic carbides, glass, mineral materials, rubber, or plastics - *For injection molding or compression molding*
Product 4	Wines from fresh grapes, including wines enriched with alcohol - *in containers with a capacity not exceeding 2 liters*
Product 5	Footwear with an outer sole of rubber, plastic, natural leather, or reconstituted leather and an upper part made of natural leather - *covering the ankle*
Product 6	Footwear with an outer sole of rubber, plastic, natural leather, or reconstituted leather and an upper part made of natural leather - *Other*
Product 7	Natural Corks
Product 8	Parts and accessories of motor vehicles - *Others*
Product 9	Other furniture and their parts - *Other wooden furniture*
Product 10	Medicines (except products of positions 3002, 3005, or 3006) consisting of mixed or unmixed products, prepared for therapeutic or prophylactic purposes, presented in doses (including those intended to be administered percutaneously) or packaged for retail sale

FIGURE A2. Time Series of Exports

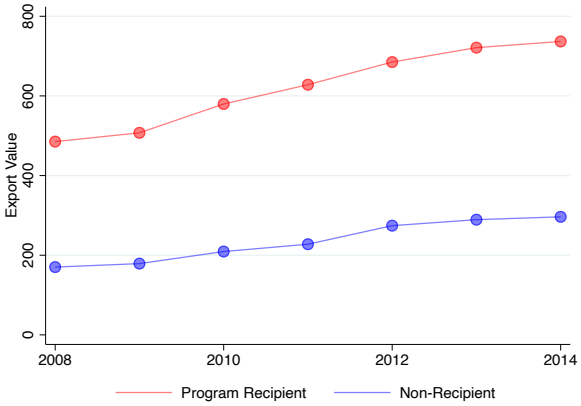
(a) Average Share of Exporters



(b) Average Share of Exporters



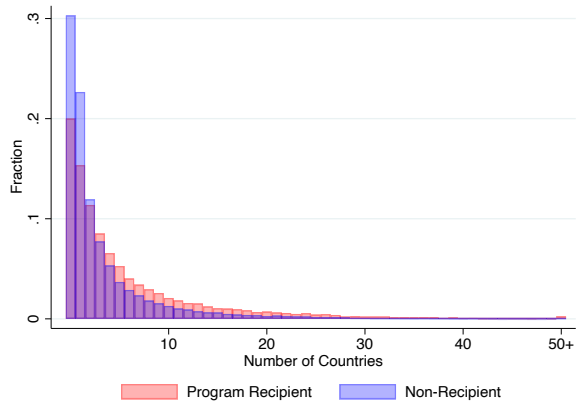
(c) Average Export Value



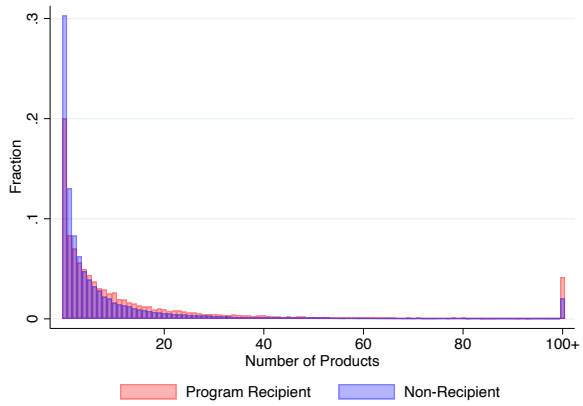
This figure shows the time series of average share of exporters and export value by year, for program recipients and non-recipients. Program recipients are defined as firms that were certified as *SME-Leader* at least once during our sample period.

FIGURE A3. Distribution of Export Destinations and Number of Products

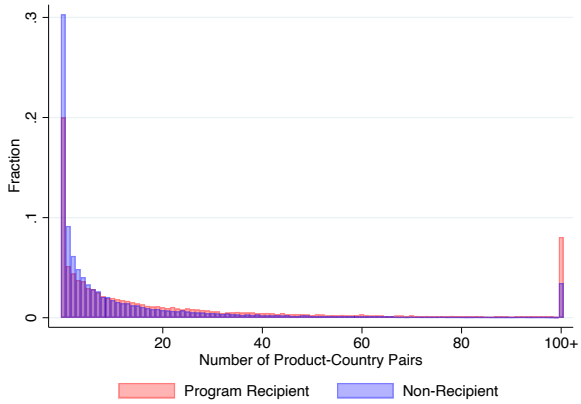
(a) Number of Export Destinations



(b) Number of Products

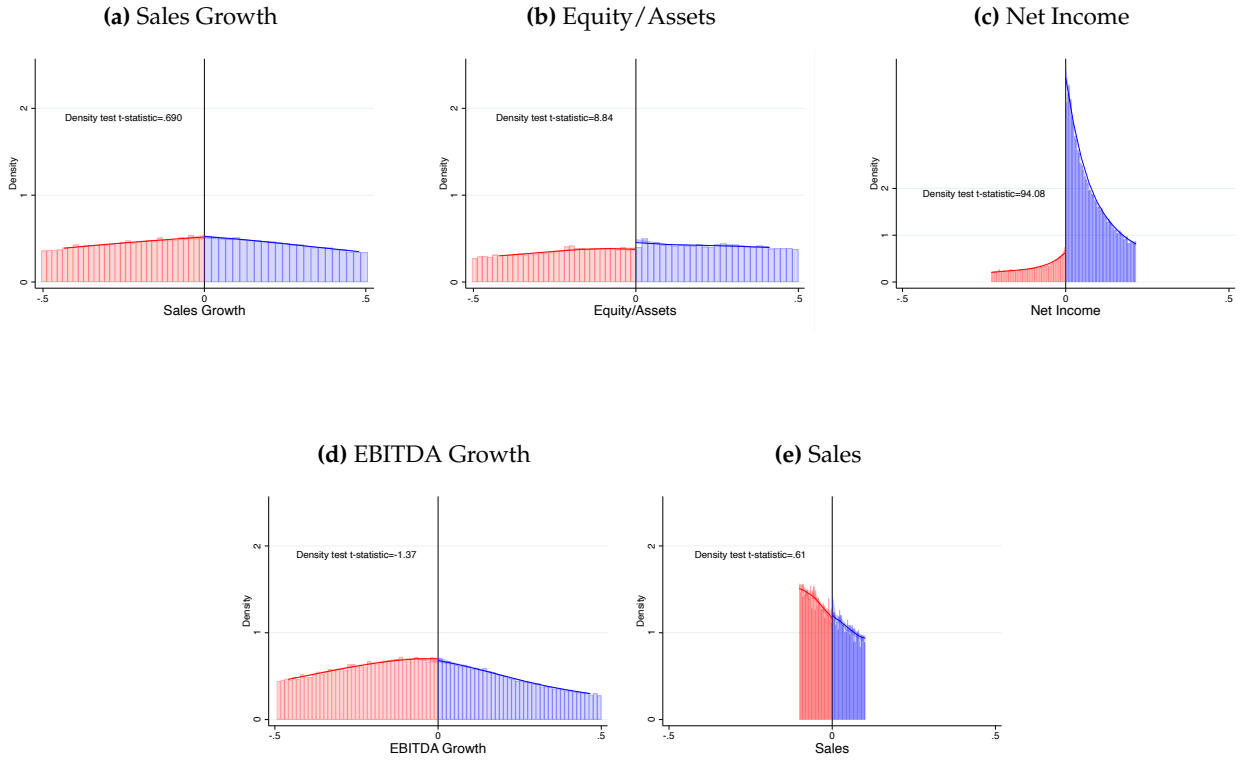


(c) Number of Product-Country Pairs



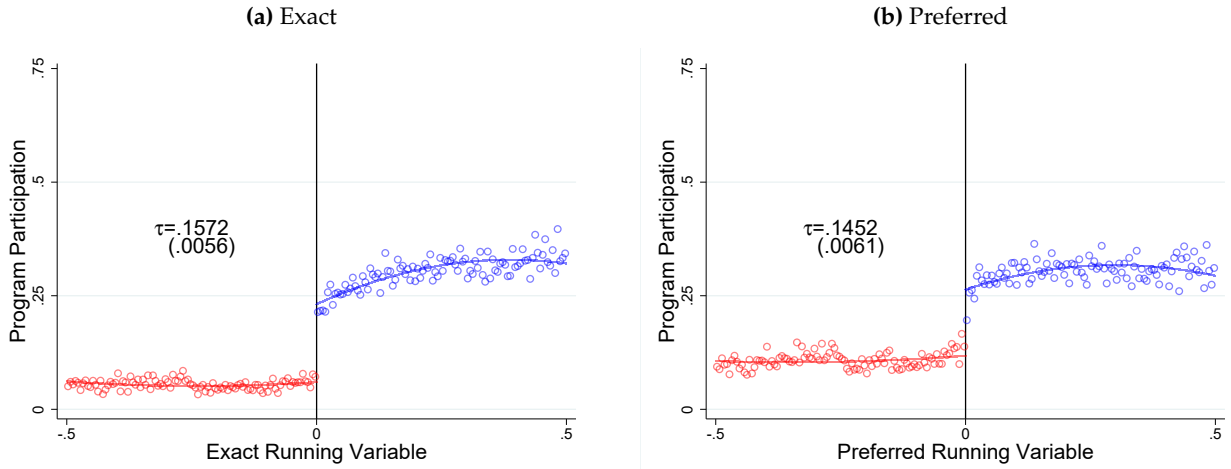
This figure shows the distribution of the number of Export Destinations, Number of Products and Number of Product-Country pairs for program recipients and non-recipients. Program recipients are defined as firms that were certified as *SME-Leader* at least once during our sample period.

FIGURE A4. Density Tests for Individual Criterion



This figure shows Cattaneo et al. (2018) density tests around the threshold for all the individual criteria considered for eligibility. Variables are standardized. The time period considered is 2008-2014.

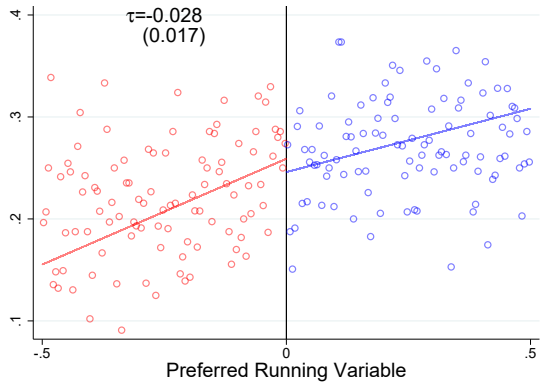
FIGURE A5. Impact on Certification



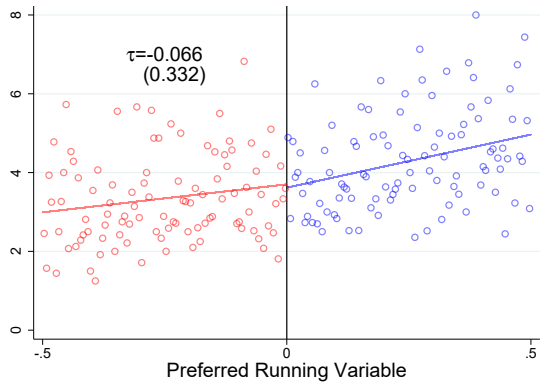
This figure shows the intention to treat estimates for the impact of firm certification on the program take-up, based on our regression discontinuity design. The *Exact* running variable incorporates all criteria. The *Preferred* running variable considers all criteria except positive net income. The figure presents second-order polynomials approximations around the threshold. The time period considered is 2008-2014.

FIGURE A6. Placebo Exercise

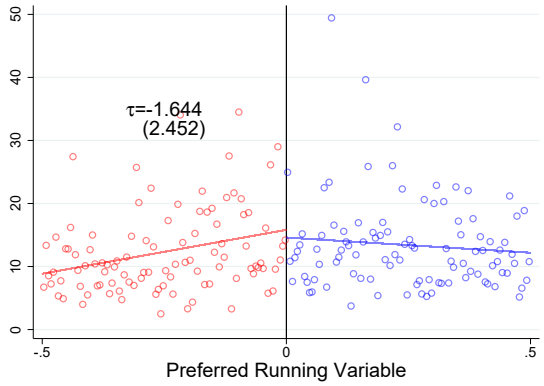
(a) Ext. Margin Export Choice



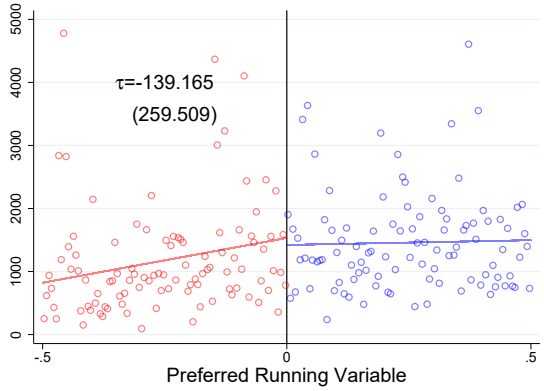
(b) Number of Countries



(c) Number of Products



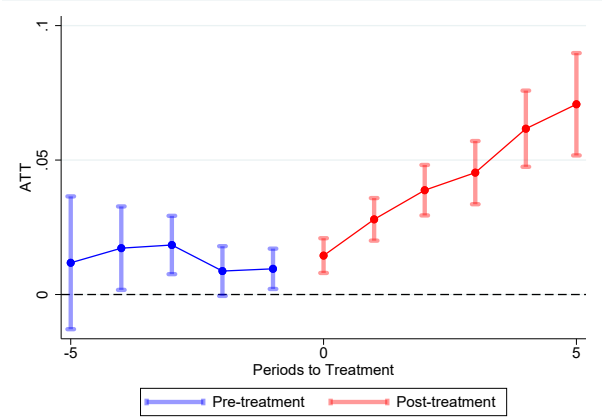
(d) Export Value (Thousands)



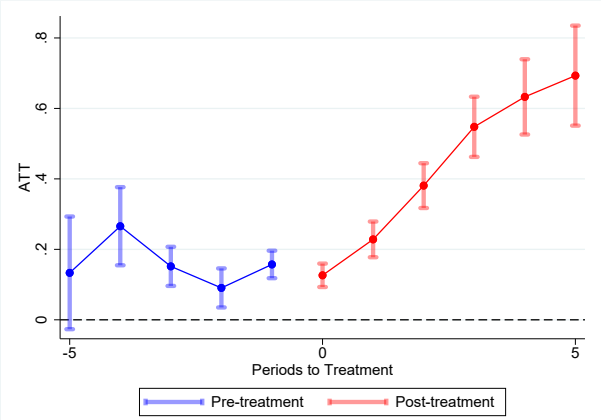
This figure shows the RD results of the placebo exercise described in Section 4. In this exercise, we simulate the introduction of the SME-Leader Program in 2007, one year prior to its actual implementation. We calculate the *preferred* running variable for 2007, assuming the same criteria as for 2008. We then apply our main regression discontinuity specification to the four main outcome variables.

FIGURE A7. Dynamic ATTs: Event-Study

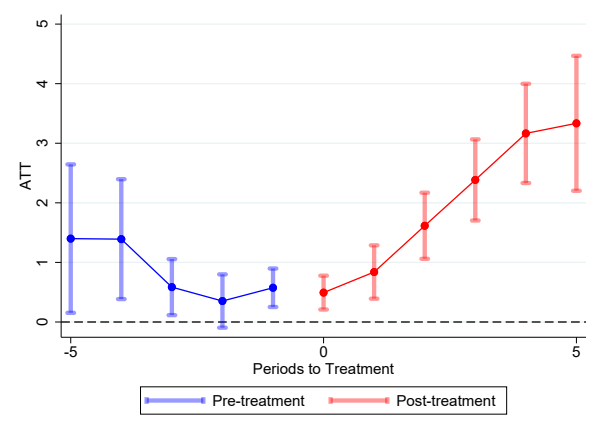
(a) Ext. Margin Export Choice



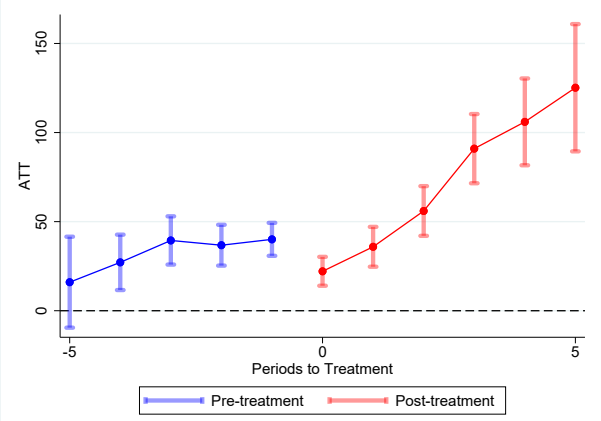
(b) Export Destinations



(c) Number of Exported Products



(d) Export Value



This figure shows the ATT of firm certification on the main outcome variables. This figure depicts the difference in first-differences in the pre-period, and the difference relative to $t-1$ for all post-periods. The time period considered is 2008-2014.

TABLE A1. Summary of Related Empirical Literature

	Setting and Data	Identification Strategy	Main Empirical Results
Zia (2008)	The Central Bank of Pakistan provides subsidized loans to domestic firms that export an eligible set of commodities. The authors exploit a shock to the supply of subsidized credit combined with loan-level data from the export sector in Pakistan to identify the impact and allocation of such financial incentives	Exogenous change in eligibility resulted in the subsidies being discontinued for a specific commodity: cotton yarn	The removal of subsidized credit causes a significant decline in the exports of privately owned firms, while the exports of large, publicly listed, and group network firms are unaffected
Minetti and Zhu (2011)	Survey data from Italian manufacturing firms in 2001	Instrumental variable approach exploiting the exogenous restrictions on the local supply of banking services	Probability of exporting is 39% lower for credit rationed firms and rationing reduces foreign sales by more than 38%
Bricongne et al. (2012)	Export data and firm-level credit constraints data for French firms during the 2008–2009 financial crisis		The effect of the crisis on large firms has been mainly at the intensive margin and has resulted in a smaller portfolio of products being offered to export destinations. The effect on smaller exporters has been to reduce the range of destinations served or to stop exporting altogether. Credit constraints have been an added aggravation for firms active in high financial dependence sectors
Manova (2013)	Exploits variation in financial development across 107 countries and variation in financial vulnerability across 27 sectors from 1985 to 1995		20%–25% of the impact of credit constraints on trade is driven by reductions in total output. As for trade-specific effect, one-third reflects limited firm entry into exporting, while two-thirds are due to contractions in exporters' sales
Muûls (2015)	Firm-level trade transaction data, balance sheets and credit scores from an independent credit insurance company for Belgian manufacturing firms between 1999 and 2007	Exploits an yearly measure of the creditworthiness of firms established by an institution external to the firm	Firms that enjoy lower credit constraints and bankruptcy risk are more likely to export. On the extensive margins, they export more products to more destinations. The same patterns hold for imports.
Paravisini et al. (2015)	Study the effect of bank credit shocks on the export behaviour of Peruvian firms during the 2008 financial crisis	1) Instrument for the supply of credit, using shocks to the balance sheet of the banks lending to each firm; 2) control for all unobserved heterogeneity in the cross-section with firm-product-destination fixed effects, and product-country-time dummies	Negative shocks to credit reduce the volume of exports for firms that continue exporting to a given product-destination market (i.e., the intensive margin) and have no impact on the probability that a firm exits or enters new product and destination markets.
Manova et al. (2015)	Universe of China's international transactions in 2005 to assess the impact of credit conditions on different trade margins	Exploit exogenous variation in financial dependence across sectors within multi-sector exporters	Foreign affiliates and joint ventures in China have better export performance than private domestic firms in financially more vulnerable sectors. These results are stronger for destinations with higher trade costs. Results imply that financial frictions hinder firms' trade flows
Akgündüz et al. (2018)	The authors exploit a rediscount credit policy of the Central Bank of the Republic of Turkey (CBRT) thath essentially allows exporting firms to receive credit with low interest rates and minimal collateral.	Use propensity score matching to construct a control group of firms and compare the credit-receiving firms before and after 2012 in a difference-in-differences framework	Credit receiving firms increased their exports by 65% and total sales by 19% compared to matched firms. Effects are larger for smaller firms
Monteiro and Moreira (2023)	Portuguese firm-level international trade transactions (FTS), combined with Credit and accounting data between 2011 and 2018	Exogenous shock to access to credit: implementation of Basel III, posing that banks must maintain a minimum level of equity relative to risk-weighted assets.	Exports to high-risk destinations decrease by as much as 8 percent compared to exports to low-risk destinations following the shock. Entry into these high-risk destinations decreases by over 5 percent and exit from high-risk destinations does not change. Products with a high dependence on bank credit explain the bulk of the drop in exports to high-risk destinations

TABLE A2. Summary Statistics: Alternative Export Variables

	Exports (SCIE)						
	Mean	Std. Dev.	p25	p50	p75	p99	Obs.
Exporting Firm	0.45	0.50	0.00	0.00	1.00	1.00	166,290
Total Exports Volume (€, in thousands)	599.56	2,715.46	0.00	0.00	132.49	11,159.73	166,290
Exporting Firm (only goods)	0.33	0.47	0.00	0.00	1.00	1.00	166,290
Exports of Goods (€, in thousands)	451.17	2,473.13	0.00	0.00	20.39	9,592.51	166,290
Exporting Firm (only services)	0.23	0.42	0.00	0.00	0.00	1.00	166,290
Exports of Services (€, in thousands)	148.40	1,104.76	0.00	0.00	0.00	3,270.97	166,290
Export to EU (€, in thousands)	422.83	2,214.12	0.00	0.00	45.93	8,211.37	166,290
Export to non-EU (€, in thousands)	176.74	1,238.25	0.00	0.00	0.49	3,895.12	166,290

This table displays summary statistics for the exports variables recorded on SCIE. The time period considered is 2008-2014. The discrepancies between the FTS and SCIE datasets regarding exports of goods come mostly from the fact that transactions with EU members are recorded trough Instrastat, which only requires firms whose annual value of total exports exceeds a predetermined threshold to provide information on their exports figures.

TABLE A3. Density Tests and the Impact of Eligibility on Certification

	Panel A: Density Tests	
	Exact	Preferred
Conventional	33.56***	0.85

	Panel B: Impact on Certification	
	Exact	Preferred
Program Eligibility	0.157***	0.145***
	(0.006)	(0.006)
Robust CI	[.143 ; .166]	[.13 ; .155]
Bandwidth	0.132	0.217
Kernel Type	Triangular	Triangular
Mean Dep. Variable	0.161	0.162

Panel A of this table shows Cattaneo et al. (2018) density tests around the threshold for the two running variables presented in section 4. Panel B shows the intention to treat estimates for the impact of firm certification on the program take-up, based on our regression discontinuity design. The *Exact* running variable incorporates all criteria. The *Preferred* running variable considers all criteria except positive net income or EBITDA. Both panels refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A4. Impact of Eligibility on Firm Financing

	Log(Total Debt)	Log(Total Loans)	Log(Long-Term Loans)	Log(Short-Term Loans)
Program Eligibility	0.113***	0.184***	0.207***	0.129***
	(0.036)	(0.037)	(0.036)	(0.037)
Robust CI	[.022 ; .171]	[.091 ; .246]	[.117 ; .27]	[.046 ; .213]
Bandwidth	0.191	0.261	0.314	0.407
Kernel Type	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	12.510	12.519	12.275	11.930

This table shows the intention to treat estimates for the impact of firm certification on firm financing, based on our regression discontinuity design. Estimates are based on the SCIE firm-year level data. This table shows estimates where the outcome variables are observed at the year after the award (T+1). All estimates are based on the *Preferred* running variable, which considers all criteria except positive net income. The estimates refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A5. Impact of Eligibility on Export Activity: Robustness to Regression Discontinuity Specification

	Panel A: Local Polynomial							
	Quadratic Polynomial				Cubic Polynomial			
	Ext. Margin Export Choice	Export Destinations	Number of Products	Export Value	Ext. Margin Export Choice	Export Destinations	Number of Products	Export Value
Program Eligibility	0.035***	0.217***	1.372***	47.091***	0.002	0.164**	1.506***	46.992***
	(0.006)	(0.054)	(0.382)	(14.224)	(0.009)	(0.065)	(0.414)	(15.751)
Robust CI	[.02 ; .046]	[.103 ; .332]	[.645 ; 2.255]	[16.853 ; 78.058]	[-.018 ; .018]	[.017 ; .29]	[.692 ; 2.417]	[12.755 ; 78.893]
Bandwidth	0.693	0.787	0.597	0.631	0.553	0.874	0.905	0.892
Kernel Type	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.254	1.168	4.409	242.925	0.254	1.168	4.409	242.925
	Panel B: Kernel							
	Uniform Kernel				Epanechnikov Kernel			
	Ext. Margin Export Choice	Export Destinations	Number of Products	Export Value	Ext. Margin Export Choice	Export Destinations	Number of Products	Export Value
Program Eligibility	0.044***	0.250***	1.146***	52.238***	0.034***	0.215***	1.260***	52.523***
	(0.006)	(0.050)	(0.284)	(11.667)	(0.006)	(0.050)	(0.310)	(11.384)
Robust CI	[.03 ; .055]	[.133 ; .35]	[.553 ; 1.81]	[25.529 ; 76.349]	[.019 ; .045]	[.093 ; .311]	[.662 ; 2.017]	[26.181 ; 75.980]
Bandwidth	0.334	0.346	0.398	0.371	0.323	0.378	0.399	0.460
Kernel Type	Uniform	Uniform	Uniform	Uniform	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Mean Dep. Variable	0.254	1.168	4.409	242.925	0.254	1.168	4.409	242.925
	Panel C: Bandwidth							
	Bandwidth = 0.25				Bandwidth = 0.50			
	Ext. Margin Export Choice	Export Destinations	Number of Products	Export Value	Ext. Margin Export Choice	Export Destinations	Number of Products	Export Value
Program Eligibility	0.022***	0.154**	1.354***	45.370***	0.045***	0.246***	1.236***	51.854***
	(0.007)	(0.061)	(0.390)	(14.926)	(0.005)	(0.047)	(0.292)	(11.396)
Robust CI	[-.017 ; .021]	[-.049 ; .284]	[.375 ; 2.463]	[-.251 ; 79.45]	[.005 ; .034]	[.008 ; .26]	[.588 ; 2.212]	[9.976 ; 71.314]
Bandwidth	0.250	0.250	0.250	0.250	0.500	0.500	0.500	0.500
Kernel Type	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.254	1.168	4.409	242.925	0.254	1.168	4.409	242.925

This table shows the intention to treat estimates for the impact of firm certification on the Extensive Margin Export Choice, Export Destinations, Number of Products and Export Value based on our regression discontinuity design. Panel A displays the estimates using second and third order local polynomial. Panel B displays the estimates using an uniform and Epanechnikov kernel. Panel C displays the estimates using fixed estimation bandwidth equal to 0.25 and 0.5. *Extensive Margin Export Choice* is a binary variable that takes the value of 1 if a firm registered a positive value of exports in a given year, and 0 otherwise. *Export Destinations* corresponds to the number of countries for which a firm exports, per year. *Number of Products* equals the number of products (eight-digit code) that each firm exports, per year. *Export Value* corresponds to the total value of exports of each firm by year. All outcome variables are retrieved from the FTS database. This table shows estimates where the outcome variables are aggregated for the 12 months following the official certification announcement. The estimates refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A6. Impact of Eligibility on Export Activity: SCIE Firm-Year Data

	Total Exports		Exports of Goods		Exports of Services	
	Ext. Margin Export Choice	Export Value	Ext. Margin Export Choice	Export Value	Ext. Margin Export Choice	Export Value
Program Eligibility	0.041***	114.963***	0.040***	80.067**	0.039***	38.614***
	(0.008)	(36.235)	(0.008)	(32.363)	(0.006)	(13.679)
Robust CI	[.02 ; .055]	[39.061 ; 201.004]	[.021 ; .054]	[7.939 ; 153.686]	[.025 ; .051]	[9.916 ; 68.956]
Bandwidth	0.296	0.525	0.351	0.580	0.479	0.428
Kernel Type	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.468	642.616	0.351	486.127	0.235	156.489

This table shows the intention to treat estimates for the impact of firm certification on the Ext. Margin Export Choice and Export Value, based on our regression discontinuity design. Estimate are based on the SCIE firm-year level data. We present the estimates for total exports (including goods and services), exports of goods and exports of services. This table shows estimates where the outcome variables are observed at the year after the award (T+1). All estimates are based on the *Preferred* running variable, which considers all criteria except positive net income. The estimates refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A7. Impact of Eligibility on Domestic Sales: SCIE Firm-Year Data

	Domestic Sales	Log(Domestic Sales)	Exports-to-Sales
Program Eligibility	294.804***	0.127**	1.875***
	(97.059)	(0.050)	(0.401)
Robust CI	[52.45 ; 473.163]	[.003 ; .211]	[.909 ; 2.616]
Bandwidth	0.384	0.258	0.448
Kernel Type	Triangular	Triangular	Triangular
Mean Dep. Variable	2050.339	13.248	12.778

This table shows the intention to treat estimates for the impact of firm certification on domestic sales of goods and exports-to-sales, based on our regression discontinuity design. Estimate are based on the SCIE firm-year level data. This table shows estimates where the outcome variables are observed at the year after the award (T+1). All estimates are based on the *Preferred* running variable, which considers all criteria except positive net income. The estimates refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A8. Impact of Certification on Export Activity: Panel Regressions

	Panel A: Two-way Fixed Effects			
	Ext. Margin Export Choice	Export Destinations	Number of Products	Export Value
Certified Firm	0.018***	0.184***	0.842***	46.658***
	(0.002)	(0.019)	(0.164)	(4.616)
Constant	0.240***	1.076***	4.126***	221.401***
	(0.000)	(0.003)	(0.024)	(0.685)
Observations	267745	267745	267745	267745
Adjusted R-Squared	0.715	0.848	0.691	0.855
Mean Dep. Variable	0.243	1.103	4.251	228.326
Fixed Effects	Firm & Year	Firm & Year	Firm & Year	Firm & Year

	Panel B: Staggered Diff-in-Diff			
	Ext. Margin Export Choice	Export Destinations	Number of Products	Export Value
ATT	0.035***	0.349***	1.526***	57.156***
	(0.004)	(0.025)	(0.199)	(5.795)

This table shows panel regression estimates for the effect of being certified as SME-Leader on Extensive Margin Export Choice, Export Destinations, Number of Products and Export Value. Panel A displays the estimates from tht two-way fixed effects regression. In Panel B, we miplement the procedure suggested by Callaway and Sant'Anna (2021b). *Extensive Margin Export Choice* is a binary variable that takes the value of 1 if a firm registered a positive value of exports in a given year, and 0 otherwise. *Export Destinations* corresponds to the number of countries for which a firm exports, per year. *Number of Products* equals the number of products (eight-digit code) that each firm exports, per year. *Export Value* corresponds to the total value of exports of each firm by year. *Certified Firm* is a binary variable that takes the value of 1 if a firm was certified as SME-Leader in a given year, and 0 otherwise.All outcome variables are retrieved from the FTS database. This table shows estimates where the outcome variables are aggregated for the 12 months following the official certification announcement. The estimates refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A9. Impact of Eligibility on Export Relationships Duration

	4-Digit Product Code		6-Digit Product Code	
	Weighted Rel. Duration	Mean Rel. Duration	Weighted Rel. Duration	Mean Rel. Duration
Program Eligibility	0.113**	0.107**	0.118**	0.111***
	(0.051)	(0.043)	(0.050)	(0.042)
Robust CI	[-.011 ; .21]	[.019 ; .209]	[.002 ; .222]	[.026 ; .211]
Bandwidth	0.568	0.522	0.580	0.486
Kernel Type	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	3.091	2.336	2.747	2.026

This table shows the intention to treat estimates for the impact of firm certification on export relationships duration. *Weighted Relationships Duration* corresponds to the weighted average of the duration (in years) of all the export relationships of each firm in a given year, where the weights are given by the total value exported under each relationship (in year *t*). *Mean Relationships Duration* corresponds to the unconditional average of the export relationships of each firm, in each year. In the first 2 columns, we define an export relationship as exports of a given 4-digit product code to a destination country. In the last 2 columns, we use the 6-digit product classification. This table shows estimates where the outcome variables are observed in the 12 months following the official certification announcement. The estimates refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A10. Impact of Eligibility Import and Input Price: Full Sample

	Log(Import Price)		Log(Input Price)	
	Within Product-Year	Within Product-Country-Year	Within Input	Within Input-Year
Program Eligibility	0.095**	0.056*	0.120	0.122
	(0.048)	(0.030)	(0.078)	(0.078)
Robust CI	[.004 ; .204]	[-.005 ; .127]	[-.03 ; .321]	[-.029 ; .323]
Bandwidth	0.428	0.606	0.386	0.382
Kernel Type	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.131	0.115	-0.014	-0.013

This table shows the intention to treat estimates for the impact of firm certification on Import and Input prices, based on our regression discontinuity design. We consider our full sample. Import prices are retrieved from the FTS database. Input prices are retrieved from IAPI database. The number of observations close to the threshold on Panel A for $Log(InputPrice)$ is insufficient to implement the regression discontinuity specification. This table shows estimates where the outcome variables are observed in the 12 months following the official certification announcement. Our sample is restricted to firms for which the minimum of the year-product combination equals 2007. The estimates refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A11. Impact of Eligibility on Import Activity

	Panel A: Exporters			
	Ext. Margin Import Choice	Countries of Origin	Number of Imported Products	Import Value
Program Eligibility	0.025***	0.061	-0.095	18.393
	(0.009)	(0.071)	(0.958)	(22.537)
Robust CI	[.003 ; .043]	[-.11 ; .2]	[-2.458 ; 1.707]	[-30.544 ; 69.463]
Bandwidth	0.358	0.385	0.397	0.433
Kernel Type	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.425	2.178	14.373	512.720

	Panel B: Full Sample			
	Ext. Margin Import Choice	Countries of Origin	Number of Imported Products	Import Value
Program Eligibility	0.015**	0.037	0.113	31.892**
	(0.007)	(0.048)	(0.635)	(13.353)
Robust CI	[-.004 ; .027]	[-.082 ; .117]	[-1.468 ; 1.228]	[-.516 ; 57.577]
Bandwidth	0.210	0.262	0.320	0.397
Kernel Type	Triangular	Triangular	Triangular	Triangular
Mean Dep. Variable	0.263	1.265	8.941	295.869

This table shows the intention to treat estimates for the impact of firm certification on Extensive Margin Import Choice, Countries of Origin and Number of Imported Products and Import Value, respectively, based on our regression discontinuity design. We restrict our analysis to the sub-sample of exporting firms, those that exported at least once during our sample period. *Extensive Margin Import Choice* is a binary variable that takes the value of 1 if a firm registered a positive value of imports in a given year, and 0 otherwise. *Countries of Origin* corresponds to the number of countries from which a firm imports, per year. *Number of Exported Products* equals the Number of Exported Products (eight-digit code) that each firm imports, per year. *Import Value* corresponds to the total value of imports of each firm by year. All outcome variables are retrieved from the FTS database. This table shows estimates where the outcome variables are observed in the 12 months following the official certification announcement. All estimates are based on the *Preferred* running variable, which considers all criteria except positive net income. The estimates refer to the 2008-2014 period. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

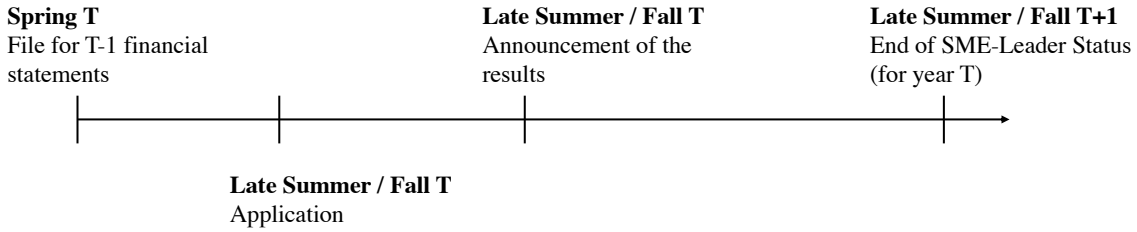
B Appendix: SME-Leader Program Details

TABLE B1. Program Criteria

	Formal	Accounting
2008	- SME Certification - Credit Rating: AAA, AA and A	- Positive growth in business turnover - Equity/Net Assets >=20%
2009	- SME Certification - Credit Rating: AAA, AA and A - Regularized Status with the ficas authority, social security and IAPMEI	- Net income >= 0 or positive growth in business turnover - Equity/Net Assets >=15%
2010	- SME Certification - Financial reports avilable for 1 fiscal year - Credit Rating: AAA, AA and A - Regularized Status with the ficas authority, social security and IAPMEI	- Net income >= 0 or positive growth in business turnover - Equity/Net Assets >=15%
2011	- SME Certification - Financial reports avilable for 3 fiscal years - Credit Rating: AAA, AA and A - Regularized Status with the ficas authority, social security and IAPMEI	- Net income >= 0 - Positive growth in business turnover or EBITDA - Equity/Net Assets >=20% - Business turnover>=500,000€ - No. of Employees (AWU)>=5
2012	- SME Certification - Financial reports avilable for 3 fiscal years - Credit Rating: AAA, AA and A - Regularized Status with the ficas authority, social security and IAPMEI	- Net income >= 0 - Positive growth in business turnover or EBITDA - Equity/Net Assets >=20% - Business turnover>=500,000€ - No. of Employees (AWU)>=5
2013	- SME Certification - Financial reports avilable for 3 fiscal years - Credit Rating: AAA, AA and A - Regularized Status with the ficas authority, social security and IAPMEI	- Net income >= 0 or positive growth in business turnover or EBITDA (with positive EBITDA in 2011 and 2012) - Positive growth in business turnover or EBITDA - Equity/Net Assets >=25% - Business turnover>=750,000€ - No. of Employees (AWU)>=10
2014	- SME Certification - Financial reports avilable for 3 fiscal years - Credit Rating: AAA, AA and A - Regularized Status with the ficas authority, social security and IAPMEI	- Net income >= 0 or positive growth in business turnover or EBITDA (with positive EBITDA in 2012 and 2013) - Positive growth in business turnover or EBITDA - Equity/Net Assets >=25% - Business turnover>=750,000€ - No. of Employees (AWU)>=10

This table summarizes the eligibility for *SME-Leader* between 2008 and 2014. *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 for SMEs and it is obtained electronically through IAPMEI website.

FIGURE B1. SME-Leader Program Timeline



C Appendix: Wine, Cork and Olive Oil

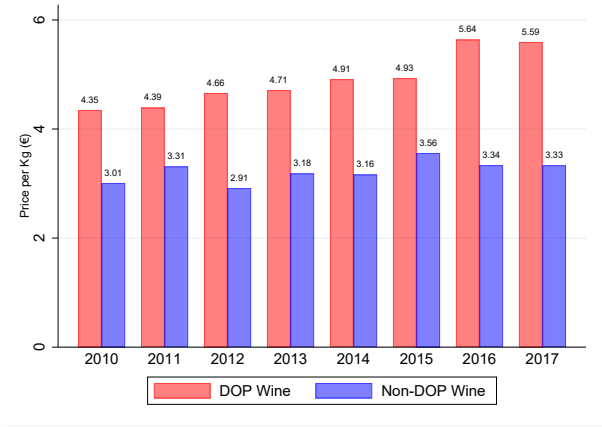
As a final case study exercise, we focus on a set of major Portuguese exports — Wine, Olive Oil, and Cork — that have well established metrics of quality observable in our export data. We define three binary measures of quality. For wine, we compare DOP (Denominação de Origem Protegida) certified wine, the top quality certification, to all other exported wine (Mendes, 2023). For olive oil we compare extra-virgin to virgin and refined oil. For cork, we compare natural versus agglomerated. In each, we identify these distinctions by comparing 8 digit product codes (which represent, for example, extra-virgin vs. virgin olive oil) within broader 6 digit codes (which might indicate olive oil generally). Figure C1 shows that the average unit export price is indeed higher among products classified as higher quality. We focus on exports to wealthy markets, specifically to North America.

Unfortunately, we do not have sufficient observations close to the threshold to estimate our regression discontinuity within these product categories. Hence, we focus on two-way fixed effects panel regressions. In addition, as the DOP certification was only introduced in 2010, we extend our sample period until 2017 to increase the number of available observations. For each category, we consider a transaction level dataset and focus on a binary variable equal to one if the transaction is high quality. As such, our results can be interpreted as the increase in the fraction of transactions that are high quality within firm (weighted by the number of export transactions).

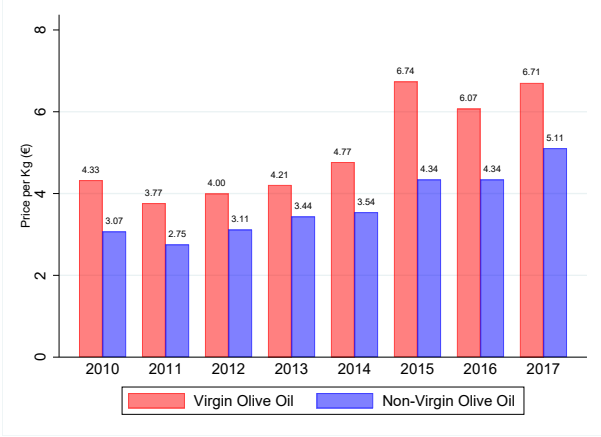
We present our results in Table C1. Across measures, we find that access to credit is associated with an increase in product quality. For wine, access to credit is associated with an increase in the probability a transaction is high quality of 2.4 percentage points. For olive oil, it is associated with an increase of 2.7 percentage points, and for cork, of 1 percentage point. While only the result for wine is statistically significant at conventional level (given that there are substantially more observations), all point estimates are positive.

FIGURE C1. Average Export Price: Wine, Olive Oil and Cork

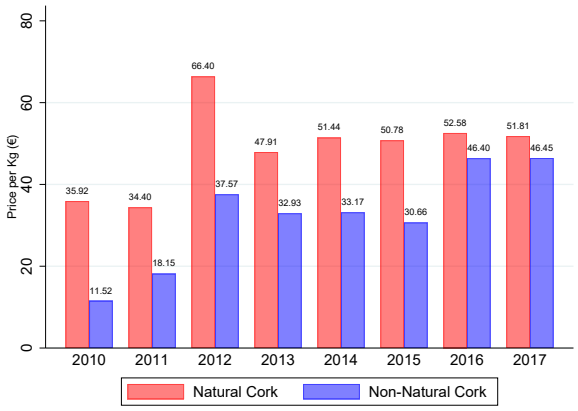
(a) Avg. Price of Wine



(b) Avg. Price of Olive Oil



(c) Avg. Price of Cork



This figure shows the evolution of export prices for Wine, Olive Oil and Cork among exporting SMEs. We distinguish between DOP and non-DOP wine, Virgin Olive Oil and non-Virgin Olive Oil, Natural Cork and non-Natural Cork.

TABLE C1. Effect of Certification on Export Quality: Wine, Olive Oil and Cork

	DOP Wine	Virgin Olive Oil	Natural Corks
Certified Firm	0.024*	0.027	0.010
	(0.013)	(0.041)	(0.015)
Constant	0.550***	0.634***	0.746***
	(0.005)	(0.018)	(0.007)
Observations	23476	1228	5942
Adjusted R-Squared	0.425	0.235	0.519
Mean Dep. Variable	0.560	0.647	0.751
Fixed Effects	Firm & Year	Firm & Year	Firm & Year

This table shows firm fixed effects estimates for the effect of being certified as SME-Leader on Export Quality, for three different product categories. In column 1, we focus on the Portuguese wines that are exported by Portuguese firms and build the variable *DOP Wine*, a binary variable that takes the value of 1 if the exported wine has the DOP certification and 0 otherwise. In column 2, we focus on the olive oil exports, and define *Virgin Olive Oil*, a binary variable that takes the value of 1 if the exported olive oil is virgin and 0 otherwise. In column 3, we focus on the exports of corks, and define *Natural Corks*, a binary variable that takes the value of 1 if the exported corks are produced from natural cork and 0 otherwise. All columns show estimates where the outcome variables are aggregated for the 12 months following the official certification announcement. All regressions include firm and year fixed effects. For all, the time period considered is 2010-2017. Standard errors are reported in parentheses. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.