Bank Specialization in Lending to New Firms

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Abstract

We formulate a novel dimension of bank-lending specialization—specialization in lending to new firms—and investigate its impact on the creation, credit access, and survival of new businesses. We exploit a Portuguese reform that drastically reduced the red tape of starting a new firm and that was rolled out in a staggered manner across municipalities from mid-2005 onward. We show that while reducing regulatory barriers stimulates business creation, this effect depends crucially on the pre-reform number and market share of local banks specialized in lending to new firms. A greater presence of such specialized bank branches is associated with improved credit access and higher leverage of new local businesses. Moreover, new firms that obtain loans from specialized branches exhibit an up to 12 percent higher survival rate.

JEL codes: E51, G21, L26, M13

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1 Introduction

The benefits of bank lending specialization for bank credit allocation in the economy are well-recognized in the literature. Geographical and sector specialization are associated with higher expertise in evaluating business ventures (Paravisini et al. (2023)), higher quality and cheaper monitoring (Berger et al. (2017)), and sustained credit supply to the real sector at the trough of the economic cycle (De Haas and Van Horen (2013), De Jonghe et al. (2020), Giannetti and Saidi (2018)). By focusing on lending to a market segment, financial intermediaries reduce information asymmetries and ensure better lending outcomes (Blickle et al. (2023)). Since newly established firms constitute a market segment with an acute level of information asymmetry, we introduce a novel dimension of bank lending specialization – *specialization in lending to new firms or start-ups*.[1]

We demonstrate that the presence of financial intermediaries specialized in lending to new firms stimulates local business creation by facilitating credit access to newly established firms - a category of firms widely known to be severely credit-constrained. Moreover, our results indicate that specialized banks have a competitive advantage in screening and selecting new firms. When comparing the long-term survival rates of the first-time borrowers of specialized and non-specialized lenders, we observe the highest excess survival probability among the group of the youngest (i.e., the most informationally opaque) borrowers of the specialized lenders. Our findings are consistent with bank start-up specialization alleviating the credit constraint problem for viable new businesses, enhancing firm survival and job creation. This study is the first to demonstrate the positive impact of lending specialization and, hence, banks' superior ability to overcome information asymmetry, on the rates of business creation and long-term survival.

This paper contributes to the current body of knowledge on the importance of financial intermediation in promoting economic welfare. It exemplifies the pivotal role that the quality of bank credit allocation plays in economic policy implementation, resource allocation, and economic growth.

Using credit register data with universal coverage for Portugal, we measure the lending specialization at the bank-municipality (bank branch) level and capture a branch's excess expertise in lending to new firms relative to other branches in the same municipality. We

[1]We use the terms "new firm" and "start-up" interchangeably. Both indicate a recently established firm irrespective of the industry of operation.

then use this measure to investigate the impact of start-up specialized lenders on the local entrepreneurial activity, business survival, and job creation. We exploit a deregulation reform in Portugal that removed excessive hurdles to business creation and drastically simplified and reduced the costs of the firm origination process. Branstetter et al. (2013) provide the first set of evidence on the consequences of this wave of deregulation that resulted in an increase in firm and job creation. We study whether the deregulation reform had a heterogeneous impact across municipalities depending on the degree of local bank branches' expertise in lending to start-ups. While the structure of the bank market and bank competition are shown to be highly relevant for the firm incorporation rate (for example, Black and Strahan (2002)), the link between the degree of the local banks' specialization and firm creation has not been examined before.

Given that the entry deregulation reform was implemented gradually across the municipalities, we employ the recent staggered difference-in-differences methodologies (Callaway and Sant'Anna (2021), Cengiz et al. (2019)) to document that the deregulation of entry in a municipality results in a significant increase in business creation of around 25 firms per 100,000 municipality inhabitants per year. Moreover, we find that the impact of the reform on firm creation is concentrated in municipalities with a high degree of start-up specialization among lenders. The presence of one more specialized bank branch is associated with the post-reform incorporation of 8 more firms per 100,000 inhabitants. A one standard deviation increase in the share of specialized branches and the market share of specialized branches are associated with an increase of around 14 new firms per 100,000 inhabitants per year.

We proceed with examining the credit access channel and show that it is responsible for the elevated rate of business creation. In the analysis at the firm level, we document that new firms located in municipalities with a higher degree of branch specialization tend to have a higher probability of obtaining bank credit and a higher level of financial leverage. The magnitude of this impact depends on the firms' age: as younger firms are more opaque and typically severely credit-constrained, the positive impact of the presence of specialized lenders on credit availability increases for younger start-ups. Thus, for example, we establish that for firms in the age group of up to two years, an increase in the number of specialized branches from the 25th to the 75th percentile (from 1 to 4) is associated with a 2.1 percentage points (pp) increase in the local start-ups' probability

of having bank credit, which is almost 12% of the average probability (18%).

Finally, we explore whether the branches specialized in lending to new firms have a competitive advantage in screening and selecting start-up borrowers. We compare the long-term performance of firms that obtain loans from specialized and regular branches at the start-up stage, examining their differences in survival rates, profitability, and number of workers they employ.

We document that a firm borrowing for the first time from a specialized lender has up to 5.6 pp higher probability of 10-year survival than a firm borrowing elsewhere, which constitutes 12% of the average survival probability in the sample (46%). Moreover, we demonstrate that lenders' start-up specialization is a stronger determinant of the borrowers' improved chances for long-term survival than other lenders' characteristics, such as industry specialization and branch size. After securing a loan from a start-up specialized lender, new firms demonstrate up to 4 pp higher return on assets. In the long run, at the age of 10 years, such firms provide employment to 9% more workers than their local industry peers financed by non-specialized branches.

In sum, we document that specialization in lending to new firms is a relevant institutional feature in local credit markets. Start-up specialized bank branches facilitate credit access for young firms and, thus, stimulate business creation in the area. Moreover, start-up specialized lenders demonstrate superiority in screening opaque new businesses.

Our paper contributes to several strands of literature. It is generally related to the literature showing that financial development is an essential prerequisite for economic growth (Levine and Zervos (1998), Rajan and Zingales (1998), Levine (2005)). The banking sector development and competition, in particular, are shown to impact business creation and resource reallocation across economic agents (Black and Strahan (2002), di Patti and Dell'Ariccia (2004), Bertrand et al. (2007), Dehejia and Gupta (2022)). Availability of long-term credit is a crucial factor for firm creation, especially in industries characterized by high set-up costs (Derrien et al. (2021)).

The focus of the paper is on financing for small and growing firms. Such firms contribute disproportionately to job creation (Haltiwanger et al. (2013), Lawless (2014)), innovation (Breitzman and Hicks (2008)), and, thus, potential economic growth. Farinha et al. (2019) show that access to long-term bank credit is crucial for start-up survival. Banerjee and Duflo (2014) demonstrate how credit constraints can adversely affect SMEs'

growth and productivity. They document that, when gaining access to subsidized credit, firms invest newly available funds in expanding production rather than substituting more expensive credit, a behavior consistent with being credit-constrained prior to the subsidy. They further find that the investments resulting from the additional credit lead to a boost in firm sales and profitability. Alleviating the credit constraint problem for SMEs is particularly important and has pronounced effects on firm investment and employment during an economic downturn (Bonfim et al. (2023)). We show that an environment with a strong presence of bank branches specialized in lending to new firms enhances firms' access to credit and contributes to their long-term survival.

As financial intermediaries are the primary source of external funding for young SMEs (Robb and Robinson (2012), Bustamante and D'Acunto (2019), di Patti and Nigro (2018)), a large body of literature is dedicated to investigating mechanisms that ameliorate the information asymmetry problem between banks and this naturally opaque category of firms. Reducing the information production costs, i.e., the costs of screening and monitoring borrowers, is one of the identified mechanisms to alleviate the SMEs' credit constraint problem. Relationship lending is found to be efficient in reducing the lenders' information production costs. Longer lending relationships allow banks to accumulate and reuse information over repeated interactions, which then increases the firms' credit availability (Petersen and Rajan (1994)) and reduces collateral requirements as well as the cost of credit for small firms (Berger and Udell (1995)). However, to accumulate knowledge through relationship lending, time is necessary. This is not possible for newly created firms.

Lending specialization is another strategy that allows banks to accumulate information through repeated interactions with borrowers operating in the same market and, therefore, sharing similar traits. Berger et al. (2017) provide evidence consistent with the specialized banks having lower costs of monitoring firms in the sector of their specialization. Paravisini et al. (2023) show that banks develop and maintain market-specific knowledge that gives them an information advantage in funding respective projects. Blickle et al. (2023) demonstrate that industry specialization is associated with bank expertise in screening and subsequent monitoring of opaque firms, which results in better loan performance. Consequently, bank lending specialization alleviates credit constraints for borrowers in the respective market segments (Di and Pattison (2023)), especially dur-

ing economic turmoil when the information asymmetry is exacerbated (De Haas and Van Horen (2012), Giannetti and Saidi (2018), De Jonghe et al. (2020)). Analogously, the exit of specialized lenders from the market amplifies the credit constraint problem for local corporate borrowers (Duquerroy et al. (2022)).

Thus, our paper contributes to the discussion of the merits of lending specialization vs. diversification (Winton (1999)) and provides an argument in favor of specialization by demonstrating its positive impact on the rates of business creation and survival. In addition, our study shows that lenders can develop specialization in the markets that lie outside of the conventional dimensions of industry and location.

The remainder of the paper is organized as follows. Section 2 provides a brief description of the reform. Section 3 presents the data and the sample we use for the analysis. In Section 4, we analyze the impact of the reform on firm creation. In Section 5, we present the measure of the start-up specialization and estimate its impact on firm creation after the reform, access to credit for start-ups, and their survival rate. Section 6 concludes.

2 The *Empresa Na Hora* reform

Prior to 2005, the process of starting a business in Portugal was marked by substantial financial and temporal costs. The process could cost up to 2,000 euros and required multiple visits to different public agencies, taking up to 95 days to complete the registration of a new company. Such costly entry regulations are known to hamper firm creation, force new entrants to be larger (Klapper et al. (2006)), and reduce employment (Bertrand and Kramarz (2002)).[2] Therefore, to battle the excessive administrative hurdles, the government developed a program aimed at simplifying the firm origination process.

The Empresa na Hora (ENH) or "On the Spot Firm" program implied establishing one-stop shops where all the registration procedures for firms in eligible industries could be completed within a few hours. The non-eligible industries generally included those where additional permits or certification were required, such as finance, arms manufacturing, public transportation, pharmacies, etc. The program was launched on July 6, 2005.

[2]Moreover, stricter regulation of entry is associated with higher levels of corruption and greater relative size of the unofficial economy (Djankov et al. (2002))

However, the resource constraints prevented it from being implemented simultaneously in all the municipalities. Instead, the program was implemented in a staggered manner across municipalities by taking advantage of the pre-existing local infrastructure. ENH offices were gradually set up in the former Trade Registry Offices and Business Formalities Centers.

In municipalities where the program was implemented, the period required to start a business was reduced to a single day. According to the World Bank's Doing Business report, by 2008, Portugal had made significant progress in reducing the time and cost associated with starting a business. The country moved from the 111^{th} place to the 5^{th} place when ranked by the average number of days required to start a business (see Figure 1). Simultaneously, the sum of fees declined from 12.5% of annual income per capita to 2.9% or approximately 600 euros.

Furthermore, the government launched an extension for the ENH program that allowed for registering a business entity via the Internet - "Empresa Online". Initially, the procedure required the prospective entrepreneurs to engage the services of intermediaries with digital certification, such as lawyers, solicitors, or notaries, which was associated with additional legal costs and rendered this option less affordable for potential small businesses. It was only in the second half of 2009, that "Empresa Online" became more available to individuals with an electronic certification that allowed them to identify themselves digitally.

Branstetter et al. (2013) provide the first set of evidence on the short-term consequences of the ENH reform. They document that in the months following the implementation of the program in a municipality, the number of newly registered start-ups increases by 17%, and seven new jobs are created per 100,000 local inhabitants. The study looks into the quality of the new businesses, firms, and sole entrepreneurs and reports that they are on average smaller and have a lower probability of survival than the businesses registered pre-reform. Felix and Maggi (2022) also confirm the positive impact of the ENH reform on the rate of firm incorporation and local employment. They also report that the new firms contributed 40% to the post-reform job creation, and 60% of new jobs resulted from the incumbent firms' expansion in response to the competition shock.

3 Data

We rely on the information on the ENH program implementation, i.e., the ENH offices' opening dates, reported in Branstetter et al. (2013). Analogous to this paper, we focus on the period between 2000 and 2008. There are two reasons for restricting the analyzed period up until the year 2008. First, the impact of the reform in the municipalities that were treated during the global financial crisis is likely to be distorted by the severe economic conditions. Secondly, in 2009, the "Empresa Online" extension of the ENH program became available to the general public allowing for remote firm registration irrespective of the business location, which hinders the identification by giving access to the facilitated firm incorporation procedure to entrepreneurs from the municipalities where the ENH office was not yet launched and that, therefore, serve as the control group.

To accurately quantify the impact of the reform, we construct a sample of Portuguese municipalities homogeneous in economic structure and population size. To achieve this objective, we exclude the island part of Portugal (Azores and Madeira), municipalities with a population of less than 10,000 people, and the two largest economic centers of the country - Lisbon and Porto. As a result, the sample comprises 184 medium-sized municipalities in mainland Portugal. By the end of 2008, 84 of the municipalities in our sample received treatment, and 100 municipalities constitute the control group.

We start by examining the impact of the reform on business creation, i.e., on the number of newly established firms scaled by the population at the municipality-year level. The SPAI database (Sistema de Partilha de Informação) is our source for the exact firms' origination dates and single-digit industry of operation starting from the year 2000. Municipality-level population data comes from Statistics Portugal. The firm annual financial statement data are available from the Central Balance Sheet Database (CBSD) starting from 2006.

The Portuguese credit registry, the Central de Reponsabilidades de Crédito (CRC), maintained by Banco de Portugal provides us with one of the most comprehensive databases on bank corporate lending. The CRC covers the universe of bank-firm credit relationships in Portugal and reports the total sum of corporate loans provided by a bank to individual firms at a monthly frequency. We rely on this data to track bank-firm relationships and to estimate the creditors' lending specialization.

Since the expertise underlying the specialization in lending to granular market segments is likely to be developed and preserved at the ground levels of the bank organizational structure, we would like to capture the degree of lending specialization of each bank office, i.e., at the branch level. As the CRC provides us with credit exposure at the bank-firm level, we approximate branch loan portfolios by aggregating each bank's corporate loans at the municipality level. This approximation yields the exact branch portfolios for instances where only one branch office of a bank operates in a municipality. In other cases, the approximation relies on the assumption that all branches of a bank in a given municipality are supervised by the same regional management team that maintains the lending expertise. Thus, we obtain bank-municipality level loan portfolios and refer to them as bank branch portfolios throughout the paper.

In the analysis, we consider firms operating in the industries that are eligible for registration via an ENH office. Eligible firms constitute 88% of the total number of firms in the data. We apply a set of criteria to ensure that the newly incorporated firms that we are considering are, indeed, new businesses rather than subsidiaries of existing entities. In particular, we retain newly originated firms that, in their first year of operation, do not consist of more than four establishments, do not have establishments abroad or subsidiaries of their own, and do not employ more than ten employees. Varying the number of employees between ten and fifty does not have a substantial impact on the results.

In subsection 5.3, where we investigate the new firms' access to bank credit, the analysis requires a sample of economically active firms irrespective of whether they obtain bank credit or not. Such a sample allows us to investigate the probability of having bank credit among groups of similar businesses and isolate the impact of the specialized branches on the firms' probability of obtaining corporate loans. When a firm does not have a loan and, thus, does not appear in the credit registry, we can only determine its operational status in a particular year based on whether it submitted the financial statement or not. Since the financial statement data availability starts in 2006, we make an assumption on the operating status of firms created before 2006 in order to generate a sample that includes a pre-reform period for every municipality. Namely, we take a sample of firms registered starting from 2004, and assume that they were economically active in the years 2004 and 2005 for which the financial statement data are not available.

For firms created after 2006, no assumptions are required. Thus, we examine the new firms' access to bank credit in the period between 2004 and 2008.

4 The impact of the reform on business creation

We exploit the staggered implementation of the ENH reform to infer the impact of the firm entry deregulation on business creation. In this section, we perform the analysis at the municipality-year level and study the dynamics of the annual number of newly established firms in the already treated compared to not yet treated municipalities. To ensure comparability between the municipalities, we follow Branstetter et al. (2013) and scale the number of new firms by the local population size. First, we employ a two-way fixed effects (TWFE) linear model that controls for unit (municipality) and time observable and unobservable characteristics with unit and time fixed effects. We estimate the following model:

$$\textbf{N} \text{ new firms per 100K inhabitants}_{mt} = \alpha + \boldsymbol{\beta_1}\textbf{ENH}_{mt} + \tau_t + \mu_m + \epsilon_{mt} \qquad (1)$$

where ENH denotes an indicator variable that takes the value of one for municipality m when the ENH office is launched there starting from year t onwards and zero otherwise; τ_t and μ_m are year and municipality fixed effects, respectively.

Considering the potential bias of the TWFE methodology with the variation in treatment timing widely discussed in the recent literature (for example, Goodman-Bacon (2021), Sun and Abraham (2021)), we employ two alternative staggered difference-in-differences methodologies: Callaway and Sant'Anna (2021) and Cengiz et al. (2019). In the Callaway and Sant'Anna (2021) model, the control group consists of the not yet treated and "never treated", i.e., not treated until 2008, municipalities. The Cengiz et al. (2019) methodology implies generating separate stacks (samples) of observations for each treated cohort. A stack includes observations from a cohort of municipalities that receive treatment in the same year and all the municipalities that never receive the treatment.

Table 1 presents the estimation results of the aforementioned models. We can observe that after the ENH reform is implemented in a municipality, i.e., an ENH office is opened, the number of new firm entries increases by 24 firms per 100,000 municipality inhabitants

or by 7% of the average number of 346 new firms per municipality.[3] All three models yield similar results.

Figure 2 depicts the dynamic coefficient plot demonstrating the progression of the reform's impact on the rate of business creation over time following the treatment. The ENH reform had a long-lasting impact on the firm incorporation rate that unfolded over the years following the reform implementation. We can also observe that prior to the reform, there was no difference in firm creation trends between the treated and control groups of municipalities.

5 The specialization in lending to new firms

5.1 Measure of start-up specialization

The prevailing approach to measuring lending specialization in the current literature lies in assessing the total credit exposure to a particular market segment, typically geographical or sectoral, at the bank level. To the best of our knowledge, Duquerroy et al. (2022) is the first study to consider lending specialization at the bank branch level. They focus on the industry specialization of French bank branches while also accounting for the industry composition of the counties' credit markets.

Similar to Duquerroy et al. (2022), our measure of start-up specialization is designed to capture the bank branch's excess expertise in lending to new firms relative to other branches in the same municipality. This approach ensures that our measure of specialization is not driven by the number of start-ups in a municipality, and we do not categorize bank branches as specialized solely on account of their loan portfolios being inflated with young borrowers due to the municipality-specific economic conditions. Instead, the branches that we identify as specialized in lending to new firms maintain loan portfolios that are markedly distinct from those of their regional competitors. In other words, they exhibit lending behavior consistent with implementing a business model of focusing on the market segment of newly established ventures.

[3] Although Branstetter et al. (2013) employ a different methodology, they arrive at the same estimated impact of the ENH reform. They measure the short-term impact of the reform in the months after the reform and arrive at the estimate of 2 extra firms per month which translates into 24 extra firms per years.

We utilize one of the common categorizations of new firms (or start-ups) as firms in their initial four years of operation (for example, Ko and McKelvie (2018)). In terminology of Berger and Udell (1998), we consider "infants" (0-2 years) and "adolescents" (3-4 years) businesses as the group of interest. The estimation of the start-up specialization measure comprises several steps. First, we calculate the share of start-up borrowers in the total number of corporate borrowers in the branch's loan portfolio. There are two reasons for constructing the specialization measure based on the number of borrowers rather than the sum of loans. First, start-ups typically have smaller loans and, hence, constitute a small and less variable share of branches' credit exposure. Secondly, the number of borrowers arguably better reflects the operational time and costs that loan managers of the branch spend processing loan applications and, thus, gaining expertise in lending to new firms.

Second, we subtract the average share of start-up borrowers among all the bank branches in the same municipality. Thus, we ensure that our individual specialization measure does not correlate with the overall credit market exposure to new firms.

$$RS_{bmt} = \underbrace{\frac{\textbf{N} \text{ start-up borrowers}_{bmt}}{\textbf{N} \text{ borrowers}_{bmt}}}_{\text{individual exposure to start-ups}} - \underbrace{\frac{\textbf{N} \text{ start-up borrowers}_{mt}}{\textbf{N} \text{ borrowers}_{mt}}}_{\text{average local exposure to start-ups}} \tag{2}$$

where RS_{bmt} is the relative specialization in start-ups of bank branch b in a municipality m at date t. RS_{bmt} takes values in the range [-1,1], where positive values indicate a branch's positive relative lending to start-ups compared to its local peers. In our estimations, we use the values of the relative specialization in start-ups measured at the end of 2004 with the aim of capturing the pre-reform credit market landscape and alleviating endogeneity concerns.

We follow Duquerroy et al. (2022) and determine specialized bank branches as those whose measure of the relative specialization in lending to new firms falls into the top quartile of the *country-wide distribution*. Figure 3 presents the distribution of the relative specialization in start-ups among all the branches of Portuguese banks in 2004. The start-up specialized branches lie at the right end of this distribution, in the 4^{th} quartile,

irrespective of the municipality of their operation:

$$\text{Spec}_{bmt} = \mathbf{I}(RS_{bmt} > p75)$$

There are municipalities where none of the bank branches specialize in lending to new firms. We can observe such cases when the shares of start-ups in the branches' loan portfolios do not differ from one other, and their RS_{bmt} are close to zero.

In order to evaluate the impact of the start-up specialization on firm creation and credit access at the municipality level, we construct three measures capturing the local branches' intensity of specialization in lending to start-ups: a) the number of specialized branches in a municipality, b) the share of specialized branches in the total number of branches, and c) the market share of specialized branches. Figure 4 presents graphically the geographical distribution of these municipality-level specialization measures in Portugal.

5.2 Specialization in lending to new firms and business creation

After establishing the positive impact of the ENH reform on the rate of firm incorporation, we proceed with investigating the heterogeneity of the reform's impact across Portuguese municipalities depending on the intensity of start-up specialization of the local lenders. We introduce the aggregated municipality-level specialization measures described above into Model 1:

$$\mathbf{N} \text{ new firms per 100K inhabitants}_{mt} = \alpha + \beta_1 \text{ENH}_{mt} + \boldsymbol{\beta_2} \mathbf{ENH}_{mt} \times \mathbf{Spec}_m + \tau_t + \mu_m + \epsilon_{mt} \quad (3)$$

where Spec_m is one of the three branch specialization measures estimated at the end of 2004 and aggregated at the municipality level. The coefficient of interest in this model is $\boldsymbol{\beta_2}$, as it captures the marginal effect of the specialization measures on business creation after the ENH office is launched in year t in municipality m. The specialization measures do not enter the estimation as stand-alone terms as they are time-invariant and, thus, absorbed by the municipality fixed effects.

Table 2 presents the results of estimating Model 3 for the three local measures. The results indicate that the impact of the ENH reform on firm creation is concentrated in

municipalities with a high degree of start-up specialization among lenders. The presence of one more specialized bank branch is associated with the post-reform incorporation of 8 more firms per 100,000 inhabitants.

A one standard deviation increase in the share of specialized branches and market share of specialized branches are associated with an increase of around 14 new firms per 100,000 inhabitants per year. The results suggest that the firm entry deregulation has the intended positive impact on business creation primarily in the areas where the local banking sector is predisposed to support such an expansion.

In the specifications presented in columns (4)-(6), we consider additional municipality-level explanatory variables to ensure that the observed positive impact of the specialization on firm creation after the reform is not driven by other municipality characteristics. Analogous to the variables of interest, we estimate these control variables at the end of the pre-reform year 2004. We horse-race these controls with the variables of interest, i.e., we include the interaction terms between the controls and the ENH indicator variable. Hence, we verify that the municipality-level specialization measures are distinct from other key municipality characteristics, and isolate their contribution to the reform outcomes from potentially impactful local factors.

Since credit market competition can positively impact firm creation (Black and Strahan (2002)), we include in the analysis a measure of the local bank market concentration - the Herfindahl–Hirschman Index (HHI). In Table 2, we can observe that despite having the expected negative sign (as higher HHI means lower concentration), bank competition does not have a statistically significant effect on the rate of firm incorporation following the ENH reform implementation in a municipality.[4]

Next, even though we do not observe a pre-trend in firm creation in the treated group of municipalities (Figure 2), we nevertheless ensure that our findings are not driven by pre-existing conditions stimulating the local economy. To achieve this objective, we control for the local pre-reform entrepreneurial activity as such a control is the second-order indicator for an array of business-environment factors that determine the rate of firm creation. We include the number of economically active start-ups in a municipality

[4]The fundamental difference between our setup and that in Black and Strahan (2002) is that the object of the deregulation in Black and Strahan (2002) is the banking sector, while in our case the firms' excessive entry barriers are removed. One might expect that, following bank competition deregulation, when banks are entering new markets, the credit flow is higher than in another case as banks compete for a share of the newly available markets.

per 100,000 inhabitants at the end of 2004. Accounting for the entrepreneurial activity does not substantially affect the coefficients of interest.

5.3 Specialization in lending to new firms and access to credit

It is natural to hypothesize that the specialized branches contribute positively to the rate of firm creation by enhancing credit accessibility for new businesses. We proceed with investigating this channel of the impact of the start-up specialization on business creation: we test whether the presence of more and larger specialized bank branches are associated with improved credit access for local new firms. With panel firm-level data, we run the following model in the sample of new firms:[5]

$$Y_{fimt} = \alpha + \beta_1 \text{ENH}_{mt} + \boldsymbol{\beta_2 \text{ENH}_{mt} \times \text{Spec}_m} + \gamma X_{fimt} + \tau_t + \mu_m + \nu_i + \epsilon_{fimt} \qquad (4)$$

where Y_{fimt} is a variable capturing access to credit for firm f operating in industry i in municipality m at the end of year t. To study the extensive margin of access to credit we employ an indicator variable that takes the value of one if a firm has a bank loan of above 5,000 euro and zero otherwise. To study the intensive margin, we examine the impact of the local start-up specialization on the firms' financial leverage estimated as debt-to-total assets ratio. In this firm-level analysis, we include a vector of firm controls: firm industry ν_i and firm age in months at time t. In some specifications, we also control for the new firms' size at time t (natural logarithm of total assets), which then limits our sample to years 2006-2008 as firm balance sheet data availability starts in 2006.

Subsequently, we adjust Model 4 in order to control for firm-type specific credit demand and capital structure and, thus, ensure that our estimates capture the differences in credit supply depending on the level of the lending specialization of the local branches. To achieve this, we replace separate municipality and industry fixed effects with firm-group fixed effects à la Degryse et al. (2019), namely, municipality-industry-size group fixed effects.[6] The adjusted model looks as follows:

$$Y_{fimt} = \alpha + \beta_1 \text{ENH}_{mt} + \boldsymbol{\beta_2 \text{ENH}_{mt} \times \text{Spec}_m} + \gamma X_{fimt} + \tau_t + \kappa_{mis} + \epsilon_{fimt} \qquad (5)$$

[5] We carry on with the definition of new firms as firms up to 4 years old.

[6] As the combination of municipality and year fixed effect would be collinear with the variables of interest, we include year fixed effects separately. In Appendix Figure A1, we provide coefficients for a model with an alternative combination of the fixed effects.

Where κ_{mis} is municipality-industry-size group fixed effects.

Figure 5 plots the coefficients of interest from estimating Model 4 with the loan dummy as a dependent variable and without firm size control (thus covering the entire sample period) for different age groups of start-ups. We observe that, following the ENH reform, all three measures of the local level of start-up specialization have a positive impact on the probability of having a bank loan for almost all age groups of firms (with the exception of the number of the specialized branches not having a significant effect on the group of firms of up to four years). However, when we consider in the analysis the firms' size (Figure 6), we find that 1) the market share of specialized branches does not have a statistically significant impact on the probability of having bank credit for start-ups irrespective of their age; 2) local start-up specialized branches facilitate credit access primarily for firms up to two years old. Figure 6 plots the coefficients for the most stringent model specification - firm-group fixed effects - and demonstrates that the younger is a firm, the more important is the presence of the specialized branches for the firm's probability of having a corporate loan. Notably, in our sample, 95% of firms have bank credit by the age of four years. In other words, conditional on surviving to the age of four years, almost all firms of such age have bank loans.

Thus, from this analysis, we infer that the relative size of the specialized branches (the market share) does not impact the probability of having bank credit for young firms but the higher number and share of the specialized branches improves credit access for the most credit-constrained younger firms. For firms up to two years old, the impact of the start-up specialized lenders is highly significant in statistical and economic terms. For the rest of the subsection, we review in more detail the effect of the specialized branches on firm credit access for this group of borrowers.

Table 3 presents the complete set of results of estimating equation 4 with the loan dummy dependent variable. The sample in columns (1)-(3) includes start-ups active between 2004 and 2008[7], and columns (4)-(6) account for the firms' size which is available for all firms starting from 2006 and, therefore, the estimations cover the 2006-2008 period. Table 4 presents the results of estimating equation 4 for the financial leverage as a dependent variable. Since the calculation of financial leverage requires balance sheet information, the sample in Table 4 covers years between 2006 and 2008.

[7]Data availability is discussed in section 3

In Table 3, we can observe that more start-up specialized branches in absolute value and their share among all the branches in a municipality are associated with a higher probability of having credit for local young firms after the ENH reform is implemented in the area. When controlling for firm size, the impact of these variables on the post-reform credit access increases in size and statistical significance.

The estimates indicate that the presence of start-up specialized branches is an important determinant of bank credit availability for young companies: one more specialized branch in the area increases a firm's probability of having a bank loan by 0.7 percentage point (pp) or 4% of the average probability of having a loan (18%). One standard deviation increase in the share of specialized branches improves a firm's probability of having a loan by almost 7% relative to the mean.

The estimates in Table 4 indicate that all three measures of local start-up specialization have a positive impact on the volume of credit available to young companies. One standard deviation increase in the municipality-level lending specialization measures is associated with 5.5-6.4% increase in the firms' financial leverage relative to the mean value.

Overall findings indicate that while the market share of the specialized branches does not affect start-ups' chances of obtaining bank loans, it is highly relevant for the amount of the available credit. Put differently, the relative size of start-up specialized lenders does not affect the probability of obtaining debt financing but is an important determinant of the volume of accessible credit.

Our inference remains unchanged when we run a more stringent model specification with firm-group fixed effects - Model 5. On the contrary, these estimations yield larger coefficients and, hence, a stronger positive impact of the start-up specialized lenders on credit availability for new firms. The full set of the estimation results can be found in Table A1.

Moreover, we obtain numerically stronger results corroborating the same conclusions when applying alternative methodologies for examining young firms' access to credit: Probit model for loan dummy and Tobit for financial leverage. Tables A2 and A3 present the respective estimates.

5.4 Specialization in lending to new firms and new firms' survival

Focusing on a particular market segment gives banks an informational advantage in lending to the respective group of borrowers. Therefore, we move forward and examine whether our measure of start-up specialization is associated with branches' superior expertise in selecting viable new businesses. Namely, we investigate whether the start-ups created as a result of the ENH reform have a higher probability of survival if they obtain their first bank loan from a start-up specialized branch. Therefore, in the sample of new firms that obtain bank credit, we gauge the difference in survival rates between the start-ups that borrow from specialized branches and start-ups that obtain loans elsewhere. To achieve this goal, we employ two distinct methodologies: the cross-sectional linear probability model and the Cox proportional hazards model (Cox (1972)).

5.4.1 Linear probability model

We start by estimating a linear probability model to examine whether the maximally opaque new firms, i.e., the first-time borrowers, that obtain credit from a specialized branch have a higher probability of reaching the age of 5 and 10 years than firms that obtain credit elsewhere. We estimate the following cross-sectional model in the sample of first-time borrowing new firms:

$$S_{fimc}^{age} = \alpha + \beta_1 \text{ENH Firm}_f + \boldsymbol{\beta_2 \textbf{ENH Firm}_f \times \textbf{Spec}_{bm}} + \beta_3 \text{Spec}_{bm} + \tau_c + \kappa_{mi} + \epsilon_{fimc} \quad (6)$$

where S_{fimc} is an indicator variable that takes the value of one if firm f operating in industry i and municipality m reaches the age of either 5 or 10 years ($age \in \{5, 10\}$) and zero otherwise. c stands for the firm cohort, i.e., the year of firm origination. As before, we consider start-ups created between 2004 and 2008.[8] We control for the cohort's average survival probability with cohort fixed effects τ_c. ENH Firm$_f$ is an indicator variable for a firm created after the ENH reform was implemented in the municipality. Within the same cohort, there are ENH firms and non-ENH firms depending on whether a firm was originated before or after the ENH reform was implemented.

[8]Since in this analysis we consider firms at the time when they obtain their first bank loan, there is no uncertainty regarding their economic activity status. The firms in the sample are economically active and no assumptions are required. For simplicity, we consider firms that established a single bank relationship in a year t when they obtain their first loan.

$Spec_{bm}$ is an indicator variable that takes the value of one if a firm obtains its first loan from a start-up specialized bank branch b and zero if the loan is issued by a regular branch. In this analysis, we consider the first-time borrowers because the information asymmetry is maximal for such companies as prior bank relationships signal the borrower's quality and reduce screening costs.

Apart from the cohort fixed effects τ_c and municipality-industry fixed effects κ_{mi}[9] , some model specifications include bank fixed effects η_B. Bank fixed effects in this setup allow to isolate the branch's expertise driven by the specialization from other bank-specific characteristics that can potentially impact the quality of lending of all the branches of the same bank, such as bank size or quality of the organizational structure.

Columns (1)-(2) and (5)-(6) of Table 5 present the results of estimating Model 6. The results indicate that start-ups that obtain their first loan from a specialized bank branch are approximately 5 pp more likely to survive in the medium and long term.

In columns (3)-(4) and (7)-(8), we control for the municipality-industry-cohort specific probability of survival with the respective fixed effects[10]. In this specification, we explore the effect of interest for groups of firms created the same year in the same municipality and operating in the same industry, thus, capturing the difference in the ENH start-ups' probability of survival associated with borrowing from a specialized bank branch. In such a stringent model specification, we can observe the amplification of the effect of interest: being screened and selected by a specialized lender indicates up to 6.1 pp higher probability that a firm reaches the age of 5 years and up to 5.6 pp higher probability that a firm stays in business for 10 years. As only 46% of firms in our sample of borrowing start-ups stay in business after ten years, this constitutes 12.2% higher chances of survival.

Once again we examine the impact of the start-up specialized lenders on firms by age group. We uncover that the difference in survival probability between start-ups borrowing from a specialized branch and a regular branch is the largest for firms obtaining their first loan in their first year after origination. Figure 7 depicts the coefficients of interest for four age groups: we can observe that if an ENH start-up obtained a loan from a specialized branch before reaching the age of 12 months, it has an 8 pp higher survival probability than other under 1-year old firms. In other words, the impact of start-up

[9]The model with three separate groups of fixed effects yields similar positive and statistically significant results, see Table A4.

[10]Given the proximity of the GFC, the year of origination is an important factor for the young firms' survival probability.

specialization peaks in the market segment where the information asymmetry is at its maximum. This finding supports the conclusion that elevated survival rates of start-ups in the specialized branches' portfolios are driven by the branches' superior screening and selection expertise.

Further, we explore how other branch's characteristics impact its quality of lending to new companies and horse-race these characteristics with the start-up specialization. We consider branch industry specialization[11] and branch size (natural logarithm of the total branch's loan portfolio) as alternative determinants of the lenders' screening and selection expertise. The results of this analysis are reported in Table 6.

We observe that lenders' industry specialization has a sizable positive impact on the probability of survival for firms operating in the respective industry and created as a result of the ENH reform but only on the 5-year horizon. The branch's size, especially when compared with other branches of the same bank by means of bank fixed effects, is also positively associated with the borrowers' survival probability. However, this impact is not augmented by the reform. Compared to the alternative characteristics, start-up specialization of the branch granting the first loan to a start-up is the strongest indicator for the start-up's enhanced chances of long-term survival.[12]

5.4.2 Cox proportional hazards model

We reproduce the findings of the positive association between branch specialization and start-up survival in the Cox proportional hazard analysis. We estimate how borrowing from a specialized branch impacts firms' likelihood of going out of business.

We start by examining Kaplan-Meier curves for firm survival rates over time by firm group. Figure 8 plots the survival functions for firms created before and after the deregulation implementation in the treated municipalities, i.e. ENH firms vs non-ENH firms. We observe that firms created as the result of the reform go out of business more often starting from the third year of operations, and the gap in survival rates is growing over time.

[11] In the reported results, the industry specialization measure is constructed in the same manner as the start-up specialization, i.e., using the number of borrowers in each industry. Using the industry specialization measure constructed based on lending volume instead of borrower quantity leads to the same conclusions, see Table A5.

[12] In Table A6, we present an additional test where we control for the branches' observable and unobservable characteristics by means of the branch fixed effects.

Then we examine whether borrowing from different types of bank branches has an impact on the plotted survival function. Figure 9 depicts the Kaplan-Meier curves for the ENH firms split into groups by the type of bank branch where they obtained their first loans: specialized vs regular branch. Consistent with the earlier findings, we observe that start-ups borrowing from a specialized bank branch have on average higher survival rates, especially in the long term.

In the same sample as in subsection 5.4.1, we estimate the following model:

$$\lambda(t) = \lambda_0(t) \times \exp(\beta_1 \text{ENH Firm}_f + \boldsymbol{\beta_2}\textbf{ENH Firm}_f \times \textbf{Spec}_{bm} + \beta_3 \text{Spec}_{bm} + \tau_c + \mu_m + \nu_i) \tag{7}$$

The coefficients (log of the hazard ratio) for Model 7 are reported in column 1 of Table 7. In column 2, we allow for stratification by cohort, i.e., the model implies the estimation of individual baseline hazard $\lambda_c(t)$ for each cohort c.

The results of estimating the proportional hazard model are consistent with prior findings: borrowing from a start-up specialized branch reduces the likelihood of failure for firms created as the result of the firm entry deregulation. Namely, there is almost a 12% decrease in the relative risk of going out of business at every age (conditional on reaching this age) for firms who obtain their first loan from a specialized branch.

5.5 Specialization in lending to new firms and new firms' performance

In this section, we look into the differences in the operational performance of the firms originated as the result of the ENH reform depending on the type of a bank branch that provided their first corporate loan. We estimate a cross-sectional model analogous to Model 6:

$$Y^{age}_{fimc} = \alpha + \beta_1 \text{ENH Firm}_f + \boldsymbol{\beta_2}\textbf{ENH Firm}_f \times \textbf{Spec}_{bm} + \beta_3 \text{Spec}_{bm} + \tau_c + \kappa_{mi} + \epsilon_{fimc} \tag{8}$$

where Y^{age}_{fimc} is one of the continuous firm performance measures calculated at the end of the calendar year when a firm reaches a certain age ($age \in \{5, 10\}$). We consider the following dependent variables: 1) net profit over total assets; 2) EBITDA over total assets; 3) natural logarithm of the number of workers; 4) growth in the number of workers

between the year when the first loan is obtained and the year when a firm reaches the specified age. As before, we control for the common cohort characteristics and performance with cohort fixed effects τ_c. Municipality-industry fixed effects, κ_{mi}, account for the peer firms' average performance. Spec_{bm} is a dummy variable indicating that a firm obtained its first bank loan from a specialized branch. ENH Firm_f indicates that a firm was originated after the ENH reform was implemented in its municipality.

The estimation results for the profitability measures are presented in Table 8. We observe that the firms that obtain financing from the specialized lenders at their start-up stage exhibit substantially higher return on assets at the age of 5 years. Considering that the median net profit over total assets in this sample is 0 and the median EBITDA over total assets is 3.5%, the observed 3 pp and 4 pp of excess profitability are striking findings.

By the age of 10, among the firms that survived up to that age, there is no difference in the level of profitability. One possible reason for this result may be that mature firms converge in their performance measures to the industry standards. However, at the same age of 10 years, the ENH firms selected by the specialized lenders employ more workers than their peers. In columns 5-8 of Table 9, we can see large positive coefficients indicating a higher number of workers and higher growth in the number of workers among the firms of interest. The coefficients are significant in the model specifications that include bank fixed effects. Thus, we document that, controlling for the bank-level quality of lending, the start-ups that obtain loans from the specialized branches employ 9% more workers at the mature age of 10 years and grow their workforce by 33 pp more than their peers between the year they obtain their first bank loan and the 10-year threshold.

The elevated profitability of the businesses funded by the specialized branches explains, at least partially, the higher rates of survival observed among these firms. It also provides further evidence in favor of the specialized branches' expertise in screening and selecting new firms. The enhanced rate of job creation among the post-reform firms borrowing from the specialized branches is another policy-relevant finding. It demonstrates that the superior quality of the credit allocation by the specialized lenders helps achieve the objectives of the deregulation reform while mitigating potential adverse spillovers.

6 Conclusion

Our paper evaluates the benefits of bank-lending specialization for economic growth in the form of firm creation and survival. We introduce a novel dimension in bank specialization and focus on banks' expertise in lending to new firms. Exploiting a staggered deregulation event in Portugal that spurred firm entry rate, we document that firm creation is concentrated in the areas of operation of the start-up specialized bank branches. This effect is separate from the overall bank competition in the area and from the local pre-reform entrepreneurial activity.

We demonstrate that start-up specialization facilitates access to credit for new firms that are typically characterized by high levels of opacity and, therefore, are credit-constrained. Furthermore, specialized lenders exhibit superiority when it comes to assessing the viability of a new business: firms that borrow from these lenders face substantially better survival prospects, demonstrate higher productivity, and employ more workers.

These findings can inform policy decisions directed at supporting small business creation and growth while preserving financial stability. Our paper is a showcase of the banking sector's pivotal role in shaping future aggregate economic outcomes following an economic policy implementation. On the one hand, if banks are too strict and risk-averse when selecting which new firms to finance, promising new businesses may never grow and prosper. This would hinder growth and innovation in the economy and potentially lead to a misallocation of resources. On the other hand, if banks are too lenient and easily finance new businesses, financial stability may be threatened: new firms with high leverage are characterized by poor performance (De Haas et al. (2022)) and survive at lower rates (Farinha and Santos (2006)). Alternatively, many unviable firms will be kept on financial life support for too long, leading to competitive distortions and a suboptimal allocation of resources. We show how banks' knowledge, acquired through lending expertise, may be crucial in striking the balance between too little or too much lending to new, small businesses.

References

Banerjee, A. V. and Duflo, E. (2014). Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program. *The Review of Economic Studies*, 81(2):572–607.

Berger, A. and Udell, G. (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *Journal of Banking Finance*, 22(6):613–673.

Berger, A. N. and Udell, G. F. (1995). Relationship lending and lines of credit in small firm finance. *Journal of business*, pages 351–381.

Berger, P. G., Minnis, M., and Sutherland, A. (2017). Commercial lending concentration and bank expertise: Evidence from borrower financial statements. *Journal of Accounting and Economics*, 64(2):253 – 277.

Bertrand, M. and Kramarz, F. (2002). Does Entry Regulation Hinder Job Creation? Evidence from the French Retail Industry*. *The Quarterly Journal of Economics*, 117(4):1369–1413.

Bertrand, M., Schoar, A., and Thesmar, D. (2007). Banking deregulation and industry structure: Evidence from the french banking reforms of 1985. *The Journal of Finance*, 62(2):597–628.

Black, S. E. and Strahan, P. E. (2002). Entrepreneurship and bank credit availability. *The Journal of Finance*, 57(6):2807–2833.

Blickle, K., Parlatore, C., and Saunders, A. (2023). Specialization in banking. Working Paper 31077, National Bureau of Economic Research.

Bonfim, D., Custódio, C., and Raposo, C. (2023). Supporting small firms through recessions and recoveries. *Journal of Financial Economics*, 147(3):658–688.

Branstetter, L., Lima, F., Taylor, L. J., and Venâncio, A. (2013). Do entry regulations deter entrepreneurship and job creation? Evidence from recent reforms in portugal. *Economic Journal*, 124(577):805–832.

Breitzman, A. and Hicks, D. (2008). An analysis of small business patents by industry and firm size. *Faculty Scholarship for the College of Science & Mathematics*, 12.

Bustamante, M. C. and D'Acunto, F. (2019). Banks' screening and the leverage of newly founded firms. *SSRN Working Paper*.

Callaway, B. and Sant'Anna, P. H. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2):200–230. Themed Issue: Treatment Effect 1.

Cengiz, D., Dube, A., Lindner, A., and Zipperer, B. (2019). The Effect of Minimum Wages on Low-Wage Jobs. *Quarterly Journal of Economics*, 134(3):1405–1454.

Cox, D. R. (1972). Regression models and life-tables. *Journal of the Royal Statistical Society: Series B (Methodological)*, 34(2):187–202.

De Haas, R., Sterk, V., and van Horen, N. (2022). Startup types and macroeconomic performance in europe. (269). Available at SSRN: https://ssrn.com/abstract=4140934 or http://dx.doi.org/10.2139/ssrn.4140934.

De Haas, R. and Van Horen, N. (2012). International shock transmission after the lehman brothers collapse: Evidence from syndicated lending. *American Economic Review*, 102(3):231–37.

De Haas, R. and Van Horen, N. (2013). Running for the Exit? International Bank Lending During a Financial Crisis. *The Review of Financial Studies*, 26(1):244–285.

De Jonghe, O., Dewachter, H., Mulier, K., Ongena, S., and Schepens, G. (2020). Some Borrowers Are More Equal than Others: Bank Funding Shocks and Credit Reallocation. *Review of Finance*, 24(1):1–43.

Degryse, H., De Jonghe, O., Jakovljević, S., Mulier, K., and Schepens, G. (2019). Identifying credit supply shocks with bank-firm data: Methods and applications. *Journal of Financial Intermediation*, 40:100813.

Dehejia, R. and Gupta, N. (2022). Financial development and micro-entrepreneurship. *Journal of Financial and Quantitative Analysis*, 57(5):1834–1861.

Derrien, F., Mésonnier, J.-S., and Vuillemey, G. (2021). Set-up costs and the financing of young firms. (792). Available at SSRN: https://ssrn.com/abstract=3771327 or http://dx.doi.org/10.2139/ssrn.3771327.

Di, W. and Pattison, N. (2023). Industry specialization and small business lending. *Journal of Banking Finance*, 149:106797.

di Patti, E. B. and Dell'Ariccia, G. (2004). Bank competition and firm creation. *Journal of Money, Credit and Banking*, 36(2):225–251.

di Patti, E. B. and Nigro, V. (2018). The financial structure of italian start-ups, in good and bad times. *Bank of Italy Occasional Paper*, (449). Available at SSRN: https://ssrn.com/abstract=3413557 or http://dx.doi.org/10.2139/ssrn.3413557.

Djankov, S., La Porta, R., Lopez-de Silanes, F., and Shleifer, A. (2002). The Regulation of Entry*. *The Quarterly Journal of Economics*, 117(1):1–37.

Duquerroy, A., Mazet-Sonilhac, C., Mésonnier, J.-S., and Paravisini, D. (2022). Bank local specialization. *Banque de France Working Paper*, (865).

Farinha, L., Félix, S., and Santos, J. A. C. (2019). Bank Funding and the Survival of Start-ups. Technical report.

Farinha, L. and Santos, J. A. C. (2006). The survival of start-ups: Do their funding choices and bank relationships at birth matter? Available at SSRN: https://ssrn.com/abstract=950978 or http://dx.doi.org/10.2139/ssrn.950978.

Felix, S. and Maggi, C. (2022). What is the impact of increased business competition? *Working paper*.

Giannetti, M. and Saidi, F. (2018). Shock Propagation and Banking Structure. *The Review of Financial Studies*, 32(7):2499–2540.

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, 225(2):254–277. Themed Issue: Treatment Effect 1.

Haltiwanger, J., Jarmin, R. S., and Miranda, J. (2013). Who Creates Jobs? Small versus Large versus Young. *The Review of Economics and Statistics*, 95(2):347–361.

Klapper, L., Laeven, L., and Rajan, R. (2006). Entry regulation as a barrier to entrepreneurship. *Journal of Financial Economics*, 82(3):591–629.

Ko, E.-J. and McKelvie, A. (2018). Signaling for more money: The roles of founders' human capital and investor prominence in resource acquisition across different stages of firm development. *Journal of Business Venturing*, 33(4):438–454.

Lawless, M. (2014). Age or size? contributions to job creation. *Small Business Economics*, 42(4):815–830.

Levine, R. (2005). Chapter 12 finance and growth: Theory and evidence. volume 1 of *Handbook of Economic Growth*, pages 865 – 934. Elsevier.

Levine, R. and Zervos, S. (1998). Stock markets, banks, and economic growth. *The American Economic Review*, 88(3):537–558.

Paravisini, D., Rappoport, V., and Schnabl, P. (2023). Specialization in bank lending: Evidence from exporting firms. *Journal of Finance*, 78(4):2049–2085.

Petersen, M. A. and Rajan, R. G. (1994). The benefits of lending relationships: Evidence from small business data. *The Journal of Finance*, 49(1):3–37.

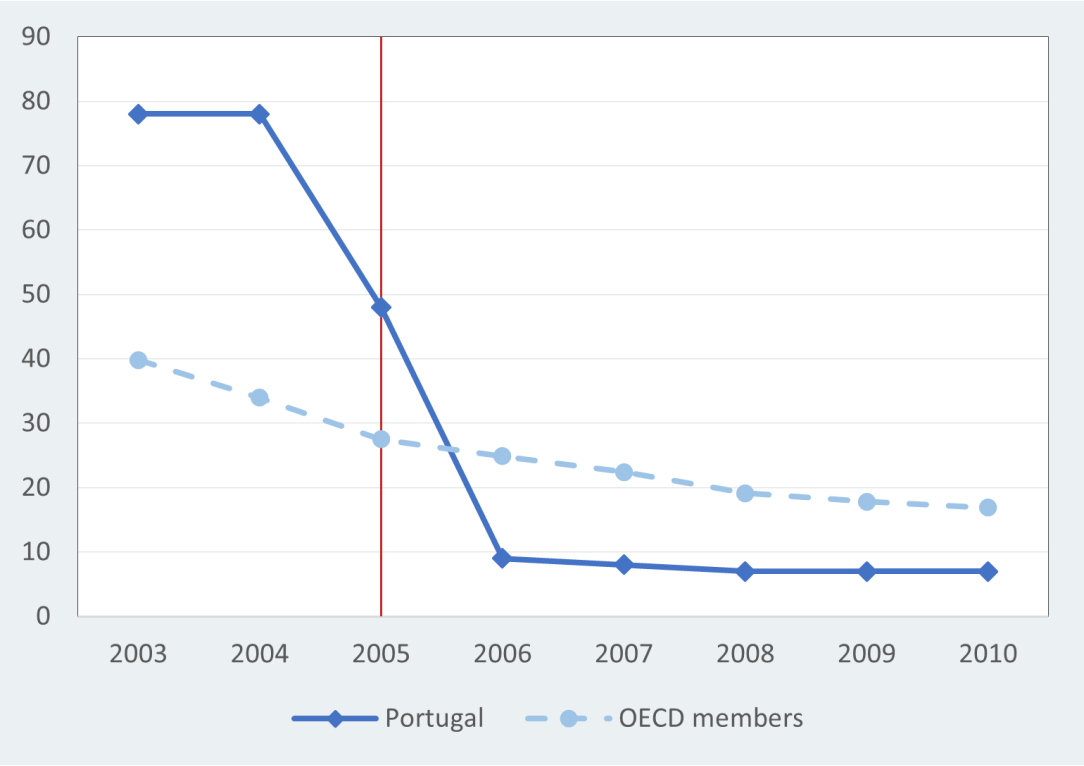
Rajan, R. G. and Zingales, L. (1998). Financial dependence and growth. *The American Economic Review*, 88(3):559–586.

Robb, A. M. and Robinson, D. T. (2012). The Capital Structure Decisions of New Firms. *The Review of Financial Studies*, 27(1):153–179.

Sun, L. and Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, 225(2):175–199. Themed Issue: Treatment Effect 1.

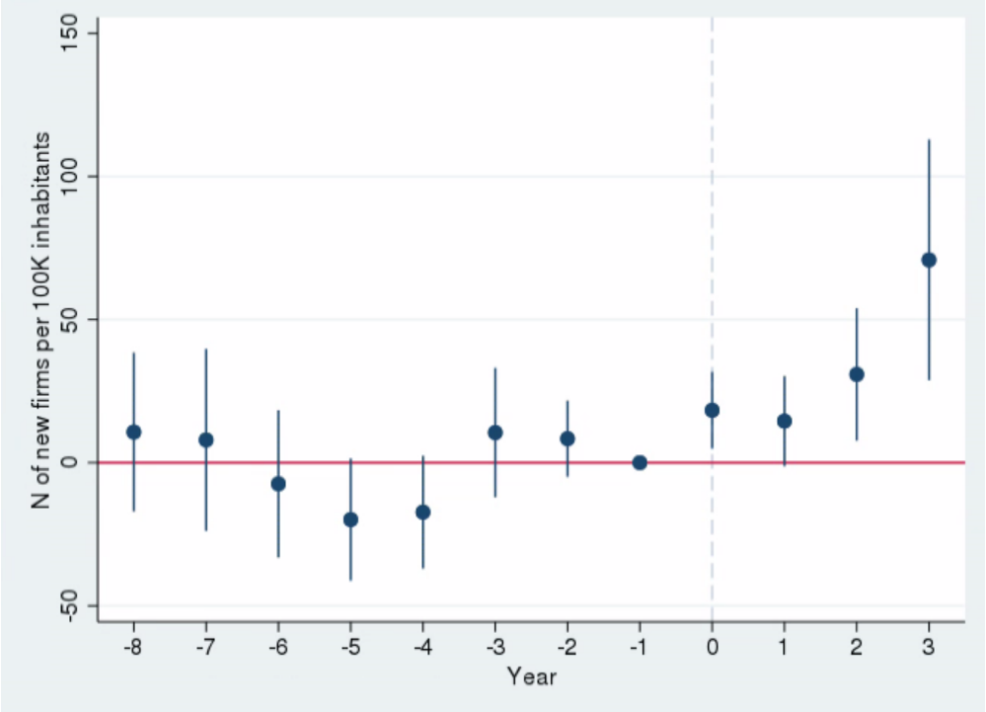
Winton, A. (1999). Don't put all your eggs in one basket? diversification and specialization in lending. *Working paper*.

Figure 1: Number of days required to start a business



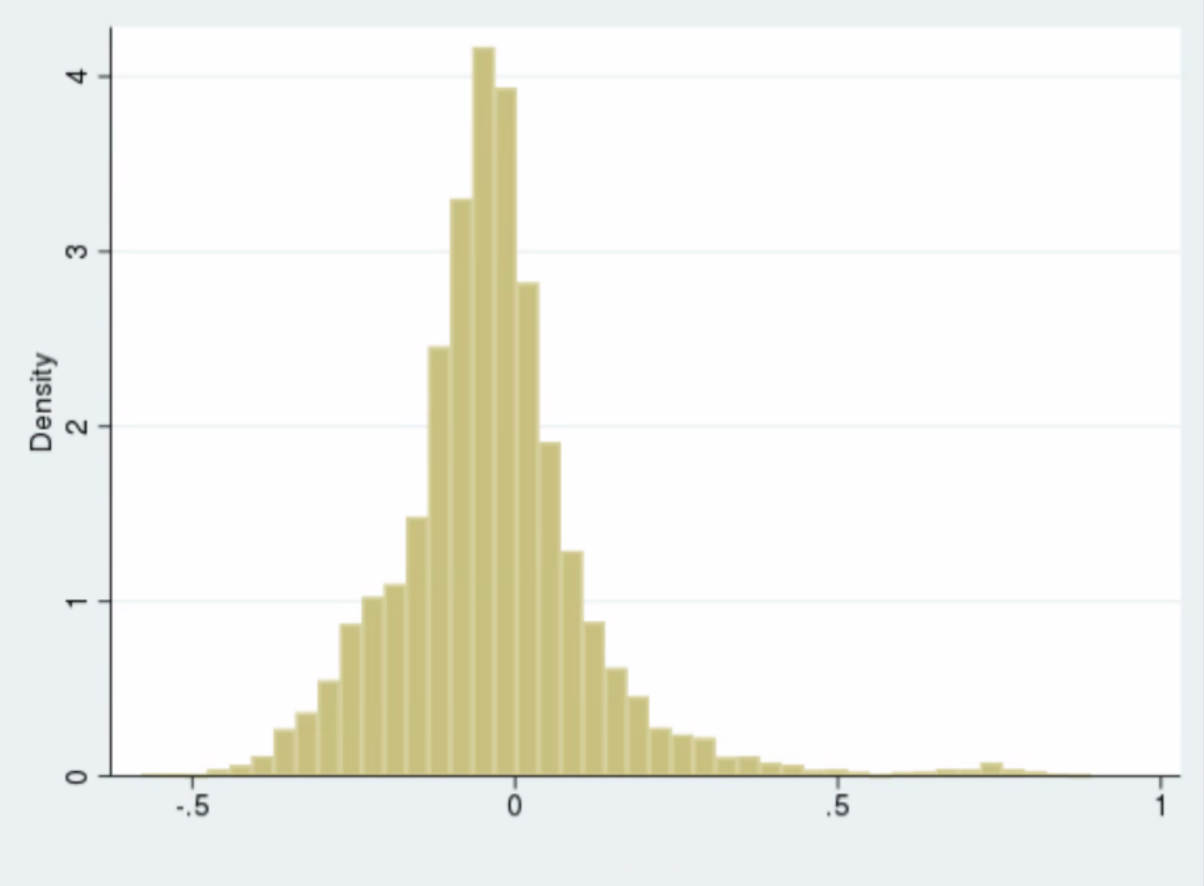
Source: Doing Business, the World Bank

Figure 2: Dynamic impact of the ENH reform on firm creation



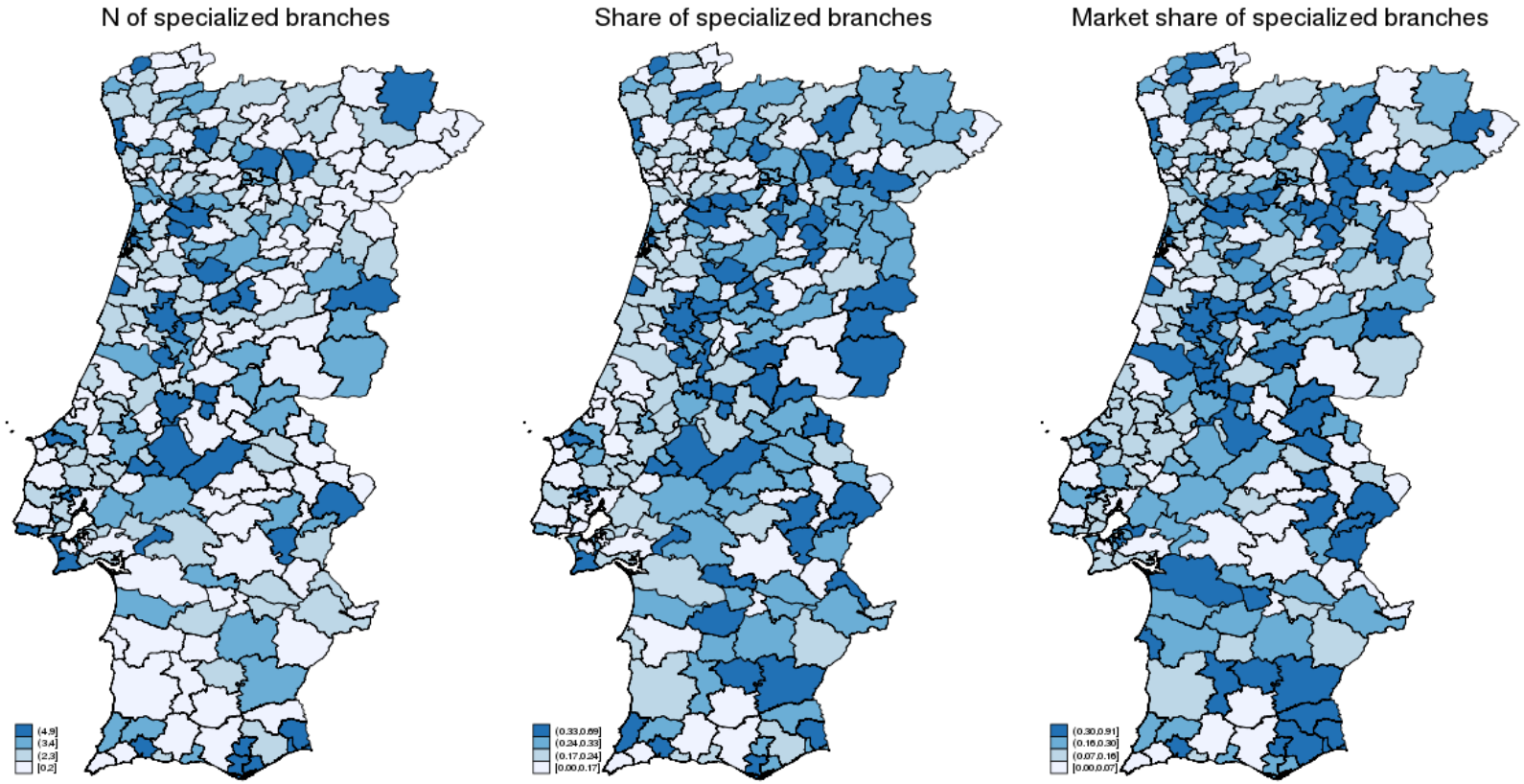
Notes: The figure depicts the dynamic coefficient graph for the Cengiz et al. (2019) model for the impact of the ENH reform implementation on the rate of business creation. The estimation is performed at the municipality-year level. The dependent variable is the number of newly incorporated firms in a municipality per year per 100,000 inhabitants. The staggered treatment at the municipality level starts in mid-2005. 95% confidence intervals.

Figure 3: Distribution of the E_{bmt} in 2004



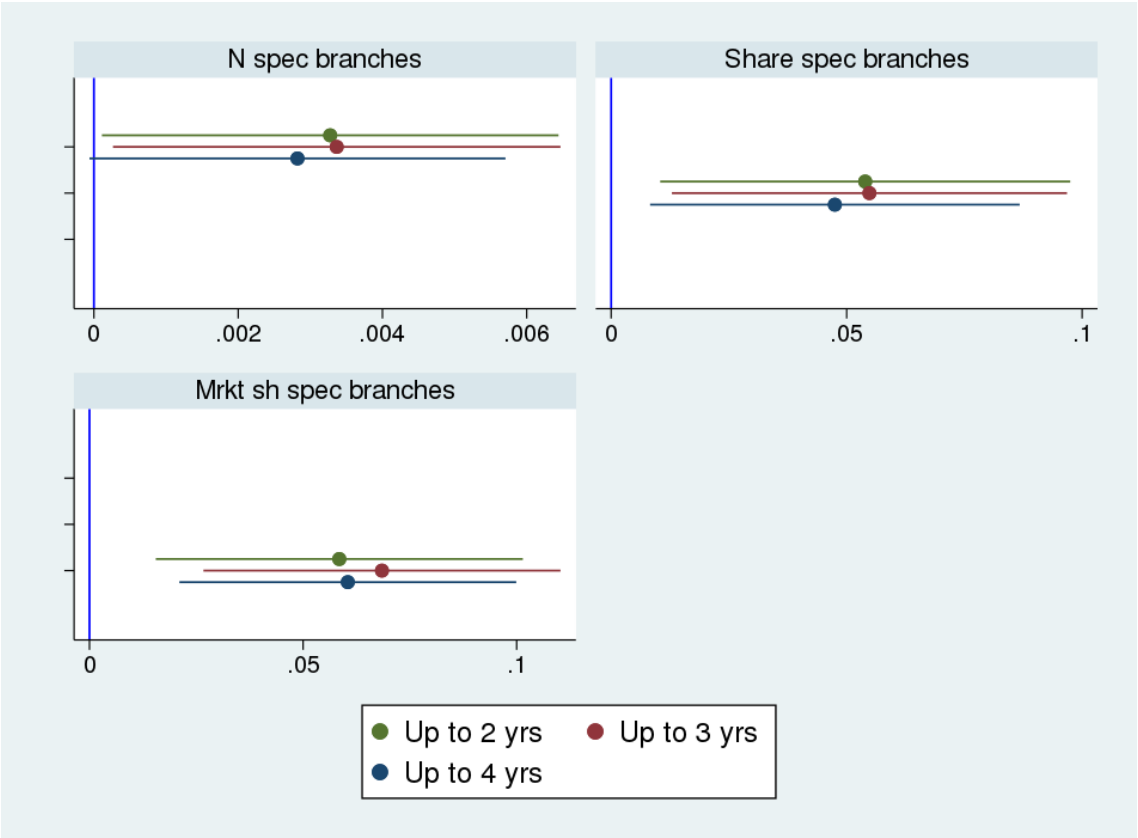
Notes: The figure depicts the countrywide distribution of the Portuguese bank branches' excess shares of new firms in the corporate loan portfolios. The excess share of start-ups is calculated as the difference between a branch's individual exposure to start-up borrowers and the average exposure to start-ups among the branches operating in the same municipality.

Figure 4: Municipality-level start-up specialization measures



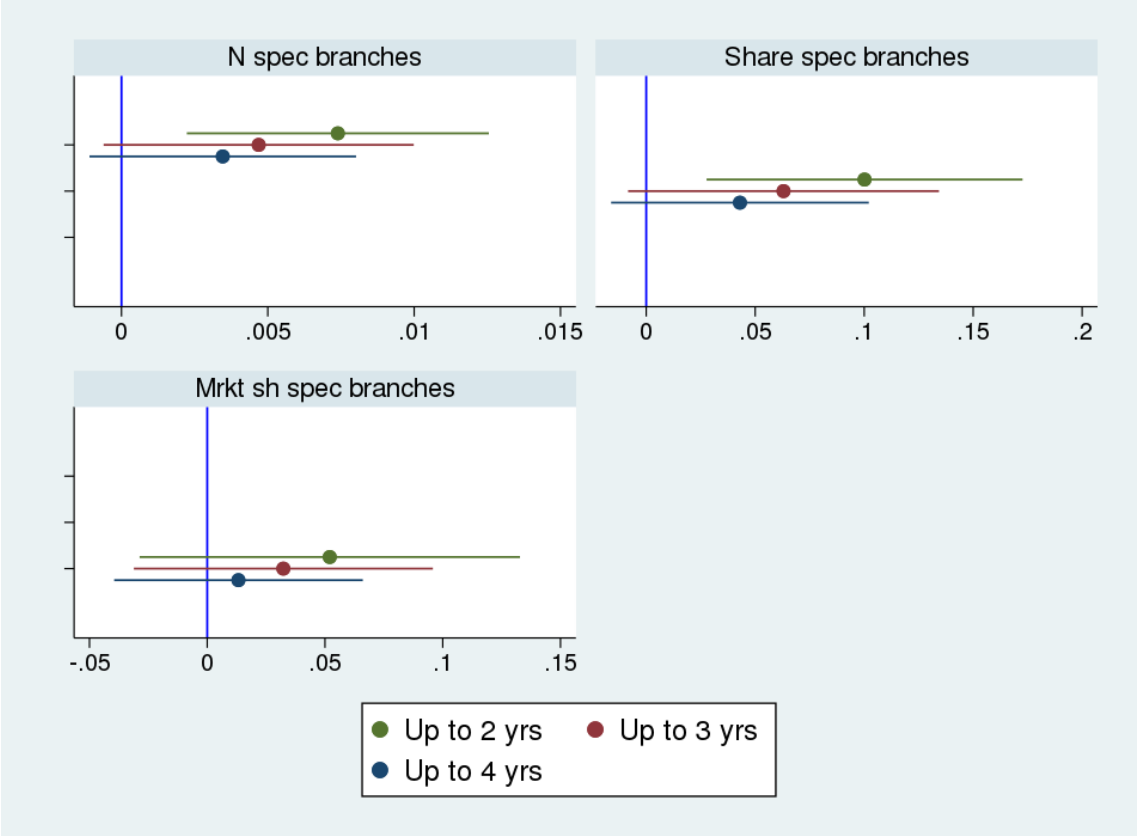
Notes: The figure presents the heat map of the geographical distribution of the municipality-level measures of bank branches' specialization in lending to new firms (start-ups). The distributions of the measures are split in quartiles; darker colors indicate a higher quartile. The municipality-level specialization measures are estimated based on the branch-level specialization indicators that are then aggregated at the municipality level in the following ways: 1) number of the specialized branches; 2) share of the specialized branches in the total number of local branches; 3) market share of the specialized branches in the local credit market.

Figure 5: Credit access coefficients by firm age group:
municipality & industry & year fixed effects



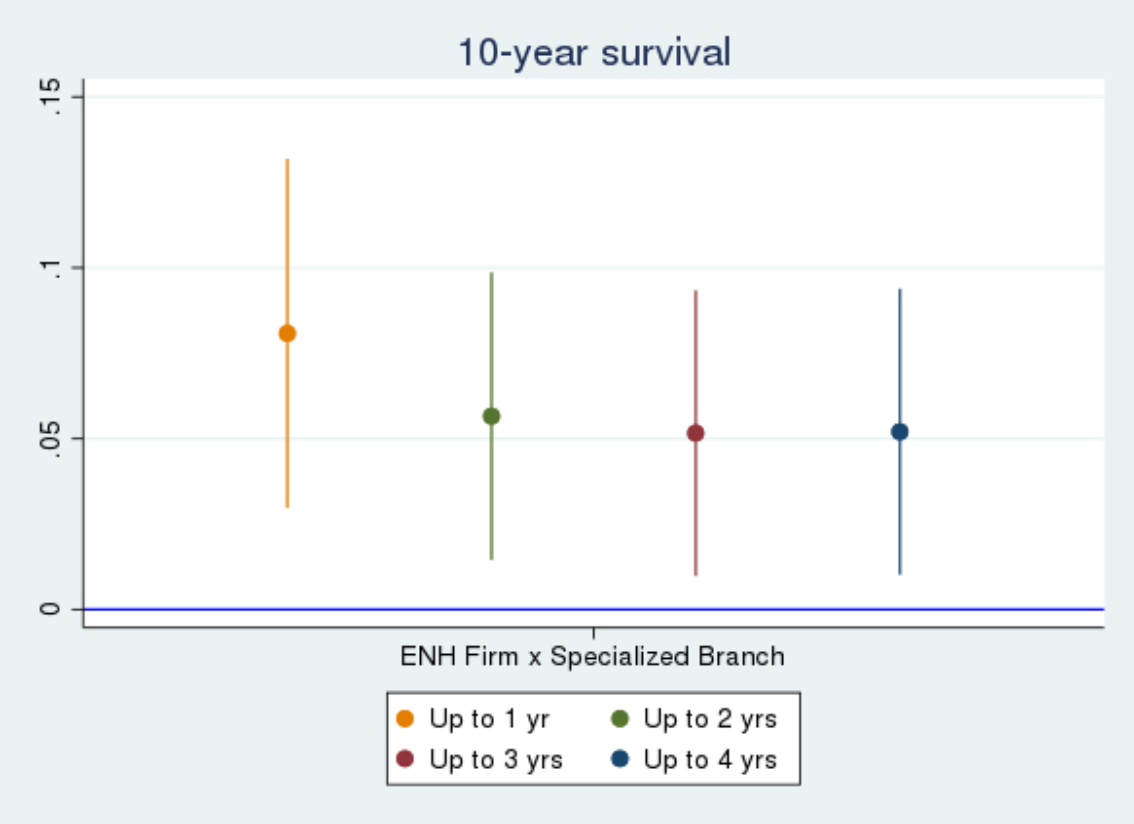
Notes: The figure plots the probability of having a bank loan for new firms after the ENH reform is implemented in their municipality depending on the start-up specialization of the local bank branches. Each horizontal line refers to a different age group of firms (firms up to 2, 3, or 4 years old). The dot represents the point estimate of a panel regression, where the dependent variable takes the value of 1 if the firm has a bank loan at the end of the year (0 otherwise). The displayed coefficients refer to the interaction between a binary variable indicating the reform implementation with a continuous variable of the local branches' start-up specialization aggregated at the municipality level: the number of the specialized branches, the share of the specialized branches in the total number of branches, and the total market share of the specialized branches (each represented in a separate chart). The regressions include municipality, industry, and year fixed effects. The regressions include the firm age in months and the pre-reform measures for bank market concentration (HHI) and level of the entrepreneurial activity (the number of economically active start-ups) as controls. Estimation period is 2004-2008. 90% confidence interval

Figure 6: Credit access coefficients by firm age group:
firm-group & year fixed effects



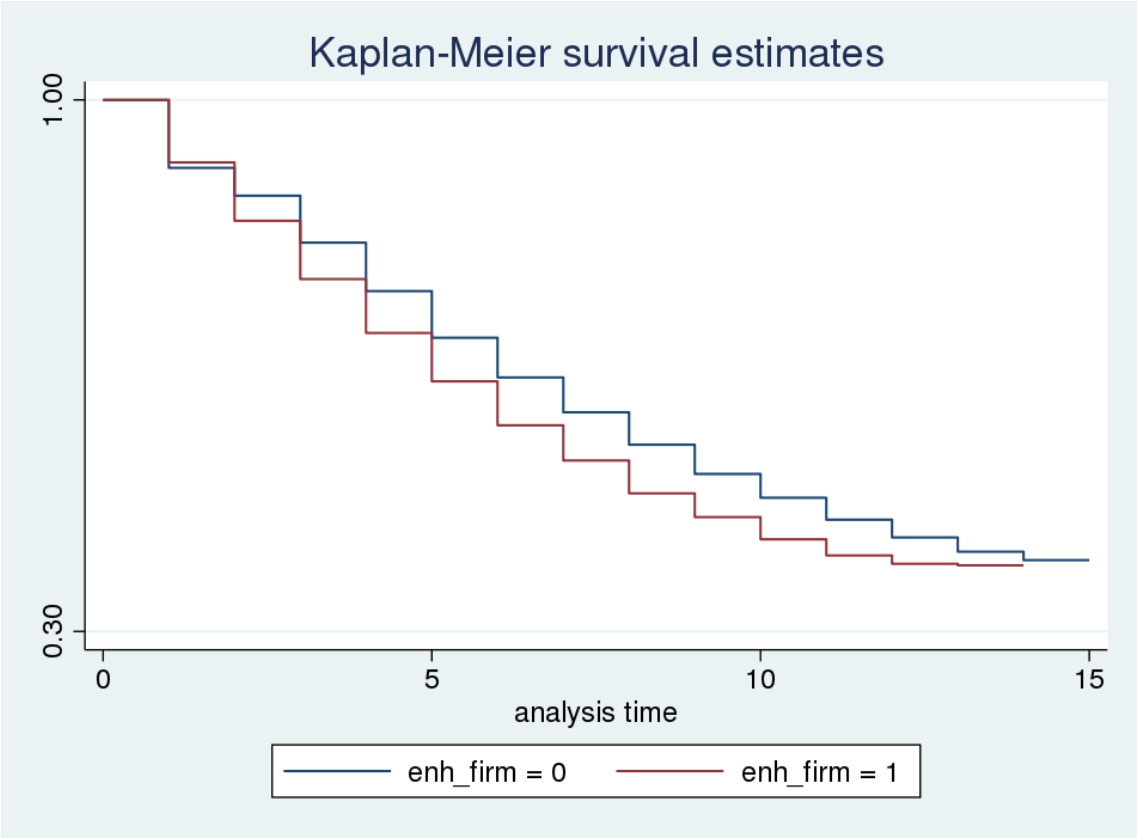
Notes: The figure plots the probability of having a bank loan for new firms after the ENH reform is implemented in their municipality depending on the start-up specialization of the local bank branches. Each horizontal line refers to a different age group of firms (firms up to 2, 3, or 4 years old). The dot represents the point estimate of a panel regression, where the dependent variable takes the value of 1 if the firm has a bank loan at the end of the year (0 otherwise). The displayed coefficients refer to the interaction between a binary variable indicating the reform implementation with a continuous variable of the local branches' start-up specialization aggregated at the municipality level: the number of the specialized branches, the share of the specialized branches in the total number of branches, and the total market share of the specialized branches (each represented in a separate chart). The regressions include year fixed effects and firm-group fixed effects, i.e., municipality-industry-size group fixed effects. The size group is determined as a within-industry quintile of the natural logarithm of firms' total assets. The regressions include the firm age in months as well as the pre-reform measures for bank market concentration (HHI) and level of the entrepreneurial activity (the number of economically active start-ups) as controls. Estimation period is 2006-2008. 90% confidence interval

Figure 7: Survival probability: municipality-industry & cohort fixed effects



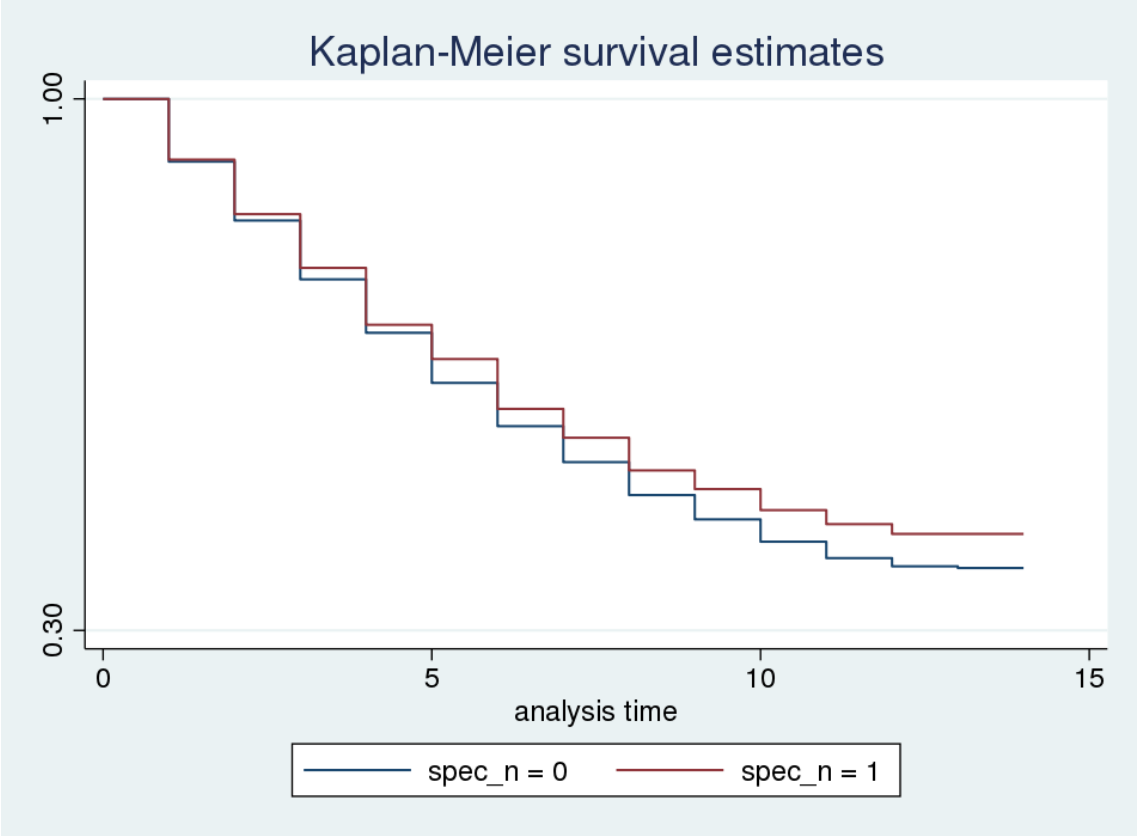
Notes: The figure plots the 10-year survival probability of start-up firms, created after the reform and financed by a specialized bank branch. Each vertical line refers to a different age group of firms (firms up to 1, 2, 3, or 4 years old). The dot represents the point estimate of a cross-sectional regression, where the dependent variable takes the value of 1 if the firm is in operation for at least 10 years (0 otherwise). The coefficient displayed refers to the interaction between a binary variable capturing if the firm was created after the reform with a binary variable capturing if the firm borrows from a bank branch specialized on start-ups (defined as being in the upper quartile of the branch specialization measure). The regression includes municipality-industry and firm creation cohort fixed effects. The vertical lines represent 95% confidence intervals.

Figure 8: Kaplan-Meier survival analysis by firm type: ENH firms vs non-ENH firms



Notes: This Kaplan-Meier plot shows the survival functions for the populations of the ENH firms (red) and non-ENH firms (blue) in the treated municipalities. Each step of the function indicates the share of the firms in the population that survived up to the corresponding age. The data is right-censored as after year 2018 the survival of firms is not observed. ENH firm is a firm registered after the ENH reform was implemented in a municipality. Logrank test statistics for differences between the curves: $\chi^2(1) = 57.0 (p - value = 0.000)$.

Figure 9: Kaplan-Meier survival analysis of the ENH firms: specialized branch borrowers vs regular branch borrowers



Notes: This Kaplan-Meier plot shows the survival functions for the populations of the ENH firms that obtain their first loans from the specialized branches (red) and from the regular branches (blue). Each step of the function indicates the share of the firms in the population that survived up to the corresponding age. The data is right-censored as after year 2018 the survival of firms is not observed. An ENH firm is a firm registered after the ENH reform was implemented in a municipality. A specialized branch is a bank branch that is identified as specialized in lending to new firms pre-reform. A regular branch is a non-specialized branch. Logrank test statistics for differences between the curves: $\chi^2(1) = 5.9(p - value{=}0.015)$.

Table 1: Impact of the ENH reform on business creation

	(1) Two-Way Fixed Effects	(2) Callaway and Sant'Anna (2021)	(3) Cengiz et al. (2019)
ENH	24.26***	24.78***	25.07***
	(7.92)	(8.29)	(7.24)
Obs.	1,656	1,656	4,356
R^2	0.778		0.773

Notes: The estimations are performed at the municipality-year level. The dependent variable is the number of new firms per 100,000 municipality inhabitants annually. The two-way fixed effects model includes municipality and year fixed effects. Callaway and Sant'Anna (2021) model uses not yet treated and "never treated" (i.e. not treated until 2008) municipalities as a control group. Cengiz et al. (2019) methodology constructs the control group out of "never treated" municipalities in the sample. Column 3 reports a higher number of observations, as the Cengiz et al. (2019) methodology implies generating separate stacks (samples) of observations for each treated cohort. A stack includes observations from a cohort of municipalities that receive treatment in the same year and all the municipalities that never receive the treatment. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Impact of the ENH reform on business creation conditional on the local branches' specialization in lending to new firms

	(1)	(2)	(3)	(4)	(5)	(6)
ENH	0.200	-0.944	9.265	40.64	50.33	68.79*
	(10.99)	(10.98)	(8.803)	(35.73)	(35.23)	(35.77)
ENH x No. of specialized branches	8.384**			7.893**		
	(3.377)			(3.296)		
ENH x Share of specialized branches		120.2**			119.0**	
		(47.66)			(47.14)	
ENH x Market share of specialized branches			112.2*			121.5*
			(63.46)			(62.73)
ENH x HHI				-56.56	-138.2	-154.5
				(142.7)	(143.4)	(135.2)
ENH x No. of new firms scaled by population				-0.033	-0.034	-0.042
				(0.030)	(0.030)	(0.032)
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,656	1,656	1,656	1,656	1,656	1,656
Adjusted R-squared	0.749	0.750	0.749	0.749	0.750	0.749
Impact of one SD increase in specialization measure	*13.2*	*12.4*	*16.2*	*12.4*	*12.3*	*17.5*

Notes: The estimations are performed at the municipality-year level. The dependent variable is the number of newly registered firms per 100,000 inhabitants annually. ENH is an indicator variable that takes the value of 1 starting from the year when the ENH reform was implemented in a municipality and 0 otherwise. The coefficients of interest are the interaction terms of the ENH variable and municipality-level measures of the intensity of local bank branches' specialization: "No. of specialized branches" is the absolute number of the specialized bank branches operating in a municipality at the end of the pre-reform year 2004; "Share of specialized branches" is calculated as the number of specialized branches divided by the total number of bank branches operating in a municipality at the end of 2004; "Market share of specialized branches" is the sum of market shares of all the specialized branches operating in a municipality (value between 0 and 1). HHI is Hirschman-Herfindahl index that captures bank competition in the credit market at the end of 2004. We control for the level of the pre-reform entrepreneurial activity in a municipality by including the number of economically active young firms (up to 4 years old) at the end of 2004 scaled by the municipality's population. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Local specialization and credit access: Extensive margin

	2004-2008			2006-2008		
	(1)	(2)	(3)	(4)	(5)	(6)
ENH	-0.008	-0.003	0.001	-0.008	-0.004	0.002
	(0.018)	(0.018)	(0.018)	(0.032)	(0.033)	(0.035)
ENH x No. of specialized branches	0.003*			0.007***		
	(0.002)			(0.003)		
ENH x Share of specialized branches		0.054**			0.097***	
		(0.026)			(0.036)	
ENH x Market share of specialized branches			0.059**			0.050
			(0.026)			(0.042)
ENH x HHI	-0.004	-0.043	-0.020	0.051	0.011	0.092
	(0.084)	(0.089)	(0.083)	(0.098)	(0.105)	(0.113)
ENH x No. of new firms scaled by population	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm size				0.104***	0.104***	0.104***
				(0.002)	(0.002)	(0.002)
Firm age	0.013***	0.013***	0.013***	0.008***	0.008***	0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	235,367	235,367	235,367	107,527	107,527	107,527
Adjusted R-squared	0.104	0.104	0.104	0.183	0.183	0.183
Impact of one SD increase in specialization measure (relative to mean)	*2.8%*	*3.7%*	*3.4%*	*6.7%*	*6.7%*	

Notes: The table presents the estimations for the new firms' probability of having bank loan depending on the local bank branches' specialization in lending to new firms. The estimations are performed in a panel setup at the firm-year level. The dependent variable is an indicator variable that takes the value of 1 if a firm has a bank loan at the end of the calendar year and 0 otherwise. The sample consists of firms in the age group of up to two years (for other age groups, see Figures 6 and A1). ENH is an indicator variable that takes the value of 1 starting from the year when the ENH reform was implemented in a municipality and 0 otherwise. The coefficients of interest are the interaction terms of the ENH variable and municipality-level measures of the intensity of local bank branches' specialization: "No. of specialized branches" is the absolute number of the specialized bank branches operating in a municipality at the end of the pre-reform year 2004; "Share of specialized branches" is calculated as the number of specialized branches divided by the total number of bank branches operating in a municipality at the end of 2004; "Market share of specialized branches" is the sum of market shares of all the specialized branches operating in a municipality (value between 0 and 1). HHI is Hirschman-Herfindahl index that approximates bank competition in the credit market at the end of 2004. We control for the level of the pre-reform entrepreneurial activity in a municipality by including the number of economically active young firms (up to 4 years old) at the end of 2004 scaled by the municipality's population. Firm age is measured in months at the end of the calendar year. Firm size is the natural logarithm of total assets. Total assets data is available starting from 2006. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Local specialization and credit access: Intensive margin

	(1)	(2)	(3)	(4)	(5)	(6)
ENH	0.009	0.010	0.012	0.008	0.009	0.011
	(0.025)	(0.024)	(0.024)	(0.025)	(0.024)	(0.024)
ENH x No. of specialized branches	0.003*			0.003*		
	(0.002)			(0.002)		
ENH x Share of specialized branches		0.049**			0.049**	
		(0.022)			(0.022)	
ENH x Market share of specialized branches			0.048*			0.049*
			(0.026)			(0.026)
ENH x HHI	0.051	0.024	0.054	0.047	0.021	0.050
	(0.119)	(0.125)	(0.114)	(0.119)	(0.125)	(0.114)
ENH x No. of new firms scaled by population	-0.000*	-0.000*	-0.000**	-0.000*	-0.000*	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm size				0.011***	0.011***	0.011***
				(0.001)	(0.001)	(0.001)
Firm age	0.003***	0.003***	0.003***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	106,989	106,989	106,989	106,989	106,989	106,989
Adjusted R-squared	0.018	0.018	0.018	0.021	0.021	0.021
Impact of one SD increase in specialization measure (relative to mean)	*5.5%*	*6.4%*	*5.3%*	*5.5%*	*6.4%*	*5.4%*

Notes: The table presents the estimations for the new firms' financial leverage depending on the local bank branches' specialization in lending to new firms. The estimations are performed in a panel setup at the firm-year level. The dependent variable is financial leverage calculated as debt over total assets. Firm balance sheet information is available starting from 2006. Therefore, the estimation period in the table is from 2006 to 2008. The sample consists of firms in the age group of up to two years. ENH is an indicator variable that takes the value of 1 starting from the year when the ENH reform was implemented in a municipality and 0 otherwise. The coefficients of interest are the interaction terms of the ENH variable and municipality-level measures of the intensity of local bank branches' specialization: "No. of specialized branches" is the absolute number of the specialized bank branches operating in a municipality at the end of the pre-reform year 2004; "Share of specialized branches" is calculated as the number of specialized branches divided by the total number of bank branches operating in a municipality at the end of 2004; "Market share of specialized branches" is the sum of market shares of all the specialized branches operating in a municipality (value between 0 and 1). HHI is Hirschman-Herfindahl index that approximates bank competition in the credit market at the end of 2004. We control for the level of the pre-reform entrepreneurial activity in a municipality by including the number of economically active young firms (up to 4 years old) at the end of 2004 scaled by the municipality's population. Firm age is measured in months at the end of the calendar year. Firm size is the natural logarithm of total assets. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Branch specialization in lending to new firms and ENH firm survival rate

	5-year survival				10-year survival			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ENH Firm	0.004	0.003	0.022	0.022	0.002	0.000	-0.014	-0.016
	(0.010)	(0.010)	(0.025)	(0.024)	(0.010)	(0.010)	(0.022)	(0.021)
ENH Firm x Specialized Branch	0.051**	0.048**	0.061***	0.057***	0.052**	0.047**	0.056**	0.054***
	(0.021)	(0.020)	(0.023)	(0.022)	(0.021)	(0.020)	(0.022)	(0.021)
Specialized Branch	-0.003	-0.020*	-0.004	-0.015	0.002	-0.019*	0.001	-0.018
	(0.011)	(0.011)	(0.013)	(0.013)	(0.011)	(0.011)	(0.012)	(0.012)
Municipality-Ind & Cohort FE	Yes	Yes			Yes	Yes		
Municipality-Ind-Cohort FE			Yes	Yes			Yes	Yes
Bank FE		Yes		Yes		Yes		Yes
Observations	36,582	36,578	34,186	34,183	36,582	36,578	34,186	34,183
Adjusted R-squared	0.032	0.037	0.030	0.035	0.041	0.048	0.042	0.047
Relative to average survival rate	*7.8%*	*7.4%*	*9.4%*	*8.8%*	*11.6%*	*10.4%*	*12.4%*	*12.0%*

Notes: The table presents the estimation of the cross-sectional linear probability Model 6 to examine the survival rate of new firms created after the ENH reform depending on whether a firm obtains its first ever loan from a specialized branch or a regular branch. The dependent variables are indicator variables that take the value of 1 if a start-up reached the age of 5 or 10 years and 0 otherwise. Average 5- and 10-year survival probability in this sample of borrowing new firms are 67% and 46%, respectively. ENH firm is an indicator variable that takes the value of 1 if a firm was registered after the ENH office was launched in its municipality and 0 otherwise. Specialized branch is an indicator variable that takes the value of 1 if a bank branch is identified as a specialized in lending to new firms in the pre-reform year 2004 and the value of 0 if the branch is not specialized. The sample consists of new firms (up to 4 years old) in the year when they obtain their first bank loan. Cohort stands for the year when a firm is originated. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Branch specialization in lending to new firms and ENH firm survival rate: alternative branch characteristics

	5-year survival				10-year survival			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ENH Firm	-0.001	-0.002	-0.069	-0.053	0.003	0.001	-0.061	-0.057
	(0.010)	(0.010)	(0.091)	(0.090)	(0.010)	(0.010)	(0.089)	(0.090)
ENH Firm x Specialized Branch	0.049**	0.046**	0.052**	0.047**	0.053**	0.047**	0.055**	0.049**
	(0.021)	(0.020)	(0.023)	(0.021)	(0.021)	(0.020)	(0.023)	(0.021)
Specialized Branch	-0.003	-0.020*	0.002	-0.016	0.002	-0.020*	0.005	-0.016
	(0.011)	(0.011)	(0.011)	(0.012)	(0.011)	(0.011)	(0.011)	(0.012)
ENH Firm x Industry Specialized Branch	0.024*	0.026*	0.027*	0.027*	-0.006	-0.004	-0.004	-0.003
	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)	(0.016)	(0.016)	(0.015)
Industry Specialized Branch	-0.008	0.004	-0.003	0.005	-0.008	0.003	-0.006	0.004
	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
ENH Firm x Branch Size			0.004	0.003			0.003	0.003
			(0.005)	(0.005)			(0.005)	(0.005)
Branch Size			0.009***	0.019***			0.004	0.018***
			(0.003)	(0.006)			(0.004)	(0.006)
Constant	0.669***	0.669***	0.505***	0.323***	0.458***	0.459***	0.381***	0.131
	(0.003)	(0.003)	(0.047)	(0.107)	(0.003)	(0.003)	(0.064)	(0.115)
Municipality-Ind & Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE		Yes		Yes		Yes		Yes
Observations	36,582	36,578	36,582	36,578	36,582	36,578	36,582	36,578
Adjusted R-squared	0.032	0.037	0.032	0.038	0.041	0.048	0.041	0.048
Relative to average survival rate	*7.5%*	*7.1%*	*8.0%*	*7.2%*	*11.8%*	*10.4%*	*12.2%*	*10.9%*

Notes: The table presents the estimation of the cross-sectional linear probability Model 6 to examine the survival rate of new firms created after the ENH reform depending on whether a firm obtains its first ever loan from a specialized branch or a regular branch. The dependent variables are indicator variables that take the value of 1 if a start-up reached the age of 5 or 10 years and 0 otherwise. Average 5- and 10-year survival probability in this sample of borrowing new firms are 67% and 46%, respectively. ENH firm is an indicator variable that takes the value of 1 if a firm was registered after the ENH office was launched in its municipality and 0 otherwise. Specialized branch is an indicator variable that takes the value of 1 if a bank branch is identified as a specialized in lending to new firms in the pre-reform year 2004 and the value of 0 if the branch is not specialized. The sample consists of new firms (up to 4 years old) the year when they obtain their first bank loan. Cohort stands for the year when a firm is originated. Industry Specialized Branch is an indicator for a bank branch specialized in the new firm's 1-digit industry pre-reform. Branch Size is the natural logarithm of the branch's total corporate loan portfolio in thousand euros. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Cox survival analysis

	(1)	(2)
ENH Firm	0.009	0.007
	(0.024)	(0.024)
ENH Firm x Specialized Branch	-0.120**	-0.116**
	(0.055)	(0.054)
Specialized Branch	-0.007	-0.008
	(0.028)	(0.028)
Municipality FE	Yes	Yes
Industry FE	Yes	Yes
Cohort FE	Yes	
Stratification by Cohort		Yes
Observations	36,995	36,995
Wald chi2	4.93E+06	7.64E+07
Prob >chi2	0.000	0.000

Notes: The table presents estimation of the proportional hazard model for the new firms' hazard of going out of business over time. The point estimates are log of the hazard ratio ($\lambda(t)/\lambda_0(t)$) and, thus, stand for an approximate increase or decrease in the underlying hazard ratio. To arrive at an exact estimate subtract an exponent of the coefficient from 1. A negative estimate indicates lower hazard, i.e., lower probability, of going out of business; a positive estimate indicates higher hazard. Cohort is the year of firm origination. Stratification by cohort allows for individual baseline hazard $\lambda_c(t)$, i.e., individual average failure probability, for each cohort of firms. ENH firm is an indicator for a new firm that was originated as a result of the ENH reform. Specialized branch is an indicator for a bank branch specialized in lending to new firms pre-reform. The coefficient of interest, the one for the interaction term, indicates that an ENH firm that obtains its first loan from a specialized branch has an 11.3% (*1-exp(-0.12)*) lower hazard of going out of business than an ENH firm borrowing from a regular branch. Estimation period is 2004-2008. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Branch specialization in lending to new firms and ENH firms' profitability

	At the age of 5 years				At the age of 10 years			
	$\frac{\text{Net Profit}}{\text{Total Assets}}$		$\frac{\text{EBITDA}}{\text{Total Assets}}$		$\frac{\text{Net Profit}}{\text{Total Assets}}$		$\frac{\text{EBITDA}}{\text{Total Assets}}$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ENH Firm	-0.008	-0.008	-0.006	-0.006	-0.013**	-0.013**	-0.008	-0.009
	(0.008)	(0.007)	(0.008)	(0.008)	(0.006)	(0.006)	(0.007)	(0.007)
ENH Firm x Specialized Branch	0.033**	0.029**	0.039***	0.037**	0.004	0.007	0.001	0.004
	(0.013)	(0.014)	(0.014)	(0.015)	(0.013)	(0.012)	(0.014)	(0.013)
Specialized Branch	0.003	-0.005	0.001	-0.006	-0.003	-0.001	-0.004	-0.002
	(0.005)	(0.006)	(0.006)	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)
Municipality-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE		Yes		Yes		Yes		Yes
Observations	23,799	23,795	23,799	23,795	16,201	16,193	16,201	16,193
Adjusted R-squared	0.045	0.045	0.046	0.048	0.054	0.054	0.047	0.046

Notes: The table presents the estimation of the cross-sectional Model 8 to examine the performance of the firms created after the ENH reform depending on whether they obtain their first loan from a specialized branch or a regular branch. The dependent variables are continuous measures of firm profitability calculated at the end of the calendar year when a firm reaches the age of 5 or 10 years: 1) net profit over total assets, and 2) EBITDA over total assets. ENH firm is an indicator variable that takes the value of 1 if a firm was registered after the ENH office was launched in its municipality and 0 otherwise. Specialized branch is an indicator variable that takes the value of 1 if a bank branch is identified as a specialized in lending to new firms in the pre-reform year 2004 and the value of 0 if the branch is not specialized. Cohort stands for the year when a firm is originated. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

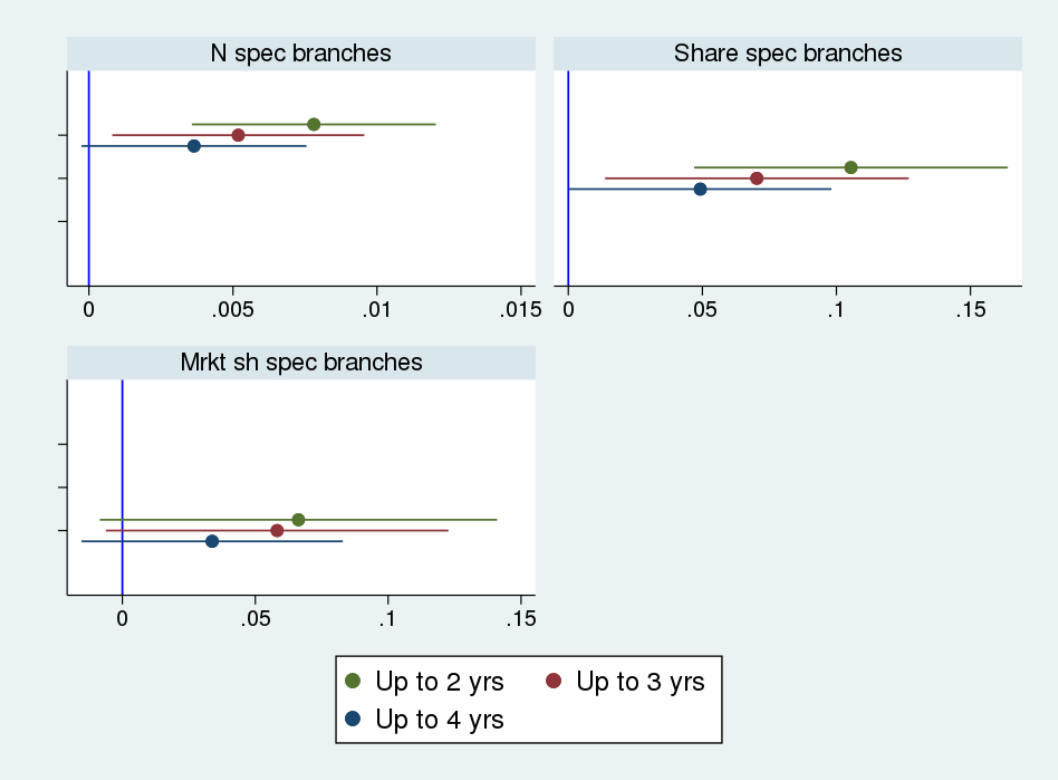
Table 9: Branch specialization in lending to new firms and job creation

	At the age of 5 years				At the age of 10 years			
	Ln(No.Workers)		Δ No.Workers		Ln(No.Workers)		Δ No.Workers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ENH Firm	0.005	0.004	0.058	0.047	-0.019	-0.024	0.011	-0.008
	(0.018)	(0.018)	(0.053)	(0.053)	(0.029)	(0.029)	(0.082)	(0.081)
ENH Firm x Specialized Branch	-0.015	-0.005	0.020	0.055	0.071	0.093*	0.262	0.330*
	(0.031)	(0.031)	(0.121)	(0.127)	(0.052)	(0.051)	(0.167)	(0.168)
Specialized Branch	-0.019	-0.034*	-0.038	-0.115	-0.014	-0.033	0.032	-0.015
	(0.016)	(0.018)	(0.062)	(0.074)	(0.021)	(0.026)	(0.081)	(0.091)
Municipality-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE		Yes		Yes		Yes		Yes
Observations	23,983	23,977	13,137	13,132	16,306	16,298	8,789	8,775
Adjusted R-squared	0.099	0.102	0.029	0.029	0.095	0.097	0.042	0.045

Notes: The table presents the estimation of the cross-sectional Model 8 to examine the number of job created by the firms originated after the ENH reform depending on whether they obtain their first loan from a specialized branch or a regular branch. The dependent variables are continuous measures calculated at the end of the calendar year when a firm reaches the age of 5 or 10 years: 1) natural logarithm of the number of workers, and 2) EBITDA over total assets. ENH firm is an indicator variable that takes the value of 1 if a firm was registered after the ENH office was launched in its municipality and 0 otherwise. Specialized branch is an indicator variable that takes the value of 1 if a bank branch is identified as a specialized in lending to new firms in the pre-reform year 2004 and the value of 0 if the branch is not specialized. Cohort stands for the year when a firm is originated. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Appendix

Figure A1: Credit access coefficients by firm age group: municipality & industry-year-size group fixed effects



The figure plots the probability of having a bank loan for new firms after the ENH reform is implemented in their municipality depending on the start-up specialization of the local bank branches. Each horizontal line refers to a different age group of firms (firms up to 2, 3, or 4 years old). The dot represents the point estimate of a panel regression, where the dependent variable takes the value of 1 if the firm has a bank loan at the end of the year (0 otherwise). The displayed coefficients refer to the interaction between a binary variable indicating the reform implementation with a continuous variable of the local branches' start-up specialization aggregated at the municipality level: the number of the specialized branches, the share of the specialized branches in the total number of branches, and the total market share of the specialized branches. The regressions include municipality and industry-year-size group fixed effects. The size group is determined as a within-industry quintile of the natural logarithm of firms' total assets. The regressions include the firm age in months as well as the pre-reform measures for bank market concentration (HHI) and level of the entrepreneurial activity (the number of economically active start-ups) as controls. Estimation period is 2006-2008. 90% confidence interval

Table A1: Credit access: Firm-group fixed effects

	Loan dummy			Leverage		
	(1)	(2)	(3)	(4)	(5)	(6)
ENH	0.022	0.025	0.028	0.011	0.011	0.011
	(0.036)	(0.038)	(0.040)	(0.021)	(0.021)	(0.020)
ENH x No. of specialized branches	0.007**			0.003**		
	(0.003)			(0.002)		
ENH x Share of specialized branches		0.100**			0.058**	
		(0.044)			(0.023)	
ENH x Market share of specialized branches			0.052			0.061**
			(0.049)			(0.023)
ENH x HHI	-0.145	-0.181	-0.078	0.001	-0.031	0.018
	(0.129)	(0.136)	(0.155)	(0.096)	(0.102)	(0.086)
ENH x No. of new firms scaled by population	-0.000	-0.000	-0.000	-0.000*	-0.000*	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm age	0.007***	0.007***	0.007***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Municipality-Industry-Size FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	105,403	105,403	105,403	104,866	104,866	104,866
Adjusted R-squared	0.216	0.216	0.216	0.048	0.049	0.049
Impact of one SD increase in specialization measure (relative to mean)	*6.7%*	*6.9%*		*5.5%*	*7.6%*	*6.8%*

Notes: The table presents the estimations for the new firms' probability of having bank credit and financial leverage depending on the local bank branches' specialization in lending to new firms. The estimations are performed in a panel setup at the firm-year level. Municipality-Industry-Size fixed effects capture average capital structure and probability of having credit within a group of similar firms. Firm size groups are defined as quintiles of firm size distribution withing the same industry. Firm balance sheet information is available starting from 2006. Therefore, the estimation period in the table is from 2006 to 2008. The sample consists of firms in the age group of up to two years. ENH is an indicator variable that takes the value of 1 starting from the year when the ENH reform was implemented in a municipality and 0 otherwise. The coefficients of interest are the interaction terms of the ENH variable and municipality-level measures of the intensity of local bank branches' specialization: "No. of specialized branches" is the absolute number of the specialized bank branches operating in a municipality at the end of the pre-reform year 2004; "Share of specialized branches" is calculated as the number of specialized branches divided by the total number of bank branches operating in a municipality at the end of 2004; "Market share of specialized branches" is the sum of market shares of all the specialized branches operating in a municipality (value between 0 and 1). HHI is Hirschman-Herfindahl index that approximates bank competition in the credit market at the end of 2004. We control for the level of the pre-reform entrepreneurial activity in a municipality by including the number of economically active young firms (up to 4 years old) at the end of 2004 scaled by the municipality's population. Firm age is measured in months at the end of the calendar year. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A2: Probit model for probability of new firms' bank credit access: marginal effects

	Average marginal effect			Marginal effect at covariates' mean		
	(1)	(2)	(3)	(4)	(5)	(6)
ENH x No. of specialized branches	0.008***			0.008***		
	(0.003)			(0.003)		
ENH x Share of specialized branches		0.105***			0.117***	
		(0.035)			(0.039)	
ENH x Market share of specialized branches			0.067			0.075
			(0.043)			(0.048)
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipality-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	107,525	107,525	107,525	107,525	107,525	107,525
Pseudo R2	0.177	0.177	0.177	0.177	0.177	0.177

Notes: The table presents the marginal effects of the local bank branches' specialization on the probability of having bank credit by new firms after the ENH reform implementation estimated with a Probit model. The marginal effect is defined as the partial derivative of the fitted probit model with respect to the interaction term of interest. The model estimations are performed in a panel setup at the firm-year level. The dependent variable is an indicator variable that takes the value of 1 if a firm has a bank loan at the end of the calendar year and 0 otherwise. The estimated model contains the full set of municipality- and firm-level controls: firm age and size, and interaction of the ENH indicator variable with HHI and the number of active new firms at the end of 2004 scaled by population. The sample consists of firms in the age group of up to two years. ENH is an indicator variable that takes the value of 1 starting from the year when the ENH reform was implemented in a municipality and 0 otherwise. Only the marginal effects for the variables of interest are reported: the interaction of the ENH variable and municipality-level measures of the intensity of local bank branches' specialization. "No. of specialized branches" is the absolute number of the specialized bank branches operating in a municipality at the end of the pre-reform year 2004; "Share of specialized branches" is calculated as the number of specialized branches divided by the total number of bank branches operating in a municipality at the end of 2004; "Market share of specialized branches" is the sum of market shares of all the specialized branches operating in a municipality (value between 0 and 1). HHI is Hirschman-Herfindahl index that approximates bank competition in the credit market at the end of 2004. We control for the level of the pre-reform entrepreneurial activity in a municipality by including the number of economically active young firms (up to 4 years old) at the end of 2004 scaled by the municipality's population. Firm age is measured in months at the end of the calendar year. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Tobit model: start-ups' financial leverage

	(1)	(2)	(3)
ENH	0.039	0.038	0.066
	(0.126)	(0.124)	(0.117)
ENH x No. of specialized branches	0.018**		
	(0.009)		
ENH x Share of specialized branches		0.347***	
		(0.112)	
ENH x Market share of specialized branches			0.262*
			(0.145)
ENH x HHI	0.174	-0.023	0.204
	(0.605)	(0.632)	(0.578)
ENH x No. of new firms scaled by population	-0.000	-0.000	-0.000**
	(0.000)	(0.000)	(0.000)
Firm age	0.011***	0.011***	0.011***
	(0.001)	(0.001)	(0.001)
Firm size	0.116***	0.116***	0.116***
	(0.004)	(0.004)	(0.004)
Municipality FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	106,989	106,989	106,989
Pseudo R2	0.042	0.042	0.042

Notes: The table presents the Tobit model estimations for the start-ups' financial leverage depending on the local bank branches' specialization in lending to new firms. As a lot of start-ups do not have debt, we reproduce the results of estimating a linear model in Table 4 with a Tobit censored regression model where the dependent variable, the firm financial leverage, is censored at its natural minimum value of zero. The estimations are performed in a panel setup at the firm-year level. The dependent variable is financial leverage calculated as debt over total assets. firm balance sheet information is available starting from 2006. Therefore, the estimation period in the table is from 2006 to 2008. The sample consists of firms in the age group of up to two years. ENH is an indicator variable that takes the value of 1 starting from the year when the ENH reform was implemented in a municipality and 0 otherwise. The coefficients of interest are the interaction terms of the ENH variable and municipality-level measures of the intensity of local bank branches' specialization: "No. of specialized branches" is the absolute number of the specialized bank branches operating in a municipality at the end of the pre-reform year 2004; "Share of specialized branches" is calculated as the number of specialized branches divided by the total number of bank branches operating in a municipality at the end of 2004; "Market share of specialized branches" is the sum of market shares of all the specialized branches operating in a municipality (value between 0 and 1). HHI is Hirschman-Herfindahl index that approximates bank competition in the credit market at the end of 2004. We control for the level of the pre-reform entrepreneurial activity in a municipality by including the number of economically active young firms (up to 4 years old) at the end of 2004 scaled by the municipality's population. Firm age is measured in months at the end of the calendar year. Firm size is the natural logarithm of total assets. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A4: Branch specialization in lending to new firms and ENH firm survival: municipality & industry & year fixed effects

	5-year survival		10-year survival	
	(1)	(2)	(3)	(4)
ENH Firm	0.004	0.003	-0.001	-0.002
	(0.010)	(0.010)	(0.010)	(0.010)
ENH Firm x Specialized Branch	0.041**	0.039**	0.041**	0.039**
	(0.020)	(0.019)	(0.020)	(0.019)
Specialized Branch	-0.003	-0.020*	0.004	-0.019*
	(0.011)	(0.011)	(0.011)	(0.011)
Municipality FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
Bank FE		Yes		Yes
Observations	36,994	36,991	36,994	36,991
Adjusted R-squared	0.032	0.037	0.037	0.044

Notes: The table presents the estimation of the cross-sectional linear probability to examine the survival rate of new firms created after the ENH reform depending on whether a firm obtains its first ever loan from a specialized branch or a regular branch. The dependent variables are indicator variables that take the value of 1 if a start-up reached the age of 5 or 10 years and 0 otherwise. Average 5- and 10-year survival probability in this sample of borrowing new firms are 67% and 46%, respectively. ENH firm is an indicator variable that takes the value of 1 if a firm was registered after the ENH office was launched in its municipality and 0 otherwise. Specialized branch is an indicator variable that takes the value of 1 if a bank branch is identified as a specialized in lending to new firms in the pre-reform year 2004 and the value of 0 if the branch is not specialized. The sample consists of new firms (up to 4 years old) the year when they obtain their first bank loan. Cohort stands for the year when a firm is originated. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A5: Branch specialization and ENH firm survival: branch industry specialization measures with credit exposure

	5-year survival				10-year survival			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ENH Firm	-0.002	-0.003	0.014	0.013	0.005	0.004	-0.009	-0.011
	(0.010)	(0.010)	(0.025)	(0.025)	(0.011)	(0.010)	(0.023)	(0.023)
ENH Firm x Specialized Branch	0.050**	0.047**	0.059**	0.055**	0.053**	0.048**	0.057**	0.056***
	(0.021)	(0.020)	(0.024)	(0.022)	(0.021)	(0.020)	(0.022)	(0.021)
Specialized Branch	-0.004	-0.020*	-0.004	-0.015	0.002	-0.020*	0.001	-0.018
	(0.011)	(0.011)	(0.013)	(0.013)	(0.011)	(0.011)	(0.012)	(0.013)
ENH Firm x Ind Specialized Branch (exp)	0.021	0.021	0.027*	0.028*	-0.012	-0.014	-0.015	-0.017
	(0.014)	(0.014)	(0.016)	(0.016)	(0.014)	(0.014)	(0.017)	(0.018)
Ind Specialized Branch (exp)	0.007	0.010	0.003	0.007	-0.000	0.002	-0.004	-0.001
	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)
Municipality-Ind & Cohort FE	Yes	Yes			Yes	Yes		
Municipality-Ind-Cohort FE			Yes	Yes			Yes	Yes
Bank FE		Yes		Yes		Yes		Yes
Observations	36,582	36,578	34,186	34,183	36,582	36,578	34,186	34,183
Adjusted R-squared	0.032	0.038	0.030	0.036	0.041	0.048	0.042	0.047

Notes: The table presents the estimation of the cross-sectional linear probability to examine the survival rate of new firms created after the ENH reform depending on whether a firm obtains its first ever loan from a specialized branch or a regular branch. The dependent variables are indicator variables that take the value of 1 if a start-up reached the age of 5 or 10 years and 0 otherwise. Average 5- and 10-year survival probability in this sample of borrowing new firms are 67% and 46%, respectively. ENH firm is an indicator variable that takes the value of 1 if a firm was registered after the ENH office was launched in its municipality and 0 otherwise. Specialized branch is an indicator variable that takes the value of 1 if a bank branch is identified as a specialized in lending to new firms in the pre-reform year 2004 and the value of 0 if the branch is not specialized. The sample consists of new firms (up to 4 years old) the year when they obtain their first bank loan. Cohort stands for the year when a firm is originated. Industry Specialized Branch is an indicator for a bank branch specialized in the new firm's 1-digit industry pre-reform. Opposed to the main specification presented in Table 6, branch industry specialization is measured using the branches credit exposure, i.e., loan volume provided to borrowers in the respective industry. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A6: Branch specialization and ENH firm survival: branch fixed effects

	5-year survival		10-year survival	
	(1)	(2)	(3)	(4)
ENH Firm	0.007	0.018	0.000	-0.026
	(0.010)	(0.025)	(0.010)	(0.021)
ENH Firm x Specialized Branch	0.030	0.049**	0.045*	0.058**
	(0.021)	(0.024)	(0.025)	(0.029)
Municipality-Ind & Cohort FE	Yes		Yes	
Municipality-Ind-Cohort FE		Yes		Yes
Branch FE	Yes	Yes	Yes	Yes
Observations	36,357	33,852	36,357	33,852
Adjusted R-squared	0.032	0.028	0.045	0.043

Notes: The table presents the estimation of the cross-sectional linear probability to examine the survival rate of new firms created after the ENH reform depending on whether a firm obtains its first ever loan from a specialized branch or a regular branch. The dependent variables are indicator variables that take the value of 1 if a start-up reached the age of 5 or 10 years and 0 otherwise. Average 5- and 10-year survival probability in this sample of borrowing new firms are 67% and 46%, respectively. ENH firm is an indicator variable that takes the value of 1 if a firm was registered after the ENH office was launched in its municipality and 0 otherwise. Specialized branch is an indicator variable that takes the value of 1 if a bank branch is identified as a specialized in lending to new firms in the pre-reform year 2004 and the value of 0 if the branch is not specialized. The sample consists of new firms (up to 4 years old) the year when they obtain their first bank loan. Cohort stands for the year when a firm is originated. Branch fixed effects control for observable and unobservable time-invariant branches' characteristics that can impact the quality of lending. Standard errors clustered at the municipality level in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$