Revista Galega de ECONOMÍA | Galician Journal of ECONOMICS

Revista Galega de Economía, 33(3) (2024). ISSN-e: 2255-5951
https://doi.org/10.15304/rge.33.3.8983

Articles

The Regional Firm Density and the Growth of Firms in the Portuguese Textile and Clothing Industry

A densidade rexional de empresas e o crecemento das empresas da industria téxtil e da confección portuguesa

Rolando Vaz[1,a]

[1] Research on Economics, Management and Information Technologies (REMIT), Department of Economics. Portucalense University, Rua Dr. António Bernardino de Almeida, 541, 4200-072 Porto, Portugal

[a]vaz.rolandovaz@gmail.com

Received: 18/January/2023; Accepted: 15/November/2023

Abstract

This paper focuses on the relationship between the regional firm density and the growth of firms in the Portuguese textile and clothing industry to investigate how their geographic clustering influences said growth. Despite the concentration of this industry in the Northern region of Portugal in only four poles, our results show that the location of firms in the cluster is not relevant for growth when the whole industry is considered. However, disaggregate analysis shows that the clothing industry does exhibit both location externalities and cross-location effect, while textile manufacture exhibits neither. In addition, our empirical evidence reveals that the growth of firms located in the cluster is positively correlated with external finance. This result suggests that location becomes a solvency signal for firms, and, specifically, this might help to explain why textile manufacturers firms are located in the cluster. These findings are relevant for entrepreneurs and Portuguese policymakers, as it jeopardizes the optimal allocation of scarce resources in the Portuguese textile cluster.

Keywords: External funding; Firm growth; Location effects; Portuguese textile industry; Textile cluster.

Copyright © University of Santiago de Compostela. This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International ((CC BY-NC-ND 4.0)) License

Resumo

Este traballo céntrase na relación entre a densidade rexional de empresas e o crecemento das empresas da industria téxtil e da confección portuguesa para investigar como inflúe a súa agrupación xeográfica no devandito crecemento. A pesar da concentración desta industria na rexión Norte de Portugal en só catro polos, os nosos resultados mostran que a localización das empresas no clúster non é relevante para o crecemento cando se considera a industria no seu conxunto. Con todo, a análise desagregado mostra que a industria da confección si presenta tanto externalidades de localización como efecto de localización cruzada, mentres que a fabricación téxtil non presenta ningún dos dous. Ademais, os nosos datos empíricos revelan que o crecemento das empresas situadas no clúster está positivamente correlacionado co financiamento externo. Este resultado suxire que a localización se converte nun sinal de solvencia para as empresas e, en concreto, isto podería axudar a explicar por que as empresas de fabricación téxtil localízanse no clúster. Estes resultados son relevantes para os empresarios e os responsables políticos portugueses, xa que pon en perigo a asignación óptima dos escasos recursos no clúster téxtil portugués.

Palabras chave: Financiamento externo; Crecemento empresarial; Efectos de localización; Industria téxtil portuguesa; Clúster téxtil.

JEL: C23; G10; L25; L67; R11.

Revista Galega de Economía, 33(3) (2024). ISSN-e: 2255-5951
https://doi.org/10.15304/rge.33.3.8983

1. INTRODUCTION

The recent academic interest in the impact of geographic location on firm growth has been challenged due to the difficulty in establishing a comprehensive theory about the effect of geographic clustering on firm growth. Some studies have supported conventional wisdom in that the concentration of economic activity in a cluster has a significant impact on firm growth (Tarfasa et al., 2016; Audretsch & Dohse, 2007; Hoogstra & Van Dijk, 2004; Liedholm, 2002; Porter, 2000, 1998; Storey, 1994; Pyke et al., 1990). However, other studies have stated that being located in a cluster is statistically insignificant (Glancey, 1998; Kolvereid, 1992; Lee, 2018).

This paper focuses on the relationship between the regional density and growth of firms in the Portuguese textile and clothing industry to investigate how they influence geographic clustering. This industry is one of the oldest sectors in Portugal and one of the most advanced and best-performing transformation industries in the world (Truett & Truett, 2019; ATP, 2019; Serra et al., 2012). Predominantly based in the Northern region of Portugal, it comprises a formally recognized cluster with 87% turnover and 85% employment for the entire Portuguese textile and clothing industry, located in four main sub-regions in the in the "Norte" of Portugal (ATP, 2019).

Using a sample of 2.487 firms for the period 2011–2019 from the Sistema de Análise de Balanços Ibéricos database (or SABI in short) for the Portuguese textile and clothing industry, we have carried out an analysis using panel data and linear regression models.

Our results show that the location of firms in the cluster is not relevant for growth when the whole industry is considered. This finding is puzzling: if there is no location externality, what is the reason for there to be a level of geographical concentration?

Next, we conjectured two alternative explanations: the existence of intra-division spillovers, and the existence of other benefits for belonging to a cluster. To explore these conjectures, we initially separated the industry into two groups regarding their particular textile activities: "Textile manufacture" (division 13 in the Portuguese classification of economic activities), and "Clothing industry" (division 14). The former comprises firms involved in the preparation and spinning of textile fibers (131), textile weaving (132), textile finishing (133), and the manufacture of other textiles (139); the latter comprises firms involved in the confection of articles of clothing, except leather articles with fur (141), the manufacture of leather articles with fur (142), and the manufacture of articles made of mesh (143). Our disaggregate analysis drew three main empirical findings. Firstly, division 14 exhibited location externalities (a result in line with Harabi (2007), Hoogstra & Van Dijk (2004), McPherson (1996), and Storey (1994)). However, division 13 reported no such location externalities (a result consistent with Lee (2018) and Van Geenhuizen and Reyes-Gonzalez (2007)). The same negative result was noted after further disaggregation of firms in division 13 between closely-related activities 131-133 and 139.

Our second result showed that the cross-location effect between both divisions was not significant for the textile manufacturing firms (division 13), and only those in the clothing industry (division 14) benefit inter-industry location externalities. Interestingly, although this industry is formally recognized as a cluster in Portugal, it is actually comprised of two different and unrelated divisions.

Finally, it is left to explain why firms in division 13 are still geographically concentrated in Portugal. We conjecture that other benefits not associated with productive externalities might play a particular role. Our third finding provides empirical evidence that the growth of firms located in the Portuguese textile and clothing cluster is positively correlated with external

finance; specifically, this also helps to explain why textile manufacture firms (division 13) are located in the cluster. This result suggests that business proprietors strategically (and rationally) choose to locate a firm within the cluster as it helps mitigate informational asymmetries problems in accessing external finance. In other words, location becomes a solvency signal for firms.

Our analysis also addresses the effect of other variables on the growth of firms, which allow us to conclude that firm size is significantly and positively correlated with growth, while age is significantly negative. These results are in line with the empirical literature (for example, Ullah, 2019; Coad et al., 2018; Coad et al., 2016, Serrasqueiro & Maças Nunes, 2016; Maças Nunes et al., 2013; Coad & Tamvada, 2012; Leitão et al., 2010; Oliveira & Fortunato, 2006b; Audretsch et al., 2004; Cabral & Mata, 2003).

This paper is organized as follows: Section 2 contains the theoretical background and hypothesis development; Section 3 presents the methodology and describes the data and variables; Section 4 presents non-parametric and parametric results. Finally, Section 5 presents concluding remarks and suggestions for future research.

2. THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

This section presents several statistical hypotheses related to location, drawn from the review of relevant literature. Besides this, we explore the effect of other variables that the literature has considered relevant to the growth of firms (e.g., Vaz, 2021; Fadahunsi, 2012), namely firm size, firm age, and financial sources.

2.1 Location

Does location matter to firms? Some locations or geographic areas have increasingly been recognized as being more favorable for firm growth than others (Lee, 2018; 2009; Storey, 1994; Davidsson et al., 2002). Such is the case of firms located in an industrial district, or a cluster, like Silicon Valley in the United States or Zhongguancun Science Park in China (Tarfasa et al., 2016; Pyke et al., 1990). Firms are motivated to locate close to each other because of Marshallian agglomeration externalities (Folta et al., 2006). These spillovers, which constitute the essence of location advantage, are associated with labor market pooling, specialized input suppliers, and knowledge spillovers (Lee, 2018; Porter, 2000). Audretsch (1998) said that the marginal cost of transmitting knowledge, especially tacit knowledge, rises with distance. This suggests that being located in a cluster is more conducive to firm growth because, there, firms are granted access to location resources, which does not occur in other regions (Pe'er, Vertinsky 2016; Wonglimpiyarat, 2016; Cuervo-Cazurra et al., 2014; Audretsch & Dohse, 2007; Barringer et al., 2005; Acs & Armington, 2004; Audretsch & Dohse, 2004; Altenburg & Meyer-Stamer, 1999).

Although establishing a comprehensive theory about the effect of geographic clustering on firm growth is difficult, the empirical literature has offered diverse but conflicting results. Concerning the effect of geographic clustering, some studies have supported the conventional wisdom: the concentration of economic activity in a geographic space has a significant impact on firm growth (Harabi, 2007; Liedholm, 2002; Storey, 1994). Hoogstra and van Dijk (2004) concluded that 'location matters' but that the effect differs by type of economic activity. McPherson (1996), in an analysis of five southern African countries, provided some evidence of the existence of agglomeration externalities and found that urban-based firms grow faster than small and micro firms do in rural areas. Other studies, however, have stated that being

Revista Galega de Economía, 33(3) (2024). ISSN-e: 2255-5951
https://doi.org/10.15304/rge.33.3.8983

located in a cluster is statistically insignificant (Glancey, 1998; Kolvereid, 1992). Lee (2018) found that location per se has no positive effect on firm growth in an empirical analysis of firms in nine industries across six countries, and Van Geenhuizen and Reyes-Gonzalez (2007) reported that clustered firms have no significant influence on innovation and speed of growth. To summarize, the effects on a firm's growth of being surrounded by firms belonging to the same industry are controversial. With this in mind, we have posited three hypotheses regarding firm location in different ever-widening geographic areas:

H_{1a} – Being located in a cluster has a positive effect on firm growth rate.

H_{1b} – Being located in a municipality has a positive effect on firm growth rate.

H_{1c} – Being located in an "extended" or "wide" municipality (i.e., surrounded by firms located at an area encompass a municipality and nearby municipalities) has a positive effect on firm growth rate.

2.2 Size

Gibrat (1931) presented the first formal model that relates the dynamics of firm size to the structure of the industry, known in the literature as the "Law of proportional effect" (Sutton, 1997). Gibrat's Law states that the average growth rate is the same for all firms at any given time (Parker, 2009). Consequently, the expected growth rate of a firm is independent of its size, and the probability of a given growth rate during a specific time interval is the same for all firms in the same industry (Becchetti & Trovato 2002; Sutton 1997). Within this context, the issue of whether firm size has a systematic influence on the growth rate of a firm has been the subject of extensive research in empirical studies (Mukhopadhyay & Amirkhalkhali 2010). Despite the apparent power of Gibrat's Law, most empirical analyses have rejected the hypothesis of independence of growth in relation to size: the size presents an inverse relationship to the firm's growth (Fowowe, 2017, Tarfasa et al., 2016, Brenner & Schimke, 2015, Maças Nunes et al., 2013; Mateev & Anastasov, 2010, Harabi, 2007; Oliveira & Fortunato, 2006b; Almus & Nerlinger, 2000; 1999; McPherson, 1996; Hall, 1987; Mansfield, 1962). Small firms grow faster (Coad & Tamvada 2012; Davidsson et al. 2002; Liedholm 2002) than their larger counterparts (Maças Nunes et al., 2013; Evans 1987). Hence, it is expected that the smaller the firm, the higher its growth rate:

H_2 – The growth rate of firms is independent of their size.

2.3 Age

Jovanovic (1982) and Evans (1987) theoretically address the age of firms as a determinant of firm growth. While Evans found that firm growth decreases at a diminishing rate with firm size, Jovanovic concluded that, on average, older firms grow more slowly than younger ones within an industry (i.e. firm growth decreases with firm age). This may happen because young firms need to grow to be able to reduce uncertainty and accumulate sufficient resources that allow them to withstand unpredictable external shocks (Dobbs & Hamilton 2007). Concerning empirical research, most analyses have concluded that age and firm growth are inversely related to each other (Nichter & Goldmark, 2009; Liedholm, 2002; McPherson, 1996): unlike mature firms, young firms exhibit high growth rates (Coad et al., 2018; Fowowe, 2017; Coad et al., 2016; Hampel-Milagrosa et al., 2015; Maças Nunes et al., 2013; Lotti et al., 2009; Morone & Testa 2008; Harabi, 2007; Davidsson et al., 2002; Almus & Nerlinger, 1999, Storey, 1994, Variyam & Kraybill, 1992). Hence, it is expected that young firms have high growth rates:

H_3 – The older a firm is, the more negatively affected its growth is.

2.4 Financing sources

Growth can be seriously hampered when firms are subject to financial restrictions (Musso & Schiavo, 2008) . Of course, access to finance does not directly cause growth, but credit constraints may affect it. Therefore, without adequate access to financing, the staying power of the business and its growth potential is jeopardized (Ullah, 2019; Rahaman, 2011). Research on the role of financing in the firm growth process highlights that access to finance impacts firm behavior (investment, production, innovation, and exporting decisions) (Rostamkalaei & Freel 2016). Consequently, financial capital is essential for the growth of firms because it can be easily converted into other types of resources (Tarfasa et al., 2016). It must be pointed out that there are two sources of financial resources: internal and external. The former stems from the injections of capital provided by the business proprietor and the profits of the firm; the latter is provided from financial institutions, suppliers, and the capital market (Wang et al., 2022; Serrasqueiro et al. 2021). Firms that can finance themselves with their profits are less exposed to external financing sources (Kunt-Demirgüç & Maksimovic 1998). Internal sources of financing are typically the first option for a business proprietor; however, this form of funding is likely to be limited, which may constrain the growth of the firm (Rostamkalaei & Freel 2016). According to Rahaman (2011), as the level of external financial constraints decreases, the tendency for firms is to transition from relying on internal funds to seeking external sources of financing to support their growth. It should also be mentioned that internal financial resources are related to the idiosyncratic characteristics of the business proprietor (motivation, number of founders, networks, and personal and family resources) and internal factors of the firm (vision and mission). The external financial resources are related to the owner's idiosyncratic characteristics (such as age and experience) and factors that are external to the firm (political and economic) (Vaz, 2021), which portray the features of the financial system in which the firm is situated and determine external financing options (Dobbs & Hamilton 2007).

According to the empirical literature, financial capital is one of the determining factors of firm growth (Serrasqueiro & Maças Nunes, 2016; Coad et al., 2013; Guariglia et al., 2011; Serrasqueiro et al., 2010; Segarra & Teruel, 2009; Zhou & Wit, 2009; Hermelo & Vassolo, 2007; Oliveira & Fortunato, 2006a; Carpenter & Petersen, 2002; Cooper et al., 1994). Based on the above arguments, we have formulated the following research hypothesis.

H_4 – There is a positive relationship between internal and external finance and the growth of a firm.

3. RESEARCH METHODS

In this section, we present our study data and the variables.

3.1 Data

The data was obtained from the SABI database, which offers exhaustive information from balance sheets and financial sources, both on public and private firms belonging to Portugal. The data included all variables found in annual reports e.g., number of employees, sales, assets, financial ratios, date of establishment and industry classification codes. Using this information, we chose different criteria by first selecting Portuguese firms classified according to Rev. 3 on divisions 13 and 14. Secondly, we restricted our analysis to active firms ($i = 1, \ldots, n$) throughout

Revista Galega de Economía, 33(3) (2024). ISSN-e: 2255-5951
https://doi.org/10.15304/rge.33.3.8983

all sample periods (2011–2019 inclusive). Thirdly, given that statistical tests can only be computed based on raw data without missing values in the data matrix, we excluded firms with missing values for the number of employees, age, assets, liability, and location. Finally, we only considered firms having at least one employee throughout the period, and we only considered firms having a turnover greater than zero throughout the period. The final sample was a balanced panel dataset and comprised a total of 2.487 firms. During the 9 years covered in this study, these firms survived, were not absorbed by other firms and did not go bankrupt.

3.2 Dependent variable

To measure dependent variable growth, we used the growth rate given by the difference between the logarithm of a size-related variable in the current and immediately previous period. The literature has traditionally studied the growth of firms by analyzing the evolution of the series of employment, sales or assets. More specifically, we measured firm growth by taking the log-differences to minimize the effect of heteroscedasticity in statistical analysis (Coad & Holz, 2010), the usual procedure for calculating growth rates (Coad et al., 2018, Serrasqueiro & Maças Nunes, 2016, Brenner & Schimke, 2015, Gopinath, 2012, Rahaman, 2011, Serrasqueiro et al., 2010); that is,

$$Growth_{i,t} = log\ Size_{i,t}() - log\ Size_{i,t-1} \quad (1)$$

where $Size_{i,t}$ is measured by any of the following variables identified in the literature: employment (Coad et al., 2016; Delmar & Wiklund, 2008), sales (Guariglia et al., 2011), and assets (Mateev & Anastasov, 2010; Heshmati, 2001). Accordingly, we used three different measures for growth that reflect different aspects of the growth process. Several measures in the analysis of firm growth allowed us to provide a more complete picture and robustness of the effect of size on the growth of firms (Dobbs & Hamilton, 2007; Delmar et al., 2003).

3.3 Independent variables

The independent variables included internal factors related to the essence and characteristics of the firm and external factors related to economic ones (Vaz, 2021; Fadahunsi, 2012). We considered five variables: *Size, Age, Internal* and *External Finance*, and *Location*. Unless mentioned, all but the dummy and proxy variables were subjected to logarithmic transformation (natural log). The variable *Size* ($Size_{i,t-1}$) is a measure of the number of firm resources. To be consistent with the growth measure chosen, Size was measured by (the logarithm of) the number of employees, sales, and assets in the previous periods. The variable Age ($Age_{i,t-1}$) was measured by (the log of) the number of years a firm had been active in the business sector in the previous periods. Concerning the variables of financing sources, we followed the methodology of Serrasqueiro et al. (2010). The variable *Internal Finance* ($Internal_{i,t-1}^{Finance}$) is a proxy, and we used cash flow, given by the ratio between earnings after tax plus depreciation and total assets in the previous period; The variable *External Finance* ($External_{i,t-1}^{Finance}$) is also a proxy, and we used the level of debt given by the ratio between total liabilities of total assets in the previous period.

Finally, concerning Location, the literature has proposed different measures for this independent variable. Folta et al. (2006), using data on 806 private and public U.S. biotechnology firms, asserted that methods for determining clusters are imprecise even though

they considered the Metropolitan Statistical Area to define clusters. Glancey (1998) simply made a dichotomic distinction between firms located in rural areas and those located in urban ones. In our body of work, we analyzed the Portuguese Textile Cluster, a geographically proximate group of interconnected firms mainly located at four poles. To measure the local levels of agglomeration and the local market concentration, we needed to determine the boundaries within which these forces operate; therefore, we constructed series that measures three different dimensions. A first series, denoted as $LCluster_i$, simply indicates whether a firm pertains (or not) to one of the four poles of the Portuguese textile and clothing industry. Like other previous studies (Lee, 2018; Tarfasa et al., 2016; Van Geenhuizen & Reyes-Gonzalez, 2007), we created a dummy variable that takes the value of 1 if the firm belonged to one of the above-mentioned poles, or 0 otherwise. A second series, denoted as $LMunicipality_i$, accounted for all firms belonging to each firm's municipality. Here the cluster and the resulting spillovers were measured as concentrated within a municipality. The greater the number of firms in a municipality, the greater the effect of location on firm growth. Finally, we considered that location spillovers are measured not only by the firms within a municipality but also by the conglomerate "surrounding" that firm: that is, firms belonging to the municipality as well as those neighboring the municipality account for the location externality of each firm. Accordingly, we followed the methodology of Pe'er et al. (2016), based on concentric rings with various radii around the geographic centroid, defining a third variable denoted as $LWideCluster_i$. This variable considered the total number of firms belonging to their respective municipalities plus those belonging to the neighboring municipalities.

3.4 Descriptive Statistics

The distribution of firms by $Size_{i,t-1}$ (measured by the number of employees in 2011) and $Age_{i,t-1}$ (the firm's number of years from foundation to 2011) is presented in Figures 1-2, which show that most firms are small and young. The size distribution of firms is J-shaped: there are a few large firms and many small firms. The 79 smaller firms have 1 employee, while the largest has 761 employees. In 2011, the 86 youngest firms in the sample were 1 year old, while the oldest was 106.

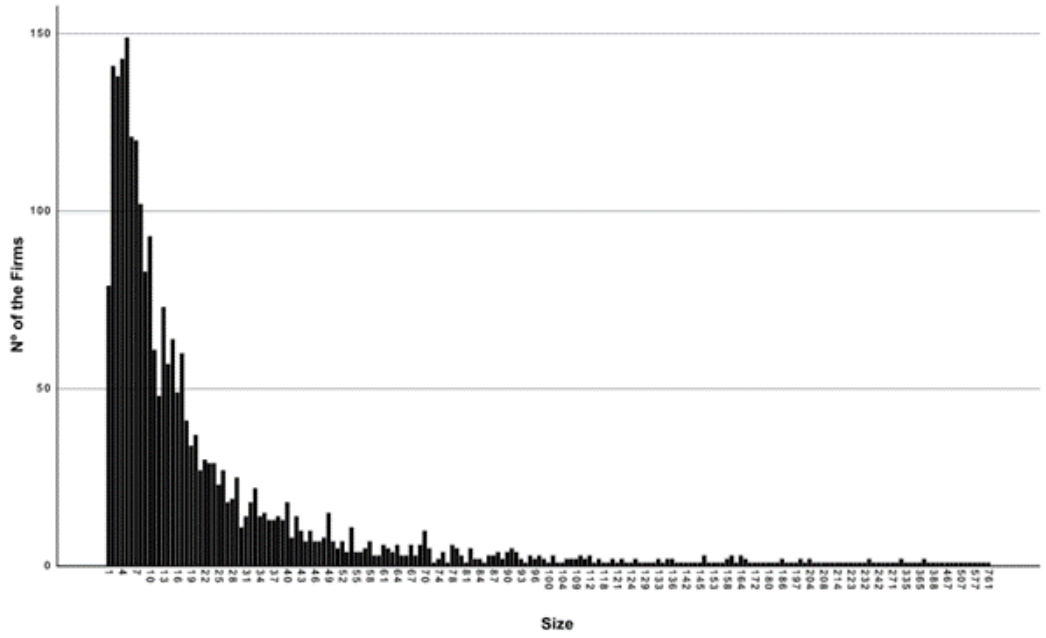
Table 1 displays basic statistics for the measures $Growth_{i,t}$, $Size_{i,t-1}$, $Age_{i,t-1}$, $Internal_{i,t-1}^{Finance}$ and ($External_{i,t-1}^{Finance}$). Throughout the period of analysis, firms on average grew more in assets followed by sales and, finally, employees. In the analysis, it can be seen that the average in our sample of the firms in the Portuguese textile and clothing industry was about 28 employees, whereas the median, a measure that is less susceptible to outliers, was 12 employees, in 2011. The mean and median confirmed the usual definition of small and medium-sized businesses adopted by the European Union. In terms of sales, in 2011, firms sold on average around 1.662.912 euros and had approximately 1.735.375 euros in assets. On average, the age of firms was approximately 16 years old, whereas the median was 12 years old, which means that most of the firms were young. Concerning the analysis of the ($Internal_{i,t-1}^{Finance}$) and ($External_{i,t-1}^{Finance}$) variables, the high average debt of firms stood out.

Concerning the distribution of firms among location, we found that most of them were concentrated in four main sub-regions (the textile cluster): Cávado (24% of the total firms); Ave (33%); Área Metropolitana do Porto (21%), and Tâmega e Sousa (8%). Most firms (n = 2.130 [86%]) were located inside the textile cluster, while only 357 (14%) were based outside the cluster (Table 3). This reinforces the idea that the textile sector (and the sector's main infrastructures) is geographically concentrated in the "Norte" region of Portugal (see Figure 3). According to ATP (2019), the Portuguese textile and clothing industry is mainly located in the

Revista Galega de Economía, 33(3) (2024). ISSN-e: 2255-5951
https://doi.org/10.15304/rge.33.3.8983

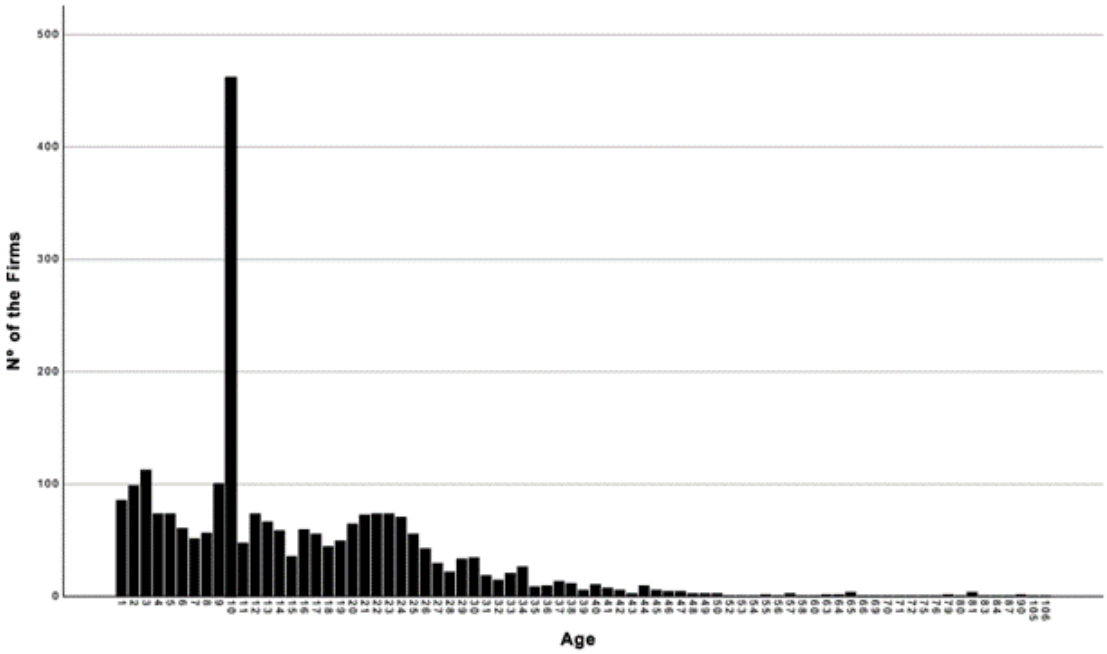
"Norte" region of Portugal which represents 87% of the turnover and 85% of employment. The rationale of this distribution may be due to there being a positive location externality, where there is a higher average growth rate for firms within a cluster than the growth rate of firms located outside it (Table 3). We provide further analysis on this topic in the following section.

Figure 1. Frequency plot over the number of employees for the whole population of the firms in t-1



Source: SABI

Figure 2. Frequency plot over the age of the firms for the whole population t-1



Source: SABI

Table 1. Summary statistics for the variables of the Portuguese textile and clothing industry.

Variable Name	No of Obs.	Mean	Median	Standard Deviation	Min.	Max.
$Growth_{i,t}^{Employees}$	2.487	0.0073	0.0000	0.09719	-1.51	1.95
$Growth_{i,t}^{Sales}$		0.0131	0.0125	0.11913	-1.85	2.04
$Growth_{i,t}^{Assets}$		0.0159	0.0113	0.10419	-1.33	1.17
$Size_{i,t-1}^{Employees}$		1.0931	1.0792	0.52752	0.00	2.88
$Size_{i,t-1}^{Sales}$		5.5723	5.4702	0.70179	3.43	7.88
$Size_{i,t-1}^{Assets}$		5.4785	5.4201	0.73658	3.70	8.45
$Age_{i,t-1}$		1.0587	1.0792	0.38710	0.00	2.03
$Internal_{i,t-1}^{Finance}$		0.0535	0.0559	0.27910	-5.85	6.20
$External_{i,t-1}^{Finance}$		0.8201	0.6771	0.90717	0.02	19.59

Source: Own computations from SABI.

Table 2. Growth rates at different percentiles for the Portuguese textile and clothing industry.

Variable Name	p5	p10	p25	p50	p75	p90	p95
$Growth_{i,t}^{Employees}$	-0.1091	-0.0621	-0.0067	0.0000	0.0296	0.0792	0.1249
$Growth_{i,t}^{Sales}$	-0.1393	-0.0909	-0.0347	0.0125	0.0591	0.1168	0.1670
$Growth_{i,t}^{Assets}$	-0.1266	-0.0817	-0.0299	0.0113	0.0593	0.1233	0.1753
No of Obs.	2.487						

Source: Own computations from SABI.

Table 2 displays the average firm growth at each percentile for the Portuguese textile and clothing industry. Concerning growth, it was reported that: (1) Whatever the growth measurement used, the descriptive statistics indicate that until the 25th percentile, growth was negative. For the modal value of the distribution (p50) and later (p75, p90, and p95) percentiles, growth was positive. This seems to support the idea that most firms do not maintain their initial size. Firms exhibiting an increase in the number of employees, sales or assets—suggesting an upsizing (positive) growth—coexist with others that shrink—suggesting a downsizing (negative) growth; and (2), firms grew more in assets, followed by sales and, finally, employees; the same happened for the firms that shrank.

Revista Galega de Economía, 33(3) (2024). ISSN-e: 2255-5951
https://doi.org/10.15304/rge.33.3.8983

Figure 3. Map of Northern Portugal by nuts III

Source: https://www.ccdr-n.pt/storage/app/media/files/ficheiros_ccdrn/institucional/mapa_norte.jpg

Table 3. Summary of statistics relating location and growth of the Portuguese textile and clothing industry.

	Variable name	No. of obs.	Mean	Median	Standard deviation	Min.	Max.
Out of the cluster	$Growth_{i,t}^{Employees}$	357	-0.0012	0.0000	0.10571	-1.13	1.26
	$Growth_{i,t}^{Sales}$		0.0036	0.0073	0.13374	-1.74	1.48
	$Growth_{i,t}^{Assets}$		0.0066	0.0049	0.10568	-1.07	1.17
In the cluster	$Growth_{i,t}^{Employees}$	2.130	0.0087	0.0000	0.09562	-1.51	1.95
	$Growth_{i,t}^{Sales}$		0.0146	0.0132	0.11643	-1.85	2.04
	$Growth_{i,t}^{Assets}$		0.0175	0.0126	0.10385	-1.33	1.09

Source: Own computations from SABI.

4. RESULTS

This section outlines the estimation framework. We present a non-parametric analysis (Section 4.1.) for the above-described variables and a regression methodology (Section 4.2.) that supports our hypotheses. We conclude by presenting the results that explain the "location puzzle" (Sections 4.3., 4.4. and 4.5.).

4.1 Non-Parametric Results

Table 4 reports the Pearson Correlation of the variables used in this study on the Portuguese textile and clothing industry. The correlation between the measures of firm growth ($Growth_{i,t}^{Employees}$, $Growth_{i,t}^{Sales}$, and $Growth_{i,t}^{Assets}$) is moderate but significant at the 0.01 level. These results provide us with some confidence relative to the econometric analysis performed in the next section, given that the measures of growth were not all continuous, which might be problematic in the regression analysis (see Coad et al. 2018, ft.3). We found a low, positive correlation which was significant at the 0.01 level, coinciding with common definitions of

growth for $Size_{i,t-1}$. There was also a low, negative correlation but also significant at the 0.01 level with $Age_{i,t-1}$. $Internal_{i,t-1}^{Finance}$, and $External_{i,t-1}^{Finance}$ variables reporting a low, positive correlation that was significant at the 0.01 and 0.05 level, matching common definitions of growth. Finally, the variables $LCluster_i$, $LMunicipality_i$, and $LWideCluster_i$ had a positive correlation and significant at the 0.01 and 0.05 levels for all of the measures of the growth variable, also being highly correlated among themselves.

Table 4. Pearson correlation for all variables

Variable name	1	2	3	4	5	6	7	8	9	10	11	12
1 $Growth_{i,t}^{Employees}$	1.000											
2 $Growth_{i,t}^{Sales}$	0.313**	1.000										
3 $Growth_{i,t}^{Assets}$	0.164**	0.357**	1.000									
4 $Size_{i,t-1}^{Employees}$	0.129**	0.059**	0.048**	1.000								
5 $Size_{i,t-1}^{Sales}$	0.103**	0.123**	0.090**	0.820**	1.000							
6 $Size_{i,t-1}^{Assets}$	0.055**	0.028**	0.103**	0.721**	0.916**	1.000						
7 $Age_{i,t-1}$	-0.106**	-0.124**	-0.122**	0.298**	0.337**	0.425**	1.000					
8 $Internal_{i,t-1}^{Finance}$	0.029**	0.157**	0.242**	0.028**	0.070**	0.055**	-0.058**	1,000				
9 $External_{i,t-1}^{Finance}$	0.014*	0.072**	0.186**	-0.060**	-0.100**	-0.147**	-0.087**	-0.518**	1.000			
10 $LCluster_i$	0.036**	0.033**	0.037**	0.059**	0.048**	-0.008	-0.099**	0.063**	-0.055**	1.000		
11 $LMunicipality_i$	0.019**	0.017*	0.022**	0.004	0.013	-0.016*	-0.050**	0.041**	-0.036**	0.409**	1.000	
12 $LWideCluster_i$	0.028**	0.024**	0.023**	0.025**	0.033**	-0.006	-0.078**	0.053**	-0.046**	0.548**	0.701**	1.000

Source: Own computations from SABI.
** The correlation is significant at the 0.01 level. * The correlation is significant at the 0.05 level.

4.2 Regression methodology – Multivariate model

To perform the studies, we followed the tradition of modeling firm growth as a stochastic process (Coad et al., 2018). To model the dynamics of firm growth, we began by opting for a multiple linear regression. To avoid endogeneity, we regressed each measure of growth with non-correspondent measures of Size. The multiple multivariate regression specification was.

$$Growth_{i,t} = \beta_0 + \beta_1 Size_{i,t-1}^{Sales} + \beta_2 Age_{i,t-1} + \beta_3 Internal_{i,t-1}^{Finance} + \beta_4 External_{i,t-1}^{Finance} + \beta_5 LCluster_i + \beta_6 LMunicipality_i + \beta_7 LWideCluster_i + \varepsilon_{i,t}, \quad (2)$$

where $Growth_{i,t}$ was the growth rate experienced by firm *i* for the period 2011-2019, and $\varepsilon_{i,t}$ represented the statistical residual. The variable $Size_{i,t-1}^{Sales}$ represented firms' *Size* in 2011; $Age_{i,t-1}$ represented the number of years of the firm's existence until 2011; $Internal_{i,t-1}^{Finance}$ represented the cash flow of the firms in the previous period; $External_{i,t-1}^{Finance}$ represented the level of debt of the firms in the previous period; $LCluster_i$ indicated whether a firm pertained (or not) to one of the four poles of the Portuguese textile and clothing industry; $LMunicipality_i$ accounted for all firms belonging to each firm's municipality; and $LWideCluster_i$ accounted for

Revista Galega de Economía, 33(3) (2024). ISSN-e: 2255-5951
https://doi.org/10.15304/rge.33.3.8983

the total number of firms belonging to the firm's municipality plus those belonging to the neighboring ones.

The results are presented in Table 5. The empirical evidence obtained in this study, for size, age, and financial resources, shows that the findings were similar to the other empirical studies (Coad et al., 2018, Fowowe, 2017, Serrasqueiro & Maças Nunes, 2016, Tarfasa et al., 2016). Gibrat (1931) prediction that size is only determined by random influences and the null hypothesis that every firm has the same probability to grow can be rejected, so H_2 was rejected. Jovanovic (1982) and Evans (1987) showed that young firms on average, exhibit higher growth rates than mature firms, so our analysis could not reject hypothesis H_3. The financial resources, internal or external, are determinants stimulating the growth of firms in the Portuguese textile and clothing industry. Similar results were found in the Musso and Schiavo (2008) study, meaning that we could not reject the previous formulated hypothesis, H_4.

Regarding location, each definition exhibited a positive and small coefficient when regressed with the different measures of growth. The standalone effect on the growth of firms located in an agglomeration was not statistically significant, so our results reject hypotheses H_{1abc}. This suggests that firms can grow in any geographic area as the location externalities are weak. These results were in line with Lee (2018), concerning location in a cluster per se having no positive effect on firm growth, and contrasted with other empirical studies claiming that concentration of economic activity in a geographic space has a significant impact on firm growth (Harabi, 2007; Hoogstra & Van Dijk, 2004; Liedholm, 2002; McPherson, 1996; Storey, 1994). However, this finding is puzzling: if there is no location externality, how can it be explained that 87% of turnover and 85% of employment of the sector are located in four main sub-regions in the "Norte" region of Portugal? We will call this the "location puzzle" for the Portuguese textile and clothing industry.

In the following sections, we conjecture different explanations for this puzzle, namely, the existence of intra-division spillovers (section 4.3), the existence of inter-division spillovers (section 4.4) and the existence of other benefits for belonging to a cluster (section 4.5).

Table 5. Multiple linear regression results

Variable name	$Growth_{i,t}^{Employees}$	$Growth_{i,t}^{Sales}$	$Growth_{i,t}^{Assets}$
$Size_{i,t-1}^{Sales}$	0.021 (0.000***)		0.019 (0.000***)
$Size_{i,t-1}^{Employees}$		0.022 (0.000***)	
$Age_{i,t-1}$	-0.052 (0.000***)	-0.050 (0.000***)	-0.037 (0.000***)
$Internal_{i,t-1}^{Finance}$	0.007 (0.004***)	0.093 (0.000***)	0.146 (0.000***)
$External_{i,t-1}^{Finance}$	0.002 (0.000***)	0.019 (0.000***)	0.036 (0.000***)
$LCluster_i$	0.003 (0.222)	0.003 (0.326)	0.005 (0.032**)
$LMunicipality_i$	8.219-7 (0.871)	2.052-6 (0.736)	7.644-6 (0.120)
$LWideCluster_i$	1.130-6 (0.630)	4.994-7 (0.859)	-2.668-6 (0.240)
$LWideCluster_i$	-0.054 (0.000***)	0.025 (0.000***)	-0.090 (0.000***)
R^2	0.034	0.074	0.211
Observations	2.487		

Source: Own computations from SABI.
Note: The value in parentheses is significant at the t-test. * p < 0.10; ** p< 0.05; *** p < 0.01.

4.3 The "location puzzle" and intra-division spillovers

The poor results in the multivariate analysis concerning location effects are puzzling. In this section, we conjecture that the origin of this puzzle is the dissimilarity between the activities performed by firms belonging to the Portuguese textile cluster. Our hypothesis is that location spillovers exist among textile-related firms, but only among those developing close textile activities. Specifically, we might adapt hypothesis 1c as follows: "Being located in an "extended" or "wide" municipality with firms developing similar textile activities has a positive effect on firm growth rate."

To check our hypothesis, we adopted the regression strategy of separating firms into two groups regarding their particular textile activities. The first group comprise firms involved in the preparation and spinning of textile fibers, textile weaving, textile finishing, and manufacture of other textiles, classified according to Rev. 3 on division 13 "textile manufacture"; the second group is made up of firms involved in clothing as their main output and classified according to the Rev. 3 on division 14 "clothing industry". To be consistent with this new analysis, we created two new location variables, $LwideCluster_i^{13}$ and $LwideCluster_i^{14}$ that accounted for the total number of firms belonging to their respective municipalities plus those belonging to the neighborhood municipalities for each respective group.[1]

Next, to address the location effect on both groups of firms in the Portuguese textile and clothing industry, we regressed equation (2) for these subsamples, Table 6 showing our results.[2]

The relationship between growth and size was significantly positive, while the variable Age was significantly negative for both industries (similar results were obtained in studies such as Coad et al., 2018, Fowowe, 2017, and Tarfasa et al., 2016). The variables of Internal and External finance continue positive and significant for both groups. The coefficient of the variable $LwideCluster_i^{13}$ for division 13 (textile manufacture) was negative and not significant, while the value attained in $LwideCluster_i^{14}$ for division 14 (clothing industry) was positive and significant, albeit with a small β_6 coefficient.

Table 6. Multiple linear regression results, using the dependent variables with different divisions.

	13	14	13A	13B
Variable name	$Growth_{i,t}^{Assets}$			
$Size_{i,t-1}^{Sales}$	0.017 (0.000***)	0.021 (0.000***)	0.015 (0.000***)	0.018 (0.000***)
$Age_{i,t-1}$	-0.033 (0.000***)	-0.040 (0.000***)	-0.035 (0.000***)	-0.031 (0.000***)
$Internal_{i,t-1}^{Finance}$	0.133 (0.000***)	0.167 (0.000***)	0.088 (0.000***)	0.170 (0.000***)
$External_{i,t-1}^{Finance}$	0.025 (0.000***)	0.043 (0.000***)	0.020 (0.000***)	0.030 (0.000***)
$LwideCluster_i^{13}$	-6.992^{-6} (0.230)			
$LwideCluster_i^{14}$		8.765^{-6} (0.003***)		
$LwideCluster_i^{13A}$			3.657^{-5} (0.259)	
$LwideCluster_i^{13B}$				-1.903^{-5} (0.080*)
Constant	-0.070 (0.000***)	-0.104 (0.000***)	-0.056 (0.000***)	-0.082 (0.000***)

[1] In the remainder of the paper, we have addressed location by focusing on the variable $Growth_{i,t}^{Assets}$, hence checking hypothesis 1c, as we found the results more significative.

[2] We found similar results when we took $Growth_{i,t}^{Employees}$ and $Growth_{i,t}^{Sales}$ as the independent variables in the regressions.

Revista Galega de Economía, 33(3) (2024). ISSN-e: 2255-5951
https://doi.org/10.15304/rge.33.3.8983

	13	14	13A	13B
R^2	0.184	0.237	0.162	0.209
Observations	910	1.577	269	641

Source: Own computations from SABI.
Note: The value in parentheses is significant at the t-test. * p < 0.10; ** p< 0.05; *** p < 0.01.

These results partially solve the location puzzle: while firms in the clothing industry consider it important to be in the cluster, it is not relevant to textile manufacture. This finding leads to the creation of a new puzzle, as, in our database, 83% of firms in the textile manufacture industry (division 13) were also located in the four main sub-regions in the "Norte" region of Portugal. So, we next wonder whether further disaggregation of the textile manufacture (division 13), would be able to solve the location puzzle. Accordingly, we separated firms belonging to division 13 into two groups of firms. The first one, which we denoted as division 13A, includes firms devoted to activities such as preparation, spinning, weaving and textile finishing activities, and are classified according to Rev. 3 on groups 131, 132, and 133 (see Table 1). The second group, denoted division 13B, includes firms' developing activities related to the manufacture of home textiles and other textiles, classified in group 139 (see Table 1). To be consistent with this new analysis, we created two new location variables, $LwideCluster_i^{13A}$ and $LwideCluster_i^{13B}$, and we regressed equation (2) for these new subsamples. Table 6 displays our results. The relationship between growth and size, age, and internal and external finance remained unchanged. The coefficient of the variable $LwideCluster_i^{13A}$ was not significant and for the $LwideCluster_i^{13B}$ a significantly negative coefficient was reported, suggesting that location is a restrictive factor of growth.

These results show that the Marshallian agglomeration externalities, associated with labor market pooling, specialized input suppliers, and knowledge spillovers (Lee, 2018; Folta et al., 2006; Porter, 2000) did not result in greater growth of firms belonging to the textile manufacture. Hence, our "location puzzle" has been solved at least for division 14 but it still unexplained for firms belonging to division 13.

4.4 The "location puzzle" and inter-industry spillovers

In our database, 83% of firms in textile manufacture (division 13) were located in the "Norte" region of Portugal. Nonetheless, the previous section shows that the location decision of business proprietor is unusual as no external effect was reported for firms in division 13.

Table 7. Multiple linear regression results, using the dependent variables with different divisions.

	14	13A	13B
Variable name	$Growth_{i,t}^{Assets}$		
$Size_{i,t-1}^{Sales}$	0.021 (0.000***)	0.015 (0.000***)	0.018 (0.000***)
$Age_{i,t-1}$	-0.040 (0.000***)	-0.036 (0.000***)	-0.031 (0.000***)
$Internal_{i,t-1}^{Finance}$	0.167 (0.000***)	0.088 (0.000***)	0.169 (0.000***)
$External_{i,t-1}^{Finance}$	0.043 (0.000***)	0.020 (0.000***)	0.030 (0.000***)
$LwideCluster_i^{13A}$	0.000 (0.002***)	0.000 (0.226)	0.000 (0.065*)
$LwideCluster_i^{13B}$	0.000 (0.002***)	0.000 (0.171)	0.000 (0.042**)
$LwideCluster_i^{14}$	2.385^{-5} (0.000***)	1.143^{-5} (0.475)	-7.391^{-6} (0.502)
Constant	-0.108 (0.000***)	-0.052 (0.002***)	-0.085 (0.000***)

	14	13A	13B
R^2	0.238	0.164	0.210
Observations	1.577	269	641

Source: Own computations from SABI.
Note: The value in parentheses is significant at the t-test. * p < 0.10; ** p< 0.05; *** p < 0.01

In this section, we conjecture that the origin of the unsolved location puzzle for division 13 stemmed from the existence of location spillovers among firms developing different, but complementary activities. Our hypothesis is that location spillovers exist for firms in division 13, but only among those developing complementary textile activities, because complementarities exist when firms of some industry are located close to firms of other industries. Thus, we needed to adapt Hypothesis 1c again to consider this location complementarity for division 13.

To check our hypothesis, we adopted the close regression strategy that was followed in section 4.3. Therefore, we assessed the cross-relationship between $LwideCluster_i^{13A}$, $LwideCluster_i^{13B}$ and $LwideCluster_i^{14}$ and their respective groups. Table 7 presents our results.

The results for growth and size, age, and internal and external finance were still unchanged. Concerning location, a cross-division effect was not reported. The coefficients for location-related variables were not found to be significant for subdivisions 13A and 13B, while the value taken for division 14 was positive and significant, albeit with a β_7 coefficient close to zero. These results imply that only the firms in the clothing industry (division 14) enjoyed inter-industry location externalities, because they are located close to textile-related firms.

4.5 The "location puzzle": Benefit of being located in the Portuguese textile cluster poles

In the previous section, we did not empirically find external spillovers that explain the reasons that resulted in the present location of firms in division 13, the textile manufacture, which represents 37% of the total firms. This suggests that other motivations or benefits play a role. The usual intuition of a business holder's location choice is usually related to cultural (entrepreneurial culture), behavioral, historical and institutional factors, that influence your location decisions (Musolino et al., 2020). For example, modern environmental regulation would find it less costly to move the firms together with sites endowed with abatement technologies. This would save fixed costs, then increase profits and trigger firm growth. Yet, our previous finding has not reported location effects for firms in the textile manufacture (division 13). Therefore, an alternative explanation is that firms obtain some benefit for locating at a cluster. Next, we explored the relationship between locations in clusters and one of the possible benefits: having access to external financial resources.

We regressed equation (3) with the variable $LCluster_i$, filtered by selecting two groups. One group includes the 2.130 firms belonging to the four poles of the Portuguese textile and clothing industry and a second group comprised 357 firms that were not in any of the poles. We also undertook the same analysis for divisions 13A, 13B, and 14. The linear multivariate regression specification then became:

$$Growth_{i,t} = \beta_0 + \beta_1 Size_{i,t-1}^{Sales} + \beta_2 Age_{i,t-1} + \beta_3 Internal_{i,t-1}^{Finance} + \beta_4 External_{i,t-1}^{Finance} + \varepsilon_{i,t} \quad (3)$$

Revista Galega de Economía, 33(3) (2024). ISSN-e: 2255-5951
https://doi.org/10.15304/rge.33.3.8983

All variables are the same as in equation (2). The results are presented in Table 8 and Table 9.

The relationship between growth and size and age remained unchanged. The results show that the effect of external financial resources on the growth of firms was greater for firms located inside the cluster. The coefficient to the variables of the financial resources (internal or external) is positive and significant, but the value of the coefficient β_4 is higher for firms that are located in one of the four poles, in all the division's portions of the sample.

Table 8. Multiple linear regression results, for all firms, using the dependent variables with firms inside the four poles and outside the four poles, respectively.

	Inside the cluster			**Outside the cluster**		
Variable name	$Growth_{i,t}^{Employees}$	$Growth_{i,t}^{Sales}$	$Growth_{i,t}^{Assets}$	$Growth_{i,t}^{Employees}$	$Growth_{i,t}^{Sales}$	$Growth_{i,t}^{Assets}$
$Size_{i,t-1}^{Sales}$	0.020 (0.000***)		0.016 (0.000***)	0.023 (0.000***)		0.025 (0.000***)
$Size_{i,t-1}^{Employees}$		0.020 (0.000***)			0.020 (0.000***)	
$Age_{i,t-1}$	-0.052 (0.000***)	-0.048 (0.000***)	-0.030 (0.000***)	-0.045 (0.000***)	-0.037 (0.000***)	-0.029 (0.000***)
$Internal_{i,t-1}^{Finance}$	0.018 (0.000***)	0.156 (0.000***)	0.229 (0.000***)	-0.005 (0.144)	0.038 (0.000***)	0.068 (0.000***)
$External_{i,t-1}^{Finance}$	0.004 (0.000***)	0.023 (0.000***)	0.044 (0.000***)	-0.001 (0.414)	0.008 (0.000***)	0.019 (0.000***)
Constant	-0.049 (0.000***)	0.019 (0.000***)	-0.090 (0.000***)	-0.070 (0.000***)	0.022 (0.043**)	-0.112 (0.000***)
R^2	0.034	0.102	0.267	0.035	0.034	0.156
Observations	2.130			357		

Source: Own computations from SABI.
Note: The value in parentheses was significant at the t-test. * p < 0.10; ** p< 0.05; *** p < 0.01.

Table 9. Multiple linear regression results, using the dependent variables with firms inside the four poles and outside the four poles, respectively.

	Inside the cluster			**Outside the cluster**		
	13A	**13B**	**14**	**13A**	**13B**	**14**
Variable name	$Growth_{i,t}^{Assets}$					
$Size_{i,t-1}^{Sales}$	0.012 (0.000***)	0.018 (0.000***)	0.016 (0.000***)	0.013 (0.204)	0.017 (0.000***)	0.028 (0.000***)
$Age_{i,t-1}$	0.026 (0.000***)	-0.032 (0.000***)	-0.033 (0.000***)	-0.070 (0.001***)	-0.016 (0.070**)	-0.024 (0.003***)
$Internal_{i,t-1}^{Finance}$	0.386 (0.000***)	0.158 (0.000***)	0.261 (0.000***)	0.053 (0.000***)	0.221 (0.000***)	0.078 (0.000***)
$External_{i,t-1}^{Finance}$	0.113 (0.000***)	0.033 (0.000***)	0.046 (0.000***)	0.010 (0.000***)	0.025 (0.000***)	0.023 (0.000***)
Constant	-0.198 (0.000***)	-0.086 (0.000***)	-0.089 (0.000***)	0.022 (0.725)	-0.092 (0.000***)	-0.146 (0.000***)
R^2	2	0.211	0.298	0.376	0.214	0.150
Observations	250	506	1.374	19	135	203

Source: Own computations from SABI.
Note: The value in parentheses was significant at the t-test. * p < 0.10; ** p< 0.05; *** p < 0.01.

This result supports the conventional wisdom that firms can gain substantial advantages if they are located in a cluster (Lee, 2018; Porter, 2000). It provides empirical evidence that the growth of firms located in the textile and clothing cluster is positively correlated with external finance, and this helps to explain why textile manufacture firms are located in the cluster. This result implies that business proprietors strategically (and rationally) decide to locate their firms in the cluster because it helps mitigate information asymmetry problems in accessing external finance. In other words, the location itself becomes a solvency signal for firms.

5. CONCLUSION

In this paper, we have empirically addressed a "location puzzle" in the Portuguese textile and clothing industry. Although firms belonging to this cluster are mainly concentrated in four poles, we found that location is not relevant when the whole industry is considered. This is the "location puzzle": if there is no location externality for firms in the Portuguese textile and clothing industry, why are 87% of firms located in the four main sub-regions in the "Norte" region? At the disaggregate analysis, we found that the clothing industry (division 14) exhibited location externalities, whereas the textile manufacture (division 13) did not. The same negative result was obtained after further disaggregating for firms in division 13 (divisions 13A and 13B). In addition, the cross-location effect between both divisions was not significant for the textile manufacture firms, and only the firms in the clothing industry had inter-industry location externalities. To understand our results about location, we conjectured that other benefits not associated with productive externalities might play a role. We presented empirical evidence that the growth of firms located in the textile and clothing cluster is positively correlated with external finance; this also helps to explain why textile manufacture firms are located in the cluster. This result suggest that business proprietors strategically (and rationally) decide to locate their firms in the cluster because it helps mitigate information asymmetry problems in accessing external finance. In other words, the location itself becomes a solvency signal for firms. Finally, in accordance with previous outcomes in the literature, our empirical findings indicate that size is significantly and positively correlated with growth, while age is significantly negative.

Our results suggest that the Portuguese textile and clothing industry, a formally recognized cluster, is comprised of two unrelated sectors; this means that the interests of firms associated with the cluster might be (rather) disparate when it comes to, for example, spillovers associated with labor market pooling, specialized input suppliers, knowledge spillovers, or simply the gains in access to external financial resources. While firms in the clothing industry (division 14) find location relevant and can benefit from Marshallian external location effects, those belonging to the textile manufacture (division 13) do not obtain any spillover benefits. This is relevant for business holders and policymakers concerning the optimal allocation of the scarce amount of placement resources available in the cluster poles, as our results jeopardizes any policies and public subsidies aimed at guiding the location decision that business owners may take in "textile manufacture". In the microanalysis, our results suggest that the geographic promotion of the Portuguese textile and clothing industry cluster should be focused on firms in division 14 (see Table 6). If other textile manufacturers are also allowed in the poles, those belonging to division 13A must be selected (see Table 6).

In addition, if external finance is the true benefit of being located inside the cluster for firms of the "textile manufacture" (division 13), public policies or measures should be implemented to mitigate monitoring or information asymmetry problems that the Portuguese financial sector incur to provide external funds to those in said cluster.

Revista Galega de Economía, 33(3) (2024). ISSN-e: 2255-5951
https://doi.org/10.15304/rge.33.3.8983

Two avenues for future research have been identified. Firstly, the issue of whether the location puzzle is prevalent in other sectors of the Portuguese economy (or in other economies) could be studied. Since business owners find that locating their firms in a cluster is a signal that mitigates information asymmetry problems concerning access to external financial funds, analyzing if this is the case for other clusters would be wise to do. If so, this would shed light on a major structural problem in the Portuguese economy. Secondly, since the contribution of our body of work was concerned with location, different methods and techniques to address spillover location effects should be considered, such as spatial analysis (Raspe & van Oort, 2011). This could help to explain the impact of other related firms and universities on location and firm growth (Duschl et al., 2011). These alternative empirical analyses could be undertaken to check the robustness of our results concerning the existence of location externalities.

Acknowledgments

The author would like to thank the two referees of this journal for their useful insights.

References

Acs, Zoltan J., & Armington, C. (2004). The Impact of Geographic Differences in Human Capital on Service Firm Formation Rates. *Journal of Urban Economics 56*(2), 244–78.https://doi.org/10.1016/j.jue.2004.03.008

Almus, M., & Nerlinger, E.A. (1999). Growth of New Technology-Based Firms: Which Factors Matter?. *Small Business Economics, 13*(2) 141–154. https://www.jstor.org/stable/40229039

Almus, M., & Nerlinger, E.A. (2000). Testing 'Gibrat's Law' for Young Firms - Empirical Results for West Germany. *Small Business Economics, 15*(1), 1–12. https://www.jstor.org/stable/40229089.

Altenburg, T., & Meyer-Stamer, J.(1999). How to Promote Clusters: Policy Experiences from Latin America. *World Development, 27*(9), 1693–1713.https://doi.org/10.1016/S0305-750X(99)00081-9

ATP. (2019). Fashion From Portugal 4.0. *Associação Têxtil e Vestuário de Portugal*.

Audretsch, D. B. (1998). Agglomeration and the Location of Innovative Activity. *Oxford Review of Economic Policy, 14*(2), 18–29. https://www.jstor.org/stable/23606493

Audretsch, D. B., Klomp, L., Santarelli, E., & Thurik, A.R. (2004). Gibrat's Law: Are the Services Different?. *Review of Industrial Organization, 24*(3), 301–24. https://www.jstor.org/stable/41803623

Audretsch, D. B., & Dohse, D. (2004). The Impact of Location on Firm Growth. *Centre for Economic Policy Research, 4332*, 1–29. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=540242

Audretsch, D. B., & Dohse, D. (2007). Location: A Neglected Determinant of Firm Growth. *Review of World Economics, 143*(1), 79–107.https://doi.org/10.1007/s10290-007-0099-7

Barringer, B. R., Jones, F. F., & Neubaum, D.O. (2005). A Quantitative Content Analysis of the Characteristics of Rapid-Growth Firms and Their Founders. *Journal of Business Venturing, 20*(5), 663–687.https://doi.org/10.1016/j.jbusvent.2004.03.004

Becchetti, L., & Trovato, G. (2002). The Determinants of Growth for Small and Medium Sized Firms. The Role of External Finance. *Small Business Economics*, 19, 291–306. https://www.jstor.org/stable/40229240

Brenner, T., & Schimke, A. (2015). Growth Development Paths of Firms-A Study of Smaller Businesses. *Journal of Small Business Management, 53*(2), 539–57. https://doi.org/10.1111/jsbm.12081

Cabral, L. M. B., & Mata, J. (2003). On the Evolution of the Firm Size Distribution: Facts and Theory. *American Economic Review, 93,* 1075–1090. https://www.jstor.org/stable/3132279

Carpenter, R. E., & Petersen, B. C. (2002). Is the Growth of Small Firms Constrained by Internal Finance?. *Review of Economics and Statistics, 84*(2), 298–309. https://www.jstor.org/stable/3211778

Coad, A., Daunfeldt, S.-O., & Halvarsson, D. (2018). Bursting into Life: Firm Growth and Growth Persistence by Age. *Small Business Economics, 50*(1), 55–75. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2616759

Coad, A., & Holz, W. (2010). Firm Growth: Empirical Analysis. *The Papers on Economics and Evolution*.

Coad, A., Segarra, A., & Teruel, M. (2013). Like Milk or Wine: Does Firm Performance Improve with Age?. *Structural Change and Economic Dynamics 24*(1), 173–189. https://doi.org/10.1016/j.strueco.2012.07.002.

Coad, A., Segarra, A., & Teruel, M. (2016). Innovation and Firm Growth: Does Firm Age Play a Role? *Research Policy ,45* (2), 387–400.https://doi.org/10.1016/j.respol.2015.10.015

Coad, A., & Tamvada, J.P. (2012). Firm Growth and Barriers to Growth among Small Firms in India. *Small Business Economics, 39*(2), 383–400. https://www.jstor.org/stable/41682804

Cooper, A. C., Gimeno-Gascon, F.J., & Woo, C.Y. (1994). Initial Human and Financial Capital as Predictors of New Venture Performance. *Journal of Business Venturing 9*(5), 371–395. https://doi.org/10.1016/0883-9026(94)90013-2

Cuervo-Cazurra, A, De Holan,P.M., & Sanz, L. (2014). Location Advantage: Emergent and Guided Co-Evolutions. *Journal of Business Research, 67*(4), 508–515. https://doi.org/10.1016/j.jbusres.2013.11.007

Davidsson, P., Kirchhoff, B., Hatemi-J, A, & Gustavsson, H. (2002). Empirical Analysis of Business Growth Factors Using Swedish Data. *Journal of Small Business Management* , *40*(4), 332–49. https://doi.org/10.1111/1540-627X.00061

Delmar, F., Davidsson, P., &. Gartner, W. B. (2003). Arriving at the High Growth Firm. *Journal of Business Venturing, 18*(2), 189–216.https://doi.org/10.1016/S0883-9026(02)00080-0

Delmar, F., & Wiklund, J. (2008). The Effect of Small Business Managers Growth Motivation on Firm Growth: A Longitudinal Study. *Entrepreneurship Theory and Practice, 32*(3), 437–457. https://doi.org/10.1111/j.1540-6520.2008.00235

Diaz Hermelo, F, & Vassolo, R. (2007). The Determinants of Firm's Growth: An Empirical Examination. *Revista Abante 10*(1), 3–20.

Dobbs, M., & Hamilton, R.T. (2007). Small Business Growth: Recent Evidence and New Directions. *International Journal of Entrepreneurial Behavior* & Research, *13*(5), 296-322.https://doi.org/10.1108/13552550710780885

Duschl, M., Schimke, A., Brenner, T., & Luxen, D. (2011). Firm Growth and the Spatial Impact of Geolocated External Factors - Empirical Evidence for German Manufacturing Firm. *Working Paper Series in Economics, 36, 1-27*.

Evans, D. S. (1987). The Relationship Between Firm Growth, Size, and Age: Estimates for 100 Manufacturing Industries. *The Journal of Industrial Economics, 35*(4), 567–581. https://doi.org/10.2307/2098588

Fadahunsi, A., (2012). The Growth of Small Businesses: Towards A Research Agenda. *American Journal of Economics and Business Administration, 4* (1), 105–115.https://doi.org/10.3844/ajebasp.2012.105.115

Folta, T. B., Cooper, A.C., & Baik, Y.-S. (2006). Geographic Cluster Size and Firm Performance. *Journal of Business Venturing, 21*(2), 217–42. https://doi.org/10.1016/j.jbusvent.2005.04.005

Fowowe, B. (2017). Access to Finance and Firm Performance: Evidence from African Countries. *Review of Development Finance, 7*(1), 6–17. https://doi.org/10.1016/j.rdf.2017.01.006

Gibrat, R. (1931). Les Inegalities Economiques, Sirey, Paris.

Glancey, K. (1998). Determinants of Growth and Profitability in Small Entrepreneurial Firms. *International Journal of Entrepreneurial Behaviour & Research 4*(1), 18–27.https://doi.org/10.1108/135525598102039

Gopinath, R. C. (2012). Understanding the Determinants of Firm Growth in Young REIs. *Working Paper*: 1–49.

Guariglia, A., Liu, X., & Song, L. (2011). Internal Finance and Growth: Microeconometric Evidence on Chinese Firms. *Journal of Development Economics, 96*(1), 79–94.https://doi.org/10.1016/j.jdeveco.2010.07.003

Hall, B. H. (1987). The Relationship Between Firm Size and Firm Growth in the US Manufacturing Sector. *The Journal of Industrial Economics, 35* (4), 583–606. https://doi.org/10.2307/2098589

Hampel-Milagrosa, A., Loewe. M., & Reeg, C. (2015). The Entrepreneur Makes a Difference: Evidence on MSE Upgrading Factors from Egypt, India, and the Philippines. *World Development, 66*, 118–30.https://doi.org/10.1016/j.worlddev.2014.08.005

Harabi, N. (2007). Determinants of Firm Growth: An Empirical Analysis from Morocco. *MPRA Paper, 4394*, 1–30.https://mpra.ub.uni-muenchen.de/id/eprint/4394

Diaz Hermelo, F, & Vassolo, R. (2007). The Determinants of Firm's Growth: An Empirical Examination. *Revista Abante 10*(1), 3–20.

Heshmati, A. (2001). On the Growth of Micro and Small Firms: Evidence from Sweden. *Small Business Economics, 17*, 213–28. https://doi.org/10.1023/A:1011886128912

Hoogstra, G. J., & Van Dijk, J. (2004). Explaining Firm Employment Growth: Does Location Matter? *Small Business Economics 22*, 179–92. https://www.jstor.org/stable/40229319

Jovanovic, B. (1982). Selection and the Evolution of Industry. *Journal of the Econometria Society, 50*(3): 649–70. https://doi.org/10.2307/1912606

Kolvereid, L. (1992). Growth Aspirations among Norwegian Entrepreneurs. *Journal of Business Venturing, 7*(3): 209–22. https://doi.org/10.1016/0883-9026(92)90027-O

Kunt-Demirgüç, A, & Maksimovic, V. (1998). Law, Finance, and Firm Growth. *Journal of Finance, 53*(6), 2107–37.https://doi.org/10.1111/0022-1082.00084

Lee, C-Y. (2009). Do Firms in Clusters Invest in R&D More Intensively? Theory and Evidence from Multi-Country Data. *Research Policy, 38*(7): 1159–71. https://doi.org/10.1016/j.respol.2009.04.004

Lee, C-Y. (2018). Geographical Clustering and Firm Growth: Differential Growth Performance among Clustered Firms. *Research Policy, 47*(6), 1173–84. https://doi.org/10.1016/j.respol.2018.04.002

Leitão, J., Serrasqueiro, Z., & Maçãs Nunes, P. (2010). Testing Gibrat's Law for Listed Portuguese Companies: A Quantile Approach." *International Research Journal of Finance and Economics, 37*, 147–58. http://www.eurojournals.com/finance.htm

Liedholm, C. (2002). Small Firm Dynamics: Evidence from Africa and Latin America. *Small Business Economics, 18*, 227–42. https://doi.org/10.1023/A:1015147826035

Lotti, F, Santarelli, E., & Vivarelli, M. (2009). Defending Gibrat's Law as a Long-Run Regularity. *Small Business Economics, 32*(1), 31–44. https://doi.org/10.1007/s11187-007-9071-0.

Maças Nunes, P., Gonçalves. M., & Serrasqueiro, Z. (2013). The Influence of Age on SMEs' Growth Determinants: Empirical Evidence. *Small Business Economics, 40*, 249–72. https://doi.org/10.1007/s11187-011-9363-2

Mansfield, E. (1962). Entry, Gibrat's Law, *Innovation, and the Growth of Firms*. The American Economic Review, *52*(5), 1023–51. https://www.jstor.org/stable/1812180

Mateev, M., & Anastasov, Y. (2010). Determinants of Small and Medium Sized Fast Growing Enterprises in Central and Eastern Europe: A Panel Data Analysis. *Financial Theory and Practice, 34*(3), 269–95.

McPherson, M. A. (1996). Growth of Micro and Small Enterprises in Southern Africa. *Journal of Development Economics 48*, 253–77. https://doi.org/10.1016/0304-3878(95)00027-5

Morone, P., & Testa, G. (2008). Firms Growth, Size and Innovation an Investigation Into the Italian Manufacturing Sector. *Economics of Innovation and New Technology, 17*(4), 311–29.https://doi.org/10.1080/10438590701231160

Mukhopadhyay, A., & Amirkhalkhali, S. (2010). Profitability Performance and Firm Size-Growth Relationship. *Journal of Business & Economics Research, 8*(9), 121–126.https://doi.org/10.19030/jber.v8i9.764

Musolino, D., Mariotti, I., &. Brouwer, A. E. (2020). Stated and Revealed Locational Preferences of Firms: A National Scale Perspective. *Annals of Regional Science, 64*(3), 493–99. https://doi.org/10.1007/s00168-020-00982-8

Musso, P., & Schiavo, S. (2008). The Impact of Financial Constraints on Firm Survival and Growth. *Journal of Evolutionary Economics, 18*(2), 135–49. https://doi.org/10.1007/s00191-007-0087-z

Nichter, S., & Goldmark, L. (2009). Small Firm Growth in Developing Countries. *World Development*, *37*(9),1453–64. https://doi.org/10.1016/j.worlddev.2009.01.013

Oliveira, B., & Fortunato, A. (2006a). Firm Growth and Liquidity Constraints: A Dynamic Analysis. *Small Business Economics, 27*, 139–56. https://doi.org/10.1007/s11187-006-0006-y

Oliveira, B., & Fortunato, A. (2006b). Testing Gibrat's Law: Empirical Evidence from a Panel of Portuguese Manufacturing Firms. *Journal of Entrepreneurship in Emerging Economies, 13*(1), 65–81.https://doi.org/10.1080/13571510500519996

Parker, S. C. (2009). The Economics of Entrepreneurship. *Cambridge University Press*, 1–550. https://doi.org/10.1017/9781316756706

Pe'er, A., Vertinsky, I., & Keil, T. (2016). Growth and Survival: The Moderating Effects of Local Agglomeration and Local Market Structure. *Strategic Management Journal*, *37*(3), 541–64.https://doi.org/10.1002/smj.2331

Porter, M. (2000). Location, Competition, and Economic Development: Local Clusters in a Global Economy. *Economic Development Quarterly, 14*(1), 15–34.https://doi.org/10.1177/089124240001400105

Porter, M. E. (1998). Clusters and the New Economics of Competition. *Harvard Business Review, 76*, 77–90.

Pyke, F., Becattini, G, & Sengenberger, W. (1990). *Industrial Districts and Inter-Firm Co-Operation in Italy*. Geneva: International Institute for Labour Studies.

Rahaman, M. M. (2011). Access to Financing and Firm Growth. *Journal of Banking and Finance, 35*(3), 709–23.https://doi.org/10.1016/j.jbankfin.2010.09.005

Raspe, O., & Van Oort, F. (2011). Growth of New Firms and Spatially Bounded Knowledge Externalities*. Annals of Regional Science, 46*(3), 495–518. https://doi.org/10.1007/s00168-009-0357-9

Rostamkalaei, A., & Freel, M. (2016). The Cost of Growth: Small Firms and the Pricing of Bank Loans. *Small Business Economics, 46*(2), 255-72. https://www.jstor.org/stable/43895704

Segarra, A., & Teruel, M. (2009). Small Firms, Growth and Financial Constraints. *SSRN Electronic Journal*, 1–32.http://dx.doi.org/10.2139/ssrn.1825064

Serra, F., Pointon, J., & Abdou, H. (2012). Factors Influencing the Propensity to Export: A Study of UK and Portuguese Textile Firms. *International Business Review, 21*(2), 210–24.https://doi.org/10.1016/j.ibusrev.2011.02.006

Serrasqueiro, Z., & Maças Nunes, P. (2016). Determinants of Growth in Portuguese Small and Medium-Sized Hotels: Empirical Evidence Using Panel Data Models. *Tourism Economics 22*(2), 375–96.https://doi.org/10.5367/te.2014.042

Serrasqueiro, Z., Leitão, J., & Smallbone, D. (2021). Small- and Medium-Sized Enterprises (SME) Growth and Financing Sources: Before and after the Financial Crisis. *Journal of Management & Organization, 27*(1), 6–21. https://doi.org/10.1017/jmo.2018.14

Serrasqueiro, Z., Maçãs Nunes, P., Leitão, J., & Armadaz, M. (2010). Are There Non-Linearities between SME Growth and Its Determinants? A Quantile Approach. *Industrial and Corporate Change, 19*(4), 1071–1108.https://doi.org/10.1093/icc/dtp053

Storey, D. J. (1994). *Understanding the Small Business Sector*. 1ª. London: Routledge.

Sutton, J. (1997). Gibrat' s Legacy. *Journal of Economic Literature, 35*(1), 40–59. https://www.jstor.org/stable/2729692

Tarfasa, S., Ferede,T., Kebede, S., & Behailu, D. (2016). Determinants of Growth of Micro and Small Enterprises (MSEs): Empirical Evidence from Ethiopia. *Swiss Programme for Research on Global Issues for Development - R4D Working Paper*, 1–29.

Truett, L.J., & Truett, D.B. (2019). Challenges in the Portuguese Textile and Clothing Industry: A Fight for Survival. *Applied Economics*, *51*(26), 2842–2854.https://doi.org/10.1080/00036846.2018.1558362

Ullah, B. (2019). Financial Constraints, Corruption, and SME Growth in Transition Economies. *Quarterly Review of Economics and Finance Art in Pre, 75*, 1–13. https://doi.org/10.1016/j.qref.2019.05.009

Van Geenhuizen, M., & Reyes-Gonzalez, L. (2007). Does a Clustered Location Matter for High-Technology Companies Performance? The Case of Biotechnology in the Netherlands. *Technological Forecasting and Social Change*, *74*(9), 1681–1696. https://doi.org/10.1016/j.techfore.2006.10.009

Variyam, J. N., & Kraybill, D.S. (1992). Empirical Evidence on Determinants of Firm Growth. *Economics Letters, 38*(1), 31–36.https://doi.org/10.1016/0165-1765(92)90157-T

Vaz, R. (2021). Firm Growth: A Review of the Empirical Literature. *Revista Galega de Economía, 30*(2), 1–20.https://doi.org/10.15304/rge.30.2.7190

Wang, C., Zhao, S., Zheng, H., & Bai, Y. *(2022). Does Financial Constraint Hinder Firm Growth? Emerging Markets Finance and Trade, 58*(15), 4195–4206. https://doi.org/10.1080/1540496X.2022.2069490

Wonglimpiyarat, J. (2016). Government Policies towards Israel's High-Tech Powerhouse*. Technovation, 52–53,* 18–27. https://doi.org/10.1016/j.technovation.2016.02.001

Zhou, H., & De Wit, G. (2009). Determinants and Dimensions of Firm Growth. SCALES - Scientific AnaLysis of Entrepreneurship and SMEs

redalyc
UAEMEX

Available in:
https://www.redalyc.org/articulo.oa?id=39180902001

How to cite

Complete issue

More information about this article

Journal's webpage in redalyc.org

Scientific Information System Redalyc
Diamond Open Access scientific journal network
Non-commercial open infrastructure owned by academia

Rolando Vaz

The Regional Firm Density and the Growth of Firms in the Portuguese Textile and Clothing Industry
A densidade rexional de empresas e o crecemento das empresas da industria téxtil e da confección portuguesa

Revista Galega de Economía
vol. 33, no. 3, 1, 2024
Universidade de Santiago de Compostela,
ISSN: 1132-2799

DOI: https://doi.org/10.15304/rge.33.3.8983