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ORIGINAL PAPER

A long-term mortality analysis of subsidized firms in rural areas: an empirical study in the Portuguese Alentejo region

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Abstract Studies have demonstrated that public policies to support private firms' investment have the ability to promote entrepreneurship, but the sustainability of subsidized firms has not often been analysed. This paper aims to examine this dimension specifically through evaluating the mortality of subsidized firms in the long-term. The analysis focuses on a case study of the LEADER+ Programme in the Alentejo region of Portugal. With this purpose, the paper examines the activity status (active or not active) of 154 private, rural, for-profit firms in Alentejo that had received a subsidy to support investment between 2002 and 2008 under the LEADER+ Programme. The methodology is based on binary choice models in order to study the probability of these firms still being active. The explanatory variables used are the following: (1) the characteristics of entrepreneurs and managers' strategic decisions, (2) firm profile and characteristics, (3) regional economic environment. Data assessment showed that the cumulative mortality rate of firms on 31st December 2013 is over 20 %. Interpretation of the regression model revealed that

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the probability of firms' survival increases with higher investment, firm age and regional business concentration, whereas the number of applications made by firms has a negative impact on their survival. So it seems that for subsidized firms the amount of investment is as important as its frequency.

Keywords Public policy · Subsidized firms · Firms' sustainability · Long-term mortality analysis · Binary choice models

JELClassification R58 · D21 · C25

1 Introduction

The socio-economic sustainability of regions and countries depends on their ability to create and maintain firms and jobs. Public policies to support entrepreneurship play a vital role in more vulnerable economies, such as rural areas (Santos 2012). The business environment is crucial for firm development, including easy access to finance (Gur 2012). Indeed, according to Voigt and Moncada-Paternò-Castello (2012), public policy addressed to low R&D intensive sectors would tend to focus on improving financial support, and public policies are likely to influence private investment (Paunov 2012) or even increase productivity and employment levels (Alvarez et al. 2012). Nevertheless, assessment of their sustainability has been little explored in research.

The concept of sustainability is related to a long-term time scale and is associated with efficient use of resources in order to maintain an economic gain with environmental and social quality (Bell and Morse 2008: 10–18). For firms, efficient use of resources is also based on rational utilization of human[1] and financial[2] resources, to ensure the firm's survival in the long run. Although public policies support firms' competitiveness, financing investment and jobs, their effect is not always the one intended. According to Bernini and Pellegrini (2011): 262–264, subsidized firms tend to invest more and increase the number of employees compared to non-subsidized firms, in order to receive additional public funding. In the long term, this can affect growth and productivity, and subsidized firms' ability to maintain their market position (Bernini and Pellegrini 2011: 264; 2013: 166).

Concerning the evaluation of a public policy, the term sustainability refers to the extent to which the results and outputs of the intervention are durable (European Commission 2008: 43). In this sense, the assessment criteria of this dimension are related to answering questions such as, "Are the results and impacts, including institutional changes, durable over time? Will the impacts continue if there is no more public funding?" (European Commission 2008: 43). The present study focuses on what happens at the microeconomic level in the long term, based on analysis of

[1] E.g. the optimal employment level.

[2] E.g. the balance between costs and income or between investments and additional cash-flow.

firm mortality in the subsidized context, and the analysis is centred on a case study in the LEADER Programme.[3]

The present paper focuses on the 154 private for-profit firms operating in the rural Portuguese region of Alentejo which received funding in the 3rd phase of the LEADER Programme,[4] also called LEADER+, between 2002 and 2008. The paper examines the survival and mortality status of these firms on 31st December 2013 and tries to answer the following questions: How many funded firms are still active? What are the determinants that affect positively and negatively the survival or mortality in these firms?

The methodology is based on binary choice models, in order to study the survival behaviour of subsidized firms, through potential explanatory variables, such as entrepreneurs and managers' strategic decisions, firm profile and characteristics, and the regional economic environment.

This research is divided into five main chapters: (1) characterization of firm mortality in Portugal and in Alentejo; (2) theoretical and conceptual framework, with a literature review concerning the determinants of business survival and mortality; (3) description of data used and methodology; (4) analysis and discussion of results and (5) presentation of the main conclusions.

2 Firm demography: Portugal and Alentejo region

Portugal is a country in southern Europe covering an area of 92.212 km^2 and divided into seven regions at NUT[5] level 2: North, Centre, Lisbon, Alentejo, Algarve and two island groups of the Azores and Madeira. The present study focuses only on the Alentejo,[6] one of the regions with the lowest level of competitiveness in the European Union (Eurostat 2014: 370), sparsely populated[7]

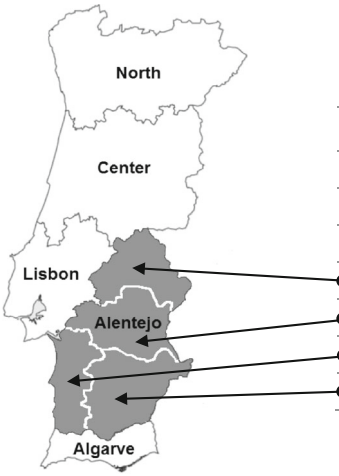
[3] The LEADER (Links between actions of rural development) programme was created in 1991 by the European Commission. This initiative, based on an innovative methodology, with different characteristics from classical models, was designed to encourage and support entrepreneurship, stimulate innovation and motivate cooperation, by funding investment in rural areas (Santos 2012: 70). Based on a territorial approach, the LEADER programme is built on the principle that local actors are best qualified to detect a territory's needs and therefore outline its Local Development Strategy (European Commission 2006). It was indeed following this premise that the concept of Local Action Groups–LAG—was born. These entities are responsible for the management of LEADER Programme funds in a given area.

[4] Currently, we are at the closure of the 4th phase and the beginning of the 5th phase of the LEADER programme. LEADER I, ran from 1991 to 1993, LEADER II from 1994 to 1999 and LEADER+ from 2000 to 2006. Although LEADER+ operated between 2000 and 2006, the first application approvals only began in 2002. The approval period and execution of applications submitted until 31st December 2006 was extended to 2008.

[5] Nomenclature of Territorial Units for Statistics.

[6] We consider the Alentejo without the sub-region of Lezíria do Tejo, because according to CCDRA (2011: 9), this sub-region shows a different socio-economic profile from the other NUTS III forming the Alentejo region.

[7] The Alentejo has only 18.4 inhabitants per km^2, Portugal has 113.7 inhabitants per km^2 and the European Union has 116.3.



Geographical location	Population density[9]	Ageing ratio[10]
European Union – 28	116.3	114.10
Portugal	113.7	131.10
Alentejo	18.4	190.80
Alto Alentejo	18.5	212.2
Alentejo Central	22.7	186.3
Alentejo Litoral	18.3	189.5
Baixo Alentejo	14.6	179.2

Fig. 1 Regions of Mainland Portugal—some social indicators (2012), Source: Authors' own elaboration based on INE (2002) for the map, INE (2013) and Eurostat (2014) for statistical indicators

and with an ageing population.[8] The Alentejo accounts for nearly a third of the Portuguese mainland and its territory is sub-divided in four sub-regions at NUT level 3: (1) Alto Alentejo; (2) Alentejo Central; (3) Alentejo Litoral and (4) Baixo Alentejo. These sub-regions have specific socio-economic characteristics and the business sector has registered different tendencies in the last decades (Fig. 1).

Between 2004 and 2012, the Portuguese business sector lost 22,146 firms and 158,481 workers. In the Alentejo region, the trend also shows a decrease in the number of firms and people employed in the same period, respectively 4.2 and 2.0 %. The sub-regions of Alto Alentejo and Alentejo Central recorded values above the national and regional average, with a 6.5 and 5.0 % decrease in the number of firms, respectively (Table 1).

The Portuguese firm mortality rate increased from 10.44 % in 2004 to 18.48 % in 2011. In the Alentejo, the trend of this indicator in the same period was more pronounced, increasing from 9.82 to 18.82 %. Among its sub-regions, we highlight Alentejo Litoral with the highest firm mortality rate, close to 20 % (Table 2).

The survival rate of firms born 2 years previously decreased from 58.79 % in 2006 to 48.47 % in 2012. In the Alentejo, this indicator also shows a decreasing tendency and is even more pronounced in the sub-region of Baixo Alentejo, where the negative variation of this indicator was close to 25 % (Table 3).

In parallel to the previous analysis, it is also important to highlight that the follow-up period of the study covers a period of recession and economic crisis in Portugal. From 2006, both Portugal and Alentejo showed reduced GDP growth, including some years with negative values, such as 2009, 2011 and 2012 (Fig. 2). This economic context could partially explain the trends described above.

[8] The Alentejo region has an ageing ratio of 190.80, meaning there are 190.80 old people for every 100 young people. At the national level this indicator is 131.10 and in the EU 114.10.

Table 1 Number of firms and people employed by geographical location—Portugal, Alentejo and Alentejo sub-regions (2004 and 2012)

Geographical location	Firms (No.)				Employees (No.)			
	Year		Variation (04/12)		Year		Variation (04/12)	
	2004	2012	No.	%	2004	2012	No.	%
Portugal	1,084,928	1,062,782	−22,146	−2.0 %	3,670,147	3,511,666	−158,481	−4.3 %
Alentejo	55,024	52,701	−2,323	−4.2 %	127,883	125,384	−2,499	−2.0 %
Alto Alentejo	11,432	10,694	−738	−6.5 %	27,625	26,113	−1,512	−5.5 %
Alentejo Central	19,219	18,257	−962	−5.0 %	47,289	43,494	−3,795	−8.0 %
Alentejo Litoral	10,822	10,782	−40	−0.4 %	24,753	27,401	2,648	10.7 %
Baixo Alentejo	13,551	12,968	−583	−4.3 %	28,216	28,376	160	0.6 %

Source: INE, Sistema de Contas Integradas das empresas (SCIE), (http://www.ine.pt, accessed on 24-11-2014)

Table 2 Firm mortality rate (%) by geographical location—Portugal, Alentejo and Alentejo sub-regions (2004–2011)

Geographical location	Year					Average 2004–2011 (%)
	2004 (%)	2006 (%)	2008 (%)	2010 (%)	2011 (%)	
Portugal	10.44	10.98	14.88	15.36	18.48	13.82
Alentejo	9.82	10.32	13.76	14.03	18.82	12.94
Alto Alentejo	10.12	10.49	13.43	13.91	17.78	12.74
Alentejo Central	9.49	10.32	13.96	14.08	18.71	12.77
Alentejo Litoral	10.42	10.41	13.69	13.73	19.88	13.34
Baixo Alentejo	9.06	9.55	13.15	12.66	18.44	12.07

Source: INE, Demografia das Empresas, (http://www.ine.pt, accessed on 24-11-2014)

Table 3 Survival rate (%) of firms born 2 years previously, by geographical location—Portugal, Alentejo and Alentejo sub-regions (2006–2012)

Geographical location	Year				Average (%)	Variation 2006–2012 (%)
	2006 (%)	2008 (%)	2010 (%)	2012 (%)		
Portugal	58.79	57.92	48.59	48.47	52.55	−17.6
Alentejo	59.66	58.36	50.39	47.81	53.29	−19.9
Alto Alentejo	58.58	59.39	50.29	50.12	54.66	−14.4
Alentejo Central	59.83	56.83	51.34	48.66	53.34	−18.7
Alentejo Litoral	56.61	53.57	47.06	44.75	49.23	−21.0
Baixo Alentejo	61.53	58.66	52.08	46.36	54.15	−24.7

Source: INE, Demografia das Empresas, (http://www.ine.pt, accessed on 24-11-2014)

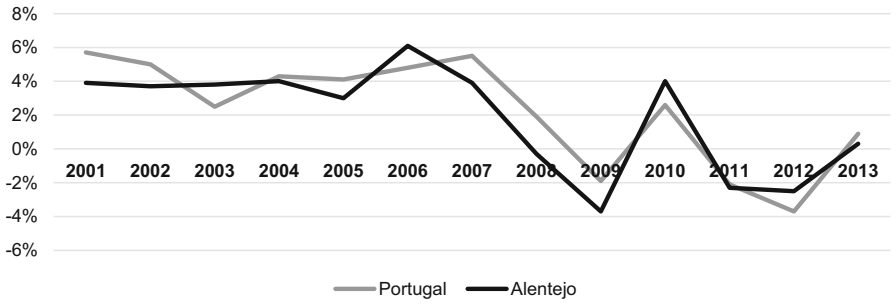


Fig. 2 Nominal GDP (YoY % change)—Portugal and Alentejo (2001–2013), Source: INE, Contas Nacionais, (http://www.ine.pt, accessed on 21-07-2015)

3 Determinants of firms' survival and mortality

3.1 Main explanatory factors

In recent decades, many authors, such as Agarwal (1997); Brixy and Grotz (2007); Buddelmeyer et al. (2006); Clarke et al. (2012); De Silva and McComb (2012); Déprez (2010); Falck (2007); Ferreira et al. (2012); Fukuda (2012); Geroski et al. (2010); Grappegia et al. (2011); Holmes et al. (2010); Smida and Khelil (2010); Stearns et al. (1995); Tsoukas (2011); Yu et al. (2009), among others, have tried to explain the determinants of business survival and mortality. A full understanding of this phenomenon is even more important when the impact of business demography influences the sustainability of territories.

Firms create value, wealth and employment, and entrepreneurship is seen as an instrument for promoting a region or country's growth and development. According to Carvalho et al. (2011: 87), entrepreneurship is a dynamic process that combines identification of a business opportunity with the individual ability to achieve it. This concept may take on an economic dimension or a non-profit facet, when it creates value for society in general (Carvalho et al. 2011: 87). Entrepreneurship could be associated with starting a business or simply with the motivation to develop a project in an existing firm with the aim of modernizing, expanding or diversifying its activity. However, not all these projects are successful, and despite the investment made, can sometimes lead to the firm's closure.

According to Ferreira et al. (2012: 817), there is no single factor responsible for the early closure of a business, but the study they carried out in the city of São Paulo in Brazil, showed that the actions of the entrepreneur, particularly in terms of strategic decisions, is a major cause of business mortality. In addition to features related to the entrepreneur—market knowledge, sense of organization and planning—these authors also mention the environment and the firm profile as determinant factors of business survival or mortality.

In a similar study, Grapeggia et al. (2011) concluded that the early mortality of new and mature firms is connected to the entrepreneur's inability to adapt or overestimating his capacity for organizational management. The external environment of any organization is dynamic, and entrepreneurs have to constantly update their knowledge, both of the market and products/services, to be able to stand out from the competition. Possession of a good sense of organization and business planning are essential to be able to manage any unforeseen situations involving the profit strategy of an organization.

Smida and Khelil (2010: 80) argue that the main causes of new firm mortality are connected to the entrepreneur's capacity and ability to manage the business, namely the inability to follow the market's evolution, inefficient management of resources and lack of motivation.

The management quality of firms is also related to the age, education and experience of firm managers. Older entrepreneurs are related to more experience and more networking, and consequently these attributes have a positive impact on firm survival (Nafziger and Terrell 1996; Gallié et al. 2009). On the other hand, a

higher level of education could be associated with the entrepreneur's greater capacity to organize the firm's activity, explaining a higher probability of survival (Gallié et al. 2009).

Besides the profile of the entrepreneur, other factors influence the mortality of newly established firms. Déprez (2010), studying French business demography, determined that the underlying conditions of the project to create the firm are crucial for its survival, as is the choice of sector of activity, the initial investment and the legal status of the promoter. This study concludes that the greater the investment at an early stage of business, the greater the probability of firm survival. However, Del Monte and Scalera (2001) found an opposite relationship: the amount of capital invested has a negative impact on firms' lifespan. For these authors, a possible explanation could be that firms created under a public programme and with a higher start-up investment, as the result of subsidy, are more prone to financial crisis and therefore presumably less efficient.

At the sector level, according to Déprez (2010), activities such as trade, agribusiness and family support are more fragile. Firms with more than one owner also tend to show a greater life expectancy at birth than firms with a single proprietor (Déprez 2010). The choice of corporate structure—number of participants in the firm—can be related to financial motivations or to fill a gap, such as lack of market knowledge or experience (Grapeggia et al. 2011: 447).

Firm age is also identified by Carvalho et al. (2011) and Fukuda (2012) and Holmes et al. (2010) as a variable that can influence business mortality. Carvalho et al. (2011: 91) indicate that the mortality rate decreases with firm age, but according to Fukuda (2012) and Holmes et al. (2010), this relationship is not linear, being influenced by the surrounding context and macroeconomic variables.

The relationship between firms' age and their survival must also be seen in connection with the market's evolution and firms' attributes. In fact, the probability of firm survival differs significantly throughout the organization's various evolutionary stages (Agarwal 1997: 581), and is also related to the life cycle of products/services. Firms that develop a profit-making activity should aim to maximize profit and sales. However, all products/services have a life cycle characterized by essentially four phases: (1) launch or placing on the market and (2) growth—during which sales increase—(3) maturity, when they achieve the maximum value—and (4) decline—which shows a falling trend. A firm that is concerned about its sustainability cannot solely base its business strategy on existing products/services at a given moment in time. It must continuously innovate, modernize and complement its supply (Durafour 2003: 78). Once again, for firms already established in the market, the entrepreneur's strategic decisions play a vital role in the survival of the business, because they will be responsible for the decision to invest or not, to start a new cycle and reverse this declining trend leading to its extinction.

Related to product/service life-cycle we have the evolution of market players. According to Agarwal (1997), there is a decline in survival rates with the increasing competitive intensity of markets. The first firms entering a market are more likely to survive. However, this does not mean that the probability of survival declines with age, but simply that market trends are likely to influence the entry of new

participants, which may increase competitive intensity and cast doubt on the survival of established undertakings (Agarwal 1997: 581–582).

The region's characteristics—size, evolution of employment and concentration of firms—can influence the survival of new firms (Falck 2007). The geographical proximity of firms with affinities can promote human interaction, labour mobility and the exchange of knowledge between entities, which can result in economies of scale that contribute to the growth of established firms (De Silva and McComb 2012: 691). However, greater density of the same industry in a very limited space decreases firms' survival rate, while a higher concentration at greater distances reduces mortality (De Silva and McComb 2012).

According to MEDDE[9] (2013), the dynamics of business creation is less active in French rural areas but recently created firms have a higher average life expectancy than in urban areas. Yu et al. (2009) had already studied this regional phenomenon in the USA and came to the same conclusion: firms' mortality rate in rural areas is lower than in urban areas. These authors identified as the main causes for this trend the higher costs associated with new firm entry in rural areas, due to the return on investment being slower, resulting in a greater capital effort at the beginning of the business, and therefore greater motivation to achieve the financial objectives.

3.2 Impact of a public subsidy

Cerqua and Pellegrini (2014), studying specifically the impact of public support, concluded that subsidies have a positive influence on employment, investment and turnover, and the growth rate of these indicators is considerably higher in subsidized firms. In fact, that public support can help businesses to overcome the difficulty of access to external financing (Colombo et al. 2013) and it is expected to increase the probability of firm survival (Duhautois et al. 2015; Gallié et al. 2009; Gennari and Lotti 2013; Mamede et al. 2013). However, some authors (Battistin et al. 2001; Alonso-Nuez and Galve-Górriz 2011) found opposite results and argued that the probability of firm survival does not depend on public subsidy.

Mamede et al. (2013) focus their study on Portuguese firms and find that, 3 years after receiving the subsidy, subsidized firms have a mortality rate of 4 % and non-subsidized ones of 15 %. This means that the impact of subsidy increases by 11 % the probability of firm survival, and the annual average mortality rate of subsidized firms is 1.3 %. However, a possible explanation for this result could be the so-called *honeymoon effect*. Access to public financial subsidy means firms must stay in the market for a period of time (e.g. 3–5 years). This obligation represents undoubtedly a clear incentive to keep the activity open, even if operating at suboptimal efficiency levels, in order to hold on to the subsidy (Gennari and Lotti 2013: 10).

Other authors, such as Del Monte and Scalera (2001), Gallié et al. (2009), Gennari and Lotti (2013), and Duhautois et al. (2015), with studies focused on Italy or France, extend the time horizon of analysis to nearly 10 years. The results (Table 4) show that the annual average mortality rate of subsidized start-ups is between 2.1 and 6.7 %, values higher than the findings of Mamede et al. (2013) for

[9] Ministère de l'Ecologie, du Développement Durable et de l'Énergie.

Table 4 Benchmarking of firm mortality/survival analysis supported by public programmes

Authors	Country	Focus	Period	Independent variables	Conclusions
Del Monte and Scalera (2001)	Italy	Start-up supported by Law 44 (Italian business support programme) located in southern Italian region	1988–1997	Amount of initial invested capital at start-up (size) Capital-labor ratio Amount of subsidy received (subsidy)	Total mortality rate in 1997 of supported firms: 32.6 % > Annual average: 3.3 % Positive and significant relationship between firm survival and explanatory variables: subsidy and capital-labor ratio. Negative impact of invested capital
Gallié et al. (2009)	France	Young innovative SME supported by French National Competition for Creation of New Technology-based Firms	1999–2007	Entrepreneur's age and education level Firm age and operating sector Public support environment (to be in an incubator, linked to public research organization and level of subsidy)	Supported firms have a higher survival rate than other firms Total mortality rate in 2007 of supported firms: 16.83 % > Annual average: 2.1 % Public support environment and entrepreneur profile have a positive impact on firm survival. Firms operating in manufacturing industry, scientific and technical services have a higher probability of survival
Gennari and Lotti (2013)	Italy	Start-up supported by incentive to female entrepreneurship	2002–2011	Not applicable. Authors determine the discrete-time survivor function using non parametrical technique	Subsidized firms show a higher survival rate for a period of up to 5 years after incorporation, after this period the rates are similar Total mortality rate in 2011 of subsidized firms: 67.3 % > Annual average: 6.7 % Total mortality rate in 2011 of non-subsidized firms: 67.9 % > Annual average: 6.8 %

Table 4 continued

Authors	Country	Focus	Period	Independent variables	Conclusions
Mamede et al. (2013)	Portugal	Subsidized firms under Portuguese POE/PRIME Programme (Incentive Programme for the Modernization of the Economy)	2000–2008	Firm size, age, sector and geographical location Level of skilled labor (intensive or not)	Subsidized firms have higher survival rate than non-subsidized firms Mortality rate of subsidized firms after 3 years (from receiving subsidy): 4 % > Annual average: 1.3 % Mortality rate of control group (in T + 3): 15 % > Annual average: 5 % The impact of subsidies on firms' survival is higher in micro-enterprises, young companies, low technological industry and non-intensive skilled labor enterprises
Duhautois et al. (2015)	France	Start-up funding by French ACCRE Programme (entrepreneurial assistance to unemployed)	1998–2006	Capital investment to start Means of financing the business (personal resources and/or bank loan)	Subsidized firms have higher survival rate than non-subsidized firms Accumulative mortality rate in 2006 of subsidized firm: 52.6 % > Annual average: 6.6 % Accumulative mortality rate in 2006 of non-subsidized firms: 62.4 % > Annual average: 7.8 % Public policy has a positive effect on firm survival whatever their sources of financing, and whatever their initial capital investment

Source: Authors' own elaboration based on Del Monte and Scalera (2001), Gallié et al. (2009), Gennari and Lotti (2013), Mamede et al. (2013) and Duhautois et al. (2015)

Portugal. So what could happen to Portuguese subsidized firms in the long term or simply over a period of 5 or 8 years? This is precisely the scope of the present paper.

Most studies on the lifespan of firms supported by public programmes are more focused on analysis of start-ups or newly created firms, excluding those already established (Del Monte and Scalera 2001; Gallié et al. 2009; Alonso-Nuez and Galve-Górriz 2011; Duhautois et al. 2015; Gennari and Lotti 2013).

This paper considers both newly created and established firms. Furthermore, whereas the main conclusions of cited readings converge essentially on determining whether the survival probability of subsidized firms is statistically higher than the control group (non-subsidized firms), this paper is focused on the analysis of success (survival) or failure (death) determinants of subsidized firms. In addition to these contributions to the state of the art, we also introduce in our probabilistic model a singular explanatory variable: the number of applications/investment projects funded per beneficiary under the same programme.

As demonstrated previously and in Table 4, firms' survival and mortality depends on several factors. However, due to limited data available for the sample, this study focuses on just some of the dimensions identified, namely strategic decisions taken by the entrepreneur or managers, firm profile and environmental characteristics. Figure 3 identifies the variables chosen to interpret each of these dimensions.

4 Public policy to support rural areas: the case of the LEADER Programme

Public policies to encourage investment, and more particularly oriented to rural areas, such as the LEADER Programme, are playing an important role as an instrument encouraging local economic development (Santos et al. 2015). Rural areas considered territories dominated by a high ageing index, low population concentration, fragile economic structure and weak economic growth are faced with several difficulties in accessing specialized services and external financing (Santos 2012: 70). The role of the state and of public policies are particularly important in these areas in order to mitigate these barriers and encourage the entry of new firms, or promote the survival of established ones. In fact, although firm mortality rate is

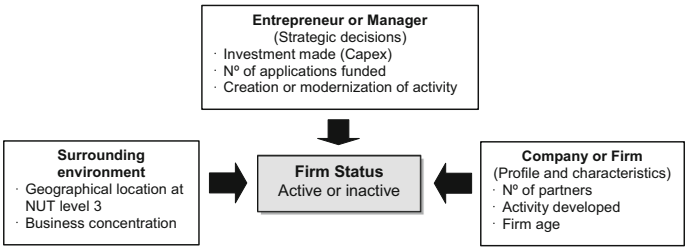


Fig. 3 Framework of the study, Source: Authors' own elaboration

considered lower in rural areas, most of these regions continue to show weak business dynamics which, in the long term, could cast a doubt on their sustainability.

One of the key features of the LEADER concept is that it focuses on area-based local development strategies. The local development strategy is drawn up taking into account "local strengths and weaknesses, threats and opportunities, endogenous potential and the identification of major bottlenecks for sustainable development" (European Commission 2006: 8), but also in a multi-sector approach.

The Alentejo is a predominantly rural region[10] with a strong agricultural tradition, where 8 Local Action Groups (LAG) are in charge of managing LEADER funds in their specific territorial areas (Fig. 4). The main focus of the different local development strategies is linked to the promotion of territories and their resources. Namely, boosting manufacturing industry based on local products (agribusiness and handicrafts), tourism activities (hotel, restaurant and entertainment), trade (supporting industry and tourism) and supporting service activities (Santos 2012: 23).The present study takes into consideration the LEADER Programme's objectives for the region by incorporating dummy variables for each of the cited activities.

Previous studies about the LEADER Programme in the Portuguese Alentejo region (Santos 2012; Santos et al. 2015) showed that this public policy led to a specialization of investment in two sectors identified as priorities and strategic for LAG, namely tourism activities and agribusiness. More than 95 % of investment made by the private sector in the first three phases of the LEADER Programme was based on material projects, with intangible expenditure being residual (Neto et al. 2012, 2014). R&D investment, which generates innovation and accelerates the rate of economic growth (Guloglu and Baris Tekin 2012), was practically non-existent.

5 Data and methodology

5.1 Data

The present study focuses on the 154 private for-profit firms[11] located in the rural Portuguese region of Alentejo (NUTS level 2) which received funding under the

[10] In the present study, and according to legislation, rural areas are considered as those where population density does not exceed 120 inhabitants/km^2, excluding all urban centers with more than 15,000 inhabitants. Secondly, the intervention area of each LAG should not exceed 100,000 inhabitants or be less than 10,000 inhabitants (http://www.qca.pt/iniciativas/leader.asp accessed on 27-11-2014).

[11] The private sector, which includes companies and single owner businesses, represents in Alentejo 20,102,827 Euros of investment and 356 investment projects (Autoridade de Gestão do PIC LEADER+ 2008). The present study focuses on companies representing 54 % of investment made and 55 % of applications funded, due to the non-existence of information about VAT and the number of single owner businesses supported by LEADER+ Program on the database provided by the LEADER+ Programme Management Authority in Portugal. Furthermore, with only the name of the beneficiary it is not possible to find the VAT number of single owner businesses in the firm database, because this is only available for firms with more than one owner. Indeed, without this information it is not possible to check the active/inactive status of the beneficiary or to collect additional information about it.

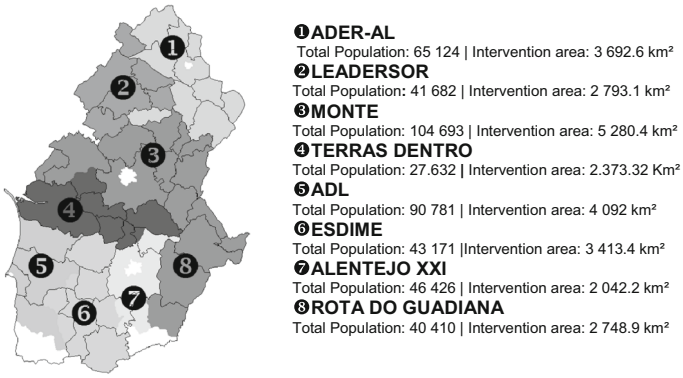


Fig. 4 Rural Area of Alentejo divided by LAG intervention areas, Source: Authors' own elaboration based on Santos (2012: 24) and http://www.proder.pt, accessed on 13.06.2014

LEADER+ Programme between 2002 and 2008. The study examined the survival or mortality status of these firms on 31st December 2013, the year following the programme obligations of all firms which were still active.

The dataset was formed with data from different sources. A list and description of investment projects implemented in the Alentejo region was provided by the Management Authority of the LEADER+ Programme in Portugal. These data were crossed with other information obtained from the Portuguese Ministry of Finance,[12] Portuguese Ministry of Justice[13] and other public databases,[14] in order to inquire if firm i was still active or not[15] and to obtain its NACE,[16] and date and county of establishment.

The firm status—dependent variable—is described by the binary variable y_i, defined as:

$$y_i = 1 \text{ if firm is still active,}$$
$$y_i = 0 \text{ if firm is not active or inactive.}$$

The independent variables belong to the groups indicated in Fig. 3: entrepreneur's and manager's strategic decisions, the firm profile and characteristics, and its regional economic environment. Table 5 identifies and describes each of these variables.

[12] Ministério das Finanças website—http://www.portaldasfinancas.gov.pt.

[13] Ministério da Justiça website—https://publicacoes.mj.pt.

[14] Portal das empresas: http://www.portaldaempresa.pt; Base de dados de empresas: http://www.linkb2b.pt.

[15] The study considers that a firm is inactive or "dead" when its VAT—Value Added Tax—registration is not active in the Portuguese Tax System. We take this as a reference because according to Portuguese Law, cessation of VAT activity occurs when in two consecutive years a firm has no practices related to taxation or when the firm does not possess assets (CTOC 2009: 61). So it seems the firm no longer generates any value for society.

[16] Statistical Classification of Economic Activities in the European Community.

Table 5 Identification and description of independent variables

Group	Independent variables	Description	Hypotheses (expected impact on survival probability)
Strategic decisions of entrepreneur	*Investment*	Total investment (Capex) funded under the LEADER+ Programme by firm. Values expressed in thousands of euros, constant prices—base 2006	±
	Nr_applications	Number of applications funded per firm under the LEADER+ Programme, between 2002 and 2008	±
	Creation Modernization	Decision to set up a firm or upgrade an existing one. A dummy variable was created and coded: 1 = *creation* and 0 = modernization	±
Profile and characteristics of firm	*Nr_partners*	Number of partners in the firm. This variable is divided into two groups: single-member, sole proprietorship, and two or more partners/associates in other cases. A dummy variable was created and coded: 1 = if firm has 2 or + partners and 0 if firm has just 1 partner	+
	Agribusiness *Manufacturing* *Trade* *Tourism* *Service*	Activity supported essentially in five groups: *Agribusiness*, other *Manufacturing* activity, *Trade*, *Tourism* and support *Services* for companies. A dummy variable was created for each activity, *Service* being the omitted reference category	±
	LAge	Age of firm on 31st December 2013 or in the year it ceased activity. Variable expressed as a logarithm	+
Regional economic environment of firm	*Alto_Alentejo* *Alentejo_Central* *Alentejo_Litoral* *Baixo_Alentejo*	Geographical location of firm at NUTS level 3: *Alto_Alentejo* (Northern), *Alentejo_Central* (Center), *Alentejo_Litoral* (Coast) or *Baixo_Alentejo* (Southern). A dummy variable was created for each region, *Baixo_Alentejo* being the omitted reference category	±
	Business_Conc	Business concentration in the county where the firm operates. We consider the average values recorded between 2004 and 2012	+

The study considers that an application is destined to help a firm in the early stages of business (creation) when the difference between the date of starting activity and that of application approval was less than 1 year

Tourism activities = Hotels, restaurants, coffee shops, animation and entertainment

This study considers business concentration or density as the average number of companies per km^2 in a county. In Portugal, a county is an administrative and territorial division within the regional division of NUTS level 3

Information of business concentration was provided by Portuguese National Institute of Statistics—http://www.ine.pt accessed on 26-11-2014

Source: Authors' own elaboration

5.2 Methodology

The analysis is based on binary choice models, because y_i has only two possible outcomes (0 or 1). "These models essentially describe the probability that $y_i = 1$" (Verbeek 2008: 200), which in our study is the probability of firm i is still being active.

Binary choice models are in general expressed by some function $G(.)$. This Eq. (1) shows "that the probability of having $y_i = 1$ depends on the vector x_i containing individual characteristics" (Verbeek 2008: 201).

$$P\{y_i = 1|x_i\} = G(x_i, \beta) \tag{1}$$

In the present study, estimation of the function $G(.)$ is through the maximum likelihood method and the Loglog model (2).

$$G(x_i'\beta) = e^{-e^{-x_{i\beta}'}} \tag{2}$$

6 Results and discussion

6.1 Descriptive statistics

On 31st December 2013, 78.6 % of firms surveyed were still active (Table 6), equivalent to an inactivity or mortality rate of 21.40 %. Taking into account that the follow-up period of the study is 8 years (2006–2013), the annual average rate is 2.7 %. Indeed, this result is close to the one obtained by Del Monte and Scalera (2001) and Galilé et al. (2009) of 3.3 and 2.1 % respectively. Regarding the findings of Gennari and Lotti (2013) and Duhautois et al. (2015) (annual mortality rate of 6.7 and 6.6 % respectively), we can conclude that the performance of this sample is significantly higher.

On average, the investment per firm was around 71 thousand euros, the minimum being 3.24 thousand euros and the maximum 230.65 thousand euros (Table 6).

Each firm, on average, applied and received funding to support investment for 1.3 LEADER Programme applications. At least one firm had 6 applications approved and funded (Table 6) and 17.5 % of the sample had two or more applications approved and funded (Table 7). The average investment for firms submitting only one application was 61.85 thousand euros, while in other cases, the average amount invested per project was 50.9 thousand euros (Table 7).

About 34 % of funded firms were in the early stages of business, with the application to support the firm's inception or begin a business. For the remaining 66 % the investment project aimed to modernize or diversify activities (Tables 6, 8).

Concerning the promoter's legal status, 82.5 % of the sample are firms with two or more partners and the remainder have only one named person (Table 6).

Table 6 Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Status	154	0.7857	0.4127	0	1
Investment	154	70.987	54.063	3.24	230.65
Nr_Applications	154	1.279	0.771	1	6
Creation	154	0.338	0.474	0	1
Nr_Partners	154	0.825	0.381	0	1
Agribusiness	154	0.234	0.425	0	1
Manufacturing	154	0.039	0.194	0	1
Trade	154	0.123	0.330	0	1
Tourism	154	0.357	0.481	0	1
Service	154	0.247	0.433	0	1
Age	154	14.513	8.045	2	78
Al_Central	154	0.325	0.470	0	1
Al_Litoral	154	0.188	0.392	0	1
Alto_Al	154	0.240	0.429	0	1
Baixo_Al	154	0.247	0.433	0	1
Business_Conc	154	2.392	1.579	0.64	7.38

Source: Authors' own calculation

Table 7 Number of firms and investment per number of applications

No of applications per firm	Total companies		Average investment per application (thousands of euros)
	No	%	
No_application = 1	127	82.5	61.85Eur
No_application ≥ 2	27	17.5	50.89Eur
TOTAL	154	100	55.49Eur

Source: Authors' own calculation, based on Autoridade de Gestão do PIC Leader+ (2008), http://www.linkb2b.pt, https://www.portaldasfinancas.gov.pt, http://www.portaldaempresa.ptandhttp://publicacoes.mj.pt

Table 8 Active and inactive firms per business phase: creation or modernization

Business phases	Total companies		Active companies		Inactive companies	
	No.	%	No.	%	No.	%
Creation	52	33.8	37	71.2	15	28.8
Modernization	102	66.2	84	82.4	18	17.6
TOTAL	154	100	121	78.6	33	21.4

Source: Authors' own calculation, based on Autoridade de Gestão do PIC Leader+ (2008), http://www.linkb2b.pt, https://www.portaldasfinancas.gov.pt, http://www.portaldaempresa.pt and http://publicacoes.mj.pt

Table 9 Average age of active and inactive companies

Firm status	Total companies		Average age	Average investment per application (thousands of euros)
	No.	%		
Active Firms	121	78.6	15.6 years	63.97Eur
Inactive Firms	33	21.4	10.6 years	45.11Eur
TOTAL	154	100	14.5 years	55.49Eur

Source: Authors' own calculation, based on Autoridade de Gestão do PIC Leader+ (2008), http://www.linkb2b.pt, https://www.portaldasfinancas.gov.pt, http://www.portaldaempresa.pt and http://publicacoes.mj.pt

The average age of firms analyzed is 14.5 years, the youngest in the sample is 2 years old and the oldest 78 years (Table 6). The average age of firms ceasing activity is 10.6 years and the average age of active firms on 31st December 2013 is 15.6 years (Table 9).

The most prominent sectors of activity were tourism, business support services and agribusiness, accounting for 83.8 % of observations (Table 6).

Average business density in the geographical area under study is 2.4 firms per km^2, the minimum being 0.64 and the maximum 7.38 (Table 6). These values are significantly below the Portuguese national average, which for the period between 2004 and 2012, is 12.43 companies per km^2 ([17]).

The geographical distribution of the sample at NUTS level 2 was as follows: 32.5 % in *Alentejo_Central*, 18.8 % in *Alentejo_Litoral*, 24 % in *Alto_Alentejo* and 24.7 % in *Baixo_Alentejo*, as shown in Tables 5 and 9. The inactive or mortality rate is more expressive in *Alentejo_Central*, being over 33 %, while *Alto_Alentejo* and *Baixo_Alentejo* have the lowest values (Table 10).

6.2 Model estimation

$$\begin{aligned}\Pr(Status = 1|\ldots) = G[&\beta_0 + \beta_1 Investment + \beta_2 Nr\,Application + \beta_3 Creation \\ &+ \beta_4 Nr\,Partner + \beta_5 Agribusiness + \beta_6 Manufacturing + \beta_7 Trade \\ &+ \beta_8 Tourism + \beta_9 Log\,Age + \beta_{10} Alentejo\,Central \\ &+ \beta_{11} Alentejo\,Litoral + \beta_{12} Alto\,Alentejo + \beta_{13} Business\,Conc]\end{aligned} \tag{3}$$

The probability model (3) was estimated by a Loglog model (2), and the results are presented in Table 11. Interpretation of these results shows that all independent variables, except *Nr_partners*, are statistically significant at the 10 % level. The independent variables of *Creation*, *Lage* and *Business_Conc* have a significant positive coefficient, while the remaining variables are significantly negative.

[17] Average value registered in Portugal between 2004 and 2012, based on the information provided by Instituto Nacional de Estatística de Portugal, Sistema de Contas Integradas das Empresas (http://www.ine.pt accessed on 13-06-2014).

Table 10 Active and Inactive firms at NUTS level 3

NUTS level 3	Active companies		Inactive companies		Total	
	No.	%	No.	%	No.	%
Alentejo_Central (Center)	39	32.2	11	33.3	50	32.5
Alto_Alentejo (Northern)	30	24.8	7	21.2	37	24.0
Alentejo_Litoral (Coast)	21	17.4	8	24.2	29	18.8
Baixo_Alentejo(Southern)	31	25.6	7	21.2	38	24.7
Total	121	78.6	33	21.4	154	100

Source: Authors' own calculation, based on Autoridade de Gestão do PIC Leader+ (2008), http://www.linkb2b.pt, https://www.portaldasfinancas.gov.pt, http://www.portaldaempresa.pt and http://publicacoes.mj.pt

Table 11 Results of LogLog model estimation

Variables		Coefficient	Marginal effect
Entrepreneur strategic decision	Investment	0.00903* (0.00511)	0.0012* (0.00067)
	Nr_Applications	−0.614** (0.252)	−0.082** (0.032)
	Creation	1.394** (0.571)	0.185*** (0.071)
Firm characteristics	Nr_partners	0.591 (0.534)	0.079 (0.070)
	Agribusiness	−1.785** (0.737)	−0.237** (0.094)
	Manufacturing	−2.510*** (0.856)	−0.334*** (0.106)
	Trade	−1.605* (0.845)	−0.214* (0.111)
	Tourism	−1.755*** (0.652)	−0.233*** (0.083)
	Lage	3.344*** (0.789)	0.445*** (0.083)
Surrounding environment	Al_Central	−1.111* (0.604)	−0.148* (0.078)
	Al_litoral	−1.174* (0.694)	−0.156* (0.091)
	Alto_al	−1.542** (0.672)	−0.205** (0.085)
	Business_Conc	0.385** (0.183)	0.051** (0.024)
	Constant	−5.903*** (1.852)	–
	Observations	154	
	Log likelihood function	−52.9933	
	Reset Test (Wald)	0.8607	
	Reset Test (LR)	0.8614	
	% Correctly Classified	87.01 %	

Standard errors in parentheses

The results for Reset Test (Wald and LR) are the p-values

*** Coefficient significant at 1 %, ** coefficient significant at 5 % and * coefficient significant at 10 %

The functional form of the model was checked with the following tests: (1) Wald version of Reset test and (2) LR—Likelihood-Ration version of Reset test. A robustness check was also made, comparing the results with other binary choice models such as Logit, Probit and Cloglog (see Appendix 1). Compared to the other

models, the Loglog model is the most appropriate for explaining the $\Pr(Y = 1|X)$, because it has the highest value of log-likelihood function and simultaneously the highest percentage of accuracy.

In Table 11, an extra column was added to show the marginal effects of the Loglog model and indicates for each unit variation of x_j where the variation in $E(Y|X) = \Pr(Y = 1|X) = \beta_j g(x_i'\beta)$. This is because in binary choice models the coefficients are not a direct interpretation, only giving information about the direction of the relationship: negative or positive. "One way to interpret the parameters (…) is to consider the marginal effects of changes in the explanatory variables. (…) The marginal effect is defined as the partial derivative of the probability that y_i equals one" (Verbeek 2008: 201).

6.3 Interpretation of results

The coefficients of explanatory variables related to the activities carried on by firms in *Agribusiness*, *Manufacturing*, *Trade* and *Tourism* shows they all have a negative sign, which means that compared to the omitted reference category of *Service*, there is a lower probability of survival for firms in these activities. In other words, the probability of survival in firms with certain characteristics and dedicated to business support services will be higher than in a situation where they have any other activity—*Agribusiness*, *Manufacturing*, *Trade* and *Tourism*. For example, the probability of firm survival decreases 33.4 % when the activity carried out changes from *Service* to *Manufacturing*, all other variables remaining constant (Table 11). A possible explanation may be that support services for firms are less concentrated in the Alentejo region,[18] and due to reduced competition, have a higher probability of survival, as De Silva and McComb (2012) mentioned. Moreover, Gallié et al. (2009), also found that firms operating in professional, scientific and technical services are more likely to survive.

According to the findings of Carvalho et al. (2011), Fukuda (2012) and Holmes et al. (2010), the explanatory variable of *Age*, expressed as a logarithm in the model, has a positive impact on the probability of 'Status' being equal to one. In this study, this means that the survival probability of a firm located in the Alentejo region that has received funding under the LEADER+ Programme increases 4.45 % with a 10 % increase in its age (Table 11). This may indicate that a firm's experience, antiquity and reputation in the market are likely to provide a competitive advantage.

There is a greater probability of subsidized firms surviving if the project is destined to *Creation* of a new entity compared to the omitted reference category—*Modernization* of a firm already in the market. More precisely, survival probability increases by 18.5 % if the investment project is concerned with business creation, as opposed to a situation in which the application was to modernize the business

[18] According to Instituto Nacional de Estatística de Portugal, between 2004 and 2012, market concentration of business support services—information and communication activities; consulting, scientific and similar technical activities; administrative activities and other support services–in the Alentejo region (NUTS 2 without *Lezíria do Tejo*) was on average 16 %, while the national average was 24 % (http://www.ine.pt accessed on 13-06-2014).

activity of an incumbent firm, all other variables remaining constant (Table 11). Mamede et al. (2013: 23) also concluded in their study that the impact of public incentives on firm survival is more evident in new companies than in those already established. Accordingly, it is possible to assume that the LEADER programme, when facilitating access to financing for a newly created firm, leveraged the survival of these firms.

The amount of investment also has a positive impact on the probability of firm survival. Nevertheless, the impact is not very relevant—the probability of firm survival increases 0.1 % Table 11) when investment increases by 1000 Euros, all other variables remaining constant—and only significant at 10 % level. This finding converges on the same conclusion as Déprez (2010) but is contrary to that of Del Monte and Scalera (2001). According to Del Monte and Scalera (2001: 17), the negative relationship between the amount of investment and survival could presumably be due to a bias induced by subsidies in favour of larger (higher investment) and riskier firms. So under this assumption, it is possible to deduce that firms funded by the LEADER programme in the Alentejo region are less risky. On the other hand, if considering that companies with greater investment need a greater economic return in order to survive, it is also possible to presume that they must have strategic planning.

Another variable linked to the entrepreneur's strategic decision is the number of applications submitted to the LEADER Programme. The negative relationship between the *Nr_applic* variable and the $\Pr(Y = 1|X)$ shows that an increase of one unit in the number of applications for funding by a firm decreases its survival probability by 8.2 % (Table 11), all other variables remaining constant. Taking into account that every application should be supported by a business plan in order to attest the long term economic and financial viability of the project, the submission of several applications by the same firm, based on different business plans, could reveal little strategic planning beyond the short term. Articulating this conclusion with the existing relationship between *Status* and *Investment*, it is possible to conclude that firms investing more but less frequently (better medium and long term planning) are more likely to survive.

The regional location of firms in *Alto_Alentejo*, *Alentejo_Central* and *Alentejo_Litoral* reduces the probability of firm survival as against location in NUTS 3 *Baixo_Alentejo*. In other words, a firm with certain characteristics and located in *Baixo_Alentejo* is more likely to have active operations on 31st December 2013 compared to one located in any of the other regions—*Alto_Alentejo*, *Alentejo_Central* and *Alentejo_Litoral*. For example, if we compare a firm located in *Alentejo_Litoral* with another in *Baixo_Alentejo* and all other variables remaining constant, location in the former decreases the probability of survival by 15.6 % compared to the latter. According to Instituto Nacional de Estatística de Portugal (INE 2014), the *Baixo_Alentejo* was the NUTS 3 in all Alentejo which registered on average in recent years the lowest mortality rate[19] (Table 2) and one of the highest survival rates[20] (Table 3).

[19] The average mortality rate in the *Baixo Alentejo* was 12.07 % between 2004 and 2011.

[20] The average survival rate of enterprises born two years before was 55.22 % between 2006 and 2012.

The variable of business concentration influences the probability of firms' survival positively, and interpretation of its marginal effect (Table 11) indicates that an increase of one unit in business concentration increases the probability of survival by 5.1 %, all other variables remaining constant. Although De Silva and McComb (2012) showed that a very high business concentration in the same sector may increase the mortality rate, in the sample of this study, the average business density is 2.39 (Table 5), a value below the Portuguese national average of 12.43.[21] Therefore, it is possible to assume that, in this case, business density influences the probability of survival positively, because the firms studied are in rural areas, poor in terms of infrastructure supporting economic activity. We can therefore deduce that existing firms in this region complement each other, intervening upstream and downstream in the value chain, and supporting the sustainability of firms installed in the Alentejo region.

Finally, *Nr_Partners* is not a significant variable, meaning that in the model, there is no causal relationship between survival probability and the dummy variable of number of partners. Despite previous studies of the LEADER Programme in Portugal (Serrano et al. 2014, 2015) showing a significant negative correlation between mortality rate and the number of partners, when this variable is placed in a regression a causal relationship is not found. A possible explanation of this result could be related to the specification of the *Nr_Partners* variable. Indeed, due to data restrictions, we only know if firms have 1 or more than 1 partner.

7 Conclusions

The conditioning factors of business survival and mortality are divided into internal factors, which the entrepreneur has control of, and external factors, characteristics of the firm's environment that the entrepreneur does not control but is forced to react to (Grapeggia et al. 2011: 448). In this sense, the profile of the entrepreneur, his ability to plan a business start-up—knowledge of markets, competitors and customers—and the decisions taken—corporate structure, investment plan, activity developed, firm location, etc.—are critical for determining a firm's success or failure.

The study also revealed that the entrepreneur's strategic decisions, the firm's profile and its regional economic environment are relevant factors for determining the survival or mortality of firms located in the Portuguese Alentejo region funded under the LEADER+ Programme. Geographical location, namely in southern inland Alentejo (Baixo Alentejo—NUTS 3), and the activity carried out, particularly business support services, have a positive effect on the probability of firm survival. Increases in the amount of investment, firm age and business density increase the probability of firms remaining active, whereas, an increase in the

[21] Average value registered in Portugal between 2004 and 2012, based on the information provided by Statistics Portugal, Integrated Business Accounts System and the General Directorate of Territory (http://www.ine.pt accessed on 13-06-2014).

number of applications funded by the same beneficiary has a negative impact on firm survival.

The conclusions of this study are coherent with the literature review, but also bring new contributions, namely in the impact of the entrepreneur's strategic decision on firm survival and the efficiency of LAG management in the Alentejo region:

1. The model reveals that firms with a higher investment and a lower number of funded applications have a higher probability of survival. These results suggest that firms investing more but less frequently (better medium and long term planning) are more likely to survive. So it seems that for subsidized firms the amount of investment is as important as its frequency.
2. Despite the major economic crisis felt in the country in recent years and the relatively poorer situation of the Alentejo, the mortality rate of our sample is not higher than the values of other studies (Del Monte and Scalera 2001; Gennari and Lotti 2013; Duhautois et al. 2015). In fact, our result is very close to the minimum values (Table 4). This finding leads us to deduce that LAGs were effective in the selection of projects funded.

These findings can be useful for policy-makers and entrepreneurs in order to improve the long-term results of public policy impacts. Through funding strategic investment, the LEADER Programme promoted entrepreneurship in the Portuguese rural areas of Alentejo, but the sustainability of the results achieved depends on the effectiveness of decisions taken in the short term by the different players: LAG and entrepreneurs. In fact, as mentioned by Holmes et al. (2010: 194), there is a possibility that when public policy intends to encourage the rapid expansion of microenterprises, as a mechanism for economic growth and development, policy may inadvertently increase the probability of their failure.

Despite the conclusions highlighted, the study has some limitations. The first concerns data restrictions, namely about entrepreneur profile (e.g. age, gender and education). Indeed, this information was not available in the firms' database consulted and in the data provide by LAG. Secondly, the study only focuses on one geographical region of Portugal. Despite the importance of the present qualitative research in deepening knowledge and improving understanding of the regional economic situation, it could be interesting in future research to extend the sample to all Portuguese regions.

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Appendix: Robustness check

See Table 12.

Table 12 Results of Logit, Probit, Cloglog and LogLog model estimation

Variables	Logit	Probit	Cloglog	Loglog
Investment	0.0123** (0.00620)	0.00705** (0.00347)	0.00661** (0.00329)	0.00903* (0.00511)
Nr_Applications	−0.773** (0.335)	−0.421** (0.193)	−0.368* (0.195)	−0.614** (0.252)
Creation	1.655** (0.739)	0.977** (0.418)	0.980** (0.424)	1.394** (0.571)
Nr_partners	0.879 (0.671)	0.451 (0.380)	0.417 (0.372)	0.591 (0.534)
Agribusiness	−2.405*** (0.928)	−1.419*** (0.521)	−1.472*** (0.511)	−1.785** (0.737)
Manufacturing	−3.361*** (1.204)	−1.959*** (0.687)	−2.014*** (0.751)	−2.510*** (0.856)
Trade	−2.159** (0.991)	−1.209** (0.551)	−1.146** (0.509)	−1.605* (0.845)
Tourism	−2.330*** (0.802)	−1.391*** (0.453)	−1.430*** (0.445)	−1.755*** (0.652)
Lage	3.898*** (0.944)	2.231*** (0.523)	2.064*** (0.526)	3.344*** (0.789)
Al_Central	−1.428* (0.735)	−0.884** (0.419)	−0.971** (0.414)	−1.111* (0.604)
Al_litoral	−1.655* (0.854)	−0.941* (0.481)	−0.981** (0.464)	−1.174* (0.694)
Alto_al	−1.919** (0.836)	−1.087** (0.472)	−1.022** (0.449)	−1.542** (0.672)
Business_Conc	0.503** (0.226)	0.252** (0.116)	0.199** (0.0996)	0.385** (0.183)
Constant	−7.270*** (2.255)	−4.033*** (1.246)	−3.912*** (1.230)	−5.903*** (1.852)
Observations	154	154	154	154
Log likelihood function	−53.0823	−53.0925	−53.5077	−52.9933
Reset Test (Wald)	0.9203	0.7379	0.0515	0.8607
Reset Test (LR)	0.9203	0.7381	0.1309	0.8614
% Correctly Classified	85.06 %	85.71 %	81,82 %	87,01 %

Standard errors in parentheses

The results for Reset Test (Wald and LR) are the p-values

*** Coefficient significant at 1 %, ** coefficient significant at 5 % and * coefficient significant at 10 %

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