LISBOA SCHOOL OF ECONOMICS & MANAGEMENT

SINCE 1911

MASTER IN FINANCE

MASTER'S FINAL WORK

DISSERTATION

THE CHANGING FACE OF ENTREPRENEURS IN PORTUGAL

INÊS FREITAS GOMES

OCTOBER – 2014

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SUPERVISION:

PROFESSORA ANA ISABEL ORTEGA VENÂNCIO

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ABSTRACT

This study evaluates the changes on entrepreneurial activity in Portugal. More specifically, it analyzes which start-ups and founder's characteristics changed between the last three decades (1980, 1990 and 2000). To enlight this research, we employ Portuguese data, from a matched employer- employee database.

Portuguese entrepreneurs are predominantly middle-aged male with lower education levels. In terms of gender, there was not changes overtime. Female entrepreneurs are decreasing since 1986, being yet a minority in our sample. The number of young entrepreneurs is increasing since 1986 but in a contracting decreasing rate after 2000. Lastly, we assist to a decrease on the number of highly educated entrepreneurs in Portugal. The number of start-ups' founded by very low educated individuals is been increasing since 1986. During the period of analysis, medium education was the education level that suffered more changes. Until 2000, the number of medium educated entrepreneurs increased and then decreased in the last period..

We also find that start-ups are becoming smaller. In terms of start-up survival, the probability has increased specially in the last period.

***JEL* classification: L26; M13**

Keywords: Entrepreneurs, Founders, Start-Ups, Characteristics, Gender, Age, Experience Venture size, Firm survival

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LIST OF ABBREVIATIONS AND ACRONYMS

CAE - *Classificação Portuguesa de Actividades Económicas*

CEEDR - *Centre for Enterprise and Economic Development Research*

FINICIA - *Programa do INOFIN para favorecer o processo de criação de empresas*

IAPMEI – *Instituto de Apoio às Pequenas e Médias Empresas e à Inovação, I.P.*

IEFP - *Instituto do Emprego e Formação Profissional*

INE- *Instituto Nacional de Estatística*

INOFIN - *Programa-Quadro de Inovação Financeira para o Mercado de PME do IAPMEI*

MEI - *Ministério da Economia e da Inovação*

NUTS II - Second level of Statistic Territorial Units

PEDIP - *Programa Específico para o Desenvolvimento da Indústria Portuguesa*

POCTI - *Programa Operacional Ciência, Tecnologia, Inovação*

POE – *Programa Operacional da Economia*

POSI - *Programa Operacional Sociedade de Informação*

PRAXIS – *Programa operacional no âmbito do QCA II*

PRIME - *Programa de Incentivos à Modernização da Economia*

QCA I – *Primeiro Quadro Comunitário de Apoio*

QCA II – *Segundo Quadro Comunitário de Apoio*

QCA III - *Terceiro Quadro Comunitário de Apoio*

QP – *Quadros de Pessoal*

QREN – *Quadro de Referência Estratégico Nacional*

1. INTRODUCTION

Entrepreneurship is considered a process of innovation responsible for introducing new products and production methods and different organizational schemes (Schumpeter, 1934; Wennekers and Thurik, 1999; Carree and Thurik, 2003; Tamizharasi and Panchanatham, 2010). This activity plays an important role in the economy not only by stimulating its productivity, growth and innovation (Audretsch, 2007; Praag and Versloot, 2008) but also by fostering job creation (Ashcroft and Love, 1996; Parker and Johnson, 1996; Fölster, 2000).

Previous literature gives different definitions for entrepreneurs: arbitrageur/speculator[1]; innovator (Schumpeter,1934); allocator of resources and a leader. [2] Generally, entrepreneurs are persons who organize, own and manage a business (Robert and Brockhaus, 1980; Caliendo, et al., 2011) and assume risk and the possibility of failure (Drucker, 1970; Hisrich, 1990; Robert and Brockaus, 1980). Despite being creative persons (Swedberg, 2000), entrepreneurs need to have a wide range of skills in order to create a successful business (Lazear,2005).[3] To support the financing needs of their businesses, they use their own savings or funds from friends and family (Blanchflower and Oswald, 1998; Cassar, 2004; Damodaran, 2009). Start-up firms tend to be small with low revenues and higher operating losses in the first years (Damodaran, 2009). Consequently, entrepreneurs have lower initial earnings and slower earnings growth relatively to a salaried worker (Hamilton, 2000).

[1] According to Richard Cantillon (1755), the entrepreneur is an arbitrageur or speculator that bears all the risk and uncertainty involved in this process.
[2] For more detailed information about the identities of entrepreneurs, see Parker (2009) and Hébert and Link (2006).
[3]Lazear (2005) adds that a start-up founder beside their many skills has to assemble a group of people with various expertise and gain access to capital to finance their investments.

Several studies argue that the main determinants when choosing to become an entrepreneur are age, gender, education and experience (Blau, 1987; Evans and Jovanovic, 1989; Wit, 1993; Bates, 1995; Taylor, 1996; Blanchflower and Oswald, 1998; Djankov et al. 2005; Georgellis and Wall, 2005; Ardagna and Lusardi 2008; Iyer and Schoar 2010). In the last years, several social, economic and policy changes have occurred in Portugal that affected the life conditions and risk profile of population, and, consequently, the propensity of creating new start-ups. Therefore, in this study, we will evaluate the changes in the entrepreneur's determinants in the last three decades, 1980, 1990 and 2000.

While there has been some research on understanding the main determinants of entrepreneurial activity, a study that analyses possible changes on the entrepreneur's demographic and educational characteristics in Portugal has been missing and therefore it will be the focus of this study. Thus, our research questions are: Did demographic and educational characteristics change overtime for Portuguese entrepreneurs? Are the entrepreneurs becoming younger and more highly educated? Did the initial characteristics of the start-ups changed overtime?

To answer our research questions, we use a unique dataset that includes information about all employees and firms in the Portuguese private sector between 1986 and 2009. For each firm, we gather detailed information on the characteristics of the founder demographic and educational characteristics and start-ups initial conditions such as size, survival and number of founders.

Our results suggest that Portuguese entrepreneurs are predominantly middle-aged male with lower education levels. In terms of gender, there was not changes overtime. Female

entrepreneurs are decreasing since 1986, being yet a minority in our sample. The number of young entrepreneurs is increasing since 1986 but in a contracting decreasing rate after 2000. Lastly, we assist to a decrease on the number of highly educated entrepreneurs in Portugal. The number of start-ups' founded by very low educated individuals is been increasing since 1986. During the period of analysis, medium education was the education level that suffered more changes. Until 2000, the number of medium educated entrepreneurs increased and then decreased in the last period. We also find that start-ups are becoming smaller. In terms of start-up survival, the probability has increased specially in the last period.

This study has implications for policy makers and practitioners. A more thorough understanding of the main determinants of entrepreneurial activity can help policy makers to define better funding programs and policies for this matter. In this way, they will be able to understand which strategies should be applied to improve the entrepreneurial activity and determine which are available to cope with the different types of entrepreneurs namely as female or male, younger or older, more educated or not.

The remaining sections of this paper are structured as follows. The following section reviews the literature about the determinants of entrepreneurial activity and presents the main hypothesis of this study. Then, section III makes and overview of the Portuguese macroeconomic and financial context in the last two decades. Section IV, describes the dataset and how it was constructed. The empirical methodology and results are described in section V. Finally, section VI concludes.

2. LITERATURE BACKGROUNG AND HYPOTHESIS

Entrepreneurship is a multidimensional concept, whose definition depends on the perspective studied. Entrepreneurial activities have been characterized in terms of three perspectives (Djankov et al., 2005): institutional, sociological and psychological. The institutional perspective emphasizes the role of economic, political and legal institutions play in the dynamics of entrepreneurial activity. By the other side, sociologists evaluate entrepreneurship in terms of social variables mainly cultural values (Cochran, 1971) and social networks (Young, 1971). Lastly, the psychologists give relevance to the individual characteristics of entrepreneurs. The main psychological characteristics are locus of control and need for achievement (Misra and Kumar, 2000; Simpeh, 2011). The first one relies on the belief about whether individual performance/outcome is the result of our actions (internal control orientation) or not. Need for achievement is the trait that entrepreneurs carry by having the need to succeed and get results on action outcomes.

In this section, we start by reviewing studies, more integrated in the psychological perspective, related to personal and external factors influencing entrepreneurship, namely pecuniary and non-pecuniary incentives, demographic characteristics and human capital.

2.1. Entrepreneurial Incentives: pecuniary and non-pecuniary

Using Parker's framework of the determinants of entrepreneurship (Parker, 2009), we review several effects on the propensity of individuals to become entrepreneur. In one hand, individuals can enter into entrepreneurial activity due to a profitable and innovative new business opportunity that they discover (Parker, 2009) or because they

are looking for better social life conditions and a wealth source guaranteed that were compromised by adverse circumstances– unemployment (Baptista, et al., 2008)[4]. Although, the motivations for the individuals that get into a business are not merely driven by pecuniary rewards, non-pecuniary also play a key role (Amit, et al., 2000).

In addition to the financial benefits of venture creation, the desire to be independent, autonomous or being one's own boss is also an incentive for entrepreneurial activity (Schumpeter, 1934; Dennis, 1996; Amit, et al., 2000; Hamilton, 2000; Frey and Benz, 2003; Hurst and Pugsley, 2011).

Entrepreneurs face several problems such as lack of financial support and financial constraints[5], thus, having enough capital to support the investment in new businesses increases the probability of becoming an entrepreneur. The receipt of inheritance and gifts is also relevant for the choice of becoming an entrepreneur (Blanchflower and Oswald, 1998).

2.2 Demographic Traits

In this section, we analyze the main demographic traits: age and gender.

The relationship between age and self-employment is not consensual in the previous literature. Some studies claim that self-employment is more likely to be pursued by older individuals (Bluedorn and Martin, 2008; Dawson, et al., 2009). Others argue that self-employment is higher among younger individuals (House, et al., 1993; Wit, 1993). Taken together, entrepreneurs' age has an inverted U-shaped relationship with the

[4]This evidence is confirmed by the push and pull theory: an environment under economic contraction conditions where unemployment is high, entrepreneurs are more likely to start a new business. For a detailed explanation, see (Storey, 1992).

[5] See, for example, Blanchflower and Oswald (1998); Holtz-Eakin, Joulfaian, and Rosen (1994); Evans and Jovanovic (1989); Evans and Leighton (1989); Carree and Verheul (2012).

likelihood of firm creation. Middle-aged individuals[6] are more likely to be involved in entrepreneurial activities (Vanden Heuvel and Wooden, 1997; Bradley and Roberts, 2004; Georgellis and Wall, 2005; Lévesque and Minniti, 2006; Henley, 2007; Dawson, et al., 2009). Globally, the majority of entrepreneurs start a venture when there are between 25 and 40 years old (Kaufmann, 1999). This evidence changes when we consider women entrepreneurs and different regions besides the USA and Europe. Merwe and Lebakeng (2012), in their study, find that Asian female entrepreneurs are between 40 and 49 years whereas Australian women entrepreneurs start their own business under the age of 30 (Dann and Bennet, 2000). Nonetheless, entrepreneurship may be less atractive for older people because they are less capable of working long hours and are more risk averse[7] (Lévesque, et al., 2002; Lévesque and Minniti, 2006). In contrast, Parker (2009) suggest that is more expectable to find older entrepreneurs because they have human and physical capital requirements that are often unavailble for young individuals. In addition, older entrepreneurs have a better social and business network . Thus, it is expected that we find older Portuguese entrepreneurs giving the current ageing of the Portuguese population (see Figure 1) and to the higher life expectancy. It is notable that in the past years, and due to the crisis that has been affecting Portuguese economy, is becoming more difficult to get capital. Consequently, we expect than older entrepreneurs have other ways to acquire capital than younger individuals (Blanchflower and Oswald, 1998). This fact is also due to the fact that young people are increasingly coming later in the labor market because they are investing more in their higher education. According to Alves, et al. (2010), Portugal is

[6] According to Lévesque and Minniti (2006), individuals who become entrepreneurs are between 35 and 44 years old.

[7] This result confirms the conclusions as stated by Holtz-Eakin, et al. (1994): age and risk attitudes are strongly correlated.

assisting to an increase of the youth work share with more education levels and a decrease of the percentage of low educated young individuals. Thus, we expect that there is a higher investment in higher education by Portuguese individuals, in recent years. Furthermore, the youth unemployment (International Labour Organization, 2013) that Portugal has been suffering in this period is an "open door" for youth entrepreneurship but due to the reasons mentioned before, Portuguese individuals have been pushed to emigrate.

Hypothesis 1: *The proportion of older entrepreneurs is increasing overtime, in Portugal.*

Relatively to gender, men still have prevalence on entrepreneurial activities and women are less likely to be involved in entrepreneurial activities, showing a negative relationship with self-employment[8]. According to Dhaliwal (2007), one third of businesses in UK were founded by women. Compared with others regions, Asian female entrepreneurs are a small proportion on business start-ups founders (Jones et al., 1992, Metcalf et al., 1997). Despite of women are becoming more involved in entrepreneurial activities, they continue to face difficulties in setting up and running businesses. Women face different constraints which in the end affect their participation and performance in entrepreneurship (CEEDR, 2000; Parker, 2009). Besides financial discrimination and the lack of support after and during the business, women do not have required psychological traits, such as confidence, skills and network, necessary to run a start-up (Carter and Jones-Evans, 2006). On the last years, there have been more policies to improve female entrepreneurship.Although,the number of female

[8] As shown by Evans and Leighton (1989); Devine (1994); Georgellis and Wall (2005); Dhaliwal (2007); Klyver (2007); Minniti and Naudé (2010).

entrepreneursis still decreasing explained by their preference to give more attention to lifestyle and family, dedicating a great part of their time to them (Dawson, et al., 2009). In contrast, business has been the main focus for most male entrepreneurs in their whole life which gives them more entrepreneurial experience prior to start a business. Despite of these facts, some Portuguese social and economic changes have been affecting the decision to become entrepreneur. Figure 2 shows the evolution of female Portuguese population over the last years. From 1991 to 2009, women are becoming a higher proportion of Portuguese individuals which increases the number of available woman to start a business. In terms of family commitment, we can see in Figure 3 that Portugal is assisting to a decrease of number of newborns overtime which lead us to conclude that women are facing less obligations with children and family and more available to reconcile work and leisure. Aditionally, the increase of female unemployment rate in these last decades also affected the decision of becoming entrepreneur because unemployed individuals have a lower opportunity cost on their time than a salaried worker (see Figure 4). Women facing unemployment have fewer chances than becoming entrepreneurs if they want to get a better wealth and lifestyle. Thus, we can conclude that Portuguese women are having more motivated to become entrepreneurs.

Hypothesis 2: *Female entrepreneurs are likely to be more involved in entrepreneurial activities overtime.*

2.3 Human Capital

Human capital refers to crucial human aspects, namely as knowledge, skills and attitudes, for labor performance (Becker, 1962). According to human capital theory, this can be divided in two types: specific and general (Becker, 1962; Becker, 1975; Acemoglu, 1999). On one side, specific human capital can be used on a specific job or

firm, resulting in less job opportunities in the labor market. On the other side, general human capital is useful for many jobs and industries. The accumulation of general human capital allows the worker to get employed in different starting levels or switching over to a better job. To conclude this section, two main variables of human capital theory are reviewed: education and experience.

Education is the main factor for driving firm performance and competitiveness (Aldcroft, 1992; Prais, 1995), by making workers more productive (Schultz, 1961; Becker, 1962; Lynch and Black, 1995). Education provides individuals with better analytical abilities and knowledge about entrepreneurial opportunities recognition and exploitation (Casson, 1995; Davidsson and Honig, 2003) and become more successful in running a venture since they have better managerial and communication skills (Henley, 2009; Parker, 2009). Although, Jovanovic (1982) argued that entrepreneurial abilities are acquired over time. For some authors, entrepreneurial skills do not depend on education and formal knowledge but on learning by doing and learning effects from past entrepreneurial experience (Blau, 1985; Wit, 1993; Minniti and Bygrave, 2001; Cope, 2005). Findings about education are mixed (House, et al., 1993; Taylor, 1996). Parker (2009) argues that there is a positive relationship between education and entrepreneurship in developed countries. Pietrobelli, et al. (2004) find that there is a negative relationship between entrepreneurship and secondary education and positive only with primary education, privileging entrepreneurial skills[9]. This association can also depend on the type of business: formal businesses are related to higher degrees of education and informal businesses to secondary education (Lederman, et al., 2014).

[9] For Le (1999) and Casson (2003), the skills that make entrepreneurs successful are not the same as those enhanced in formal education. Also, education overvalues paid employment relative to self-employment which can reduce the interest for highly educated individuals to choose entrepreneurship.

Even so, managers and paid worker, tend to have a higher level of formal education than the entrepreneurs do. In Portugal, we are assisting to a decrease of illiteracy rate and to an increase in the number of individuals attending higher education schools, particularly due to the compulsory education (9 years of school) imposed since 1981 by the government. Despite the costs of attending university studies, there are several policies and social benefits that turn university fees less expensive. In addition, unemployment rates have also affected highly educated individuals in Portugal. For that reason and because wages are not rising, highly educated individuals are likely to enter into entrepreneurial activities for better life conditions. On the other side, less educated individuals are more targeted to jobs in the primary and secondary sectors than for entrepreneurial positions. Thus, we expect:

Hypothesis 3: *Portuguese entrepreneurs are more likely to become more educated overtime.*

As well as education, experience is also a key factor for performance (Chandler, 1962; Andrews, 1965; Hambrick and Mason, 1984; Barney, 1991). It stimulates earnings growth (Medoff and Abraham, 1980) and contributes to firm success (Vesper, 1980; Ronstadt, 1988) and to the possibility of the entrepreneur getting involved again in setting up new start-ups (Westhead and Wright, 1999; Ucbasaran, et al., 2006). Previous studies found a positive relationship between entrepreneurship and experience (Evans and Leighton, 1989; Kaufmann, 1999; Williams, 1999; Shane, 2003). Experience involves training for skills necessary to run a business namely negotiating, planning, decision making, problem solving and communication (Shane, 2003). Kaufmann (1999) find that most of entrepreneurs have more than 10 years of industry experience and have not more than one business reflecting a weak entrepreneurial experience. These two

variables and their effect on entrepreneurs are very important on explaining the existence of spin-off[10]. Entrepreneurial characteristics[11] are the key factor that affects spin-off formation.

2.4 Start-ups characteristics

Start-up size is an important determinant for the subsequent performance of new firms. The initial start-up size can depend on several founder characteristics. For instance, human capital (education and experience) is positively correlated with start-up size. In other words, this means that individuals with better training skills and knowledge are likely to start larger firms[12] (Barkman, 1994; Mata, 1996). Also, there is a positive relationship between entrepreneur's wealth and start-up size (Holtz-Eakin, et al., 1994; Cabral and Mata, 2003; Colombo and Grilli, 2005). According to Kaufmann (1999), start-ups are mostly small firms, businesses with no other employees than the owners or businesses with one to four employees. Furthermore, small firms are an advantage for entrepreneurs in the way that allow them to better understand the overall organization and how operates, the technologies and many other business features that would not be possible with larger firms (Bowen and Hisrich, 1986). In the last years, the Portuguese economy has been assisting to a decrease on the size of firms and an increase in the number of start-ups (Braguinsky, et al., 2011). According to Cabral and Mata (2003) and Angelini and Generale (2005), the financial constraints can explain this fact since constrained firms tend to be smaller. Other fact is the strong work protections in

[10] A spin-off is considered a category of entrepreneurship and is defined as "an individual or an organizational unit leaving an existing firm to start as a new firm on the basis of his/their specific knowledge and competences" (Elfring and Foss, 2000)

[11] Shrivastava (2010) defines entrepreneurial characteristics as entrepreneurial talent. It includes characteristics like opportunity recognition, risk aversion and strive for independence.

[12] Human capital and start-up size have a positive relationship because highly educated individuals are more confident in their entrepreneurial ability and may suffer less from financial constraints, assuming that experience is related to personal wealth (Colombo, et al., 2004).

Portugal (Angelini and Generale, 2005). Due to the restrictive practices that have been affecting portuguese firms, some businesses are forced to reduce their demand for workers and some workers are forced to create low productivity firms.

Hypothesis 4: *Start-ups are more likely to be smaller overtime.*

Firm size is one of the main factors that influence the survival probability (Sonmez, 2013). Several studies claim that there is a positive relationship between start-up size and survival (Jovanovic, 1982; Mata and Portugal, 1994), meaning that larger have more probabiltiy of survival than small firms (Dunne and Hughes, 1994; Parker, 2009; Cabral and Mata, 2003). Kranenburg, et al. (2002) also consider economic conditions as a factor for firm survival. Under favorable economic conditions, the probability of exiting the market is low. Although, Portuguese economy has been suffering a deep recession with a consequently increase of taxes which is been reducing the likelihood of firms survival. In addition, these circumstances are creating some barriers on getting monetary support and bank loans, specially for firms facing financial difficulties and financial constraints (Ghosal, 2003).

Hypothesis 5: *Portuguese start-ups are having less probability of survival.*

3. OVERVIEW OF PORTUGUESE ECONOMY

To better frame the paper's results, we will briefly describe the main features of the Portuguese economy and the main policies towards entrepreneurship in the last two decades. For a better analysis, we distinguish three periods in this section: 1980, 1990 and 2000.

The 80s decade was marked by the entrance of Portugal in the European Community (1986). Since then, the creation of a single market led the country to a stable economic growth, low labor costs and interest rates, inflows of European funds and the allowance of development of several programs and policies. In these years, Portugal experienced high GDP growth rates related to the other periods in analysis, followed by the decrease of unemployment and illiteracy rates. Figure 5 illustrates the growth rate of GDP, in percentage, over the last years. From 1986 to 1988, the annual growth rate of GDP rose to 6.4 percent, whereas from 1988 to 1992 it decreased significantly to 1 percent.

In 1992, it was signed the Treaty on European Union with the purpose of bringing new forms of cooperation among Member State governments and to prepare the country to the creation of a single European currency. Consequently and after a weak period characterized by a decrease of GDP and increase of unemployment until 1993, Portugal attained a growth era until 2000.

In the last period we highlight the introduction of euro in 2002. Since then and due to the increased international competition following the new enlargement of the European Union (the integration of Central, Eastern European countries)[13] and the establishment

[13] The main reasons for the new enlargement of the European Union were merely by economic, political and safety reasons. In one side, these countries were looking for integration in the remaining economies and a bigger participation in European policy decisions. In the other side, Central and Eastern countries

of fixed exchange rate [14], Portugal entered in economic crisis and high deficit in 2003. Further, the fall of the Berlin Wall and the disintegration of the Soviet Union were causes for the crisis (Comissão Europeia, 2008). Also, the Portuguese GDP achieved negative growth rates[15], the unemployment rate and the amount of government debt reached the higher values comparative to our period analysis. Figure 6 and Figure 7 shows the amount of Portuguese government debt and the unemployment rate, between 1986 and 2009, respectively. Consequently, the number of students attending higher education decreased since 2003 after growing four times more relative to 1986, the migration outflows increased considerable, followed by a fall of families' wealth and the rise of poverty risk.

Table 1 summarizes the main European and Portuguese policies towards entrepreneurship.

Since the entrance of Portugal in the European Community, Portugal negotiated an amount of transfers from the EU, corresponding to five phases: "Anterior Regulamento"(1986 to 1988); QCA I - Primeiro Quadro Comunitário de Apoio (1989 to 1993) ; QCA II - Segundo Quadro Comunitário de Apoio (1994 to 1999); QCA III - Terceiro Quadro Comunitário de Apoio (2000 a 2006) and QREN - Quadro de Referência Estratégico Nacional (2007 to 2013). The main purposes of these monetary

wanted to enforce the safety in their countries because they were particularly concerned about the possibility of Russia becoming an unstable country and, consequently, to generate difficult problems in these countries.

[14] Banks faced financial constrains (banks' liquidity and the sovereign debts were affected), difficulties to keep up with minimum regulatory ratios and bad debts. These were the main reasons for the significant decreasing of the interest in credit and lending activities. This crisis was a big concern, mostly, for Ireland, Greece and Portugal. Also government policy choices and the bailout to the two banks that were a risk for Portuguese banking system contributed to a high public deficit and high public debt. As we can see in figure 3, until 2008 there was steady growth of government debt.

[15] On Figure 5, we can see that between 2003 and 2009, the GDP annual growth arose from -0.9 percent to 2.36 percent, in 2007, followed then by a sharply decrease to -2.9 percent, in 2009.

inflows were to ensure the economic development and the modernization of society, qualify the human capital and promote life quality and social cohesion.

Additionally, in 1988 and 1992 were launched the Specific Program for the Development of Portuguese Industry (PEDIP I and PEDIP II, respectively) with the purpose of modernizing the Portuguese industry and strengthen competitiveness. Other programs such as Praxis, POE, POCTI, POSI and PRIME also stimulate the entrepreneurship in the last decades. The overall goal of these policies is to stimulate entrepreneurship and enhance competitiveness and productivity of Portuguese firms by increasing the number of start-ups, improve education and training of population and promote business innovation.

In 2000 was created the European Charter for Small Enterprises which main goal was to improve the education and training for entrepreneurship of small enterprises. Two years later, the European Commission presented the Green Paper on Entrepreneurship Policy, where the Commission explains the importance of entrepreneurship and identifies the key factors for a better promoting of entrepreneurship in Europe. In order to improve entrepreneurship, the main proposals of Commission were setting better incentives for entrepreneurs by creating social security systems specially for entrepreneurs, increasing the availability of venture capital and business angel finance and investments, giving more support to entrepreneurs and establish strategic partnerships between them and reducing administrative and regulatory barriers.

The main organization that supports entrepreneurial activity in Portugal is IEFP – Instituto do Emprego e Formação Profissional which was created in 1962 and is designed particularly for individuals who have difficulties in entering the labor market

namely youngsters looking for their first job or unemployed individuals. Their major initiatives are described in Table 2.

Specifically, there are further segmented portals containing information and practical guides aimed at helping entrepreneurs to establish new businesses. For young entrepreneurs, we have for example the program *Empreender +* and *Programas de Apoio ao Empreendedorismo e à Criação do Próprio Emprego.* Their main goals are attracting business ideas and ways of investment and job creation, respectively. Besides these programs targeted to young people, there are others that also help women to integrate more into the world of entrepreneurship. This is the case for *Plataforma do Empreendedor*, *Portugal Empreendedor*, *Programa Estratégico para o Empreendedorismo e a Inovação (+e+i),* among others. In terms of financing, we also have the program FINICIA promoted by IAPMEI and MEI which main goal is to provide easy access to financing solutions and technical assistance in the creation of companies, through the issuing of monetary grants.

4. DATA AND DESCRIPTIVE STATISTICS

Our analysis draws on a matched employer-employee database (QP - "Quadros de Pessoal").

QP is a mandatory database that covers comprehensive information, from 1986 to 2009, of the entire Portuguese private sector, on more than 220,000 firms and 2,000,000 individuals per year. It is submitted annually, by firms with at least one employee, to the Portuguese Ministry of Employment and Social Security. Data concerning firms include year of creation, location, size, industry, number of establishments, initial capital and ownership structure. The data on workers characteristics include gender, age, education, wages and hours worked.

From the QP, we select all start-ups established between 1986 and 2009. For these new firms, we identify the founders and their background history. We exclude firms which were not possible to identify at least one owner or if we could not identify the founders' background history. Our sample was restricted to founders with ages between 20 and 60 years. In total, our sample includes 869,315 which founded 421,263 firms. We supplement this data with information at the county level from INE, namely GDP, population and unemployment level.

Table 3 and Table 4 summarize the variables description used in this study and the descriptive statistics of our sample considering the three different decades: 1980, 1990 and 2000. Middle aged men are more likely to start-up firms. Nevertheless, the founder is becoming younger and the percentage of female entrepreneurs is increasing. In terms of educational level, we have different results when considering the analysis for the three periods. In 1980s, the majority of founders had very low education (45.11%)

while in the next periods we have a higher presence of low educated individuals on entrepreneurial activity (39.53% and 41.54%, respectively). Simultaneously, the number of high educated individuals increased since 1980s to 2000s, from 9.08% to 17.19%. We also find that the percentage of foreign entrepreneurs has increased overtime.

Regarding start-ups characteristics, 42.35% of the start-ups of our sample were established in the decade of 1990. Although, we observe on Figure 8 a peak of firm entry in 2001 and a decline since then, justified by the recessive macroeconomic cycle and public deficit in Portugal, in the following years. The firms are typically small and have, on average, four employees and one and two founders. The size of the start-up and, as well, the number of founders has been decreasing since the 1980s decade. In terms of survival, the number of firms surviving has been decreasing sharply. In the 1980s, 97,10% of the start-ups survived more than two years. Since then, the number of firms surviving declined to 79,49%, on average, in 2000s.

5. EMPIRICAL METHODOLOGY AND RESULTS

Our empirical strategy consists in comparing founders' and start-ups characteristics established in three different periods in time: from 1986 to 1989, from 1990 to 2000 and from 2000 to 2009.

5.1. Gender

In order to analyze the demographic and educational characteristics of the entrepreneurs overtime, we will use the following equation:

$$Y_{fycj} = \alpha_0 + \gamma_y + \beta_1 D90 + \beta_2 D00 + X'_f \delta + Z'\theta + \lambda_y + \rho_c + \omega_j + \varepsilon_{fycj} \quad (1)$$

where f denotes the founder of a start-up, y is the entry year, c indicates the region and j the industry.

We start by evaluating if there were significant changes in the percentage of female entrepreneurs. Our dependent variable is gender, a dummy variable equaling one for women and zero for men. Our variables of interest are D90, a dummy variable equaling 1 if the start-up was established between 1990 and 1999 and 0 otherwise, and D00, a dummy variable equaling 1 if the start-up was established between 2000 and 2009 and 0 otherwise. The omitted category is the period between 1986 and 1989. Our vector X represents the founder's characteristics – age and education. Founders' age is measured with four categorical variables: Age 20-29 is coded one for individuals with age between 20 and 29; Age 30-39 is coded one for individuals with age between 30 and 39; Age 40-49 is coded one for individuals with age between 40 and 49 and; Age 50-60 is coded one for individuals with age between 50 and 60; and founders' education is defined with four categorical variables: high education is a dummy variable equaling

one for founders with bachelors, masters or doctoral degrees; medium education is a dummy variable equaling one for individuals reporting a high school diploma or vocational school degree; low education is a dummy variable equaling one for individuals that attended junior high school; and very low education is a dummy variable equaling one for individuals who never attended or completed the elementary school. The vector Z contains controls for economic activity namely: GDP per capita per year, population and unemployment, measured on logarithms. To further control for economic activity we use municipality (ρ_c), dummy variable defined with seven categorical variables, following NUTS II, equaling one for the respective territorial unit; industry (ω_j), dummy variable defined seventy eight categorical variables, according to industry classification, CAE review 2.1, equaling one for the respective industry code; and year fixed effects (λ_y), dummy variable defined with twenty four categorical variables, from 1986 to 2009, equaling one for the respective reference year. The results for the specification (1) are presented in Table 5. As our dependent variable is a dummy variable, we use a logit model. In appendix, Table A 1 and Table A 2 present the results for probit and linear probability model. In column (1) we have only the variables of interest and the economic activity controls and in column (2) we add the remaining variables. The results show a negative relationship between dependent variable and our variable of interest, suggesting that firms established by male entrepreneurs increased along the period. The results suggest that there is a decrease of 0.8% and 1.2% in the proportion of firms created by female entrepreneurs in 1990s and 2000s, respectively, compared to the decade of 1980. Portuguese female entrepreneurs are also becoming younger and higher educated. Nevertheless, the coefficients only are statistically

significant in the last period. Therefore, we reject *Hypothesis 2* that the percentage of female entrepreneurs is increasing.

5.2. Age

For age, we also use equation (1) but the dependent variable is measured as logarithm of age. Our variables of interest are also D90 and D00. The omitted category is the period between 1986 and 1989. Our vector X represents the founder's characteristics – gender and education – and the vector Z includes the controls for economic activity. In this case we use an OLS model which results are presented in Table 6, where Column (1) represents the specifications with the variables of interest and economic activity variables and in column (2) we add the founder demographic and education characteristics. The results show a negative relationship between dependent variable and our variable of interest, suggesting that firms established by older entrepreneurs decreased along the period, with a higher decrease in 1990s followed then by a slower decrease. In another perspective, we see the firms established in Portugal are becoming founded by younger entrepreneurs. Related to the other variables, the results show that for older Portuguese entrepreneurs, there is a low probability of being women and having greater education levels. The coefficients are statistically significant at 1%. Thus, we reject *Hypothesis 1* that entrepreneurs are becoming older overtime.

5.3. Education

Our dependent variable is education is also defined with defined with four categorical variables: *high education* is a dummy variable equaling one for founders with bachelors, masters or doctoral degrees; *medium education* is a dummy variable equaling one for individuals reporting a high school diploma or vocational school degree; *low education* is a dummy variable equaling one for individuals that attended junior high school; and

very low education is a dummy variable equaling one for individuals who never attended or completed the elementary school. As in the previous models, our main variables are D90 and D00 and the omitted category is the period between 1986 and 1989. Our vector X represents the founder's characteristics – gender and age – and the vector Z includes the controls for economic activity. Results of multinomial logit model are presented in Table 7 (specification with our variables of interest and the economic controls and Table 8 (containing all variables of this model). The reference category very low education is omitted. For low education, there is evidence that the probability of having entrepreneurs with low education is increasing overtime. In the other side, we observe that for the remaining categories of education, the probability of having firms established by them is decreasing overtime, comparatively to entrepreneurs with very low education level. The period of 2000s was the period with greater changes in the way that there was a higher variation for low education (positive) and medium/high education (negative). We also can observe that female entrepreneurs have predominantly medium and high education while male entrepreneurs have low education levels. In terms of age, there is a negative relationship between older entrepreneurs and education. In the other side, Youngers are becoming more high educated individuals and the proportion of young individuals with low education levels decreased. Thus, we find that entrepreneurs are becoming less highly educated overtime. Results are only statistically significant in the last period and for medium and high education. Hence we do reject the *Hypothesis 3* that entrepreneurs are expected to become more educated overtime.

5.4. Start-ups' size

In the following sections we test the impact of entrepreneurs' characteristics on start-up survival and size, across time, using the following regression:

$$Y_{fycj} = \alpha_0 + \gamma_y + \beta_1 D90 + \beta_2 D00 + Y'_S \eta + X'_f \delta + Z' \theta + \lambda_y + \rho_c + \omega + \varepsilon_{fycj} \quad (2)$$

where f denotes the founder of a start-up, s refers to start-up, y is the entry year, c indicates the region and j the industry.

Our dependent variable is size which is measured as the logarithm of the initial number of employees of the start-up. In this model, we also use the dummies D90 and D00 as variables of interest. As mentioned before, vector X and Z represents founder's characteristics and economic activity controls, respectively. Our vector Y denotes the start-ups characteristics – number of founders which is measured as the logarithm of the number of founders of the firm. The results for the OLS model are presented in Table 9. Column (1) presents the specification with the variables of interest and economic controls and in column (2), we add the remaining characteristics for this model. The regression indicates decreasing negative relationship between our variables of interest and firm size which means that firms are becoming smaller since 1986. The relationship between firm size and the number of founders and education is positive. In the other side, the probability of having larger firms founded by male entrepreneurs is high. Relative to age, there is a strong correlation between individuals aged among 40 and 49 years and firm size. The coefficients are statistically significant at 1% level. Therefore, we do not reject *Hypothesis 4* that firms are becoming smaller overtime.

5.5. Start-ups' survival

Our dependent variable is survival, a dummy variable equaling one if survived the first two years and zero otherwise. As in the previous models, D90 and D00 are the main variables for this analysis. The vector Y represents the start-ups' characteristics –size and number of founders –, the vector X and Z represents the founder's characteristics and economic activity controls. Table 10 presents the marginal effects of logit regression. In appendix, Table A 3 and Table A 4 present the results for probit and linear probability model. Column (1) presents our main variables of interest and economic controls and in column (2), we add the start-ups and founder's characteristics mentioned before. The estimations display those start-ups survival has increased overtime since 1986. The results for probit and linear probability model are different from the previous, showing that the 1990s were characterized by a decrease of firm survival. In terms of founders' characteristics, we find that being women contributes negatively for firm survival. The relationship between age/education and survival is positive, showing that older and highly educated individuals have a higher probability of keeping the start-up in the market. In terms of firm characteristics, we find a positive relationship between the number of founders and firm survival. Lastly, coefficients about firm size have different signals in the models, showing that there is not a consensual conclusion about the relationship between firm size and survival. Overall, we can conclude that firms are surviving more in the last years, leading us to reject the *Hypothesis 5,*since the results are statistically significant.

Comparing our results to the relevant literature regarding the impact of Portuguese macroeconomic conditions, we see that in fact economic control variables do have a significant impact in the characteristics of entrepreneurs and star-ups, mainly GDP and

unemployment rate. Our results on descriptive statistics shows that firm entry occur mostly in the decade of 1990 and 2000. Specifically, these findings are somehow consistent with the push and pull theory (Storey, 1982) that argues that under economic conditions contraction, entrepreneurs are more likely to found new firms.

6. CONCLUSION

The aim of our study is to analyze the changes of founders and start-ups' characteristics in Portugal overtime. Using a Portuguese matched employer-employee database, the QP, we look at relationship between firm entry and the characteristics of entrepreneurs and firms.

In order to reach our conclusions, we conducted several models analysis in order to understand the statistical significance of our variables and their impact over start-ups, simultaneously controlling for municipality, industry and year effects.

We find that Portuguese entrepreneurs are predominantly middle-aged male with lower education levels. In terms of gender, female entrepreneurs are still a minority in our sample. We can say that there was no changes since 1986 since female entrepreneurs are continuing to decrease. On the other hand, we find that entrepreneurs are becoming younger in Portugal overtime, but in a slower decrease after 2000. For education, there is evidence that entrepreneurs are not becoming more educated overtime. In fact, the number of start-ups' founded by very low educated individuals is been increasing since 1986. During the period of analysis, medium education was the level that suffered more changes. Until 2000, the number of medium educated entrepreneurs increased and then decreased.

In terms of start-ups characteristics, we find that start-ups are becoming smaller. Regarding their propensity to survive, most firms established between 1986 and 2009 survived more than two years. According to the estimations, the number of firms that survived at least two years is been rising through the period.

Nonetheless, the estimations obtained are limited by the extension of dataset used which lead to some computational problems due to a higher number of variables, that was posteriorly reduced, and by the fact that our dataset only contains data until 2009. This study could be further developed by analyzing the impact of the last years' recession, unemployment and high public deficit and debt in Portugal with a more enlarged dataset. It would also be useful to study the start-ups entry by including a wide sample containing workers data to study it from the perspective of Portuguese workers instead from only the perspective of entrepreneurs.

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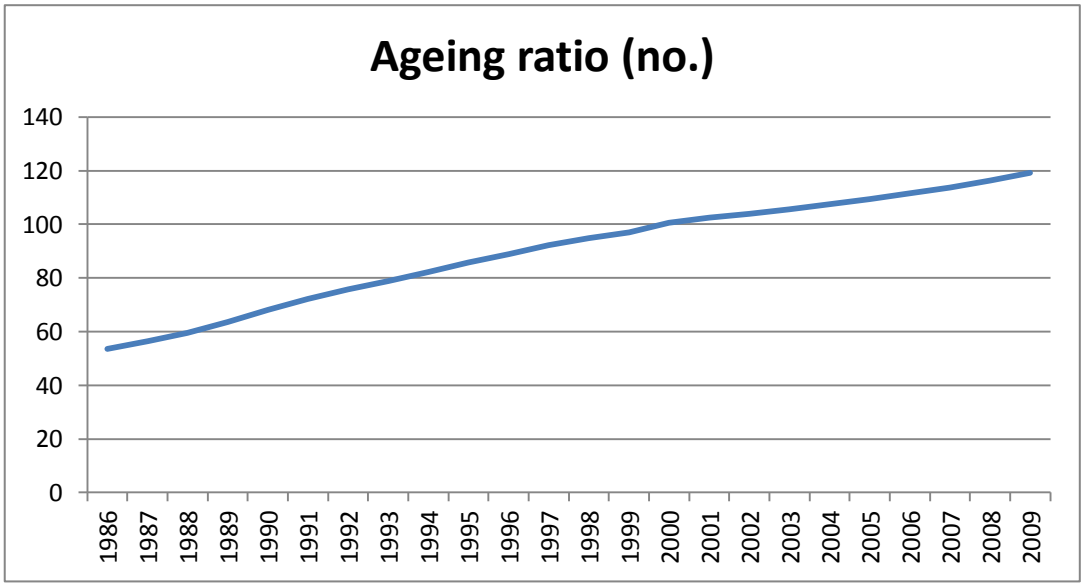
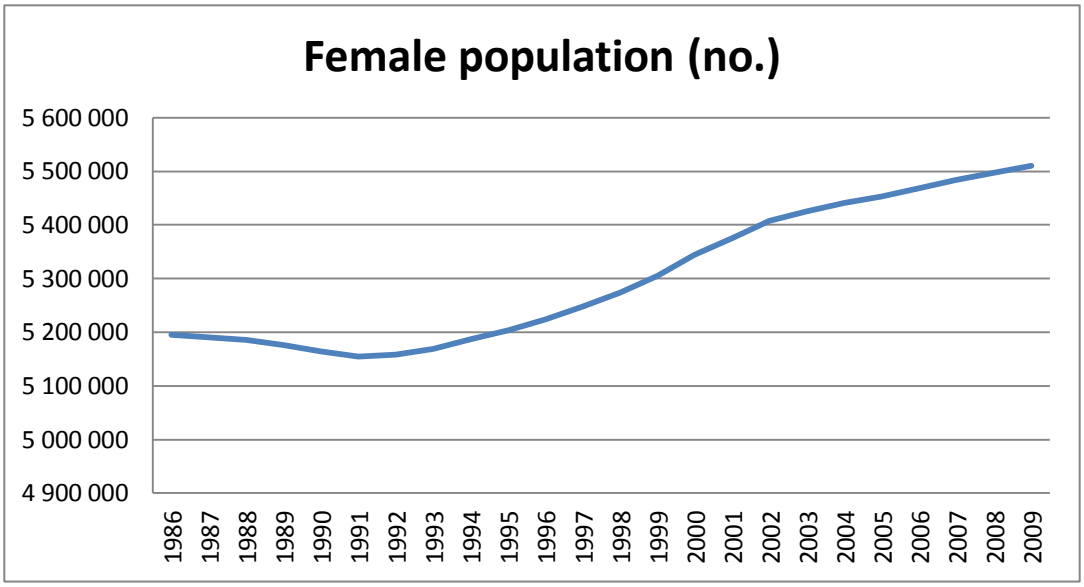
Figure 1- Ageing ratio (1986-2009; no.)



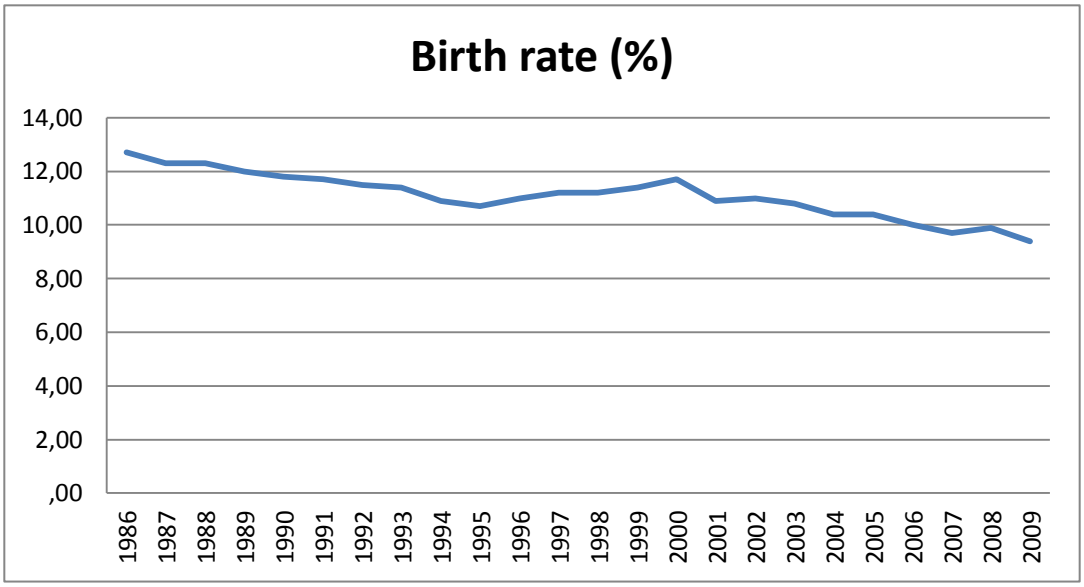
Source: INE

Figure 2 - Female Population (1986-2009; no.)



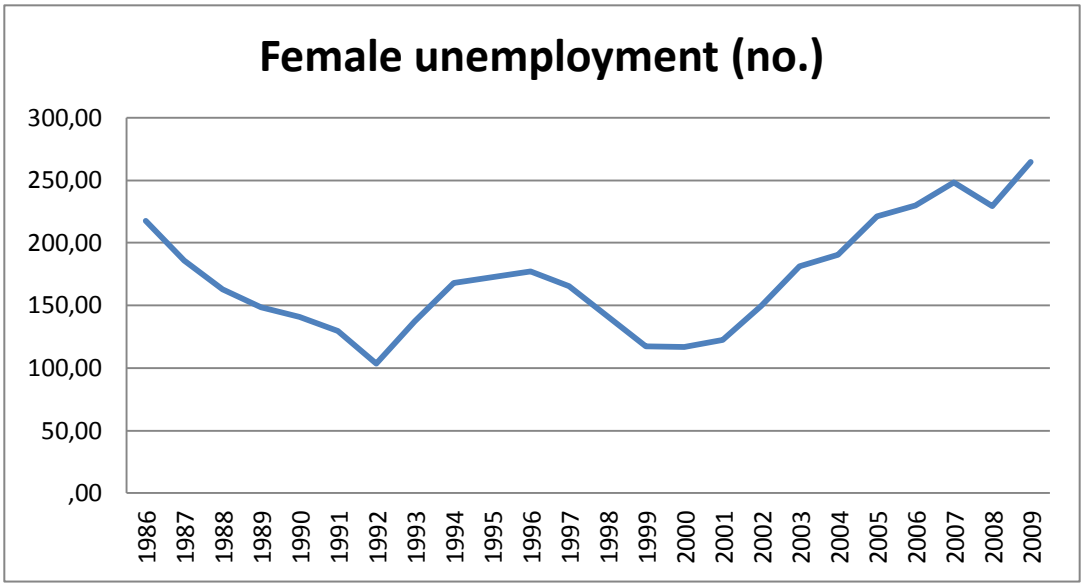
Source: INE

Figure 3 - Birth rate (1986-2009;%)



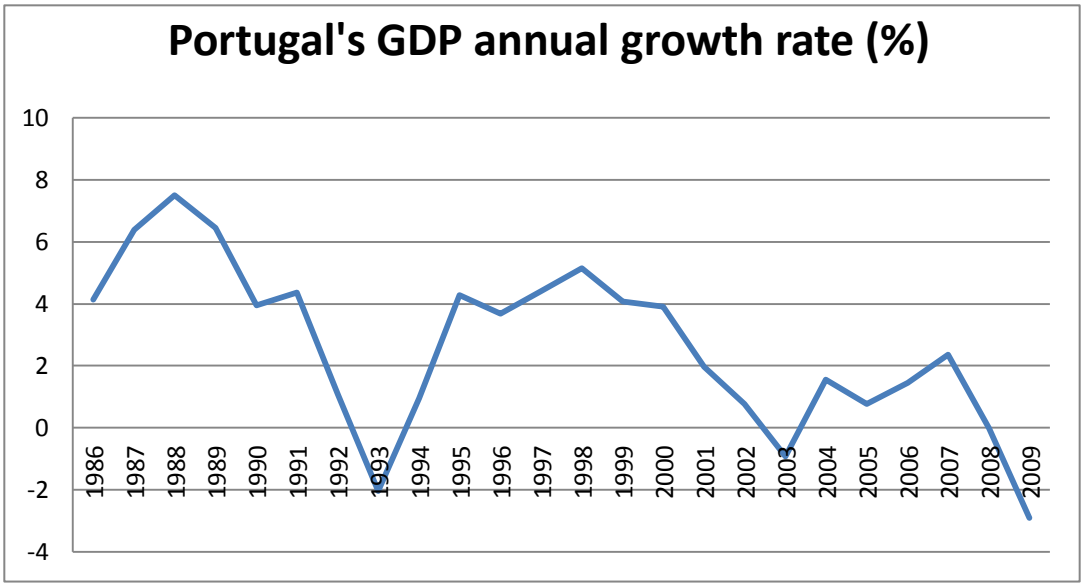
Source: INE

Figure 4 - Female unemployment (1986-2009;no.)



Source: INE ; the numbers are expressed in thousands.

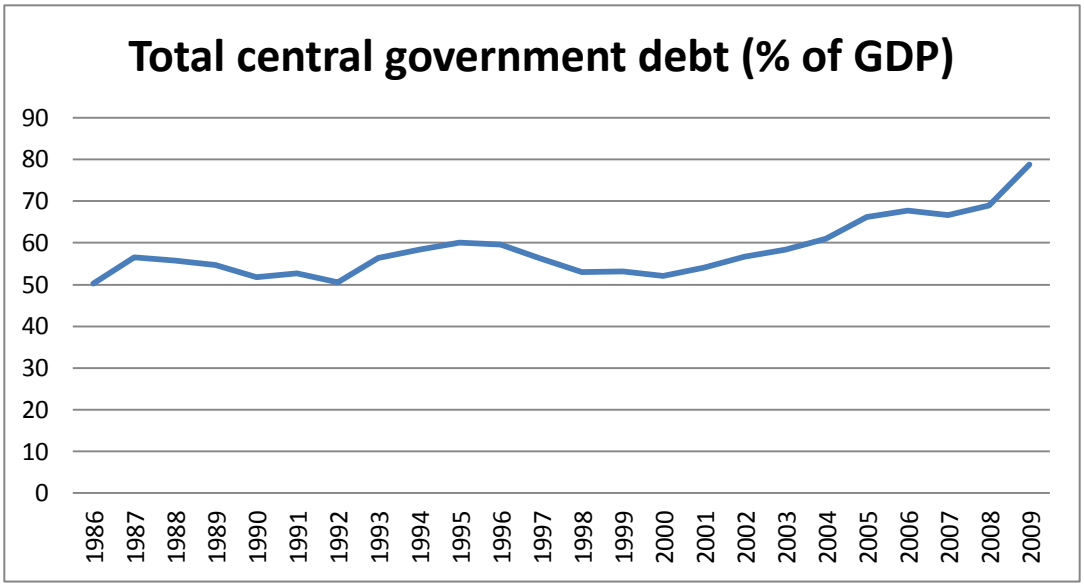
Figure 5- Portugal's GDP annual growth rate (1986-2009;%)



Source: OECD database

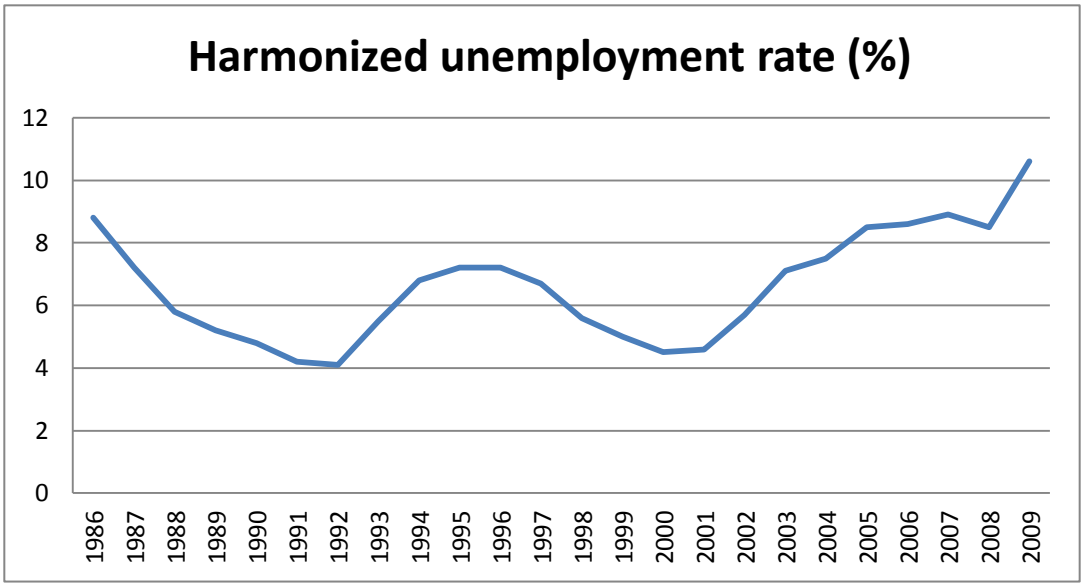
Note: 1974-1994 are estimated values.

Figure 6- Total central government debt (1986-2009 ; % of GDP)



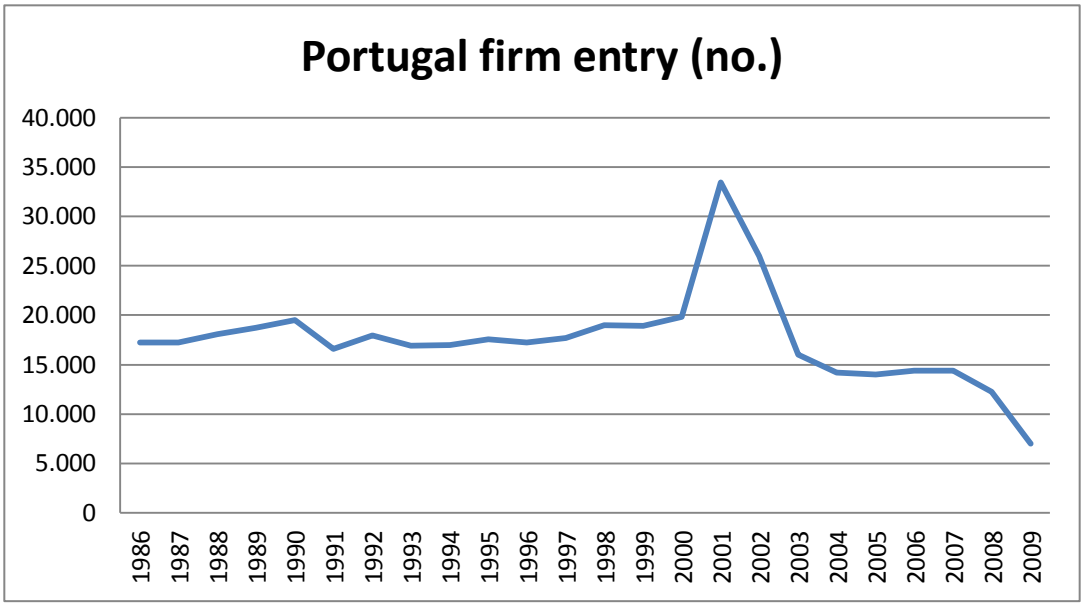
Source: OECD database

Figure 7- Harmonized unemployment rate (1986-2009; %)



Source: OECD database

Figure 8 - Portugal firm entry (1986-2009; no.)



Source: QP

Table 1 – Summary of the main Entrepreneurship Policies

Policy/Program	Date	Objective
PEDIP I – QCA I	1988-1993	Stimulate the competitiveness and the creation of new patterns of specialization.
PEDIP II – QCA II	1994-1999	Induce innovation and stimulate the business role
Praxis XXI	1994-1999	Ensure a supply of international R&D quality and contribute to the development of higher education and improve the position of Portugal in European scientific networks and attract research activities.
Lisbon Strategy	2000	Increase competitiveness and economic growth, through the creation of the appropriate conditions for the creation of start-ups.
European Charter for Small Enterprises	2000	Satisfy the necessities of small enterprises, improving education and training for entrepreneurship
POE – QCA III	2000-2006	Modernize and guide the infrastructures to support businesses in technological, training and consulting domains and promote business innovation.
POCTI – QCA III	2000-2006	Overcome scientific and technological backwardness of the country, strengthen the innovation process and promote scientific and technological culture.

POSI – QCA III	2000-2006	Improve a society of information and knowledge.
Green Paper "Entrepreneurship in Europe"	2003	Increase the number of start-ups, by turning the European society into a more entrepreneurial one.
PRIME[16]	2003-2006	Potentiate the Portuguese economy abroad and enhance the competitiveness and productivity of Portuguese firms.
QREN	2007-2013	Get a sustainable economic growth and social cohesion, qualify the population and the territory and improve the efficiency of governance.

[16] The Prime Program replace the previous program of QCA III – POE.

Table 2- Grants and Incentives for Entrepreneurship - IEFP

Program	Receiver	Support provided
Support for Self-Employment for Receivers of Unemployment Benefits	Individuals who are receiving unemployment benefits able to present a project that can create, at least, employment for them.	Give support to employment projects by anticipating unemployment benefits
Support for Business Creation	- Unemployed for 9 months or less in involuntarily unemployed or enrolled for more than nine months; - Young people looking for 1st job aged between 18 and 35 years; - who have never exercised professional activity as an employed or self-employed; - Independent workers whose average monthly income in the last year of activity, is less than the guaranteed minimum monthly remuneration.	Give support to projects to create small profitable businesses by giving access to credit lines by banking institutions.
National Microcredit Program	- People with entrepreneurial profile having special difficulties in accessing the labor market and in risk of social exclusion - Micro-entities and cooperatives up to 10 workers with viable projects with creation of jobs, particularly in the area of social economy	Give access to credit for projects with investment and small amount financing
Youth Invest	- Young people aged between 18 and 30 years, registered as unemployed in the Employment Institute, and who have a viable business idea and adequate training for business	Give financial support for investment, for the creation of own employment and technical support for the entrepreneurship skills enhancement

Table 3- Description of variables

Variables	Description
Founder's gender	Dummy variable, equaling one for women and zero for men.
Founder's Age	**Age 20- 29** is coded one for individuals with age between 20 and 29; **Age 30- 39** is coded one for individuals with age between 30 and 39; **Age 40- 49** is coded one for individuals with age between 40 and 49; **Age 50- 60** is coded one for individuals with age between 50 and 60.
Founder's education level	**High education** is a dummy variable equaling one for founders with bachelors, masters or doctoral degrees; **Medium education** is a dummy variable equaling one for individuals that attended high school or vocational school degree; **Low education** is a dummy variable equaling one for individuals that attended junior high school; **Very low education** is a dummy variable equaling one for individuals that never attended or completed the elementary school.
Firm Size	Size = Log(initial number of employees)
Firm Survival	Dummy variable, equaling one if survived the first two years and zero otherwise.

Table 4-Descriptive Statistics

PANEL A – FIRMS' CHARACTERISTICS

	1980s		1990s		2000s	
	Mean/ Freq.	**S.D./ Percent**	**Mean/ Freq.**	**S.D./ Percent**	**Mean/ Freq.**	**S.D./ Percent**
Number of founders*	2.526	1.282	2.213	1.141	1.716	.875
Size*	5.656	19.982	4.555	14.884	3.626	5.565
Firm Survival	69.229	97,10%	170.778	95,72%	136.365	79,49%

PANEL B – FOUNDERS' CHARACTERISTICS

Gender						
Male	50,168	70.37%	119,825	67.16%	114,419	66.69%
Female	21,126	29.63%	58,588	32.84%	57,137	33.31%
Age*	42.424	9.552	40.344	9.552	38.303	9.353
20-29	25.940	2.533	26.011	2.469	26.110	2.457
30-39	34.901	2.816	34.685	2.825	34.372	2.822
40-49	44.430	2.857	44.221	2.838	44.008	2.831
50-60	54.366	3.081	54.174	3.054	54.163	3.061
Education						
Very low	32,163	45.11%	51,625	28.94%	28,811	16.79%
Low	23,623	33.13%	70,520	39.53%	71,258	41.54%
Medium	9,032	12.67%	34,268	19.21%	41,990	24.48%
High	6,476	9.08%	22,000	12.33%	29,497	17.19%
Nationality						
Portuguese	20,630	98.85%	103,146	98.46%	164,545	95.91%
Europe	159	0.76%	918	0.88%	3,074	1.79%
Africa	19	0.09%	212	0.20%	928	0.54%
Asia	30	0.14%	168	0.16%	1,079	0.63%
South American	29	0.14%	283	0.27%	1,819	1.06%
Central/North American	2	0.01%	26	0.02%	98	0.06%
Other	2	0.01%	9	0.01%	13	0.01%
Firm Entry	71,294	16.92%	178,413	42.35%	171,556	40.72%

*This variable is quantified in terms of mean and standard deviation. The remaining use frequency and percentage.

This table reports descriptive statistics for start-ups established between 1986 and 2009, and respective firms' and founders' characteristics. All data was retrieved from QP- Quadros de Pessoal.

Table 5- The impact of founder's characteristics on gender using logit (marginal effects)

VARIABLES	(1)	(2)
D90	-0.00775	-0.00814
	(0.00528)	(0.00528)
D00	-0.0123**	-0.0119**
	(0.00595)	(0.00594)
Age 30-39		-0.00197
		(0.00210)
Age 40-49		-0.00602***
		(0.00219)
Age 50-60		-0.0247***
		(0.00249)
Low Education		-0.00980***
		(0.00186)
Medium Education		0.0127***
		(0.00225)
High Education		0.0105***
		(0.00267)
GDP	0.0481***	0.0461***
	(0.00644)	(0.00645)
Population	-0.331*	-0.369**
	(0.170)	(0.170)
Unemployment	0.00461	0.00139
	(0.00353)	(0.00354)
Observations	421,263	421,263

This table uses data on all start-ups established between 1986 and 2009, and respective firms' and founders' characteristics retrieved from the database Quadros de Pessoal. The dependent variable is "Gender", which is a dummy equaling 1 for female founders and 0 for male founders. The variables of interest are: D90, a dummy variable equaling 1 if the start-up was established between 1990 and 1999 and 0 otherwise, and D00, a dummy variable equaling 1 if the start-up was established between 2000 and 2009 and 0 otherwise. The omitted category is the period between 1986 and 1989. In column (1) we have only the variables of interest and the economic activity controls and in column (2) we add the remaining variables. All models include county, industry and year fixed effects. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 6- The impact of founder's characteristics on age using OLS (marginal effects)

VARIABLES	(1)	(2)
D90	-0.0133***	-0.0138***
	(0.00274)	(0.00266)
D00	-0.000670	-0.00673**
	(0.00315)	(0.00304)
Gender		-0.00856***
		(0.000791)
Low Education		-0.133***
		(0.000916)
Medium Education		-0.195***
		(0.00114)
High Education		-0.168***
		(0.00132)
GDP	-0.0496***	-0.0180***
	(0.00337)	(0.00328)
Population	-0.721***	-0.592***
	(0.0911)	(0.0879)
Unemployment	-0.0463***	-0.0302***
	(0.00192)	(0.00184)
Observations	421,263	421,263

This table uses data on all start-ups established between 1986 and 2009, and respective firms' and founders' characteristics retrieved from the database Quadros de Pessoal. The dependent variable is represented by the logarithm of founder's age. The variables of interest are: D90, a dummy variable equaling 1 if the start-up was established between 1990 and 1999 and 0 otherwise, and D00, a dummy variable equaling 1 if the start-up was established between 2000 and 2009 and 0 otherwise. The omitted category is the period between 1986 and 1989. In column (1) we have only the variables of interest and the economic activity controls and in column (2) we add the remaining variables. All models include county, industry and year fixed effects. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 7- The impact of founder's characteristics on education using Multinomial Logit (marginal effects)

VARIABLES	*Low education(1)*	*Medium education(1)*	*High education(1)*
D90	0.002018	0.000624	-0.00076
	(0.00571)	(0.0054)	(0.00437)
D00	0.009231	-0.02118***	-0.01153**
	(0.00635)	(0.0057)	(0.00461)
GDP	0.057182***	0.079671***	0.012256***
	(0.00696)	(0.00636)	(0.00511)
Population	0.195476	0.432512***	0.711757*
	(0.18082)	(0.15476)	(0.12453)
Unemployment	-0.03296***	0.076165***	0.047851***
	(0.00372)	(0.00296)	(0.00234)
Observations	421,263	421,263	421,263

This table uses data on all start-ups established between 1986 and 2009, and respective firms' and founders' characteristics retrieved from the database Quadros de Pessoal. The dependent variable is represented by four categorical variables for education level (high education, is a dummy variable equaling one for founders with bachelors, masters or doctoral degrees; medium education, is a dummy variable equaling one for individuals reporting a high school diploma or vocational school degree and low education is a dummy variable equaling one for individuals that attended junior high school; and very low education is a dummy variable equaling one for individuals who never attended or completed the elementary school). The variables of interest are: D90, a dummy variable equaling 1 if the start-up was established between 1990 and 1999 and 0 otherwise, and D00, a dummy variable equaling 1 if the start-up was established between 2000 and 2009 and 0 otherwise. The omitted category is the period between 1986 and 1989. In this table we have only the variables of interest and the economic activity controls. All models include county, industry and year fixed effects. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 8 - The impact of founder's characteristics on education using Multinomial Logit (marginal effects)

VARIABLES	*Low education(2)*	*Medium education(2)*	*High education(2)*
D90	-0.0005	-0.00269	-0.00134
	(0.0057)	(0.00534)	(0.00436)
D00	0.0087	-0.02131***	-0.01088**
	(0.00631)	(0.00563)	(0.0046)
Gender	-0.0172 ***	0.011741***	0.004878***
	(0.0016)	(0.00131)	(0.00104)
Age 30-39	-0.0246 ***	-0.06069***	0.008918***
	(0.0023)	(0.00162)	(0.00133)
Age 40-49	-0.0518 ***	-0.11564***	-0.02981***
	(0.0023)	(0.00173)	(0.00145)
Age 50-60	-0.1026 ***	-0.16579***	-0.04213***
	(0.0026)	(0.00212)	(0.00171)
GDP	0.0513 ***	0.070103***	0.007867
	(0.007)	(0.00631)	(0.00511)
Population	0.1149	0.255231*	0.642684***
	(0.1797)	(0.15345)	(0.12431)
Unemployment	-0.0369 ***	0.066252***	0.044894***
	-0.0005	-0.00269	-0.00134
Observations	421,263	421,263	421,263

This table uses data on all start-ups established between 1986 and 2009, and respective firms' and founders' characteristics retrieved from the database Quadros de Pessoal. The dependent variable is represented by four categorical variables for education level (high education, is a dummy variable equaling one for founders with bachelors, masters or doctoral degrees; medium education, is a dummy variable equaling one for individuals reporting a high school diploma or vocational school degree and low education is a dummy variable equaling one for individuals that attended junior high school; and very low education is a dummy variable equaling one for individuals who never attended or completed the elementary school). The variables of interest are: D90, a dummy variable equaling 1 if the start-up was established between 1990 and 1999 and 0 otherwise, and D00, a dummy variable equaling 1 if the start-up was established between 2000 and 2009 and 0 otherwise. The omitted category is the period between 1986 and 1989. In this table we all the variables of this model. All models include county, industry and year fixed effects. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 9- The impact of founder and start-ups' characteristics on firm size using OLS (marginal effects)

VARIABLES	(1)	(2)
D90	-0.0605***	-0.0548***
	(0.00827)	(0.00806)
D00	-0.0640***	-0.0695***
	(0.00921)	(0.00894)
Number of founders		0.361***
		(0.00213)
Age 30-39		0.00790**
		(0.00314)
Age 40-49		0.0191***
		(0.00331)
Age 50-60		0.00574
		(0.00376)
Gender		-0.0169***
		(0.00230)
Low Education		0.0219***
		(0.00272)
Medium Education		0.0368***
		(0.00343)
High Education		0.0612***
		(0.00439)
GDP	-0.0663***	-0.0281***
	(0.0101)	(0.00983)
Population	-3.962***	-2.401***
	(0.263)	(0.255)
Unemployment	-0.0832***	-0.0491***
	(0.00544)	(0.00527)
Observations	421,263	421,263

This table uses data on all start-ups established between 1986 and 2009, and respective firms' and founders' characteristics retrieved from the database Quadros de Pessoal. The dependent variable is firm size which is the logarithm of the initial number of employees. The variables of interest are: D90, a dummy variable equaling 1 if the start-up was established between 1990 and 1999 and 0 otherwise, and D00, a dummy variable equaling 1 if the start-up was established between 2000 and 2009 and 0 otherwise. The omitted category is the period between 1986 and 1989. In column (1) we have only the variables of interest and the economic activity controls and in column (2) we add the remaining variables. All models include county, industry and year fixed effects. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 10- The impact of founder and start-ups' characteristics on firm survival using Logit (marginal effects)

VARIABLES	(1)	(2)
D90	0.0227***	0.0208***
	(0.00790)	(0.00755)
D00	0.120***	0.109***
	(0.00771)	(0.00739)
Gender		-0.00167*
		(0.000899)
Size		-0.000454
		(0.000579)
Number of founders		0.0853***
		(0.00104)
Age 30-39		0.0378***
		(0.00112)
Age 40-49		0.0581***
		(0.00126)
Age 50-60		0.0736***
		(0.00158)
Low Education		0.0270***
		(0.00126)
Medium Education		0.0354***
		(0.00142)
High Education		0.0458***
		(0.00164)
GDP	-0.0525***	-0.0430***
	(0.00801)	(0.00767)
Population	-4.287***	-3.787***
	(0.157)	(0.151)
Unemployment	-0.190***	-0.177***
	(0.00225)	(0.00222)
Observations	421,263	421,263

This table uses data on all start-ups established between 1986 and 2009, and respective firms' and founders' characteristics retrieved from the database Quadros de Pessoal. The dependent variable is firm survival (dummy variable equaling one if survived the first two years and zero otherwise). The variables of interest are: D90, a dummy variable equaling 1 if the start-up was established between 1990 and 1999 and 0 otherwise, and D00, a dummy variable equaling 1 if the start-up was established between 2000 and 2009 and 0 otherwise. The omitted category is the period between 1986 and 1989. In column (1) we have only the variables of interest and the economic activity controls and in column (2) we add the remaining variables. All models include county, industry and year fixed effects. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A 1- The impact of founder's characteristics on gender using Probit (marginal effects)

VARIABLES	(1)	(2)
D90	-0.00798	-0.00836
	(0.00524)	(0.00524)
D00	-0.0124**	-0.0118**
	(0.00592)	(0.00592)
Age 30-39		-0.00177
		(0.00211)
Age 40-49		-0.00539**
		(0.00220)
Age 50-60		-0.0232***
		(0.00249)
Low Education		-0.00879***
		(0.00185)
Medium Education		0.0151***
		(0.00224)
High Education		0.0126***
		(0.00267)
GDP	0.0483***	0.0460***
	(0.00641)	(0.00641)
Population	-0.354**	-0.392**
	(0.170)	(0.170)
Unemployment	0.00486	0.00141
	(0.00353)	(0.00354)
Observations	421,263	421,263

This table uses data on all start-ups established between 1986 and 2009, and respective firms' and founders' characteristics retrieved from the database Quadros de Pessoal. The dependent variable is "Gender", which is a dummy equalling 1 for female founders and 0 for male founders. The variables of interest are: D90, a dummy variable equaling 1 if the start-up was established between 1990 and 1999 and 0 otherwise, and D00, a dummy variable equaling 1 if the start-up was established between 2000 and 2009 and 0 otherwise. The omitted category is the period between 1986 and 1989. In column (1) we have only the variables of interest and the economic activity controls and in column (2) we add the remaining variables. All models include county, industry and year fixed effects. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A 2 - The impact of founder's characteristics on gender using LPM(marginal effects)

VARIABLES	(1)	(2)
D90	-0.00767	-0.00808
	(0.00514)	(0.00514)
D00	-0.0125**	-0.0119**
	(0.00587)	(0.00587)
Age 30-39		-0.00203
		(0.00214)
Age 40-49		-0.00624***
		(0.00222)
Age 50-60		-0.0246***
		(0.00248)
Low Education		-0.0101***
		(0.00179)
Medium Education		0.0132***
		(0.00227)
High Education		0.0112***
		(0.00273)
GDP	0.0478***	0.0458***
	(0.00629)	(0.00630)
Population	-0.324*	-0.360**
	(0.169)	(0.169)
Unemployment	0.00528	0.00193
	(0.00356)	(0.00357)
Observations	421,263	421,263

This table uses data on all start-ups established between 1986 and 2009, and respective firms' and founders' characteristics retrieved from the database Quadros de Pessoal. The dependent variable is "Gender", which is a dummy equaling 1 for female founders and 0 for male founders. The variables of interest are: D90, a dummy variable equaling 1 if the start-up was established between 1990 and 1999 and 0 otherwise, and D00, a dummy variable equaling 1 if the start-up was established between 2000 and 2009 and 0 otherwise. The omitted category is the period between 1986 and 1989. In column (1) we have only the variables of interest and the economic activity controls and in column (2) we add the remaining variables. All models include county, industry and year fixed effects. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A 3 – The impact of founder and start-ups' characteristics on firm survival using Probit (marginal effects)

VARIABLES	(1)	(2)
D90	-0.0131**	-0.0104*
	(0.00629)	(0.00610)
D00	0.0486***	0.0485***
	(0.00621)	(0.00600)
Gender		-0.000763
		(0.000919)
Size		-0.00223***
		(0.000596)
Number of founders		0.0903***
		(0.000983)
Age 30-39		0.0406***
		(0.00115)
Age 40-49		0.0626***
		(0.00127)
Age 50-60		0.0785***
		(0.00155)
Low Education		0.0275***
		(0.00122)
Medium Education		0.0362***
		(0.00141)
High Education		0.0473***
		(0.00166)
GDP	-0.0227***	-0.0174***
	(0.00642)	(0.00626)
Population	-3.679***	-3.299***
	(0.134)	(0.130)
Unemployment	-0.192***	-0.178***
	(0.00210)	(0.00205)
Observations	421,263	421,263

This table uses data on all start-ups established between 1986 and 2009, and respective firms' and founders' characteristics retrieved from the database Quadros de Pessoal. The dependent variable is firm survival (dummy variable equaling one if survived the first two years and zero otherwise). The variables of interest are: D90, a dummy variable equaling 1 if the start-up was established between 1990 and 1999 and 0 otherwise, and D00, a dummy variable equaling 1 if the start-up was established between 2000 and 2009 and 0 otherwise. The omitted category is the period between 1986 and 1989. In column (1) we have only the variables of interest and the economic activity controls and in column (2) we add the remaining variables. All models include county, industry and year fixed effects. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A 4 - The impact of founder and start-ups' characteristics on firm survival using LPM (marginal effects)

VARIABLES	(1)	(2)
D90	-0.0215***	-0.0191***
	(0.00187)	(0.00186)
D00	0.00980***	0.00947***
	(0.00256)	(0.00253)
Gender		-0.00191**
		(0.000954)
Size		0.00264***
		(0.000612)
Number of founders		0.0714***
		(0.000827)
Age 30-39		0.0508***
		(0.00158)
Age 40-49		0.0690***
		(0.00157)
Age 50-60		0.0786***
		(0.00165)
Low Education		-0.00191**
		(0.000954)
Medium Education		0.0208***
		(0.00105)
High Education		0.0223***
		(0.00137)
GDP	-0.0211***	0.0336***
	(0.00252)	(0.00164)
Population	-3.495***	-0.0123***
	(0.0781)	(0.00251)
Unemployment	-0.273***	-3.130***
	(0.00220)	(0.0770)
Observations	421,263	421,263

This table uses data on all start-ups established between 1986 and 2009, and respective firms' and founders' characteristics retrieved from the database Quadros de Pessoal. The dependent variable is firm survival (dummy variable equaling one if survived the first two years and zero otherwise). The variables of interest are: D90, a dummy variable equaling 1 if the start-up was established between 1990 and 1999 and 0 otherwise, and D00, a dummy variable equaling 1 if the start-up was established between 2000 and 2009 and 0 otherwise. The omitted category is the period between 1986 and 1989. In column (1) we have only the variables of interest and the economic activity controls and in column (2) we add the remaining variables. All models include county, industry and year fixed effects. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1