Entrepreneurship in Portugal: Aggregate Trend and Evolution of the Individual Characteristics of Entrepreneurs

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Abstract

Entrepreneurship has a major role in economic growth, job creation and social mobility. However, it has been documented its decline in the past decade. We study entrepreneurship in Portugal between 1998-2014. We define entrepreneurs as self-employed with employees. The rate of entrepreneurship –that is, the proportion of entrepreneurs in the labor force– has decreased for the aggregate level and, also, for decompositions based on education level, area of residence and age group. We proceed to study the entrepreneurs' characteristics such as age, education level, area of residence, gender and nationality. Entrepreneurs are older and more educated. We regress entrepreneurs on the previously mentioned characteristics. The highest coefficients are on older age groups and higher education levels, meaning that individuals with that particular set of characteristics are more likely to be an entrepreneur. Further, the Blinder-Oaxaca Decomposition is used to study the mean difference on being an entrepreneur; first, for the first and last year and, second, for every pair of consecutive years. We found that endowments have become more favorable to entrepreneurship. However, the coefficients effect dominates, decreasing the entrepreneurship mean. Thus, the coefficients on the characteristics have become lower. We study the most common previous occupational choices of entrepreneurs and find a surge of individuals leaving unemployment for entrepreneurship; yet the total entrance in entrepreneurship has decreased. Finally, we study the relation between aggregate entrepreneurship, real GDP growth and unemployment. However, we discard those two series as causes for the decline in entrepreneurship.

Resumo

O empreendedorismo tem um papel relevante no crescimento económico, na criação de emprego e na mobilidade social. Contudo, este tem vindo a diminuir na passada década. Estudamos empreendedorismo em Portugal entre 1998-2014. O empreendedor é definido como um trabalhador por conta própria que emprega. A taxa de empreendedorismo –proporção de empreendedores na população ativa– está diminuindo tanto em termos agregados como, também decompondo a mesma por grupos etários, níveis de educação e áreas de residência. Procedemos com o estudo das características dos empreendedores; como idade, género, nível de escolaridade, área de residência e nacionalidade. Os empreendedores estão mais velhos e têm maior escolaridade. Regredimos empreendedor nas características anteriores. Os coeficientes mais elevados são em grupos etários mais velhos e em indivíduos com maior escolaridade. Assim, indivíduos com estas características têm maior probabilidade de serem empreendedores. Em seguida, a Decomposição de Blinder-Oaxaca é utilizada para estudar a diferença na média de ser empreendedor; primeiramente, para o primeiro e último ano, seguidamente, para todos os pares de anos consecutivos. Descobrimos que a evolução das características é favorável ao empreendedorismo. Contudo, o efeito dos coeficientes é dominante, diminuindo a média de empreendedor. Assim, os coeficientes nas características diminuíram. Estudamos as anteriores ocupações dos empreendedores e descobrimos que há um aumento de anteriores desempregados que entram no empreendedorismo, contudo, a entrada total no empreendedorismo diminuiu. Por fim, estudamos a relação entre empreendedorismo agregado, crescimento real do PIB e desemprego. No entanto, excluímos estas séries como possíveis causas da diminuição do empreendedorismo.

Keywords: Entrepreneurship; Self-employment; Blinder-Oaxaca Decompostion.

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While writing this thesis I had companions from my island that were also writing their thesis. We shared mutual motivation and support, to whom I shall thank.

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1. Introduction

Entrepreneurship is a driver of change. Entrepreneurial businesses introduce new goods, services and production processes that lead to a rise on living standards and generate long term economic growth (Smith, 1776; Schumpeter, 1942; Lucas, 1978). On a highly competitive fast pace world, the relevance and importance of these businesses for technological progress and competitiveness between countries is greater than ever.

The study of entrepreneurship is wide. Entrepreneurship has been linked to (1) economic growth, small and young businesses are associated with the creation of groundbreaking technologies and, these businesses also adapt faster and adopt more rapidly new technologies (Acemoglu et al. , 2013; Akipt and Kerr, 2015); (2) job creation, young and small firms are the greater net contributors to job creation in the US (Decker et al., 2014; Adelino et al., 2016); (3) economic mobility and inequality, opening a business might be a way to leave poverty and even become rich. In this topic the research differs once the mean income of an entrepreneur is usually lower when compared to a dependent worker (Quadrini, 2000; Canetti et al., 2006).

The study of entrepreneurship has recently become more relevant. It was documented that the aggregate rate of entrepreneurship (Hyatt and Spletzer, 2013; Decker et al., 2014; Kozeniauskas, 2017) –proportion of entrepreneurs in the labor force– has been decreasing for the US and, as we find, also in Portugal. The consequences of such decline in aggregate entrepreneurship are diverse, for instance: higher market concentration, higher income inequality, lower employment, and possible lower long-term economic growth. Thus, the study of entrepreneurship is complex and diverse. To study this reality, new and more complete datasets are becoming available opening the research for new contributions on this topic.

This dissertation aims to study entrepreneurship in Portugal. We start by studying aggregate entrepreneurship. For that we use data from the Portuguese Labor Survey from 1998 to 2014. The dataset that we use has some particular information, it divides the self-employed between self-employed with employees and self-employed without employees. The majority of the studies in entrepreneurship define an entrepreneur as a self-employed individual but we go further, defining an entrepreneur as a self-employed that employs. The aggregate rate of entrepreneurship is thus defined as the proportion of entrepreneurs, self-employed individuals

that employ, in the labor force. We find that, as has been found for the US, aggregate entrepreneurship has decreased in Portugal by 1.4 p.p between 1998 and 2014. Further, we decompose the rate of entrepreneurship by age group, education level and area of residence. The first result holds for the majority of the decompositions, that is, the entrepreneurship rate has decreased in almost every region, for almost every age group and for almost all education levels. However, the decline is not homogeneous for all the decomposed subgroups.

Not everyone can become an entrepreneur. Individual characteristics play an important role. We study the role of individual characteristics as age, education level, gender, area of residence and nationality of the labor force participants in the likelihood of becoming an entrepreneur. First, we do it using the linear probability model for binary response for all observations, defining being an entrepreneur as the outcome variable and the characteristics of the individuals that belong to the labor force as the dependent variables. The coefficients on each characteristic represent how valuable such characteristic is, that is, having or not having a specific characteristic increases or decreases the probability of an individual to be an entrepreneur. Since the aggregate entrepreneurship rate has decreased we look for significant changes in the entrepreneur's characteristics and labor force that might have justified such decrease. For that, in order to measure the changes in the coefficients and in the endowments, we use the Blinder-Oaxaca Decomposition, comparing the first year of our analysis, 1998, with the last year, 2014. Further, we do the procedure for every pair of consecutive years in order to analyze aggregate entrepreneurship during crisis and foreign economic aid and the subsequent recovery.

We found significant changes in the individual characteristics of the labor force in Portugal during these years. The labor force is older and more educated. These factors would, for a certain extent, increase the likelihood of an individual becoming an entrepreneur and, thus increase the aggregate rate of entrepreneurship. That is, the endowments effect in the Oaxaca Decomposition has actually played a positive role for entrepreneurship, since, at the end of our analysis, the labor force characteristics are more favorable to entrepreneurship. But the coefficients effect dominates the endowments effect in almost every year. The coefficients effect has the opposite sign of the endowments effect and is making aggregate entrepreneurship to decrease. Thus, the coefficients on the characteristics that we control for have become, on average, lower. Some other variables, exogenous, are the reason for such decline in aggregate

entrepreneurship while, most of the individual characteristics –that we control for– are helping entrepreneurship, although, we do not assume causality.

The origin of the decline in entrepreneurship might be somewhere else besides the individual characteristics of the labor force. We complement our analysis by studying the previous occupation of the entrepreneurs and what they become after leaving entrepreneurship. Occupational backgrounds are related with individual skills, characteristics and preferences. The previous occupational choices studied are: being a salaried worker, being out of the labor force, being unemployed and being self-employed without employees. This study finds that while entrepreneurship has become more popular for the unemployed people, the entrance into entrepreneurship from all other occupational choices has declined. Adding to this, entrepreneurs maintain their position for longer periods of time, that is, if he/she already was an entrepreneur last year then it is more likely that he/she remains one. On the other hand, the former entrepreneurs leave entrepreneurship to become mostly employees or get retired.

Finally, we complement the temporal analysis of the entrepreneurship by studying macro data for that period. First, we analyze the relation between GDP and aggregate entrepreneurship, that is, to what extent changes in the aggregate entrepreneurship rate would affect changes in the gross product. Second, we study how unemployment and aggregate entrepreneurship relate; since both are mutually exclusive occupations, it would be expected that the relationship is negative. The relations between unemployment and GDP growth with aggregate entrepreneurship are studied in the literature. We find it interest to study the relations between those macro series with entrepreneurship because, in one hand, the results for Portugal may be different to the results for other countries, on the other hand, since we use a different definition of entrepreneurs, a stricter group of individuals, we might also reach different results.

The next section outlines the main studies in this area by topics. Section 3 does an overview of the data collected; section 4 defines an entrepreneur; section 5 characterizes the entrepreneurs; section 6 has the empirical analysis, presenting firstly the estimated results for the Linear Probability Model and, secondly, for the Oaxaca Decomposition while also introducing briefly these methods; section 7 evaluates the previous occupation backgrounds of entrepreneurs; section 8 relates aggregate entrepreneurship and unemployment with real GDP growth; section 9 concludes and comments on limitations and future research.

2. Literature review

2.1. Declining entrepreneurship trend

The declining entrepreneurship trend has being documented in the United States by Decker et al. (2014) The authors of this study conceive entrepreneurship as a main driver of job creation and economic dynamism. Even tough, they refer the downward trend for entrepreneurial businesses in the US, they do not present reason for that so.

Then reasons for this decline in aggregate entrepreneurship are presented by Kozeniauskas (2017). This author uses a general equilibrium model of occupational choice that accommodates different reasons for the decline. The reasons studied for the decline in aggregate entrepreneurship are (1) skill biased technological change, (2) superstar firms hypothesis and (3) increases in the fixed costs either by changes in the regulation or technological change. Besides addressing this decline, this paper also shows that the decline has been higher for more educated individuals and that there has been a shift in the economic activity away from entrepreneurs. This study uses cross section micro level data on individuals to compute the aggregate rates of entrepreneurship, as this work that uses data on the labor survey. The main findings are that this decline is mainly due to increases in the fixed costs and skill biased technical change.

2.2. Demographics and entrepreneurship

In terms of demographics, entrepreneurs age is an important factor. There are different theories on this topic. On one hand, human capital tends to grow with age, certain skills need time and experience to be developed and young individuals lack them, skills as: decision making, leadership, market knowledge are intrinsically related with increasing with age and experience. This idea of need for on-job training is in line with the Becker's model (Becker, 1964) on Human Capital. On the other hand, characteristics more common for younger individual are energy and creativity, as well as lower risk aversion.

Liang et al. (2014) go far on this point and say that the age structure of the population has clear consequences on entrepreneurship. First, bigger older age cohorts are associated with higher competition in the labor market. These individuals are occupying the high-level management positions that are crucial to develop the skills needed to be a successful entrepreneur, postponing the younger cohorts' development of these skills. The relation between entrepreneurship and age is then an inverted u-shape. Their results show that a decrease in the median age of the population increases the new business formation rate. Thus, it is expected that countries with a younger labor force experience greater rates of entrepreneurship, such as United States, compared to countries where aging process is quite intense, such as Japan. Adding to this, there is a rank-effect, that is, not only there are more entrepreneurs in younger countries, these countries also have higher rates of entrepreneurship for all age cohorts.

On the other hand, age is also considered a key success predictor. Successful high growth firms are run by middle-aged people (Azoulay et al., 2018). The idea that young individuals are highly creative and capable of producing big ideas is not true. Instead, older founders are more likely to run successful firms.

2.3. Personality Traits of Entrepreneurs

Pekkala et al. (2017) do a review of recent studies on entrepreneurship in multiples areas. The main conclusion draw is that microeconmetric studies often do not include psychological variables or personality trait variables that might be important to predict entrepreneurship dynamics as well as highly successful outcomes.

Levine and Rubinstein (2015) have a very new approach studying this matter. First, they desegregate self-employment into incorporated and unincorporated. Second, they include variables such as exam scores, likelihood of doing illicit activities during studies and self-esteem levels on their analysis.

2.4. Entrepreneurship and Job Growth

Young firms are more responsive to changes. Although the lack of financing can be a constraint for this firms to seize new opportunities (Adelino et al., 2017). Once more, these firms'

importance on job creation is referred, the role of their special characteristics, such as higher flexibility and higher innovativeness compared to non-entrepreneurial firms play an important role on their ability to generate jobs.

2.5. Modeling entrepreneurship

Modeling entrepreneurship is complex. Different models are used to study entrepreneurship. Occupational choice models are commonly used. Individuals chose between paid work, entrepreneurship and being out of the labor force based on their skills, preferences and on incentives of each occupational choice –that is, the wage rate of their type for each occupational choice. Lazear (2002) uses this type of model based on the hypothesis that entrepreneurs are not highly specialized but rather competent on very different skills and tasks. Also Kozeniauskas (2017) this type of model.

Regarding the entry, exit and firm dynamics Hopenhayn (1992) proposes a long run equilibrium proportion of business owners, i.e. entrepreneurs, in the labor force. Fixed costs and entry costs are found to have a great impact on firms' earnings distribution and prevalence in the market.

In terms of the individual decision between paid work and self-employment, includes entrepreneurship, Dillon and Stanton (2017) model this using a life-cycle model of future earnings. Individuals will get to know better their prospective earnings as self-employed when they enter self-employment and they will keep learning about their earnings while they remain in self-employment. In case their future earnings are smaller for self-employment then they change back to paid work. This option of returning to paid work has high monetary value, individuals are more likely to experiment self-employment if they know for sure that they can easily get back to paid work. Adding to this, they evaluate policies for entering into self-employment by increasing incentives within the model's framework. The two policies studied were, first, subsidies for entry into entrepreneurship and second, a flat tax rate for self-employment earnings. Both polices are effective in terms of increasing the entry into self-employment although neither policy has a net positive effect on Government's Revenue.

3. Data

We use data from the Portuguese Labor Survey from 1998 to 2014. The data is collected by the Portuguese Statistics Bureau (Instituto Nacional de Estatística). There are differences among the quarter observations. The Bureau has two different series for the period, one from 1998-2010 and another form 2011-2015. Within the same series some variables are extinguished, other added and some take different outcomes. Although, the variables used in this study are present in both series and are compatible by making some transformation in the case the outcome of a certain variables changes. Also, the survey follows individuals for six quarters. That makes it possible to evaluate the likelihood of an individual become an entrepreneur on a six-quarter period but not for the overall period. This particularity of using partial longitudinal information contained in the dataset is not exploited in this study.

To study entrepreneurship the dataset used is complete. It distinguishes between self-employed that do not have employees and self-employed that employ. That feature is not commonly found in datasets of this type neither used on the majority of the studies on entrepreneurship. The samples simple size is big. It consists of approximately 40 thousand observations for every quarter (Tables 9 and 10 – Appendix). Using frequency weights, we can get the approximate representativeness of each observation in the Portuguese population.

Nevertheless, the dataset has some limitations. Variables on personality or skills such as test scores, self-esteem levels, risk aversion, propensity to do small illegal activities, among others are not included in the dataset. These types of variables are of interest to study entrepreneurs either to study success of entrepreneurs, leading factors to enter entrepreneurship or just correlation, that is, which characteristics are more common among entrepreneurs. Also, it does not include data on income or wealth for the self-employed, making not possible to compute the returns to entrepreneurship. It also would be interesting to have more information related with the business ownership that the dataset does not contain. For instance, if the individual owns a business or not – not all self-employed necessarily own a business – and more data on the businesses owned: age, dimension, among others.

3.1. Overview

It is important to know the dynamics of the population and of the labor force during 1998-2014. As Table 1 shows the population has increased by 1.8% increase, about 183 thousand individuals. The labor force also has increased by 1.5%. And, on the other hand, the Working Age Population has decreased, by 1.5% decrease, resulting on a higher Labor Force Participation Rate.

Table 1 - Labor Force Participation Rate

	1998	2014
Population	10,184,997	10,368,054
Labor Force	5,113,733	5,189,857
Working age Population	6,872,417	6,769,649
Labor Force Participation Rate	74.41	76.66

Table 2 – Number of Individuals by Occupational Choice and Percentages of the Labor Force

	Employees		**Self-Employed**		**Self-Employed wo/ employees**		**Entrepreneurs**	
	1998 Q4	2014 Q4	1998 Q4	2014 Q4	1998 Q4	2014 Q4	1998 Q4	2014 Q4
Number of individuals	3,496,908	3,659,411	1,231,954	811,766	939,414	580,302	292,540	231,464
% of the labor force	68,38	70,51	24,09	15,64	18,37	11,18	5,72	4,46
Difference	162503		-420188		-359112		-61076	
% change	4,65%		-34,11%		-38,23%		-20,88%	

Using the variable work situation (Table 25 – Appendix) to identify the entrepreneurs. This variable has 4 relevant different outcomes: the individual is an employee –that is, he or she works for someone else– the individual is self-employed without employees, the individual is self-employed and employs at least one employee and the individual is an unpaid family worker. Given the outcomes of the variable work type we can distinguish two types of self-employment: self-employed that does not employ and self-employed that employs. The sum of the two gives the total number of self-employed.

Self-employment has decreased both in total as well as decomposed into two subgroups. There are more inhabitants and more individuals in the labor force although self-employment has decreased while it would be expected to increase. Only the working age population has been reduced but that decline is considerably small compared with the decline on self-employment.

Table 2 shows that the proportion of the Labor Force that were self-employed accounted for 24.09% of the Labor Force, in 1998, and only 15.64% in 2014. Self-employed without employees represented 18.37% in 1998 and by 2014, represent 11.18%. The self-employed with Employees accounted for 5.72% of the labor force in 1998 and, in 2014, 4.46%.

Self-employed has decreased more than a third. In 1998, 1,231,954 individuals were self-employed, in 2014, there is 811,766 individuals in this condition. There are less 420,188 self-employed in Portugal. The self-employed without employees has decreased by 38.2% while the self-employed with employees has decreased by 20.9%. The decrease on the total self-employed is mainly due to the self-employed without employees, 85% of the decrease in self-employment is from those individuals.

Regarding the dynamics over the period studied, Figure 1 shows that the labor force has increased until 2007, in that year it has reached the maximum of individuals. While the number of self-employed was already decreasing, it started decreasing approximately in 2001 or even earlier, and from that year on, the number of individuals with this occupation has been decreasing until at least late 2014. There is a flight of individuals from self-employment that antecedents the decrease on the labor force. In order to study entrepreneurship in more detail we strict our analysis to a subgroup of self-employment.

Figure 1 - Labor Force and Self-employment Evolution, in thousands
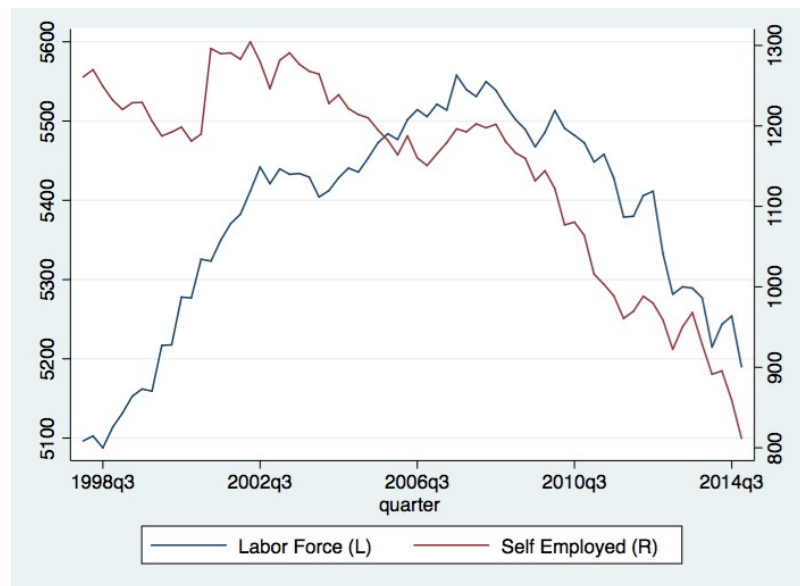
4. Definition of an entrepreneur

Defining entrepreneurship and an entrepreneur is difficult. Schumpeter's definition of entrepreneurship is firms that can created highly innovative goods or production processes. The latter businesses will overtake the established ones, the process that was called "creative destruction". Those firms are associated with the high-tech industry and produce great technological progress to the society. But that type of businesses is difficult to account. Because there is a lot of uncertainty on a firm's success.

The most common definition of an entrepreneur in the literature is defining an entrepreneur as self-employed. Although, some of the self-employed might have liberal professions or be contracted workers such as housekeepers, lawyers, artists, architects, musicians, doctors, among others. They do not necessarily run and/or own a business. The dataset has that information but also has information on whether self-employed have employees.

Entrepreneurs are defined as Self-Employed that employ and this group is studied in more detail. This definition goes further than many other studies on entrepreneurship. Because it excludes self-employed that do not have any employee.

There is no guarantee that the defined entrepreneurs indeed run a business or are business owners, but it is highly expected that they do, once they have employees. Having employees is also a sign of commitment and responsibility. The definition used is a good proxy to study aggregate business ownership dynamics.

4.1. Aggregate Rate of Entrepreneurship

The aggregate entrepreneurship rate is the proportion of the labor force that are entrepreneurs. That is, self-employed with employees. The rate was computed for every quarter between 1998 to 2014.

To study the incidence of entrepreneurship for specific sub-groups, for instance different education levels, the following procedure is done:

$$entrepreneurship\ rate_{it} = \frac{subgroup\ of\ entrepreneur_{it}}{labor\ force\ subgroup_{it}}$$

i denotes the different sub-groups, for instance age, educational level or area of residence

4.2. Alternative Definitions

Alternative rates were also computed. Besides the entrepreneurship rate, the rates computed were: self-employment rate, rate for self-employed that do not have employees, rate for entrepreneurs, that have more than 10 employees. The denominator for all rates is the number of individuals in the labor force. The proportion of the labor force for all types of self-employment has declined.

Figure 2- Self-Employment Rates Evolution
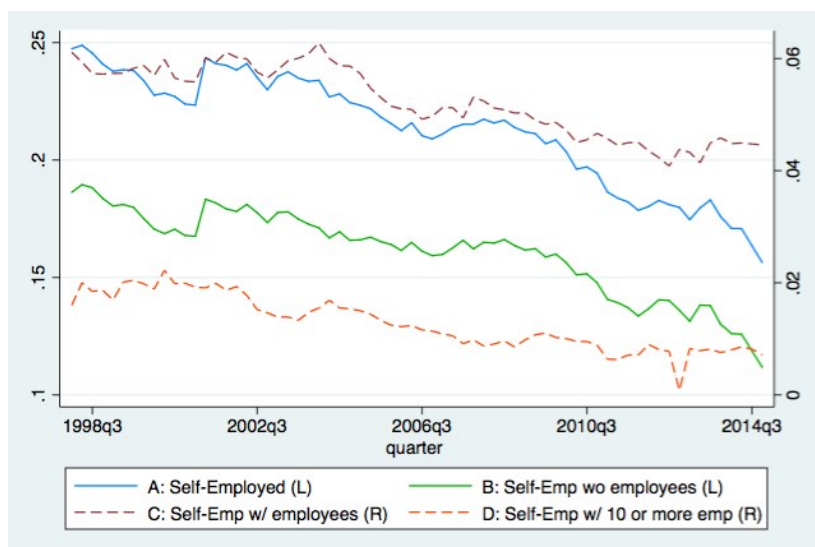
Figure 2 shows that independently of the definition used or the type of self-employment studied all has major declines. As stated in section 3.1., the self-employed without employees had the biggest decline. Even controlling for very small firms entrepreneurship, that is, excluding entrepreneurs with less than 10 co-worker, has decreased.

5. Entrepreneurs

There are less entrepreneurs in Portugal. There were 292.5 thousand entrepreneurs in 1998. In 2014, there were less 64 thousand entrepreneurs. The number of entrepreneurs has decreased by 20.88%.

Figure 3 - Aggregate Entrepreneurship
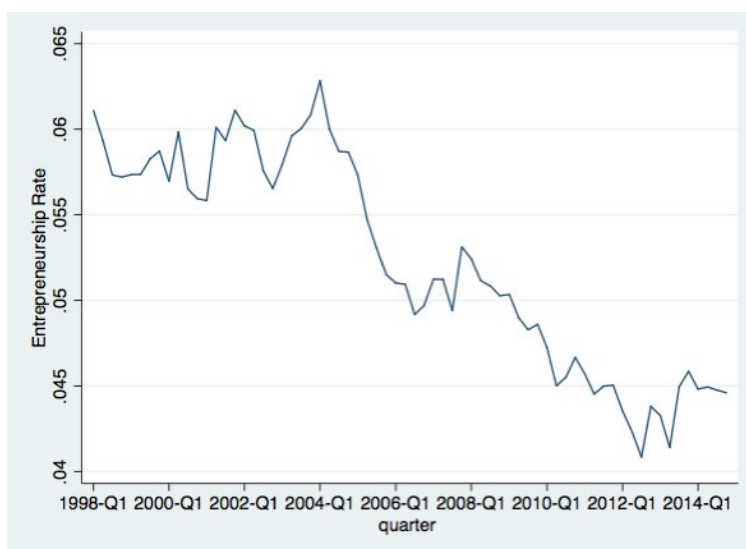
Aggregate entrepreneurship has declined from 5.9% to 4.5%. This decline might be different based for different groups of entrepreneurs. To evaluate that we decompose the aggregate rate of entrepreneurship by age groups, education levels and areas of residence to look for incidence of entrepreneurship among different groups.

5.1. Decomposed Rates of Entrepreneurship

5.1.1. Age

Regarding age, the rates of entrepreneurship were computed for 7 different age groups.

Figure 4 - Entrepreneurship Rates by Age

Figure 5 - Differences between the average rates of 1998 and 2014
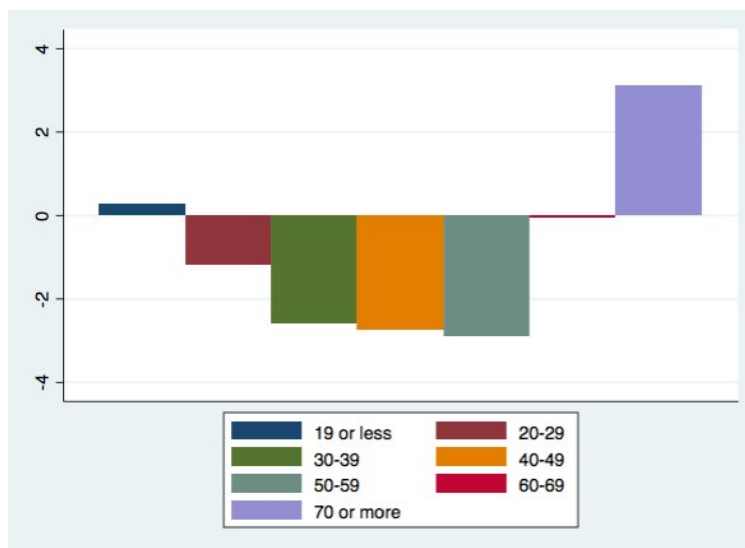
The highest rates of entrepreneurship are for middle age individuals or older (Figures 4 and 5; Table 13 – Appendix). The age groups with the highest rates in 1998 were 50-59, 60-69 and 40-49 with 8.93%, 8.29% and 8.19%, respectively. For almost every age group the entrepreneurship rates have decreased. The rate for age group 50-59 had the biggest decline, decreased by 3%, followed by the age group 40-49, decreased by 2.7%. and by 30-39, decreased by 2.6%

On the other hand, entrepreneurship is becoming more common among the oldest age group, 70 or more years old had a major increase by 3%. The incidence of entrepreneurship among individuals in that age were not that big in 1998, but it has grown and has become the second age group with the highest incidence of entrepreneurship. One reason for high rates of entrepreneurship in this age group is that the majority of the employees are already retired. On the other hand, the very young have low rates

5.1.2. Area of Residence

Algarve and Alentejo have the highest rate of entrepreneurship, with 7.7% and 6.6%, respectively, in the beginning of 1998 (Figures 6 and 7; Table 12 – Appendix). These two regions kept their leadership in terms of entrepreneurship rate on the majority of the period.

On the other hand, Madeira and Azores have the lowest incidence of entrepreneurship, 2.7% and 4.8% in 1998, respectively. There are signs of a timid convergence the national average rates for those two regions.

Entrepreneurship has decreased in all regions of Portugal, excluding Madeira. The leading regions of entrepreneurship were the ones with biggest declines in percentage points, Algarve and Alentejo, 2.81 and 1.82 p.p. difference between 1998 and 2014, respectively.

Figure 6 - Entrepreneurship Rates by NUT
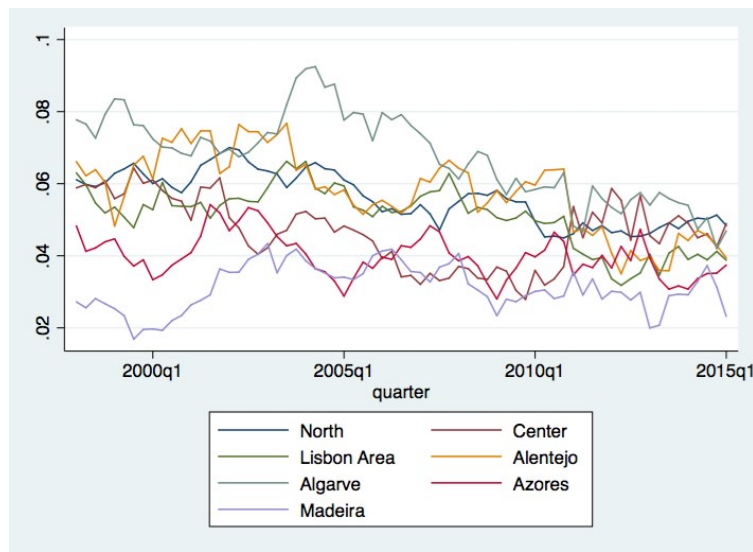
Figure 7 - Differences between the average rates of 1998 and 2014
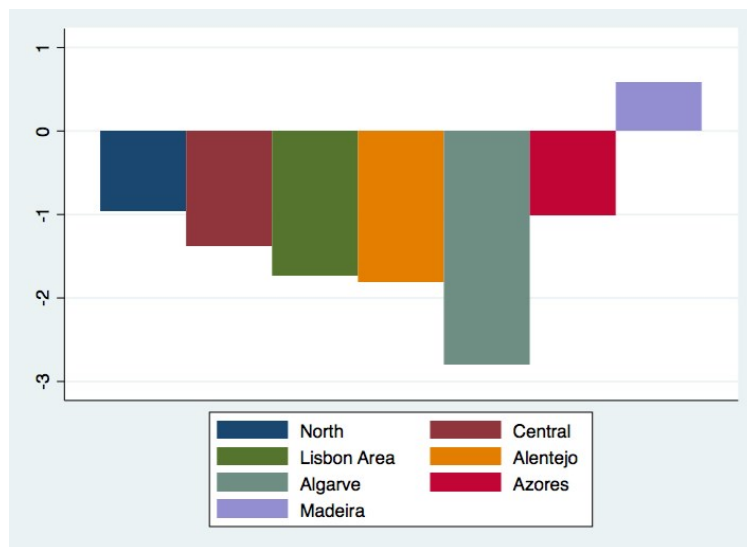
5.1.3. Education Level

Entrepreneurship is more common for individuals with lower levels of education (Figures 8 and 9; Table 11 – Appendix). Individuals with less than high school and individuals with high and some college. The ones that hold an undergrad degree had the highest rate in 1998, 6.23%, although it has decreased on the following years.

Figure 8 - Entrepreneurship Rates by Education Level
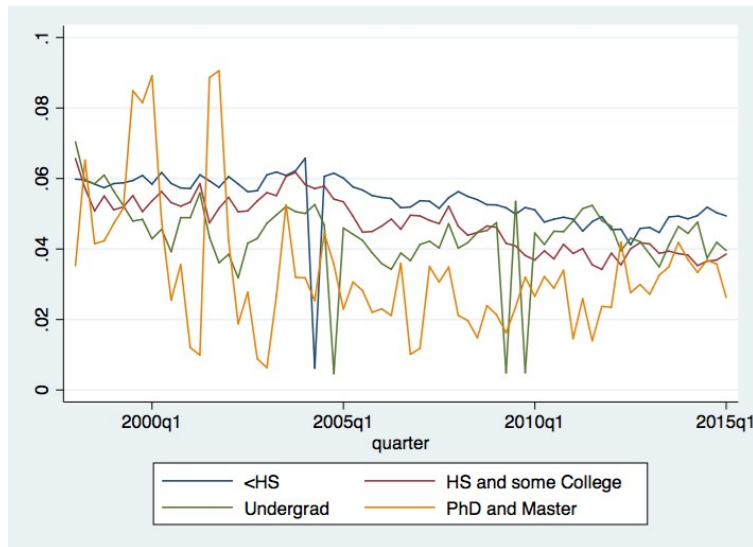
Figure 9 - Differences between the average rates of 1998 and 2014
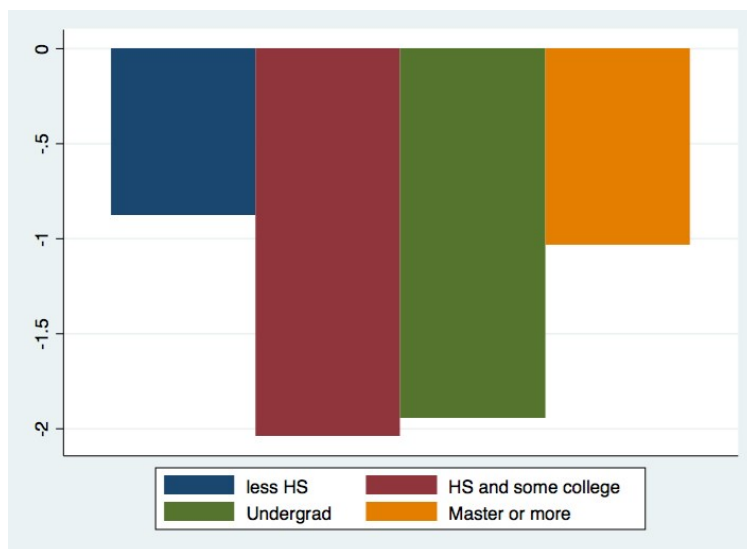
Entrepreneurship has decreased for all education levels. The higher levels of education were more affected as it was documented in the US by Kozeniauskas (2017). The least affected by the decrease were individuals that had less than high school.

5.2. Entrepreneurs' Profile

The entrepreneur's profile has changed during this period. Analyzing the entrepreneurs profile is complementary to analyzing the aggregate trend. What type of entrepreneurs are leaving entrepreneurship?

This section compares the characteristics of entrepreneurs their evolution and compares them with the remaining occupational choices.

5.2.1. Age

Entrepreneurs are older than the employees but younger than the self-employed without employees. Entrepreneurs are, on average, 47 years old (Table 3). The mean of the entrepreneurs age is 7 years older than the overall population, 8 years older than the employees, and 7 years younger than the self-employed without employees.

Table 3 - Age by Work Condition

	Population	Employees	Self-Employed	Self-Employed wo Employees	Entrepreneurs
Mean	40.4	38.8	51.9	53.7	46.9
Median	40	38	52	54	46
Std. Dev	22.73	11.56	14.62	15.08	11.68

Table 4 - Age Groups Proportions for the whole period

Age Group	Population	Employees	Self-Employed	Self-Employed wo Employees	Entrepreneurs
19 or less	21.49	2.12	0.19	0.23	0.05
20 to 29	13.45	22.86	5.64	5.59	5.61
30 to 39	14.93	29.58	16.83	14.65	23.26
40 to 49	14.27	25.23	22.44	19.58	31.36
50 to 59	12.60	16.15	22.33	21.40	25.16
60 to 69	10.72	3.78	19.07	21.66	11.22
70 or more	12.54	0.28	13.51	16.89	3.33

Entrepreneurs are middle age or older (Table 4). Entrepreneurs with ages between 30 to 59 years old account for the majority of the entrepreneurs, 79.7% of the entrepreneurs are within this age group. Entrepreneurs younger than 30 are not that common, only 5.7%, and, on the other hand, entrepreneurs with 60 or more years old, are also not that common, account for 14.6%.

Employees are younger that entrepreneurs. There is a higher proportion of employees between 20 to 29, 22.9%, compared to the self-employed and lower proportions for older individuals,

aged 60 or more, 4.0%. That is comprehensible to the extent that individuals enter the labor at between 20-29 and leave it at more than 60. Even though, the retirement age has changed during this period it never surpassed the 66 years old.

The later entrance in the entrepreneurship may have different reasons. Individuals need to acquire certain qualities and skills that take time and, more important, are learned working for someone else. On the other hand, certain skills decrease with age such has energy, risk aversion among others. Data shows that is unlike for very young people to open a business. Other reason besides skills that may justify the later entrance into entrepreneurship is based on the life cycle theory. Individuals need to save enough money to pay for the business fixed cost and entrance costs.

Entrepreneurs age follows the same pattern as the population and as the employees (Table 14 – Appendix). There are less very young entrepreneurs and more very old. The young entrepreneurs aged between 20 and 29 represent now only 2% while in 1998 they represented 8%. The proportion for the very old entrepreneurs has almost doubled, from 2.76% in 1998 to 4.18% in 2014.

The data suggests that the young which enter the labor force, aged between 20 and 29, are less likely to become entrepreneurs straight away. They are more likely to start as employees and then move to entrepreneurship. The proportion of individuals with that age is higher for employees that it is for all types of self-employment, and the proportion of middle age entrepreneurs is always higher. On the other hand, entrepreneurs are more likely to retire later than employees, the proportion of individuals with 60 or more is higher for all types of self-employment than it is for employees.

5.2.2. Gender

Table 5 shows that Woman surpassed men as employees. Women were less than men in 1994, 45.2%, while, by the end of 2014 they surpassed men on this group, accounting for 51.5%, this happened on the second quarter of 2010.

Table 5 - Gender

	Overall		Employees		Self-Employed		Self-Employed wo Employees		Entrepreneurs	
	1994	2014	1994	2014	1994	2014	1994	2014	1994	2014
Male	48.22	47.36	54.77	48.46	58.94	65.03	54.03	62.31	74.72	71.83
Female	51.78	52.64	45.23	51.54	41.06	34.97	45.97	37.69	25.28	28.17

Woman's participation into entrepreneurship registered a timid increase. Although participation of woman in entrepreneurship remains lower when compared to other occupational choices. Woman's accounted for only 25.3% of the entrepreneurs, in 1998, and by 2014, they accounted for 28.2%.

5.2.3. Area of Residence

Table 6 show that the north of Portugal leads in entrepreneurship. It is the region in Portugal with more entrepreneurs. In 2016, almost half of the entrepreneurs in Portugal lived in the north and almost a third of the entrepreneurs in Portugal lives in the Lisbon area. Lisbon area and the north of Portugal have approximately the same number of inhabitants. Although, the north has considerably more entrepreneurs.

Table 6 - Area of Residence

	Population		Employees		Entrepreneurs	
	1994	2014	1994	2014	1994	2014
North	35.63	35.01	36.18	34.53	37.92	40.29
Central	17.30	16.32	15.48	16.14	20.07	15.97
Lisbon	33.34	34.76	35.71	35.86	29.73	31.70
Alentejo	5.28	4.80	4.87	4.63	4.87	4.43
Algarve	3.71	4.22	3.37	4.02	4.87	3.99
Azores	2.36	2.39	1.88	2.29	1.50	1.85
Madeira	2.38	2.51	2.50	2.52	1.03	1.76

Central Portugal has had the biggest decline in entrepreneurship. The entrepreneurs living in central Portugal represented 20% of the total entrepreneurs in Portugal, in 1994. By the end of 2014 they represent less 4 percentage points.

5.2.4. Education Level

Portuguese entrepreneurs are becoming more educated. There are more entrepreneurs in all levels of education higher than having less than high school. Figure 10 shows that in 1998, entrepreneurs with the minimum level of education - having less than high school - accounted for more than two thirds of the total of the entrepreneurs. 16 years later the proportion of entrepreneurs with less than high school has decreased to just slightly more than a half.

Figure 10 – Education Level of the Entrepreneurs
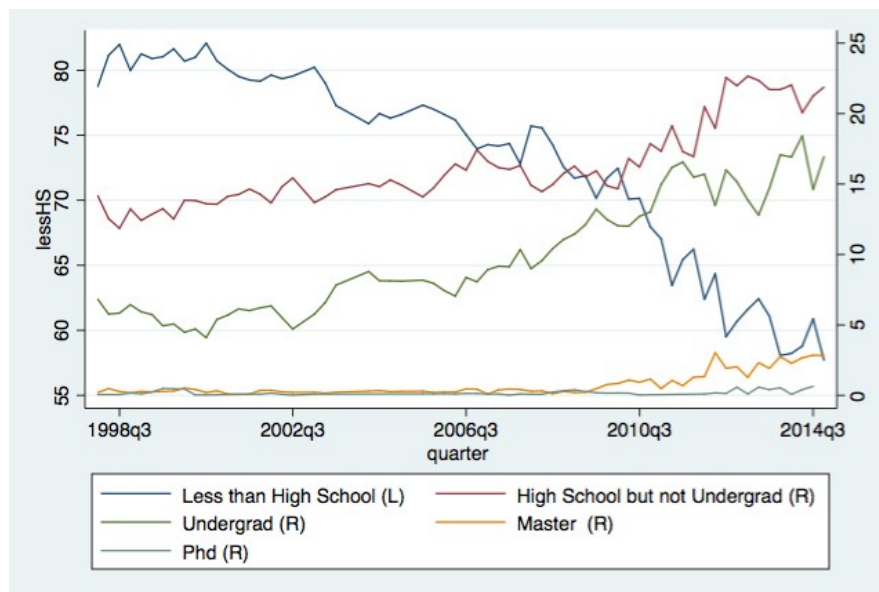
Figure 11 – Education Level of the Employees
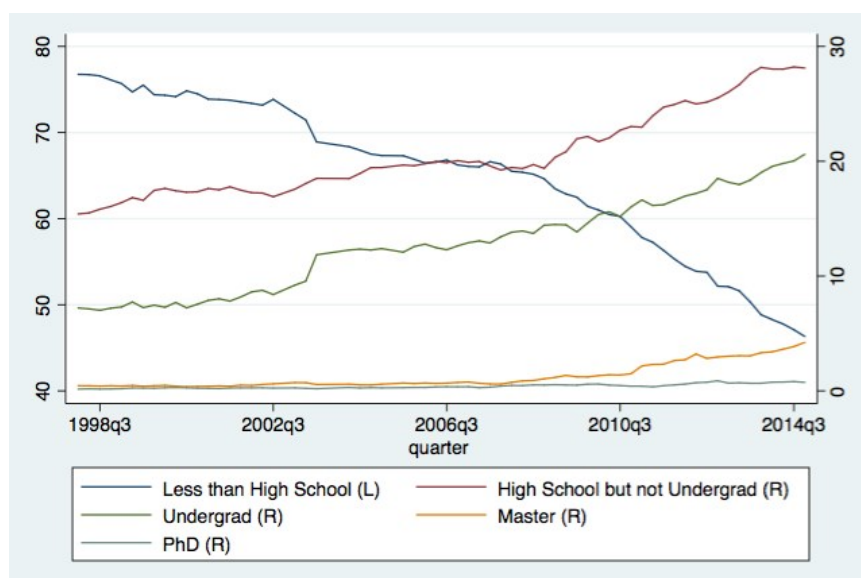
On the other hand, entrepreneurs with the very high level of education such as Masters or PhDs are unlikely. The proportion of entrepreneurs with masters starts to grow more significantly in 2009. Although, in 2014 is still lower than 5%. Entrepreneurs with PhD are rare. There is no clear sign of an increasing trend of entrepreneurs with PhDs.

The level of education in Portugal, during the time period studied, had major increases. There are less people with less than high school and increasingly more people with more than high school, undergrad degree, master's degree and PhD. This upgrade on the level of instruction is higher and faster for the employees and for the entrepreneurs (Figure 10 and 11). By the end of 1998, almost 80% of the entrepreneurs had less than High School, by the end of 2014 they were 58%, for the employees 76% versus 46% by the end of 2014.

Comparing the education change of the entrepreneurs with the employees they look roughly similar. Entrepreneurs are not that more educated when compared to employees (Figure 11). Both groups have progressed, having more people with college degrees, but the proportion of employees with undergrad and master is higher than the one for entrepreneurs. By the end of 2014, 20.60% of the employees have an undergraduate degree versus 16.94% of the entrepreneurs and 4.22% of the employees had a master versus 2.83% of the entrepreneurs. In the contrary, there are very few entrepreneurs with very low education level, only 0.38% in 2014, has less than 3 years of schooling, while this proportion for employees is 1.11%.

5.2.5. Nationality

The vast majority of entrepreneurs in Portugal are nationals (Table 15- Appendix), only 1.63% of the entrepreneurs are foreigner in 1998. The proportion of foreign entrepreneurs has even decreased. There no dominant nationalities among the foreign entrepreneurs, that is, the majority of the most common nationalities of foreign entrepreneur in 1998 are no longer the same in 2014 (Table 16 – Appendix).

6. Conditional Analysis

To help to characterize entrepreneurs and measure how do they differ from the remaining individuals in the labor force in terms of the studied characteristics. The study proceeds with the conditional analysis. Two methods are used to address the characterization. The linear regression model for all observation for all periods and the Oaxaca decomposition to measure the changes, on the effect and on the endowments.

6.1. Characteristics Effect

6.1.1. Methodology

To measure the effect of the entrepreneurs' characteristics in the likelihood of one's becoming an entrepreneur it used is a Linear Probability Model for Binary Response (LPM). In this model the coefficients estimated on the independent variables represent the increases or decreases in the probability of realizing the dependent variable.

The depend variable is equal to one if the individual is an entrepreneur and equal zero otherwise. The independent variables are age, educational level, gender, nationality and area of residence.

$entrepreneur_i = \beta_1 + \beta_{2k} agegroup_{ki} + \beta_{3j} area\ of\ residence_{ji} +$

$\beta_{4l} education\ level_{li} + \beta_4 foreign + \beta_5 female + \varepsilon_i$ (1)

$$k - 1,..,4 \qquad j - 1,..,6 \qquad l - 1,..,4$$

The coefficients are estimated by Ordinary Least Squares, standard errors and t test are robust. . The observations are weighted by a new generated variable that is the weights included in the dataset rounded, frequency weights. That way the observations reflect more closely the real proportions of the population.

The control variables included in the regression are the normal ones included on a wage regression. The literature assumes that these individual characteristics assume an important role for defining a worker's productivity.

The base group of the regression is people who live in the North of Portugal, with age between 20 to 29 years old, with less than High School as education level, who are male and with Portuguese nationality.

Some concerns regarding the properties of the OLS estimators in a Linear Probability Model. Since the outcome variable y is a Bernoulli random variable –it only takes value 0 or 1– the variance of y is the probability of success $P(y=1 \mid x)$ times the probability of failure $P(y=0 \mid x)=1- P(y=1 \mid x)$ (Equation A.2 – Appendix). The variance of the error term is equal to the variance of the outcome variable (Equation A.3 – Appendix). Thus, the variance of the error term depends on the regressors, making the errors heteroskedastic. A solution for heteroskedasticity in the Linear Probability Model is to use the White Robust Standard Errors and compute the t-ratios with this type of errors (Wooldridge, 2002).

The coefficient estimated by the linear probability model are unbiased and consistent (Equation A.1). However, this study is an empirical research and some concerns make the OLS estimators lose their properties. First, there is the possibility of omitted variables, there are definitely other variable that impact one's likelihood of becoming an entrepreneur besides the ones we control for. This problem may overestimate or underestimate the coefficients of our model. Second, the control variables – independent variables - are all categorical, none is a continuous variable. The regressors are considerably restricted and that may turn the model a not so good description of the underlying response probability. However, the model is useful to characterize entrepreneurs and to study their changes, given the data used.

6.1.2. Results

It follows the estimated coefficients of equation (1), section 6.1.1. All regressions have a binary outcome, that is, the dependent variable is a dummy and is defined as one if the individual is an entrepreneur and zero otherwise, all the standard errors are robust.

Table 7 - Estimated coefficients of equation (1)

VARIABLES	(1) Labor Force	(2) Labor Force	(3) Overall	(4) Probit LF	(5) Probit Overall
Age					
19 or less	-0.0150***	-0.0158***	-0.00914***	-0.0402***	-0.0298***
	(2.35e-05)	(2.37e-05)	(1.49e-05)	(3.79e-05)	(8.82e-06)
30-39	0.0321***	0.0336***	0.0322***	0.0583***	0.0475***
	(2.66e-05)	(2.68e-05)	(2.32e-05)	(6.74e-05)	(4.95e-05)
40-49	0.0539***	0.0560***	0.0504***	0.0879***	0.0679***
	(3.17e-05)	(3.20e-05)	(2.74e-05)	(7.91e-05)	(5.76e-05)
50-59	0.0606***	0.0634***	0.0460***	0.0975***	0.0644***
	(3.77e-05)	(3.81e-05)	(2.82e-05)	(8.68e-05)	(5.82e-05)
60-69	0.0673***	0.0697***	0.0216***	0.108***	0.0331***
	(5.81e-05)	(5.81e-05)	(2.46e-05)	(0.000108)	(4.90e-05)
70 or more	0.0406***	0.0432***	0.00296***	0.0704***	-0.00589***
	(7.25e-05)	(7.26e-05)	(1.81e-05)	(0.000123)	(2.90e-05)
female	-0.0419***	-0.0419***	-0.0296***	-0.0375***	-0.0294***
	(2.34e-05)	(2.34e-05)	(1.37e-05)	(1.48e-05)	(8.53e-06)
Education Level					
HS but not college	0.00577***	0.00872***	0.00607***	0.00445***	0.00373***
	(3.16e-05)	(3.21e-05)	(2.24e-05)	(2.66e-05)	(1.75e-05)
Undergrad	0.00561***	0.00947***	0.0100***	0.00340***	0.00677***
	(3.82e-05)	(3.87e-05)	(3.23e-05)	(3.26e-05)	(2.20e-05)
Master	-0.00880***	-0.00135***	0.000222***	-0.0120***	-0.00378***
	(9.37e-05)	(9.45e-05)	(8.55e-05)	(0.000110)	(7.34e-05)
PhD	-0.0374***	-0.0335***	-0.0215***	-0.0410***	-0.0198***
	(0.000153)	(0.000153)	(0.000138)	(0.000250)	(0.000160)
Area of Residence					
Central Portugal	-0.0126***	-0.0131***	-0.00286***	-0.00994***	-0.00252***
	(3.41e-05)	(3.41e-05)	(1.97e-05)	(2.39e-05)	(1.70e-05)
Lisbon area	-0.00653***	-0.00703***	-0.00436***	-0.00542***	-0.00394***
	(2.97e-05)	(2.97e-05)	(1.64e-05)	(2.15e-05)	(1.38e-05)
Alentejo	-0.00169***	-0.00192***	-0.00191***	-0.00153***	-0.00160***
	(6.18e-05)	(6.18e-05)	(3.18e-05)	(4.42e-05)	(2.77e-05)
Algarve	0.00798***	0.00817***	0.00490***	0.00609***	0.00443***
	(7.01e-05)	(7.00e-05)	(3.89e-05)	(5.16e-05)	(3.36e-05)
Azores	-0.0157***	-0.0149***	-0.00947***	-0.0130***	-0.00964***
	(7.55e-05)	(7.55e-05)	(3.85e-05)	(5.48e-05)	(3.31e-05)
Madeira	-0.0248***	-0.0243***	-0.0133***	-0.0202***	-0.0131***
	(6.39e-05)	(6.39e-05)	(3.47e-05)	(4.48e-05)	(2.88e-05)
foreigner	-0.00585***	-0.00424***	-0.00189***	-0.00628***	-0.00331***
	(6.10e-05)	(6.12e-05)	(4.19e-05)	(5.47e-05)	(3.73e-05)
year fixed effects	no	yes	yes	no	no
quarter fixed effects	no	yes	yes	yes	yes
Constant	0.0376***	0.0459***	0.0299***	-1.974***	-2.0830***
	(2.69e-05)	(5.95e-05)	(3.46e-05)	0.00048	0.00047
Observations	344,027,292	344,027,292	617,617,882	344,027,292	617,617,882
R-squared	0.021	0.022	0.026		
Pseudo R2				0.0584	0.1128

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Regression 2 (Table 7) is chosen because it controls for years and quarters, it restricts to individuals belonging to the labor force and are roughly similar to the Probit margins. The LPM model coefficients do not assume odd values; they represent the probabilities, and none is higher than 1 or lower than -1.

Setting all dummies equal to zero gives the constant of the regression. That is, one's average probability with set of characteristics of the base group to be an entrepreneur. In this case, the probability for this group is 4.59% out of the labor force. Having or not having a specific characteristic increases or decreases the probability of a labor force individual to be an entrepreneur, compared to the base group. We do not assume causality, that is, a specific characteristic causes an individual to be an entrepreneur. The relationships between the independent variables (characteristics) and the outcome variable (being an entrepreneur) are of correlation.

The variable that has higher coefficients is age. For the all years' regression, the age groups with higher coefficients are 50 to 59 years and 40 to 49. If the individual is between 50 and 59 years old the probability of being an entrepreneur increases by 0.0634 when compared to the base group. If the individual belongs to the age group that follows, between 60 and 69 years old, the probability increases by 0.0697 compared to the base group. A t-test was performed in order to access whether the coefficient on age group 60-69 is greater or equal than the coefficient on the age group 50-59. The p-value equals 0 thus we reject the null. Meaning that the age group between 60 and 69 is the likely among entrepreneurs.

Education level also has a significant role. Having high school and some college and holding and undergrad degree increases the probability of an individual being an entrepreneur. If an individual has high school and some college, the probability of being an entrepreneur increases by 0.00872 compared to the base group and by 0.0095 if he has an undergraduate degree. On the contrary, having a master's degrees and a PhD actually decreases the probability of an individual to be an entrepreneur. The coefficients on different education levels suggest that, in one hand, entrepreneurs are, on average, more educated than the labor force and, on the other hand, individuals with very high levels of education such as PhD are unlikely to be entrepreneurs.

Regarding gender, female entrepreneurs are less, the probability decreases by 0.0419. As it was stated in section 5.2.2, there are significantly less entrepreneurial women both at the beginning and at the end of the analysis.

Only for an individual in Algarve is more likely to be an entrepreneur. The probability for the individuals that live in that region increases by 0.00817 compared to an individual that lives in the North. For every other region is less likely for an individual to be entrepreneur compared to the North of Portugal.

Lastly, foreign entrepreneurs are less likely than individuals with Portuguese nationality, if he or she is foreigner the probability of being an entrepreneur decreases by 0.00424 compared with the Portuguese.

The highest prevalence of entrepreneurship is among individuals that live in Algarve, with age between 60 and 69, that have High School or some college, that are Portuguese and male. Summing this all coefficients to the constant gives 0.1255 probability for this group.

On the other hand, the least likely incidence of entrepreneurship is among individuals that live in Madeira, that are 19 or younger, that hold a PhD, that are female and have foreign nationality. For this hypothetic group, the sum of the coefficients is negative and gives -9,61%. There is no individual that reunites those particular characteristics, just having a PhD with 19 or less years old is already rather impossible.

6.2. Blinder-Oaxaca Decomposition

6.2.1. Methodology

Once the effect of the independent variables is measured for the whole period considering all observations it is important to study how does this effect have changed along the period analyzed and measure the change on the mean value of the dependent variable. For that it is used the Blinder-Oaxaca Decomposition, this method determines differences in the mean of the dependent variables in two different groups as well as measures the contribution of each variable in the mean difference.

The decomposition was first introduced by Oaxaca (1973). This decomposition is frequently used for labor market outcomes such as to compute the gender gap, in this case, gender is the variable that splits the two groups. The coefficients are thus estimated for males and for females.

Weichselbaumer and Winter-Ebmer (2003) did a meta study of the predicted gender gaps, using Blinder-Oaxaca over time, for a variety of countries as well as draws some interesting advantages and disadvantages of this method. First, if the included characteristics are already affected by discrimination, this leads to underestimation of the group difference. Second, if the dependent variables are not good productivity predictors, or more precisely in this case, predictors of becoming an entrepreneur then the mean difference is biased upwards or downwards. Here, they refer to a twofold decomposition with an explained part and a unexplained part. The latter part is what is used as a discrimination indicator. If there is correlation between the omitted variables and the variable that separates the groups, often is gender, then the unexplained part might capture not only discrimination but also unobserved productivity differences between the two groups. We use years as the variable that splits the groups and so, the correlation between a year dummy and some omitted variables is possible.

Using the threefold Oaxaca decomposition there is no need for a pooled model as it happens when using a twofold decomposition. The assumptions for pooled models are stronger, and in presence of unobserved heterogeneity the OLS estimates are inconsistent (Wooldridge, 2002).

D denotes the difference in the mean outcome of the two group, unconditional on the regressors.

$$D = E(Y_A) - E(Y_B)$$

Then we have a classical linear regression

$$Y_i = X'_i \beta + \varepsilon_i$$

X is a matrix of regressors, it contains a constant, and β is a vector of the coefficients, it contains the intercept.

The expected value of Y_i is equal to the expected value of the regressors times the coefficient vector and the expected value of the error term equals 0, hence this difference D can be rewritten as

$$D = E(X_A)'\beta_A - E(X_B)'\beta_B$$

To evaluate the contribution of the regressors in the mean difference. The difference D can then be decomposed into three parts (Jann, 2008):

$$D = [E(X_A) - E(X_B)]'\beta_B + E(X_B)'[\beta_A - \beta_B] + [E(X_A) - E(X_B)]'[\beta_A - \beta_B]$$

This decomposition is in the viewpoint of group B, once the differences in the endowments of A and B are weighted by the coefficient of group B and the differences in the coefficients are weighted by the predictors of group B.

Each part as a different meaning and can be interpreted as follows:

$$A = [E(X_A) - E(X_B)]'\beta_B$$

A reflects the part of the mean difference that is explained through the differences in the predictors, in this case, education level, age, gender, nationality and area of residence. This part is called the explained part of the difference because the model regressors are explaining this difference. It can be also interpreted as what would be the mean value of the outcome of group B if it had the same regressors as group A. This part is named the endowments effect. Then, we have

$$B = E(X_B)'[\beta_A - \beta_B]$$

This part is the difference in the coefficients, is usually considered as the discrimination factor. The difference in the constants of the two groups is also included in here. This part is not explained by the dependent variables in the model it is rather fully unexplained, the effect of

this regressors on the depend variables changes across the two groups due to other exogenous reasons. And, finally:

$$C = [\,E(X_A) - E(X_B)]'[\beta_A - \beta_B]$$

C is the interaction between the differences between the two groups in the coefficients and in the endowments. The part is partially explained and partially unexplained, the difference in the expected values of the regressors is explained, the difference in the coefficients is unexplained.

The variable that defines the groups is a dummy that, first, equals zero if the year is 1998 and 1 if the year equals 2014, so the first and the last years analyzed. Then, we proceed analyzing year on year. For that we define dummies for each pair of following years, 1998-1999, 1999-2000, …, 2012-2013 and 2013-2014. In total were defined 17 dummies, one for the first and last year and 16 for each pair of following years between 1998 and 2014.

The regression was restricted by individuals belonging to the labor force in order to the mean value of the outcome variable, being an entrepreneur or not, be similar to the computed aggregate rate of entrepreneurship. We also control for quarter fixed effects.

6.2.2. Analysis

6.2.2.1. First and Last Year

The mean value of the dependent variable, the probability of being an entrepreneur, has decreased 0.014, or 23.7% (Table 17 – Appendix). The Blinder-Oaxaca method decomposes that difference into different parts, 3 in case is a threefold decomposition (previous section), and that give us information about the sources of this difference.

First, we have the endowments part, that is, if the characteristics of the labor force in 2014 were the same as in 1998, it would be expected that entrepreneurship mean to increase[1] 0.006 (Table 17 and Figure 17– Appendix). Although this effect is outweighed by the second source of

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[1] The difference due to endowments is negative and the mean of entrepreneurship has declined between 1998 and 2014. The value of the mean difference is positive because is 1998 minus 2014. Hence, a negative value in the endowments part makes the mean to grow between 1998-2014.

difference: the coefficients. The differences in the coefficients accounts for the majority of the decrease in entrepreneurship 0.023. That is, the main source of the mean difference between groups is not explained by the dependent variables. Finally, the interaction part, a combination between the differences in the coefficients and the differences in the regressors, accounts for − 0.0028. It also contributes to a lower difference between groups.

The variables that contribute the most for the difference in the endowments are age groups and education levels. In detail, the differences in age groups 40-49 and 50-59, having an undergrad degree and in female are the main contributors (Figure 18 – Appendix). The population is older, more individuals hold an undergrad degree and there is more woman in the labor force in 2014 than in 1998. All of those facts worked in favor of a higher entrepreneurship incidence. The regressors in 2014 become more beneficial for entrepreneurship, but it is important to notice that strict exogeneity is not assumed, hence, there is no causality in the regressors. That is, there is no guarantee that the regressors are actual predictors of entrepreneurship.

As it would be expected, changes in the area of residence between the two groups were not that big and, thus, had almost no impact on the mean change between groups.

Regarding the coefficients' changes, once more the effects of some age groups contributed the most for the mean difference (Table 21 and Figure 19– Appendix). On average, the coefficients of our model have decreased between 1998 and 2014. The coefficients represent the likelihood of an individual that possess or not specific characteristics and belongs to the labor force to be an entrepreneur. Once coefficients have decreased, the effect of the controlled characteristics on being an entrepreneur has become lower. The coefficients on the age groups 30-39, 40-49 and 50-59 had major declines, as well as the coefficient on HS and some college. In the contrary, the coefficient on female had a major increase.

The first and last year analysis is limited. The decline on the mean of entrepreneurship for the labor force between 1998 and 2014 may be caused by specific year effects or different business cycle faces. Thus, it is necessary to evaluate the changes year on year.

6.2.2.2. Year on Year

In the majority of the period, aggregate entrepreneurship decreases. Figure 12 shows the difference in the mean of the outcome variable: being an entrepreneur. At each year the mean difference results from the mean for the previous year minus the mean for that year. That is, if the mean difference is positive, then aggregate entrepreneurship has decreased in that year compared to previous year, and, if it is negative, then aggregate entrepreneurship has increased.

Figure 12 - Oaxaca Decomposition: Decomposed Mean Difference of Entrepreneur, Year on Year 1998-2014
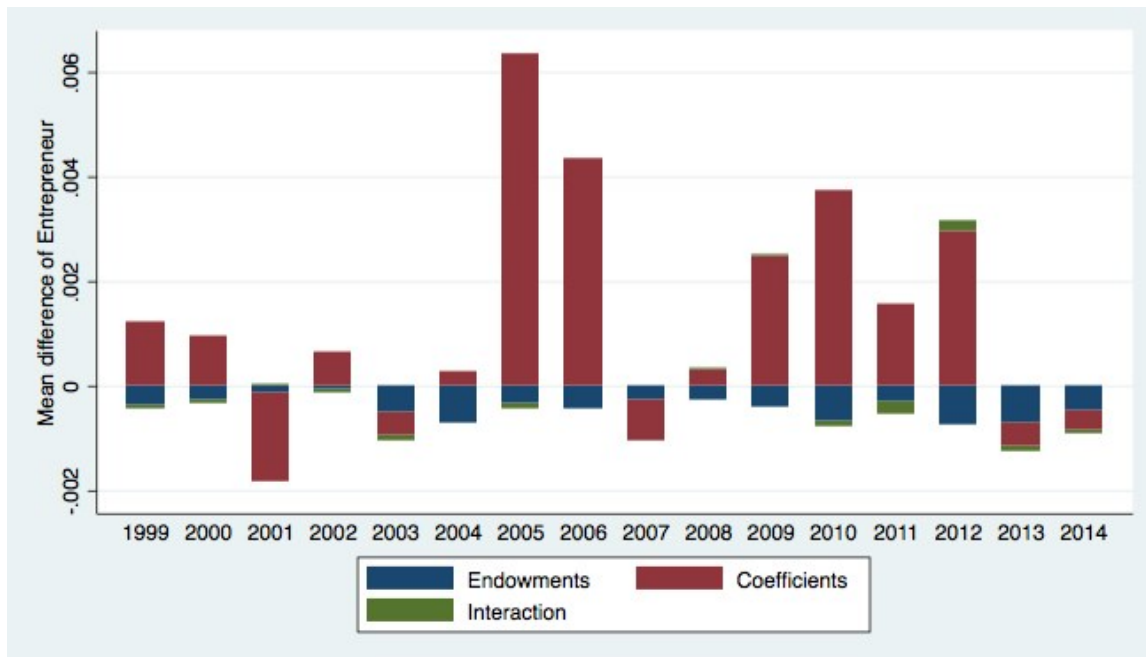
Note: Endowments, Coefficients and Interactions results were computed using the threefold Blinder-Oaxaca Decomposition. The sum of endowments, coefficients and interaction equals the difference in the outcome variables, being an entrepreneur. The values for each year result from the difference between that year and the previous year. Thus, if sum of the endowments, coefficients and interaction is greater than zero then aggregate entrepreneurship decreases and if the sum of the three is negative then aggregate entrepreneurship increases.

The biggest decline in aggregate entrepreneurship is in 2005 and 2006, as shown is Figure 12. In 2005, real GDP has increased by 0.8% in 2005 and by 1.6% in 2006. Thus, in this period both series have changed in different direction and with different magnitudes. Suggesting that the relation between real GDP and the aggregate entrepreneurship is quite limited.

The second biggest decline happens in 2009 and 2010, comparing to the previous year. These were the years that followed the financial crisis. Between beginning of 2008 and 2009 Portugal has negative growth rates of real GDP. Suggesting this financial crisis has some impact on aggregate entrepreneurship. On one hand, the crisis affected heavily the banks. Major banks in

Portugal needed government assistance. Minor firms rely a lot on financing from banks, and the lack of financing may have hurt small businesses. On the other hand, minor firms were not robust enough to survive the crisis by other reasons besides lack of financing. This can be shown because during this period bigger firms increased their proportion in the firm size distribution as well as increased their proportion in terms of Gross Value Added (Figures 27 and 28 – Appendix).

During 2005-2008 expansionary policies are undertaken. Some of these policies are oriented to increase incentives to entrepreneurship. For instance, easier firm creation process, creation of incubators and accelerators, subsidies to create companies, among others. In 2005 it was introduced the policy named *Empresa na hora*. That policy made it simpler to register a company, it reduced the costs, time as well as the legal requirements for initial capital. The policy has had some significant positive impact in what extents to firm creation and job growth (Branstetter et al. 2014). But, in terms of the proportion of entrepreneurs in the Labor Force, it was during this period that aggregate entrepreneurship has decreased the most. Giving evidence that the policy was not effective in increasing the number of entrepreneurs in the labor force.

Moreover, entrepreneurship between 2008 and 2012 has consistently decreased. Between 2011 and 2014 Portugal is under foreign financial aid and undertakes strict austerity measures. GDP growth decreases considerably between 2011 until the end of 2012. Afterwards, both GDP growth and aggregate entrepreneurship increase. The austerity measures might have hurt entrepreneurs at the initial stage, but, afterwards, aggregate entrepreneurship increases.

The relationship between real GDP growth and aggregate entrepreneurship is weak. Comparing both variables at the same period there are some periods where aggregate entrepreneurship and GDP growth are positively correlated –after 2012 both series increase– as well as there are periods where the two series are negatively correlated –between 2005-2006–. This issue is going to be addressed further in this study (section 8.1).

Figure 20 (and Tables 21 and 22 – Appendix) shows the contribution of each endowments to the endowments part. The endowments effect is, for almost every period, negative, meaning that the changes in the endowments are favorable to aggregate entrepreneurship. The endowments that have the greatest contributions are: age groups 40-49 and 50-59, education

level High School or some college and Undergrad. On the other hand, female has consistently had an unfavorable impact on aggregate entrepreneurship. During the whole period, there are more female in the work force, but the incidence of entrepreneurs among woman is considerably lower.

The increase in the education level of the labor force has positive effects in entrepreneurship. Two distinctive effect are studied in the literature. First, a more educated population has higher probability of entering entrepreneurship. The coefficients on higher levels of education are significantly higher (section 6.1.2 and Table 7). The returns to education are high and studies even suggest that are even higher for entrepreneurs (Hartog et al., 2010b; Van Praag et al., 2009; Van der Sluis et al., 2008; Bates, 1990). Second, higher educated population also has implication on the success of entrepreneurs (Millán et al., 2011). This theory suggests that an educated population acts as a determinant of entrepreneurial success. Either by the possibility of having more educated, employees, and, thus more productive, or by the differences in the preferences that high educated individuals have, changes in the demand for entrepreneurial goods and services. And, third, education level of entrepreneurs may turn easier the access to capital.

Figure 21 (and Tables 21 and 22 – Appendix) shows the contribution of each coefficient to the coefficients part. The constant plays the major role. Changes in the constant show that some other factors are influencing the decline in entrepreneurship besides the ones we control for. The coefficients that have decreased the most are: on age groups 30-39 and 40-49, on having High school and some college, on central Portugal and on Lisbon.

Some considerations from this part are: (1) the negative trend on entrepreneurship is not due to change in the variables that we control for, that is, the endowments part in the Oaxaca decomposition does not justify this trend (2) GDP growth does not seem to justify this trend either (3) the policy that reduced entry regulations did not inverted the declining trend on entrepreneurship.

We proceed our analysis to study what entrepreneurs were before becoming one and if the entrance into entrepreneurship has been decreasing homogeneously for all main previous occupational choices. The previous occupational choices of an entrepreneur studied are being

out of the labor force, being an employee, being self-employed without employees and being unemployed. We also study in more detail the relation between GDP growth and entrepreneurship.

7. Entrance and Exit from Entrepreneurship

To study the entrance and exit from entrepreneurship we use two questions present in the survey (Tables 25 and 26 – Appendix); the current work condition of the individual, as well as the work condition last year; and a question whether the individual belongs to the labor force or not at the current period and in the last year. We have quarterly information on how many individuals have entered entrepreneurship from different occupation choices. In early two thousand there is great increase in the number of self-employed without employees[2], therefore we have decided to study the entrance and exit from entrepreneurship after that increase, that is, starting our analysis in 2001. The main occupational choices previous to entrepreneurship that we study are: being an employee, being self-employed without employees, being unemployed and being out of the labor force. The decision to enter a different occupational choice will depend on the incentives that individuals face. As stated in the previous sections, entrepreneurship has become a less popular occupational choice, in both relative terms: lower proportion of entrepreneurs in the Labor Force and in absolute terms, the total number of entrepreneurs in the economy has decreased.

The entrance in entrepreneurship has decreased 46% from 2001 to 2014 (Table 27 and Figure 23 – Appendix). Individuals are entering less into entrepreneurship. Meanwhile, the exit from entrepreneurship has kept high for most of the years, decreased 15% in the same period. In 2006 the entrance into entrepreneurship reaches a relative minimum. Even though, the policy "On the Spot Firm" has started to be implemented in the year before.

In the period previous to the financial crisis, in 2007 and beginning of 2008, the entrance into entrepreneurship increases considerably (Figure 23 – Appendix) but when the financial crisis

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[2] The increase did not happen for the entrepreneurs. Although, since the number of self-employed without employees had a great increase the flow from this occupational choice to entrepreneurship also increases considerably and the conditional probabilities suffer major changes.

hits the exit from entrepreneurship increases. Thus, entrepreneurs are extinguished during this period. The same increase in the entrance followed by an increase in the exit happens in 2011 and 2012. But, in this case, the exit remains higher than the entrance into entrepreneurship for a longer period, between the beginning of 2012 and mid-2014. This period is one of the periods where more entrepreneurs are extinguished. The figures suggest that, in one hand, the entrance and exit in entrepreneurship has some cyclical behavior and are related with the economic crisis. Although, when comparing aggregate entrepreneurship (Section 6.2.2.2) there is not that clear change during crisis periods. On the other hand, the entrance and exit in entrepreneurship have clearly some time lag, they do not behave simultaneously. Further, the decline in the entrance into entrepreneurship may not be homogeneous for the main occupational choices prior to entrepreneurship.

Figure 13 - Entrance into Entrepreneurship from Major Occupational Choices
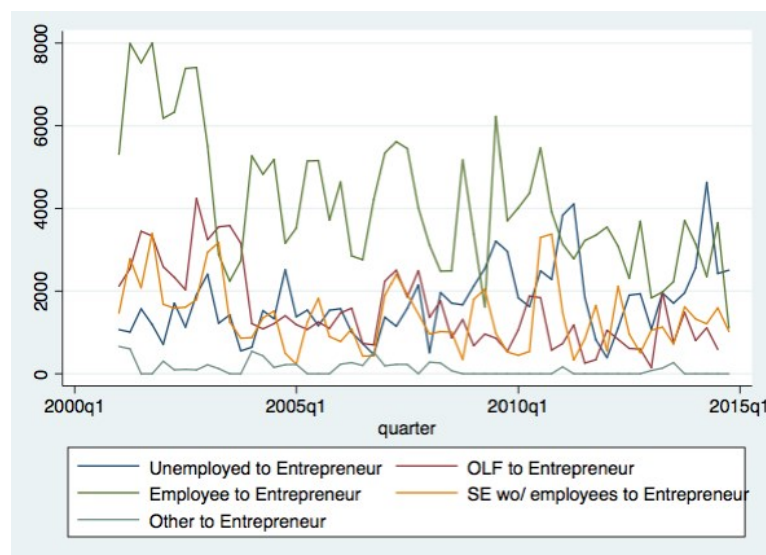
The entrance into entrepreneurship has decreased for almost every occupational choice. Figure 13 shows the number of individuals that were not entrepreneurs but become one in the current year. Among the previous occupational choices to entrepreneurship studied, employees and people out of the labor force are entering less into entrepreneurship. As it would be expected, being an employee is the most common previous occupational choice besides already being an entrepreneur. But the number of individuals that are employees and that have moved to entrepreneurship has decreased the most, from the previous occupational choices that we study. The incentives to enter entrepreneurship for employees has reduced compared to other

occupational choices. In the contrary, entrepreneurship has become more popular among unemployed, suggesting evidence that, in some cases, individuals enter entrepreneurship by necessity.

The occupational choices studied have different dimensions, thus it is important to know not only the number of individuals that change from those occupational choices to entrepreneurship but also how likely it is for an individual, that belongs to a given occupation choice, to change to entrepreneurship. That is, the conditional probability of being an entrepreneur at the current period given the occupational choice last year.

The highest conditional probability of being an entrepreneur is if the individual already was an entrepreneur last year (Figure 24 – Appendix). Although, this probability has also decreased mainly during crisis. This probability is a measure of success of entrepreneurs. A higher value suggest that entrepreneurs stay at least on year as such. In 2001, 97.2% of the entrepreneurs were already entrepreneurs last year and, by the end of 2014 the probability was roughly the same. However, there are two periods where is clear the lower success rates of the entrepreneurs: first, during the financial crisis, by the end of 2008 the same probability is 95.1%; and, second, during the foreign economic aid period, the probability registers the lowest value in the beginning of 2012.

Figure 14 - Conditional Probability of Being an Entrepreneur at t Given the Occupational Choice at t-1
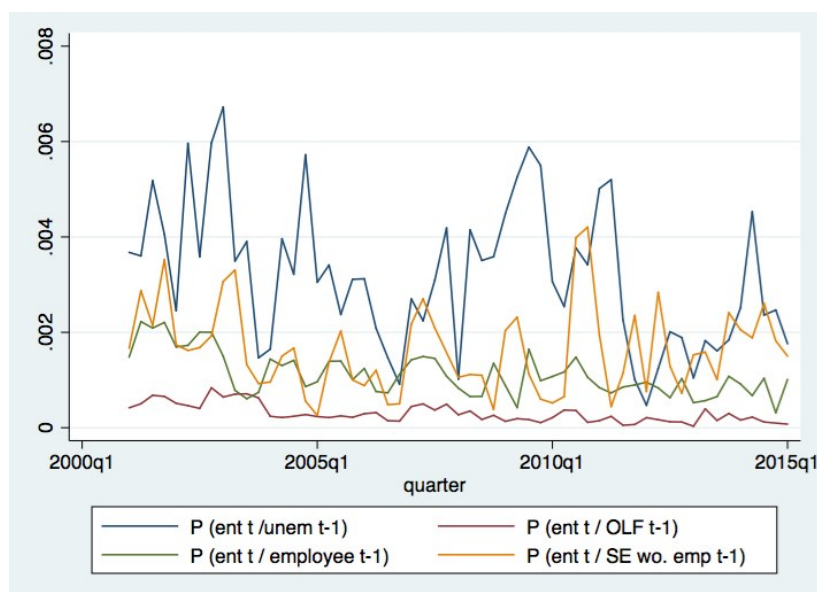
The probabilities of becoming an entrepreneur conditional on the occupational choice last year have decreased (Figure 14). The occupational choices, besides already being an entrepreneur last year, that has higher probabilities to become entrepreneurs are: being unemployed, in the early two thousand the number of people unemployed in Portugal was considerably low, although, after 2008 the unemployment rate reaches the highest levels during the period studied; being self-employed without employees, in case the individual already runs a business it makes sense that this probability is higher. The self-employed might already be "entrepreneurs[3]", in the sense that they are business owners, however, do not employ anyone. But, once they hire the first employee, they start being considered entrepreneurs.

8. Entrepreneurship, GDP and Unemployment

8.1. Entrepreneurship and GDP Growth

Entrepreneurship may be affected by the overall economic performance or vice versa. This part evaluates the relation between GDP growth and aggregate entrepreneurship. As previously mentioned in section 6.2.2, when it was studied the Oaxaca Decomposition year on year, the relationship between entrepreneurship and GDP growth is weak. This topic was studied by different economists, but it has some difficulties in what extents to prove this relationship empirically. First, the results will depend on the measure of entrepreneurship used, the measure we use in this study is the ratio of self-employed that employ at least one worker. Previous studies use rather the total self-employed. Other measure of entrepreneurship is the number of patents that firms register, and the number of firms in the economy that register numerous patents. Salgado-Banda (2005) shows a positive relationship of entrepreneurship in GDP growth when using the patent-based method. On the other hand, when using as measure the ratio of self-employed in the labor force, he founds a negative relationship of entrepreneurship on GDP growth.

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[3] Entrepreneurs here refer to everyone that owns a business and not the definition used in the rest of the dissertation: being self-employed and employ at least one employee.

Figure 15 - Real GDP Growth and Aggregate Entrepreneurship
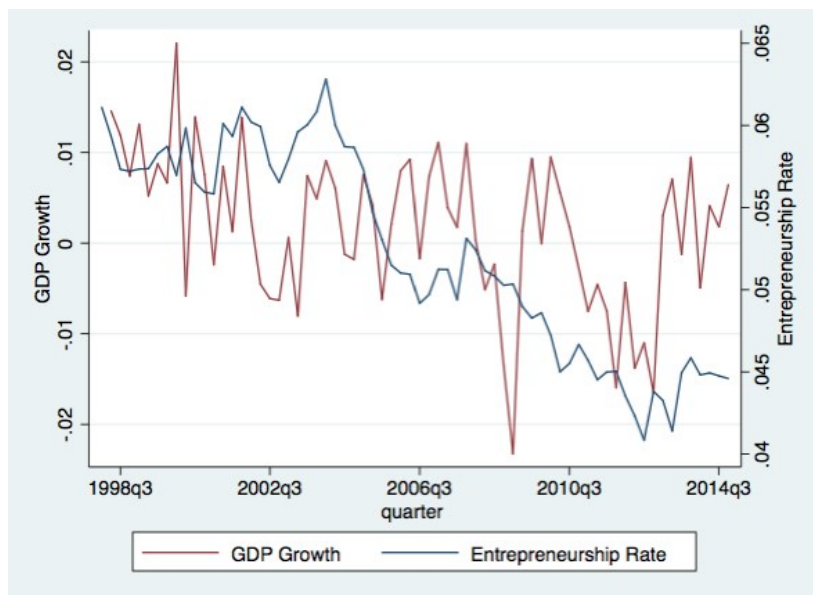
Note: Real GDP Growth (Left axis), Entrepreneurship Rate (Right axis)

Figure 16 – Scatter of GDP growth (year-to-year percentage change) and Entrepreneurship Rate (year-to-year percentage point change)
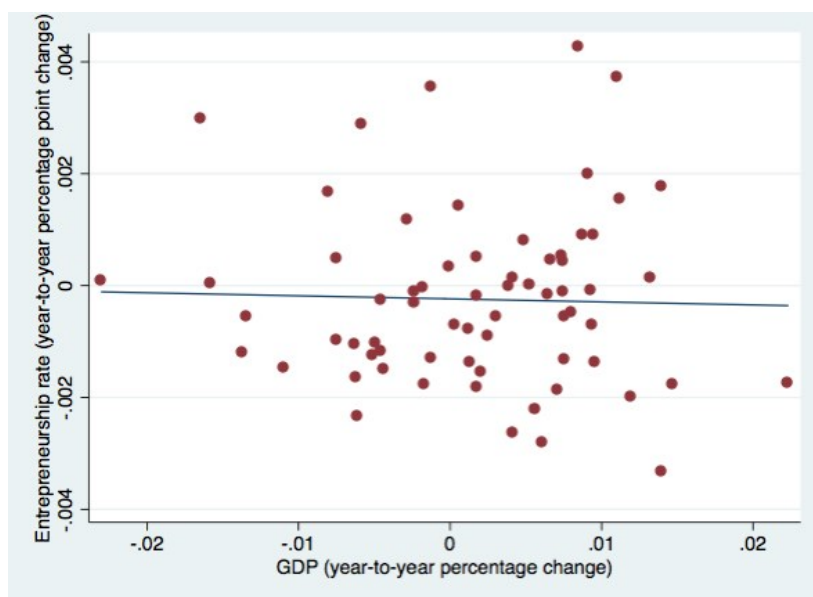
Table 8 - Correlation between GDP (percentage change) and Entrepreneurship Rate (percentage point change) – Correlation for figure 14

	GDP Growth
Δ Entrepreneurship Rate	-0.0295

Figure 15 shows the real GDP growth and the entrepreneurship rate. There is no clear sign of a relationship between the two series, the downward trend in entrepreneurship does not relate to the changes in GDP. The adjustment is low (Figure 16 and Table 8), correlation between the first difference of the entrepreneurship rate and real GDP growth is -0.0295, and it is actually negative. Two reasons justify the negative correlation: First, a big number of micro and small firms in the economy do not contribute as much to economic growth (Figures 27 and 28 – Appendix) and the number of very small firms had increased during periods of negative growth rates. The majority of micro and small firms in Portugal produce goods or services that are not that technological neither that innovative. Second, self-employment can be seen as way to exit unemployment. Unemployment is higher during crisis. Hence, it would be expected that the entrepreneurship rate may increase during crisis due to this effect.

We also evaluate relationship between either contemporaneous GDP growth and aggregate entrepreneurship with lagged dependent variables. And, also find no significant correlation (Figure 25 – Appendix). However, it is still possible a longer-term relation between GDP growth and aggregate entrepreneurship. The correlation of both variables using 10 time lags is greater, although negative; that is, current GDP growth may depend negatively on aggregate entrepreneurship 3 years ago or more[4] or vice-versa.

8.2. Entrepreneurship and Unemployment

In order to develop more this idea, we analyze the relationship between unemployment and entrepreneurship rates among the period studied. Once more, this relation may not be simultaneous, there could be some time lag between unemployment at a certain period and aggregate entrepreneurship in the following periods or vice versa.

Previous literature studying the relationship between entrepreneurship and unemployment identifies to possible effects of both series. First, there is the refugee, push or desperation effect. That is, once unemployment increases, aggregate entrepreneurship will also increase. Unemployed individuals will try entrepreneurship in order to subsist. The opportunity cost of entering entrepreneurship for the unemployed will be lower in the sense that they will not miss a salary. Second, in opposition, high unemployment will disrupt entrepreneurship because:

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[4] Each lag corresponds to a quarter.

individuals may lack personal wealth, the unemployed usually have lower education levels and possible lower skills, not been talented enough to run a business and to sustain it. Also, high unemployment rates are associated with low economic growth that leads to lower entrepreneurial opportunities. And, also, during crisis credit constraints to start a business may be higher.

The literature says that the effect of entrepreneurship on unemployment is relevant in the medium and long run. Thurik et al. (2007) have studied this relationship for OECD countries and have found that both effects hold, the second effect offsets the refugee effect. That is, current in the current self-employment rates have a significant impact on future unemployment rates. On the other hand, high unemployment also generates higher entrepreneurship although this effect is considerably lower.

We use a stricter group of individuals that has been used to study the relation between entrepreneurship and unemployment. While previous studies define entrepreneurs as self-employed individuals we use the self-employed that employs, which, in case of Portugal and over the time period studied, represent less than half of the total self-employed.

There is a very strong negative correlation between current unemployment rates and entrepreneurship rates as Figure 29 and Table 29 (Appendix) shows. The correlation is -0.92, that is, if entrepreneurship increases then it would be expected that unemployment decreases and/or vice versa. In other terms, data show that peaks in unemployment are associated with troughs in aggregate entrepreneurship and vice versa. The observed relationship is closer to the second view. That is, high rates of unemployment are bad for entrepreneurship because both variables may move simultaneously but in opposite directions. When unemployment rises entrepreneurship decreases due to loss of economic activity, reducing the number of entrepreneurial opportunities, as well as, a decrease on wealth of entrepreneurs either because they are unemployed or because they cannot finance the entrance costs.

The correlation is not that big when analyzing the first differences of the rates of unemployment and entrepreneurship (Table 29 – Appendix), but it is still negative. Further lagged dependent variables also show small correlation between the two series.

9. Conclusions

Entrepreneurship has benefited from the changes in the labor force during the studied period. Entrepreneurs are more educated and older. These results come from the Oaxaca Decomposition, in particular, the positive effect of the endowments in our regression. However, we do not assume causality. On the other hand, the changes in the characteristics of the entrepreneurs may also result in better quality entrepreneurship. The investment on education for the whole population is positive for entrepreneurship.

The increase of education level of the entrepreneurs is still lower when compared to the labor force. The coefficients on higher levels of education are lower by the end of our analysis, meaning that high qualified individuals are avoiding entrepreneurship. Also, the rate of entrepreneurship among the highest qualified –having undergraduate degree or more– has decreased more compared to the lower qualified individuals –having less than high school. Adding to this, we found that more unemployed are becoming entrepreneurs. Entrepreneurship as an escape to unemployment is becoming more popular. Hence, entrepreneurial businesses may find it more difficult to attract more high skilled employees. Putting at stake the quality of future entrepreneurship.

Lower aggregate entrepreneurship may result in a shift of the economic activity to big established firms. We do not model this response. But, two cases must be considered: in case the shift of the economic activity to bigger firms is a result of an efficient market response, that is, bigger firms are more productive and should also employ the most productive workers. In this case policy may not be needed it. On the other hand, if we consider externalities on high firm concentration such as higher consumer prices, more market power, less innovation, policy might be desirable to target the real causes of the decline in entrepreneurship.

9.1. Limitations

The main limitation of this dissertation is the lack of explanatory variables when analyzing entrepreneurship. Our main model, the linear probability model, has low predictive power, the adjustment is low. However, main relevant variables are included in the regression and the dataset we use has a randomized and big sample. Giving a good perspective on how

entrepreneurs are. There is still the possibility of coefficients of our linear dependent model be overestimated or underestimated due to the lack of explanatory variables.

9.2. Future research

We have ruled GDP growth and unemployment as reasons for the decline in entrepreneurship. However, the real reasons behind the decline are still to be found. Thus, possible reasons to be considered for the decline are: superstar firm hypothesis, that is, bigger stablished firms have easier access to innovative technologies and, thus, are more productive; increase in the entrance costs across industries and credit market constraints.

Moreover, to study the returns to self-employed and entrepreneurship in Portugal and how have they changed is interesting for future research. Including more explanatory variables such as test scores, family background, psychological variables, firm dimension, among others.

10. Bibliography

Acemoglu, Daron, Ufuk Akcigit, Nicholas Bloom and William Kerr. 2013. "Innovation, Reallocation And Growth," Working Papers 13-23, Center for Economic Studies, U.S. Census Bureau.

Adelino, Manuel, Song Ma, and David Robinson. 2017. "Firm Age, Investment Opportunities, and Job Creation." *Journal of Finance* 72(3): 999–1038.

Azoulay, Pierre, Benjamin Jones, J Daniel Kim, and Benjamin Jones. 2018. "Age and High-Growth Entrepreneurship," 1–50.

Bates, Timothy. 1990. "Entrepreneur Human Capital Inputs and Small Business Longevity", *The Review of Economics and Statistics,* 72(4): 551-59.

Becker, G. 1964. *Human Capital: A theoretical and empirical analysis with special reference to education*, Chicago: University of Chicago Press, 1993.

Branstetter, Lee, Francisco Lima, Lowell J Taylor, and Ana Venâncio. 2014. "Do Entry Regulations Deter Entrepreneurship and Job Creation? Evidence from Recent Reforms in Portugal." *Economic Journal* 124(577): 805–32.

Decker, Ryan, John Haltiwanger, Ron Jarmin, and Javier Miranda. 2014. "The Role of Entrepreneurship in US Job Creation and Economic Dynamism." *Journal of Economic Perspectives* 28(3): 3–24.

Dillon, Eleanor, and Christopher Stanton. 2017. "Self-Employment Dynamics and the Returns to Entrepreneurship.".

Glaeser, Edward L., Sari Pekkala Kerr, and William R. Kerr. 2015."Entrepreneurship and Urban Growth: An Empirical Assessment with Historical Mines." *Review of Economics and Statistics*, 97(2): 498-520.

Hartog, Joop, Mirjam van Praag, and Justin van der Sluis. 2010. "If you are so smart, why aren't you an entrepreneur? Returns to cognitive and social ability: Entrepreneurs versus employees." *Journal of Economics and Management Strategy* 19(4): 947-989.

Hopenhayn, Hugo A. 1992. "Entry , Exit , and Firm Dynamics in Long Run Equilibrium." *Econometrica* 60(5): 1127–50.

Hyatt, Henry R and James R Spletzer. 2013. "The Recent Decline in Employment Dynamics" *IZA Journal of Labor Economics* 2(5)

Jann, Ben. 2008. "The Blinder–Oaxaca Decomposition for Linear Regression Mode." *The Stata Journal* 10(3): 288–308.

Quadrini, Vincenzo. 2000. "Entrepreneurship, Saving and Social Mobility", *Review of*

Economic Dynamics, 3(1): 1-40.

Kozeniauskas, Nicholas. 2017. "What ' s Driving the Decline in Entrepreneurship ?" .

Lazear, Edward P. 2005. "Entrepreneurship." *Journal of Labor Economics* 23(4): 649-680

Levine, Ross, and Yona Rubinstein. 2015. "Smart and Illicit: Who Becomes an Entrepreneur and Do They Earn More?" *Quarterly Journal of Economics* 132(2): 963–1018.

Liang, James, Hui Wang, and Edward Lazear. 2014. "Demographics and Entrepreneurship.".

Lucas, Robert E. 1978 "On the Size Distribution of Business Firms." *The Bell Journal of Economics*, 9(2): 508–523.

Millán, José María, Emilio; Congregado, Concepción Román, Mirjam Van Praag, and André Van Stel. 2011. "The Value of an Educated Population for an Individual's Entrepreneurship Success." *Journal of Business Venturing* 29(5): 612–32.

Pekkala Kerr, Sari, William R. Kerr, and Tina Xu. 2017. "Personality Traits of Entrepreneurs: A Review of Recent Literature." *HBR Working Paper 18-047*.

Schumpeter, Joseph A. *Creative Destruction From Capitalism, Socialism and Democracy*. Harper: New York, 1942.

Smith, Adam. *The Wealth of Nations*. London, 1776.

Thurik, A. Roy, Martin A. Carree, André J. van Stel, and David B. Audretsch. 2007. "Does Self-Employment Reduce Unemployment?".

Van der Sluis, J., C.M. Van Praag and W. Vijverberg. 2008. "Education and entrepreneurship selection and performance: A review of the empirical literature", *Journal of Economic Surveys* 22 (5), 795-841.

Van Praag, Mirjam, Arjen van Wittenlosstjuijn, Justin van der Sluis. 2009. "Returns for Entrepreneurs vs. Employees: The Effect of Education and Personal Control on the Relative Performance of Entrepreneurs vs. Wage Employees" *Tinbergen Institute Discussion Paper* 111 (3), University of Amsterdam.

Weichselbaumer, Doris;, and Rudolf; Winter-Ebmer. 2003. "A Meta-Analysis of the International Gender Wage Gap." *Journal of Economic Surveys* 19 (3): 479–511.

Wooldridge J. M. 2002. *Econometric Analysis of Cross Section and Panel Data*. The MIT Press: Cambridge. pp.453-472, ISBN: 0262232197.

A. Appendix

A.1. Data

Table 9 - Observations and Weighted Observations from 1998-2014

		Observations		Weighted Observations	
year	quarter	Freq.	Percent	Freq.	Percent
1998	Q1	50,280	1.68	10,137,716	1.43
1998	Q2	50,067	1.67	10,149,830	1.43
1998	Q3	48,217	1.61	10,164,557	1.43
1998	Q4	48,303	1.61	10,184,997	1.43
1999	Q1	47,795	1.60	10,185,672	1.43
1999	Q2	47,316	1.58	10,204,055	1.44
1999	Q3	46,196	1.54	10,224,667	1.44
1999	Q4	46,090	1.54	10,245,923	1.44
2000	Q1	46,031	1.54	10,257,149	1.44
2000	Q2	45,626	1.52	10,280,941	1.45
2000	Q3	44,265	1.48	10,305,799	1.45
2000	Q4	44,777	1.49	10,328,027	1.45
2001	Q1	45,434	1.52	10,341,099	1.46
2001	Q2	45,681	1.53	10,358,466	1.46
2001	Q3	44,181	1.48	10,377,786	1.46
2001	Q4	45,117	1.51	10,394,231	1.46
2002	Q1	45,482	1.52	10,400,954	1.46
2002	Q2	45,617	1.52	10,414,655	1.47
2002	Q3	43,934	1.47	10,429,188	1.47
2002	Q4	44,185	1.48	10,442,841	1.47
2003	Q1	46,858	1.56	10,450,521	1.47
2003	Q2	46,385	1.55	10,458,033	1.47
2003	Q3	46,118	1.54	10,465,221	1.47
2003	Q4	49,147	1.64	10,473,976	1.47
2004	Q1	50,310	1.68	10,474,927	1.47
2004	Q2	50,714	1.69	10,478,446	1.48
2004	Q3	49,353	1.65	10,485,907	1.48
2004	Q4	49,403	1.65	10,494,519	1.48
2005	Q1	49,040	1.64	10,490,333	1.48
2005	Q2	47,87	1.60	10,493,012	1.48
2005	Q3	46,711	1.56	10,502,344	1.48
2005	Q4	46,507	1.55	10,511,910	1.48
2006	Q1	45,973	1.53	10,512,242	1.48
2006	Q2	45,166	1.51	10,517,523	1.48
2006	Q3	44,271	1.48	10,524,059	1.48
2006	Q4	44,124	1.47	10,533,288	1.48

Table 10 - Observations and Weighted Observations from 1998-2014 (continuation)

		Observations		Weighted Observations	
year	quarter	Freq.	Percent	Freq.	Percent
2007	Q1	44,164	1.47	10,530,839	1.48
2007	Q2	43,162	1.44	10,537,652	1.48
2007	Q3	42,529	1.42	10,546,224	1.48
2007	Q4	42,105	1.41	10,553,316	1.49
2008	Q1	42,226	1.41	10,550,099	1.49
2008	Q2	42,197	1.41	10,554,088	1.49
2008	Q3	41,599	1.39	10,560,340	1.49
2008	Q4	41,948	1.40	10,565,436	1.49
2009	Q1	41,877	1.40	10,559,045	1.49
2009	Q2	41,378	1.38	10,561,703	1.49
2009	Q3	40,881	1.36	10,567,893	1.49
2009	Q4	40,828	1.36	10,574,123	1.49
2010	Q1	40,888	1.37	10,566,489	1.49
2010	Q2	40,139	1.34	10,566,924	1.49
2010	Q3	39,772	1.33	10,569,768	1.49
2010	Q4	40,369	1.35	10,574,104	1.49
2011	Q1	39,884	1.33	10,559,848	1.49
2011	Q2	40,077	1.34	10,555,174	1.49
2011	Q3	39,365	1.31	10,552,110	1.49
2011	Q4	40,41	1.35	10,545,880	1.48
2012	Q1	40,258	1.34	10,524,284	1.48
2012	Q2	39,884	1.33	10,512,871	1.48
2012	Q3	39,858	1.33	10,503,601	1.48
2012	Q4	39,948	1.33	10,491,638	1.48
2013	Q1	40,158	1.34	10,468,529	1.47
2013	Q2	39,361	1.31	10,456,709	1.47
2013	Q3	39,647	1.32	10,443,523	1.47
2013	Q4	40,493	1.35	10,428,375	1.47
2014	Q1	41,788	1.40	10,406,010	1.47
2014	Q2	41,665	1.39	10,393,655	1.46
2014	Q3	41,633	1.39	10,381,436	1.46
2014	Q4	42,157	1.41	10,368,054	1.46
	Total	2,995,192	100.00	710,224,554	100.00

A.1.1. Variables Description

The following variables were chosen to study the entrepreneur's profile. The concerns and procedure used to transform the variables were the following:

Age group: Age in years. There were created 5 different age groups for the regression that are less than 19 years old, from 20 to 29, from 30 to 39, from 40 to 49, from 50 to 59, from 60 to 69 and more than 70 years old.

Education level: The education level variable has 10 different groups between 1998-2002 and 2010-2014. From 2003 to 2010 there were 11 educational levels, the extra education level was post-graduation without holding a master's degree. The procedure here was to add the individuals with this level to the ones that hold an undergrad degree and replacing every other level of education that followed. After this correction the 10 education levels were merged into 5 different ones to be included in the regression, less than High School, High School and some college, Undergrad degree, Master's degree and PhD.

Area of residence: Based on the Portuguese NUTs, statistical division for Portugal, the 7 different areas of residence are North of Portugal, Lisbon area, Central Portugal, Alentejo, Algarve, Azores and Madeira. It was the 2002 version.

Gender: Female dummy included in the regression was defined as 1 if the individual is female and zero otherwise.

Nationality: The foreign dummy was defined has 1 if the individual does not have Portuguese citizenship and 0 otherwise.

A.2. Section 5: Entrepreneurs

A.2.1. Decomposed Rates of Entrepreneurship

Table 11 - Entrepreneurship Rate Decomposed by Education Level

Education Level				
year	less HS	HS and some college	Undergrad	Master or more
1998	5,88%	5,72%	6,23%	4,61%
2014	5,01%	3,67%	4,28%	3,57%
change	-0,88%	-2,04%	-1,95%	-1,03%

Table 12 - Entrepreneurship Rates Decomposed by Area of Residence

Area of Residence							
year	North	Central	Lisbon Area	Alentejo	Algarve	Azores	Madeira
1998	6,01%	5,96%	5,73%	6,32%	7,65%	4,39%	2,69%
2014	5,04%	4,57%	3,99%	4,49%	4,85%	3,37%	3,27%
change	-0,97%	-1,39%	-1,74%	-1,82%	-2,81%	-1,02%	0,58%

Table 13 - Entrepreneurship Rates Decomposed by Age Group

Age							
year	19 or less	20-29	30-39	40-49	50-59	60-69	70 or more
1998	0,20%	2,08%	5,77%	8,19%	8,93%	8,29%	5,09%
2014	0,46%	0,88%	3,18%	5,45%	6,01%	8,23%	8,18%
change	-0,19	-2,07	-5,74	-8,14	-8,87	-8,20	-5,00

A.2.2. Entrepreneurs' Profile

Table 14 - Age Group Proportions 1998 versus 2014

	Population		Employees		Self-Employed		Self-Employed wo Employees		Entrepreneurs	
	1998	2014	1998	2014	1998	2014	1998	2014	1998	2014
19 or less	23.77	19.69	3.93	0.79	0.19	0.17	0.21	0.20	0.18	
20 to 29	15.64	10.72	27.71	16.03	8.50	3.58	8.73	4.04	7.77	2.42
30 to 39	14.65	14.01	28.10	28.77	19.64	15.75	17.97	14.58	24.99	18.69
40 to 49	13.34	15.01	23.08	28.55	22.93	23.47	20.52	19.68	30.66	32.95
50 to 59	11.32	14.01	13.30	20.66	21.65	24.07	21.11	21.72	23.37	29.95
60 to 69	10.57	11.90	3.53	4.89	17.56	18.68	19.81	21.46	10.33	11.71
70 or more	10.71	14.65	0.35	0.32	9.53	14.28	11.64	18.31	2.76	4.18

Table 15 – Foreign Entreprenuers

	Population			Employees		Entrepreneurs	
	Overall	1998	2014	1998	2014	1998	2014
Portuguese	97.58	98.84	97.95	98.90	97.53	98.37	98.72
Foreigners	2.42	1.16	2.05	1.11	2.47	1.63	1.28

Table 16 – Nationalities of the Entrepreneurs

		Population		Employees		Entrepreneurs	
	Country	1998 Q4	2014 Q4	1998 Q4	2014 Q4	1998 Q4	2014 Q4
Angola	AO	0.19	0.15	0.16	0.14	0.1	0.17
Brazil	BR	0.14	0.44	0.17	0.52	0.06	0.21
Canada	CA	0.03	0.01	0.01	0	0.11	0.18
China	CN	0.02	0.01	0.02	0.02	0.41	0.17
Cabo Verde	CV	0.15	0.27	0.24	0.37	0.22	-
Germany	DE	-	0.05	0.04	0.03	0.16	0.04
Denmark	DK	-	0	0.01	0	0.09	0.07
Algeria	DZ	0.00	0	-	0	0.16	-
Spain	ES	-	0.07	0.04	0.07	0.21	0.03
France	FR	-	0.06	0.19	0.09	0.11	0.14
United Kingdom	GB		0.07	0.01	0.04	0.08	0.03
Guinee	GN	0.01	0.02	0.03	0	0.11	0
Equatorial Guinee	GQ	0.02	0	0.05	0	-	-
Italy	IT	-	0.01	0.03	0.01	0.1	0
Morocco	MA	0.01	0	0.02	0	0.06	-
Mozambique	MZ	0.06	0.01	0.03	0.02	0.19	0
Netherlands	NL	-	0.01	0.00	0	0.08	0.21
Portugal	PT	98.84	97.95	98.89	97.53	98.37	98.72
São Tomé and Príncipe	ST	0.04	0.07	0.07	0.08	-	-
East Timor	TL	0.01	0	0.04	0	-	-

A.3. Section 6 Conditional Analysis

A.3.1. Linear Probability Model

$$E(y|x) = \beta_0 + \beta_1 x_{1i} + \cdots + \beta_k x_{ki} \qquad \textbf{\textit{(Equation A.1)}}$$

$$VAR(y|x) = \Pr(y = 1|x) * [1 - \Pr(y = 1|x)] \qquad \textbf{\textit{(Equation A.2)}}$$

$$\text{VAR}(\varepsilon|x) = \text{VAR}(y - X\beta|x) = \text{VAR}(y|x) = \Pr(y = 1|x) * [1 - \Pr(y = 1|x)]$$
$$= (\beta_0 + \beta_1 x_{1i} + \cdots + \beta_k x_{ki}) * (1 - \beta_0 + \beta_1 x_{1i} + \cdots + \beta_k x_{ki}) \qquad \textbf{\textit{(Equation A.3)}}$$

A.3.2. Blinder-Oaxaca Decomposition

Figure 17 - Oaxaca Decomposition: Decomposed Mean Difference of Entrepreneur 1998 v 2014
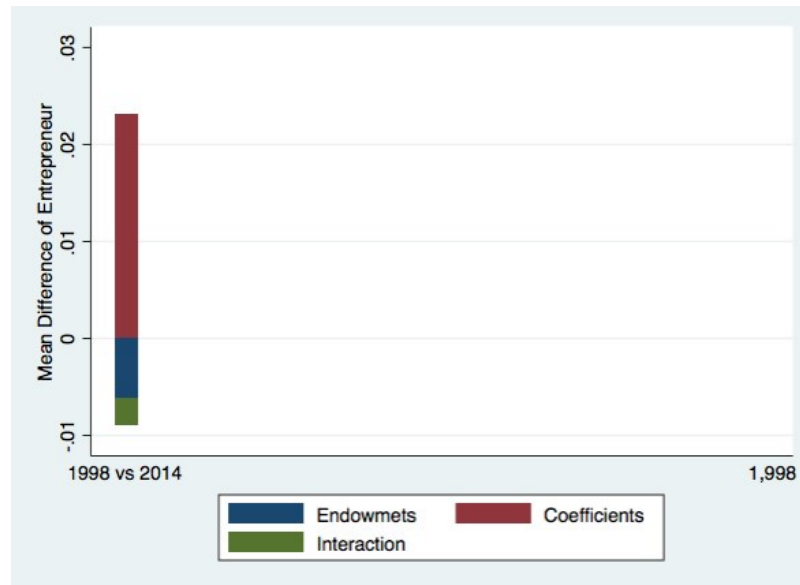
Figure 18 - Oaxaca Decomposition: Individual Contribution of the Endowments 1998 v 2014
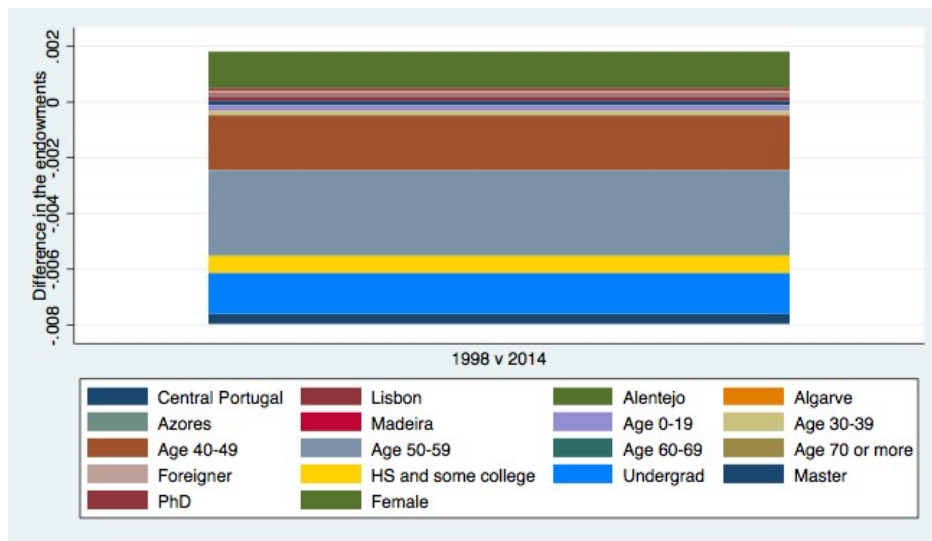

Figure 19 - Oaxaca Decomposition: Individual Contribution of the Coefficients 1998 v 2014
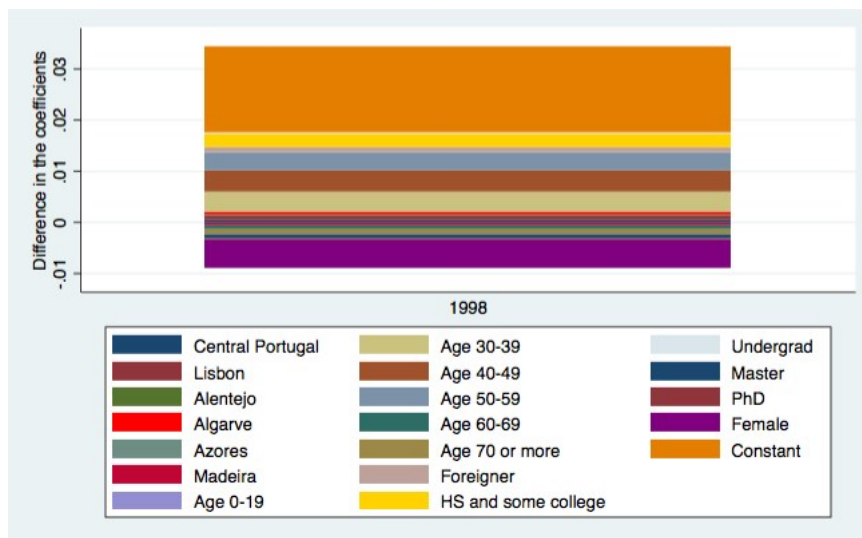
Figure 20 - Oaxaca Decomposition: Individual Contribution of the Endowments Year on Year 1998-2014
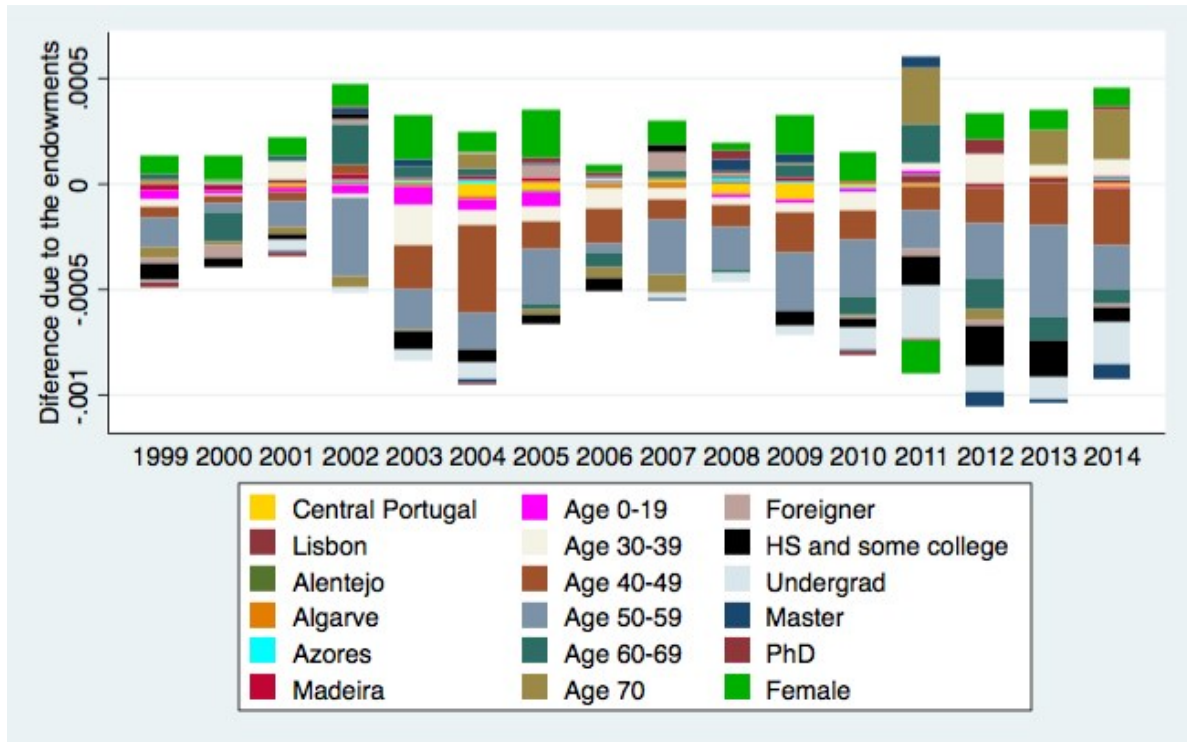
Figure 21 - Oaxaca Decomposition: Individual Contribution of the Coefficients Year on Year 1998-2014
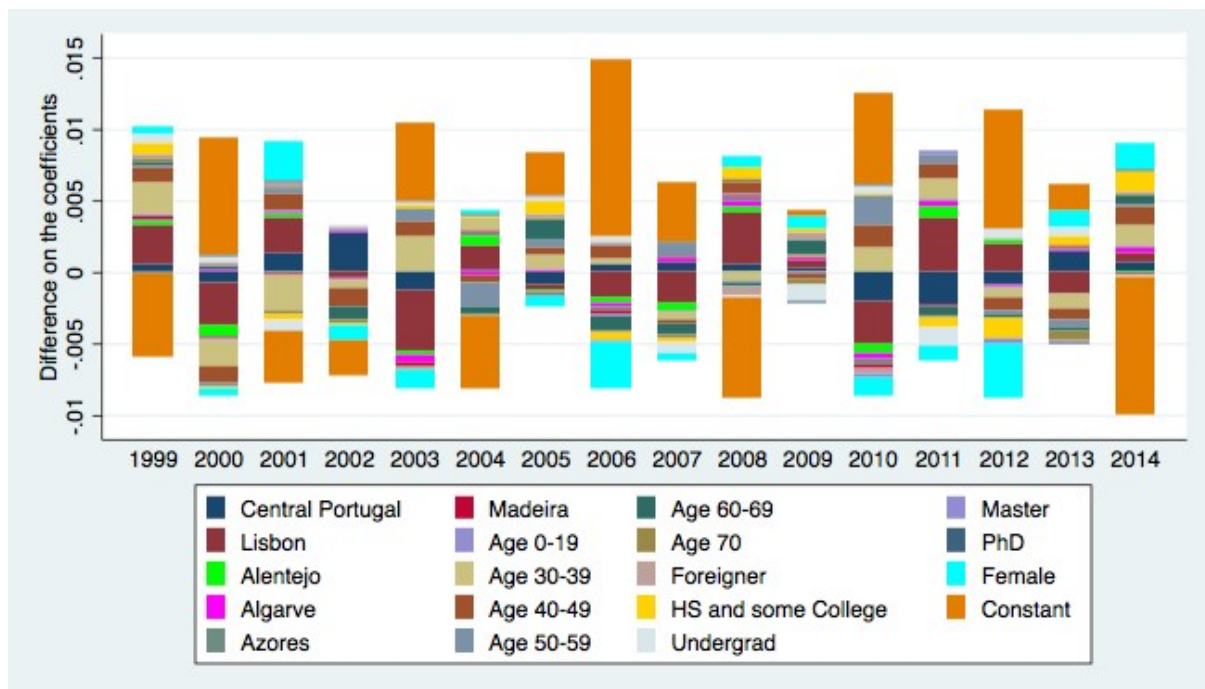
Table 17 – Overall Oaxaca Decomposition Difference

Entrepreneur	1998 v 2014	1998 v 1999	1999 v 2000	2000 v 2001	2001 v 2002	2002 v 2003	2003 v 2004	2004 v 2005
overall								
Group 1	.0587407	.0587407	.0579391	.0573078	.0591017	.0585572	.0596083	.0600482
Group 2	.044777	.0579391	.0573078	.0591017	.0585572	.0596083	.0600482	.0541376
Difference	.0139637	.0008016	.0006313	-.0017939	.0005445	-.0010512	-.0004398	.0059105
Endowments	-.006238	-.0003608	-.0002664	-.0001258	-.0000502	-.0005179	-.0007038	-.0003227
Coefficients	.02302	.001224	.0009598	-.0017012	.0006608	-.0004231	.0002705	.0063569
Interaction	-.0028183	-.0000616	-.000062	.0000331	-.0000661	-.0001102	-6.56e-06	-.0001237

Table 18 - Overall Oaxaca Decomposition Difference (continuation)

Entrepreneur	2005 v 2006	2006 v 2007	2007 v 2008	2008 v 2009	2009 v 2010	2010 v 2011	2011 v 2012	2012 v 2013	2013 v 2014
overall									
Group 1	.0541376	.0502049	.0512456	.0511747	.0490518	.0461031	.0450621	.0426189	.0438657
Group 2	.0502049	.0512456	.0511747	.0490518	.0461031	.0450621	.0426189	.0438657	.044777
Difference	.0039327	-.0010407	.0000709	.0021229	.0029488	.001041	.0024432	-.0012468	-.0009113
Endowments	-.0004263	-.000262	-.0002743	-.0003956	-.0006703	-.0003002	-.0007297	-.0006999	-.0004713
Coefficients	.0043349	-.0007893	.000294	.0024892	.0037279	.0015643	.0029551	-.0004384	-.0003622
Interaction	.0000242	.0000106	.0000512	.0000292	-.0001089	-.0002231	.0002178	-.0001085	-.0000777

Table 19 – Oaxaca Decomposition Endowments Difference per year

	1998 v 2014	1998 v 1999	1999 v 2000	2000 v 2001	2001 v 2002	2002 v 2003	2003 v 2004	2004 v 2005
endowments								
quarter2	2.14e-07	-2.83e-10	3.94e-06	-2.07e-06	1.53e-07	-1.02e-07	-1.11e-06	1.33e-07
quarter3	6.32e-07	-9.11e-07	4.91e-07	3.85e-06	2.11e-06	1.91e-06	1.32e-06	8.45e-07
quarter4	-1.68e-06	2.26e-07	1.40e-06	4.67e-07	-3.21e-06	1.09e-06	4.91e-06	8.77e-07
Central Portugal	-.0001527	8.14e-06	.000013	-.0000206	-.0000107	.0000135	-.0000615	-.0000342
Lisbon area	.0001476	.0000127	-1.75e-06	.0000156	9.63e-06	-3.39e-06	3.86e-06	4.79e-06
Alentejo	-6.42e-06	-4.56e-06	2.52e-06	-3.87e-09	-9.13e-08	-6.10e-06	-1.69e-06	-4.47e-06
Algarve	.0000188	-1.30e-06	-1.67e-06	7.11e-08	3.26e-06	-7.38e-06	-.0000117	6.77e-06
Azores	.0000508	3.63e-07	-6.84e-06	-1.71e-07	6.05e-06	2.10e-06	.0000168	1.13e-06
Madeira	.0000459	-.0000287	-.000026	-8.48e-06	.0000269	7.24e-06	.0000119	.0000176
age 0-19	-.0001727	-.0000413	.0000129	.0000107	-.0000389	-.0000847	.0000533	-.0000736
age 30-39	-.0001595	-.0000322	-8.00e-06	.0000906	.0000212	.0001927	-.000072	.0000677
age 40-49	-.0020045	-.0000552	-.0000392	-.0000455	.0000415	-.000212	-.0004183	.0001353
age 50-59	-.0030122	-.0001439	.0000376	.0001212	.0003717	.0001897	.0001722	.0002541
age 60-69	-.0000538	.0000249	-.0001409	.0000244	-.0001884	.0000574	.0000416	-.0000292
age 70 or more	.0000757	-.0000483	.0000174	.0000384	.0000548	-5.97e-06	.0000698	.0000266
foreigner	.0000515	.0000236	-.000064	4.07e-06	.0000282	-1.02e-07	8.70e-06	.0000596
HS and some college	-.0006232	-.0000775	-.0000441	-.0000277	.0000294	-.0000908	.0000623	-.0000422
Undergrad	-.0014424	.0000108	-1.59e-06	.0000495	-.000025	.0000479	-.000073	-4.47e-06
Master	.0003702	-7.93e-07	-4.40e-09	-3.19e-06	.0000251	.0000362	-.000019	9.57e-06
PhD	.0000733	-.0000254	5.67e-06	-.0000172	3.28e-06	-1.91e-06	-8.80e-06	.0000201
female	.0012969	.0000872	.0001085	.0000798	.0001113	.0002053	.0000922	.0002278

Table 20 - Oaxaca Decomposition Endowments Difference per year (continuation)

	2005v 2006	2006v 2007	2007 v 2008	2008 v 2009	2009 v 2010	2010 v 2011	2011 v 2012	2012 v 2013	2013 v 2014
endowments									
quarter2	9.02e-08	-2.34e-07	1.97e-06	-8.83e-07	-2.24e-07	1.74e-06	-4.07e-07	-1.71e-06	1.63e-07
quarter3	2.85e-07	8.67e-07	-1.38e-06	-2.36e-06	1.01e-06	2.64e-07	4.08e-06	1.58e-06	3.67e-07
quarter4	-1.19e-06	-3.71e-08	-2.17e-06	1.50e-06	-8.74e-07	-1.22e-06	-6.74e-09	-3.92e-06	-9.48e-07
Central Portugal	-2.84e-06	.000016	-.0000471	-.0000757	-.0000165	-9.65e-06	8.66e-07	4.29e-06	-.0000161
Lisbon area	-1.10e-07	-9.00e-06	9.94e-06	1.91e-07	9.57e-07	.000038	-.0000203	.0000246	.0000175
Alentejo	-1.05e-06	.0000104	-6.62e-07	3.03e-07	1.50e-06	4.52e-06	-4.04e-07	1.58e-06	2.46e-06
Algarve	-.0000203	-.0000122	-3.36e-06	-3.62e-06	-3.88e-06	-5.74e-06	1.96e-06	2.67e-06	2.31e-06
Azores	2.03e-06	2.92e-08	.0000159	.0000111	-7.63e-07	4.68e-06	3.81e-07	3.10e-06	8.60e-06
Madeira	1.10e-06	3.30e-06	9.38e-06	.0000179	6.20e-06	1.04e-06	-1.71e-06	2.19e-06	3.95e-07
age 0-19	-3.86e-06	-7.51e-06	-.0000204	-.0000171	-.0000191	.0000111	-6.37e-06	-1.35e-06	-6.43e-06
age 30-39	-.0000891	-.0000488	-.0000301	-.0000451	-.0000897	.0000333	.0001396	.0000462	.0000781
age 40-49	-.0001658	-.0000992	-.0001081	-.0001894	-.0001407	-.0001123	-.0001596	-.000195	-.000271
age 50-59	-.0000501	-.0002577	-.0002002	-.0002745	-.000271	-.0001859	-.0002637	-.0004366	-.0002064
age 60-69	-.0000653	.0000337	-.0000163	.0000573	-.0000787	.0001894	-.0001465	-.0001092	-.0000745
age 70 or more	-.0000547	-.0000856	9.15e-06	8.25e-06	-.0000158	.0002648	-.0000544	.0001697	.0002388
foreigner	.0000157	.0000835	.0000109	-2.14e-06	-4.60e-06	-.0000308	-.0000278	8.10e-09	-.0000156
HS and some college	-.0000584	.0000324	2.02e-06	-.0000719	-.0000434	-.0001419	-.0001846	-.0001732	-.0000715
Undergrad	5.92e-06	-.0000305	-.0000378	-.0000372	-.0001095	-.0002468	-.0001273	-.0001076	-.0001945
Master	.0000144	-6.79e-06	.0000521	.000043	-4.80e-06	.0000505	-.000068	-.0000217	-.00007
PhD	.0000147	6.58e-06	.0000505	2.95e-06	-.0000182	-.0000145	.0000649	-5.03e-07	.0000183
female	.0000321	.0001088	.0000315	.000182	.0001378	-.0001508	.0001196	.000095	.0000887

Table 21 – Oaxaca Decomposition Coefficients Difference per year

	1998 v 2014	1998 v 1999	1999 v 2000	2000 v 2001	2001 v 2002	2002 v 2003	2003 v 2004	2004 v 2005
coefficients								
quarter2	-.0004274	-.0004418	-.0007	-.0003618	.0010592	-.0003861	.0010897	-.0000314
quarter3	-.0009492	-.0012222	.0003328	-.0010016	.0014342	-.0009324	.0013866	.0000671
quarter4	-.0009022	-.0013247	.0005969	-.001654	.002082	-.0013144	.0016433	.0004071
Central Portugal	.0004451	.000513	-.0007982	.0012878	.0027511	-.0012283	.0001167	-.0008209
Lisbon area	.0008421	.0027133	-.0029735	.0025247	-.0003363	-.0042904	.0017299	-.0004741
Alentejo	.0001394	.000305	-.0007198	.0002341	-.0000108	-.0002389	.0006907	-.0000742
Algarve	.0005153	.0000205	.0001387	.0002	.0000826	-.0006135	-.000247	.0001628
Azores	-.0001299	.0001603	-.0000234	-.0001238	-.000024	-3.57e-06	.0002237	-.0000919
Madeira	-.0004266	.0002236	-.0000924	-.0000585	-.000138	-.0001925	.0001509	-.0001511
age 0-19	-.0001263	.0000904	-.00011	.0001306	-.0001537	.0000742	.0000185	-.0000288
age 30-39	.0038368	.0022966	-.0019258	-.0024712	-.0004711	.0024867	.0008388	.0010041
age 40-49	.0042057	.0009569	-.0010636	.0011315	-.001321	.0009233	-.0005021	.0005456
age 50-59	.003503	.0001558	-.0003464	.0002645	.0001604	.0009845	-.0016699	.0004915
age 60-69	-.0008503	.0002735	.000286	.0001253	-.0009509	-.0000715	-.0004794	.0014387
age 70 or more	-.0010098	.0002979	.000057	-.0002503	-.0001759	-.0000802	-.000131	.0001663
foreigner	.0010753	.0002302	.0001637	.0003083	.000102	-.0001161	.0000794	.0002419
HS and some college	.0024991	.000757	-.000121	-.0004652	-.0001616	.0003021	.0001324	.0009741
Undergrad	.0003533	.0006229	.0004087	-.0007185	.0002161	.0000886	-9.84e-06	.000266
Master	-.0007008	7.95e-07	-.0000313	.0000749	-8.55e-06	.0000683	-.0000587	.0000456
PhD	-.00018	-.0001575	.0001434	.0000736	-.0000294	-.000029	.0000448	-.0000343
female	-.0055436	.0005253	-.0005134	.0027743	-.0010452	-.0013369	.0003332	-.0008035
_cons	.016851	-.005773	.0082514	-.0037259	-.0024002	.005483	-.0051101	.0030562

Table 22 - Oaxaca Decomposition Coefficients Difference per year (continuation)

	2005 v 2006	2006 v 2007	2007 v 2008	2008 v 2009	2009 v 2010	2010 v 2011	2011 v 2012	2012 v 2013	2013 v 2014
coefficients									
quarter2	-.0006761	.000012	.0002565	.0000913	.0002017	-.00028	.0000246	.0001893	-.0004726
quarter3	-.0006161	.0000213	-.0001142	.0001919	-.0000601	-.0003106	.0005609	-.001108	.0004357
quarter4	-.0011295	-.0008294	.0009736	2.06e-06	-.0002513	-.0000841	-.0001213	-.0005863	.0006791
Central Portugal	.0005889	.0007021	.0005368	.0002472	-.0020615	-.0023488	-.0008945	.0014555	.0006472
Lisbon area	-.0018481	-.0022103	.0036087	.0005307	-.0029308	.0037971	.0019292	-.0015523	.0007363
Alentejo	-.0003018	-.0004626	.0004374	4.94e-06	-.000666	.000784	.000258	.0000543	-.0001307
Algarve	-.0003096	.0002991	.0003525	.000171	-.0004058	.0003811	-.0001408	.0000516	.000369
Azores	-.000297	-.0000962	.0002732	.0000318	-.0003732	.0001163	-.0001141	.0001779	.000072
Madeira	-.0002511	.0000726	.000206	.0001365	-.0003118	-.0000443	.0000254	.0001597	-.000122
age 0-19	-.0001245	-4.67e-06	.0000178	-.0000354	.0000165	-.000015	-.0000431	-.0000318	.0000331
age 30-39	.0003013	-.0006102	-.0005979	.000049	.0016893	.0014534	-.0005468	-.0009503	.0014378
age 40-49	.0009823	-.000185	.0007778	-.0004307	.0016258	.0009892	-.0009115	-.0008691	.0012423
age 50-59	.0001324	.0008936	-.000211	.0000878	.0019746	.0007304	-.0003449	-.0004846	.0002294
age 60-69	-.0009808	-.0007864	-.0001705	.0010128	.0001124	-.0006613	-.0002832	-.0002332	.0005766
age 70 or more	-.0000961	-.0003406	.0003258	-.0003915	-.0000405	-.0001658	.000079	-.0006758	.0001412
foreigner	.0001126	.0000718	-.000646	.0004894	-.0003598	-.0000326	.0000347	-.0001206	.000074
HS and some college	-.0006023	-.000218	.0007692	.0002055	.0001084	-.0006288	-.0013395	.0005453	.001509
Undergrad	.0003349	-.0007173	-.0001263	-.0011582	.000474	-.0012518	.0006379	.0007012	-.0000677
Master	-.0000423	-.0000288	.0000503	-.0000846	-.000216	.0001927	-.0004611	.0000389	-.0000799
PhD	-.0000159	.0000264	-.000038	-.0000596	.0000869	-.0000434	-.0000158	-.0001502	.0000642
female	-.0032373	-.0005857	.0006865	.001	-.0013637	-.0010743	-.0037325	.0011378	.0018212
_cons	.0124105	.004187	-.007074	.0003974	.0064788	.0000609	.0083545	.001812	-.0095575

Table 23 - Oaxaca Decomposition Interaction Difference per year

	1998 v 2014	1998 v 1999	1999 v 2000	2000 v 2001	2001 v 2002	2002 v 2003	2003 v 2004	2004 v 2005
interaction								
quarter2	1.25e-06	-2.17e-09	-4.29e-06	7.46e-07	-3.23e-06	1.17e-07	1.61e-06	5.76e-09
quarter3	7.43e-06	5.69e-06	-1.20e-06	-4.46e-06	-5.34e-06	-4.80e-06	-1.80e-06	-5.23e-08
quarter4	-8.62e-06	-1.26e-06	-2.34e-06	-5.96e-07	8.44e-06	-2.73e-06	-7.22e-06	-2.34e-07
Central Portugal	.0000497	-2.71e-06	.0000134	.0000129	6.15e-06	4.62e-06	1.97e-06	-.0000101
Lisbon area	-.0000324	-6.16e-06	-1.98e-06	-7.65e-06	6.70e-07	-.0000285	-2.98e-06	1.28e-06
Alentejo	2.77e-06	2.83e-06	-7.77e-06	8.94e-07	1.01e-07	5.86e-06	2.63e-06	-9.13e-07
Algarve	-.0000923	-8.39e-08	-1.27e-06	-8.37e-07	-2.69e-06	8.85e-06	3.76e-06	1.85e-06
Azores	.0000219	-1.12e-07	-3.27e-07	-5.78e-08	4.18e-07	2.16e-08	-6.46e-06	2.13e-07
Madeira	.0000457	6.65e-06	-2.85e-06	-6.40e-07	5.53e-06	2.86e-06	-2.77e-06	5.12e-06
age 0-19	-.0002546	5.38e-06	-2.50e-06	2.03e-06	-.0000123	.0000129	2.17e-06	-6.13e-06
age 30-39	-.0000998	-9.92e-06	1.64e-06	-.000019	8.12e-07	-.0000478	-6.51e-06	-8.15e-06
age 40-49	-.0006706	-4.00e-06	2.92e-06	-3.89e-06	-3.78e-06	-.0000142	.0000143	-5.16e-06
age 50-59	-.0009566	-2.13e-06	1.19e-06	-2.97e-06	-5.41e-06	-.0000182	.0000239	-.0000106
age 60-69	8.26e-06	1.57e-06	-9.57e-06	7.53e-07	-.0000369	-8.42e-07	-3.75e-06	-.0000107
age 70 or more	-.0000407	-.0000213	-1.56e-06	.0000105	8.48e-06	3.92e-07	-7.08e-06	-3.83e-06
foreigner	-.0005391	-.0000183	-.0000436	-.0000295	-.0000187	-3.15e-07	-5.76e-06	-.0000376
HS and some college	-.0012159	-.0000449	3.63e-06	6.60e-06	-2.28e-06	-.0000145	-4.52e-06	-.0000439
Undergrad	-.0002349	-.0000258	4.27e-06	.0000645	-.0000144	-.0000123	1.68e-06	-6.89e-06
Master	.0006265	2.07e-08	2.24e-07	3.21e-06	2.31e-06	-.0000134	-.0000118	-2.97e-06
PhD	.0001434	.0000551	-.0000127	9.77e-06	9.20e-07	-7.57e-07	3.50e-06	6.57e-06
female	.0004203	-2.13e-06	2.63e-06	-9.23e-06	5.05e-06	.0000125	-1.37e-06	8.40e-06

Table 24 - Oaxaca Decomposition Interaction Difference per year (continuation)

	2005 v 2006	2006 v 2007	2007 v 2008	2008 v 2009	2009 v 2010	2010 v 2011	2011 v 2012	2012 v 2013	2013 v 2014
interaction									
quarter2	1.26e-06	4.67e-08	-1.60e-06	1.98e-07	7.43e-08	1.47e-06	2.81e-08	5.95e-07	1.05e-06
quarter3	3.75e-07	-3.76e-08	-4.21e-07	8.02e-07	1.20e-07	4.18e-07	-3.02e-06	-4.97e-06	-1.98e-06
quarter4	-3.43e-06	7.00e-08	3.93e-06	-5.72e-09	-7.66e-07	-5.11e-07	-1.03e-08	4.54e-06	3.66e-06
Central Portugal	4.97e-07	-2.75e-06	5.53e-06	3.94e-06	-.0000128	-.0001317	-1.07e-06	-8.57e-06	7.63e-06
Lisbon area	2.85e-06	8.72e-06	-.0000274	-5.51e-08	-2.57e-06	-.0000537	8.50e-06	.0000123	-3.36e-06
Alentejo	-5.85e-06	-.0000118	8.17e-06	-3.68e-08	-1.60e-06	-.0000258	2.64e-07	-1.91e-07	9.94e-07
Algarve	6.84e-06	-5.71e-06	-4.05e-06	-4.79e-06	2.93e-06	-.0000126	-8.80e-07	5.35e-07	-8.13e-06
Azores	3.05e-06	2.77e-08	-.0000114	-8.35e-07	-7.09e-06	-3.45e-06	9.67e-07	-2.47e-06	-2.05e-06
Madeira	1.02e-06	-6.93e-07	-3.47e-06	-3.45e-06	4.74e-06	1.27e-07	1.12e-07	-6.36e-07	1.13e-07
age 0-19	-2.23e-06	-1.72e-07	1.79e-06	-4.16e-06	2.17e-06	1.16e-06	-3.04e-06	-7.62e-07	2.49e-06
age 30-39	-3.30e-06	3.39e-06	1.91e-06	-2.35e-07	-.0000193	7.63e-06	-.0000113	-5.72e-06	.0000183
age 40-49	-.0000121	1.33e-06	-6.41e-06	5.94e-06	-.0000186	-9.74e-06	.0000117	.0000125	-.0000268
age 50-59	-5.65e-07	-.0000207	3.66e-06	-2.05e-06	-.0000531	-.0000142	8.96e-06	.0000192	-4.29e-06
age 60-69	.0000129	-4.64e-06	4.72e-07	.0000121	-1.85e-06	-.0000238	7.29e-06	4.22e-06	-7.75e-06
age 70 or more	4.03e-06	.000017	2.17e-06	-1.84e-06	3.53e-07	-.0000252	-2.50e-06	-.0000504	.000018
foreigner	-3.49e-06	-9.16e-06	.0000744	1.80e-06	-7.85e-06	-7.15e-06	6.28e-06	2.95e-08	.0000113
HS and some college	.0000223	-4.00e-06	1.56e-06	-.0000169	-5.75e-06	.0000583	.0000833	-.0000358	-.0000843
Undergrad	-.0000128	.0000396	6.72e-06	.0000229	-.0000335	.0001049	-.0000329	-.0000394	6.07e-06
Master	4.91e-06	-2.26e-06	-.0000151	.0000234	.000027	-.000075	.0001074	-3.03e-06	.0000135
PhD	2.21e-06	-1.26e-06	.0000118	1.64e-06	8.58e-06	-5.17e-06	5.80e-06	-3.39e-06	-.0000127
female	5.59e-06	3.52e-06	-1.15e-06	-9.09e-06	.00001	-9.22e-06	.0000319	-7.11e-06	-9.44e-06

A.4. Section 7: Entrance and Exit from Entrepreneurship

Table 25 - Outcomes of the Variables Condition Before Work and Work Situation

Name of the variable	Original name	Outcomes
Condition before work	Condição perante o trabalho	Worker; Unemployed first job; unemployed; compulsory military service; military forces; student; retired; domestic worker; other (out of the labor force)
Work Situation or Work status	Situação na profição	Employee; self-employed without employees; entrepreneur; family worker without income other (1)

Note: The dataset has Condition Before Work and Work Status for the last year, for period t and for period t-1. In total we use four different variables to compute the entrance and exit from entrepreneurship. To compute the number of unemployed and number of individuals out of the labor force that enter entrepreneurship we use variable Condition Before Work. The number of unemployed results from the sum of the unemployed with the first job and the unemployed. The number of individuals OLF results from the sum of the compulsory mandatory service; students; retired individuals and others.

(1) This outcome is only present in the series between 1998-2010

Table 26 - Condition Before Work Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
New Condition Before Work	668,356,609	2.54761	1.467303	1	4

New_cbw	Freq.
Worker	312,366,809
Military	1,948,940
Unemployed	29,716,300
Out of the Labor Force	324,324,560

Note: The new variable generated is based on the variable Condition Before work. It results from the sum of the two types of unemployed and the sum of the different outcomes associated with being out of the labor force. Thus, the new variable has four possible outcomes with the following meaning: 1 – the individual is a worker; 2 – the individual is a military; 3 – the individual is unemployed and 4 – the individual is out of the Labor Force.

Figure 22 – Exit from Entrepreneurship to other occupational choices
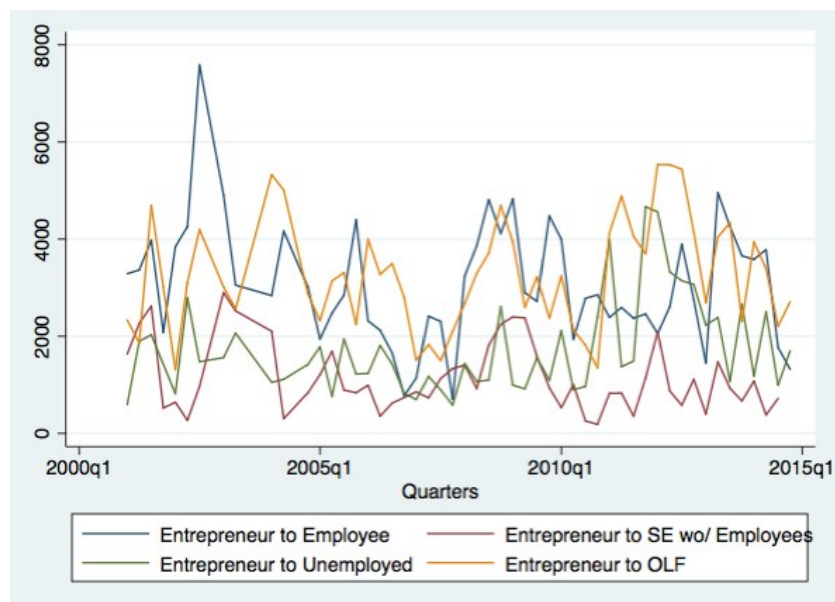
Note: Entrepreneur to employee means that the individual was an entrepreneur at year t-1 and at year t the individual is an employee. The reasoning is the same for the other occupational choices. The values are the sum of individuals that were entrepreneurs at year t-1 and at year t have some other occupational choice for every quarter.

Table 27 – Entrance and Exit from Entrepreneurship

	Exit	Entrance
2001	9,217	14,023
2014	7,819.75	7,508.75
change	-15.15%	-46.45%

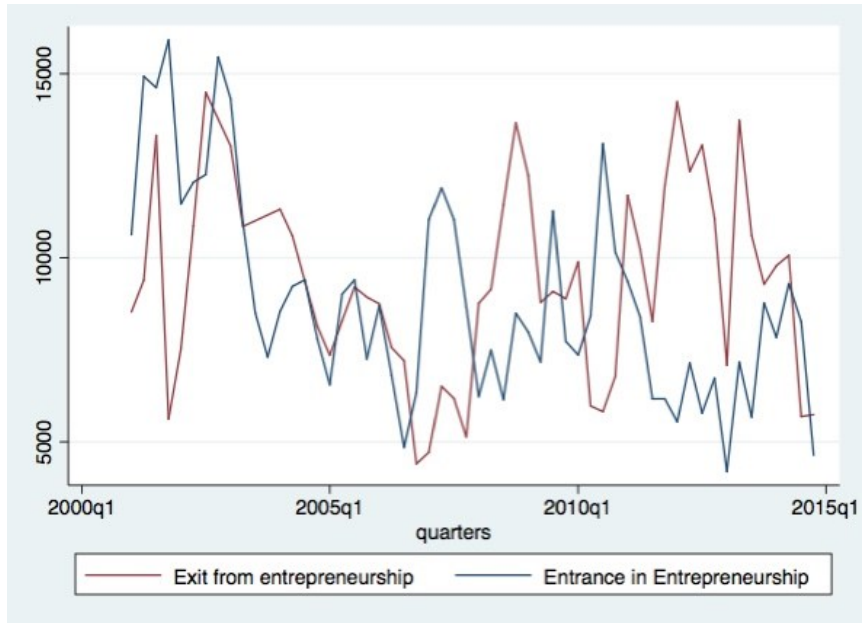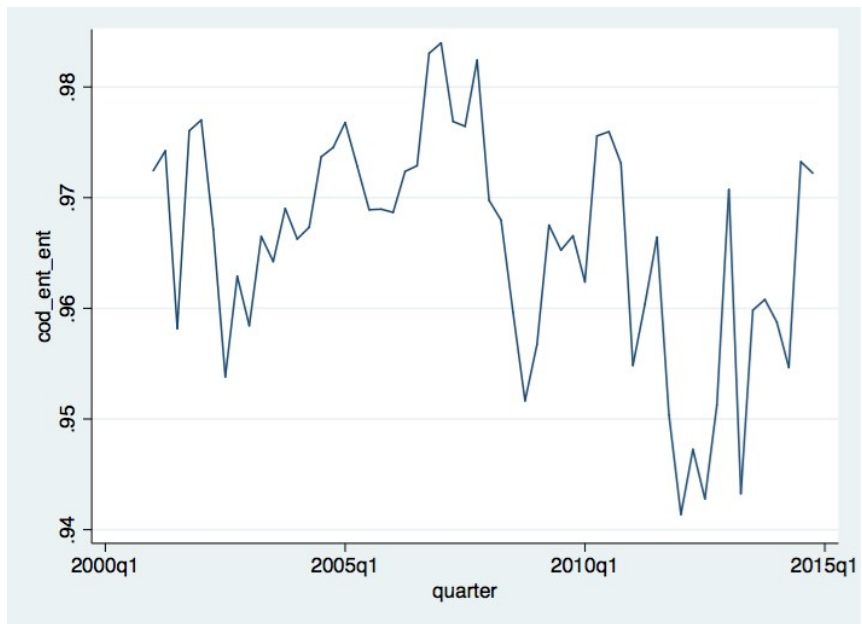*Figure 23 - Entrance and Exit from Entrepreneurship*

Figure 24 - Conditional Probability of Being an Entrepreneur at t Given that he/she was an Entrepreneur at t-1

A.5. Section 8: Entrepreneurship, GDP and Unemployment

Table 28 - Entrepreneurship, GDP and Unemployment rate from 1998-2014

Variable	Obs	Mean	Std. Dev.	Min	Max
Entrepreneurship Rate	68	.0523269	.0062729	.0408378	.0628293
Growth Rate of GDP	67	.0017167	.0084762	-.023	.0222912
Unemployment Rate	68	.0945147	.0360299	.0486667	.1733333

Note: The observations are quarterly 1998-2014. The series for unemployment used is from the OECD. The values are in units, not in percentages.

Figure 25 - Cross Correlogram First Difference of the Real GDP growth and First Difference of the Entrepreneurship rate
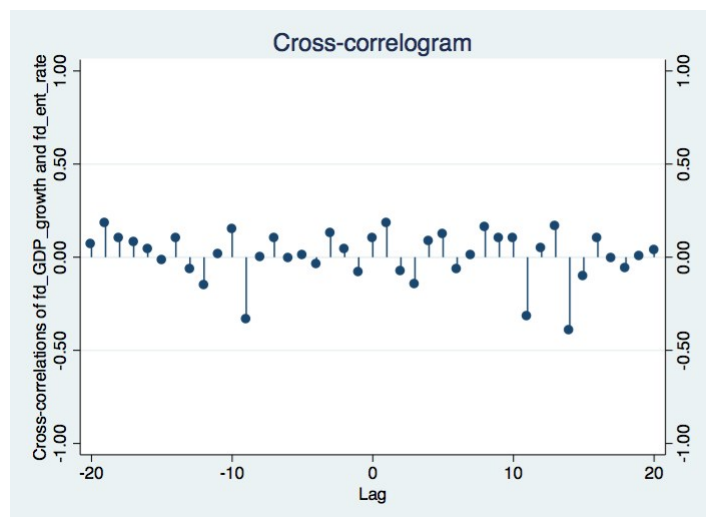
Figure 26 - Cross Correlogram First Difference of the Unemployment Rate and First Difference of the Entrepreneurship Rate
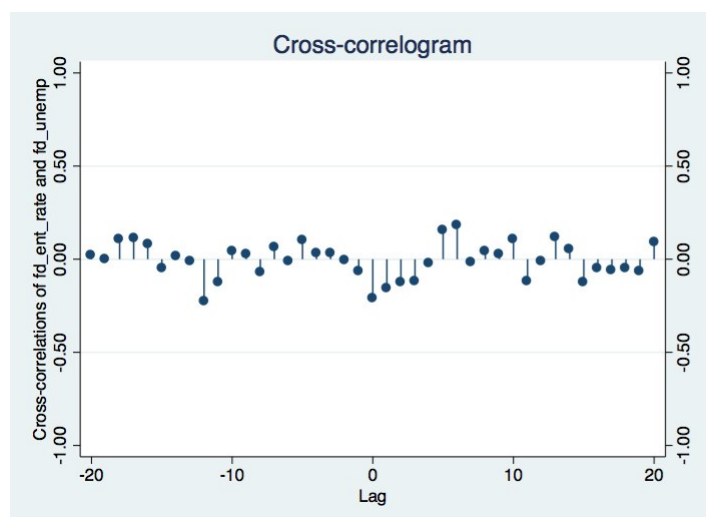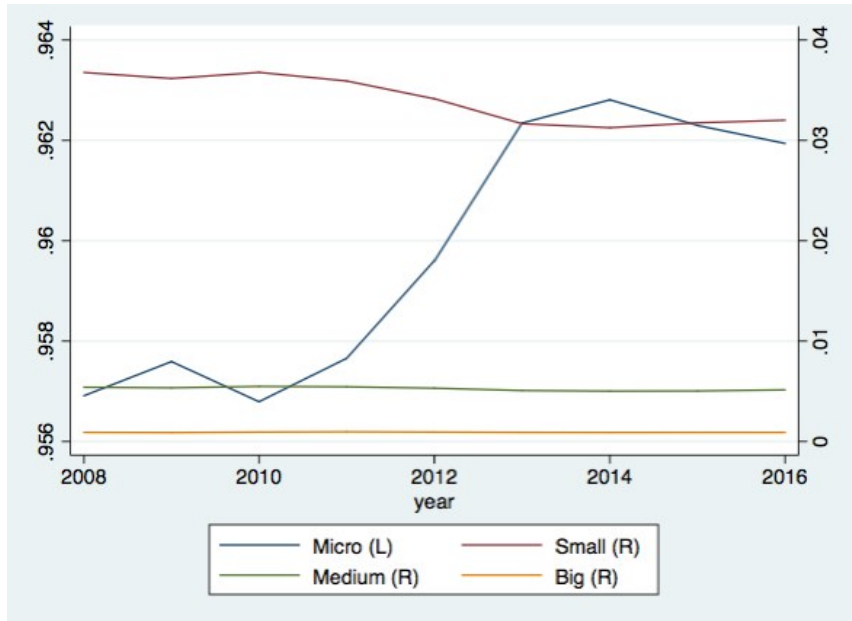
Figure 27 - Proportion of Firms by Type

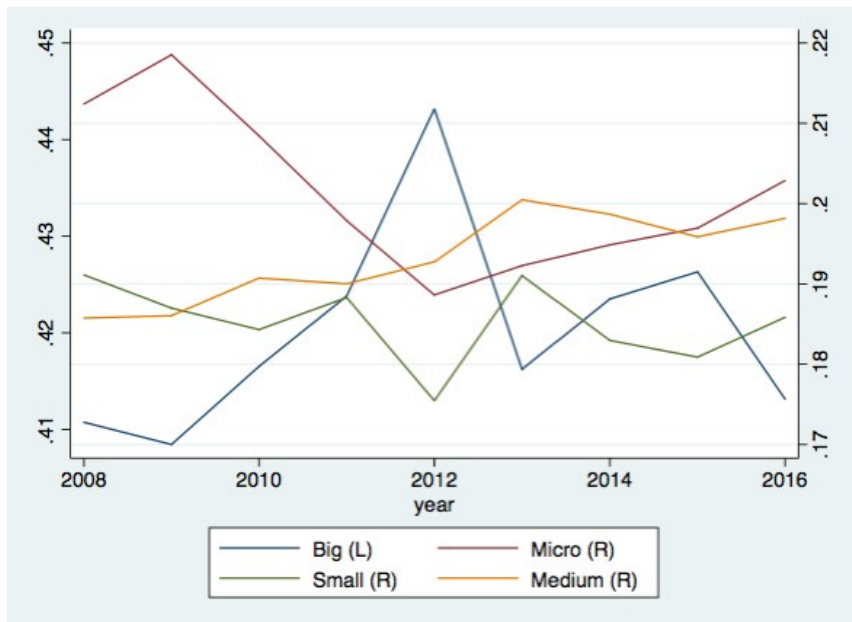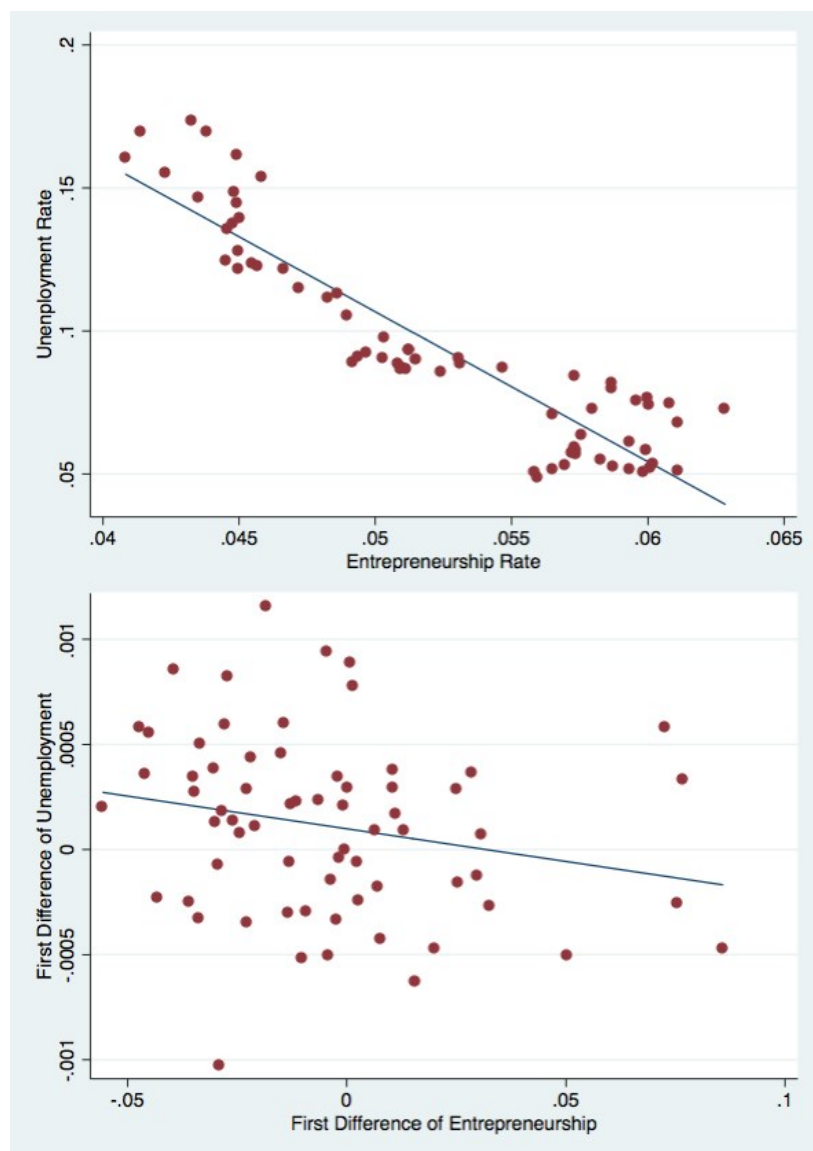
Figure 28 - Proportion of GVA by Firm Type

Figure 29 - Scatter of Entrepreneurship and Unemployment

Table 29 - Correlations between Entrepreneurship and Unemployment

	Entrepreneurship Rate	Unemployment Rate	Δ Entrepreneurship Rate	Δ Unemployment Rate
Entrepreneurship Rate	1.0000			
Unemployment Rate	-0.9149	1.0000		
Δ Entrepreneurship Rate	0.1201	0.0081	1.0000	
Δ Unemployment Rate	-0.0707	0.0734	-0.2225	1.0000