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Relationship between education level and holding a full-time or part-time employment (Portugal 2006-2016)

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ABSTRACT

The 2008 economic crisis produced significant setbacks in economic growth in developed countries, and countries like Portugal, in particular, were seriously harmed. Human capital is a factor of production which provides benefits to both individuals and society and, as such, it is crucial when analysing countries' economic revivals. This article's goal is to carry out a study of the likelihood of being employed in Portugal between 2006 and 2016, differentiating between full-time and part-time work, according to the maximum level of study attained. The results show that individuals with higher education have a high probability of having full-time work.

Keywords: human capital; education level; employment; economic research

JEL classification: E24; I21; J24

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1. Introduction

The 2008 economic crisis produced significant setbacks in growth in developed countries, above all the countries of Southern Europe, which were the most seriously affected of all the countries in the European Union (EU). Portugal in particular experienced a fall in Gross Domestic Product (GDP) per capita in constant dollars of 3.07% in the year 2009 (WB, 2018). The second economic impact took place in 2012, a year after the EU's intervention, with a fall in GDP per capita of 3.64% (WB, 2018).

A labour force's training is considered to be a factor of production that provides direct benefits to the individual who has the training and external benefits to society in general. Each individual's decision to undertake formal higher or secondary studies or to leave the education system, as well as the choice of training field, depends on many factors, the most significant of which are personal, related to family or socio-economic. Whatever the motives, it is very important to analyse the labour supply bearing in mind individuals' training levels and the type of working hours for which they have been hired.

The working hypothesis is to identify the characteristics that make a candidate more likely to be employed and what type of working hours they have, bearing in mind the education level they have completed. The goal of this research is to assess the probability of being employed, distinguishing between full-time or part-time work, for the working-age population in Portugal between 2006 and 2016, depending on education level and differentiating between higher, secondary and primary education.

2. Background to the human capital theory

Although the economy of education has been an important field of research from the mercantilists to the classical economists, its development as a scientific model since the Schultz conference (1960) on "Investment in Human Capital" at the annual meeting of the American Economic Association is, for many, the birth of this theory. According to the author, all workers, when participating in the labour market, not only bring their physical strength and innate abilities individually but also carry a range of knowledge that they have acquired throughout their education and is specific to them, making them stand out from other workers. Later, researchers such as Becker (1965), Denison (1970) and Mincer (1974) provided human capital theory with form and consistency.

The theory envisages the demand for education (training) like the demand for any capital good that becomes apparent by increasing the subject's productive potential. As individuals reach different education levels, they transform themselves in such a way that there will be palpable differences between their production capacity and the production capacities of other workers who have not reached the same level. This is the difference between workers, which means companies compete among one another to win over the most educated, and therefore most productive, workers, with a consequent increase in the salaries that these workers are paid. Individuals will choose their optimal investment in education, comparing the present value of the cost of that investment with the present value of the benefits they will get from it in the future.

The central hypothesis of human capital asserts that education increases the productivity of those who have it, and in this respect it is entirely innovative and produces great divergences. The rest of its analysis, however, is based on the classical model, the major characteristics of which are: firstly, that human relationships are the product of individuals' rational behaviour, according to which each one acts in defence of his or her legitimate interests; secondly, the market (through the free interplay of supply and demand) is the framework for efficiently assigning resources; finally, all individuals attempt to maximise their utility and, in order to do so, make decisions based on a cost-benefit analysis of the resources at their disposal.

Over time, skill means that the marginal productivity of an equal factor in all jobs becomes the same, so the only reason for there to be different levels of productivity among workers in a balanced situation will be due to the workers' different capacities for production. These differences in capacity

may be due to each individual's own nature or may be increased by investing in oneself by way of education.

Education, from this point of view, is a form of investment that has certain particularities (Freire-Seoane, 1990), which can be summarised in the following considerations: 1) It is a complex phenomenon due to its multi-faceted nature and its dependence on the cultural and social context. 2) Education systems can be organised according to quantitative and qualitative criteria that provide some base measurements that are important for calculating its costs. 3) It should be remembered that there is a positive correlation between different academic levels and income for those who reach those different levels.

The main thing to take away from human capital theory is that there are characteristics that may have a decisive influence on employment opportunities and people's incomes. The main ones are education (which can be measured by the number of years of schooling), experience (measured by the number of years of work and career) and, to a lesser extent, intelligence (measured by intelligence quotient).

In this theory's perspective, supply and demand for employment set the salary and employment levels in the economy. Any increase or reduction in salaries will cause a change in the amount of employment, which will lead to a situation of balance. Similarly, it is posited that unemployment is caused by a lack of adaptation of the supply to the qualifications required by the demand, and so the solution to unemployment could be achieved by adjusting education to existing labour demands.

The market establishes that workers who have a higher number of years of education get the best-paying jobs as they are the most productive and are therefore favoured by employers (Moreno, 1998). These differences in productivity should translate into growth in salaries because, within the neoclassical framework, factors are remunerated according to their marginal productivity. This is, therefore, a sequence of benefits: education-productivity-employment-salary.

From this point of view, education can be considered to be a capital good from a dual individual and social perspective. On the one hand, individuals invest in education because they hope that in the future their net income will increase over their lifetime and, on the other hand, education is a way for society to create a profitable good that helps increase the production of goods and services.

The tenets of human capital theory (Blaug, 1983) can be laid down in several parts: the first tenet establishes that individuals use some of their income on themselves, thinking about future pecuniary and non-pecuniary fulfilment. The second tenet argues for an investing rather than consuming stance by the person who seeks post-compulsory education. The last tenet establishes that demand for post-compulsory education is influenced by different variables, some relating to the direct and indirect actual costs of acquiring a particular level of education and other future variables connected to variations that the education will create for employment opportunities and income levels for the educated person.

Moreover, investment in human capital falls over the years; time is a factor in producing this type of capital and its price (wage rate) increases as human capital increases. We have to bear in mind that, for older people, the later investments are made in human capital, the less time is left for the worker to benefit from higher income. For this reason, it is logical for investment in human capital to decline as time goes by.

When individuals complete their compulsory education, they may choose to go into the labour market and look for work or keep studying, incurring several costs that will in part include direct costs, but also indirect costs or opportunity costs related to the phase during which they keep studying rather than joining the labour market.

Individuals who stop studying and enter the labour market at a younger age will start to collect income earlier. On the other hand, workers that choose to continue studying will postpone their entry into the labour market until they reach 21, 22 or 23 years of age, depending on the duration of the studies chosen. But when the latter choose to start a job, they will generally do so with a higher salary than they would have received if they had not continued their studies and this income will likely be higher throughout their working lives.

When extending the macroeconomic sequence of the education-employment type relationship, the following results emerge: 1) People who have completed higher levels of education will have more employment opportunities and will enjoy better job types; 2) If the type of work these people have reflects their production capacity, it means that education increases their productivity; 3) If the development of a society is a function of growth in its members' production capacity, then greater education will contribute to greater economic development. This was the optimistic conclusion reached by human capital theory and it has since encouraged investment in education.

Human capital theory represented an innovative, powerful framework for rationally understanding investment in education and training, as well as for assessing the profitability of such investment (Mincer, 1958; Schultz, 1961; Becker, 1965). The initial optimism envisaging that the spread of education would effectively even out individuals' opportunities in industrialised societies was followed by pessimism about the possibilities of varying income distribution through education. The pioneers of this new scepticism were Jencks *et al.* (1972). Most criticism addressed the failure demonstrated by education and training programmes in their aims to reduce poverty levels (Levin, 1977).

In the 1970s, the screening hypothesis emerged (Arrow, 1973; Spencer, 1973; Stiglitz, 1975), which is a new interpretation of education and, above all, makes the main critique of human capital theory within the perspective of neoclassical economics. In signalling models, education emerges as a way of selecting more productive individuals and the consequences are demonstrated not only regarding recommendations for public policy based on human capital but also regarding the efficiency of competitive market systems. Even in the event that we found ourselves in a highly competitive private sector context, efficient attribution of resources would not take place (Rosen, 1977; Riley, 1979; Stiglitz and Weiss, 1983; Easton, 1983, 1988).

In fact, the idea of selection or screening was first posited by Berg (1970). In this theory, there is an increase in academic requirements for getting a job, while the characteristics of jobs have not changed compared to what was demanded previously. Based on data analysis, the author confirms the previous proposition, coming to the conclusion that we are in a situation of educational inflation when there is no significant variation in productivity.

The idea of selection was quite damaging for human capital theory, which argued the demand for education could be considered as the demand for a capital good that increases the production potential of an individual. That said, if education does not increase individuals' productivity but only serves to allow them to access a job, it is possible that individuals increase their future income but at aggregate level all the social benefits connected to education would have disappeared.

The main aspect to take from this theory, then, is that education does not add any type of new production capacity to the person, and its sole function is to provide information on certain innate capacities within individuals which are important for the production system. It is even possible that if individuals find it hard to transmit their worth in the labour market they use educational qualifications as signalling instruments, that is, they invest in education as a signal, even if that training does not improve productivity at all. As a result, an education system that does not establish appropriate information signals regarding people's aptitudes or does not do so to a sufficient degree of nuance would stop being truly useful.

The screening hypothesis is similar to human capital theory, particularly in the neoclassical framework, in the idea that education can boost economic development by selecting the most productive individuals for the best jobs.

According to this theory, there is a significant positive relationship between type of work and education when expressed as an average. Furthermore, there is also considerable variation in salaries for the same education level, so there it may be the case that a poorly paid university graduate earns less than young people who have secondary education but are well paid. Lastly, there is considerable variation in education with respect to each employment category. This situation may be explained by statistical discrimination when hiring and by the presence of internal labour markets of differing intensities in both private and state companies.

The 1970s saw the emergence of institutionalist theory, which assigns greater importance to the demand for work and assumes that workers' productivity is in the workplace (Thurow, 1975, 1983;

Doering and Piore 1971, 1983). In Thurow's model, business owners are the ones that design jobs and establish levels of responsibility, promotion prospects, training and salaries. When joining companies, workers are not completed factors but require company-specific training that will gradually shape them. Employers see more education as the mark of a person's ability to adapt to the job and his or her greater ability to absorb training. Individuals no longer compete for salaries but for jobs, and what is important to them is their relative education level compared to others.

The labour market is formed of queues in which candidates are ordered for each job. At the front of the queue are workers who can take on the training needed for the job at the lowest cost to the employer. As there is no evidence for calculating that cost, business owners rely on characteristics such as education, age, sex and examinations such as psychometric tests and personal interviews in order to achieve an approximate measure of the costs needed to train those workers. Assuming that the labour market does not absorb the entire labour "queue", there will be people who cannot get a job and so are unemployed.

All this reasoning demonstrates the importance of education and training, since when they are used as indicators for hiring, any variation in education distribution may cause a variation in relative position in the employment queue. An increase in the supply of a workforce that has high educational qualifications (assuming an even distribution of jobs), would force many qualified individuals to accept jobs of a lower category. These individuals would be encouraged to invest in education simply to keep their previous position in the labour market. This type of behaviour causes the result of an absolute increase in educational credentials for the same structure of jobs.

This theory accepts that supply and demand of different qualifications are not adjusted but that demand for work creates its own supply, in other words, it sets the different qualifications that should be taught. Accordingly, it can be said that supply depends on demand.

The reasons for which individuals with higher education levels have more job opportunities and greater possibilities of achieving better jobs are: on the one hand, educational qualifications that allow employers to save on selection costs, as well as reducing the risks involved in hiring and, on the other hand, the educational characteristics that make it possible to reduce costs incurred by companies when training workers (Becerra, 1998). With this reasoning in mind, people with higher education levels will reap greater benefits from job opportunities and will likely have higher incomes. This is not necessarily because they are more productive (as human capital theory established), but due to savings in selection and training costs.

Research carried out by institutionalists has shown that there are specific mechanisms within companies for assigning roles and salaries (Doeringer and Piore, 1971, 1983). Internal markets are formed within each company which are similar to a working career. Each of the internal markets has a job ladder that comprises jobs ordered according to the qualification levels required to perform them. At the foot of the ladders there are some entry-level positions for the external labour market. Companies turn to the external market to hire people for entry-level or routine jobs (which involve the least responsibility and qualification and therefore have the lowest salaries), and the remaining positions are filled by the company internally. Business owners will gradually promote workers as they see them become more productive in their positions. Since unemployed people know how hard it is to get a job, rather than worrying about the salary they would earn, they largely compete for the job itself.

Human capital theory generally establishes that workers with the highest number of years of education get jobs with the best salaries, since they are the most productive and, as a result, they are favoured by employers. The theoretical hypothesis on which this is based suggests that the supply and demand of work determine the salary and level of employment in the economy, and any variation in these quantities causes a rise or fall in salaries, which modifies the conditions of balance. Similarly, it is posited that unemployment is caused by a lack of adaptation of the supply to the qualifications required by the demand, and so the solution to unemployment could be achieved by adjusting education to existing labour demands (Teijeiro *et al.*, 2013).

According to this hypothesis, education is undoubtedly placed as a key element for countries' development by helping to improve competitiveness and growth in the long term (López *et al.,* 2018; Freire-Seoane *et al.*, 2011). A country that wishes to be competitive should, principally, make suitable investment in education, as well as carrying out proper management to improve the quality of academic investment and the employability of its graduates (Aghion and Cohen, 2004). A country's human capital level plays an important role in the process of incorporating a population into the labour market, in improving living conditions and, perhaps, in a more egalitarian share in income (Sapelli, 2003). Knowledge is identified as a strategic asset in companies (Kianto *et al.*, 2018; Crook *et al.*, 2011; Marimuthu *et al.*, 2009; Mariz-Pérez *et al.,* 2012).

As for education level, researchers indicate that people with training are less prone to make mistakes, are better able to address new problems, require less supervision, are better able to take on risks and responsibilities, and can easily adapt to change (Corrêa da Silva and Pereira, 2013). Work is therefore identified as one of the main reasons for going to university (Monte and Schoier, 2015); despite this, holding a higher education qualification does not guarantee access to a desired job (Gleason, 2018; Alves, 2005) but, on the other hand, on many occasions people who lack a tertiary level qualification are not considered from the perspective of employers (Jackson and Collings, 2018; Márquez, 2009).

Currently, the characteristics of the labour market require both active and potential workers to have not only high levels of vocational skills but also a great capacity for adaptation in a context that changes very quickly. On this subject, González and Wagenaar (2003) have highlighted the importance of developing cross-cutting skills to meet the demands of the labour market. Similarly, García *et al.* (2009) have carried out research to analyse the role played by training for cross-cutting skills in the process of joining the labour market, finding that skills which enhance autonomy and adaptation to new demands, the ability to work in a team, motivation or a capacity for ongoing learning are highly valued in workplaces. As a result, for workers' profiles to be valued, they must combine different aspects, such as knowledge, professional expertise and employability. The concept of employability has evolved considerably from its origins to the present day. At the moment, the idea of employability covers numerous characteristics and/or conditions that go beyond whether the person is, for example, a certain age or has extensive responsibilities at home (Rentería-Pérez and Malvezzi, 2008). It has also shifted from a social, organisational concept that defined the job opportunities within a society or organisation to become a psychosocial construct that indicates the likelihood of a person getting or keeping a job in a specific social/work setting (Fugate *et al.*, 2004; Thijssen, Van der Heijden and Rocco, 2008; Geisler *et al.*, 2019).

Many researchers have, over time, studied the satisfaction levels of full-time and part-time jobs without reaching a consensus about which type of job provides the highest satisfaction level (Jaworski et al., 2018; Barling and Gallagher, 1996; Jackofsky and Peters, 1987; McGinnis and Morrow, 1990; Wetzel and Gallagher*,* 1990). The research therefore resulted in analyses of commitment in both types of work, but a common position could not be reached in this case either (Martin and Peterson, 1987; Sinclair and Gardner*,* 1999; Wetzel and Gallagher*,* 1990; Lee and Johnson, 1991; Martin and Hafer, 1995; Morrow, 1994; Krausz *et al.*, 2000; McGinnis and Morrow, 1990).

Nonetheless, it is believed that part-time jobs provide a context that is very different from full-time jobs, because the group and setting to be assessed are completely different (Feldman, 1990; Miller and Terborg, 1979; Conway and Briner, 2002), that is, an individual's goal to have a full-time job are unsuccessful if he or she has a part-time job. This is not the case if the individual has no aspirations to get this type of work and is satisfied with a part-time job.

Another important aspect that has been analysed by many researchers is job quality. This research includes reports drawn up by the major international institutions (OECD, 2013; UNECE, 2014). The socio-economic landscape experienced in Europe has caused a spread of precarious, low-productivity jobs, particularly in countries that have suffered the most from the effects of the economic crisis (Olsthoorn, 2014). Precarious work is understood (Rodgers and Rodgers, 1989) as work that does not give individuals the ability to earn enough income to sustain a "decent" level of living. Other authors,

such as Olsthoorn (2014), identify precarious jobs according to two premises: the insecurity generated by not being able to achieve enough income from a salary and the insecurity connected to the possibility of being dismissed. These features can be easily identified when analysing salary levels in relation to type of contract (open-ended/fixed-term) and working hours (full time or part-time), variables that determine a greater or lesser likelihood of being dismissed (Quinlan *et al.*, 2001).

3. Method

3.1. Data

The data used in this research comes from the Labour Force Survey (LFS). This survey was carried out by the European Union (EU LFS) on 28 Member States, 2 candidate countries and 3 countries of the European Free Trade Association as stipulated in Council Regulation (EEC) No 577/98 of 9 March 1998.

Currently, the LFS microdata available deal with a period from 1983 to 2016 for a total of 33 European countries and cover 180 variables.

In this research, the goal is to analyse the situation of the labour market in Portugal, paying particular attention to the level of studies attained and full-time/part-time working hours for the period between 2006 and 2016.

The choice of this period of time was not random, since 2006 reflects the pre-financial crisis situation, the year 2011 was when the worst consequences of the crisis were felt, and from then on the macroeconomic indicators indicate the start of economic recovery.

This research uses variables from the LFS survey and the following were selected for the purposes of this analysis:

- "Age", which classifies all the respondents into age groups. This variable has been used to extract only people of working age, i.e., persons aged over 16.
- "Ilostat", which classifies the population surveyed into working population, unemployed, inactive and military service.
- "Sex", which identifies women and men within the total group of interviewees. This variable is used to calculate how many working people are men and how many are women.
- "Ftpt", which divides the number of interviewees into "full-time" or "part-time" workers.
- "Hatleve1D", which makes it possible to see the highest level of studies attained by each individual surveyed, divided into "lower secondary", "upper secondary" and "third level".

Table 1 shows the variables used, the types given in the LFS and the units for expressing each one.

Table 1. Variables used in the analysis

Variable	LFS Type
Population 16+	Age≥16
In work	Ilostat=1
Full-time workers	Ftpt=1
Part-time workers	Ftpt=2
Primary or lower level of studies	Hatleve1D=L
Secondary level of studies	Hatleve1D=M
Third level of studies	Hatleve1D=H

Source: own elaboration

Table 2 gathers the make-up of the sample in relation to the total number of surveyed respondents in 2006, 2011 and 2016.

Table 2. Make-up of the sample

	2006	2011	2016
Population surveyed aged 16 or over	154,176	139,634	142,092
% of population aged 16 or over and female	52.88%	53.40%	53.27%
% of population aged 16 or over and male	47.12%	46.60%	46.73%
% of population in work	53.02%	48.28%	48.90%
% of in-work population working full-time	88.18%	84.72%	86.88%
% of in-work population working part-time	11.82%	15.28%	13.12%

Source: own elaboration, LFS data (LFS, 2018)

The percentage of respondents in work is calculated as the proportion in work among the respondents aged 16 or over. Full-time and part-time workers, however, are calculated with regard to the number of individuals in work. Finally, the percentage of women and men is calculated in relation to the total number of surveyed people over 16 years of age.

The results obtained show that the percentage of the population in work fell from 53.02% in 2006 to 48.90% in 2016. More specifically, regarding full-time and part-time jobs, the former, i.e. full-time jobs, fell in favour of part-time contracts. This may be interpreted as a deterioration in employment contracts during the period of economic crisis, and some improvement is seen towards 2016, when, although with lower percentages than 2006, it had improved in comparison with 2011.

3.2. Model

The analysis of the labour market situation in Portugal according to the highest level of studies attained deals with the proportion of those in work by contract type: full time or part-time. In this instance, the most suitable study methods are binary response models, taking the following form:

$$P(y=1|x)=G(\beta_0+ \beta_1x_1+....+ \beta_kx_k)=G(\beta_0+x\beta)$$

The response probability for y is calculated so that:

$$P(y=1|x)= P(y^*>0|x)=P[e>-(\beta_0+x\ \beta|x]=1-G[-(\beta_0+x\ \beta)]= G(\beta_0+x\ \beta)$$

In most binary response models, the main goal is to explain the effects of x_i on response probability P(y=1|x). Formulation of the latent variable tends to give the impression that what matters most is the effect of each x_i on y*.

In social sciences research, the model's dependent variable is very often a qualitative variable that may have several attributes. To model this type of data, logistic regression is a highly important tool. In comparison with alternative models, the *logit* model is very attractive to use because the probabilities obtained for the dependent variable do not increase linearly with the independent variable, as is the case with the linear probability model.

In the *probit* model, G is the standard normal cumulative distribution function, which is expressed as an integral:

$$G(z)= \varphi(z)= \int \varphi(z)dv \qquad [1]$$

Where:

- G is a function that takes values strictly between zero and one for all real numbers z. This ensures that the estimated response probabilities are strictly between zero and one.
- φ(z) is standard normal density

$$\varphi(z)=(2\Pi)^{-1/2}\exp(-z^2/2) \qquad [2]$$

Choosing G ensures that P(y=1|x) is strictly between zero and one for all parameter and x_j values.

The G functions are increasing functions. Each one increases more quickly in z=0,

$$G(z)\rightarrow 0 \text{ as } z \rightarrow -\infty, \text{ and } G(z)\rightarrow 1 \text{ as } z\rightarrow \infty.$$

According to human capital theory, education directly leads to the accumulation of human capital. Furthermore, increases in education levels significantly enhance the rate of return and future training, which involves the accumulation of even higher levels of human capital during working life (Freire and Bilbao, 2003). Since part of this human capital is specific to the company, as an individual's human capital increases, it becomes less likely that the company will make this capital redundant and so it becomes less likely they will dismiss him or her. There is therefore a clear link between the probability of an individual being unemployed and education level (Freire and Bilbao, 2003).

One of the first studies that attempted to quantify education's impact on unemployment was the work of Nickell (1978), which analysed the evidence for a relationship between education and unemployment events in the life of an individual in Great Britain. The estimates obtained for this relationship were divided into the impact of education and qualifications on the likelihood of being unemployed and the expected length of unemployment. The estimated probabilities were calculated based on a *logit* model, estimated using standard maximum likelihood estimation.

Later, in research carried out by Freire and Bilbao (2003), a logistic model was estimated to obtain probability of unemployment in the Spanish working population and, like Nickell's model (1978), the parameters were estimated using standard maximum likelihood estimation methods. Moreover, although the model's specification includes some common elements, the nature of the data used has significant modifications.

In this research, the studies by Nickell (1978) and Freire and Bilbao (2003) are taken as references, and the dependent variable in the model proposed is the working population in the sample in full-time and part-time work, binary variables; the independent variables are education level attained by each individual, therefore creating three binary variables: tertiary education, secondary education and lower education.

The estimations are carried out only using one independent variable, in order to avoid multicollinearity and deviation of probability problems.

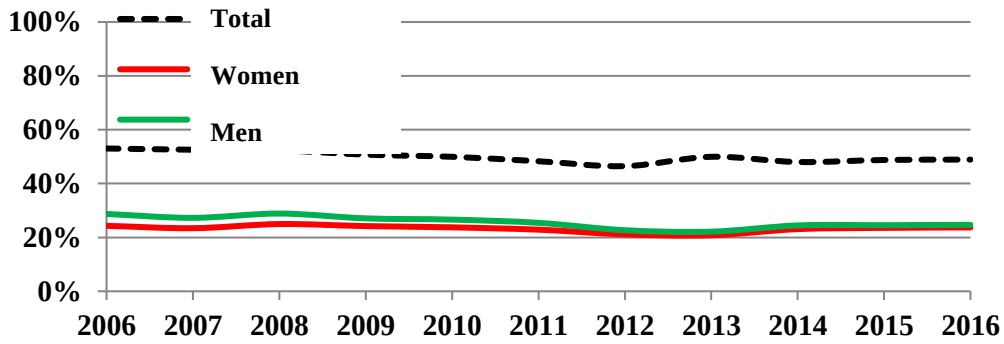
4. Results

Graph 1 shows the percentage of the population in work during the 2006-2016 period. The information available shows that employment saw a gradual, sustained decline from 2006 to 2010, falling sharply in 2011 and 2012, before embarking on a path towards recovery in 2013.

In 2006, the proportion of the population in work was 52.56% and in 2012 this figure had fallen to 46.47%, the lowest in the period studied. By 2016, the proportion of people in work had recovered to 48.90%.

It can be seen that the gap between the percentage of male and female people in work becomes smaller during the period analysed, since in the year 2006 these figures were 24.31% for women and 28.71% of men, while in 2016 they were 23.71% for women and 24.67% for men.

Graph 1. Percentage of population in work (total, men and women)



Source: own elaboration

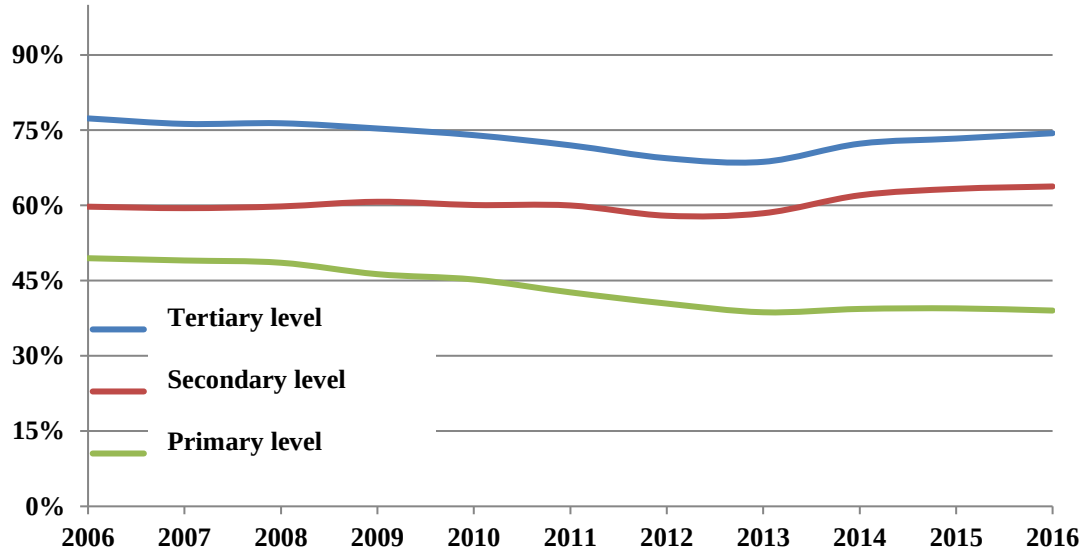
Graph 2 presents the results of the analysis of being in employment in accordance with education level attained for the period between 2006 and 2016. The results show that the greatest percentages

in work are found among the highest education levels and the lowest are found among individuals who have only primary education. In 2006, 77.36% of the population with higher education was in work, compared with 49.48% of people with primary level studies.

The economic crisis affected jobs in such a way that the percentage of people in work for all education levels fell in 2011 with regard to 2006, and only those with secondary education stayed at levels close to those in 2006.

Finally, the economic recovery is latent in the data, and we can observe that in 2016 74.40% of people with higher education were in employment. On the other hand, the most affected groups are those with only primary education levels, where in-work percentages are still at levels lower than at the peak of the crisis.

Graph 2. Percentage of population in work by education level



Source: own elaboration

Graph 3 shows the results of those working full time by education level attained during the 2006 to 2016 period. From the information available, we can see that in 2006 73.15% of people with higher education were working full time, however, this percentage falls to 56.80% for the people surveyed with secondary level studies and to 42.49% for people with primary level studies.

The figures change for 2011 and 2016, so that the percentage of people with tertiary education working full time falls to 66.36% in 2011 and 69.07% in 2016.

With regard to individuals with secondary education, the evolution of the data between 2011 and 2016 is similar to the data for tertiary studies, so in 2011 55.51% were working full time and in 2016 this percentage rises to 58.87%.

Finally, regarding individuals without education beyond primary education, 42.49% were working full time in 2006. However, in 2011 the percentage of full-time workers with primary education fell to 34.50% and in 2016, unlike the case for other education levels, this proportion continued to fall, reaching 31.99% in full-time work.

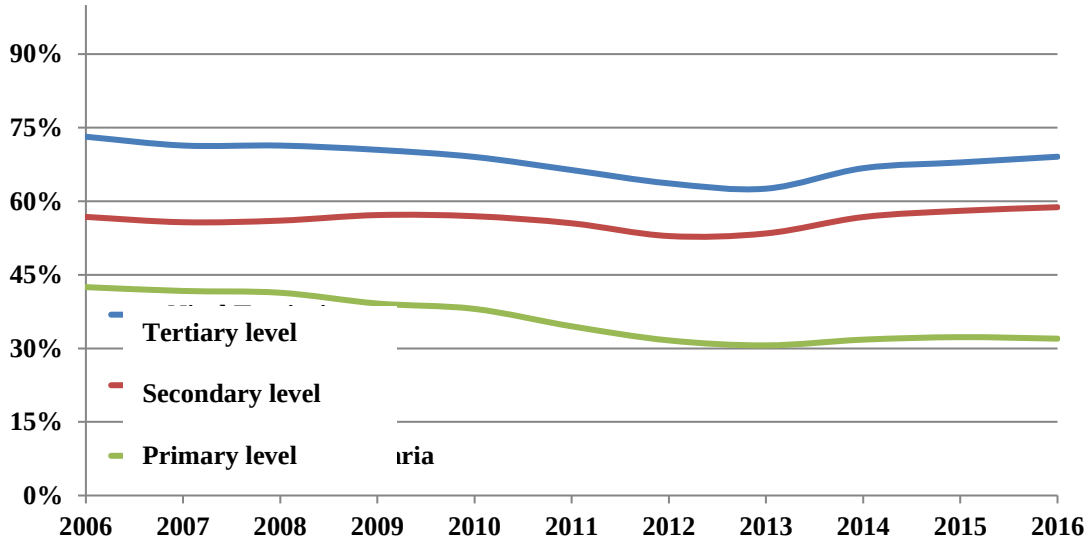
Graph 4 shows the percentages of people working part-time in the period between 2006 and 2016. In general terms, it can be said that whatever the education level, these figures are below 10%.

People with higher education working part-time in 2006 represented 4.21%, and this percentage increased in 2011 to 5.63%, eventually reaching 5.33% in 2016.

On the other hand, individuals with secondary education working part-time in 2006 represented 2.95%, however, this percentage rose to 4.49% in 2011, reaching its highest level in 2015, 5.26%, before falling slightly to 5% in 2016.

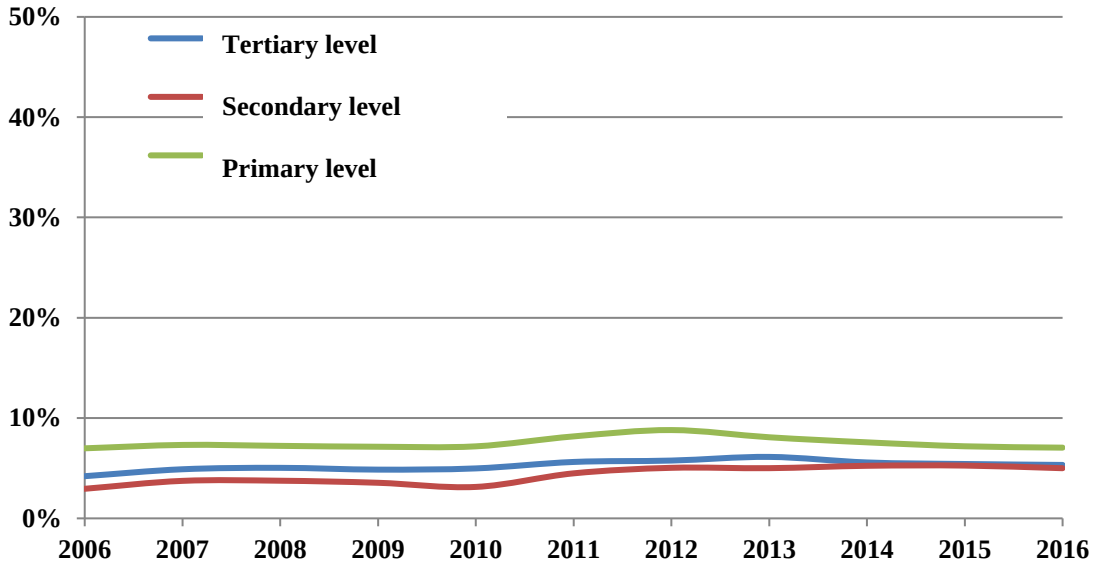
Finally, individuals with primary education working part-time in 2006 represented 6.99%, a figure that increased over the period under analysis to peak in 2012, at 8.80%.

Graph 3. Percentage of population in full-time work by education level



Source: own elaboration

Graph 4. Percentage of population in part-time work by education level



Source: own elaboration

The information available is used to make estimations in two probit models, so that the following can be calculated for the year 2016:

- The probability that an individual with tertiary studies has a full-time job.
- The probability that an individual with secondary studies has a full-time job.

Table 3 gathers together the results of these estimations.

The results show that people who have tertiary education, that is, those who have an undergraduate degree, master's degree or doctorate, have an 81.03% probability of being in full-time work. In the meantime, the probability of being in full-time work falls to 50.51% for individuals who have secondary-level studies.

Table 3. *Probit* estimation results

		2016
Y= In full-time work		
Constant	β_0	-.3124262
	Std Err.	.003674
	p>|z|	0.000
Tertiary education level	β_1	.8103584
	Std Err.	.0096674
	p>|z|	0.000
Y= In full-time work		
Constant	β_0	.2832375
	Std Err.	.0037305
	p>|z|	0.000
Secondary education level	β_1	.505193
	Std Err.	.0087018
	p>|z|	0.000

Source: compiled by the authors, calculations made using Stata 13

5. Conclusions

Between 2006 and 2016, Portugal experienced all the stages of the economic cycle: improvements in employment, unemployment and recovery. In other words, the 11 years analysed covered one of the largest financial crises experienced in the world and Portugal in particular was seriously affected. The year 2011 was marked by a significant socio-economic downturn, leading to intervention by the European institutions in order to implement a package of measures able to reduce the deficit, debt and control inflation.

Portugal is currently on a path to economic recovery, and it is vitally important to study the repercussions of this period on the labour market, taking into consideration different education levels.

The information available shows that the employment level between 2006 and 2016 fell from 53.02% in 2006 to 48.90% in 2016. In particular, taking into account education levels, it can be observed that individuals with tertiary studies, i.e. those who have an undergraduate degree, master's degree or doctorate, have the highest employment rates. The figures for this group were 77.36% in 2006 and 74.40% in 2016. While it is true that the percentage fell, it is still the highest percentage.

People with secondary education had average employment levels of 59.75% in 2006, rising slightly to 63.78% in 2016. And finally, individuals with primary studies are most affected by the effects of the crisis, since 49.48% were employed in 2006 and in 2016 fell to 39.04%.

The *probit* model has been used to test two hypotheses that provide the results of the probability that an individual with tertiary education has a full-time job and the probability that a person with secondary education has a full-time job. The analysis shows that 81.03% of individuals who have tertiary studies would find full-time work, while the probability of people with secondary studies being employed full time falls to 50.51%.

In conclusion, the structure of the Portuguese labour market reveals that a higher level of studies provides greater employment possibilities in general and specifically an 81.03% chance of being hired for full-time work. This is the type of work that encourages reactivation of trade and therefore favours socio-economic recovery.

Limitations and future lines of research

This research lacks certain limitations such as the availability of a longer period of data and the availability of the characteristics of the contracts. In other words, knowing specifically what the full-

time and part-time jobs are, in order to understand if the educational level is essential for those jobs. In addition, it would be interesting to know what the preferences of workers are compared to full or part-time.

Future analyzes may draw on preferences employees for full or part-time, the differences between gender and the characteristics of the contract according to the level of education obtained.

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Annex 1. Percentage of respondents working full time and part-time by level of studies

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
In work	53.02%	52.56%	52.33%	50.73%	49.94%	48.28%	46.47%	49.93%	48.01%	48.76%	48.90%
Women	24.31%	23.43%	24.97%	24.20%	23.74%	22.87%	21.14%	20.81%	23.09%	23.54%	23.71%
Men	28.71%	27.27%	28.86%	27.07%	26.61%	25.41%	22.68%	22.14%	24.45%	24.53%	24.67%
Total in work											
Tertiary level	77.36%	76.26%	76.39%	75.34%	74.01%	71.99%	69.41%	68.69%	72.31%	73.33%	74.40%
Secondary level	59.75%	59.46%	59.80%	60.73%	60.08%	60.00%	57.94%	58.44%	62.02%	63.31%	63.78%
Primary level	49.48%	49.03%	48.57%	46.29%	45.23%	42.67%	40.43%	38.70%	39.36%	39.47%	39.04%
In full-time work											
Tertiary level	73.15%	71.36%	71.35%	70.48%	69.03%	66.36%	63.65%	62.56%	66.74%	67.91%	69.07%
Secondary level	56.80%	55.72%	56.05%	57.18%	56.94%	55.51%	52.90%	53.44%	56.78%	58.04%	58.78%
Primary level	42.49%	41.70%	41.34%	39.15%	38.05%	34.50%	31.63%	30.61%	31.78%	32.29%	31.99%
In part-time work											
Tertiary level	4.21%	4.90%	5.04%	4.86%	4.98%	5.63%	5.76%	6.13%	5.57%	5.42%	5.33%
Secondary level	2.95%	3.74%	3.75%	3.55%	3.14%	4.49%	5.04%	5.01%	5.24%	5.26%	5.00%
Primary level	6.99%	7.32%	7.23%	7.14%	7.18%	8.17%	8.80%	8.09%	7.58%	7.19%	7.05%

Source: own elaboration, LFS data (2018)