ISCTE Business School
Instituto Universitário de Lisboa

# JOB QUALITY OF THE PHD GRADUATES IN PORTUGAL

**Pedro Alexandre de Oliveira Cordeiro**

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Supervisor:
Prof. Fátima Suleman, Professora Auxiliar com agregação, Escola de Ciências Sociais e Humanas,
Departamento de Economia Política

Co-supervisor:
Prof. Abdul Kadir Suleman, Professor Associado, Escola de Tecnologias e Arquitetura,
Departamento de Matemática

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- Spine -

Abstract

Job quality has been a subject of growing interest by the international institutions and academics in the last two decades. Economic crisis and increasing supply of graduates renewed the debate about the benefits of investments in higher education and the working conditions of young highly skilled people. This dissertation draws on European Union Labour Force Survey data from the year 2014 and examines the job quality of the PhDs holders in Portugal. It should be noted that literature on PhD graduates jobs is scarce, so this research attempts to fill this gap in the literature. The jobs were examined through a fuzzy clustering analysis, which enabled us to identify typologies of PhDs jobs. The empirical results pointed to three fuzzy clusters and show that one type of job comprises foreign young women with precarious and part-time jobs, who are overqualified and unsatisfied since are looking for another job. Another cluster aggregates senior PhD holders with high-wages, stability and good work-life balance. Finally, the third typology differs from the latter since PhD graduates seem to find it difficult to balance personal life and professional responsibilities. The findings corroborate previous research in that young people are facing increasing difficulties in the labour market; this affects also highly skilled young people.

Keywords: Job quality, Portugal, PhD graduates, “good and bad” jobs

JEL Classification System:
I2 Education and Research Institutions
I23 Higher Education; Research Institutions
J4 Particular Labour Markets
J42 Monopsony; Segmented Labour Markets

Resumo

A qualidade do emprego tem sido objeto de crescente interesse por parte das instituições internacionais e de académicos nas últimas duas décadas. A crise económica e o aumento da oferta de graduados reavivaram o debate sobre os benefícios do investimento no ensino superior e as condições de trabalho dos jovens altamente qualificados. Esta dissertação baseia-se nos dados do *European Union Labour Force Survey* a partir do ano de 2014 e examina a qualidade de emprego dos doutorados em Portugal. Deve notar-se que a literatura sobre os empregos dos doutorados é escassa, procurando esta pesquisa preencher essa lacuna na literatura. Os empregos foram examinados por meio de uma análise de *cluster*, que nos permitiu identificar tipologias de emprego dos doutorados. Os resultados empíricos apontaram para a existência de três *clusters* e mostram que um tipo de emprego abrange mulheres jovens estrangeiras com empregos precários e de *part-time*, com excesso de qualificações e insatisfeitas uma vez que procuram outro emprego. Outro grupo agrega doutorados mais velhos com salários altos, estabilidade e bom equilíbrio entre vida profissional e pessoal. Finalmente, a terceira tipologia difere da última, pois os doutorados parecem ter dificuldade em encontrar equilíbrio entre a vida pessoal e as responsabilidades profissionais. Os resultados corroboram pesquisas anteriores, em que os jovens enfrentam crescentes dificuldades no mercado de trabalho; isso afeta também os jovens altamente qualificados.

Palavras-chave: qualidade de emprego, Portugal, doutorados, “bons e maus” empregos

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List of Abbreviations

BHPS British Household Panel Survey
CDHCareers on Doctorate Holders
DGEEC Direção-Geral de Estatísticas da Educação e Ciência
DSIGoM Decision Systems, Inc. Grade of Membership
EU European Union
EU-LFS European Union Labour Force Survey
ETUI-REHS The European Trade Union Institute for Research, Education and Health and Safety
EWCS European Working Conditions Survey
GoM Grade of Membership
ILO International Labour Organization
LFS Labour Force Survey
OECD The Organisation for Economic Co-operation and Development
SES The European Union Structure of Earnings Survey

## Introduction

By the end of the 20th century a meeting of the International Labour Organization (ILO, 1999) showed some apprehension with "Decent Work". Its aim was to generate more jobs with acceptable quality, emphasising the harmony that must exist between quantity and quality (ILO, 1999). Later on, this concern has been linked to the growth of employment in a context in which the governments are mainly a majority of left-wing parties and so, more interested in the labourers' quality of life (Davoine, Erhel and Guergoat-Larivière, 2008). Available literature examines job quality in general (e.g. Leschke and Watt, 2008) or focuses on some specific categories of workers, notably young graduates (e.g. Boccuzzo and Gianecchini, 2015). However, the quality of jobs of highly skilled people is still missing in the literature. We try to fill this gap through an analysis of job quality of PhD graduates.

The concept of job quality became a priority at the Lisbon European Council in 2000. In this meeting the objective "*more and better jobs*" was stressed with the intention of contributing to a more competitive and developed European Union. At the same time the social cohesion would be strengthened (European Council, 2000 a)). This policy would be carried on by the Nice European Council, (2000 b): 4-Annexes) which considered that "More and better jobs are the key to social inclusion". As expected, the European Commission (2001 a): 8) also acknowledged the relevance associated to this phenomenon when it stated *"… increasing quality in work can form part of a virtuous circle of increasing productivity, rising living standards and sustainable economic growth."*.

This is also the perspective of Findlay, Kalleberg and Warhurst (2013) to whom the relevance of job quality cannot be denied as it not only enriches the individual welfare, but also fosters a country to have an economical advantage regarding their competitors. Only through a complete research accessing the existence of job quality within the labour market, is it possible to perceive how a certain country economically behaves (Muñoz de Bustillo et al., 2011).

There have been several organisms that have taken steps to measure this subject in general terms. Initially, the European Commission suggested a set of indicators to achieve "full employment" also known as the Laeken Indicators (European Commission, 2001 a)). Then, the European Trade Union Institute for Research,

Education and Health and Safety (ETUI-REHS) developed a set of variables to survey the evolution of the quality of work in the European scene and to get to know if there was a balance between the increasing number of jobs and their quality (Leschke and Watt, 2008). On the other hand, at a particular level, there are also some approaches, that evaluate the job quality of University Graduates and Masters. However, at PhD level there are very few studies.

Currently, to avoid the loss of PhDs to other countries it is necessary to further investigate this issue by accessing the existent jobs as well as the calling those jobs might have (OECD, 2019). Taking into consideration the lack of literature focussing on the job quality of PhDs in comparison with other levels of education, this thesis intends to be a complement to the existent contributions given by other authors.

This empirical research is supported by secondary data from the EU Labour Force Survey (EU-LFS), of 2014. The specific case of Portugal will be addressed in this study, so that a clearer understanding can be achieved, as far as the features and attributes underlying the jobs of PhD graduates. The statistical method of fuzzy clustering analysis will be implemented to ascertain the different "segments" or "typologies" of jobs held by doctorates. Ultimately, this research seeks to understand the type of employment conditions that PhD graduates have in Portugal.

In the first chapter the theoretical framework will be supported by the central theories that explain job quality, and that also emphasize the existence of segmentation within the labour market. Then, an analysis of the most notable approaches in literature used to measure job quality will be carried out. A section is dedicated to the literature on PhD graduates' jobs and other working conditions. In the second chapter the methodology and empirical data will be displayed. Empirical evidence and discussion of the findings are displayed in the third chapter. Finally, the concerns and recommendations that researchers should take into account when addressing this matter will be presented in the conclusion.

# Job Quality-Analysis

## I – Literature Review

### 1.1 Definition and Central Theories of Job Quality

Nowadays, in spite of the awareness of the necessity of formulating an international indicator that defines and measures the concept of job quality, there is not a model that unites the entire agreement of the several authors (Munoz de Bustillo et al, 2011; Kalleberg, Warhurst and Findlay, 2013). In fact this phenomenon has a great complexity since it encompasses multiple dimensions (Davoine et al, 2008; Kalleberg and Vaisey, 2005), thus becoming difficult to adapt it to different countries because of the underlying cultural and structural differences/dissimilarities (Munoz de Bustillo, et al, 2011; Holman, 2013).

To these idiosyncrasies we must add the different areas of knowledge dealt with by the several authors that study this concept (Kalleberg and Vaisey, 2005). Distinct conceptions of job quality are, indeed, a consequence of the multiplicity of the existing social sciences. Thus, the scientists which are connected to economic matters concentrate their research in the importance of remunerations, while the psychology scholars follow the aspects that generate the fulfilment concerning a job (e.g. complexity of the task). Opposite to these perspectives, sociological literature is more concerned with the level of job autonomy awarded to every employee (Kalleberg and Vaisey, 2005). In this way, several paths could be adopted, as Wendy Jones (2014:3) stated *"... there are many features which are considered to influence job quality, and priorities vary amongst authors and between academic disciplines."*.

Leontaridi (1998) claims that the concept of "good" and "bad" jobs varies according to the observation either of reality through the lenses of classical and non-classical theorists or through the lenses of institutional theorists. The author explains the existing differences between schools of thought and the theories underlying them, so that we can understand what makes them define in such diverse way the quality of the jobs.

It is, thus, important to consider the theory of compensation wage differentials, which belongs to the classical economic current and was formulated by Adam Smith in the 18th century (Smith, 1950). According to this perspective, the advantages and disadvantages stemming from the existence of the most diverse jobs in the same area

will tend to equalize themselves when exposed to a free market. For Smith (1950), on the one hand the workers will claim better salaries to accept more precarious jobs, but on the other hand they will be satisfied with less money if the job is pleasant. However, this theory has some flaws, since there is no irrefutable evidence that these negative characteristics lead to better salaries, except when it comes to jobs that imply the risk of death (Smith, 1979).

Institutionalists offer a divergent contribution as far as the way this subject will be tackled. For them, there is a multiplicity of forces that modify job quality, mattering not only the economic aspect, but also the political and social dimension (Osterman, 2013).

Dunlop (1966:36) was one of the first authors to introduce in the debate a new type of market that favours some workers in detriment of others, the so-called Internal Labour Market: "The scope of an internal labor market is defined by the limits of a single administrative set of rules governing the movement of employees". Later, Piore and Doeringer (1971) improved this concept. According to them, the formation of this kind of markets depends not only on the particular skills that a certain company is trying to protect and on the specific training given to each employee when performing a task, but also on the customs and traditions that conduct the behaviour of the management and the workforce. The prerogatives and the benefits that such market provide to the workers embraced by it, do not include the workers belonging to the External Labour Market (Piore and Doeringer, 1971).

These authors brought this theory together with the Dual Labour Market theory (Leontaridi, 1998) which is based on the divide of the labour market. According to the latter the jobs with the best characteristics (better salaries, good working conditions, opportunities for career development) are part of the primary sector. The less appealing jobs (lower salaries, few chances of career development, bad working conditions) are part of the secondary sector (Piore and Doeringer, 1971). So, there is, a correspondence between the god jobs of the primary sector and the Internal Labour Market.

However, we must be careful whenever we label jobs as good or bad. In fact, and although the different kinds of jobs are enshrined in literature, it is not entirely true to strictly separate good from bad jobs, since the jobs in the labour market don't have only characteristics that are positive or features that are adverse (Kalleberg, 2012). The

notion of segmentation applied to the labour market is, however, a matter of undeniable veracity (Leontaridi, 1988).

It is a fact that certain kinds of workers are more associated with worse working conditions than others. This is pointed out by another branch of the institutional doctrine, when it mentions the appearance of the outsiders and the insiders, respectively. Despite being available to work in precarious situations, the absence of job opportunities for the outsiders is real, as a result of the unbearable turnover costs that no company wants to pay with regard to the insiders (Lindbeck and Snower, 2001). The outsiders are, indeed, considered as a segment in the labour market that lacks power to have an effect not only over their employment but also on wage negotiations (Sampson, 1988).

In spite of all these drawbacks, and differently from what one might expect, not all the workers that are working under these circumstances demand a market deregulation, so that they may have access to better jobs. (Guillaud and Marx, 2013).

It is the case of the temporary workers that because they feel they are close to getting the same benefits of the insiders (e.g. permanent contracts) behave in the same way they do (Guillaud and Marx, 2013). This conception, however, conflicts with the vision of several classical economists among them, Adam Smith (1950), to whom the market mustn´t suffer state intervention, so that there is no segmentation.

Thus, one can see the multitude of ways to face the state of the job market and in particular the different jobs that make part of it. It, thus, becomes urgent to conceptualise the quality in an integrated way, aggregating the contribution given by the different social sciences so as to obtain a more realistic approach of the concept of job quality (Kalleberg and Vaisey, 2005).

In the light of the examined literature, we propose to submit to empirical test the following hypotheses inspired in the labour market segmentation arguments:

Hypothesis 1: The labour market is divided in “good” and “bad” segments. Good/bad characteristics of jobs cluster together.

Hypothesis 2: Some categories of workers prevail in some type of jobs.

## 1.2 Measuring Job Quality

Though the debate around job quality is gradually progressing, the biggest difficulty lies in going beyond the mere rhetorical deliberation and start the implementation of successful policies. Such a thing will not be possible until there is no agreement between the many investigators and the international authorities (ILO and European Union), about how to measure this concept (Munoz de Bustillo et al, 2011). In fact, we can only obtain a sustainable and coherent analysis if a better formulation of quality of work is reached (Kalleberg, Warhurst and Findlay, 2013). However, the subjectivity inherent to the human being and the diversity of components used to quantify job quality make the different perspectives become a reality (Kalleberg and Vaisey, 2005). There are, thus, several methodological options that have to be considered so that we can get a valid index of job quality, having each dimension a crucial importance for its fulfilment (Munoz de Bustillo et al, 2011). To this, we must add as an additional difficulty the fact that some facets that are linked to it may suffer negative aspects because of a specific dimension, which generates obstacles to the study of this matter (Findlay et al, 2017). Furthermore, when one evaluates the quality, we have to take into consideration the type of population to which it is directed, since the different features of the workers may need to be determined by certain dimensions and specific measures (Boccuzzo and Gianecchini 2015).

Throughout the literature there seems to be an agreement as far as the multidimensional character of job quality is concerned (Findlay et al, 2017; Leschke and Watt, 2008; Kalleberg and Vaisey, 2005) what offers a wider research field from where the employers may suggest strategies with practical effect at quality level (Findlay et al, 2017). Two approaches, whose preoccupation is exactly the measuring and conceptualisation of the quality of the jobs, pop out. So, for some investigators there are more advantages in measuring quality of work through a diversity of dimensions, inherent to each job (wages, type of contract) and aggregate the results in a global measure. On the other hand, another branch of literature sustains that another approach can be used, which is based on the perception that every worker has its job, thus becoming a universal measure by itself (Kalleberg and Vaisey, 2005; Clark, 2015).

However, not all the procedures to quantify the quality are so black and white, especially in the European scenery. That reality gained life when the first European

attempt to conceptualise an indicator that solved precarity and social exclusion of the labour market. (European Commission, 2001 a)). Although the first step to debate this matter has been given in the Lisbon European Council, and later strengthened in the Nice European Council, it was only in the Stockholm European Council that the study of specific indicators to measure the quality so as to be introduced in 2001 in the Laeken European Council (Stockholm European Council, 2001; European Commission, 2001a)). So, in the report formulated by the European Commission (2001 a)) two characteristics are defined: 1) characteristics of the job itself and 2) work wider labour market context. In this approach there is a huge use of subjective and contextual varieties such as the satisfaction transmitted by the workers related to the work they do. There are, however, some limitations associated to the Laeken indicators what makes them a bit problematic to be used in these days (Munoz de Bustillo et al, 2011). These indicators overlook the crucial dimensions of work such as the wages. Simultaneously most of them tend to focus in matters that have little or nothing to do with the concept of job quality, as it is the case of the possibility of entering the job market (Munoz de Bustillo et al, 2011; Davoine et al, 2008).

Later, these very same difficulties were not detected when launching the European Job Quality Index (Munoz de Bustillo et al, 2011). In fact, the idea was to check which changes have taken place throughout the times in the different European countries as far as job quality is concerned (Leschke, Watt and Finn, 2008). The different works used for this study, for example the European Labour Force Survey and the European Working Conditions Survey offered relevant information to establish the comparison among countries and differentiate the quality of workers according to gender (Leschke, Watt and Finn, 2008). Always with the intention of getting an indicator that circumscribed the most impactful areas on job quality, Leschke and Watt (2008:5) praised the importance of wages as well as of five other sub-indexes: *"non-standard forms of employment, work-life balance and working time, working conditions and job security, access to training and career advancement, and collective interest representation and participation.*".

It can be argued that wages are the most decisive dimension to formulate a correct classification of job quality (Leschke, Watt and Finn, 2008). But will the use of this particular indicator be enough to draw an overall conceptualization of job quality?

(Boccuzzo and Gianecchini 2015). This is the question to which we will try to give an answer in the next point.

### 1.2.1 Is Wage enough to draw an overall conceptualization of job quality?

Several authors when referring to job quality, further encourage the separation that such phenomenon must suffer, so that it becomes its true version. It is not only important to examine the features that are perceived to have an effect on the employees as it is the case of type of job agreement, pay or even work duration. Thus, and unlike the situation that Burchell et al. (2013) have encountered, what surrounds the attainment of work as well as the content associated with it, it is equally relevant to draw the concept of job quality (Muñoz de Bustillo et al, 2011).

After resorting to the outcomes of a considerable extensive survey with regard to Britain (BHPS), some factors were discovered to be more relevant to the employees than the payment or remuneration they receive (Clark, 1997). In practice, the employees which are more unsatisfied, in the work they perform, are those which highlight the value of pay as one of the most important dimensions.

On a different context, secondary data was adopted, and the findings were completely dissimilar (Muñoz de Bustillo and Macías, 2005). It became easy to perceive the notion that employees, working in Spain, acknowledged the relevance of "income level" as being more connected with their satisfaction in work, than any other dimension tested.

With this in mind, and even considering the fact that job satisfaction is not entirely well qualified to achieve a correct and precise notion of job quality, the investigation on this matter could be beneficial to authenticate the hypothesis tested (Muñoz de Bustillo et al, 2011).

An innovative modus operandi was introduced when remuneration's amount and perks, such as the possibility to have health coverage, and retirement rewards were constructed as one global dimension in order to achieve an overall concept of job quality (Kalleberg, Reskin and Hudson, 2000). Payment, as a factor, should never be omitted from an analysis on this subject (Hill, McGovern and Smeaton, 2004). However and despite the pertinence of including wages or another economic dimension to

evaluate the broader concept of job quality, it is not sufficient to interpret this phenomenon only through this method, as Jencks, Perman and Rainwater stated (1988:1322) "*…the 13 nonmonetary job characteristics together are twice as important as earnings".* Such finding was a result of a unique mode of perceiving job quality, which was constructed so that a categorization of dissimilar jobs could be achieved (Jencks, Perman and Rainwater, 1988). In other words, it enabled us to know in comparative terms, what was the appraisal given to unalike jobs.

Research on this matter goes even further and lay emphasizes on the interest of studying all the most critical factors, with respect to the individuals that are employed (Clark, 2015). Thus, an approach should never be confined to a mere concern of investigating only wage (for instance), if the main goal is to create a strategy for enhancing job quality.

According to Jencks, Perman and Rainwater (1988) employees acknowledge the phenomenon of job quality and the merit of the features that are contained by it, in a personal and particular manner, therefore leading to jobs with the best aspects not being cherished in the same way. These authors are convinced that the nonmonetary elements of a job have an influence over the employees which is undervalued by great part of the population.

### 1.2.2 Other approaches for measuring job quality

Findlay, Kalleberg and Warhurst (2013) advocate that it is necessary to start from the different available ideas to formulate new perspectives that may receive the contribution of a multitude of theoretical subjects and that focus on measuring job quality. This way, in this chapter, the dimensions that several authors considered important to reach their concepts of job quality.

Though it may not be easy to determine the attributes that make a job be classified by the workers as having good quality, it is important to consider their nature (Boccuzzo and Gianecchini 2015).Thus, while some authors opt for purely subjective approaches (Kalleberg and Vaisey, 2005) others take an interest in the objective aspects of the job (Holman, 2013), but the fact is that the majority integrates characteristics that

belong to both points of view (Leschke and Watt, 2008; Ritter, 2005; Boccuzzo and Gianecchini 2015).

Kalleberg and Vaisey (2005) stressed a model composed by non-objective elements that assess the perception that the workers which belong to different age groups and to the International Association of Machinists exhibit in relation to the quality of their job. This analysis aimed at getting to know the reasons why a job is considered as having quality, and for this purpose specific characteristics belonging to three distinct categories were considered: economic benefits (satisfaction regarding remunerations and satisfaction with fringe benefits), non-economic benefits (range of intrinsic rewards and level or degree of autonomy) and satisfaction with opportunities for advancement (security within a job).

More recently, Loughlin and Murray (2013) called our attention to when considering the factors that have the potential to influence job quality, since the preference of employees to work on a certain type of work is frequently disregarded. The relevance of this construct was indeed verified, also known as "work status congruence", to create adverse consequences in the companies that don't consider this factor. This happens because such concept, seems also to be connected with the different health dimensions that constitute an employee' welfare.

Similarly, Burchell, Sehnbruch, Piasna and Agloni (2013) regard the existence of several empirical theories, whenever the micro-level or employee is regarded as a unit, which give more importance to the behaviours of the employees (satisfaction within a job) rather to the content and circumstances where the work is developed. In other words, the bigger picture around the worker is not taken into consideration.

Holman (2013), on the other hand, doesn't believe in the efficiency of a subjectivist conception and so he provides an alternative and diverse view of this phenomenon with info collected from the European Working Conditions Survey. Having as a starting point a theory-driven approach only objective indicators are collected, particularly wages and payment system, work organization, security and flexibility, skills and development and engagement. Through this perspective it was possible to identify the existence of various job types, which are dissimilar concerning their properties, as it is the case of high-strain jobs composed by precarious conditions and substantial amount of work as well as of active jobs, which are associated with the

best type of qualities that a job has (e.g.: low intensity regarding the amount of work, great levels of earnings and a challenging job).Furthermore, this author emphasized other four job types, such as, saturated jobs, team jobs, insecure jobs and passive jobs, where the strict divide between positive and negative aspects of work is not so clear.

Ritter (2005) considers an analysis shaped by seven areas, both subjective and objective, where the author looks for some jobs or sectors of work more vulnerable to the occurrence of negative outcomes in various dimensions of job quality. This research which was rooted on the third edition of the European Survey of Working Conditions, quantified not only the contrasting pay levels existing throughout different European countries and the exorbitant working hours experienced by the employees, but also the security experienced in work. Additionally, the quality of workplace relations, the availability of training, the stress and the occupational safety were other dimensions accessed to perceive the degree of concern that the employers have towards their employees.

Finally, it is important to highlight the important contribution of Boccuzzo and Gianecchini (2015) who, as Ritter (2005), included in their study a subjectivist and objectivist view. However, and as a result of having supported their research in the contribution rendered by different study areas such as economy, psychology, and human resources management, these authors managed to identify three dimensions where graduates' job quality should be underpinned. Considering the professional dimension, this has as its pillar the practice of the management of human resources, which determinate the evolution and the career of the workers in an enterprise, as it is the case of the training, opportunities of career advancement and working in teams. The economic dimension itself, goes beyond the importance that salaries have in the workers' lives and conceptualizes the fringe benefits and the type of contract, the latter being associated with contract stability. There is still the dimension of work-life balance, that, because of having psychology-based origin concentrates itself in the well-being and balance necessary between work and private life, thus being analysed the working hours and the commuting time.

## 1.3 An outlook over the literature on PhD Graduates' jobs and working conditions

According to Fontes, Novais and Cabral-Cardoso (2005) up until 2005, in Portugal, PhD graduates were confronted with a shortage of desirable job vacancies, in positions that had a connexion with the academy. Besides as available job opportunities for applying were surrounded with poor conditions, which led not only to a growing discontent between doctorates and the public sector, but also caused a shift of mind set on what concerned the best place to look for a job. Even though these highly educated workers theoretically possessed characteristics that were useful for supporting the development of private firms, it wasn't visible a significant rate of employment associated to them, in this market. So much so that the DGEEC (2014), with the support of the Careers on Doctorate Holders survey (CDH 2012) exposed evidence of this reality. For instance, only 48 PhD graduates who had obtained their doctorate degree in 2005 worked in a private firm while 1059 were employed in Higher Education (DGEEC, 2014). Incidentally, it wasn't formulated any particular guideline that stipulated doctorates' action plan, once the employees were admittedly seen as equals by the majority of their employers (Fontes, Novais and Cabral-Cardoso, 2005).

Latterly, companies acknowledged the value that PhD graduates generate, in terms of innovative operations, but it still exists a tendency towards the recruitment of employees with clearly less academic education to perform the same role (Garcia-Quevedo, Mas-Verdú and Polo-Otero, 2011).

Simultaneously, the utilization of temporary contracts seems to be a recurrent practice that employers do not refrain from applying, as the new wave of the CDH 2015 pointed out (DGEEC, 2017). So far, and after observing closely the responses given, the occurrence of a non-substantial decrease between the CDH 2012 (with 41% of temporary contracts) and the CDH 2015 in Portugal (with 37% of temporary contracts) (DGEEC, 2014 and DGEEC, 2017) was noticed.

In the same way a proficient entity, as it is the OECD (2019), recently drew attention to the amount of permanent contracts binding doctorates to their jobs in Portugal. Notwithstanding the fact that this type of contract is the most used it was verified the need for this number to be higher. Yet these agreements mentioned before are not enough to bring to an end the unappealing job offers that exist in the

Portuguese' labour market, particularly for doctorates. As a consequence, the phenomenon of "brain drain" emerges in this debate, with the main objective of conceptualizing these exceedingly experienced workers that move to other countries looking for better job conditions.

For this matter it is convenient to call upon, Passaretta, Trivellato and Triventi (2018) research, which scrutinized two groups of Italian PhD graduates according to the year of the PhD conclusion (2004 and 2008).This strategy provided the literature with crucial information on the conditions PhD graduates have been submitted to, without considering job only in a quantitative perspective but also exalting the value of quality. Therefore, dependent variables were first chosen as it is the case of the contract type (fixed-term or open-ended or self-employed), the percentage of doctorates working abroad, the employment status (employed, unemployed or inactive) and also the kind of work performed by these highly qualified workers. Being immediately after conceptualised the independent variables that focus on the year the doctorates finished their PhD and in the study area of their doctorate (law, engineering, etc). In fact, and unlike the prevailing literature, this study takes into account the current difficulties in finding a steady job and for this reason it only evaluates the situation of doctorates five years after finishing their PhD. Thanks to this methodologic decision it was possible to make comparisons between the cohorts (2004 and 2008) and this way to come to the conclusion that there is a growing insecurity linked the job of these workers, namely with the perception of a rising use of fixed-term forms of agreements, between these epochs. This is certainly one of the reasons that originated a 5% increase in the number of doctorates that look for a job in other countries. Even so, for these authors, very few PhD graduates face the necessity to take jobs for which they are over graduated.

Waaijer et al. (2016) alluded to the growing apprehensiveness that one must have when studying the repercussions of temporary contracts on PhD graduates. Jobs that are under such agreements aren't thought to be the poorer in terms of quality, on the perspective of such workers. However, this kind of contracts (temporary) are categorically linked to an unfavourable reaction of doctorates' job satisfaction, particularly if it is considered the case of job security. In addition, it is also the concern of this analysis to find out in which way PhD graduates from five different Universities in Netherlands are positioned and integrated in the work market.

For this purpose, it was observed the relation between type of employment contract (temporary, permanent and self-employed) and the employment status, but also the perception of job satisfaction that PhDs have in relation to several aspects of the work, as it is the case of job content. This way, it was sought to understand in which type of sector do PhDs graduates work and if these are forced to do part-time, always taking into consideration the characteristics of these workers, as for instance, gender and nationality and of the PhD doctorate area. This research also allowed us to understand that in opposition to the reality more recently observed in Italy by Passaretta, Trivellato and Triventi (2018) there is an overqualification of a significant part of PhDs in Netherlands as well as an underqualification in some more generic skills (e.g. communication skills) (Waaijer et al, 2016).

Western et al (2007) though in a different cultural context, as it is the case of Australia, also observed a shortage of skills necessary to the performance of tasks in the jobs (e.g. communication skills, participation in team-work) that the PhD programs do not tackle. Though this study has as its main target the analysis of training programmes of doctorates and of the problems linked to them, it also enables us to understand the degree of satisfaction that PhDs feel in their job due to the competences they acquired in these programmes. Thus, by filling a questionnaire in the year of 2006 it was possible to conclude that the increase of job satisfaction was linked to the increase of certain factors, among them the salary, the networking developed throughout the PhD program, number of children of the PhD graduates, the structure of the PhD program and motivation to take a PhD.

However, it is not only the international studies that use job satisfaction to achieve a better measurement of job quality, since in the different stages of Careers on Doctorate Holders (CDH) used in Portugal the degree of job satisfaction is used to conceptualise the different indicators of job quality (e.g. satisfaction with earnings, satisfaction with job location).Besides in the mentioned survey some relevant aspects of work are not analysed, as it the case of the wish of the PhD to work more hours in his current job, the option being to include this dimension in a more general concept as it is the one of satisfaction with job conditions. This is, thus, the biggest reason that makes it more compelling to analyse in a detailed way the dimensions and sub dimensions that influence the work of PhD graduates in Portugal, through the recourse of secondary data collected by the EU-LFS (version 2014).

In practice, one starts to notice the growing importance that several agencies lend to this subject, particularly the XXI Portuguese Constitutional Government that aims at defending the necessity to create steady jobs and guaranty the autonomy for PhDs (decreto-lei nº 57/2016 29 de agosto). In fact, this government recognises the value of stability as an important dimension for the success of these workers when it stretches the length of the contract of the investigators to six years, one year longer than the length offered by the grants of the FCT, on the strength of the (decreto-lei nº 57/2016 29 de agosto). Simultaneously, it establishes different wage levels in order to reward the merit and the experience of these workers. Although these steps need to be monitored in a progressive way, they are, no doubt, a good first step to improve job quality.

# II- Empirical Data and Methodology

## 2.1 Empirical Data

This empirical research is supported by the secondary-data given by European Union Labour Force Survey (EU-LFS) 2014. Although this is a survey already used in several occasions to compare the state members of the European Union as far as job quality is concerned, focussing on their households, as it is shown by the research of Leschke and Watt (2008), this study aims at a different scope. In fact, and as the aim is to get to know the job quality of PhDs only in Portugal, the Portuguese statistical office is responsible to define the sample, prepare surveys and interviews to collect results that must comply with the orientations and regulations of the Eurostat. These results are then sent to this European organism. (Eurostat, 2003).

As the Eurostat (2003) mentions, the European Union Labour Force Survey is, in fact, an extremely detailed source, what makes it extremely requested by several scientific writings, having been even chosen together with other surveys to formulate the first approach of job quality at European level, also known as Laeken Indicators (European Commission, 2001a)). Other authors, as it is the case of Muñoz de Bustillo et al. (2009) stress the high quality of this source, though they point out the existence of some limitations and disadvantages that are associated to it. Thus, it is important to notice these limitations, as well as some advantages not yet referred.

### 2.1.1 Advantages and limitations of the European Union Labour Force Survey (EU-LFS)

On one hand, this survey provides the research not only with a considerable sample size (Eurostat, 2003; Muñoz de Bustillo et al, 2009), but also with quarterly results (Eurostat, 2015; Muñoz de Bustillo et al, 2009) which enables the study of a wide time period (Muñoz de Bustillo et al, 2009). These characteristics make the EU-LFS an imperative tool for formulating policies that will improve the current state of the labour market. In fact, some aspects of the labour market are almost exclusively specified by this source, such as the availability to work in order to classify unemployment (Eurostat, 2003).

On the other hand, and although this survey particularizes the features (e.g. gender, age, occupation) that characterize the job quality that a given sample has, it doesn't give us the chance to know the specific income that each individual has, since it only provides the income in deciles (Muñoz de Bustillo et al, 2009). Moreover, the outcomes of the EU-LFS may be exposed to sampling and non-sampling errors as it happens in other surveys (Eurostat, 2003; Eurostat, 2015). There are procedures that can be applied to estimate the impact of these mistakes (non-sampling errors) on the precision of the sample, but they are still too expensive (Eurostat, 2003).

As this empirical analysis is conducted with the support of secondary-data, it may happen that certain variables deeply associated to job quality in the literature may not exist in the EU-LFS database and, as a consequence, may not be evaluated. Thus, some variables considered important by some authors are not mentioned in the database of this survey, such as the skill mismatch (Allen and van der Velden, 2001; Bender and Heywood, 2009), the quality of workplace relations and stress (Ritter, 2005). We must add to these limitations the fact that job satisfaction had not been directly questioned in interviews made to the sample, all the more having in mind the importance given to this dimension, namely by Clark (2015). Hence, to reach a better perception of job satisfaction we resort to indicators that have some co-relation with this dimension.

## 2.2 Methodology

### 2.2.1 Chosen criteria for the PhD' sample selection

As previously mentioned, this research aims to study the segment of the workforce which has the highest level of academic qualification, as it is the case of the PhD graduates. To accomplish a clear and accurate selection of these particularly skilled individuals from the EU-LFS database some criteria was implemented. First and foremost, the respondents of this survey must be considered employed, as it regards to their professional status. Secondly, only the workers which possess an educational level that corresponds to ISCED 8 (the highest educational attainment level that one can achieve) are integrated in this analysis. Furthermore, the age of the PhD graduates which were interviewed is exhibited in 5 years age bands, as it is advocated by the Eurostat.

Nevertheless, it was decided to aggregate the last age group (60-74) in a 15-year age band since it encapsulates only 7.28% of the doctorates that responded to this inquiry. At last, and before considering the size of the sample, as well as the variables selected, it is relevant to underline that the variable HATFIELD (Disciplinary field of this level-PhD) encompassed on this analysis fields with at least one similarity. Therefore, in this study the PhD graduates that belong to the field of foreign languages are included in the field of humanities, languages and arts as well as those who belong to the field of computing are integrated in the field of science, mathematics and computing.

### 2.2.2 Sample size and selected variables

After having implemented the above-mentioned criteria, the sample was reduced to 371 individuals. A multifaceted approach will be applied to this sample so as to characterise the concept of job quality as we assume that one simple indicator (e.g. income) is unable to encompass the whole of this phenomenon (Leschke, Watt and Finn, 2008). So, because it is fundamental to use several variables (internal and external) to obtain a sharper notion of this concept, but also because it is necessary to justify the relevance of the several variables used, this study is based on the existing literature.

Though the database of the EU-LFS (version 2014) contains every variable used in this analysis, it is important to assume that the educational mismatch variable is an indicator specifically built for this study. In this way, this analysis uses two categories of variables that belong to the Eurostat LFS, which are the core variables (demographic background, employment characteristics of the main job, second job, atypical work, hours worked, field of this level (PhD), income) and the derived variables for standard labour market analysis (time since person started to work) (Eurostat, 2013). Bearing in mind that the interviews that are made to PhD graduates in the scope of the EU-LFS focus on objective aspects of their job, subjective variables were not used with the aim of assessing job quality of these workers in this study.

However, this is not an obstacle that prevents the obtainment of subjective conclusions as it comes to some variables of objective nature. It is the case of the internal variable "existence of more than one job or business" that in spite of being an objective variable it is here used as one of the proxies to help understand the job satisfaction of the workers. This is a relevant methodological decision for the empirical analysis, since it certainly has an influence on what its direction will be. As Crespo, Simoes and Pinto (2017) argue, the perspectives of job quality distinguish themselves as they value either the objective variables or the subjective ones. It is noteworthy to underline the relevant role of the fuzzy clustering analysis on this study, as it enables us to get three typologies based on the considered internal variables. Besides, this analysis gives us a better perception of the distribution of PhD graduates in those typologies. In the next section we will tackle the analysis of the relevance of the internal and external variables for the study of job quality, having as its base the literature. Only in this way can we formulate and characterise the different typologies in a precise manner.

### 2.2.3 Internal variables

#### Income

In this analysis, the variable income (INCEDECIL in the database) encompasses the monthly (take-home) pay from main job. Since, it is divided in deciles, the individuals which earn less are in the decile 10 (opening decile) and the ones that are best paid are in the 100 decile (final decile) (Eurostat, 2013). Hence, it doesn't allow to perceive the exact income assigned to each worker, which can be observed as a negative obstacle of this EU-LFS, by several authors (Muñoz de Bustillo et al, 2009).However, this will not have an impact on this study, due to the fact that what is intended is not to know the accurate amount of wages of each worker but to understand if there are significant marked differences between workers' wages. As previously shown, it isn't wise to narrow the job quality analysis to a single indicator, as it is the case of wages (Clark, 2015). Nonetheless, it is still recognized that wages play a prominent role on job quality (Hill, McGovern and Smeaton, 2004). Indeed, Leschke, Watt and Finn (2008) even consider this variable to be the most significant for job quality. To these authors, the range of this indicator to influence important dimensions, which are associated with

people's living standards (e.g. capability to buy goods; benefits and pensions quality), enables to reach this conclusion.

## Contractual arrangement

In accordance with Eurofound (2017), if the employees are offered the opportunity to choose between an unlimited contract and a temporary one, they tend to opt for the first contract type. In fact, employees report to work under temporary contracts due to involuntary reasons. To Wilson, Brown and Cregan (2008) this occurs since permanent work is more associated with a better job quality, from the perspective of the workers, than temporary work (e.g. casual work). For these authors, it isn't only the absence of job security that originates this perception, but also the shortage of skills which are acquired and applied on the job. Other authors also consider the influence of involuntary temporary contracts in job quality, although under the dimension of non-standard forms of employment (Leschke and Watt, 2008). So, in this analysis, a combination of two variables from the EU-LFS (TEMP and TEMPREAS) is made, so that it can be understood if the PhD graduates in Portugal are in permanent jobs and the reasons why some of them may not be (e.g. could not find a permanent job; it is a contract for a probationary period). As the Eurostat (2011) suggested, the contractual arrangements and more particularly the fixed-term contracts are indeed relevant for perceiving the current state of the labour market.

## Working time

Scheele (2007) argues that the determination of job quality depends to a great extent on the working time. For this author, such variable has the relevance to affect employees' income and long-term social protection, but also on their well-being. Conscious of the importance of this dimension, Ritter (2005) considers not only the excessive hours but also the asocial hours (atypical work: evening night, Saturday and Sunday work), as the excessive working hours can raise the individuals' dissatisfaction with regard to the work-life balance dimension. Particularly for the individuals that work more than 45 hours a week, as it is suggested by the Eurofound (2006) after

resorting to data from the fourth European working conditions survey. However, to conceptualise the working time it is not enough to consider these indicators, but also the distinction between part-time and full-time. This is also the belief of Leschke, Watt and Finn (2008) as they introduce voluntary part- time work in their analysis with the aim of describing working time and work-life balance. The same authors also consider that job insecurity is a problem that part-time employees face. Working in part-time jobs can also be adverse to achieving good monetary rewards and benefits when compared to full time work (Eurofound, 2006). Therefore, in this research the variables chosen to characterize working time are: number of hours per week usually worked in the main job (HWUSUAL), and the full-time/part-time distinction (FTPT) (Eurostat, 2013).

## Work-life balance

Fagan and Walthery (2011) emphasize the significant role that working hours have in the determination of work-life balance. According to these authors, the employees that work a great number of hours, while in full-time, are not likely to indicate work-life balance. On top of that, the schedule or working time arrangement also influences the work-life balance of such workers. Those employees who work in atypical working hours evince a reduced chance of having a good work-life balance, when compared to the workers who perform their job in standard schedules. The Eurofound (2006) reveals similar findings, as it suggests that non-standard schedules, especially working at night, may be harmful to workers' health. It is important to note, that employees that work during the day indicate to face significant less adverse health symptoms than night-time workers. Leschke, Watt and Finn (2008) also suggest that the hours worked by the employees must be aligned with the time for fulfilling the family and community life compromises. The firm size where the employees work is also another variable that seems to have an effect over the work-life balance, because when the company size increases, the work-life balance of these workers tends to decline (Boccuzzo and Gianecchini, 2015; Crespo, Pinto and Simoes, 2017). In spite of the significance of this variable for explaining work-life balance, Boccuzzo and Gianecchini (2015) have shown evidence that the balance between work and life is not the most important dimension for getting to know the job quality, in the perspective of younger workers, as it is the case of the graduates, when comparing with the economic

benefits, for instance. The highest results in the work-life balance dimension are indeed associated with older workers (Fagan and Walthery, 2011). In this way, this research seeks to understand if there are differences between age groups regarding work-life balance. Thus, in this analysis the work-life balance will be characterized by the atypical work which encompasses night work (NIGHTWK), shift work (SHIFTWK), evening work (EVENWK), Saturday (SATWK) and Sunday work (SUNWK) as well as working at home (HOMEWK) (Eurostat, 2013)

## Job Satisfaction

Kalleberg and Vaisey (2005) emphasize the strong association that job ratings have with job satisfaction, in order to demonstrate the quality of these variables for the job quality measurement. In a similar way, Clark (2015) advocated that job quality doesn't have only one method through which it can be assessed. Thereby, "overall job satisfaction" could be significant for this purpose.

On the other hand, other authors believe that while this single construct has some advantages regarding the assessment of job quality, the benefits of knowing the specific dimensions that affect work are not considered, as they are in a multidimensional approach (Munoz de Bustillo et al, 2011). However, the relevance of job satisfaction cannot be disregarded, as it was included in the first European approach concerning job quality, also known as the Laeken indicators (European Commission, 2001 a)).

In the interviews of EU-LFS (version 2014) the satisfaction that the workers feel wasn't directly inquired, with regard to their jobs. Therefore, through the use of three different questions (Table 3), one can see the variations that the three typologies have when regarding this dimension. In spite of the variables here considered being proxies of job satisfaction, it doesn't mean that they fail to provide a correct perspective of this construct.

## Educational Mismatch

A key point that must be introduced when referring to the variables, that have the weight to change, in some way, how job satisfaction is regarded by an

employee, is certainly, the mismatch concerning the abilities (Allen and van der Velden, 2001).If the employees do not perceive this dimension has being fulfilled, then they will, most likely, change their job as Allen and van der Velden clearly mentioned (2001:450) *"Skill mismatches are an important cause of job dissatisfaction, which provide an incentive for workers to look for other work,.."*. This dimension was also scrutinized by Bender and Heywood, who also reached the same conclusions (Bender and Heywood, 2009).

Ermini, Papi and Scaturro (2017) expanded this debate with the support of "skill mismatch", since the findings of this dimension were used to portray "over-education". Undoubtedly, the latter concept has acquired lack of interest from diverse literary sources when relating it to PhD graduates, which doesn't happen on other levels of academic education. Throughout the empirical research these authors reveal what elements they think justify the fact that workers with high education are in jobs that require a low degree of education. An additional clarification, rooted on contemporary developments, was offered to prevent the misconception, sometimes assumed as true, which consists on regarding "skill mismatch" and "educational mismatch" as the same concepts (Mavromaras, McGuinness, O'Leary, Sloane and Wei, 2013). Such dissimilarity was expressed when studying men that have at a least degree, and their link with job satisfaction, since superior scores were discovered to be connected with over-qualification.

According to Enders (2002) it must be eradicated the underlying conviction that employees with a doctorate find their work as not representing and not being suitable with the education they have obtained in the academy. In fact, around 50 per cent of the German employees (with a PhD), working in jobs not connected with research and higher education allude to this subsisting fit.

### 2.2.4 External variables

Demographic and Social Background

Age

Hill, McGovern and Smeaton (2004) verify, without hesitation, that age has the ability to reveal a trend considering the development of job quality. An

employee, who has lived more years, enjoy better odds of being in a greater situation, on what respects to the job (Hill, McGovern and Smeaton, 2004). Subsequently, on another research, this variable was separated in four age clusters, so that it could be perceptible to the reader if a certain cluster is more consonant (or not) with favourable job quality (Crespo, Pinto and Simoes, 2017). The outcomes of this investigation, which was constructed with the information available on the 2005 EWCS database, revealed that older workers (55-64) are those who are allocated in the most satisfactory jobs, in spite of not having great quality concerning the wages (Crespo, Pinto and Simoes, 2017). Some job facets, as it is pay, job security and autonomy were empirically tested and it was discovered that employees with less than 40 years old had less quality in these areas (Crespo, Pinto and Simoes, 2017).

Regarding specifically the employees with a PhD, Enders (2002) accentuates the pertinence of contemplating age, since it can influence the capacity of this type of educated workers to have an auspicious career. A multiplicity of consequences can occur when including this variable, as particular fields display a propensity for benefiting more the doctorates with less age. Economic sequels can appear in the future if age is not pondered in researching activities.

Gender and marital status

Evidence was found that the duration of work can have a considerable influence over a worker abandoning the job, and on non-attendance (Flanagan, Strauss and Ulman, 1974). Especially, if we ponder the case of women, since they consider the amount of hours as being truly important for their fulfilment (Clark, 1997).

Due to the additional obligations that the female gender faces outside work, in comparison with men, it is considered that this will cause them to choose jobs that value the balance between the personal life and the profession, therefore making it more arduous to achieve a great level of job quality in several distinct areas (ex: advancement in the career) (Leschke and Watt, 2008).This gender experiences lower remunerations in contrast with other group categories, as a result of the chores they have to carry out at home, which can lead to the option of a job that doesn’t meet their expertise (Bender and Heywood, 2009). Indeed, jobs with more quality are

asymmetrically distributed within the labour market in favour of particular groups, namely men, white race employees, experimented workers and with significant level of instruction (Jencks, Perman and Rainwater, 1988). The data exhibits this tendency, since male that are white are less associated to jobs with poor conditions, in terms of pay and monetary perks, in comparison with the opposite sex (Kalleberg, Reskin and Hudson, 2000). Not surprisingly, when opposing these two genders on a particular type of precarious employment ("part-time"), the female gender still has the highest propensity of facing less desirable job features (Hill, McGovern and Smeaton, 2004).

In spite of the disparity that is present within the labour market, the female gender exhibits a more favourable satisfaction, with regard to the work they perform (Clark, 1997). Even in a situation where elements of both genders exhibit the same features with respect to their private life and profession, women are predicted to inform that they are superiorly satisfied, in comparison with men (Clark, 1997). A similar discovery can also be assigned to another empirical construct, since a slight increment of joy, fulfilment or contentment that the female gender expresses when conducting a job with homologous attributes of the opposite sex was observed (Muñoz de Bustillo and Macías, 2005).

Apparently, women do not assume their job situation to be bad, due to the fact that there has been an improvement considering the previous jobs (Clark, 1997). As a result, this gender doesn't expect much better conditions in the near future, when comparing with men.

A distinguished authority, in the international scenery, contemplates the parity between genders as a relevant facet that must be present when advocating for the phenomenon of job quality (Commission of the European Communities, 2003). It is also embedded in that component, the notion of subordination regarding other constructs, as it is stated by the Commission of the European Communities (2003:11) "*Gender equality is a dimension of quality in itself and is also strongly dependant on progress under other dimensions of quality such as lifelong learning, work-life balance or flexibility and security.".*

Incidentally, a variety of factors impact both men and women, in a completely distinct manner, once the female gender is propitious to accentuate some familiar-related dimensions as playing an important role on achieving satisfaction, as

it regards to the work carried out (Clark, 1997). Hence, and it is empirically demonstrated, being married influences relevantly the extent to which this gender is satisfied or not with their present-day employment. Men are also constrained by the importance of marriage, since those who are single or unmarried are more endangered of ending up in a job with worse attributes (Hill, McGovern and Smeaton, 2004).

Nationality

As Crespo, Pinto and Simoes (2017) pointed out, there is a significant group of researchers that indicate that migrants have less job quality in comparison with natives. According to Friedberg (2000) this may be due to the fact that migrants do not have the same information as natives have, but also because some of the skills inherent in the job are concrete to the native's country, requiring therefore a period of adaptation. Since there is a distinction with regard to the education that immigrants and natives received this could influence the importance of the first cohort in the welcoming country' labour market.

Tenure and Disciplinary field of this level (PhD)

Ritter (2005) resorts to the employee's job tenure with the purpose of perceiving the employment security that these individuals have in their job. To this author, the employees with higher tenure have more possibilities of staying in a secured job in the near future. The employees with less years on the job are seen as more dispensable when comparing with those with more tenure. Muñoz de Bustillo et.al (2009) also considered the job tenure in order to achieve a more complete outlook over job security. For that matter, job security was observed under a subjective and objective approach, the latter one being concerned with exact amount of tenure of these employees.

Another variable that must be introduced in this analysis is the various disciplinary fields, of the level of education (PhD), which are also associated with different employment conditions, more specifically regarding to the job security. This is advocated by Passaretta, Trivellato and Triventi (2018), who noticed that those

employees which are on the so called “soft sciences” have more likelihood of facing non-standard contracts but of not having so much employment as those in the “hard sciences”.

Local unit characteristics

Firm size

The differences on job quality between employees can also be connected with the dimension of the companies where different employees perform their activity (Díaz-Chao, Ficapal-Cusí and Torrent-Sellens, 2017). Such conclusion appeared as a result of the research developed by the previous authors, on the plurality of capacity that distinct companies have, in the depression period that Spain dealt with (Díaz-Chao, Ficapal-Cusí and Torrent-Sellens, 2017). It was demonstrated that the small-medium companies are the ones responsible for the positive evolution, regarding the job quality within this epoch (Díaz-Chao, Ficapal-Cusí and Torrent-Sellens, 2017). Naturally, distinct circumstances dictate the connection that this matter can have with job quality, one of them being how the various workers perceive this concept (Bryson, Erhel and Salibekyan, 2017).

On the other hand, a research that considers the case of employees that own a bachelor, working on companies with diverse capacities and dimensions, present opposite values to the previous authors, once the companies that possess more dimension are associated with having the jobs with more quality (Boccuzzo and Gianecchini, 2015). Firms that employ a substantial number of employees and therefore have more magnitude, cluster better possibilities of offering the necessary job quality than companies with considerably less dimension (example: between one and twenty-four employees.) (Hill, McGovern and Smeaton, 2004).

Crespo, Pinto and Simoes (2017) also examined three different firm sizes so that it could be attested that companies with a small number of employees benefit from the best results on job quality as a general construct.

Economic activity

Erhel and Guergoat-Larivière (2010) argue that there is a small amount of information with regard to the job quality experienced in the various economic activities. These authors with the support of the LFS (2006/2007) and the SES (The European Union Structure of Earnings Survey) focused their analysis on three different sectors which encompassed different services (industries, public administration and defence). Although the temporary and part-time employment rate were two of the variables employed in this study, wages are still the most complete variable to examine job quality by economic activity, due to the available information with regard to this variable. Similarly, Crespo, Pinto and Simoes (2017) suggest that when distinguishing the diverse economic activities, the emphasis is usually on the differentials in wages, especially in the case of comparing the dissimilarities in industries.

## 2.3 Descriptive analysis- internal variables and external variables

In this chapter we will see in Table 1 a descriptive analysis of the variables that were chosen for assessing job quality that PhD graduates encounter, also known as internal variables. Then, an identical analysis will be shown in Table 2, with the main goal of understanding the characteristics that are connected with the job of this highly educated workers. In this research, it is only considered, on both tables, the percentage of the sample that responded to this survey (EU-LFS), which means that the missing values aren't included in this analysis.

Taking into consideration the first variable of Table 1, monthly (take-home) pay from main job, which is divided in deciles, we come to the conclusion that the biggest percentage of the respondents (82.58%) is in the decile 100, that is, in the best paid level. The other respondents (9.6%) are equally distributed in the 80 and 90 deciles and in a residual way in the other deciles.

As far as the work schedule is concerned, most of the PhD graduates work in full time jobs (91.64%), while only 8.36% fit in part time jobs. We realise that most of the participants work more than 31 hours a week, since 47.13% of these

individuals work between 31 hours- 40 hours and 41.95% work more than 40 hours a week.

When they are asked if they wish to work more hours than the current number of hours, most of them respond negatively (84.10%) and, from those who say they want to work more hours, 12.13% say it should only happen in the current job. The percentage of those that have only one job or business during the reference week is equally high, when compared to those who have more than one job or business during the reference week (89.76%). Equally high is also the percentage of PhD graduates that is not looking for another job (93.26%).

As to the type of contractual arrangement 72.78 % of the respondents answer they have a permanent work contract. Among those who have a temporary contract, a significant percentage (22.10%) say they cannot find a permanent job, while only 2.16% say they don´t want a permanent job.

With regard to shift work, the answers show that a very high percentage (93.80%) never does shift work. The same happens when it comes to night shifts, as more than three quarters (86.52%) of the statistical sample answer never have worked at night. As it comes to evening work the results are more heterogeneous although the respondents that say they have never worked in the evening are the most significant percentage (53.10%) versus 30.19% that answer they work sometimes. A similar behaviour is linked to Saturday work, since 53.91% of the respondents never work on Saturday. On the other hand, we can see a high number of respondents' answers 'never work on Sundays, and only 18.87% does it sometimes. When it comes to working at home, we can see a higher heterogeneity: 35.31% sometimes work at home and 37.47% usually work at home.

Having in mind the acquired learning and what is demanded to perform one´s job, we can see that one third of the individuals has a higher education level than what is necessary. A small part of this sample is five levels above the required education, what, in both cases, shows an excess of qualifications. Only 57.95% have a match between the academic qualifications and the tasks performed.

*Table 1- Descriptive analysis of the Job quality variables (Internal Variables)*

| Country | Portugal |
|---|---|
| **Internal Variables** | Frequency (%) |
| -Monthly (take-home) pay from main job-in deciles | |
| 10 | 2.70 |
| 30 | 0.90 |
| 40 | 0.60 |
| 50 | 2.10 |
| 60 | 0.90 |
| 70 | 0.60 |
| 80 | 4.80 |
| 90 | 4.80 |
| 100 | 82.58 |
| Full-time job | 91.64 |
| Part-time job | 8.36 |
| Permanent job: | |
| - Person has a permanent job or work contract of unlimited duration | 72.78 |
| Reasons for having a temporary job/work of limited duration: | |
| - Person could not find a permanent job | 22.10 |
| - Person did not want a permanent job | 2.16 |
| - It is a contract for a probationary period | 2.96 |
| Person does shift work | 6.20 |
| Person never does shift work | 93.80 |
| Person usually works in the evening | 16.71 |
| Person sometimes works in the evening | 30.19 |
| Person never works in the evening | 53.10 |
| Person usually works at night | 1.89 |
| Person sometimes works at night | 11.59 |
| Person never works at night | 86.52 |
| Person usually works on Saturdays | 12.94 |
| Person sometimes works on Saturdays | 33.15 |
| Person never works on Saturdays | 53.91 |
| Person usually works on Sundays | 8.63 |
| Person sometimes works on Sundays | 18.87 |
| Person never works on Sundays | 72.51 |
| Person usually works at home | 37.47 |
| Person sometimes works at home | 35.31 |
| Person never works at home | 27.22 |
| Do not wish to work more hours than currently | 84.10 |
| Wish to work more hours:<br>-Through a job working more hours than the present job | 0.54 |
| - Only within the present job | 12.13 |
| - In any of the above ways | 3.23 |

*Table 1- Descriptive analysis of the Job quality variables (Internal Variables) (cont.)*

| | |
|---|---|
| Person had only one job or business during the reference week | 89.76 |
| Person had more than one job or business during the reference week (not due to change of job or business) | 10.24 |
| Number of hours per week usually worked in the main job: | |
| - (1-10h) | 2.59 |
| - (11-20h) | 3.74 |
| - (21-30h) | 4.60 |
| - (31-40h) | 47.13 |
| - More than 40 | 41.95 |
| Person is not looking for another job | 93.26 |
| Person is looking for another job | 6.74 |
| Acquired and required education for the job ( in levels): | |
| - Match | 57.95 |
| - (+1) | 38.27 |
| - (+5) | 3.77 |
| **N =** | **371** |
| Source: *EU Labour Force Survey 2014/*<br>Missing values are not included in the percentage | |

Looking at the external variables shown in Table 2, we become aware of the fact that the biggest percentage of respondents, approximately ¼, is in the 45/49 age group. In fact, this sample shows an almost perfect balance between male respondents 49.06% and female respondents 50.94%. As it comes to marital status there is a clear predominance of married PhD graduates (59.57%) compared to the number single PhDs (26.68%). It was also clear that most of the participants in this research are Portuguese PhDs.

Regarding the tenure variable, two considerations deserve to be highlighted. On the one hand a reasonable part of the individuals mentioned here (26.15%) are in the 0-60 month's band. On the other hand, there is still a significant percentage of this sample (15.90%) that is between a 20 - year and a month and 25- year tenure. As to the field of studies of this level (PhD), it is verified that engineering, manufacturing and consulting are the most representative fields within this sample with 23.36% of the responses, followed by science, mathematics and computing with 21.05%. As for the number of persons working at the local unit, it was clear that the respondents work in places with more than 50 persons, as it is shown in the 84.91 percentage. Besides they do their jobs particularly in local units where the economic activity is education (75.74%), professional, scientific and technical activities (8.89%) or even human health and social work activities (6.20%).

*Table 2 - Descriptive analysis of the characteristics/features that are connected with the job (External Variables)*

| **Country** | | **Portugal** |
|---|---|---|
| **External Variables** | | Frequency (%) |
| Age | 24-29 | 1.89 |
| | 30-34 | 4.85 |
| | 35-39 | 12.40 |
| | 40-44 | 16.17 |
| | 45-49 | 25.34 |
| | 50-54 | 18.06 |
| | 55-59 | 14.02 |
| | 60-74 | 7.28 |
| Gender | Male | 49.06 |
| | Female | 50.94 |
| Marital Status | Single | 26.68 |
| | Married | 59.57 |
| | Widowed, divorced or legally separated | 13.75 |
| Nationality | Portuguese | 94.34 |
| | Foreign | 5.66 |
| Tenure (in months) | 0-60 | 26.15 |
| | 61-120 | 10.78 |
| | 121-180 | 13.21 |
| | 181-240 | 13.75 |
| | 241-300 | 15.90 |
| | 301-360 | 8.36 |
| | 361-420 | 8.36 |
| | More than 420 | 3.50 |
| Disciplinary field of this level (PhD) | Missing | 18.06 |
| | Teacher training and education science | 4.93 |
| | Humanities, languages and arts | 17.11 |
| | Social sciences, business and law | 20.07 |
| | Science, mathematics and computing | 21.05 |
| | Engineering, manufacturing and construction | 23.36 |
| | Agriculture and veterinary | 2.30 |
| | Health and welfare | 7.89 |
| | Services | 3.29 |
| Number of persons working at the local unit | Between 1 and 10 | 5.12 |
| | Between 11 and 49 | 9.97 |
| | More than 50 | 84.91 |

*Table 2 - Descriptive analysis of the characteristics/features that are connected with the job (External Variables) (cont.)*

| | | |
|---|---|---|
| Economic activity of the local unit | F- Construction | 0.27 |
| | G- Wholesale and retail trade; repair of motor vehicles and motorcycles | 0.81 |
| | I- Accommodation and food service activities | 0.27 |
| | J- Information and communication | 1.89 |
| | K- Financial and insurance activities | 0.27 |
| | M- Professional, scientific and technical activities | 8.89 |
| | N- Administrative and support service activities | 0.27 |
| | O- Public administration and defence; compulsory social security | 4.04 |
| | P- Education | 75.74 |
| | Q- Human health and social work activities | 6.20 |
| | **N =** | **371** |
| Source: *EU Labour Force Survey 2014*/ Missing values are not included in the percentage | | |

## 2.4 Fuzzy clustering analysis: benefits and limitations

Zadeh (1965) was the first author to propose the existence of a class, also known as a fuzzy set, whose components have a degree or a grade of membership (GoM) which is limited to an interval between zero (no membership) and one (full membership). In contrast to crisp sets, fuzzy sets are considered to have greater relevance, specifically in the area of information processing. Bora and Gupta (2014) go further and emphasize that when considering soft clustering techniques, the elements that are part of the data are no longer limited to just one cluster and thus show degrees of membership to several. Through an analysis based on the use of clusters it is intended to find certain patterns regarding the data, since the elements that constitute it have similar characteristics (Suganya and Shanthi, 2012). The fuzzy clustering analysis, in particular, when considering a multidimensional perspective allows to cluster the data into the corresponding clusters (Bora and Gupta, 2014). Since the job quality with regard to PhD graduates is observed in this research from a multifaceted perspective, the fuzzy clustering analysis method is used in this dissertation. With support of the DSIGoM software, version 1.0 (Decision System,

Inc, 1999), it was determined not only the prevailing characteristics of each cluster in relation to the sample but also the degree of membership of the different respondents with regard to the existing segments. To identify those significant characteristics, this program made it possible to perceive in each cluster the probability of each characteristic. Furthermore, both external and internal variables were considered by the DSIGoM software, which enabled the creation of three typologies, in order to characterize the job quality of PhD graduates in Portugal.

However, the fuzzy clustering analysis also has some limitations that must be here introduced. As Suganya and Shanthi (2012) suggest, outliers are not expected to be associated with clusters, in other words they display zero membership rate. The same authors also consider that this tool because it is not an immediate process, it could demand to change some parameters until the outcome is the intended.

# III- Empirical Results

In the first phase of this section, the results obtained from the use of fuzzy cluster analysis will be presented. In fact, through this analysis it was possible to distinguish different typologies. Each typology has its own unique features and, at the same time, some features that it shares with others. In this way, in Table 3, the underscored and predominant characteristics in each category, in what refers to the general sample, will be shown. Afterwards, the framework of PhD graduates in Portugal that make up the sample, will be determined through the representation of the distribution of these individuals by the different typologies, as shown in Table 4. Finally, the outcomes of this study will be discussed.

## 3.1 Fuzzy cluster analysis

This research has as its main goal to get to know the working conditions that PhD graduates have in Portugal. To reach this goal we resorted to the implementation of the fuzzy clustering analysis using the set of internal variables previously selected, thus enabling the distinction of typologies, where the different segments of PhD graduates fit according to their job quality. Consequently, there appeared three typologies made up by different answers as far as the external and internal variables are concerned. An example of this reality is the part-time/full-time variable as typology 1 indicates that 100% of the respondents are working part-time and typologies 2 and 3 show they are full-time workers. So that one can get the specific features of each typology only dominant values from the sample are considered in Table 3. As an example of this, take in the indicator “match” in the second typology, that although it shows a superior value in comparison to the sample, this value is not substantial enough to be considered predominant. So, we should bear in mind that although the respondents that belong to a certain typology may show a representative distribution, in a certain dimension of a variable, it may not be sufficient to be highlighted in relation to the sample. When it so happens, in those cases, a hyphen will be used, because the answer given by the respondents to a certain variable is not substantially different from the answer given by the sample.

### 3.1.1 Typologies of PhD graduates in Portugal

As it is noted in Table 3, there are three typologies of PhD graduates in Portugal. One can see the existence of a positive gradient in several characteristics, evident in the different responses that integrate the typologies. Indeed, in the first typology the characteristics of the monthly pay from main job, and the number of hours per week worked in the main job, have inferior results when compared to the second and third typology.

With regard to the contractual arrangements, it is noticeable that the first typology is the only one that doesn't contemplate stable contracts, since the PhD graduates here considered only have flexible contracts, due to the impossibility of finding permanent jobs. In spite of the second typology being more similar to the third typology, because it contains the stable contracts, it also comprises the contracts for a probationary period, which is a form of flexible contract. Considering the working time, or the duration of the work, the first typology is the only one which aggregates respondents in part-time, whilst the second and third typology only have full-time as their specific characteristic. It is therefore understandable the reason why the second and third typology are associated with a number of hours, which is from 31-40 hours and more than 40 hours respectively, and the first typology is connected with a maximum of 30 hours. In the work-life balance variable, the three typologies also have divergent outcomes since the second typology is the only one which doesn't have any type of atypical work, while the first typology shows individuals which usually work on the weekends and that perform shift work, for instance. Even though the third typology is also composed by individuals that do shift work, this segment (usually or sometimes) carries out night work and usually works at home. In the second and third typologies there is more satisfaction when considering the desire to work more hours than they currently do, whereas the first typology shows that the respondents want to work more hours, although it is only in the present job. In a similar way, the first typology is characterised as having PhD graduates that work in more than one job and that are looking for another job. This reality doesn't occur in the second and third typology. Before proceeding to the analysis of the demographic and social background of the respondents in the three typologies, it is necessary to understand that the first typology shows an overeducation when considering the education that is required to perform a

job and the third typology shows a match. Since the results of the sample are similar to the ones of the second typology a hyphen is inserted in the Table 3. It is also verified that the first typology is the opposite of the third typology with regard to the demographic and social background characteristics, which are relevant in each typology. Particularly, in the characteristics of age, gender, marital status and nationality. On the other hand, the second typology is the one which most resembles to the sample, namely in the characteristics of gender and marital status. As to the local unit characteristics, it is perceptible that education isn't one of the economic activities that stands out in the first typology, contrary to what happens with the second and third typology. This is, however, surprising because the various disciplinary fields of the PhD's in the first typology are associated with the area of education as it is the case of science, mathematics and computing.

*Table 3 –Fuzzy clustering analysis of the PhD sample data (prevailing features of each typology)*

| **Variables** | | | **Typology 1** | **Typology 2** | **Typology 3** |
|---|---|---|---|---|---|
| **Income** | Monthly pay from main job (in deciles) | | 10-90 (excluding 20) | 100 | 100 |
| **Working time** | Full- time or part-time | | Part-time | Full-time | Full-time |
| | Number of hours per week worked on the main job | | ≤ 30h | 31-40h | More than 40 h |
| **Contractual arrangement** | Permanency of the job | | Flexible (could not find permanent job) | Stable or contract for a probationary period | Stable (contract of unlimited duration) |
| **Balance between life and work (work-life balance)** | Atypical work | Shift work | Yes | No | Yes |
| | | Evening work | Sometimes | No | Sometimes or usually |
| | | Night work | No | No | Sometimes or usually |
| | | Saturday work | Usually | No | Sometimes |
| | | Sunday work | Usually | No | Sometimes or usually |
| | | Working at home | Sometimes | No | Usually |
| **Job satisfaction** | Wish to work more hours than currently | | Yes (only within the present job) | No | No |
| | Existence of more than one job or business | | Yes | No | No |
| | Looking for another job | | Yes | No | No |
| **Educational mismatch** | Acquired and required education for the job (in levels) | | Overeducated ((+1) or (+5)) | – | Match |

*Table 3 –Fuzzy clustering analysis of the PhD sample data (prevailing features of each typology) (cont.)*

| | | | | |
|---|---|---|---|---|
| **Demographic and social background** | Age | 24-39 | 40-44 or 60-74 | 50-59 |
| | Gender | Female | _ | Male |
| | Marital status | Single | _ | Widowed, divorced or legally separated |
| | Nationality | Foreign | Portuguese | Portuguese |
| | Tenure (in months) | 0-120 | 181-240 or 361-420 or More than 420 | 121-180 or 241-360 |
| | Disciplinary field of this level (PhD) | Humanities languages and arts; Science, mathematics and computing | Engineering, manufacturing and construction; Health and welfare | Teacher training and education science; science, mathematics and computing; Agriculture and veterinary |
| **Local unit characteristics** | Firm size - Number of persons working at the local unit | 1- 49 | > 50 | > 50 |
| | Economic activity of the local unit | Professional scientific and technical activities; Human health and Social work activities; other service activities | Education; Public administration and defense compulsory social security; Information and Communication | Education |

## 3.2 Distribution of the PhD graduates' sample by the three typologies in Portugal

In this section of the dissertation, one can see, the way PhD graduates in this sample are distributed in the three existent typologies in Portugal. With regard to the job quality, PhD graduates in this analysis have different mixes of internal and external variables, which, therefore results in a dissimilar distribution of these individuals by the typologies.

So that a clearer picture can be drawn an equilateral triangle is considered here. Thus, the vertices comprehend only the concrete characteristics of each typology, the edges contemplate a mixture of two typologies and the interior regards to the features

that belong to all three typologies. Therefore, if some of the PhD graduates have characteristics that are common to all the typologies they are located in the interior section of this triangle. As it is shown in Table 4, there aren't any individuals that have the identical characteristics of the first typology. Only 28.8% of the PhD graduates are inserted in the vertices and the second typology is the one that encompasses the biggest amount of these individuals (20.2%). It is also noticeable that most of the sample of PhD graduates, in Portugal, has characteristics of two different typologies (60.6%). In particular, around 30% of all the respondents here considered, have attributes of both the second and third typology. It is also important to point out that this distribution stresses a low homogeneity, since only 10.6% of the individuals in this sample have characteristics that belong to all the typologies.

*Table 4- Distribution of the PhD graduates' sample by typologies in Portugal (full membership set to 0.90)*

| Distribution of the PhD graduates'sample (Portugal) | | | Total (N=371) |
|---|---|---|---|
| Vertices | Typology 1 | 0 (0%) | 107 (28.8%) |
| | Typology 2 | 75 (20.2%) | |
| | Typology 3 | 32 (8.6%) | |
| Edges | Typology 1-Typology 2 | 84 (22.6%) | 225 (60.6%) |
| | Typology 1-Typology 3 | 29 (7.8%) | |
| | Typology 2-Typology 3 | 112 (30.2%) | |
| Interior | | | 39 (10.6%) |

## 3.3. Discussion

This research attempted to examine the job quality of PhD graduates in Portugal. The EU-LFS (2014 version) pointed to three fuzzy clusters and suggested that a divide between "good" and "bad" jobs exists even in the context of highly skilled

labour market. Furthermore, some particular segments of graduates are attached to each types of job.

As noted by Kalleberg (2012) "good jobs" go hand in hand with good characteristics, notably high wages and stability, while precariousness and low pay prevail in "bad" jobs. In fact, as one can see in Table 3, the segment of PhD graduates in typology 3 are assigned to the highest level of wage distribution, have stable and full-time contract. Nevertheless, they report atypical work which can jeopardise their work-life balance. As can be noted, often PhD graduates in typology 3 report evening, night and weekend work schedule. Kalleberg believes that this occurs because these so called "good characteristics" demand some concessions, which influence in particular, the lifestyle of these individuals.

The findings are clearer for the typology 1. Herein, flexible contracts cluster together with part-time jobs, and atypical work. Nevertheless, the wage distribution is indistinguishable, some have higher wages. Furthermore, PhD graduates might be unsatisfied since they report the willingness to find another job.

In sum, our findings corroborate our Hypothesis 1 in that good/bad characteristics cluster together. However, some overlaps exist between jobs characteristics, notably the atypical work that seems to be a common feature of typologies 1 and 3.

Although this study focuses on objective aspects of job quality, it has also been found that employees' job satisfaction is affected by the type of contract they have. In accordance with Waaijer et al. (2016), workers without stability prospects are more discontent compared to those with permanent contracts. As can be seen in Table 3 only workers in the first typology look for another job and are dissatisfied with the number of hours they work. Since the first typology is the only one considered here that has as its prevailing feature the existence of flexible contracts, it is thus clear that the contractual arrangement has leverage over job satisfaction. This dissatisfaction can also be explained by the effect that this kind of contracts (flexible) has on the families of the individuals as well as on their personal life. As previously mentioned, the use of fixed-term contracts is a trend which still doesn't seem to slow down as suggested by Passaretta, Trivellato and Triventi (2018) in their recent study.

With regard to contractual agreements, it is also possible to observe, in Table 3, that the possibility of having a fixed-term job is greater for younger PhD graduates, specifically in the age range of 24-39. This is curious, however, as job instability and low-quality jobs tend to be more associated with less educated individuals (Erhel and Guergoat-Larivière, 2010).

On the contrary, in this research, the youngest segment of doctorates is included in the only typology that is over-educated, which is the first typology. These findings are therefore not in accordance with the research by Ermini, Papi and Scaturro (2017), since these authors reported that the individuals who obtained a doctorate degree, being 29 years old or less, were less likely to have over-qualification. In the sample here considered, older PhD graduates are the ones who exhibit a match between job and education, as can be observed in the third typology. As Crespo, Simoes and Pinto (2017) argue this situation is to be expected, since the older employees are normally in jobs with higher quality in comparison with the younger ones. Nonetheless, to these authors there are also other features, here named demographic and social background characteristics, which could negatively influence the job quality of the PhD graduates. For that matter, beyond the younger employees, women and foreigners, on average are on the least quality jobs. In the particular case of the female group, the salary is one of the variables that is most mentioned when distinguishing both genders (Leschke and Watt, 2008; Crespo, Simoes and Pinto, 2017). The research developed throughout this dissertation shows results similar to the previous study, due to the fact that the first typology which is the most precarious among the three typologies, aggregates youngsters, women and foreigners as their predominant characteristics.

The PhD graduates with these characteristics face an additional difficulty. Since these individuals have a job tenure between 0-120 months, which is therefore low, they will not only be less likely to have a permanent job, but will be more easily dismissed (Ritter, 2005). As a result, it becomes hard for this segment to achieve job security as it doesn't just depend on them.

In addition, our findings reveal the existence of some disciplinary fields (PhD) that are more associated with higher quality jobs, than others. To illustrate this, one can observe Table 3, where the respondents that have a PhD in engineering, manufacturing and construction are related to higher job quality than those who are

from the humanities, languages and arts field. These outcomes are thus in line with Passaretta, Trivellato and Triventi (2018) for whom the doctorates with an academic background on some of the soft sciences (e.g. humanities, languages and arts) have a better chance of being subjected to a contract that is not standard in comparison with those in the hard sciences (e.g. engineering, manufacturing and construction).

We can thus conclude that some categories of PhD holders prevail in good/bad jobs (Hypothesis 2). On the other hand, some of the external variables such as firm size, do not have the exact same behaviour described in the literature on job quality. Indeed, to a significant section of researchers, small companies have on average better jobs than medium or even large firms (Crespo, Simoes and Pinto, 2017; Díaz-Chao, Ficapal-Cusí and Torrent-Sellens, 2017). This influence is visible particularly on the dimensions of work-life balance, physical working conditions, autonomy and intensity (Crespo, Simoes and Pinto, 2017). In our analysis, one of the prevailing characteristics in the second and third typology, which are the two typologies with higher job quality, is the work performed in a large company. Those PhD graduates who perform their activity on small and medium firms and are included in the first typology face less job quality.

Still, with regard to the characteristics of the local unit and more specifically its economic activity it is possible to verify that, as it happened in Portugal until 2005, the best quality jobs in the academy are occupied (Fontes, Novais and Cabral-Cardoso, 2005). According to Table 3, the only typology that doesn't have education as a prevailing economic activity is the first one. This suggests that doctorates in this typology are looking for a stable job but are unable to obtain it, particularly in the field of education. Thus, they are often obliged to accept jobs outside the public sector in the form of flexible contracts.

Although it is noticeable that the first typology presents the worse set of characteristics, when considering the total sample, it is noteworthy that there are also differences between the job quality experienced by the individuals of the second typology and third typology. In fact, it is recognized in this research that the third typology has the best job quality of all typologies as it is the only one that contains 100% of PhD graduates with permanent contracts. Even though it shows a poor work-life balance when compared to the second typology, the doctorate segment belonging to the third typology reports being satisfied with their current work, since

they do not intend to change their professional situation. One of the possible explanations for this to occur is the fact that PhD graduates who are in the third typology give primacy to their work that is connected with education over their personal life.

The outcomes shown here do not fail to present two different realities in Portugal, regarding the job quality. On the one hand, two typologies of older PhD graduates enjoy great working conditions and are satisfied with them. On the other hand, there is a typology composed of younger PhDs, which manifest difficulties in accessing the best quality jobs, namely through contracts with unlimited duration. After acquiring the PhD, it is therefore quite difficult to get a permanent contract. This seems to be a cross-border trend as evidenced by Passaretta, Trivellato and Triventi (2018), in their recent study. Since those PhD graduates who obtained their diploma in 2008 in Italy were 10% more likely to be on a fixed-term contract than those who obtained it in 2004.

## IV- Conclusion

In the last twenty years, the progressive improvement of the job quality has been one of the matters that has gained prominence in the debate led by the most distinguished European bodies. The employees are no longer satisfied merely with having a job, and they worry more and more with the conditions associated with it, thus becoming increasingly concerned. Indeed, the focus of these individuals is not only to have a good salary, but also to maintain, at their disposal, a good set of working conditions.

In this context one can understand the attention given by the Commission of the European Communities (2001 a) to stimulate and help Member States to improve the quality of life of employees, both at work and outside the workplace, mainly by conducting various job quality reviews in these countries. Furthermore, with the development of a new list of indicators on innovation and research, the European Union has sent a strong signal on the importance it assigns to the specific contribution of a highly skilled segment of workers, recognizing its key influence for the development of a knowledge-based economy (Commission of the European Communities, 2001 b). Thus, this dissertation reveals the growing interest by the working conditions of PhD graduates in the Portuguese context.

The starting point for this study was a theory-driven approach resorting to several authors that defined and measured the above-mentioned concept, to which, later, the available information from EU-LFS database was associated. Furthermore, in order to get a better knowledge of the job quality of these workers, fuzzy cluster analysis was used. This analysis showed us the existence of three typologies of PhDs in Portugal. The first typology is the one that shows the most precarious position in the different dimensions of the job considered in this study, because the PhD graduates in this group work under flexible contracts, since they couldn't find permanent jobs, are employed in part-time jobs, don't have a positive work-life balance, are over-educated, are looking for another job and they may have either very low or very high salaries. The second typology has as prevailing characteristics the existence of stable contracts of unlimited duration, as well as a small amount of contracts for probationary period, highest income, full-time job, great work-life balance and satisfaction with the amount of hours worked. Finally, the third typology, as previously referred to, shows not only the highest

income and full-time job but also a prevalence of stable contracts of unlimited duration and long working hours.

It is also true that the workers in this last typology do not experience a good work-life balance, when compared, for example, with the second typology, but this is probably due to the fact that these individuals are performing their activity in a demanding area as it is education. It is important to stress that more than a half of the sample (60.6%) of the PhDs shows characteristics belonging to two typologies, while only 10.2% shows characteristics of the three. On the other hand, there is a substantial number of individuals (75) with exclusive characteristics of the second typology. So, we can conclude that this labour market of highly skilled employees is segmented and some categories of employees are more likely to be assigned to "good/bad" jobs. Policy makers should take steps to foster better job quality also for those who have made huge investments in their education. Probably, they should create policies that encourage private employers to hire and offer decent jobs to PhD holders, as well as create job opportunities in the public sector, including higher education institutions.

This research has, however, some limitations that must be referred to. Specifically, these limitations are associated with the EU-LFS, the formulation of the variable of income in deciles deserving a highlight, what doesn´t give the chance to know with precision the salary of the individual, the imposition to examine the data in age-bands, the risk of some fundamental variables to measure job quality in the perspective of some authors not being in the database, of having sampling errors when the definition of the sample was made and, finally, the necessity to use proxies to get answers to questions not formulated in the questionnaire, as it was mentioned in chapter ll.

Today, as in the past, one must continue to analyse carefully the relationship, usually complex, between the quality of work in the job and the economic, political and social cycles. It is, thus, important to bear in mind that this thesis was written with the help of information collected from EU-LFS from the year 2014, that is, in a period of deep economic crisis in Portugal. This economic scenario demands in the future an analysis of the evolution of the types of jobs in order to evaluate if there were changes in the obtained data in a crisis's context, or if the situation remains unchanged. It would also be important that, when the questionnaires are made, the EU-LFS included an indicator that allowed to prove the degree of general satisfaction of the respondents. Finally, once the individuals that integrate the first typology (the one that shows more

job insecurity) are mainly foreign women, it would be interesting that a future study tackled the relationship between gender and nationality, so that their possible influence on job quality could be understood.

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Appendixes

*Table A1 - Fuzzy clustering analysis of the PhD sample data*

| **Country** | | **Portugal** | | | |
|---|---|---|---|---|---|
| **Dimensions** | | Frequency | Typology 1 | Typology 2 | Typology 3 |
| **Income** | **Monthly (take-home) pay from main job-in deciles** | | | | |
| | Missing | 10.24 | 23.32 | 13.35 | 0.00 |
| | 10 | 2.70 | 15.52 | 0.00 | 0.00 |
| | 30 | 0.90 | 5.17 | 0.00 | 0.00 |
| | 40 | 0.60 | 3.45 | 0.00 | 0.00 |
| | 50 | 2.10 | 12.07 | 0.00 | 0.00 |
| | 60 | 0.90 | 5.17 | 0.00 | 0.00 |
| | 70 | 0.60 | 3.45 | 0.00 | 0.00 |
| | 80 | 4.80 | 27.59 | 0.00 | 0.00 |
| | 90 | 4.80 | 27.59 | 0.00 | 0.00 |
| | 100 | 82.58 | 0.00 | 100.00 | 100.00 |
| **Working time** | Full-time job | 91.64 | 0.00 | 100.00 | 100.00 |
| | Part-time job | 8.36 | 100.00 | 0.00 | 0.00 |
| | **Number of hours per week usually worked in the main job:** | | | | |
| | Missing | 6.20 | 25.64 | 3.16 | 4.93 |
| | - (1-10h) | 2.59 | 29.82 | 0.00 | 0.00 |
| | - (11-20h) | 3.74 | 43.07 | 0.00 | 0.00 |
| | - (21-30h) | 4.60 | 27.11 | 4.55 | 0.00 |
| | - (31-40h) | 47.13 | 0.00 | 95.45 | 0.00 |
| | - More than 40 | 41.95 | 0.00 | 0.00 | 100.00 |
| **Contractual arrangement** | **Permanent job** | | | | |
| | - Person has a permanent job or work contract of unlimited duration | 72.78 | 0.00 | 94.06 | 100.00 |
| | **Reasons for having a temporary job/work of limited duration** | | | | |
| | - Person could not find a permanent job | 22.10 | 91.11 | 0.00 | 0.00 |
| | - Person did not want a permanent job | 2.16 | 8.89 | 0.00 | 0.00 |
| | - It is a contract for a probationary period | 2.96 | 0.00 | 5.94 | 0.00 |

*Table A1 - Fuzzy clustering analysis of the PhD sample data (cont.)*

| | | | | | |
|---|---|---|---|---|---|
| **Balance between life and work (work-life balance)** | **Shift work** | | | | |
| | Person does shift work | 6.20 | 34.75 | 0.00 | 8.10 |
| | Person never does shift work | 93.80 | 65.25 | 100.00 | 91.90 |
| | **Evening work** | | | | |
| | Person usually works in the evening | 16.71 | 0.00 | 0.00 | 49.80 |
| | Person sometimes works in the evening | 30.19 | 100.00 | 10.55 | 50.20 |
| | Person never works in the evening | 53.10 | 0.00 | 89.45 | 0.00 |
| | **Night work** | | | | |
| | Person usually works at night | 1.89 | 0.00 | 0.00 | 6.35 |
| | Person sometimes works at night | 11.59 | 0.00 | 0.00 | 39.02 |
| | Person never works at night | 86.52 | 100.00 | 100.00 | 54.62 |
| | **Saturday work** | | | | |
| | Person usually works on Saturdays | 12.94 | 100.00 | 11.26 | 0.00 |
| | Person sometimes works on Saturdays | 33.15 | 0.00 | 0.00 | 100.00 |
| | Person never works on Saturdays | 53.91 | 0.00 | 88.74 | 0.00 |
| | **Sunday work** | | | | |
| | Person usually works on Sundays | 8.63 | 100.00 | 0.00 | 19.02 |
| | Person sometimes works on Sundays | 18.87 | 0.00 | 0.00 | 80.98 |
| | Person never works on Sundays | 72.51 | 0.00 | 100.00 | 0.00 |
| | **Working at home** | | | | |
| | Person usually works at home | 37.47 | 7.94 | 19.14 | 80.04 |
| | Person sometimes works at home | 35.31 | 92.06 | 34.62 | 19.96 |
| | Person never works at home | 27.22 | 0.00 | 46.24 | 0.00 |
| **Job satisfaction** | Do not wish to work more hours than currently | 84.10 | 0.00 | 100.00 | 100.00 |
| | **Wish to work more hours** | | | | |
| | -Through a job working more hours than the present job | 0.54 | 3.39 | 0.00 | 0.00 |
| | - Only within the present job | 12.13 | 76.27 | 0.00 | 0.00 |
| | - In any of the above ways | 3.23 | 20.34 | 0.00 | 0.00 |
| | Person had only one job or business during the reference week | 89.76 | 12.67 | 100.00 | 100.00 |
| | Person had more than one job or business during the reference week (not due to change of job or business) | 10.24 | 87.33 | 0.00 | 0.00 |
| | Person is not looking for another job | 93.26 | 39.47 | 100.00 | 100.00 |
| | Person is looking for another job | 6.74 | 60.53 | 0.00 | 0.00 |
| **Educational mismatch** | **Acquired and required education for the job (in levels)** | | | | |
| | - Match | 57.95 | 0.00 | 64.31 | 86.30 |
| | - (+1) | 38.27 | 80.64 | 35.69 | 13.70 |
| | - (+5) | 3.77 | 19.36 | 0.00 | 0.00 |

*Table A1 - Fuzzy clustering analysis of the PhD sample data (cont.)*

| | | | | | |
|---|---|---|---|---|---|
| **Demographic and social background** | **Age** | | | | |
| | 24-29 | 1.89 | 11.39 | 0.00 | 0.00 |
| | 30-34 | 4.85 | 23.66 | 1.77 | 0.00 |
| | 35-39 | 12.40 | 37.72 | 5.64 | 10.32 |
| | 40-44 | 16.17 | 5.93 | 25.33 | 6.08 |
| | 45-49 | 25.34 | 12.91 | 26.45 | 30.11 |
| | 50-54 | 18.06 | 0.00 | 20.41 | 23.75 |
| | 55-59 | 14.02 | 0.00 | 10.34 | 27.79 |
| | 60-74 | 7.28 | 8.38 | 10.06 | 1.95 |
| | **Gender** | | | | |
| | Male | 49.06 | 0.00 | 50.81 | 69.90 |
| | Female | 50.94 | 100.00 | 49.19 | 30.10 |
| | **Marital Status** | | | | |
| | Single | 26.68 | 72.90 | 21.37 | 18.29 |
| | Married | 59.57 | 13.23 | 69.25 | 60.20 |
| | Widowed, divorced or legally separated | 13.75 | 13.87 | 9.39 | 21.52 |
| | **Nationality** | | | | |
| | Portuguese Nationality | 94.34 | 60.72 | 100.00 | 96.55 |
| | Foreign Nationality | 5.66 | 39.28 | 0.00 | 3.45 |
| | **Tenure (in months)** | | | | |
| | 0-60 | 26.15 | 85.78 | 12.36 | 7.82 |
| | 61-120 | 10.78 | 14.22 | 11.71 | 6.57 |
| | 121-180 | 13.21 | 0.00 | 16.49 | 16.85 |
| | 181-240 | 13.75 | 0.00 | 20.67 | 11.11 |
| | 241-300 | 15.90 | 0.00 | 16.56 | 26.31 |
| | 301-360 | 8.36 | 0.00 | 5.71 | 19.31 |
| | 361-420 | 8.36 | 0.00 | 11.11 | 9.41 |
| | More than 420 | 3.50 | 0.00 | 5.39 | 2.61 |
| | **Disciplinary field of this level (PhD)** | | | | |
| | Missing | 18.06 | 0.00 | 18.49 | 23.59 |
| | Teacher training and education science | 4.93 | 0.00 | 4.39 | 8.87 |
| | Humanities, languages and arts | 17.11 | 24.21 | 15.34 | 16.39 |
| | Social sciences, business and law | 20.07 | 20.25 | 20.13 | 19.83 |
| | Science, mathematics and computing | 21.05 | 55.08 | 7.45 | 27.68 |
| | Engineering, manufacturing and construction | 23.36 | 0.00 | 35.02 | 14.27 |
| | Agriculture and veterinary | 2.30 | 0.00 | 1.05 | 6.09 |
| | Health and welfare | 7.89 | 0.46 | 12.74 | 2.80 |
| | Services | 3.29 | 0.00 | 3.87 | 4.07 |

*Table A1 - Fuzzy clustering analysis of the PhD sample data (cont.)*

| | | | | | |
|---|---|---|---|---|---|
| **Local unit characteristics** | **Number of persons working at the local unit** | | | | |
| | Between 1 and 10 | 5.12 | 19.60 | 4.48 | 0.84 |
| | Between 11 and 49 | 9.97 | 23.85 | 9.37 | 5.85 |
| | More than 50 | 84.91 | 56.56 | 86.16 | 93.31 |
| | **Economic activity of the local unit** | | | | |
| | F - Construction | 0.27 | 0.00 | 0.49 | 0.00 |
| | G - Wholesale and retail trade; repair of motor vehicles and motorcycles | 0.81 | 0.00 | 1.47 | 0.00 |
| | I - Accommodation and food service activities | 0.27 | 0.00 | 0.49 | 0.00 |
| | J – Information and communication | 1.89 | 0.61 | 3.27 | 0.00 |
| | K - Financial and insurance activities | 0.27 | 0.00 | 0.49 | 0.00 |
| | M - Professional, scientific and technical activities | 8.89 | 30.13 | 6.46 | 2.47 |
| | N - Administrative and support service activities | 0.27 | 1.76 | 0.00 | 0.00 |
| | O - Public administration and defence; compulsory social security | 4.04 | 0.00 | 5.91 | 2.68 |
| | P - Education | 75.74 | 31.03 | 80.13 | 90.65 |
| | Q - Human health and social work activities | 6.20 | 29.19 | 1.28 | 3.42 |