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Higher Education and Labour Market Dynamics in Crisis: A European Comparative Study

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DECLARATION OF ORIGINALITY

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Dedicated to my family

ABSTRACT

From the end of 2007 onwards, Europe has seen the most prolonged recession on its history and the effect of educational attainment on certain labour market outcomes, such as employability and wage levels, which was previously seen as prominent, or even causal, becomes difficult to interpret. Likewise, there are also implications on other relevant outcomes, such as job mismatch and quality, where literature seems, rather conflicting. Empirically, this thesis investigates the relationship between educational attainment, and labour market in nineteen European countries, using both individual and country-level data. The focus is on the impact of educational attainment, on employability, job quality, wages and job mismatch. This analysis, is anticipated to contribute to the academic debate in labour economics by examining this impact across Europe, taking into account the economic climate in pre (2004) and during recession (2010) time periods, as well as the institutional and economic context of each labour market, which is represented by nine different country-level variables. Higher educational attainment is closely linked with employment and wage outcomes, but this is not that straightforward with job quality and mismatch, mainly due to various methodological limitations involved. Educational attainment is valued differently among countries. However, the labour market position of the low-educated were worse in 2010 comparing with 2004 in most countries, but this is not clear if it has a causal link with recession. Moreover, all countries examined have been classified by welfare state regimes, but it seems that this classification cannot explain the differences in the labour market outcomes between low- and high-educated. Finally, the country-level variables have been tested using the two-step approach. The Size of Government, Part time to Full time employment ratio and the GDP/Capita seem to be strong determinants of individual's labour market outcomes, in relation to their educational attainment. EPL Strictness, the gross enrolment in higher education and the debt to GDP ratios can also play some role, but their effect has been found significant only with job mismatch.

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LIST OF ABBREVIATIONS

BE: Belgium

BHPS: British Household Panel Survey

CHEERS: Careers after Higher Education: A European Research Study

CZ: The Czech Republic

DE: Germany

DK: Denmark

DLFS: Dutch Labour Force Surveys

DLHE: Destinations of Leavers of Higher Education

EC: European Commission

EE: Estonia

EOR: Employment Odds Ratio

EOR_{ed}: Country-average Employability Odds Ratio between Individuals with Different
Educational Attainment

EPL: Employment Protection Legislation

EQOR: The Employment Quality Odds Ratio

$EQOR_{ed}$: Country-average Employment Quality Odds Ratio between Individuals with
Different Educational Attainment

ERIC: European Research Infrastructure Consortium

ES: Spain

ESS: European Social Survey

EU: European Union

EULFS: European Union Labour Force Survey

EU-SILC: The European Union Statistics on Income and Living Conditions

EWCS: European Working Conditions Survey

FI: Finland

FP6: Framework Programme 6

FR: France

FT: Full-time

GB: Great Britain

GDP: Gross Domestic Product

GR: Greece

GSOEP: German Socioeconomic Panel

HILDA: Household, Income and Labour Dynamics in Australia

HPWP: High Performance Work Practices

HU: Hungary

HUR: Harmonised Unemployment Rate

ICT: Information and Communication Technologies

IE: Ireland

ILFI: Indagine Longitudinale sulle Famiglie Italiane

ILO: International Labour Organisation

IMF: International Monetary Fund

INET: The Institute for New Economic Thinking

ISCED: International Standard Classification of Education

NAFTA: North American Free Trade Agreement

NL: The Netherlands

NLS: National Longitudinal Survey

NO: Norway

OECD: Organisation for Economic Co-operation and Development

OLG-CGE: Over Lapping Generations-Computable General Equilibrium

OLS: Ordinary Least Squares

PISA: Programme for International Student Assessment

PL: Poland

PT: Part-time

PT: Portugal

PWIGLS: Population Weighted Iterative Least Squares

QLFS: Quarterly Labour Force Survey

R&D: Research and Development

REd: Returns to Education

REFLEX: The Flexible Professional in the Knowledge Society

RM: Realised Mismatch

ROVEd: Returns to Overeducation

RREd: Returns to Years of Education Required for a Job

RUEd: Returns to Under-education

SE: Sweden

SES: Structure of Earnings Survey

SHP: Swiss Household Panel Survey

SI: Slovenia

SK: Slovakia

SOG: Size of Government

SSDA: Sector Skills Development Agency

STREP: Specific Targeted Research Project

UN: United Nations

UNECE: United Nations Economic Commission for Europe

WIEGO: Women in Informal Employment: Globalising and Organising

WWII: World War Two

YO: Years of overeducation

YR: Years of required education

YU: Years of under-education

1 CHAPTER 1: INTRODUCTION AND OVERVIEW

1.1 Aim

The European labour market is purportedly common to all member-states, where mobility between workers, business establishments and capital is free (Scharpf, 2002; Graig and De Burca, 2011). However, once certain peculiarities of each state are analysed in detail, it is clear that this common labour market is divided into smaller national ones, which have only a few things in common. This raises questions on whether labour market outcomes of individuals also depend on the institutional context they live in. Moreover, the most recent economic crisis, at the end of 2007, has affected national labour markets in a very different way: some have gone through difficult economic times, while others seem to have benefited from it. Even within countries, the economic crisis seems to have affected people differently (Bell and Blanchflower, 2011a; 2011b; Hurley, 2011; 2013; Vandekerckhove, 2012; Gallie, 2013). In countries where the effect on the labour market was severe a great number of workers lost their jobs, while others saw their wages stagnate or even decrease. During the most recent recession, people with lower educational qualifications have been affected the most in all countries, irrespective of their economic performance (*ibid*). This thesis argues that labour market outcomes such as, employability, job quality and pay can fluctuate due to reasons that relate not only to individual characteristics, but also to labour markets' economic and institutional context.

An economic crisis is normally expressed in GDP negative growth terms, usually when this is negative for a period of time that exceeds six months (two consecutive quarters). Stagnation occurs when nominal GDP growth rate is very low, usually below the unit. This means that the real GDP is likely falling. Both, crisis and stagnation are

considered as periods of economic recession (Palley, 2012). During recession, the creation of new jobs is negligible and therefore, new entrants are less likely to find a job. This might induce them getting a job of lower wage or quality, than the one they would have anticipated to get in pre-recessionary periods. Unemployment rises as more people are entering the labour market, but new jobs are not generated at the same pace. Businesses find it hard to sustain their usual turnovers and profits and as a consequence, many of them are shutting down, workers are made redundant while, at the same time, the creation of new jobs is scarce. If the crisis is a prolonged one, some of them can face long spells of unemployment and this causes financial and even psychological problems. The more prolonged the crisis is the deeper this vicious spiral can become.

One of the major determinants of labour market outcomes, such as employment and wages, is educational attainment. It is generally accepted nowadays that, on average, the more educated someone is, the more likely is to find a job. Usually, this job is of better pay and also of better quality. Likewise, the education someone attains can also differ substantially, as it is argued that not all countries can provide the same quality of education (Soo and Elliot, 2010; Ozga *et al.*, 2011). Higher education is the last educational level and whoever undertakes it, postpones his/her entrance in the labour market, expecting to benefit later on when looking for a job. Practically, higher education has closer links with labour market outcomes, than the lower educational levels. However, education is a unified procedure, as it is very rare for someone to enter a higher level, without having completed all previous ones. The transition from one level to another depends on the performance somebody achieves and usually, the better the performance on the lower levels, the more likely it is for someone to pursue a course in higher education[1].

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[1] This means that innate ability is an important factor, which can bias individuals' decision to undertake higher education. However, this is very hard to be measured empirically. The relevant method, most commonly used, to gauge student's performance is the new Programme for International Student Assessment (PISA) designed by the Organisation for Economic Co-operation and Development (OECD), but there have been serious concerns over its standardised approach, as well as its applicability to measure individual's innate ability (Sellar and Lingard, 2013; Rogers, 2014). The methodology used by this thesis allowed for the employment of different data sources and therefore PISA scores could be used as a country-level variable. However, these scores are very close related to school quality and other factors and thus, using PISA scores in the country -level as just an aggregate average would likely be misleading. Taking these concerns into consideration, this thesis does not incorporate PISA scores on its analysis to

Yet, the average level of educational attainment in each country differs and this can affect the way the labour market functions. This thesis empirically treats educational attainment as years of education, examining the effect of one additional year of education in certain labour market outcomes, taking into account the economic climate as well as the institutional and economic context of each country's labour market. That said, issues with regards to individuals' ability as well as the credential effect (the effect of a higher degree) are not examined due to data limitations.

In countries with relatively high levels of educational attainment, job requirements, in terms of the years of education, could be adjusted upwards. On the contrary, in countries where the average educational attainment is low, the adjustment could be downwards. However, in such countries, high-skilled individuals might be well-desired by the labour market because they are scarce. This might cause an upward move on their relative wages, as they are very difficult to be replaced and therefore, businesses are willing to pay higher wages in order to keep them in their workforce, even in periods of economic recession. The latter seems theoretically plausible, but in practice the relationship between labour supply and demand is not that easy to be explained.

This impact of higher educational attainment on individual's labour market outcomes is not clear whether it is stronger or weaker when the economic climate is bad. Particularly, for employability it seems that unemployed individuals are more affected by a bad economic climate, especially in non-flexible labour markets, which tend to protect the incumbent workers more than the unemployed (Fabiani *et al.,* 2010; Pissarides, 2013). Moreover, since the competition for a new job is stiffer, high-educated individuals find it hard to get a job that matches their qualifications and therefore, decide to apply for jobs with lower educational requirements. Employers might respond by hiring high-educated people for jobs that require less years of education than they actually have. This makes the situation for the low-educated, especially for the unemployed ones, even harder. Given the data limitations and the

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make inferences about the innate ability of students, assuming that this is distributed rather equally within and between countries.

assumptions used, this thesis examines whether there is any evidence of this during the most recent economic recession, taking into account the economic and institutional context of each country's labour market. The empirical analysis focuses on the labour market outcomes of individuals in both quantitative, with respect employability, returns to education and occupational mismatch; and qualitative terms (job quality). The relationships between quantitative and qualitative aspects of labour market outcomes are often neglected in the labour economics literature, which tends to treat them independently[2]. However, this study argues that there might be some interdependence between them attempting a conceptual synthesis of the empirical results derived from Chapters 3, 4, 5 and 6, aiming to shed some light into the way labour market outcomes are interconnected and shaped by the interplay among individual characteristics, institutional and economic context. This synthesis is performed in Chapter 7.

Using a strict economic reasoning, labour surpluses and deficits that might occur in one country, can be covered by migrant workers since labour mobility between the European countries is considered as free (Kahanec, 2013). However, moving from one country to another is a decision that incorporates social, cultural and psychological considerations. These considerations, most of the times, are very hard to overcome and workers are not finally relented to the strict economic reasoning of supply-and-demand's automatic adjustments. There are also other technical difficulties, such as language barriers, the apparent discrepancies between the educational systems in Europe, despite the efforts made through the Bologna Declaration towards a harmonisation on qualification levels. Finally, not all countries in Europe are equally open to recruiting candidates from abroad, as this procedure requires certain robust institutional mechanisms that not all countries are equipped with. For example, Soo and Elliot (2010) found a positive correlation between quality of higher education institutions in the UK, in terms of university rankings, and overseas enrolments. This effect becomes stronger when the universities are established closer to London.

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[2] Likewise, it is also assumed that the investigation of qualitative aspects of the labour market is a type of research that should, first of all, concern other disciplines from social science, such as sociology, social psychology, as well as from the broader field of Business studies, such as Human Resource Management and Organisational Theory.

However, in an environment of economic crisis, financial uncertainty is apparent and the relocation of workers between countries might increase. But, the flow is one-way, from a country that has been affected negatively to a country that has not. This, in turn, might increase the already high inequality that existed between countries before the crisis.

The development of graduates' skills that labour market needs and therefore, the graduates' future capacity to increase productivity outcomes in a job, has been one of the main concerns of employers. Employers are mainly interested in the usefulness of higher education learning and the value that this adds to the labour market, in terms of productivity and thus, higher profits (Lowden *et al.*, 2011).

Employers are those ones who make the final decision on whether a candidate is suitable or not for a certain post. Even if, this decision-making process involves some level of uncertainty, related to its very complex nature, the heterogeneity of job tasks throughout sectors and countries as well as the specific knowledge required, some factors can be seen as more important than others. Particularly, the educational level is certainly a factor that employers take seriously into consideration when deciding the suitability of a candidate. The fact that, usually, the level of education required for a job is explicitly written in the vacancy and is also directly measurable, compared with other skills or years of relevant working experience, places education among the factors that relate closely to the labour market outcomes of the individuals. However, it is possible this relationship to be different among countries and it can be affected by the economic and institutional context each country's labour market operates.

In the policy level, Bologna Declaration (1999) laid the foundations for a European higher education area by establishing the mechanisms through which university degree courses will be harmonised, in some respects, by 2010. Such structural convergence will lead to a substantive one, in terms of content. Graduate employability is also examined in that context. To this extent, particular legislations have been enacted by the European member-states, in order to match their educational systems with the labour market, as required by the Bologna Process (Crosier *et al.*, 2007; Cardoso *et al.*, 2008;

Rauhvargers, 2009). The OECD (2009) and Eurostat (2009) have also stressed the need for further research on the compatibility of graduate skills with the needs of the labour market as well as with students' decisions to continue into postgraduate study.

The provision of a research and policy framework on the commensurability of graduates' competences, with their remuneration and well-being at work, nowadays seems more topical than ever. However, Europe is yet to see an active integrated policy-making, since the heterogeneous form of national labour markets as well as the great differences in courses and curriculums in higher education are still persistent notwithstanding of the growing massification, standardisation and quasi-marketisation of higher education procedures, through the Bologna Process. According to Jobs and Sriraman (2013), the institutional integration through the Bologna Process does not focus on the amelioration of institutional inequalities, the worldwide establishment of academic freedom as well as the emancipation and intuition of students as active global citizens, but it appears that promotes the academic dominance of high-developed countries, with profit-oriented strategic goals. The political claim is that this harmonisation does not affect the structure of institutions worldwide nor the academic freedom. Nonetheless, academics seem rather reluctant to accept such claims and have repeatedly resisted these trends. As a result, this issue indicates the need for large-scale and comparative research projects, focusing on the relationship between education and work, in order possible similarities and differences among countries to be identified so as to inform policy-making in a European level.

Likewise, the Employment Protection Legislation (EPL) is a very crucial factor, which can affect employment and wage inequality rates within a labour market. Labour markets, governed by highly protected employment legislations, are very difficult to adjust to external economic turbulences. This also works in favour of the high-skilled and more experienced workers (Barbecky *et al.*, 2010; Fahr and Smets, 2010; Kwiatkowski and Wlodarzcyk, 2014). Fabiani *et al.* (2010) argued that lower EPL labour markets are more likely to experience smoother and more balanced effects, between temporary and permanent workers, during a recession.

This thesis focuses on the relationship between educational attainment and the labour market outcomes of individuals, examining whether or not, this relationship can be affected by the economic climate as well as the economic and institutional context they live in. Principally, four different labour market outcomes- employability, quality of job, wage differentials and job mismatch- are investigated, before and during crisis, comparing people with different educational attainment who live in countries with particular labour market institutional settings and economic characteristics. In other words, the main research questions addressed in this study investigate whether and how much educational attainment adds value to individuals when competing for a job in the labour market.

Summarising, the research questions are as follows:
- Is the added value of education the same or similar between individuals of different European countries?
- What difference does an economic downturn make to individuals with different educational attainment across Europe?
- How can the added value of education be affected by labour markets' institutional and economic context across different European countries?

The concept of the added value of education has been seperated in monetary (employability, wages and perceived occupational mismatch in terms of years of education needed for a job) and non-monetary (job characteristics measuring quality of work) terms. Binary logistic regression is performed to identify the added value of educational attainment on employability between individuals residing in different countries and through periods of good and bad economic climates. Other demographic and socio-economic individual characteristics have been added to the model and treated as control variables. Then, all regression coefficients that correspond to country averages are regressed in a bivariate manner and plotted against various macro-level variables extracted from the International Monetary Fund (IMF), OECD, EUROSTAT, UNESCO and the World Bank. The latter modelling technique, recommended by Bryan *et al.* (2013) and other researchers (Franzese, 2005; Primo *et al.,* 2007; Dirckhoff, 2013), also known as the *two-step approach*, has been used in order to

identify whether countries with similar economic characteristics and labour market settings have been affected alike, in terms of the four aforementioned labour market outcomes. The welfare states regime classification is also discussed in that context (Section 1.3). The same statistical technique has been implemented to investigate employees' quality of work. The outcome variable has been converted into a binary form (low/high quality) and has been constructed by combining selected variables that can, arguably, capture working conditions and job characteristics. Returns to education are estimated by using an extended version of the Mincerian equation model. For the calculation of wage-premiums/penalties associated with job mismatch, the latter method is complemented with the ORU decomposition technique (Duncan and Hoffman, 1981). Likewise, the same macro-level variables have been used to compare and group the coefficients estimated.

To summarise, this thesis explores different models of the relationship between educational attainment and labour market dynamics across nineteen European countries. The estimation of models, which focus on the impacts of educational attainment on employability, quality of work, wages and perceived job mismatch, is anticipated to contribute to the academic debates across labour and educational economics as well as the broader social science on the added value of education in individual's labour market outcomes. This study takes into account various institutional and economic contextual characteristics of each labour market, trying to identify possible relationships between them and the trends revealed by the regression coefficients on the individual level. Gallie (2013) acknowledges that there are still a limited number of studies that examine labour market outcomes in an international perspective. Moreover, the institutional and economic context of each country is rarely taken into account. Most of these studies are of a descriptive manner, some use only countries' averages and others focus on a limited number of countries that can be arguably compared. To the researcher's knowledge, there are also just a few studies that investigate the effect of an additional year of education in both monetary and non-monetary terms (Bergin *et al.*, 2011; Hurley *et al.*, 2011; Smeeding *et al.*, 2011; Anderson *et al.*, 2012; EC, 2012; Vandekerckhove *et al.*, 2012; Hurley *et al.*, 2013; Burchell *et al.*, 2014; Russell and McGinnity, 2014)[3].

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[3] These studies are discussed in Section 2.3.

Therefore, this thesis contributes to the existing literature by examining selected labour market outcomes of individuals living in nineteen European countries in terms of their educational attainment, incorporating the similarities and differences in the economic and institutional context of their labour markets, in both good and bad economic times. Finally, a synthesis of the findings is discussed in Chapter 7.

1.2 Theoretical Background

In theoretical terms, through time, there have been numerous theories on how labour markets tend to function under both good and bad economic climates. Some of them focus on individual characteristics, but others argue that labour market outcomes, in terms of employment and wages, can be mainly informed by the institutional context, which is equally or sometimes more important. Nevertheless, most of these theories seem to agree that the educational attainment affect labour market outcomes in a positive way.

The correlation between educational attainment and earnings has been mainly expounded upon the following broad conceptual frameworks. The *alpha coefficient* approach links individual earnings to the differences in their educational attainment directly (Psacharopoulos, 1999). *Filter or screening hypothesis* sees schooling as a filter, which can be used by employers to discover those individuals who are more capable than others (Cohn and Geske, 1990; Johnes, 1993; Psacharopoulos, 1999; Checchi, 2006). Finally, the *diploma hypothesis*, related to the *diploma disease*, is an alternative hypothesis, which uses a different perspective on human capital accumulation. It suggests that credentials rather than skills per se, are obtained by individuals through their studies. The added value of education reflects the value that a specific credential can add to a potential employee, when looking for or changing a job (Dore, 1976; 1980; 1997). However, Dore (1980) claims that these two hypotheses have many things in common and they cannot really be examined separately.

1.2.1 Human Capital Theory

The *human capital theory* is a theoretical approach falling under the neo-classical economic paradigm, which focuses primarily on the determination of wages by providing an auction-market analysis. Technically, this analysis is illustrated by the incorporation of labour demand and supply curves into a single diagram, where the ultimate goal is the determination of the intersection point, generally known as the equilibrium point. Neoclassical economists see labour market as similar to any other product-market, at least in terms of the joint forces of supply and demand. However, they admit that there are some differences with the market-product, as individuals do not have unlimited time for work and thus, they face the trade-off between leisure and time, whereas in the market-product, leisure preferences cannot be applied to the product characteristics.

According to human capital theory, the productivity of individuals or the economic value of their work into the production process, are highly correlated with the cost of the investment embodied in their human capital. Given this, human capital theory can be conceptualised in the general context of individuals' *rational choices theory*. Moreover, individuals should invest in human capital until the point where the cost of acquisition of one human capital unit becomes equal to the effectuated value of their future income due to that investment (Becker, 1964; 1993).

The great majority of human capital theory definitions accept that there is positive effect of education on individuals' future income. However, there are other studies arguing that the rate of return could also be negative, especially when the calculation is performed in the macro-level, investigating the correlation between human capital and the rate of economic growth (Benhabib and Spiegel, 1994; De la Fuente and Doménech, 2006). This is because there are many factors, beyond the strict individual level, that can be automatically generated in the labour market and could influence the rate of return. One of these factors could be the progressive obsolescence of knowledge, as explained by the *law of diminishing returns* in human capital theory. To this extent, Becker (1993) reconsidered his previous study on human capital (Becker, 1964) by

focusing on competences and capabilities that could also be obtained through the process of life-long learning. This type of learning can positively affect individuals' income, improve their mental and physical health and generally, contribute to their well-being. In this context, the relevant literature distinguishes between two forms of human capital: the *general*, which refers to the acquisition of general skills related to literacy and numeracy; and the *specific*, which treats employees' earnings as specific to a certain job (Kriechel and Pfann, 2005; Gathmann and Schonberg, 2010; Zajda, 2012).

Other researchers (Psacharopoulos, 1999; David and Lopez, 2001) argued that there are also some non-pecuniary benefits that could be obtained from education, which could not be easily measured by economic and statistical research instruments. Education can contribute to a greater understanding of notions, such as social equality, social cohesion, justice, ecology or the merits democracy has, over other more authoritarian regimes. All these, according to the neoclassical human capital approach, are usually known as *externalities* and are not considered as actual components of an economic system (David and Lopez, 2001). However, according to Bowles and Gintis (2002), these externalities cannot be easily distinguished from the human capital embodiment process and therefore, cannot be seen as such, but rather as inextricable components of human capital.

Stiglitz (1987) incorporated the notions of *technological literacy* and *endogenous technological change* as qualitative advantages in the human capital formation procedure. This qualitative aspect of knowledge can be further enhanced by work-experience and learning-by-doing, creating a "meta-learning" component of human capital that its merit is so strong that surpasses the benefits of the knowledge acquired from formal schooling. This view renders political arguments on the expansion of knowledge acquired in educational institutions, rather misguided.

Another issue that can be raised from the empirical investigation of the correlation of education with labour market outcomes, in the individual or aggregate level, is the way human capital can be measured (Appendix A).

Concluding, educational levels have been related to higher earnings and productivity in human capital theory via investment mechanisms. However, there are other interpretations of the relationship between education and labour market outcomes that challenge this theory, using a more institutional approach (Cohn and Geske, 1990; Dore, 1997; Monk, 2003). The most well-know is *the screening hypothesis*, which is explained in the following Section.

1.2.2 Screening Hypothesis

According to the screening hypothesis, education is not directly linked to individuals' productivity, but rather contributes to the redistribution of income in favour of those who are more talented and more capable by nature (Arrow, 1973). Education is just a choice method. Given this, in the screening hypothesis the notion of the coefficient on years of schooling has a broader meaning than in human capital theory (Spence, 1973; Rilley, 1979; Patrinos, 1996).

The screening hypothesis is complemented by the *sheepskin effect hypothesis* (Reynolds *et al.*, 1994; Jaeger and Page, 1996), which is based on the credential level of individuals that can be, in turn, used from employers as a "filter apparatus". Thus, this filter can only work if certain criteria, such as diplomas, degrees, etc., are popularly admissible (Hungerford and Solon, 1987; Ferrer and Ridel, 2002).

Manifestly, the screening hypothesis provides an explanation of the labour market discriminations that can be considered as compatible with the notion of *maximum profit*. In other words, education is a functional practice of the labour supply, which creates its own demand due to the flexibility that exists in hiring and employing procedures. The fact that the more educated individuals enjoy higher earnings simply means that they take advantage of the situation that exists for the less educated ones. By inference, since the more educated enjoy higher pay than their marginal product, workers with less educational attainment are likely to earn less (Blaug, 1972; Johnes and Johnes, 2004).

Collins (1979) brought a more theoretical nuance on the role of credentials in a society, distinguishing between credential capitalism and Keynesianism. The former can be placed under the *efficient market hypothesis*, where markets, labour market included, are inclined towards perfect equilibrium. In this context, employers and employees will eventually reach some kind of equilibrium in the long term, where credentials will adequately reflect employees' abilities. Credential Keynesianism, on the other hand, uses credentials as an "artificial currency", which volume of circulation can balance aggregate demand, correcting market's deficiencies. This is somehow related to the concept of *credential inflation*, which has been extensively debated by many scholars, questioning the role of formal education and the usefulness of the acquisition of skills within universities (Dore, 1997; Collins, 1979; Walters, 2004; Hayes, 2006). Evans *et al.* (2004) focused on the tacit skills that cannot be acquired by formal learning, but mainly by work and life experiences as well as informal learning. These skills are competences related to the way a complex situation could be best approached and resemble to personal traits, which can be used for handling unforeseen circumstances.

Since this study pertains to issues regarding changes in educational and labour market dynamics, due to a bad economic climate, its theoretical background is also based on various labour market theories postulated to conceptualise how labour markets function in periods of economic crisis.

1.2.3 Labour Market Theories during an Economic Crisis

Phelps (1968) and Taylor (1970) suggested a theory, known as the *labour hoarding theory*. They argued that during a recession, firms are more willing to hoard the labour performed by their current employees due to the costs associated with new hiring and training, redundancies and lay-offs, as a recession is not considered as permanent phenomenon. Hence, employers prefer to incur the cost of excessive labour in order to avoid any hiring/firing costs, when recovery comes. Therefore, the sooner the economy recovers, the bigger the benefits employers can gain from hoarding labour. Moreover, as Leslie and Wise (1980) observed, employers who choose to hoard labour, might also choose to increase the working hours of their current workforce. Firms are more likely

to hoard high-skilled rather than low-skilled labour, when the output produced is decreased, due to the lack of demand. Low-skilled manual labour is more useful when demand is high and is less costly to be acquired, when economy recovers. Empirically, this theory implies that low-skilled, low-educated workers have been affected more by the most recent economic recession and therefore, their position, in terms of labour market outcomes, has been deteriorated compared to the higher-educated ones.

Implicit contract theory argues that long-term working contracts are more favourable to both employees and employers and they can be mutually beneficial, even in recession. Short-term contracts entail much higher risks and since both parties prefer to be in a less risky state, these type of contracts are not generally preferred. Given this, employers can keep wage offers in low levels for potential employees, by promising a rather stable wage in the future. These wage offers are not related directly to employees' marginal productivity and this, in turn, can make them feel secure against any future economic turbulences. The wage differences between employees depend on the degree a potential employer thinks that an employee is valuable in the production process and therefore, very difficult to be substituted. Thus, high-skilled individuals, especially those that have relevant to the job working experience, are more valuable and therefore, employers are willing to pay higher and accept more downward rigid wages, when economy and labour market performs badly (Azariadis, 1975; Akerlof and Miyazaki, 1980). Empirically, this means that the ratio between temporary and permanent contracts as well as part-time and full-time workers is not expected to change much during a crisis. In fact, it can increase in favour of permanent contracts and full-time workers and this is particularly true for the high-educated individuals. Moreover, it can be implied that the estimated returns of an additional year of education are expected to rise during recessionary periods.

On the other hand, there are theories that are strongly related to workers' marginal productivity. The *shirking theory* and the *fair wage-effort hypothesis* can be considered as such and can be placed under the broader concept of the *efficiency wage theory*. The latter argues that the more efficient and productive a worker is, the more highly rewarded can become. Those that are not productive are the first to be made

redundant, especially in recession periods. The shirking theory treats workers' productivity as something that can be directly observed by employers. In recession times, where unemployment is high, those that perform low, in terms of the productivity standards set by an employer, are facing a greater hazard to lose their jobs. Employees are aware of this situation and are willing to accept lower wages, as they prefer to have a lower-paid job rather than ending up being unemployed (Shapiro and Stiglitz, 1984). Likewise, the fair wage-effort hypothesis assumes that higher pay, makes workers more productive and thus, more efficient, rather irreplaceable and less amenable to wage-cuts, when the economic climate is bad. On behalf of the worker, effort is bigger, when he/she thinks that the wage paid is "fair". As noted in implicit contract theory, high-skilled workers are paid better because they are considered more valuable. In the case of fair wage-effort hypothesis, effort, which is usually translated to higher productivity, is easier to be observed and measured. This makes low-skilled workers more susceptible to redundancies and wage-cuts, rendering the wages earned by high-skilled, especially the white-collar ones, downward rigid and their employment more secure (Akerlof and Yellen, 1990). Hence, wage inequalities between high- and low-skilled during recession, especially in a prolonged one, like the one started at the end of 2007, might increase. Given the assumption that high-educated workers are more productive, this means that their employability compared to the lower-educated, will increase and at the same time, their returns will either increase or remain the same. Therefore, this theory implies that an economy with a greater proportion of high-educated workers is more productive as a whole and this can be reflected on its rate of GDP growth.

According to Lindbeck and Snower (1988), rigidity in wages can be explained in a vested interests context. This theory is known as the *insider-outsider theory*, where those that currently hold a position, the incumbent workers or the "insiders", do not welcome new recruitments and are primarily interested in increasing the privileges they already have over the "outsiders", meaning those that are currently unemployed. Therefore, unionism, minimum wages, the increase of labour turnover costs as well as the employment insurance, separate the working population into two groups, insiders and outsiders, with the former being much more privileged than the latter. This

situation brings rigidity to the wages of the insiders, especially to the high-skilled, as they are considered more valuable from their employers and thus, they can earn more privileges compared to the outsiders. This theory can be placed under the broader framework of *labour market segmentation theories* or, in other words, the *dual-market theories*, where labour market is separated into two fragments or sectors and mobility between the sectors is not allowed. The primary sector is the most privileged and the secondary is rather degraded. This means that countries with strict EPL or with high rates of unionism and minimum wage would result to high rates of youth unemployment in period of crisis, but relatively stable employment rates of experienced workers, especially the high-skilled. This thesis, in its empirical analysis, will only use data for EPL in the country-level and trade unionism in the individual level. Minimum wage has not been taken into account, as it is not legally established in all countries examined and where relevant legislation exists, the definition is not the same and therefore, any comparisons would be likely unreliable.

There are also theories regarding bargaining power and trade union memberships. The more collective power the workers have, the more rigid their wages are (Shister, 1943; Dunlop, 1950; Oswald, 1979). In recession periods, this has a negative effect on employment, as the main concern of trade unions is to maintain an optimum level for the wages of their members and thus, profit is suppressed. As a result, lay-offs could be the only solution for an employer to cope with the decrease in the output produced. The level of wage bargaining power may also affect the flexibility during the negotiating process. The lower the level of the wage bargaining power is, the more flexible the negotiations are. For example, wage bargaining in an individual or company level, is more adjustable to external negative economic circumstances, compared to the next higher level, where trade unions are stronger. Therefore, there is a possibility of the wage inequality between low- and high-skilled workers to rise, when the collective bargaining power is higher for the better-paid group, which in most of the cases, are the high-skilled workers. Evidently, it is more common for workers belonging to the low-skilled group to become members of a trade union, in order to protect their wages and employment, as they are less-costly or considered to be less valuable, compared to the high-skilled. Moreover, in a sector dominated by men or native workers, where wage

setting negotiations are operated in the highest level, wage inequalities might increase against women or migrants, respectively. The biggest the share this sector has to the overall working population, the largest the wage gap will be. Equally to the insider-outsider theory, these theories suggest that trade unionism as well as EPL can affect labour market outcomes, at least when these are expressed in quantitative terms, in favour of the high-educated.

Another theory, which can be linked to job requirements, is the *job competition theory*, postulated by Thurow (1975). The author argues that there is no such thing as perfect competition in the labour market, where certain frictions make it naturally incorrect. Wage setting mechanism is not only governed by the law of supply and demand, but also it can be fixed by other mechanisms, such as collective bargaining (van Ours and Ridder, 1995). Moreover, productivity is not seen as an individual attribute, but as a job characteristic. In such context, educational attainment cannot make a worker more productive, but it can inform an employer for the worker's potential ability to perform better in a job task. As a result, low-educated workers are placed at the back of the "job queue" and higher-educated at the front. Thus, in recession periods, where unemployment is high, low-educated are the most affected and the most susceptible to long term-unemployment, especially when the recession persists. This theory also implies that the low-educated seem to be less employable, especially in recessionary times. In terms of earnings, these can be affected more by the educational requirements of a job and less by individuals' actual years of education attained.

In a nutshell, all aforementioned theories seem to agree that the high-skilled are less likely to lose their jobs or be subjected to higher wage-cuts compared to the low-skilled, as they are regarded as more valuable from employers. Finally, the EPL level could also influence labour market outcomes during recession, but it is again the high-skilled that benefit the most.

1.3 Data, Research Setting and Methods

The great majority of empirical studies, examining the relationship between education and labour market, use secondary as opposed to primary data. These secondary data sets, usually conducted by governmental bodies, have been repeatedly tested and controlled for the minimisation of the sample bias and statistical error, producing samples that are more likely to be representative of the population.

The present study conducted secondary data analysis, using data from the European Social Survey (ESS) from 2004 (round 2) and 2010 (round 5), focusing on nineteen European countries. Additional data sources have also been used, such as the European Union Labour Force Survey (EULFS), the European Union Statistics on Income and Living Conditions (EU-SILC) survey, UNESCO's educational databases and other databases from the World Bank, IMF and OECD. All databases, except the ESS, have been used for the calculation of various descriptive statistics on a country-level as well as for visualising the relationship between individual and institutional and economic characteristics of the labour market of country examined.

Moreover, there are various limitations stemming out from a research strategy, like the one attempted in this study. Authorities that conduct large-scale data sets such as, the ESS and all others that have been used by the present study, conduct rigorous data-checks, before releasing their data to the public, by following strict principles for achieving the best reliability and applicability possible. These principles are designed to check for any possible duplication of records as well as to ensure that certain key variables have valid values. Therefore, various checks have been conducted for the consistency of the participants' responses on key variables, such as age, gender, household members, activity status or geographies, also known as imputation checks, which decrease bias and increase sample validity and reliability. Even if, the aforementioned issues are applied with scrutiny, problems of sampling, and principally

non-sampling errors, like measurement, processing and response errors, are mainly unavoidable[4].

The ESS is a biannual survey, which aims to capture socio-economic attitudes and values in Europe. Seven rounds have been conducted to date. Recently, the ESS has also been established as a European Research Infrastructure Consortium (ERIC), becoming prestigious and attractive to the broader social science researchers, since it can no longer be considered as an experimental survey. A cumulative pooled data set, merging Rounds 1 to 5, has been released recently, but not all variables are included and revisions are being conducted in a regular basis, in order to ensure the validity and reliability of the sample. Since there is no question regarding net/gross pay in this cumulative data set, this thesis uses Rounds 2 and 5, separately, or merged when needed, where questions regarding earnings have been asked as part of an integrated module. This module is a separate rotating one, known as "Family, Work and Well-Being", which includes information that allow the construction of variables regarding gross monthly wage, job mismatch as well as a composite variable for quality of job (Chapter 4). This module, conducted from 2004 to 2006 (Round 2) and from 2010 to 2012 (Round 5), can provide useful insights on peoples' perception on labour market outcomes, before and during recession. Particularly, regarding the pay variable, which has been used as a dependent variable in Chapters 5 and 6 and as a control variable in Chapter 4, all responses have been collected as part of this complementary module and therefore, some inconsistency can be observed with other data sources, such as the Structure of Earnings Survey (SES) conducted by Eurostat. Even if, the pay variables in both the SES and ESS are part of the 2010 round, they do not refer to the exact same period[5].

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[4] Some problems of this nature have been identified by the author of this study, who directly contacted the ESS data administration authorities. The data was, eventually, amended accordingly. The analysis performed in this thesis concerning the ESS data is based on the amended one, which has been released to the public on 14th of April 2014. A detailed description of this error is available at: http://www.europeansocialsurvey.org/data/singlealert.html?a=/data/alerts/alert0089.html

[5] Since this module had to be completed and submitted to the ESS within a period of two years, not all countries have carried it out on the same year. Therefore, some countries conducted it in 2010, others in 2011 and some others at the beginning of 2012. Apart from this, the earnings data in the SES is measured in Purchasing Power Standards (PPS), whereas in the ESS refer to gross monthly data, as it has been transformed by the author of this thesis (Chapters 4 and 5)

This study uses only variables that are common to both data sets, in order for the comparison between rounds to be feasible. Of the twenty-six countries present in Round 2 and the twenty-seven countries in Round 5, the empirical analysis of this thesis focuses on eighteen EU countries plus Norway, as it consists of a high income state geographically located in Europe, which could be used as a reference point in the empirical analysis. Overall, there are nineteen countries included in the analysis: Belgium, the Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, the UK, Greece, Hungary, Ireland, Netherlands, Norway, Poland, Portugal, Sweden, Slovenia and Slovakia.

Moreover, a combination of welfare state regimes classifications (Esping-Andersen, 1996; Ferrera, 1996; Arts *et al.*, 2002; Fenger, 2007; Arts *et al.*, 2010), as these have been transformed by Gallie (2013), has been used to classify countries both steps of the two-step approach. Therefore, countries have been classified in five different country-groups accordingly: Nordic, Continental, Liberal, Southern and Eastern. In Gallie (2013), France is classified as a unique case. In the current study, after examining the relevant literature, France has been decided to remain part of the Continental country-group. However, the scope of this study is not to provide a detailed categorisation of countries into welfare state regimes. This classification is used, mainly for illustration purposes, as an addition to the two-step approach, in a more descriptive rather than inferential manner. Therefore, all countries examined in this thesis have been classified according to the welfare state regime they belong to (Table 1.1).

Table 1.1: Classification of Countries According to Welfare State Regimes

Nordic	Continental	Eastern	Liberal	Southern
Denmark	Belgium	The Czech Republic	United Kingdom	Spain
Finland	Germany	Estonia	Ireland	Greece
Norway	France	Hungary		Portugal
Sweden	The Netherlands	Poland		
		Slovenia		
		Slovakia		

The total sample size includes 74,328 observations from nineteen countries, where 37,039 correspond to Round 2 (2004) and 37,289 to Round 5 (2010). However, not all

of these cases can satisfy the assumptions imposed for each hypothesis testing found in the four empirical chapters of this study. Therefore, an amended smaller sample has been used, depending on the hypothesis tested, in Chapters 3, 4, 5 and 6. Detailed descriptive statistics for all variables used in each empirical chapter can be found in Appendix C.

Because the sample size is not equally split among all countries and not conducted using the exact identical survey design as well as during the same period, survey weights need to be taken into account when comparisons between countries and Rounds are performed. All estimated models have been weighted to control for sample design and population size, using the Population Weighted Iterative Least Squares (PWIGLS) method, as presented in Pfefferman *et al.* (1998).

This study relies on ESS micro-data for estimating all regression models. The ESS has constructed several proxies and weight variables, which can be used to alleviate the problem of sample representativeness and ensure validity of all cases. Inevitably, on the other hand, some values of key variables, such as these related to pay, self-employment or education, have been misreported. This research study has addressed this issue by identifying cases of extreme implausibility, excluding them from the analysis[6].

Therefore, weighing all aforementioned limitations of a secondary data analysis set-up with the merits such analysis has over other research design methods, it has been decided that quantitative methods are more appropriate, relying on rigorous and state-of-the-art data-checking procedures, applied to each data set by the relevant administrative authorities. To this extent, regression estimations using the ESS micro data, enhanced and combined with calculations of aggregate statistics from other sources, can provide useful information on the labour market outcome patterns of individuals with different educational attainment in nineteen European countries, taking into account the economic climate as well as the institutional and economic context of each country's labour market.

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[6] The number of final cases is not the same in all empirical chapters of this thesis. This is explained in more detail in each chapter.

Usually, cross-national empirical literature relies on secondary data analysis, using survey-data conducted from statistical agencies, established both in the national and international level, specifically for that reason. However, responses are limited to a small percentage of the overall population and reliability can be best succeeded by the use of random sampling. Therefore, survey-data no matter how well-designed is, in terms of methodology employed; do not have the same degree of reliability, when compared to the whole population. Moreover, response bias might also appear, especially when respondents are asked directly about things that cannot be measured in an objective manner. Acknowledging all aforementioned factors that can cause bias, this thesis conducts an econometric analysis, where the effect of educational attainment on labour market outcomes is examined in terms of employability, quality of job and wages in different countries and economic times.

In economics, and in the broader social science, data sets are absolutely crucial parts of a study. Various surveys have been conducted on a national and international context, since the use of advanced technology made sample survey design significantly cheaper, but it has considerably increased the level of complexity, due to the feasibility of gathering information in areas that was impossible in the past. However, technology has also increased the reliability and validity of a survey design and requirements as well as expectations are now very high.

This thesis investigates the relationship between educational attainment and labour market in nineteen European countries, taking into account the economic and institutional context of each country's labour market in both good and bad economic times,. Therefore, a versatile, dynamic comparative design is needed in order to identify similarities and differences between and within countries.

The ESS data used can be clustered into nineteen different sub-groups, in terms of country. Consequently, an issue of interdependency rises, as units from the first level can be considered as nested to the units, clusters, of the next higher level, and so forth. Thus, selection of the first unit can be seen as conditional to the selection of units in

level two (Kish and Frankel, 1974). As a result, it is more likely for someone to share the same characteristics with someone that belongs to the same unit/cluster and therefore, the single level assumption of independent and identically distributed variables is violated and biased (Goldstein, 2011).

Multi-level models account for this interdependency but they are more practical to use when clusters are the main subject of research and thus, measurement of between-effects could be proved very informative, if additionally applied along with within-clusters effects (Snijders and Bosker, 1999; Goldstein, 2011). Lambert and Gayle (2008) argue that these models are part of panel and longitudinal data analysis, as they mainly involve the simultaneous measurement of within- and between-effects. Therefore, they can be considered as an advancement of the classical multiple regression models, since the assumption regarding the distribution of the statistical parameters involved remains intact. Their independence and constant variance are not a pre-requisite anymore, due to the clustering and covariance's random effect. Before the introduction of multi-level modelling in quantitative research, clustering was taken into account by transforming micro-data into an aggregate level, using averages corresponding to the clusters examined, but obviously, a technique like this lacks efficiency in standard error and sample measurement and therefore, its results might be misleading (Luke, 2004).

However, particularly regarding the Ordinary Least Squares (OLS) method, where the best model converges towards the closest distance that the square of estimations has from the regression line, clustering does not cause problems in the actual effect estimates, but underestimates standard errors and thus, it becomes downward biased when the data is highly clustered (Maas and Hox, 2004). Arguably, the same applies to single-level log-linear regression techniques, such as logistic regression.

Alternatively, splitting the data set into clusters to perform a regression analysis for each one separately, can be useful only when the clusters examined are of a limited number, where their sample sizes do not differ substantially. However, such technique could end up breaking down the data into very small sample sizes and therefore,

external validity is unlikely to be applied properly (Goldstein, 2011). Yet, the merits of a multi-stage design are acknowledged, but it needs a significant number of clusters in order for all assumptions to be appropriately met.

In total, two major labour market outcomes, split in four smaller ones are tested over individuals of different educational attainment. These are:

1. Employment, in terms of employability (Chapter 3) and the quality of job (Chapter 4).
2. Pay, in terms of returns to years of attained education (Chapter 5) and returns when job mismatches are taken into account (Chapter 6).

Empirically, in econometric terms, multivariate regression techniques and particularly, logit and OLS regression models have been used. The estimations produced have accounted for the clustering of observations, using robust standards errors clustered in the country-level, known as Huber-White or Sandwich estimator (Williams, 2000; Wooldridge, 2003). This method treats observations as independent across countries, but not necessarily between them. Robust standard errors have been also used to adjust for heteroskedasticity. This method, which can be applied to both linear and log-linear models, has been repeatedly used in social science research. In fact, most of the quantitative studies, which use large-scale surveys report robust standard errors, clustered or not (King and Roberts, 2012).

In order to estimate how employability and quality of job are fluctuating between individuals of different educational attainment in the nineteen countries examined, this thesis employs logit regression modelling techniques, controlling for various other variables, commonly used in the existing empirical literature. For wage premiums associated with years of attained education, an extended Mincerian wage equation is used. Regarding occupational mismatches, a similar to Duncan and Hoffman (1981) model has been employed. This is a model that is very common in the literature (Hartog, 2000; Chiswick and Miller, 2008; Galasi, 2008; Korpi and Tahlin, 2009; Kucel, 2011) and given that the ESS data used by the current thesis allow for this model to be constructed, it has been decided to be implemented accordingly. Briefly, this

model decomposes attained years of schooling (S) into years of schooling required for a job (R), years of under- (U) and over-schooling (O):

$$S=R-U+O$$

Therefore, individuals with:

- $S= R$, are considered as adequately educated (perfectly matched);
- $S= R+ O$ ($O > 0$), are the overeducated ones; and
- $S= R- U$ ($U > 0$), are defined as undereducated.

Then, the returns to U, R and O are calculated, using linear regression techniques. All estimations of the related wage-premiums/penalties are presented in Chapters 5 and 6.

All regression coefficients that correspond to the statistical interaction between years of attained education and country are regressed in a bivariate manner and plotted against various macro-level variables extracted from the International Monetary Fund (IMF), OECD, Eurostat, UNESCO and the World Bank,. The latter technique, recommended by Bryan *et al.* (2013) and other researchers (Franzese, 2005; Primo *et al.,* 2007; Dirckhoff, 2013), also known as the *two-step approach*, has been used in order to identify whether countries with similar economic climate as well as labour market economic and intitutional context have been affected alike, in terms of the four aforementioned labour market outcomes. The difference in the economic climate is captured using data from both 2004 (Round 2) and 2010 (Round 5), representing two distinct reference points for pre- and during recession period, respectively. All regression coefficient estimations related to educational attainment have been calculated, using each of these two data-sets separately.

Hence, this thesis aims to capture the effect a bad economic climate has on the labour outcome of individuals, with respect to their educational attainment using the most recent recession as an example. The severity of this effect is presented in terms of negative GDP growth, but since this is correlated with job losses, the Harmonised Unemployment Rate (HUR) is also examined. Because of the dynamic nature of these two macro-economic indicators, it has been decided that single year comparisons (i.e.,

2004 vs. 2010) would not be suitable to capture this effect and therefore, four-year averages prior to the two reference points (i.e., 2004 and 2010 respectively), where regressions have been estimated in the individual level from the ESS, have been used instead[7]. Thus, the average GDP growth rate between 2001 and 2004 is compared with the average GDP growth rate between 2007 and 2010. The same applies for the HUR[8].

This study also used the welfare state regimes classification. The relevant literature informs that countries, classified under a certain regime, are grouped in such way because of the common institutional characteristics they share, in terms of welfare policies (Kammer *et al.*, 2012). However, it is still unclear whether the same argument can be implied for their labour markets, as their economic and institutional context seems much more country-specific. Thus, even if, indeed, certain characteristics look similar, examining each of the countries as an equally-weighted component of a single and unified supranational group would be rather misleading. Therefore, this thesis goes beyond that, attempting to capture the effect of each country's labour market institutional and economic characteristics on the level of employability and quality of job of individuals with different educational attainment in terms of odds ratios (Chapters 3 and 4) and returns to an additional year of education also accounting for job mismatch (Chapters 5 and 6). In total, nine different country-level variables have been employed, expressed in terms of 2001-2004 and 2007-2010 averages. The GDP growth and HUR, which have been applied to describe the economic climate of each country, have been also used to describe each country's economic performance in pre and during recession periods. Hereafter, these variables will be called as macro-level determinants and these are:

1. The GDP growth rate;
2. The HUR;

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[7] Five-year averages are more common in the literature (Ostry *et al*, 2014). However, this study uses four-year averages because the individual level data from the ESS refer to 2004 and 2010. Particularly for 2010, if five-year averages would have been used, it would capture a year before recession (2006), where economy in most countries was booming. Regarding the averages before 2004, five-year figures could have been used, but it has been decided that it would be more appropriate if comparisons, between the two reference points, contain the same number of years. Since the four-year averages for 2010 was unavoidable, the same number of years has been used for 2004.

[8] The GDP growth data have been downloaded from the World Bank and the data regarding HUR from Eurostat.

3. The size of the government (SOG) (Government revenue as a percentage of GDP);
4. The Debt to GDP ratio;
5. The GDP/capita;
6. The ratio between part-time to full-time employees (25-64 years old);
7. The ratio between employees with temporary and permanent contracts (25-64 years old);
8. The level of EPL strictness; and
9. The gross enrolment ratio in tertiary education.

The first two macro-level determinants capture the economic performance of the country; the third and fourth show its fiscal situation; the fifth indicates the level of wealth; the sixth, seventh and eighth how flexible each country's labour market is and, finally, the ninth indicates the average educational level of each country.

Summing up, this study implements a single-level fixed-effects conventional approach using the ESS datasets, where dummy variables have been used to distinguish between countries and different economic times. Then, odds-ratios and OLS regression coefficients are regressed and plotted against the aforementioned institutional variables, using the two-step approach (Bryan and Jenkings, 2013).

Because of methodological problems related to accuracy in standard error and variance estimations, due to the small number of cases in the country-level, all nine macro-level determinants cannot be estimated and treated as independent variables in a single regression equation simultaneously. Therefore, bivariate relationships, between the estimated coefficients and each of the macro-level determinants, have been used instead. It is argued that when problems of that nature occur, then a simpler model would be more preferable (Tabachnik and Fidell, 2007). Such a simpler modelling approach is the two-step approach, which has been suggested in the literature as an alternative to the single-step or multi-level regression techniques, as it manages to capture the effect of variables operating in different level, when the assumptions of the multi-level regression techniques cannot be met adequately. On the other hand, lacks

the inferential robustness produced by more complicated regression techniques, but it has been decided that, given the data the author of this study has available, the two-step approach is more suitable, as it manages to visualise simple relationships in a relatively comprehensive, but rather more descriptive than exclusively inferential manner. The latter technique has been used in the literature (Bryan *et al.*, 2013; Dirckhoff, 2013) in order to identify relationships between estimations produced in the individual level (first step) and various institutional country-level variables (second step). In that context, this thesis also discusses the welfare state regime classification as explained earlier in this Chapter.

However, other techniques might seem more appropriate, as they can account for statistical differences in many levels of analysis. Clustering is apparent in the ESS data, but the number of countries (clusters) has not been proved sufficient to carry out this analysis in a multi-level manner. Hence, the two-step approach, where regression estimations on the individual level are bi-variably regressed and plotted against various country-level variables, which have been employed to indicate the economic and institutional context of each country, has been applied instead. This technique is common to all empirical chapters of this thesis.

In this study, educational attainment is measured in years of education, transforming the relevant continuous variable into another variable, which denotes how many years of attained education below or above the national compulsory level, respondents have. The UNESCO database has been used for this transformation, deducting the formal years of compulsory education set in each country, from the years of education an individual has actually attained. Therefore, a new variable that shows how many years an individual is over or under from the official compulsory level of the country he/she lives in, has been created.

Finally, this thesis treats educational attainment as years of education and the impact of credentials is not accounted for. The reason for this was the great inconsistency between countries on the degrees they provide, which level cannot be harmonised easily

under the common European ISCED level[9]. However, there is a variable in the ESS, where degrees have been harmonised accordingly but this required a great loss of cases, where the educational level of more than 20,000 respondents could not be identified and, in turn, fall under a particular classification[10].

1.4 Outline

Chapter 1 presented the aim of this study along with its conceptual and theoretical framework, elaborating more into the theories of human capital and screening hypothesis. The former originates from the neoclassical school of thought, while the latter can be seen as having institutional theoretical foundations. Furthermore, labour market theories as related to recession are also discussed and linked with the analysis performed in the empirical chapters of this thesis (Chapters 3, 4, 5 and 6). Finally a detailed description of the Data, Research settings and Methods used has been presented in section 1.3.

The structure of the remaining part of this thesis is as follows: In Chapter 2, higher educational attainment and labour market dynamics are placed under a policy and institutional context; and their evolution is discussed, based on literature from the broader social science on the relationship between higher educational attainment and labour market outcomes as these can be translated to employability, job quality, wages and perceived job mismatch. Europe is the main focus, before and during, the most recent economic recession. Thereafter, the core empirical analysis of this thesis has

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[9] UNESCO developed the International Standard Classification of Education (ISCED97) to facilitate comparisons of education statistics and indicators across countries on the basis of uniform and internationally agreed definitions. Levels 0, 1 and 2 refer to Pre-primary, Primary or basic and lower secondary educational levels whereas levels 3, 4, correspond to Upper secondary and Post secondary education. Finally, levels 5 and 6 are translated to first and second -stages tertiary educational levels, respectively. Recently, ISCED97 has been revised to ISCED2011 and this is also under constant revision in order to incorporate additional elements, which could make it compatible to most of the educational systems around the world. However, the basic levels as these are described by ISCED97 remain rather the same, even today.

[10] A solution to this could be given by treating educational level as a binary variable (0: No graduates, 1: Graduates) but then the variable would be oversimplified as it is assumed that all degrees have the same effect irrespectively of its level and that all people without a degree affect the outcome variable alike

been split up into four distinct Chapters (Chapter 3, 4, 5 and 6), each representing the four aforementioned labour market outcomes. Each Chapter includes a review of the relevant empirical literature, a discussion of data and estimation issues along with an explanation on the motivation for hypothesis testing, interpretation of results and concluding remarks. Finally, in Chapter 7 a conceptual link of the findings from all empirical chapters has been attempted, where a discussion of how the results compare to those in the related existing literature is also provided along with a discussion of policy implications and future research planning.

2 CHAPTER 2: THE RELATIONSHIP BETWEEN HIGHER EDUCATIONAL ATTAINMENT AND LABOUR MARKET: A POLICY AND INSTITUTIONAL ANALYSIS

2.1 Introduction

The purpose of this chapter is to offer an overview of labour supply and demand, using a policy and institutional context. The main focus will be on the value that education adds to a potential employee, when he/she enters the labour market.

A brief description of the post-WWII higher education policy agenda, which has been mainly informed by the widening of higher education to a broader population, is presented. Then, the role of the Bologna Process and various other institutions on the relationship between educational attainment and labour market is also discussed. Moreover, the most contemporary transformations within the labour market are described, examining the flexicurity model, the ongoing shift towards a more flexible market and the new forms of employment as well as their implication to high- and low-skilled workers. Finally, the last section of this chapter places labour market dynamics in the context of a bad economic climate, focusing on the relation that exists between higher educational attainment and labour market in Europe.

2.2 Educational Attainment and Labour Market: An Institutional and Policy View

The post-WWII era has been characterised by the mass model of higher education. Before this, it was for those belonging to higher social classes. The widening of higher education participation has become the kernel of higher education policies in Europe and generally, in the Western World. These policies have been boosted by the advent of Information and Communication Technologies (ICT), which enhance commercial and non-commercial bonds between countries and higher education institutions, transforming the role of higher education even further, making it universal (Jongbloed *et al.*, 2008). In a globalised world of high social mobility, higher education's boundaries are vague. The predefined "social contract" between higher education institutions and those participated in them, have become more complicated. Social mobility boundaries, even within the higher education institutions, are now defined by economic competition in a strict market environment, where governments are not the key players anymore (Brennan, 2004).

Higher education enrolment rates have been continuously rising for the last 30 years. In Europe, and especially in the Anglo-Saxon world, most of the institutions involved with higher education strategy and planning are consulting governments to enact policies towards widening the access to higher education to a broader population (Bowl, 2012). However, it is very difficult for policy-makers to design a framework towards openness in higher education. These difficulties mainly lie to the heterogeneity of the population the policies are targeted upon. Such population includes individuals from lower socio-economic groups, part-time students, students from different ethnic minority groups; vocational learning as well as disabled and care leavers and therefore it is very likely the vested interests of each groups to contradict each other, rendering policy-making a very complicated task (Centre for Enterprise and Edge Hill University, 2013).

During the last few years there has been a growing volume of research, which challenges the issue of equal opportunities in terms of higher education participation rates (Brown and Hesketh, 2004; The Milburn Commission, 2009). Most of the

literature consent that there is a bias towards high social class graduates, but it has been gradually decreasing since 1960 (Bekhradnia, 2003; Tight, 2012). Moreover, the increase in participation rates is more obvious for females and minorities with different ethnic background. Despite the fact that, during the last few decades, there has been an improvement in the participation rates of the most vulnerable groups, the inequality is still big in some occasions (Greenbank and Hepworth, 2008). Machin and Van Reenen (1998) trace the causes of the under participation in an intergenerational context, arguing that the positive relationship between parental income and participation rates is obvious even from the secondary school. Gorard (2008) identifies this problem into the previous poor school performance, which leads to early drop-outs in the secondary education, or into poor grades, which do not allow for subsequent higher education attainment. Other researchers argue that paradoxically, educational inequality persists on a high degree even nowadays, albeit the general consensus on policy orientation worldwide towards the widening of higher education participation to people from a great range of social classes (Iannelli and Patterson, 2005; Bathmaker *et al.*, 2013; Burke, 2012).

Mountford-Zimdars and Sabbagh (2013), analysing the British Social Attitudes survey (BSA), offer a plausible explanation on why the widening of participation in education is not that easy to be implemented politically, in the contemporary western democratic regimes of Europe. The majority of the people, who have been benefited from higher educational attainment in monetary and non-monetary terms, are reluctant to support the openness of higher education to a broader population. On the contrary, those that did not succeed or never tried to secure a place in a higher education institute, are very supportive of this idea. This clash of interests creates a political perplexity, making the process of policy-making rather dubious. Therefore, the apparent paradox of the increase in higher educational attainment, along with a stable rate in educational inequalities, does not seem that strange when vested interests of certain groups are taken into account.

The decision for someone to undertake higher education is not solely influenced by the value that this adds to his/her labour market subsequent occupational destination. Many

things can change in the interim and this is why people evidently choose to undertake higher education, due to reasons that are not necessarily related to their preferences regarding their labour market destination. Since an individual is exposed to different experiences and influences, strategic decisions can easily change, especially when these are taken from adolescents or individuals in their early stages of their adulthood. Given this, preferences do change with ageing and this is why there are some individuals who drop out from university, others who choose radical changes in their taught subjects or others who return to education after having worked in the labour market for many years and in different types of jobs. All these flows cannot be easily examined by a quantitative study, like the one attempted in this thesis. As a result, this research is subjected to various theoretical, methodological and even technical limitations of different kinds. These have been presented in section 1.3 and are further discussed, in relation to the specific labour market outcome, in Chapters 3, 4, 5 and 6.

Moreover, other studies examine labour and employment relations between countries, as these are influenced by each nation's relevant legislation. For example, Blanpain (2007) focused on the influence of national laws in a modern workplace environment. Nine countries- the US, Canada, Mexico, the UK, Germany, France, China, Japan and India- all highly influential to the global economy, were examined. He summarised the contemporary changes in the legislation regarding individual employment, unionisation, the laws against discrimination and privacy violation as well as the laws that protect the systems used to resolve labour and employment disputes. In each of the aforementioned countries, this study emphasised the great importance of institutions, such as the International Labour Organisation (ILO), the North American Free Trade Agreement (NAFTA) and the EU, in labour market policy-making by the promulgation of international labour standards and other various rulings.

Neumark (2006) conducted a study using extensive interviews with local partnerships throughout the state of California. His aim was to analyse the effectiveness of federal and governmental programs, to gauge issues related with school-to-work transitions. He came to the conclusion that the effectiveness of such programs was at least questionable and their impact rather poor.

However, there are different aspects, which under the context of the ongoing economic recession, gain some recognition and greater respect from the academic community and even policy-makers. A number of researchers argue that the employability agenda, which is being promoted currently, cannot stand as a sustainable rationale in a diverse European social environment. Lorenz (2006) calls for a more alternative thinking, as this harmonisation and standardisation of higher education creates permanent winners and losers, centralising all the gains, monetary and non-monetary, towards the most dominant countries, particularly towards Anglo-phone countries and specific industries. Some scholars call this phenomenon as *Englishization* (Coleman 2006; Phillipson, 2009). In general, the employability debate revolves around a three-dimensional space, where the three most dominant capital formats found in the literature- the social, cultural and economic- are represented in a single research framework. It is argued that the economic capital dominates over the other two, which are seen as subordinate (Bourdieu, 1980; Lareau and Weininger, 2003; Levitas, 2004; Moore 2008).

In this context, cooperation and collaboration between universities should aim to promote peoples' skills, while making them transferable and adjustable to the labour market. The main concern is the strengthening of the link between higher educational attainment and labour market. The EU is working towards this aim, through various policies. It is argued that higher education should focus on skills, which can increase the productivity of the potential worker. This increase can contribute in the overall growth of a country and therefore, of the European Union as a whole (Tight, 1998; European Commission (EC), 2006). Higher educational attainment that leads to a specific academic degree is a dynamic procedure, but with a pre-defined end. This renders the knowledge acquired there, as obsolete. The Bologna Declaration supports an agenda, where graduates should be further encouraged to get engaged with on-the-job training as well as life-long education programmes (Coffield, 1999). Other scholars look at the broader picture, acknowledging the benefits that higher educational attainment can bring to societies as a whole, by the simultaneous promotion of productivity, innovation and democratisation of the society as well as the mitigation of social and income inequalities (Harvey, 2000; Hayward and James, 2004). Thus, the

enhancement of individuals' employability is needed and most of the international organisations are working towards the establishment of a framework, which can ensure that higher education satisfies this aim (Diamond *et al*, 2011). Yet, this can make the employability gap between high- and low-skilled even bigger, since there is no similar policy framework specifically designed for low-skilled non-graduates on a European context.

Heinze and Knill (2008) argue that convergence in higher education policy-making, as a result of the Bologna Process, depends on a combination of cultural, institutional and socio-economic national characteristics. Even if, it can be assumed that more equal countries, in terms of these characteristics, can converge much easier, it is still questionable if and how much national policy developments have been affected by the Bologna Declaration.

Hunter (2013) places the debate under a broader political framework, juxtaposing neo-liberalism with the trends formulated by the OECD. He concludes that OECD is a very complex and multi-vocal organisation and when it comes to higher education policy suggestions, there is not any clear trend, especially towards neo-liberalism. This does not mean that economic thinking is not dominant within the OECD. This is, in fact, OECD's main concern and it is clear to all. Finally, Hunter (2013: 15-16) accordingly states that:

> "Some may feel offended by the vocational and economic foci in OECD discourse. Many would like to see HE held up for "higher" ideals. However, it is fair for OECD to be concerned with economics. They do not deny that they are primarily an organization concerned with economics. It is up to us, the readers, politicians, scholars, voters, teachers, administrators, and policy makers, to be aware that this is an economic organization and be careful of from whom we get our assumptions".

Mainly because of the prolonged manner of the economic crisis, there has been an increased interest lately from the broader academic community, in challenging the dominant view that sees the survival and success of organisations, as solely depended on maximisation of profits or minimisation of costs. An alternative view focuses on

whether and how well organisations opt to adapt to external changes, better than their non-flexible counterparts.

However, the notion of flexibility as a policy instrument can take different meaning and is not always seen as an advantage as it has been repeatedly challenged by many researchers (Hopkin and Blyth, 2004; Rodgers, 2007; Kalleberg, 2011). The view informed by the neo-liberal paradigm, which perceives flexibility, continuous labour mobility and labour market deregulation as the main factors that foster the pace and volatility of change, has been criticised as non-sustainable for the global economy (Dastmalchian and Blyton, 2001).

Furthermore, minimum wage legislation has always been a very heated debate among scholars and policy-makers across Europe. However, there is not a clear-cut on whether minimum wage can deteriorate or alleviate trends in unemployment, as it depends on various socio-economic conditions. Freeman (1996) argues that minimum wage cannot be examined without being contextualised beforehand. Therefore, the effect of an increase on the level of minimum wage and the way it is politically enforced depends on the institutional settings of a country. In some countries, it can decrease wage inequalities, while in others it can increase unemployment without affecting real wages. In that sense, this thesis avoids using minimum wage as a macro-level determinant in its empirical analysis as the interdependence with other institutional variables is very high and this is very likely to bias final results. Moreover, there are also other reasons for not using minimum wage, which are explained later in this Section.

However, some institutions, such as the ILO, EU and OECD, do not explicitly conclude whether employment situation will be improved by keeping minimum wage in low levels (Schulten, 2006; Bassanini, 2008; ILO, 2009; 2012; Dolton and Bondibene, 2011). This is mainly because there are a number of institutional reasons, such as the composition of skills, the type of job contracts or the level of technological advancement, which may affect the level of minimum wage in an economy. One-size-fits-all policies cannot be proved useful in such diverse and heterogeneous labour

market environment, like the European one[11].

Gavrel and Lebon (2008), assuming that labour market is segmented into better-paid high-quality and worse-paid low-quality jobs, argue that an increase in the minimum wage can decrease job mismatch, but it can also decrease output and thus, it can cause some increase in the unemployment rate. The rise of minimum wage will not affect the "good jobs", as those who hold them are indifferent of the minimum wage level (Gavrel *et al.*, 2012). Even if, there is evidence in the literature suggesting that the level of minimum wage can affect the labour market outcome of individuals, it has been decided not to be included in the empirical analysis of this thesis. A comparative analysis between nineteen European countries is conducted in this thesis and therefore, data in both steps of analysis should be present for all countries and periods examined. The level of minimum wage along with the EPL and trade unionism are measures that indicate the level of employees' protection on a specific labour market and in turn, the level of its flexibility. However, even if the data for the EPL is used in the country-level (second step of the analysis) and trade unionism in the individual one (first step as a control variable), minimum wage has been decided to be excluded, as this it is not legally established in all countries examined. Moreover, the definition between the countries where minimum wage legislation exist is not the same and therefore, comparisons would be likely unreliable.

During the last decade, the notion of *flexicurity* has emerged. Its main argument is that flexibility and security can indeed exist simultaneously (Schulze-Cleven *et al.*, 2007). This model of employment relations is mainly informed by the Danish model, otherwise known as the "golden triangle", which main axes are the social security and flexibility, balanced as equally important. Figure 2.1 shows the Danish Model, where high levels

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[11] Theoretically, minimum wage has been studied under two major frameworks. The first is the neoclassical one, which sees minimum wage as a violation of labour markets' competition because it creates an advantage in favour of incumbent workers, resulting into higher unemployment among those in low-paid jobs. This view has been challenged from other scholars and institutions that place minimum wage within the broader concept of redistribution policies and social justice (Prasch, 1996; Wright, 2006; ILO, 2012). In addition, there are some other theories, which account for the spill-over effect of minimum wage, arguing that a rise in minimum wage can trigger similar increases in the wages of all other workers and this may cause the real wage of the low-paid workers to remain stagnant or even drop (Brown,1999; Slaughter, 1999; Stewart, 2012).

of mobility are combined with welfare schemes of job security and safety (Bredgaard *et al.*, 2005).

Figure 2.1: The "Golden Triangle": The Danish "Flexicurity Model"
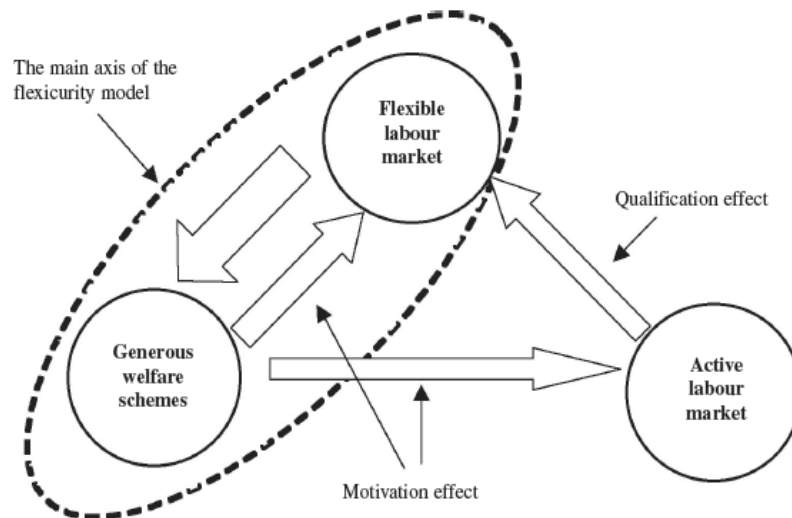
Source: Bredgaard *et al.* (2005: 64)

This model allows for non-standard labour employment, short-time working and temporary lay-off schemes, as integrated in a welfare system of employment safety and short-term unemployment. The relevant European authorities have tried to implement some of these policies, in an effort to tackle the rise in unemployment due to the current recession.   Nonetheless, since its member-states are being governed by different institutional settings, highly incompatible with the one or the other circle in the main axis of the flexicurity model depicted in Figure 2.1, the policies did not have great success, affecting the vulnerable groups even more and thus, increasing inequality (Broughton *et al.*, 2010).

In a large scale comparison study, conducted in twelve European countries, Gangl (2001) investigated possible institutional differences in the school-to-work transition patterns, partitioning the European labour market into three main categories: the labour markets belonging to continental Europe, where vocational training systems are dominant; these of the Northern European area, which use a less business-oriented policy pattern; and these of the Southern European countries, which tend to rely on their

EPL in order to confront the issue of school-to-work transition. Although the findings revealed the dominance of the "old" European countries over the "new" ones, did not offer a definite argument for comparative advantages in favour of any of the three categories, but rather called for the establishment of a more co-operative policy approach, under a single European framework. More subsequent studies, integrating former Soviet-bloc countries that joined the EU quite recently, found significant correlations among smoother school-to-work transitions, job match and weaker labour market legislation (Gangl, 2003; Unt, 2007; Saar *et al.,* 2008). Findings for Russia's school-to-work transitions, confirm previous findings of the permanence of social stratification in the post-Soviet Russia, albeit the considerable institutional changes that took place (Gerber, 2003).

Regarding industrial "globalised" societies, Dore (2004) argued that the governments' tolerance of inequalities has increased. Even if, globalisation inherently entails the notion of *market individualism*, where workforce is highly polarised and segmented, national socio-economic policies can still work towards a different direction. According to Dore, each country can still initiate a range of independent labour policy choices, but these choices tend to be circumscribed by the economic and cultural hegemony of the industrially advanced economies.

In a review of social science literature on innovation and recruitment practices, which take place within an organisation, and their association with flexibility on work, Smith (1997) constructed a model of uneven flexibility, which shows that opportunities are not the same across different groups of US workers. Specific characteristics of working conditions, related to flexibility, such as effort intensification, decentralisation of control and destabilisation of employment, increased discrimination in opportunities. The model shows that flexibility is a contradictory notion, which leads to a highly segmented workforce, as for some is a progressive, feasible and effective approach, while for others is coercive, limitative and ineffective. Usually, those that are affected negatively are the low-skilled workers or, generally, the ones that belong to the lower levels of organisational stratification. Contrariwise, those in managerial positions or

those in higher levels of hierarchy, see flexibility as an advantageous, modern and highly-efficient system of production.

This model of uneven flexibility has been challenged by Twiname *et al.* (2006) in a single firm case study. In this study, core workers are not distinguished from peripheral workers, as both are subjected to extended working hours and low expectations for pay or other benefits, in order to maintain their current employment. However, the authors acknowledge that their focus was on a single European-owned firm in New Zealand and therefore findings cannot be generalised in a larger population.

A detailed examination of the links among working life, production and institutions, was presented by a compilation of research papers edited by Wood and James (2006). It comprised of various studies, written by eminent scholars within the socio-economic research field. They aimed in capturing the causes of the rapid changes in the labour market and their relation with the continuous social, political and institutional reforms. Most of the findings support the argument that the ongoing changes in the world of work have a significant negative effect on workers' health and well-being.

Therefore, labour market is very complex field of human relations and interactions as individual, socio-economic, contextual or random events can affect people in a very different way. Job outcomes in that sense are highly uncertain and rather unpredictable and the inevitable interdependence of observable or other unobservable factors have to be seriously acknowledged when links between them are to be explained. In that sense causality between certain factors, is extremely difficult or even impossible to be identified and therefore interpretation is more realistic when the level of correlation between factors is investigated taking into account the context within such correlation has been observed.

2.3 Educational Attainment and Labour Market: What Difference does it Makes During an Economic Downturn?

There is a substantial literature supporting the argument that university enrolments rise when economy goes to a recession (Clark, 2011; Barr and Turner, 2013). In the US, the rise of total enrolments in post-secondary education, from 2007 to 2010, accounted for 13 percent (18.2 to 21 million). This increase is consistent across all age groups (Snyder and Dillow, 2012). In the EU-27 area, as Table 2.1 shows, enrolments have increased by just 1.05 percent, but there is great variation between the countries, as in some of them they have decreased. Looking at the pre-recession period (2003-2006), the relevant rate was much higher (7.51 percent). Moreover, the most recent data show that the temporal trends for 2011-2012 are negative, as enrolments in 2012 have remained stable or decreased in most countries.

However, this figure does not take into account the relative changes on the population of each country. This can be captured by the gross enrolment ratio in tertiary education, which shows the number of people enrolled in tertiary education, regardless of age, divided by the official population, aged 18-23 years old, that is eligible for enrolment in the same educational level. The data also show that in Europe, even if the average increase during the time period 2007-2010 was 2.93 percent, it was still lower compared to the 2003-2006 average (4.54 percent). Once more, there is a great variation between the European countries and no common trend can be identified. This study, in its empirical chapters, uses the gross enrolment ratio as an institutional variable (macro-level determinant), in order to examine whether the labour outcomes of individuals with different educational attainment can be partially affected by this ratio in the country-level.

Table 2.1: Enrolments and Gross Enrolment Ratio in Tertiary Education (2003-2006, 2007-2010, 2011-2012)

GEO/TIME	Tertiary Education Enrolments			Gross Enrolment Ratio		
	2003-2006	2007-2010	2011-2012	2003-2006	2007-2010	2011-2012
Europe (EU-27)	7.51	1.05	-2.87	4.54	2.93	0.27
Belgium (BE)	5.04	11.59	3.20	2.29	5.91	1.57
Czech Republic (CZ)	15.09	16.94	-1.35	13.34	8.72	-0.41
Denmark (DK)	11.86	3.47	5.85	11.53	-4.99	2.80
Estonia (EE)	6.83	0.32	-2.23	3.34	2.84	1.98
Finland (FI)	5.60	-1.85	0.19	6.20	0.10	-1.81
France (FR)	3.73	2.92	1.61	-0.34	2.77	1.24
Germany (DE)	No data	No data	No data	No data	No data	No data
Greece (GR)	14.02	6.07	0.45	22.06	16.70	2.64
Hungary (HU)	11.00	-10.96	-0.31	15.33	-6.97	0.12
Ireland (IE)	2.41	1.89	-1.91	3.56	10.29	-2.23
Netherlands (NL)	9.12	9.34	1.72	3.79	4.08	0.93
Norway (NO)	1.08	4.21	3.56	-1.44	-2.59	1.02
Poland (PL)	7.57	0.08	-3.64	5.35	6.83	-0.32
Portugal (PT)	-9.13	4.40	-1.54	0.78	8.30	-0.43
Slovakia (SK)	20.13	7.07	-2.30	10.82	6.04	0.04
Slovenia (SI)	11.62	-0.93	-3.01	13.99	3.56	0.94
Spain (ES)	-2.87	5.40	0.78	3.94	9.09	1.95
Sweden (SE)	1.88	9.08	-2.25	-2.10	-0.32	-3.92
United Kingdom (UK)	2.07	4.69	0.14	-2.74	1.82	0.71

Source: UNESCO (Author's calculations)

Andino (2005) acknowledges that the traditional Fordist workers have been substituted by the post-Fordist ones, who can be given more responsibility in the job in order to work in a more autonomous way, having higher qualifications, which can be enhanced even after graduation by on-the-job training. He also examines this new state of work in Argentina, under a context of high unemployment, poverty and generally, under a recession situation. At the beginning of a recession period, the willingness of workers to participate in skill enhancement activities is influenced positively. In a way, workers' behaviour tends to resemble Andino's post-Fordist worker. On the other hand, the labour force of an economy in a prolonged recession gradually becomes more vulnerable and socially excluded, driving unemployment rates even higher (Andino,

2005). In such environment, individuals cannot find alternative ways to step out of this vicious cycle and appear even more reluctant to obtain suitable education.

In a constantly changing business environment, under economic turmoil and uncertainty, there are not many cost-saving tools, which businesses and governments can use, apart from reducing wages, hours and workforce. In Europe, more than 5.5 million workers lost their jobs, increasing the unemployment rate to two-digit numbers in most countries and in others even more than 20 percent where this rate is not expected to decrease significantly any time soon (EC, 2012; Bermeo, 2014).

A detailed and comprehensive analysis of the European labour market, in pre- and during recession, is presented in Gallie (2013) by a compilation of papers on the effect of the economic crisis on the quality of job and social interaction. Similar to the present study, all authors participated in this edition are using the ESS rounds 2 and 5 as time reference points. Findings revealed that the change of the global and European economic climate, from an optimistic to one where uncertainty is a common place, can affect not only peoples' perceptions on the labour market, but also the actual labour market dynamics per se. This "contextual effect", meaning the effect of the institutional and economic context on the labour outcome of individuals, is not the same for people with different characteristics and changes between countries. Particularly, the papers presented in Gallie (2013) investigate changes between 2004 and 2010, focusing on five key themes:

- Opportunities for training;
- Job control;
- Work intensity;
- Job security; and
- Work-family conflict.

Researchers from a broader range of social science have been involved in this project. They concluded that the ongoing economic recession had a significant effect on peoples' working lives across the EU. For example, on-the-job training provided by employers has been decreased almost everywhere and work patterns has been shifted to a more intense and insecure status, especially in the Eastern European countries. The

report also investigates the social implications of these changes, revealing that this economic predicament affected young adults' perceptions on employment commitment, the trust they previously had on politics and the general status of democracy. Comparing different welfare state regimes in a single European political framework, the report found some patterns of stability, before and during recession periods, in the Nordic countries.

This thesis exploits the same data sets as in Gallie (2013). However, they are analysed in a different perspective by examining quantitative issues, such as employability and wage gaps; and also by incorporating the qualitative characteristics of work into a single measure, which can arguably capture the quality of job, instead of dealing with each one separately. Such perspective is not present in Gallie. Concluding, a synthesis of all labour market outcomes' findings is presented in Chapter 7, in an attempt to offer a broader view of the relevant interrelations that exist within countries and across Europe.

Kwiatkowski and Wlodarzcyk (2014) observe a diverse level of EPL index, which is extracted by measuring the level of regular and temporary contracts as well as collective dismissals in an area or country, between the European countries during the most recent recession. This index, in terms of welfare state regimes, is high in the Mediterranean (Southern) countries and relatively low in liberal countries. In countries with high EPL index, the unemployment went up and business' profits went down. This does not seem to be the case in countries with low index and therefore, policies that increase flexibility in wages and working time has been seen as way to drag economies out of recession. Still, literature is pretty ambiguous on whether an economic policy towards flexibility could provide long term solutions in recessionary periods, driving an economy in the direction of a smooth recovery and, in turn growth. Nevertheless, the majority of scholars agree that the level of uncertainty on the implementation of such policies is very high and hence, the predictions regarding policy interventions will rather fall short.

Clasen *et al.* (2012) challenge Vis *et al.* (2010) early claims of common policies in confronting economic crisis. However, according to Clasen *et al.*, some countries focused more on removing the barriers to entry in the labour market, whereas others

insisted in austerity and fiscal adjustment agenda. Even if, most scholars seem reluctant to give a definitive answer on whether welfare traditions can explain policy responses to an economic turmoil, they seem to agree for the need of a more cautious policy-making and a shift towards a stable job-creation model, rather than an uncertain and aggressive one, currently followed by most of the European countries (Chung and Thewissen, 2011; Clasen *et al.*, 2012).

Russell and McGinnity (2014), using a national representative survey for 2004 and 2009, investigated the impact of economic crisis on the working-life of people, focusing on the case of Ireland, which has been severely affected by the crisis. Although, Ireland did not choose the labour "shielding" option of reducing wages instead of mass lay-offs, there is evidence of an increasing work intensity characterised by tight deadlines and accelerating working pace (Bergin *et al.*, 2011; Russell and McGinnity, 2014). However, when the general socio-economic environment is unclear and uncertain, different surveys, based on peoples' perceptions, can lead to contrasting results regarding the same issues. Gallie (2013) agrees with Russell and McGinnity (2014), both presenting evidence of a rise in work intensification. On the other hand, the European Working Conditions Survey (EWCS) reports the opposite (Burchell *et al.*, 2014). This discrepancy can be possibly explained by the different format of the questions asked, regarding the working conditions and work intensity (Russell and McGinnity, 2014).

Economic crisis is characterised by liquidity constraints, where production and profit margins fall, accelerating the decline on the demand of goods and services, caused by the decrease of real household income. Thus, this affects labour market, where unemployment tends to rise and earnings stagnate or even fall (Lallement, 2011). Rose and Spiegel (2011) confirm this, arguing that it also depends on the economic situation of each country and the way its labour market is structured. Hence, the wealthier a country is, the smoother the negative effect of an economic crisis on the labour market. Even if, it is generally accepted that the low-skilled have suffered more by this crisis, it is still unclear whether the general economic and labour market institutional context of

each country intensifies this situation or not. The empirical analysis performed in Chapters 3, 4, 5 and 6 aims to offer a more nuanced understanding on this issue.

The effect of an economic crisis on the labour market of a country is somehow related to the academic debates regarding Okun's Law, where unemployment falls by a consistent increase on the GDP. The evidence of its validity though is quite controversial and in the case of Europe during crisis, Okun's Law cannot actually capture what really happened (Moosa, 1997; Moazzami and Dadgostar, 2009; Gallie, 2013). The apparent dissimilarity between countries has been researched extensively, where the institutional context surrounding the local labour market, its way of adjustment to the external economic climate as well as the business cycle phases each country or region is in, provided some explanation on how and to what degree an external economic shock, can affect local labour markets (Petrongolo and Pissarides, 2001; Perugini and Signorelli, 2007). Barrell *et al.* (2010) conducted a research on OECD countries for a period of time that spans from 1960 to 2007, concluding that developing countries suffer more than the developed and sometimes recovery is even impossible.

Lindquist (2004) argues that the wage premium attributed to differences in skills, represented by formal educational attainment, is marginally pro-cyclical, given that the capital-skill complementarity is present, as it rises when business cycle expands, or decreases otherwise. The main driver of this trend, at least after 1970s, is the technological innovation, which tends to be skill-biased (Murphy and Welch, 1992; Castro and Coen-Pirani, 2008). Castex and Dechter (2013) complement the wage premium attributed to the educational level, by adding the wage premium associated with working experience. They identify some weak evidence of pro-cyclicality for the one associated with education and counter-cyclicality for working experience. Their empirical results, which are based on a variant of the extended neoclassical capital-skill complementarity model (Krusell *et al.*, 2000), show that the more experienced workers are less likely to be affected by the unemployment rise. During a recessionary period, these workers and especially the high-skilled, are the last to be affected by wage-cuts, lay-offs and a general deterioration of their working conditions, compared with the low-

skilled, experienced or not. Furthermore, even though very little research has been conducted so far on the wage premium attributed to working experience in different business-cycle periods, the results confirm a stream of literature that supports the view that skills price of the more experienced workers is pro-cyclical. In general, empirical results regarding the cyclicality of skills wage-premia are rather controversial, as there are other researchers, who present results of an acyclical or strong counter-cyclical behaviour (Hart *el al.*, 2009; Mendez and Sepulveda, 2012). It seems that cyclicality depends on data, method and general theoretical and measurement context used. This thesis attempts to analyse the effect of an additional year of education not only on pay, but also on employment and quality of job in nineteen European countries, in both good and bad economic times. The analysis goes even further by investigating the effect of each country's' labour market institutional and economic context and whether the welfare state regimes classification can explain some of this effect.

Kalleberg (2011) challenges Okun's Law, as there is evidence showing that after mid-70s, unemployment is rising along with productivity and thus, GDP. In the pre-2007 recession period, organisational structural changes as well as the shift towards schemes of non-standard employment, have increased output and corporate profits, especially in the service industry. In this context, recession caused a huge increase of unemployment and a significant drop in GDP. But, even if GDP, in some cases, was starting to rise again, unemployment did not follow the opposite direction, as it increased or remained stable. During recession, non-standard employment expanded even to the public sector and work has been intensified, reflecting a sign of recovery, while the quality of available jobs has been dropping. Furthermore, Kalleberg argues that during a global recession, a country- or industry-specific rise in productivity does not necessarily mean more and better jobs. Osterman and Chimienti (2012) also add that the deterioration of working conditions, job quality and the rate of wage growth, is not something that should be solely attributed to recession, but it is a trend that started in mid-70s. The most recent recession has only accelerated this process.

Moreover, there are also studies that investigate the impact of an economic crisis between occupational categories. Results from a recent study, conducted in the US,

reveal that middle-skilled jobs show some signs of polarisation, due to technological advancements (Autor and Dorn, 2013).

Hurley *et al.* (2013), examining pay patterns in five different sectors- manufacturing, construction, accommodation and food services, financial services and public administration- concludes that the general pattern is that real wages have stagnated for most of the EU-27 countries. However, in some countries, such as the Anglo-Saxon (Liberal) and Southern countries, both employment and wage-cuts have been observed. Vulnerable groups- young people, women and low-skilled, especially migrant workers- have been affected most (Bell and Blanchflower, 2011a; 2011b; Dietrich, 2013). Likewise, Lindner (2013) found that the less-educated workers, especially the younger ones, experienced the highest percentages of unemployment and the situation was worse for women.

The impact of the current recession on the European countries depends on the nature of the institutional framework that governs a particular labour market. Likewise, within countries some workers have been affected more than others. Since, not all sectors and occupational categories are equally represented, in terms of gender, ethnic orientation, educational attainment and level of skills, this recession has a stronger negative impact on occupations dominated by low-skilled workers where both unemployment and wages dropped significantly more than in other occupations, increasing social and wage inequalities between occupational groups (Gallie, 2013).

Hurley *et al.* (2011), using data from 2008 to 2010, focus on the differences between occupational and sectoral characteristics of workers across Europe. Manufacturing and construction industries have been affected more and those who lost their jobs, where mainly workers who belonged to the middle income quartiles, second and third (Hurley *et al.*, 2011; Smeeding *et al.*, 2011). The first and fourth quartiles have been affected less, in most of the countries examined. Some countries seem to have used recession as an opportunity to upgrade jobs in terms of skills (Germany, Luxembourg, Sweden and Slovakia), while in other countries job polarisation (Bulgaria, Cyprus, Spain, France, Greece, Ireland, Latvia, Portugal, Slovenia and the UK) and de-

skilling (Denmark, the Czech Republic, Hungary, Italy and Lithuania) have been observed (Hurley *et al.*, 2011; Vandekerckhove *et al.*, 2012).

Regarding the service sector, Hurley *et al.* (2011) and Vandekerckhove *et al.* (2012) present some evidence of a relatively smooth impact of the current recession on job loss and wages. However, within industries there are some differences in terms of job cuts, as the food and accommodation industry has been affected the most by this crisis and wages have been decreased significantly in the financial sector. Food and accommodation is the worst-paid sector, where workers are relatively less-skilled and in non-standard employment in all countries examined, whereas the financial sector is ranked as the best paid in most counties, even after the wage-cuts, due to recession. Evidently, low-paid, less-skilled and temporary jobs are less secure in recession times and when the recession is a prolonged one, workers are very likely to suffer from long-term unemployment. The negative impact of the recession on the public sector wages has not been revealed before 2010. This lag can be mainly attributed to the collective wage bargaining process, which tends to be stronger in the public compared to the private sector and the fact that, after 2009, the recession, originally caused by the housing and financial sector, has been shifted to the public, where unsustainable public debts have been accumulated in most European countries, transforming the housing market crisis into a public debt crisis (Varoufakis, 2011). In this context, austerity measures have been announced and this had a significant negative effect to the public sector employees, as they saw their nominal and real wages to stagnate and even fall, especially in the Southern countries. Future research is anticipated to utilise post-2010 data, investigating labour market outcomes in that context.

In terms of industries, sectors, where the use of technology is crucial and are characterised by Knowledge Intensive Services (KIS), have not been affected from recession, as they experience some marginal wage growth and employment rates. On the other hand, service jobs that do not have these characteristics, suffered much more (Clayton, 2011).

According to Babecky *et al.* (2010) and Fabiani *et al.* (2010), at the earlier stages of recession, wages were more downward rigid for the high-skilled workers, than for the low-skilled. However, companies seemed to prefer to cut wages, than decrease their personnel. Therefore, as the crisis developed, wage-cuts were more usual among the low-skilled workers, increasing wage inequality between them and the high-skilled. Hurley *et al.* (2011), distinguishing between blue- and white-collar workers, conclude that the former suffered more by this crisis. When skills are taken into account, then high-skilled white-collar workers have experienced an increase in their employment rates. On the other hand, high-skilled blue-collar workers experience the biggest drop in employment rates, as they traditionally dominate the construction and engineering sectors, which were the sectors that have been affected most by this crisis. For low-skilled white- and blue-collar workers, the impact was rather small. Yet, this thesis does not focus on the difference between or within sectors, but aims to examine the effect of educational attainment on the labour market outcomes of individuals taking into account the economic and institutional context they live in. Even if, indeed there are evidence that not all occupations and industries have been affected the same during the recent economic crisis, the ESS data does not allow for a reliable occupational breakdown and industrial classification of workers, across the countries examined in the empirical part of this thesis. Future research will try to incorporate variables for occupation and industries in its analysis, employing more representative data sets that would allow for such investigation to be conducted.

With regards to educational attainment, there is considerable evidence showing that high-educated people suffered less than their low-educated counterparts (Anderson *et al,* 2012; Hurley *et al.*, 2013; Gallie 2013). When it comes to youth unemployment, higher educational attainment seems to make a big difference, when labour market is stagnating (Arpaia and Curci 2010; Bell and Blanchflower, 2011a; 2011b; Smeeding *et al.*, 2011; Hurley *et al.*, 2013; Gallie 2013). On the other hand, older workers seem to be affected in terms of wage-cuts and not employment losses (Vandekerckhove *et al.*, 2012).

Scarpetta *et al.* (2012) found that, during recession, non-graduates, aged between 15 to 24 years old, were more likely to be unemployed than graduates, as their employment rates fell by 11 percent, while graduates' employment rates increased by 2 percent. Considering that working experience can alleviate, but not substitute, the credential effect as well as the rise of low-skilled immigration flows, low-skilled individuals become hopeless and discouraged, remain temporary inactive and on the verge of formatting a sub-culture community, totally depended on unemployment benefit schemes. This, in turn, is likely to cause a simultaneous increase in government spending, followed by a decrease in contribution to public insurance funds.

Anderson *et al* (2012) and Hurley *et al.* (2013) investigate the impact of the current economic crisis on employability, working conditions, job quality and the wages of the European citizens. Twenty-seven EU counties plus Norway are examined, before and during the current economic crisis, using various data resources. According to these reports, not all the EU member-states have been affected the same, as national labour markets responded differently to the constraints imposed by this financial shock. Their main findings showed that job security decreased, while work has been more intense and stressful. However, in most of the countries where the job insecurity increased, a parallel increase in job autonomy and control has been observed. Finally, the rate of job mobility has fallen, as job vacancies froze and the possibilities for finding a better job dropped significantly. Work-life balance index went down as well.

Underemployment is rising, as part-time or other forms of atypical employment are not chosen voluntary, since the supply of full-time jobs decreased and therefore, those who had been searching for full-time jobs, turned towards other forms of non-standard employment. On the other hand, during this recession some positive side effects were observed, as statistics revealed that health and job well-being indicators, in terms of absenteeism and accidents at work, have improved (Hurley *et al,* 2013). Job satisfaction, as reported by employees, has also increased in most of the countries (EC, 2012).

The impact of recession on the employment status has been rather controversial. Evidence show that, even if, part-time and temporary workers were the first who lost their jobs when the crisis started, the labour market was, and still is, unable to generate full-time jobs and therefore, the biggest proportion of employment growth, where any, has been due to the creation of part-time, temporary and non-standard jobs (Hurley *et al.*, 2011; Vaughan-Whitehead, 2012).

Finally, survey-participants take different roles in an economy and their responses are also affected by this. Recession makes things even more complicated, as the level of uncertainty is much higher and therefore, the reliability of responses given should be taken with greater caution. This study is trying to identify whether or not, the effect of higher educational attainment on the labour market outcomes of individuals is uniform between different countries and economic times, controlling for various country-level macro variables, which can arguably capture the economic and institutional context of each country's labour market.

2.4 Summary and Conclusions

Labour demand and supply is seen differently by scholars of mainstream economics and those from a broader institutional background. Mainstream economists argue that labour market is governed, more or less, by the same economic laws found in product-markets, where discrepancies between supply and demand of labour are only temporary. Some scholars divert slightly from this, arguing that not all labour markets can be cleared automatically because of various frictions that do not exist in ordinary markets. On the other hand, institutionalists highlight that the role of various social, cultural and policy institutions is much more important than the market. In such debate, the effect of higher education participation has a prominent role.

Higher education provision has been expanded rapidly after WWII. The advent of new technologies dictates the enhancement of people skills and the creation of a knowledge-based economy, which in turn demands for more high-skilled workers. Inevitably,

policy aims regarding higher education are focusing towards diffusing its provision to a much broader population. This expansion was seen as a policy instrument to alleviate social and wage inequalities. However, the implementation of such policies has been proved extremely difficult in practise, mainly because of existent conflicted interests between groups of people, but also because of its incapacity to target the more vulnerable.

On the other hand, there are studies arguing that this process can make the transition of graduates into the labour market smoother. Such studies are placed under the mainstream economics framework and are mainly informed by policy decisions implemented by the Bologna Process, where competitiveness, harmonisation and employability are the main policy axes. The Bologna Process and various other institutions (e.g., the EU, OECD, ILO) have provided a framework under which higher educational attainment can be seen as inextricably linked with labour market outcomes. Finally, an alternative view, where institutional settings can circumstantially change labour market outcomes of individuals, has been presented. These factors rely heavily on policy preferences, which can change for various reasons. In particular, minimum wage, flexicurity and the implications of the changing patterns of labour market towards flexibility have been briefly discussed. However, the level of qualifications and the general economic climate are seen as crucial in determining individuals' labour market outcomes.

In terms of the effect of a bad economic climate on the unemployment rates, literature suggests that it has affected the low educated more. Findings in the existing literature related to wage- cuts have been rather controversial. However, even if there is some indication that wage-cutts for the lower educated were not proportionally higher, the effect is more severe, as they were already in the lower payment scale and therefore, their purchasing power became extremely limited. Additionally, certain industries and occupational categories have been affected more than others. In fact, some experience even a growth. On the other hand, more jobs does not necessarily translates to better jobs, especially during the recession.

The findings in the literature pertaining to the current economic crisis, inform that between the European countries the effect was different. Some, especially the Southern countries and Ireland, experienced a very deep recession. Unemployment increased, wage levels stagnated and job polarisation became bigger. In others, like Germany and the majority of the Eastern countries, it seemd that the recent recession, had no effect at all. On the contrary, job growth and up-skilling have been observed and some Eastern countries, wages went considerabley up. There are also countries where the effect was mild.

3 CHAPTER 3: EMPLOYABILITY AND EDUCATIONAL ATTAINMENT

3.1 Introduction

The empirical research that is conducted, using a comparative European perspective, on the relationship between higher educational attainment and labour market outcomes of individuals is not vast; however, some researchers attempted to study this topic under this context (Smyth *et al.*, 2001; Muller and Cangl, 2003; Teichler, 2007; Anderson, 2012; Gallie, 2013; Hurley, 2013). Issues like the graduates' transition to employment, job assignments, employment assessments, quality of work, the impact of the economic climate as well as the impact of a country's socio-economic background on wages and work satisfaction, have been examined. The structural institutional heterogeneity has been broadly acknowledged by the exposure of considerable differences between the European countries regarding their higher education and labour market policies as well as their various cultural and social differences (Gallie, 2013). But, apart from these differences, empirical findings revealed some common trends and characteristics, which are worth mentioning.

This Chapter examines the employment probability of individuals with different educational characteristics in a European institutional context, before and during the most recent recession. In more practical terms, this probability can be captured by the concept of *employability*. McQuaid and Lindsay (2005) reviewed various definitions of this concept. All definitions seem to agree that employability is inextricably interwoven with the development of skills. For example, the Northern Ireland Executive

(Department of Higher and Further Education, Training and Employment, 2002: 7) defines employability as follows:

> "...Employability is the capability to move into and within labour markets and to realise potential through sustainable and accessible employment.
> For the individual, employability depends on:
> - the knowledge and skills they possess, and their attitudes;
> - the way personal attributes are presented in the labour market;
> - the environmental and social context within which work is sought; and
> - the economic context within which work is sought."

The concept of employability, specifically for graduates, as conceived by the advantages they get from their higher educational attainment, in terms of their labour market entrance, has been one of the most important factors under consideration, in the implementation process of the higher education policies and reforms (Thomas and Jones, 2007).

The Leuven and Louvain-la-Neuve Communiqué, sets employability as the highest priority of all graduates, who participated in a higher education course, consonant to the Bologna Process (Rauhvargers *et al.*, 2009). The EC (2011b) accepts this agenda, also stressing that employability is a concept that can be used to inform and modernise higher education practices and content.

Bologna's Process working group on employability, in a report directed to ministers (Rauhvargers *et al.*, 2009), suggests the following general points, to reconcile national and European policy-making with the policy targets set by Bologna Declaration:

- Increase employers' awareness and involvement on the market value and curriculum of a Bachelor Degree;
- Chase up effective procedures for the provision of careers and guidance services;
- Inform compatibility of graduates' skills, currently working in public sector; and
- Induce self-employability among the EU countries.

The group has also conducted mini-surveys, at the end of 2007 until the beginning of 2008, in the countries that participate in the Bologna Process, in order to inform this report. The main findings revealed that the wider participation of graduates in the labour market causes problems of over-supply, as labour markets fail to respond adequately, especially in countries with low or negative GDP growth rates. Moreover, employers feel that universities are not concerned enough about their graduates' employability, since universities are reluctant to place employability as their first priority. The indication of some kind of work experience, even unpaid, part-time or in the third sector, can be perceived as an advantage for graduates when they first enter into the labour market. In fact, there are evidence showing that those who worked during their studies are more desirable than the ones who did not (Greenbank *et al.*, 2009; Blake and Worsdale, 2009). On the other hand, there are studies suggesting that this can be detrimental to graduates' career prospects (Shaw and Oglivie, 2010).

However, the successful implementation of the Bologna Declaration has been seriously questioned (Heinze and Knill, 2008; Job and Sriraman, 2013) while the growing divergence in economic indicators between the European countries has also become noticeable (Zarotiadis and Gkagka, 2013). Additionally, the encouragement and imposition of alternative educational and labour market practices consist of an imperative need, especially during recession periods (Aaberge *et al.*, 2000; ILO, 2011; Varoufakis, 2011; O'Higgins, 2012; Blyth, 2013).

Democratic societies were always closely linked to the well-being of their citizens. It is argued that the knowledge-based economy and the rise of technology seem to provide opportunities for a more efficient utilisation of people's talent. Brown (2003) challenges such claims, focusing on the increasing social inequalities through the intensification of competition in the labour market. Based on Hirsch (1977) and the conceptual framework of positional conflict theories, where power relations are crucial in the labour market, Brown investigates the link between occupational and educational inequalities. The supply of graduates is increasing steadily at a higher rate compared to the number of jobs generated for them. In such a highly competitive environment, graduates are desperately trying to win a positional advantage over others. However,

working class graduates, compared to graduates from higher social classes, are more likely to fall in an *opportunity trap*, meaning the situation where career and salary progression is negatively influenced by unfortunate early choices when entering the labour market.

Nonetheless, this thesis is not equipped with adequate data to investigate whether or not there are any differences on the labour market outcomes of individuals of different age-groups, also testing the entrapment hypothesis. Thus, it is a research question that is anticipated to inform future research, when large-scale comparative data will be available for subsequent to the economic crisis years. Finally, the main aim of this Chapter is to empirically analyse the relationship between years of educational attainment and employment across nineteen countries, taking into account the economic climate as well as the institutional and economic context of their labour markets.

The remaining part of this Chapter has been constructed as follows: Section 3.2 presents literature on the employability of individuals with different educational attainment. Since the concept of employability is designed in such a way that is more tailored to graduates, particular attention has been paid accordingly. Then, the data specification along with a description of the methodology employed is discussed in Section 3.3. The next Section (3.4) performs an empirical investigation of the relationship between educational attainment and employability using the modelling technique of the two-step approach as an attempt to incorporate the effect of the economic climate as well as the institutional and economic context of each country's labour market to its analysis. Finally Section 3.5 summarises the findings discussing them in relation to the existent literature.

3.2 Literature Review

Modern views of higher education place its functioning under a digital knowledge-based society, where economy dominates. The markets demand for skills, such as, technological competence and complex problem-solving by critical thinking and multi-

tasking, which increases competition and in turn, accelerates the pace of the working day (Westerheijden *et al.*, 2007). Haigh and Clifford (2011) argue that high competency, in both hard and soft skills, is not enough, since higher education needs to go deeper into changing attitudes and behaviours towards a successful entry into a globalised knowledge-based-economy.

Black and Lynch (2003) observed that there is a continuous rise in demand for skilled labour, which drives innovation in various workplaces and laid the foundations for a new, knowledge-based-economy. Moreover, they suggested a more effective public policy for the diffusion of this knowledge to the broader society, in order to prevent the widening of the knowledge gap against low-skilled individuals.

Spitz-Oener (2006), using a unique data set from the former West German, which includes almost 30,000 individuals and provides data on the skills requirements' modifications through time, suggests that the jobs skills in 1999 were more complex than in 1979. Job requirements in computerising occupations seem to be more complex than in other jobs. Furthermore, findings revealed that individuals with lower educational attainment have experienced the least favourable labour market outcomes developments during the last few decades, drawing a gloomy picture of their future prospects. He concludes that there is still limited empirical analysis on whether or not the skills requirements have increased because of technology-biased changes, but he also admits the importance of these changes.

A study called Careers after Higher Education: A European Research Study (CHEERS), carried out from 1997 to 2006, aimed to provide some insights in the factors that influence graduates' employment destination decisions. Specifically, it consisted of a major cross-national comparative study, conducted by the collaboration of various universities and research institutes, which main aim was to investigate the graduates' transition from higher education to employment. The countries participated in this study were: Austria, the Czech Republic, Finland, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden, the UK and Japan. Approximately 40,000 graduates from the above countries took part, offering their subjective judgements

regarding their schooling experiences and their early career, up to four years after graduation.

Schomburg and Teichler (2006), in their book consisting of reports and conference papers that used data from CHEERS, examined the relationship between higher educational attainment and labour market, situated in relatively high-developed countries. Issues such as the debate between generic and specialised education, credential inflation, overeducation and job mismatch, higher educational attainment, job satisfaction and remuneration, have been scrutinised based on the responses given by the participants. The findings revealed large heterogeneity between countries in terms of higher education systems and individual labour market outcomes. The transition of graduates from higher education to the labour market can be smoother, harder, shorter or longer, depending on the country examined. However, results indicated some marginal comparative advantage for the graduates of continental Europe, but evidence is not clear. This is because these advantages can be off-weighted by other social and cultural factors, which play a more significant role in some countries than others. The importance of these factors is great, where a high rate of incompatibility between higher educational attainment and labour market outcomes, in terms of job mismatch, is apparent. Furthermore, regarding the field of study chosen, graduates' with a more Liberal Arts background, report greater dissatisfaction with their job tasks as well as with their remuneration.

Past literature informs that the more educated someone is, the less likely he/she is to be unemployed in the future (OECD, 2000; Nunez and Livanos, 2010). In the majority of the literature, countries are examined separately mainly due to the difficulties associated with the validity of comparisons and lack of relevant data (Paul and Murdoch, 2000; Livanos, 2010), and only just a few scholars followed a cross-country approach (Schomburg and Teichler, 2006; Nunez and Livanos, 2010).

However, even if the higher-educated are considered more employable than the lower-educated, the reasons behind an employer's decision on who is the best candidate to fulfil a post, are very difficult to be identified. Labour markets are much more complex

and it appears that employers are looking for candidates who fit best with the requirements of a job, educational attainment included. On the other hand, if firms were to employ candidates based only on their higher education attainment, then all graduates would be equally employable and always in a better situation compared to non-graduates. Certainly, this is not always true, even if graduates seem to enjoy lower unemployment rates on-average.

The development of graduates' skills that labour markets needs and, in a way, the development of their future capacity to increase labour market's productivity, has been the main concern of employers, regarding the usefulness of higher education learning in terms of increasing productivity and thus, higher profits (Lowden *et al.*, 2011). Nevertheless, such skills should not be specific only to graduates, but to non-graduates as well, otherwise they will be excluded gradually from the labour market or displaced by the higher educated, intensifying the problem of overeducation and mismatches.

In the UK, the Chartered Institute of Personnel and Development (Rudiger, 2013), published a report showing that employers and potential employees, mainly the younger ones, view labour market differently. Methodologically, the report has been conducted using focus groups, consisting of individuals with different roles in the labour market: two distinct groups of employers, one of human resource professionals and one of students. The analysis was complemented by a mini-survey completed by Jobcentre Plus career advisers. The report shows that employers ask for some proof of working experience, even for junior roles and as a result, the bulk of new labour market entrants remain unemployed or stay in jobs that require education and skills, lower to their educational level. This, in turn, increases youth unemployment rates, as new batches of graduates compete for the same jobs, falling once again into the same unemployment trap. Therefore, the number of applications for young people is skyrocketing, rendering employers incapable to issue feedback to those who have not been shortlisted for an interview. Because of this, young people's confidence deteriorates along with their motivation to apply for new jobs commensurable to their skills. Moreover, poor career advice, during schooling and after graduation, intensifies the already limited understanding graduates have on how labour markets work. This causes significant

delays to their transition period from education to work, decreasing their chances of finding a good job, at least shortly after their graduation.

However, there is some evidence suggesting the opposite. Shury *et al.* (2010) argue that, in most cases, employers are satisfied with the level of skills of their new entrants, since they do not regard skills as solely acquired in formal education. Employers are more concerned in identifying the candidate that can show capacity to perform a certain job task best.

Particularly, in the UK, from 2010 onwards, all higher education providers are required to publish data, derived from the Destinations of Leavers of Higher Education (DLHE) survey, on their graduates' employability. But, there is still some growing concern over the rate of equality on internship opportunities as well as whether the expansion of higher education, especially in a period of economic crisis, favours social mobility or not (Oakleigh Consulting Ltd/CRAC, 2011; Pennington *et al.*, 2013).

Machin *et al.* (2009) and Green *et al.* (2012) found evidence of divergence in the income distribution, between different groups of higher educated individuals. Those graduated from private schools seem to earn more compared to those from public institutions. Moreover, in terms of race, white graduates are better paid than their Afro-American counterparts, even from the first months after graduation (Machin *et al.*, 2009).

Purcell *et al.* (2013) found no significant evidence of disadvantages between socio-economic groups, in terms of their labour market outcomes. However, looking at extra-curricular activities, such as volunteering and social networking, big differences between the groups are revealed, as people with a higher socio-economic status tend to participate in such activities much more often, than the lower status groups. Other research showed that mature students have relative poor attendance to such activities because of time constraints, as it is very likely that they are part-timers and/or have family commitments (Redmond, 2006). Regarding class, students with working class

origins are less likely to participate in these activities (Stuart *et al.*, 2009)[12]. Finally, the participation in such activities can indicate to the potential employer that a candidate is more likely to hold skills related to leadership, civic engagement and team-working and thus, increase his/her employability (Tchibozo, 2007).

Other researchers focused on specific categories of the work force. Aaronson *et al.* (2006) attempted to explain the significant decline on teenagers' work from the 1970 until 2000. They suggested that one of the main reasons was the increase of formal educational attainment, which can offer higher wages. New trends of working relations and labour market participation were also examined. The concepts of "disposable" and "substitutable" worker as well as the increased participation of mothers in the labour force played a significant role in the decline on teenagers' labour market involvement.

Bougheas and Georgellis (2004), using a simple statistical model based on data from the German Socioeconomic Panel (GSOEP), investigate the impact of general and firm-specific on-the-job training, as part of the German apprenticeship system. They observe a growing heterogeneity on whether firms are keen on applying firm-specific or general training to their apprentices, but also a greater inclination of large firms towards a more generic training.

Dieckhoff (2013), using exactly the same data with this thesis (ESS Rounds 2 and 5) and applying analysis for the same nineteen countries, examined the impact of economic crisis on the continuing training practices followed by individuals. Using a two-step approach, she found that individuals, who work in countries where the economic climate is bad, are less likely to participate in continuing training activities. Moreover, on average, low-skilled people participate less in such activities. Nonetheless, she concluded that the crisis led to a less polarised workforce, as the distribution of training opportunities, between the high- and low–skilled, was more equal in 2010 compared to 2004.

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[12] Yet, it is possible that individuals with a more sociable and extrovert character, are more likely to participate in extra-curricular activities and thus, it could be this personal trait that differentiates them from others and not the participation in the activities per se.

Further insights on graduates' occupational destination are presented by Canny (2004). She included demand-side and geographical factors to her analysis, arguing that the employers' attitude and region of residence have a significant effect towards the employees' occupational decisions. Extracting data from Cumbrian labour market, a rural area in the North-West of England, she argued that the occupational destinations of employees might also be influenced by the ability their potential employers have to address skill and performance gaps for their business. Residents in rural areas, especially those who do not belong in a strong, social, formal or informal network, experience greater difficulty in finding a job. The size and the profile of employers are strongly related to their employees' career development, even to those with low skills. Finally, the findings revealed a significant reluctance of employers operating in the service sector to recruit workers from rural manufacturing sectors, because of their perception that skills are not transferable between these two sectors.

According to Morley and Aynsley (2007), employers are under the impression that not all universities deliver the same quality of knowledge, implying that not all degrees of the same level have the same value in the labour market. Pennington *et al.* (2013), on the other hand, showed that the majority of employers do not take into account candidates' university reputation, but this view changes for the Small and Medium Enterprises (SME). Employers seem to focus more on identifying motivation and interest, organisational fit, soft skills and relevant working experience to their potential candidates, rather than their formal education per se. The authors found that almost half of the employers would not hesitate to choose an applicant, who has unpaid but pertinent to the job working experience, from one with more but irrelevant to the job working experience. However, Millican and Bourner (2011), investigating the same issue within graduates, concluded that part-time and casual work can be detrimental to their subsequent careers when this is explicitly written on their resumes, but this is not the case for voluntary work.

Greenbank *et al.* (2009) found that students, who are working, while studying, in part-time jobs or in jobs with temporary contracts, are less likely to quit their job after graduation and search for a full-time employment that requires graduate level

qualifications. This is likely to make the employability gap, between high and low educated, even bigger, as the latter are gradually displaced from the labour market. However, there are different views regarding the consequences that a part-time job has on the future career prospects of graduates. According to Blake and Worsdale (2009), students, who were engaged with a part-time job during their studies, felt that they were able to develop soft skills and grow their self-confidence. Shaw and Ogilvie (2010) found that part-timers were satisfied with their jobs, reporting that they gained valuable working experience, which had a positive effect on their subsequent careers.

Additionally, Hinchliffe and Jolly (2011) noted that it is not only the qualifications and the type of work experience that matters, but also, and most importantly, it is the way that these are demonstrated in resumes and job interviews by the applicant. Finally, a part-time job can offer valuable experience on how this can be best demonstrated; and therefore, counts as an advantage when someone decides to apply for a full-time job.

Juxtaposing Greenbank's *et al.* (2009) with Shaw and Ogilvie's (2010) findings, it is possible that even if most of the tasks in a part-time job are best tailored to those who need, urgently or not, some limited income along with some flexibility, many can transform them into tasks of skill development, creating a stepping stone for their subsequent career. In that sense, formal educational attainment seems less important than on-the-job learning and career planning practices. In other words, individuals' positive perception of a relative sub-optimal situation can provide them with more advantages than career barriers in the future. However, the negative impact that an insecure or limited-income job can bring to an individual or household, especially in prolonged periods of economic recession, where full-time jobs are scarce and part-time job are being created instead, should not be neglected. During such harsh economic times, there is also evidence of intensification and increased workload, not only in full-time jobs, but also in temporary and part-time jobs, irrespective of whether the job holder is a graduate or not (Hurley *et al.*, 2013).

Lately, there has been a continuous and rapidly developing debate among scholars with socio-economic research background, about the causes of the changing working patterns

and relations in economically-developed nations. Temporary and part-time employment as well as work flexibility and instability, consist some of the most profound changes and their causes can offer a more nuanced understanding on the labour market transformations (Dore, 2004; Kalleberg, 2011). Each country's labour market institutional settings as well as economic context and the way they change, due to a good or a bad economic climate, can affect the employability of individuals with different educational attainment. This Chapter attempts an analysis in order to shed more light to this issue, examining this relationship in nineteen European countries, which labour markets seem rather diverse and their economies responded differently to the most recent economic crisis.

Berg and Kalleberg (2001) presented an overview of the enduring changing labour market patterns in industrialised societies. Specifically, there has been a consistent rise on the number of workers, who have been affected by non-standard employment arrangements. Because of that, issues regarding the deterioration of job quality and well-being at work have been revealed and a justification of the rationale that favours the presence of non-standard employment relations becomes apparent. Moreover, the triangular employment relationship, meaning the relationship between recruitment agencies, their clients and the potential employee, in which legal (de jure) employment is distinguished from the actual (de facto), is also examined as an implication of the development of non-standard employment arrangements. This raises problems on the maintenance of collective wage bargaining and alienates workers from their job, since the control of the job tasks has become extremely complicated to be accurately defined (Kalleberg, 2001; 2011).

Glover *et al.* (2002) examined students' perceptions regarding their educational attainment. "Graduateness" and employability are examined, in terms of their effect on individuals' decisions and motivations for higher educational attainment. The findings from a two-cohort survey, which included 408 British students at the beginning of their university studies and 425 at the end, revealed that employability consists one of the graduates' highest priorities and the pursuit of knowledge per se, does not seem to motivate individuals' decisions for higher educational attainment any more.

Marks (2008) carried out a study in four software organisations in Scotland, conducting interviews with software developers, HR practitioners and managers. He suggested that there has been an increase on the skill requirements of a job in the IT sector, which affected the employability of IT graduates. A continuous upgrade of their technical skills and competencies consists of an imperative need, in order to keep their employment value on the same level in the contemporary labour market of a rapidly changing IT sector.

To summarise, most of the literature, focuses on comparing the employability between graduates' and non-graduates' as well as that of graduates with different personal and demographic characteristics. This thesis follows a different approach, estimating the effect of educational attainment on employability in terms of years of education, but not in terms of higher educational credentials. Thus, the effect of education on the employability of individuals reflects the marginal effect of additional years of education on the employment probability of individuals, accounting for the differences on the labour market settings of nineteen European countries as well as for the economic climate between 2004 and 2010, from where micro data is available.

3.3   Data and Methodology

The lower unemployment rates of graduates, compared to non-graduates, have been repeatedly verified empirically. For people aged between 25-64 years old, descriptive statistics from Eurostat show that from 2000, when data is available for most of the nineteen countries examined in this thesis, the unemployment rates for graduates are lower compared to people of all educational levels, irrespective of whether the economic climate is good or bad. Table 3.1 illustrates this data, which is presented as four-year averages for brevity. Even if, it is apparent that the situation for graduates is always better than non-graduates, research is still limited regarding the effect of the external economic climate and the institutional settings of each country on the employment probability of individuals with different educational attainment. Moreover,

descriptive statistics do not control for other variables that might affect the employability of individuals, such as the years of working experience, gender, incidents of previous unemployment or other demographic and socio-economic factors that can influence individuals' employment prospects.

Table 3.1: Differences between Unemployment Rates of all Educational Levels and Unemployment Rates of Graduates

GEO/TIME	Av 2003-2006	Av 2007-2010	Av 2011-2014
European Union (27 countries)	3.2	2.9	3.5
Belgium	3.2	2.9	2.9
Czech Republic	4.7	3.4	3.4
Denmark	0.43	0.9	1.5
Germany	5.05	4.0	2.8
Estonia	3.13	3.9	2.8
Ireland	1.48	3.2	5.3
Greece	1.5	1.7	5.1
Spain	2.13	5.2	8.5
France	2.15	2.3	3.0
Hungary	3.8	5.1	5.4
Netherlands	1.08	0.8	1.8
Poland	9.3	3.6	3.7
Portugal	1.6	2.6	4.0
Slovenia	2.3	1.6	2.9
Slovakia	10.5	6.7	6.2
Finland	2.8	2.1	2.2
Sweden	1.2	1.3	1.8
United Kingdom	1.4	2.1	2.1
Norway	0.5	0.6	0.8

Source: EUROSTAT (Author's calculations)

There is also empirical literature that uses more inferential analysis, implementing econometric techniques. The most commonly used is regression with a binary outcome variable in a probit or logit format (OECD, 2000; Paul and Murdoch, 2000; Schomburg and Teichler, 2006; Teichler, 2008; Livanos, 2010; Nunez and Livanos, 2010). In this thesis, the latter format has been used, where in the outcome variable the value of "1" represents the probability of being employed and "0" otherwise. The empirical analysis uses ESS which is a cross-country survey, and after acknowledging the methodological limitations involved, is anticipated to enhance the current literature by investigating the

employment probability of individuals between European countries, assessing whether or not this probability is affected by certain labour market characteristics and the general economic climate.

The analysis conducted in this section is an attempt to demonstrate the impact of educational attainment on the employability of individuals. The educational attainment is measured by years of education, centered to the compulsory level of each country. The data used is the ESS rounds 2 and 5, which refer to 2004 and 2010 respectively. These two time reference points represent the pre and during recession eras in order to assess whether the ongoing economic crisis affected the employability of individuals with different educational attainment. The analysis focuses on nineteen countries, eighteen belonging to the EU-27 area, plus Norway. The econometric technique used is binary logistic regression, where the employment status is the outcome variable, taking the value of "0" if the respondent is expected to be unemployed and "1" if employed. Additionally, in order to examine empirically whether or not the economic and institutional context of each country labour market has any effect on the probability of someone being employed, the estimations calculated by a logistic regression, in the format of odds ratios that correspond to the average of each of the nineteen countries, are regressed and plotted against nine macro level determinants, using the two-step approach. The welfare state regime classification is also taken into account in this context (Section 1.3).

This study uses odds ratio as a measure of effect size. This ratio is the odds of relative importance of the independent variables, in terms of effect on the dependent variable's odds. When logit coefficients are used instead of odds ratios, the interpretation lies on the relative importance of the independent variables, in terms of effect on the dependent variable's log odds, which under a comparison study analysis, cannot provide adequate information and are less explanatory and intuitive (Field, 2009). Therefore, it has been decided that logit coefficients will not be used. Furthermore, logistic regression, among other requirements such as the measurement of factors on the interval level and the creation of dummy variables, needs large samples to be accurate (Field, 2009). These

requirements are met when using the ESS, due to the large size of the sample. Then, this data are analysed using Stata in order to test the following research hypotheses:

$$\text{H}_0 : b_{ed} = 0 \rightarrow \text{ Years of education has no effect on someones employability}$$
$$\text{after adjusting for country and year}$$

$$\text{H}_1 : b_{ed} = 0 \rightarrow \text{ Years of education does affect someones employability}$$
$$\text{after adjusting for country and year}$$

The logistic regression has been conducted in the individual level, in a fixed-effects approach format. Then, the odds ratios corresponding to the years of education variable have been regressed and plotted against various institutional variables, as explained above. In the individual level, the binary logistic regression assumes that the dependent (outcome) variable is dichotomous and, like in most other statistics, the outcomes are independent and mutually exclusive, meaning that a single case can only be represented once and must be in one group or the other (Tabachnick and Fidell, 2007).

The approach chosen for analysing this hypothesis treats predicted probabilities as lying between 0 and 1. Thus, the model takes the following general form:

$$\pi_i = F(b_o + \sum_{j=1}^{n} b_j X) \qquad (3.1)$$

where:

F is the transforming function that maps a probability π, lying between 0 and 1.

The logistic transformation of equation 3.1 can be presented as follows:

$$\pi = \frac{\exp(b_o + \sum_{j=1}^{n} b_j X)}{1 + \exp(b_o + \sum_{j=1}^{n} b_j X)} = \frac{e^{\beta_o + \sum_{j=1}^{n} b_j X}}{1 + e^{\beta_o + \sum_{j=1}^{n} b_j X}} \qquad (3.2)$$

Now, let:

$$y = b_0 + \sum_{j=1}^{n} b_j X \qquad (3.3)$$

Because the numerator in equation 3.2 cannot be negative, irrespective of the *y* value, then π must always lie between 0 and 1. As *y* moves towards a negative direction, π approaches 0 and as it moves towards a positive direction, π approaches 1. Thus, rearranging the equation 3.3, the following expression is obtained:

$$log \frac{\pi}{1-\pi} = y = b_0 + \sum_{j=1}^{n} b_j X \qquad (3.4)$$

where:

$\pi/(1-\pi)$ denotes the odds that **y=1** and the **log[π/(1-π)]** shows the log-odds, also known as the logit. In sum, equation 3.4 expresses the logit or the logistic model.

Beta coefficients can be interpreted by taking the inverse log of both sides in equation 3.4, where $\sum_{j=1}^{n} b_j X$ is substituted by $\mathbf{b_1}(X)$ for brevity. This leads to the following:

$$\frac{\pi}{1-\pi} = \exp\left[b_0 + b_1(X)\right] = \exp(b_0) \times \exp[b_1(X)] \qquad (3.5)$$

So, if *X* increases by 1 unit, substituting *X* with *X+1*, equation 3.5 takes the following form:

$$\frac{\pi}{1-\pi} = \exp\left[b_0 + b_1(X+1)\right] = \exp(b_0) \times \exp\left(b_1 X\right) \times \exp\left(b_1\right) \qquad (3.6)$$

It can be seen from the above that a unit increase in X, increases the odds by a factor of $\exp(b_1)$. The odds ratio of the 3.5 and 3.6 equations, illustrate the estimated odds of π=1 for two individuals that differ by 1 unit on the X variable.

In this study the outcome variable has been transformed into a binary one. Respondents who are in paid work represent the prediction value 1, excluding those that are self-employed. The reference value 0 represents the unemployed, as defined by ILO; and those who responded that are not seeking work, while not belonging to any of the following groups: education, permanently sick or disabled, retired, in community or military service and doing housework or looking after their children. All other values that correspond to all kinds of inactive persons have been excluded from the analysis[13]. Additionally, respondents aged more than 70 and less than 25 years old have been filtered out. The latter sample restriction has been borrowed by Green and Zhu (2010)[14]. A descriptive overview of these variables between countries, separately for 2004 and 2010, is illustrated in Appendix C (Figures C1 and C2).

Regarding the predictor (independent) variables, some transformations of the original ones have been provided, in order all methodological requirements of a logistic regression analysis to be appropriately met, in an attempt to offer a comprehensive inferential analysis of the statistical effect they have over the outcome (dependent) variables.

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[13] Students, inactive individuals due to long term disability, those retired, those who responded that they are working in community or military service or doing housework looking after their children, those that did not classify themselves as belonging to any of the predetermined activity status category as well as those who have refused to answer, have been excluded from the analysis. To that extent, samples' cases have been significantly decreased compared with the initial number of valid cases. Thus, in terms of percentage, in order to achieve the best applicability for the dependent variable, missing cases have increased, from 3 to more than 50 percent of the total sample.

[14] This study assumes that by the age of 25 the majority of people would have completed full-time education and by the age of 70 would have decided to retire. A lower limit could have been chosen (65 years old), but since there were still a considerable number of cases belonging to the 66-70 age group that declared themselves as employed or unemployed, it has been decided not to be excluded from the analysis and therefore, the upper age limit has been set to 70. However, it is acknowledged that there is some heterogeneity between countries, due to the differences that exist in the pension systems and the relevant age limits. The total valid cases have been decreased further by 4 percent approximately. Although, the sample was truncated, it still remains reliably large (N= 15,597 to 32,285 depending on the model used).

In this study educational attainment is measured in years of education, transforming the relevant continuous variable into another variable, which denotes how many years of education, below or above the national compulsory level, respondents have attained (Section 1.3).

Employability also depends on the job requirements set by the labour market and on whether a candidate meets them or not. Educational level is one of these requirements and when it is already set high, employers are looking for candidates with other abilities and competences, such as soft skills or relevant working experience, as well as personal traits commensurable with the vacancy's requirements. In this level, a higher education degree is considered as a mandatory requirement and thus, all potential candidates must have at least one before applying. Therefore, assuming that employers consider all same level degrees as equal, irrespective of the institution awarded, an additional year of education in vacancies, where a degree is a prerequisite, might matter less than in vacancies where the educational requirements are set lower[15].

As explained in Section 1.3, data for the educational level is not adequate and therefore, the analysis has been confined into investigating the impact of years of education separately and no further claims can be made for the combined effect of an additional year of education, after the degree is awarded.

3.4 Hypothesis Testing and Analysis of Results

The model estimated includes, apart from educational attainment, other covariates that can be used as control variables[16]. These are:

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[15] It would be interesting to perform a decomposition of that effect, considering, for example, an additive comparison of three more years of education, plus a higher education qualification. In other words, how much more employable an individual who spent three years gaining a higher education qualification is, from an individual with no higher education qualification and three years less education. However, this cannot be performed by the current study due to data limitations.

[16] Other variables, such as respondents' occupational and industry classification as well as trade union membership, have been also constructed from the data and considered for inclusion in the model, however they have been found as statistically insignificant. Moreover, with the inclusion of these

1. Age, after dividing them into two categories: the younger, aged between 25 and 40 years old; and the older, aged between 41 and 70 (Binary variable/values: 0 for 25-40; 1 for 41-70).

2. Gender (Binary variable/values: 0 male; 1 female).

3. Area of domicile (Categorical variable/values: 1 a big city; 2 suburbs or outskirts of big city; 3 town or small city; 4 country village; 5 farm or home in countryside).

4. Years of working experience (Continuous variable).

5. A variable that shows whether someone has been unemployed for more than 12 months in the past (Binary variable/values: 0 No; 1 Yes).

6. A variable that shows whether someone has attended a course/conference that has improved his/her knowledge (Binary variable/values: 0 No; 1 Yes).

7. A variable that shows whether someone cohabits (Binary variable/values: 0 No; 1 Yes).

8. A variable that shows whether someone is hampered in his/her daily activities by any illness or disability (Categorical variable/values: 0 No; 1 Yes, to some extent; 2 Yes, a lot).

Thus, the estimated model consists of a dependent variable *(U)*, as a function of eleven independent variables, where: *A* refers to age; *F* to gender; *YEd* to years of education; *C* to the country of residence; *T* to the calendar year dummy; *Dom* to the domicile of residence; *YExp* to the years of working experience; *U12* to whether or not respondents have been unemployed for more than 12 months in the past; *Cou* to whether or not respondents attended any course/conference or anything that improved their knowledge; *Co* to cohabitation and *H* to the extent respondents are hampered by health issues in their everyday life. Interaction terms between country and calendar year, years of education and country or calendar year as well as their two-way interaction are also included.

variables, even if they were all applied to both employed and unemployed respondents, they excluded a very big proportion of those, especially young people, who have never worked before and therefore, could not classified themselves accordingly.

In total three statistical models have been estimated. Model 1 includes the variable regarding years of educational attainment, all the control variables that are significant as well as an interaction between country *(Ci)* and calendar year *(Ti)*. This model shows the average employability trend in 2004 and 2010, treating the variable regarding years of education as a control variable. Since this study is mainly interested in the differences in the employment odds ratios with respect to education, recognising also that there are other factors apart from the educational attainment that contribute to this, two additional Models have been estimated: Model 2 which refers to the 2004 data set, including all control variables that are statistically significant and an interaction between the variable regarding years of education and the country variable; and Model 3 where the same variables have been used, but this time using the data set that refers to 2010.

A Wald-test of significance has been performed for all independent variables, showing that the gender and domicile variables are statistically insignificant in Model 2 and thus, it has been decided not to be included in the final analysis of all models. The age variable has been also excluded, even if the statistical significance is very high in all three models. After controlling for other variables, in Model 1 the odds of being employed rather than unemployed for people aged between 41 and 70, decrease by 25% [100% × (1-0.75)], compared with the younger age-cohort [exp(b)=0.75]. Likewise, for Models 2 and 3 the effect is negative and of the same level [Model 2: exp(b)=0.77, Model 3: exp(b)=0.73]. This negative effect shows a peculiar trend in the data examined, informing that younger people are more likely to be employed than the older ones. Of course, this is an unexpected outcome as firms are more likely to employ more experienced people than younger ones. On the other hand, when the age variable is regressed over the employment status in a bivariate format, it has the opposite effect, which is also statistically significant [exp(b)=1.17, p<0.05]. When all other control variables are included, then the odds ratio is still quite high in favour of the older group, remaining statistically significant. However, when the variable regarding years of working experience is added, there is a big change and the log-odds coefficient for the older category becomes negative in all final three Models examined. This is because the years of experience and age, here treated as a continuous variables, are highly

correlated (r=0.78). Years of experience increase with age and after a certain point, both variables are highly confounding. The age effect, even if statistically significant, it is very difficult to be interpreted, since it is more likely for the employment probability to increase with ageing, as the years of experience also increase. Equally, it is more likely that working experience is a stronger determinant for someone's employment probability than age, as employers are mainly interested in the former. For these reasons, it has been decided to exclude age from this analysis, leaving only the years of working experience in the model. Before proceeding with the estimation of all regression models a descriptive analysis of all variables used, separately for 2004 and 2010, has been conducted. This can be found in Appendix C (Tables C1 and C2)

Thus, in Model 1, for individual i:

$$U_i = f(YEd_i, C_i, T_i, YExp_i, U12_i, Cou_i, Co_i, H_i, T_i \times C_i)$$

Statistically, where (a) is the constant, ($b_1...b_9$) the beta parameters and (ε_i) the error term, for individual i the model will estimate:

$$U_i = a + b_1(YEd_i) + b_2 C_i + b_3 T_i + b_4 YExp_i + b_5 U12_i + b_6 Cou + b_7 Co_i + b_8 H_i + b_9(T_i \times C_i) + \varepsilon_i$$
$$(3.7)$$

Models 2 and 3 take the following form:

$$U_i = a + b_1 YEd_i + b_2 C_i + b_3 YExp_i + b_4 U12_i + b_5 Cou + b_6 Co_i + b_7 H_i + b_8(YEd_i \times C_i) + \varepsilon_i$$
$$(3.8)$$

Particularly, the analysis of the research hypothesis can be distinguished into two separate fragments. If $\exp(b_1)>1$, there is a positive relationship between years of education and employment; and therefore, an additional year of education is associated with higher rates of employment. If, on the other hand, $\exp(b_1)<1$, the correlation is negative and thus, it is more likely for someone with a lower educational attainment to

be employed than a more educated one. The same applies to all other independent variables examined.

Table 3.2 presents the regression estimations (odds-ratios) for all significant control variables that have been used in Models 2 and 3. Interpreting the years of working experience variable for 2004, each additional year increases the odds ratio by 1.036 (3.6%).

Table 3.2: Odds Ratios Estimations for Control Variables (Models 2 and 3)

	2004		2010	
Employment Status	**exp(b)**	**P>z**	**exp(b)**	**P>z**
Years of Working Experience (*YExp*)	1.036	0.000	1.037	0.000
Long-Term Unemployment (U12)	0.091	0.000	0.086	0.000
Further Training (*Cou*)	1.620	0.000	1.718	0.000
Cohabiting (*Co*)	1.800	0.000	1.465	0.000
Health Condition (*H*)				
2. Hampered by Health Problems A Little	0.706	0.000	0.778	0.000
3. Hampered by Health Problems A Lot	0.463	0.009	0.430	0.000
Constant	14.017	0.000	8.675	0.000

Source: ESS Rounds 2 and 5 (Author's calculations)

Concluding, and since the purpose of this study is not particularly to analyse the effect of each control variable, results revealed that those that have attended a course or those who cohabit are more likely to be employed rather than unemployed, assuming that all other variables are kept constant. Moreover, spells of unemployment seem to have some effect on someone's employability, as those who have experienced long-term unemployment, more than 12 months, are more likely to remain unemployed in the future. Finally, those whose health situation hinders their working lives are more likely to be unemployed compared to those that do not have any health problem. The odds ratios do not differ much for 2010. However, the odds ratio for the constant is much higher in 2004 than in 2010, which indicates that, when all dependent variables are equal to zero, people were more employable in 2004 compared with 2010.

The odds ratios that correspond to the interaction between country and calendar year, years of educational attainment and country for 2004 as well as for 2010 are presented in Table 3.3. The abbreviation EOR stands for Employment Odds Ratio, irrespective of the number of years of educational attainment and when it is written with the subscript "ed" (EOR_{ed}) refers to the country-average employment odds ratio between individuals with respect to years of education (Models 2 and 3). All countries are sorted by the welfare state regime they belong to (Section 1.3). Odds ratios below 1, which show a negative relationship between the dependent and independent variables examined each time, are presented in brackets. The last column shows whether the value, in terms of average odds ratio within each country, of an additional year of education has increased or decreased. Downward trends are illustrated by the red arrow and upward trends by the green.

All interaction terms in the three models estimated, are highly significant on the 95% confidence level. The interaction term between country and calendar year shows the difference, between 2004 and 2010, in the employment odds for someone with an educational attainment, equal to the number of years needed for the compulsory level to be completed within each country. However, in terms of pseudo-R^2 goodness-of-fit measurement, all models are performing in a rather modest way, but this is not uncommon in the literature when logistic regression is used (Field, 2009). Model 3 seems to perform slightly better compared with the other two in various statistical tests performed (Appendix C, Table C3).

Table 3.3: EOR and EOR$_{ed}$ Estimations for Models 1, 2 and 3

	(Model 1) EOR	(Model 2) EOR$_{ed}$ 2004	(Model 3) EOR$_{ed}$ 2010	2004-2010 trend in EOR$_{ed}$
Continental:				
*Belgium (**BE**)*	(0.84)	1.08	1.03	↓
*Germany (**DE**)*	2.24	1.05	1.17	↑
*France (**FR**)*	(0.55)	1.01	1.04	↑
*The Netherlands (**NL**)*	(0.80)	(0.92)	1.14	↑
Liberal:				
*Great Britain (**GB**)*	(0.52)	(0.96)	1.11	↑
*Ireland (**IE**)*	(0.10)	1.24	1.13	↓
Nordic:				
*Denmark (**DK**)*	1.30	1.11	1.00	↓
*Finland (**FI**)*	(0.77)	1.04	1.08	↑
*Norway (**NO**)*	(0.76)	(0.97)	1.08	↑
*Sweden (**SE**)*	1.39	1.05	1.12	↑
Southern:				
*Spain (**ES**)*	(0.24)	1.06	1.11	↑
*Greece (**GR**)*	(0.80)	1.03	1.08	↑
*Portugal (**PT**)*	(0.56)	1.03	1.08	↑
Eastern:				
*The Czech Republic (**CZ**)*	(0.82)	1.21	1.15	↓
*Estonia (**EE**)*	(0.59)	1.06	1.06	-
*Hungary (**HU**)*	(0.89)	1.38	1.14	↓
*Poland (**PL**)*	1.19	1.14	1.05	↓
*Slovenia (**SI**)*	(0.69)	(0.95)	1.04	↑
*Slovakia (**SK**)*	1.32	1.10	1.17	↑
Statistics:				
N	32,285	15,597	16,688	
Pseudo R^2	0.255	0.238	0.271	
AIC	0.324	0.295	0.352	

*Note: The interactions between country and calendar year estimated in Model 1 (EOR), country and **YEd** (EOR$_{ed}$) estimated in Model 2 and 3 for 2004 and 2010 respectively, have been found statistically significant at the 99% confidence level.*
Source: ESS Rounds 2 and 5 (Author's calculations)

Model 1 shows that in 14 countries (Ireland, Spain, the UK, France, Portugal, Estonia, Slovenia, Norway, Finland, Greece, the Netherlands, the Czech Republic, Belgium and

Hungary) EOR has decreased. This means that the odds for someone with compulsory educational attainment to be employed rather than unemployed are lower in 2010 compared to 2004. The negative effect is exceptional in Ireland and Spain. The UK, France, Portugal and Estonia were also affected, whereas in Slovenia, Norway, Finland, Greece, the Netherlands, the Czech Republic, Belgium and Hungary this negative effect was still considerable but rather lower. Contrariwise, Germany showed a remarkable increase on the probability for someone to be employed, as the relevant odds ratio has been increased by more than two times [exp(b)=2.24]. A positive effect is also clear in Sweden, Slovakia, Denmark and Poland.

In terms of welfare state regimes, Liberal countries seem to show a common negative trend and the same can be said for Southern countries. In the Continental regime, Germany is by far the country that shows the highest odds ratio, while in all other countries ratios have decreased. The odds ratios in Nordic and Eastern countries do not reveal a single pattern, as there are countries with both positive and negative effects.

Looking at Model 2, in the Netherlands, Norway, the UK and Slovenia, additional years of education do not seem to make someone more employable. The EOR_{ed} are marginally below the unit and therefore, it seems that education does not increase the employment probability of individuals. This is surely an unexpected result, as literature seems to agree that the high-educated are more employable than their lower-educated counterparts (OECD, 2000; Nunez and Livanos, 2010). However, this trend is confirmed by the results from Model 3, where the odds ratios are above the unit in all nineteen countries examined for 2010, with the odds ratio in Denmark being equal to the unit, showing that years of education is not such an important factor in shaping the employability outcomes of individuals. In all other countries the effect is positive, ranging from 1.03 for Belgium to 1.17 for Germany and Slovakia. Regarding welfare state regimes, it seems that in Southern and Nordic regimes the effect of additional educational attainment is rather low, but uniform. The within patterns in all other welfare state regimes seem rather mixed.

Concerning the 2004-2010 temporal trends, the EOR_{ed} are increasing for Slovakia, Germany, Finland, Spain, the UK, the Netherlands, France, Sweden, Norway, Greece, Portugal and Slovenia. The remaining countries show a decreasing trend, with the odds-ratio in Denmark being equal to the unit in 2010. Southern countries reveal an increasing trend, even when are seen as a regime-group, however no other regime shows such consistency. The biggest decrease in EOR_{ed} temporal trends has been estimated in Hungary, but still a ratio of 1.14 for 2010 cannot be considered as low, as it remains between the highest, when compared to all other countries. Figure 3.1 plots the odds ratios estimated from Models 2 and 3. Estimations for 2004 are plotted as green dots and for 2010 as red diamonds. All countries have been sorted by the welfare state regime they belong to.

Figure 3.1: EOR_{ed} (2004 vs 2010)
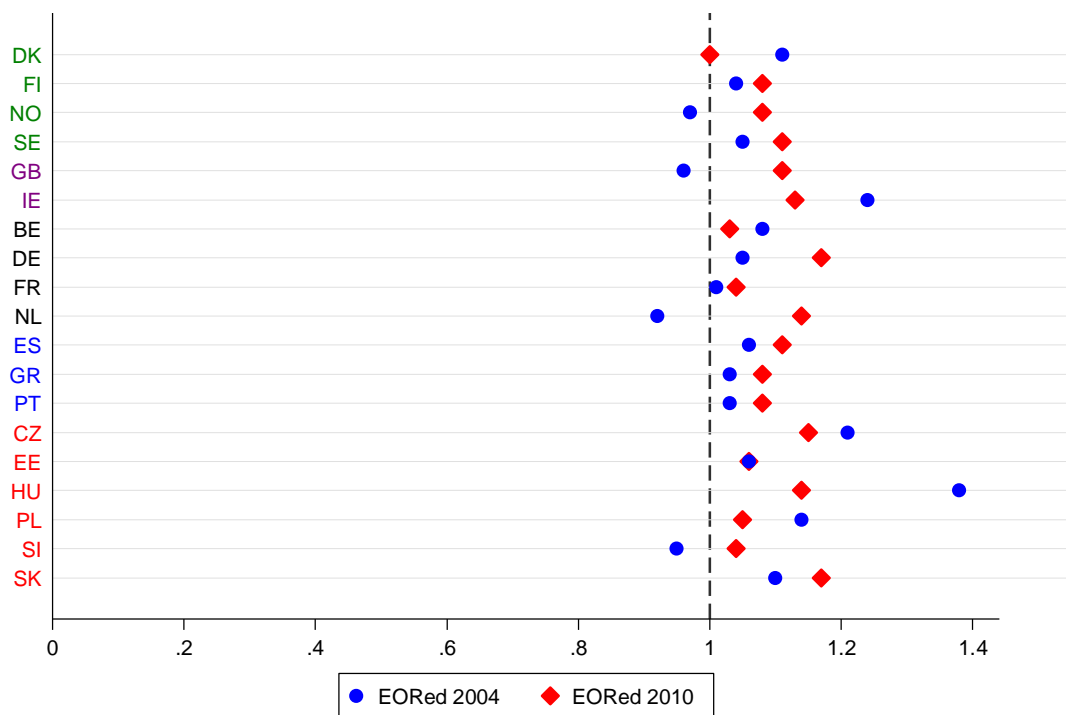
Source: ESS Rounds 2 and 5 (Author's calculations)

Summing up, there is some support that the effect of additional educational attainment is uniform within the Southern and Nordic welfare state regimes. However, the Southern countries seem to respond in a more common way compared to all other

regimes, also in terms of 2004-2010 temporal trends. Finally, having a closer look on Figure 3.1, EOR_{ed} for 2004 are more scattered than these of 2010 and therefore, some convergence between countries can be observed.

Figure 3.2 illustrates the predicted employment probability of each country, plotted over years of education. The solid curved line represents 2004 (Model 2) and the dashed 2010 (Model 3). The differences in the employment probability, between 2004 and 2010, can be geometrically measured by the distance of the two curves in any point of the x axis (not shown in the figure). Let these curves to be called as *predicted employment curves*. The slope on the predicted employment curve on each point of years of education indicates how much an additional year of education contributes to someone's expected employability. Even if, the logistic model is not considered as a strictly linear one, a strong pattern of linearity can be observed in all countries for both 2004 and 2010[17]. In countries where the slope is steeper, an additional year seems to have a bigger impact on the probability of being employed. In countries were the slopes are more flat, years of education do not play a prominent role to someone's employability and therefore, finding a job or not seems to be affected more by other reasons and less by additional educational attainment.

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[17] Logistic regression concerns a maximum likelihood logit model, which calculates conditional means in terms of logits (log odds). In other words the logit model can be seen as a linear model in log odds terms. Linear models are easier to handle compared with nonlinear ones. The assumption made in linear models is that the slopes and/or differences in means remain unchanged for different values of the independent variable. On the other hand, this does not necessarily stands for nonlinear models. However, strong patterns of linearity, as the ones found in this study, are not that uncommon.

Figure 3.2: Models 2 and 3, Employment Probability Curves for 2004 and 2010

Years of Education (compulsory level centered)

0. 2004   1. 2010
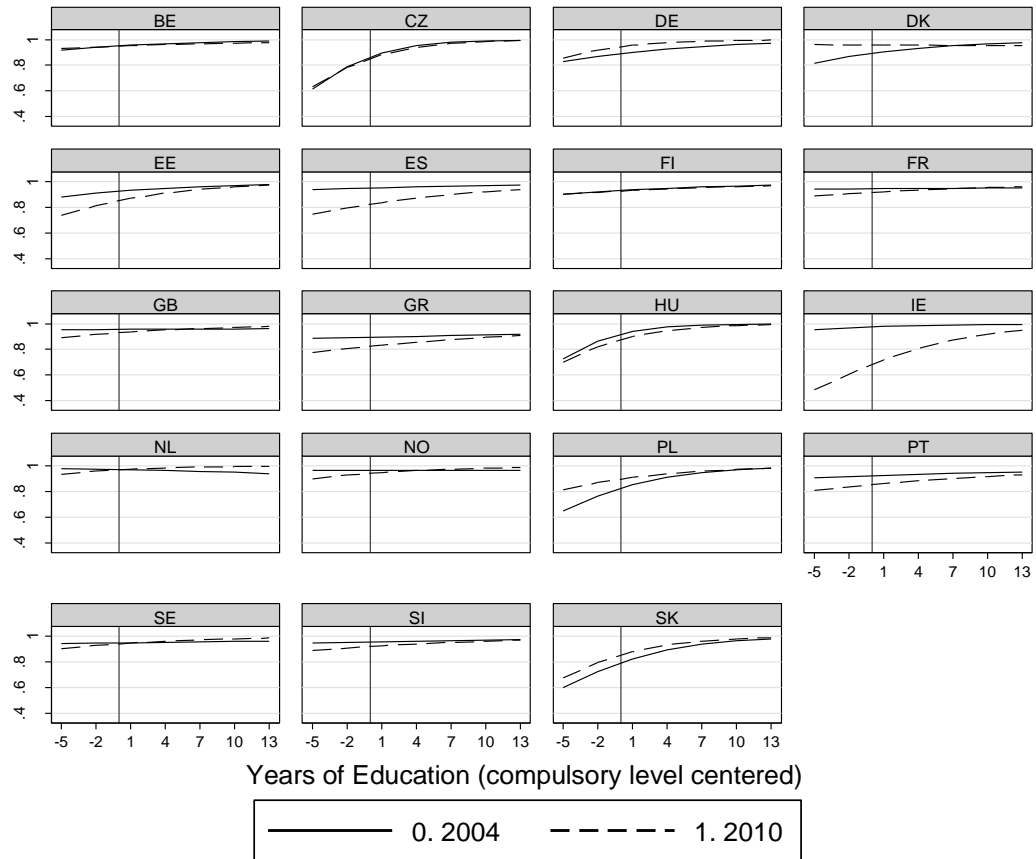
Source: ESS Rounds 2 and 5 (Author's calculations)

Nevertheless, this situation is not necessarily good or bad, as it depends on whether the predicted employment curve operates in lower or higher levels of expected employability rates. When the curve operates in higher levels, then labour supply confronts with the demand and individuals are more likely to find a job. Job opportunities are generated for individuals of all educational levels and unemployment is likely to be low and rather balanced between groups of different educational attainment. On the other hand, when the curve is flat-shaped, while operating in lower levels of expected employability, the situation seems problematic. Labour market seems to remain stagnant and in a steady state. When educational attainment does not seem to matter at all, while the probability for someone to be employed is low, individuals are less likely to invest undertaking higher levels of education. Moreover,

as the educational attainment remains low, R&D jobs are less likely to be created and therefore, labour market operates in low productivity levels and, in general, remains in hibernation. Economy does not only remain stagnant in the short-term, but also its growth potential is bleak.

The models presented above showed that countries performed quite differently, in both EOR and EOR_{ed} terms. The most recent recession was more severe in some countries than others and this might have affected people with particular educational characteristics in a different way. Moreover, the same can be implied for the institutional settings of each labour market.

This thesis accounts for the effect a bad economic climate has on the labour market outcome of individuals. The most recent recession is used as an example. The severity of this effect is presented in terms of negative GDP growth rate, but since this is correlated with job losses, the HUR is also examined. For reasons explained in Section 1.3, four-year averages prior to the two reference points, 2004 and 2010, where regressions have been estimated in the individual level from the ESS, have been used instead of single point figures. Figure 3.3 depicts the relationship between the temporal change of the EOR_{ed} estimations for 2004-2010 and the change in the GDP growth rate, as defined above. Their correlation is very moderate (r=0.29). This makes the goodness-of-fit of this bivariate relationship very low (R^2=0.08) and therefore, not statistically significant. Thus, it is unclear whether or not an increase at the GDP growth rate is likely to increase the employment probability of the higher-educated, compared to the lower-educated individuals. Figure 3.4 depicts the relationship between EOR_{ed} and HUR. It is evident that the countries are very scattered and this causes a very low score in r and R^2. The temporal fluctuations on HUR seem rather uncorrelated with the change in EOR_{ed} to all countries examined (r=0.06). In terms of welfare state regimes, Nordic countries show some consistency in both GDP growth rate and HUR, but this is not true for all other countries.

Figure 3.3: Temporal Change in EOR$_{ed}$ and Change in GDP Growth Rates
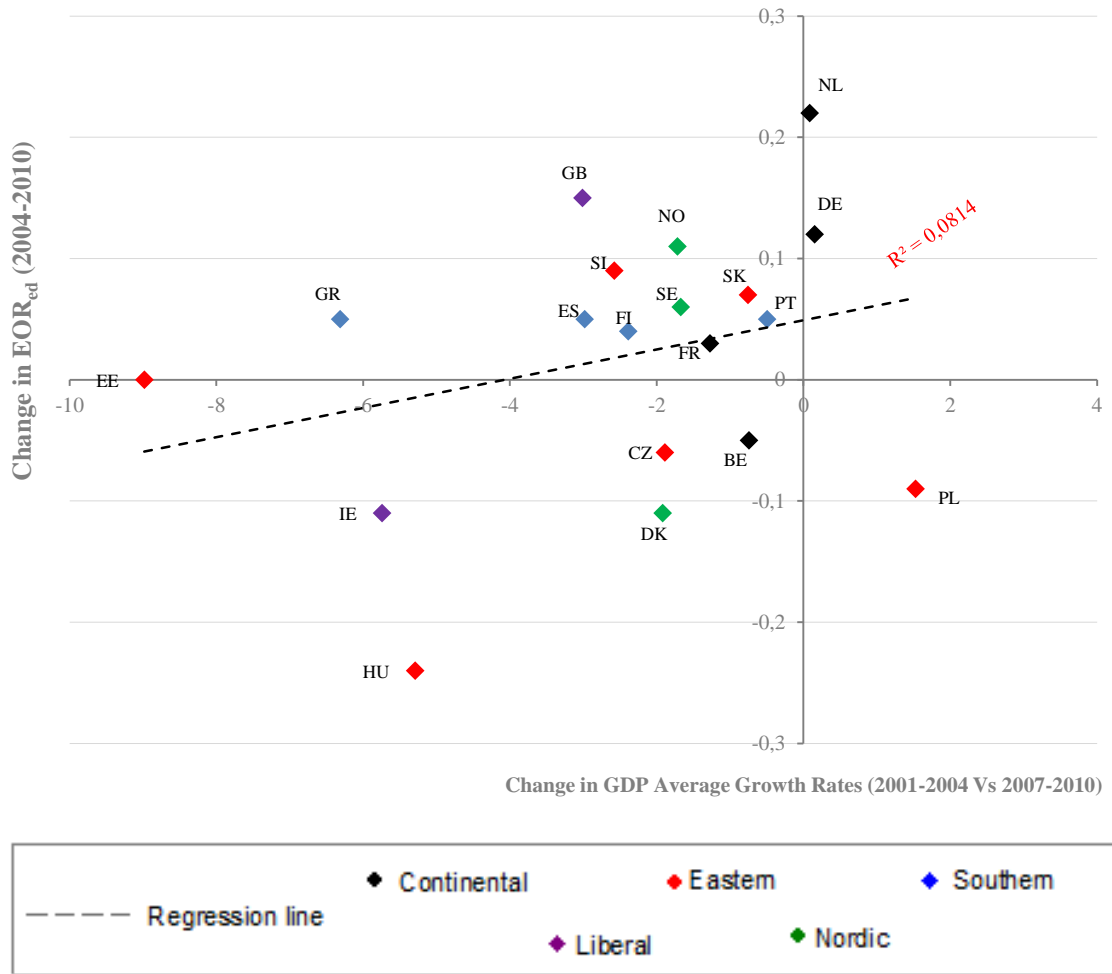
*Note: r=0.29

Source: ESS and World Bank (Author's calculations)

Figure 3.4: Temporal Change in EOR_{ed} and Change in HUR
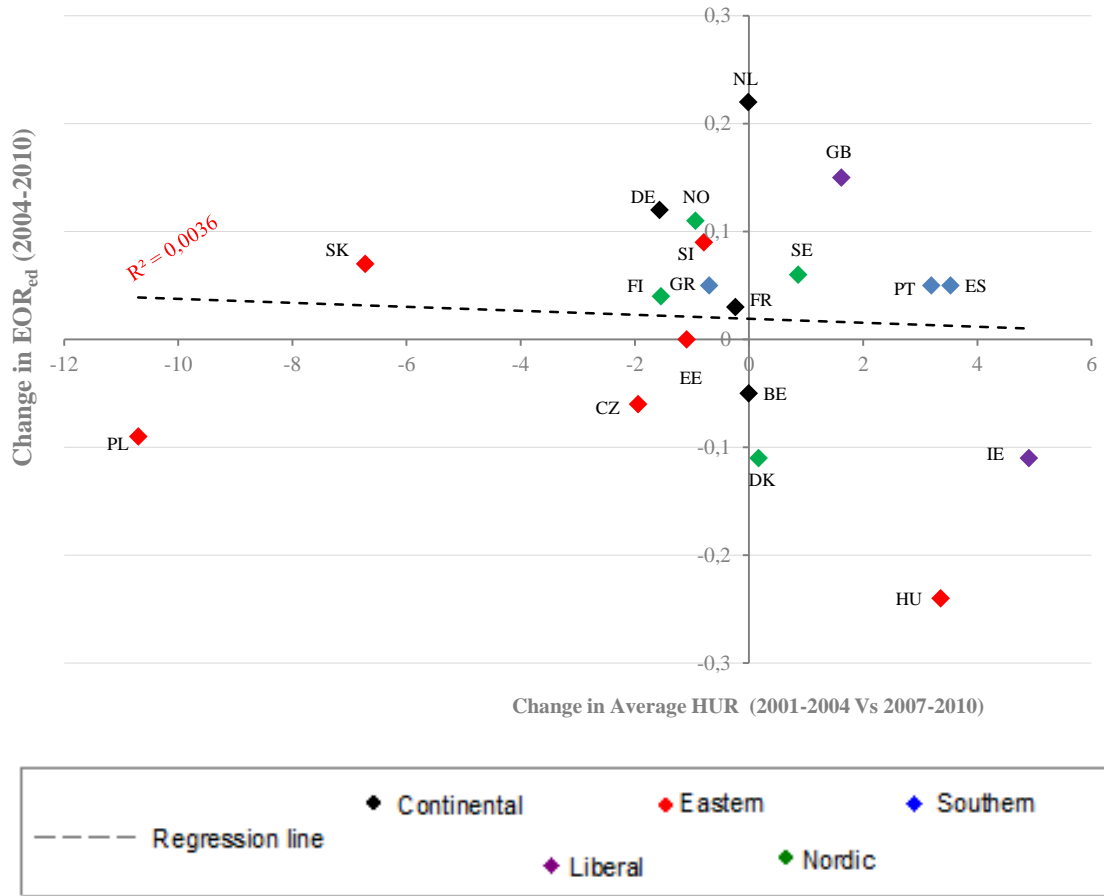
*Note: r=-0.06

Source: ESS and Eurostat (Author's calculations)

From the above figures, it seems that EOR_{ed} scores as well as temporal trends between 2004 and 2010 are characterised by some heterogeneity among all countries examined. However, similar patterns can be observed between countries that belong to specific welfare state regimes, but this is does not stand for the Eastern, Southern and Liberal regimes. The welfare state regimes literature informs that countries, classified under a certain regime, are grouped in such way because of the common institutional characteristics they share in terms of welfare policies (Kammer *et al.*, 2012), but in terms of EOR_{ed}, this grouping seems rather irrelevant. Therefore, this study goes beyond the welfare state regimes classification, capturing the effect of each country's institutional settings on the level of employability of individuals with different

educational attainment in terms of EOR_{ed}, as these have been calculated by Models 2 and 3. In total, nine different country-level variables (macro-level determinants) have been employed, as explained in detail in Section 1.3.

As Table 3.4 shows, when all macro-level determinants are regressed over the estimated EOR_{ed} for both 2004 and 2010, none of these are significant in the 95% confidence level. Certainly, this is what was expected, as a great level of multicollinearity exists due to the aggregate format of the variables as well as the small number of countries examined (N=19), especially when compared with the number of predictor variables (9). Because of the above and other limitations regarding the incompatibility of a multi-level approach in this study (Section 1.3), the estimation of a much simpler model would be preferable (Tabachnik and Fidell, 2007). The two-step approach modelling technique, where first step estimations are regressed over each macro-level determinant in a bivariate manner, has been suggested in the literature to reconcile single- with multi-level regression techniques. This approach has been decided to be employed in this Chapter, as it manages to capture the effect of institutional variables when the assumptions of multi-level regression techniques cannot be met adequately. On the other hand, it is acknowledged that this approach lacks the inferential robustness produced by more complicated regression techniques. However, it has been decided that, given the data the author of this study has available, this approach is more suitable, as it manages to visualise relationships between magnitudes in a comprehensive, but in a rather more descriptive than exclusively inferential manner.

Table 3.4: Macro-level Determinants of EOR$_{ed}$: Two-step Approach Estimations Results

EOR$_{ed}$	2004		2010	
	Coef.	P>t	Coef.	P>t
GDP Growth	0.0459505	0.482	0.0035312	0.753
HUR	-0.0100155	0.233	0.0016019	0.835
Size of Government	0.009335	0.258	-0.0033411	0.264
Debt to GDP	-0.0010568	0.593	-0.0000724	0.896
GDP/Capita	-0.004	0.309	0.001	0.920
Part-time to Full-time	-0.0030035	0.701	0.0007119	0.783
Temporary to Permanent	-0.2920181	0.715	-0.1487219	0.610
EPL Strictness	-0.0314043	0.800	-0.0002716	0.994
Gross Enrolment Ratio	-0.0036681	0.301	-0.0004159	0.774
Goodness-of-fit:				
Adjusted-R^2	0.36		-0.38	

Source: ESS Rounds 2 and 5, EUROSTAT, World Bank, IMF, OECD, UNESCO (Author's calculations)

Therefore, once each of the aforementioned macro-level determinants is regressed over the estimations produced in Models 2 and 3, then some relationships look much stronger. On the other hand, when bivariate relationships are examined, R^2 is usually very low and this informs that the results need to be interpreted with some additional caution. After testing all aforementioned variables, it was only two out of the nine macro-level determinants that have been found statistically significant, even in just one out of the two average periods they have been calculated.

Table 3.5 presents the estimations of two OLS regressions. In the first one, EOR$_{ed}$ has been regressed over the Size of the Government (SOG). The relationship is insignificant for 2004, but it becomes significant in 2010. The effect is negative, but it seems rather weak. Nonetheless, it appears that the larger the SOG in a country, the more likely is the EOR$_{ed}$ to be lower. In other words, this means that the difference in the employment probability, between high- and low-educated, is estimated to be smaller in countries, where the SOG is relatively large.

Looking at the temporal trends between 2004 and 2010, the change in EOR_{ed} has also been regressed over the average SOG change [SOG (2001-2004)-SOG (2007-2010)] and has been found highly insignificant. Therefore, it seems that no argument can be made in terms of policy recommendations, as it is not clear whether an increase on the SOG can cause EOR_{ed} to fall or vice versa. It seems that EOR_{ed} is much more related to SOG-level per se, rather than its fluctuations through time.

Table 3.5: Significant Macro-level Determinants of EOR_{ed}: Two-step Approach Estimations (Bivariate Regressions)

EOR_{ed}	**2004**		**2010**	
	Coef.	**P>t**	**Coef.**	**P>t**
Size of Government	-0.003	0.393	-0.003	0.05
Goodness-of-fit:				
Adjusted-R^2	-0.013		0.16	
Part-time to Full-time (PT/FT)	-0.005	0.04	0.0003	0.739
Goodness-of-fit:				
Adjusted-R^2	0.18		-0.005	

Source: ESS, IMF and OECD (Author's calculations)

Moreover, the ratio between those in part-time and full-time employment (PT/FT) is significant in 2004, but becomes insignificant in 2010. Regarding the 2004 to 2010 trend, the average temporal change in the PT/FT ratio is also insignificant, which means that its temporal fluctuations do not seem to affect the direction EOR_{ed} is moving.

However, the relationship between EOR_{ed} and PT/FT ratio in 2004 seems to have a significant negative effect, meaning that the bigger the ratio and therefore, the biggest the share of part-time jobs is in an economy, the lower EOR_{ed} is and thus, the smaller the gap in employment probability rates between low- and high-educated can be. This indicates that since PT/FT ratio is usually higher in flexible labour markets, the value of educational attainment in these markets seems relatively lower than in countries with non-flexible labour markets.

The relationship between EOR_{ed} and SOG as well as EOR_{ed} and PT/FT ratio is illustrated in Figures 3.5 and 3.6 respectively. In these Figures, countries are depicted in different colours, according to the welfare state regime they belong to. Nordic countries are highlighted in green, Continental in black, Liberal in purple, Southern in blue and Eastern in red. Hollow circles and plus symbols refer to 2004, whereas arrowheads to 2010. The plus symbol indicates that there has been an increase in EOR_{ed} between 2004 and 2010, while hollow circles show a decrease or that it remained the same. Moreover, the dotted line that connects the arrowhead with the plus or hollow circles indicates the temporal trends of each macro-level determinant, as defined in Section 1.3. Therefore, upward arrows show an increase, while downward a decrease. Finally, the two regression lines for 2004 and 2010 are also presented. The regression line for 2004 is depicted by the grey solid line, whereas the grey dashed line represents the OLS regression line for 2010.

Figure 3.5: Relationship between SOG and EOR_{ed}
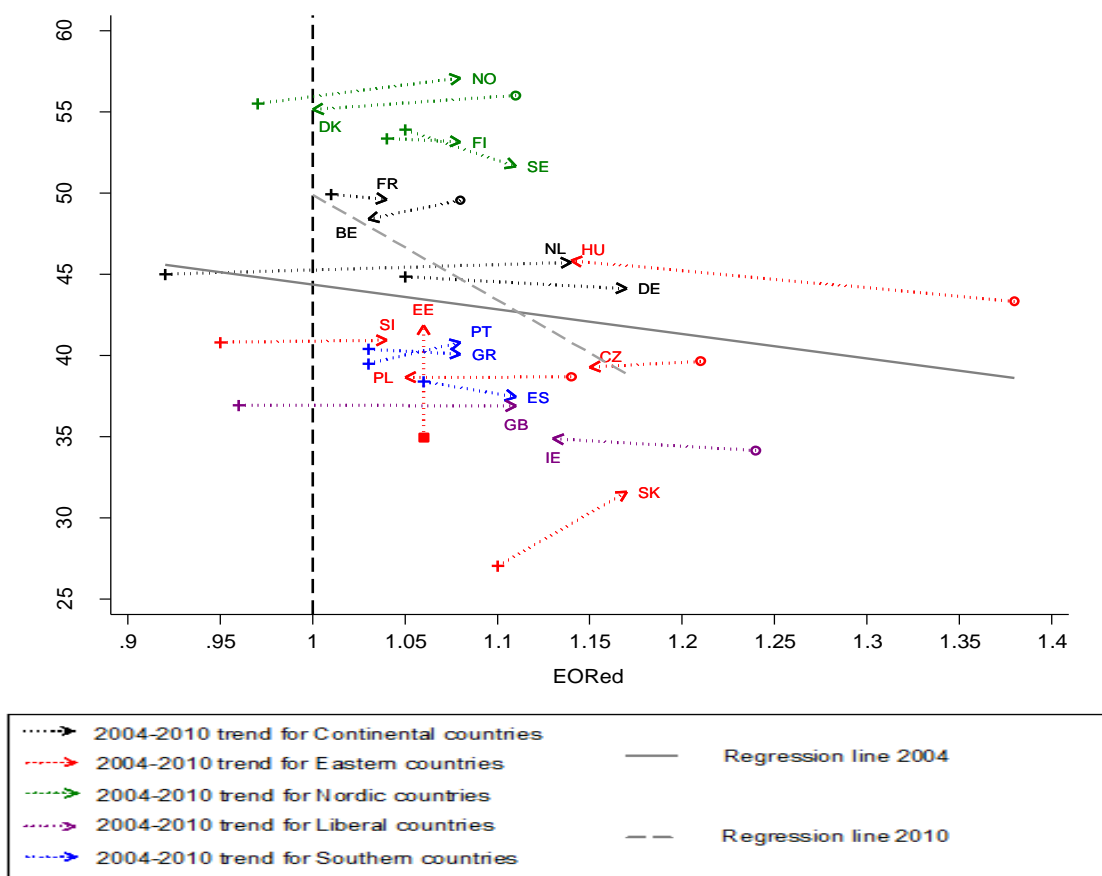
Source: Author's Calculations based upon Table 3.5

Figure 3.6: Relationship between PT/FT Ratio and EOR$_{ed}$
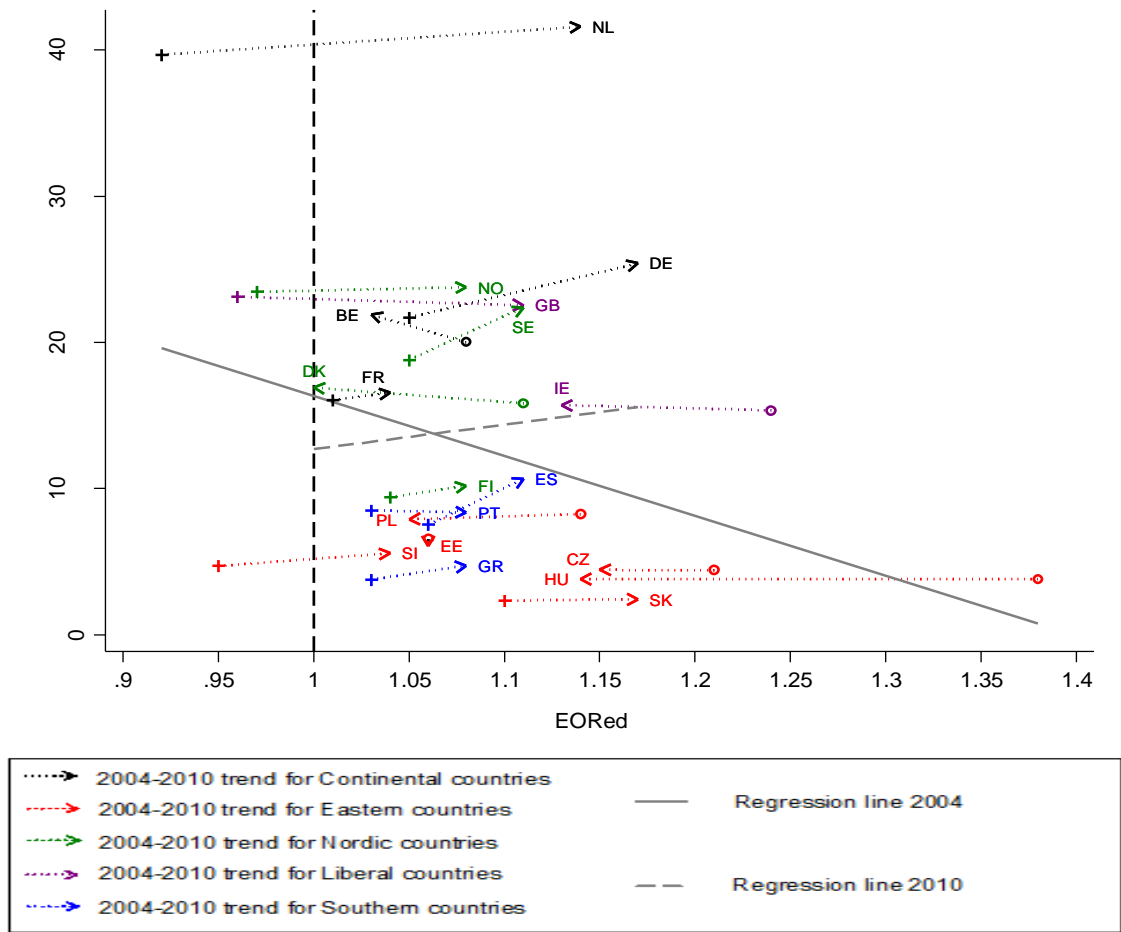
Source: Author's Calculations based upon Table 3.5

3.5 Summary and Conclusions

This Chapter examined the relationship between educational attainment and employability in nineteen European countries, before and during the most recent recession. Moreover, the effects of certain macro-level determinants of each country have been tested using the two-step approach.

Past literature informs that even if higher educational attainment seems to increase someone's employability, there are other factors, indirectly or not at all related to

educational attainment, which can affect recruitment decisions. The quality of higher educational attainment, extra-curricular activities, working experience gained while studying, quality of career advice as well as personal traits are just a few of these factors that can have some effect on the employability of individuals. Nonetheless, all these are very difficult to be empirically investigated due to the lack of data as well as definition differences among countries. Moreover, other institutional factors related to changes in the working relations or certain particularities of national labour markets, can influence employability.

After the formal ratification of the Bologna Declaration (1999), Europe has seen the employability framework to gain momentum in policy-making. It seemed that this framework, when first established, fitted the European labour market well, providing more job opportunities as well as creating new types of jobs. In that period of time, employment and wages were more secure, the standard of living, as measured by the GDP, was rising year by year; and generally, the quality of life considered to be relatively very high (EC, 2012). However, after crisis struck, it is very questionable whether or not the employability framework is still effective. There is not a straight scientific answer to this. Many researchers have offered their views but, since both higher education and labour market settings differ among countries, this framework seems to suit some countries much better than others.

Moreover, nowadays employability is considered more as a skill, with both innate and acquired elements, rather than an attribute given to individuals solely through educational attainment and certain credentials. Whoever has this multi-dimensional skill is more likely to have a better occupational future, even in periods when the labour market stagnates (de Hoyos *et al.*, 2013; Green *et al.*, 2013).

Empirically, the effect of educational attainment on the employability of individuals has been examined using micro-data from the ESS and country-level data other sources (Section 1.3). The econometric technique used were the two-step approach as this is described in the relevant literature (Franzese, 2005; Primo *et al.*, 2007; Bryan *et al.*, 2013; Dirckhoff, 2013). Particularly, the first step concerned a logistic regression on

the individual level, followed by an OLS regression where estimations from the first step arte regressed over all significant macro-level determinants. Furthermore, the nineteen European countries examined in this thesis, have been also classified by welfare state regimes (Esping-Andersen, 1996; Ferrera, 1996; Arts *et al.*, 2002; Fenger, 2007; Arts *et al.*, 2010), as these have been transformed in Gallie (2013). To summarise, the effect of certain macro-level determinants on the employability of individuals with different years of educational attainment has been examined, by regressing them over the EOR_{ed} corresponding to each country's average. The relationships that have been found as statistical significant on the 95% confidence level, have been visualised by scatter plots showing the temporal EOR_{ed} change between 2004 and 2010 in comparison with the change of the macro-level determinants, represented by four-year averages prior and after 2004 and 2010 respectively.

Regarding employability, the main findings reject the null hypothesis that higher educational attainment does not affect employment probability in most of the countries. The analysis has been performed using years of education as a measure of educational attainment. Individuals with low educational attainment have been affected most, but this is not unique to countries where recession was very severe. Past research informs that between European countries the effect of economic crisis was different. Some, especially the Southern countries, Ireland, Estonia and Hungary, experienced a deep recession, where unemployment increased. In others, like Germany and the majority of the Eastern countries, it seemed that the 2008 global recession had no effect at all. On the contrary, job growth and up-skilling have also been observed. Finally, there are countries, mainly belonging in the Condinental and Nordic regimes, where the effect was mild.

In 2004, the estimations from the first step showed that additional years of educational attinment is very likely to make somebody more employable in all countries, apart from the Netherlands, the UK, Norway and Slovenia. Each one of these four countries belongs to a different welfare state regime. However, in 2010 the higher-educated seemed more employable compared to the lower-educated, in all countries. When countries are classified into welfare state regimes, Southern countries reveal a uniform

temporal trend, as the higher-educated seem more employable than lower-educated, while the economy in terms of unemployment performs worse. On the contrary, in Ireland and Hungary, where the effect of recession was equally severe, EOR_{ed} temporal trends decrease and therefore it can be implied that a bad economic climate does not necessarily affects EOR_{ed} on a certain way.

Finally, examining the effect of labour market settings on the employability of individuals with different years of educational attainment, the SOG and PT/FT ratio seem to have a minor negative effect that is also statistically significant, but not for both 2004 and 2010 EOR_{ed} estimations . The remaining seven macro-level determinats have been found as statistically insignificant. Looking at SOG this is quite uniform within all welfare states regimes except the Eastern, where the variation between the countries is much more apparent comparing to all other regimes. Regarding the temporal change in SOG between 2004 and 2010, there is no clear trend within welfare state regimes and it seems that it cannot be attributed to a country classified under a specific regime. Moreover, recession does not seem to affect SOG in a certain way, implying that this can be attributed also to other reasons. Likewise, the 2004 to 2010 temporal change in EOR_{ed} appears to be uncorrelated with the change in SOG and therefore, any change in the latter does not seem to affect the employment probabilities of individuals with different educational attainment in a certain way.

Regarding the PT/FT ratio, there is a great variation between countries. However, in Southern as well as Eastern countries this ratio is very low, indicating a non-flexible market, where PT work is not that common. For 2010, the relationship between PT/FT ratio and EOR_{ed} is marginally positive, but statistically insignificant. However, for 2004 is negative and statistically significant, indicating that in countries with relatively higher proportion of PT jobs the employability gap between high and low educated seem smaller.

4 CHAPTER 4: QUALITY OF JOB AND EDUCATIONAL ATTAINMENT

4.1 Introduction

Kalleberg (2000; 2011) conducted a multidisciplinary review of the literature on non-standard work arrangements, including research from a variety of academic disciplines, such as sociology, economics and psychology. Macroeconomic, political, institutional, cultural and individualistic factors are equally important; and therefore, the nature of employment relations cannot be identified and explained adequately outside a cross-discipline and cross-national research framework. According to Kalleberg the reconceptualisation of employment suffers from inconsistent definitions or inadequate measures as well as significantly limited comparative research.

It is argued that higher educational attainment increases the levels of job satisfaction and the chances a graduate has in finding a job of a better quality, compared with a non-graduate (Kalleberg and Vaisey, 2005). But, what do we mean by job satisfaction and quality of job and how this correlates with the level of educational attainment? The notions of job satisfaction and quality of job, by definition, are qualitative concepts that cannot be easily measured by a single numerical scale, which in turn, can be applied to all individuals. However, there are some characteristics that can be considered as standard, seemingly common to both notions, which imply high or low levels of job quality and satisfaction. High wages and all pecuniary benefits associated, especially when complemented with job control, discretion and autonomy can be considered as such. When most of these characteristics are found in a single job, then it can be assumed that this particular job is of high quality, or at least higher, compared with jobs

that do not encompass these attributes (Kalleberg, 2011; Gallie, 2013). But, even if an individual is working in a job that is considered of a high quality, this does not necessarily mean high levels of job satisfaction, as there are many idiosyncratic preferences that can make any job holder satisfied or not, irrespective of his/her job's attributes. The notion of job satisfaction includes an unobservable, sometimes even subconscious, subjective judgement of individuals' perception regarding working conditions and reflects their relative preferences and their subjective understanding of well-being (Bowling *et al.*, 2010).

Even if, these two concepts seem very similar, it is not unlikely for employees to report low levels of job satisfaction along with high levels of job quality and/or vice versa (Fernandez-Macias and Muñoz, 2009). For an individual, the sense of job satisfaction is not only based on his/her subjective judgement, but also it can be attributed to the characteristics of the job. Thus, it cannot be measured directly from the specifications of a job and therefore, this brings an inherent vagueness to this concept, in terms of statistical measurement. This is mainly because job satisfaction, even if it can be identified easily with a single question, can be also attributed to factors that are not necessarily related to the working conditions per se. In other words, there are many different reasons that urge people to feel satisfied with their job. The same reason can have positive or negative influence on their judgement. Certainly, remuneration levels, especially for those in paid employment, play a significant role when assessing job satisfaction or quality, but there are other aspects that allow for a different interpretation (Gallie, 2007; 2013; Burcell *et al.*, 2014; Holman, 2013).

Belfield and Harris (2002) investigated patterns in job satisfaction for UK graduates, using probit statistical models techniques. They tried to explain job satisfaction by measuring individuals' job match and job offer rate. Their findings revealed that graduates' job satisfaction is not directly correlated with job match and it can be attributed to other factors, such as their former education quality. Moreover, they offer an assessment of the statistical techniques used, suggesting that probit models cannot identify adequately various characteristics for individuals that report high levels of job satisfaction. Similar findings are presented in a subsequent research, commissioned by

the Sector Skills Development Agency (SSDA), where a mixed-methods approach has been utilised to compare the UK with other EU-15 labour markets, in terms of job mismatches (Bevan and Cowling, 2007). The main focus was on job mismatches, which seemed to be more persistent in the UK than in any of the remaining EU-15. However, there are also implications concerning employees' job dissatisfaction, as incidents of over-skilling have been identified, stemming out of employers' beliefs that the best candidate for a job should be the one with the highest credentials. Even if such perception seems rational, it is not necessarily absolutely accurate to all cases and this can lead to job mismatches and in turn, employees' dissatisfaction as well as increased rates of job turnover.

Moreover, a distinction between self-employment and ordinary employment is necessary, as the former is usually a personal choice and its characteristics differ from the ordinary paid employment, since it typically involves some kind of expertise performed. Additionally, income does not always come first and is less secure. The nature of self-employment is more independent and the non-pecuniary aspects of work are more important, when compared with the ordinary paid employment (Bianchi, 2012).

Benz and Frey (2004), in a large cross-national study, using three of the oldest and most reputable longitudinal data sets in Europe- the German Socio-Economic Panel Survey (GSOEP, 1984-2000), the British Household Panel Survey (BHPS, 1991-1999) and the Swiss Household Panel Survey (SHP, 1999), confirmed empirical findings in the literature that the levels of job quality and satisfaction are much higher to self-employed compared to ordinary employees. Moreover, they argued that the self-employed feel more satisfied with their work, as the work procedure itself can be an adequate reason to feel satisfied, irrespectively of the related outcome. More recent studies verify these findings, but they acknowledge the fact that self-employed and ordinary employees report their levels of job quality and satisfaction having in mind very different meanings and therefore, results are not that comparable (Block and Koellinger, 2009; Schneck 2014). For the reasons above, ESS participants who have reported themselves as self-employed have been excluded from the empirical analysis of this Chapter. Therefore, in

order to avoid bias in the results, the econometric analysis is confined to individuals that consider themselves as working in ordinary paid employment.

Regarding the influence of higher educational attainment in job characteristics, there are few studies that examine how the nature and quality of work is affected by people's decision to undertake higher education. Edgerton *et al.* (2012) argue that lower-educated individuals are less likely to perform job tasks with a great rate of autonomy, creativity, novelty, independence and continual learning, which in turn, alienates them for the product of their labour. Thus, they are also more susceptible to perform manual work as opposed to higher-educated individuals, who are merely involved with non-manual tasks in their job (Ionescu and Cuza, 2012). However, it is not clear whether all these can be attributed to cognitive abilities and competences acquired in higher education institutions or to choices individuals make according to their innate abilities and aptitudes. There are also other idiosyncratic, not directly observable factors like psychological traumatic experiences or underlying psychological stress, which affect people's decision to perform a certain job. Of course, parental, social and economic background or context, such as country, region or industry-specific labour market characteristics, can either aggravate or mitigate the impact of these factors in an individual's decision to undertake a certain job and also affect his/her relative performance. Finally, individuals' perceptions regarding the quality of their job is very likely to be affected by the external economic climate, as when this is bad factors that affect working conditions and in turn, job quality are expected to deteriorate.

Empirically, this Chapter investigates whether this is the case in nineteen European countries, during the most recent recession, between individuals of different educational characteristics. Certain institutional and economic characteristics of the labour market, measured in the country-level, that relate to, economic performance, fiscal situation, level of wealth, labour market flexibility, higher education enrolment and welfare state regimes, are also taken into account in order to examine their effect on the job quality of individual's with different levels of educational attainment. The method used for this reason is the two-step approach (Section 1.3).

The remaining part of this Chapter has been constructed as follows. Section 4.2 presents literature on the concept of job quality, particularly focussing on its relationship with educational attainment. Then, the data specification, along with a description of the methodology employed and the technique used for the construction of a composite variable that can arguably capture the quality of job, are discussed in Section 4.3. Section 4.4 employs an empirical investigation of the relationship between educational attainment and job quality, using the modelling technique of the two-step approach as an attempt to incorporate the effect of the economic climate as well as the institutional and economic context of each country's labour market to its analysis. Finally, Section 4.5 summarises the findings, discussing them in relation to the existent literature.

4.2 Literature Review

Most of the scholars, engaged with research on job quality, agree that it is a complex and multi-dimensional concept and no single social science discipline is adequately equipped with all the methodological tools needed, to define and investigate further its causes and effects (Kalleberg, 2011).

Yates and Leach (2006) criticised the literature relevant to the relationship between paid work and social inclusion, as being over-simplistic. Furthermore, they investigated changes in the labour market and work-life balance with regards to how workers' perceive control, respect, trust and insecurity in their working environments. The study concluded that recent reforms at work, which promote flexibility, have increased negativity among workers as well as anger and introversion. Finally, there has been a continuous decline on workers' willingness to look after their families and to actively participate in communities and this, eventually, led to an increase of social exclusion.

It is very important not to ignore the non-standard employment, as part of the notion of work. Part-time work, temporary help agency assignments, flexible employment, short-term and contingent work or independent contracting, are all examples of non-standard

employment, which can increase uncertainty and the feeling of job insecurity. These are the main employment arrangements that have become increasingly debatable in recent years, gradually shaping the current trends in modern employment. These arrangements demarcate a reorientation of the conceptualisation of the notion of work and thus, of employment.

Kalleberg (2011) tried to combine both quantitative and qualitative aspects of work, considering them as equally important. Based on evidence and economic forecasts regarding job growth in the US, he identified industrial sectors, where jobs are low-paid, low-skilled, less secured and protected as well as much more stressful. These jobs can be found in food and hospitality, health and child care as well as in retail industries. Most of these jobs are regarded as personal service jobs and they do not require high skills or advanced educational credentials. These jobs are anticipated to grow in the future, but, according to Kalleberg, this does not necessarily mean that the wages or working conditions will grow as well, as this is something that depends on the value the economy is willing to attach to such jobs. However, things seem rather worrying, as data show a rising trend on job polarisation since 1975. It is more likely that recession makes the gap between good and bad jobs even bigger. Based on the above, Kalleberg argues that the expansion of higher education has increased job polarisation not only when it is measured in terms of pay differences, but also when other institutional and psychological components of job quality are taken into account.

Westwood (2002) examined the shift in the nature of work, assessing whether the new and emerging forms of work can be considered as "good". He focused on the individuals' subjective judgement to define job quality, arguing that it mainly depends on the individual preferences. Then, he distinguished the major changes that took place in the UK into: the gradual decline of blue collar jobs; the increase of managerial and technical jobs; the surge of jobs within the service sector, such as hospitality and child care services; and the mass entrance of women into the labour force. Although retail is generally regarded as a "bad" place for someone to work, Westwood gives as an example ASDA/Walmart retail chain industry, which has been voted as the best place to work in Britain in 2002.

Kalleberg's (2011) "Good Jobs, Bad Jobs" book is regarded to be the most contemporary hallmark in the job quality literature, where the concept is examined in different periods of time.   Kalleberg identified the great differences between the academic disciplines of social science, on the definition and measurement of job quality. Economists place more emphasis on the financial aspect of a job, as they consider a high quality job to be one that offers relatively high wages, including all kinds of pecuniary benefits. This is also related to the human capital concept, as it is implied that an individual holds a higher quality job because of his/her higher educational attainment and skills, which in turn, are translated to higher productivity and wages. Sociologists, acknowledging that pay does matter, claim that the relationship between job quality and pay is not causal and it can be attributed to other institutional and cultural factors, such as job security, control, flexibility in working hours, autonomy, safety or opportunities for advancement to name a few. Moreover, prestige and power are vital and can affect the level of job quality. Psychologists, on the other hand, focus on issues regarding job stress, satisfaction, well-being and self-fulfilment at work, considering them as the most important characteristics for assessing whether a job is of a high or low quality.

Findlay *et al.* (2013), reviewing the relevant literature, argued that the concept of job quality is extremely dynamic and multi-dimensional, as it changes between times, countries, occupational categories or labour markets structures. Institutional context play a very important role in influencing peoples' perceptions about job quality. However, job quality can mean different things for people that share the same contextual characteristics.

Job quality, according to Warhurst and Knox (2013), is equally important in both good and bad economic times. When the economic climate is good, job quality can increase productivity and influence political agendas in funding innovative practices, creating more jobs of higher quality in all occupational levels. An example, where job quality informed policy-making is ILO's effort to conceptualise its meaning, using the term of "decent work" (Fields, 2003; ILO, 2003).

However, even if the interest shown on the issue of productivity as related to job quality, from an economics as well as an interdisciplinary perspective, is a very topical research theme, it seems that it cannot really be considered as that novel. Gunderson (2002) analysed methodological issues, such as the definition of workplace practices and how they affect productivity, the relationship of employers' behaviour with organisational performance, the complexity of interrelated factors, the issue of reverse causality as well as the bias regarding the conduction of research within the mainstream publication process. The difference between short- and long-run effects was also examined in that context. Based on the aforementioned methodological issues, productivity is seen as being influenced by specific workplace practices, such as job design, employee involvement, compensation, alternative work time arrangements, training, diversity management and workplaces' well-being programs. Most of these practices are linked to job quality definitions in the literature and also affect employees positively, which, in turn, increase firm performance, productivity and competitiveness. Thus, it seems that a job that encompasses these practices is more likely to increase the productivity of the individual who performs it. However, despite the positive effects of the implementation of such practices, numerous barriers have been identified, which can prevent their application on the workplace. Managerial, employee and union resistance, significant legislative barriers, short-term focus, workplace practices as a source of competitive advantage, the significant decline of cooperative actions or the fact that trained employees may, eventually, decide to work for other companies, can prohibit the implementation of the aforementioned workplace practices.

Moreover, this argument sees productivity from an organisational behaviour perspective and a direct link with job quality is apparent. However, the link between job quality and productivity seems much more firm- rather than country-specific, as the practices and barriers described above operate in a very diverse way between firms. Moreover, productivity is measured in various ways and extrapolating the firm to the country-level would be a methodology that would suffer from ecological fallacy. Therefore, this thesis does not incorporate productivity in its analysis due to data limitations. A task

like this requires detailed data in the firm-level and thus, such research has been left for the foreseeable future.

Other elements, such as task discretion and control as well as the active participation in strategic decision-making processes, have been empirically tested by social researchers in order to see whether they can inform the concept of job quality. Gallie (2007), using the UK Skills Survey for 2006, argued that task discretion is a very important factor, which needs to be taken into account when job quality is under examination. Active participation in decision-making processes and the level of job autonomy, also, play a significant role in peoples' judgement on their job quality (Gallie, 2007).

In a cross-national approach, Holman (2013) presented a taxonomy of jobs in terms of their quality, using both pecuniary and non-pecuniary elements, such as skills level, flexibility, engagement and security of job, workers representation as well as other characteristics regarding the organisation of work. There are jobs that incorporate low- and high-quality elements and therefore, they cannot clearly be defined as high or low quality jobs, respectively. This depends on the weight each individual chooses to assign in each one of these elements. According to Holman (2013), active jobs are characterised by a combination of high levels of job discretion and social support and are considered to be these of the highest quality.

As illustrated in Table 4.1, differences in the disciplinary methodological "norms" between social science disciplines, can dictate the way job quality can be perceived. Even when a job can be objectively regarded as of a high-quality, the job holder might perceive it otherwise as there is other individualistic factors, which can influence peoples' judgement. Thus, even if a job is high-skilled with a great rate of autonomy according to the objective strand, subjective views in surveys, where respondents are asked to rate the quality of their job, could report high levels of job quality along with low levels of job satisfaction. This renders the concept of job quality as a very complex one, making it extremely difficult to be measured in a strict scientific way. Moreover, this makes policy-making a task that should be performed with extreme caution in all levels. However, there are scholars arguing that the methodology used to measure job

quality is no different from the one used to gauge employment or unemployment rates and since these rates have been already established as valid indicators, there is no reason why job quality cannot follow suit (Muñoz de Bustillo *et al.*, 2009; 2011).

Table 4.1: Dimensions of Job Quality Suggested by the Different Traditions of the Social Sciences

The orthodox economic approach: Compensating differentials	The radical economic approach	Behavioural economic approaches	The traditional sociological approach: Alienation and intrinsic quality of work	The institutional approach: Segmentation and employment quality	Occupational medicine and health and safety literature: Risks and impact of work on health	Work-life balance studies
Labour compensation: (1) Wages	Power relations: (2) Industrial democracy as a compensating power	(3) Participation	Objective strand: (4) Skills (5) Autonomy Subjective strand: (6) Powerlessness (7)Meaninglessness (8) Social isolation (9) Self-estrangement	(10) Contractual status and stability of employment (11) Opportunities for skills development and career progression	Conditions: (12) Physical risks (13) Psychosocial risks Outcomes: (14) Perceived impact of work on health (15) Absenteeism	Working time: (16) Duration (17) Scheduling (18) Flexibility (19) Regularity (20) Clear boundaries Intensity: (21) Pace of work and workload (22) Stress and exhaustion

Source: Muñoz de Bustillo *et al.* (2009: 13)

Other factors, such as the educational level of the job holder and the trade union participation, can also affect job quality, but once more, this is something that changes between countries, institutional regimes and occupational categories. However, most of the times, especially in long-scale studies, the measurement of job quality depends on the availability of data and the analytical methods used (Leschke and Watt, 2008; Vidal, 2013).

In the policy level, creating jobs of high quality is one of the major concerns of big international institutions, such as the OECD and ILO. The OECD acknowledges that by increasing the quantity of jobs in an economy does not mean much, when this is not accompanied by a concurrent increase on their quality. This is a perspective that the ILO and the EU share, as both stress the need for creating good jobs, irrespective of the economic climate (Burchell *et al.*, 2014). Likewise, institutions that inform policy-making at national level, suggest that the expansion of high-skilled and high salaried jobs can become a remedy for mitigating income and gender inequalities as well as can remove barriers in favour of social mobility, dragging the economy out of the recession (Hurley *et al.*, 2013).

European policy-makers are not indifferent in identifying the qualitative elements of employment. Even during periods of economic crisis, policy-making is much more directed in finding ways to decrease the number of unemployed people, the quality of job seems to gain momentum, as it has tight bonds with job stability and labour market sustainability. Muñoz de Bustillo *et al.* (2009) claimed that the European authorities have good reasons to direct the available resources accordingly, to investigate how job quality could be best assessed and measured. For example, the amount of hours Europeans spend, on average, at work is approximately 42 per week. This means that they spend approximately one third of their time to their working environments. Hence, having a good job can really boost the sense of well-being among them. Moreover, well-being is closely associated with sustainability, equality, economic development and standard of living. Thus, it is obvious that the quality of work improves these indicators as well. In economic terms, existing literature presented above also confirms

that job quality increases productivity in both the short- and long-run. (Gunderson, 2002; Fields, 2003; ILO, 2003; Kalleberg, 2011).

Moreover, Muñoz de Bustillo *et al.* (2009) summarising the most widely-known research approaches, which had been used to measure the quality of a job, split these approaches into three basic streams. The first regards those individuals that feel satisfied with their job, as working in a high quality job. Another one concerns the use of surveys, which include questions that directly ask the respondent to rate his/her job quality as well as other pertinent to these factors, such as health and safety, job security or job advancement opportunities. The third stream, which the authors seem to approve most, concerns a thorough investigation of the job quality literature, identifying specific determinants through time and between different countries, regions, occupational categories and demographic characteristics. Thus, past literature and data should be carefully collected in order these determinants to be reliably represented. The latter approach has been also followed by the author of this thesis, after carefully examining the applicability of the ESS data available. Lastly, job quality can be distinguished into the employment and work quality. The former refers to the employment relation, while the latter refers to the work activities that can affect workers' well-being (Figure 4.1). The analysis performed in the empirical part of this Chapter (Section 4.4) uses a composite variable to capture job quality as constructed by the relevant ESS variables (Section 4.3).

Figure 4.1: Sketching a General Model of Job Quality
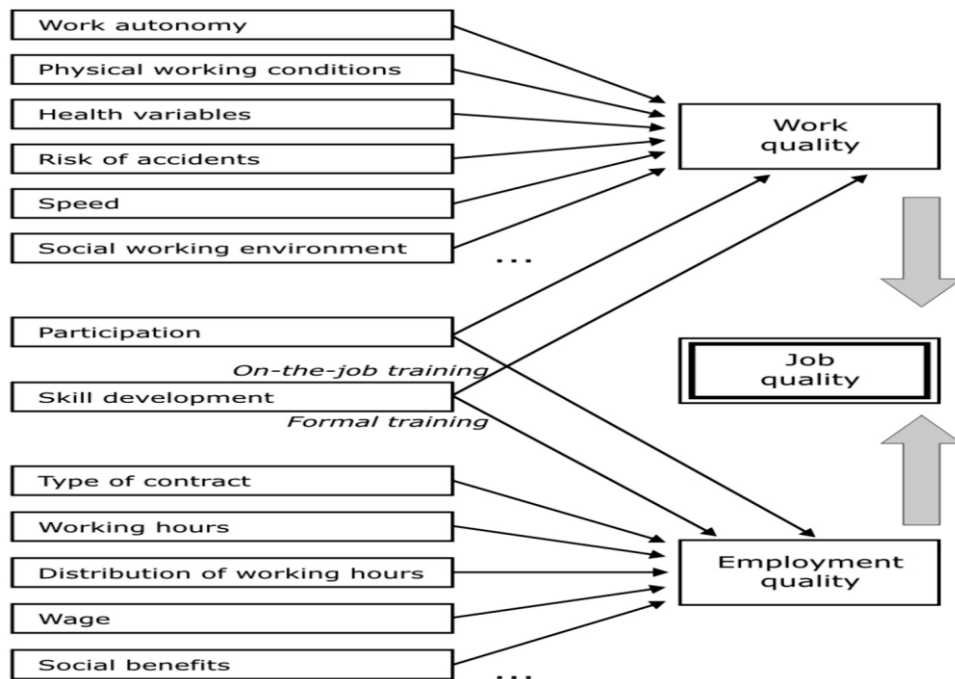
Source: Muñoz de Bustillo *et al.* (2009: 14)

In 2010, the United Nations (UN) released a report titled as "Measuring Quality of Employment", which was the product of a large-scale international pilot collaborative programme, where representatives from the EU, ILO, United Nations Economic Commission for Europe (UNECE), Women in Informal Employment: Globalizing and Organizing (WIEGO) as well as individual countries such as Mexico, the Republic of Moldova and Ukraine, worked in a two-year project related to the development of a conceptual framework, where the concept of the quality of employment could be statistically measured cross-nationally (UNECE, 2010). Based on the work of various scholars and group of experts worldwide, they came up with a framework that consists of seven dimensions regarding the concept of the quality of employment. These dimensions are summarised in Table 4.2.

Table 4.2: Job Quality Dimensions

A/A	Dimensions	Brief explanation
1	Safety and ethics of employment	This dimension refers to health and safety at work as well as to issues regarding child-labour and discrimination at work.
2	Income and benefits from employment	All income from employment is considered here. This includes pecuniary benefits, such as bonuses, commissions, gratuities, remuneration income in kind, taxable allowances, retroactive wage payments and stock options, all on a "gross" basis plus non-wage pecuniary benefits, such as supplementary medical, dental or pharmaceutical benefits.
3	Working hours and balancing work and non-working	This dimension concerns normal working hours plus overtime, the time of the day these working hours have been performed and the rate of balance between times devoted to work compared with the time spent in non-working activities.
4	Security of employment and social protection	The degree of work permanence as well as status of contract is measured here along with social protection factors regarding pension and other employment insurance contributions.
5	Social dialogue	The two major components of this dimension are trade union membership and collective bargaining plus the right that a worker has to take legal industrial actions.
6	Skills development and training	This dimension encompasses various educational credentials, skills and innate abilities of workers, their on-the-job training and the effect that overeducation has on the quality of employment.
7	Workplace relationships and work motivation	Workplace relationships refer to the social characteristics a job can entail, such as cooperation with colleagues, and work motivation refers to characteristics in the individual level, such as goals, competences, the rate of autonomy, or opportunities for advancement.

There are also various critiques on the indicators used to capture the quality of job, expressed on the basis of geographical and cultural difference. All indicators currently used, fail to capture the differences that exist between developing and developed countries as well as between countries with different welfare structure. Likewise, they do not include gender differences, albeit considerable evidences show that women hold job positions of lower quality than men (Ghai, 2003; Gautie and Schmit, 2010).

Based on the UNECE and ILO suggestions, a measurement of the quality of job has been attempted in the following Section, investigating how this can change between different countries and economic times.

4.3   Data and Methodology

This Chapter investigates the concept of job quality and how this can be affected by the most recent economic crisis and specific labour market settings across European countries. Employing an econometric technique similar to the one in Chapter 3[18], the focus shifts on an outcome variable with qualitative and more subjective characteristics, which has been constructed by grouping variables from the ESS that can arguably capture quality of job according to the relevant literature.

In particular, this outcome variable has been transformed into a binary one. The construction of the job quality composite variable, groups seven different variables, referring to characteristics of the respondents' current job. The ESS collects such information through various questions. However, in the ESS codebook, the variables with the prefix "Current job" in their label have been built to capture the qualitative characteristics of a job and therefore, they can be used as proxies for the construction of a unique variable measuring the quality of respondents' job. These variables are presented in Table 4.3, along with a summary of descriptive statistics for 2004 and 2010.

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[18] For a detailed theoretical specification of the model used see Section 3.3.

The variables "wage/salary depends on effort put into work", "job requires work very hard" and "can decide time start/finish work" have been excluded from the construction of this composite variable, as they refer more to individual characteristics and less to the quality of the job per se. These three variables have a strong idiosyncratic factor, which makes their interpretation rather dubious. However, the first and second can arguably describe work intensification, which is very likely to influence job quality. Moreover, apart from factors related to pressure and force, likely exercised by employers on workplace, dictating employees to spend more hours and energy at work, this decision can also depends on individual preferences. The same applies to other ESS questions related to the amount of working hours as well as the time of the day or the day of the week the job is performed. For example, certain individuals, who work during the weekend or night, might not consider their jobs as of low quality. Based on that, work intensification is more meaningful when examined in isolation, but equally, it cannot be seen easily as totally detached from the concept of job quality (Gallie, 2013). In the ESS there are numerous variables, which can be used to capture the rate of intensity in work. It is also very likely that this intensity could increase during recession. In the present study, the aspect of work intensification is represented by the variable on whether the current job offers enough time to meet the workload requirements, as it looks much more straightforward to be interpreted and more job-specific rather than idiosyncratic. For this reason, the latter variable has been decided to be included on the set of variables grouped to capture job quality.

Table 4.3: Proxy Variables Used for the Construction of the Job Quality Variable (Descriptive Statistics for 2004 and 2010)

	Variable	Obs	PWIGLS Weighted	Mean	Std. Dev.	Min	Max
2004							
1	*Current Job:* Variety In Work	16391	14129.63	3.514193	1.563335	1	9
2	*Current Job:* Job Requires Learning New Things	16391	14129.63	3.410807	1.634968	1	9
3	*Current Job:* Job Is Secure	16391	14129.63	3.508495	1.734904	1	9
4	*Current Job:* Wage/Salary Depends On Effort Put Into Work	16391	14129.63	2.676325	1.952166	1	9
5	*Current Job:* Can Get Support/Help From Co-Workers When Needed	16391	14129.63	3.624161	1.528946	1	9
6	*Current Job:* Can Decide Time Start/Finish Work	16391	14129.63	2.642659	1.95988	1	9
7	*Current Job:* Health/Safety At Risk Because Of Work	16391	14129.63	2.52635	1.96021	1	9
8	*Current Job:* Job Requires Work Very Hard	16391	14129.63	3.046387	1.765021	1	9
9	*Current Job:* Never Enough Time To Get Everything Done In Job	16391	14129.63	3.523379	1.663008	1	9
10	*Current Job:* Good Opportunities For Advancement	16391	14129.63	3.859514	1.620057	1	9
2010							
1	*Current Job:* Variety In Work	16343	14668.43	3.481651	1.4504	1	9
2	*Current Job:* Job Requires Learning New Things	16343	14668.43	3.35133	1.52565	1	9
3	*Current Job:* Job Is Secure	16343	14668.43	3.428781	1.619496	1	9
4	*Current Job:* Wage/Salary Depends On Effort Put Into Work	16343	14668.43	2.529859	1.854072	1	9
5	*Current Job:* Can Get Support/Help From Co-Workers When Needed	16343	14668.43	3.626948	1.376588	1	9
6	*Current Job:* Can Decide Time Start/Finish Work	16343	14668.43	2.5361	1.861264	1	9
7	*Current Job:* Health/Safety At Risk Because Of Work	16343	14668.43	2.473637	1.834275	1	9
8	*Current Job:* Job Requires Work Very Hard	16343	14668.43	2.884955	1.660765	1	9
9	*Current Job:* Never Enough Time To Get Everything Done In Job	16343	14668.43	3.435323	1.575041	1	9
10	*Current Job:* Good Opportunities For Advancement	16343	14668.43	3.71975	1.549997	1	9

Source: ESS Rounds 2 and 5 (Author's Calculations)

The researcher argues that the remaining seven variables can be interpreted in a more straightforward way. Learning new things, variety, security, support from co-workers, health and safety issues as well as whether the current job offers enough time to meet the workload requirements, even though still not strictly objectively interpretable, refer more to job's characteristics than to individual preferences. Therefore, these variables have been grouped and transformed into a single binary one, which can arguably denote the quality of a job. Before the grouping was computed, all aforementioned variables have been also transformed into binary ones. The original variables in the ESS are in a discrete ordinal format. Missing values- Not Applicable, Refusal, Don't Know and No Answer- have been excluded from the transformation performed. Overall, four discrete valid values have remained to each variable used. Negative values, represented by the responses "Not at all true", "A little true" or "Disagree", "Disagree strongly" and "Neither Agree or Disagree" where applicable, have been merged taking the value of 0. Likewise, the responses of "Quite true", "Very true" or "Agree strongly" and "Agree" take the value of 1. The "0" value corresponds to low quality jobs and "1" to high quality[19], meaning that those, who responded in a way that are grouped to more "1" than "0" values, are classified as having a high quality job. On the other hand, those with more "0" are classified as having a low quality job. Therefore, the job quality composite variable includes two categories: those that work in low quality jobs (value 0) and those in high quality jobs (value 1). A descriptive overview of this variable between countries is illustrated for 2004 and 2010 in Appendix C (Figures C3 and C4).

The final sample has been initially selected based on the limitations mentioned in Chapter 3. However, the analysis in this Chapter focuses only on employed people and therefore, the unemployed have been excluded from the sample.

The final model estimated includes, apart from educational attainment, other covariates that have been used as control variables. These are:

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[19] There is one exemption to this rule. This is the variable with the label "Never enough time to get everything done in job". In this case and because of the "negative" way this variable is asked, negative values represent high quality jobs and positive values low quality.

1. Age, after dividing them into two categories: the younger, aged between 25 and 40 years old; and the older, aged between 41 and 70 years old (Binary variable/values: 0 for 25-40; 1 for 41-70).

2. Gender (Binary variable/values: 0 male; 1 female).

3. Area of domicile (Categorical variable/values: 1 a big city; 2 suburbs or outskirts of big city; 3 town or small city; 4 country village; 5 farm or home in countryside).

4. Number of hours worked (0: 1-15h; 1: 16-35h; 2: 36-60h; 3: More than 60h).

5. Years of working experience (Continuous variable).

6. Trade union participation.

7. Gross Monthly Wage.

8. A variable that shows whether someone has been unemployed for more than 12 months, in the past (Binary variable/values: 0 No; 1 Yes).

9. A variable that shows whether someone has attended a course/conference that has improved his/her knowledge (Binary variable/values: 0 No; 1 Yes).

10. A variable that shows whether someone cohabits (Binary variable/values: 0 No; 1 Yes).

11. A variable that shows whether someone is hampered in his/her daily activities by any illness or disability (Categorical variable/values: 0 No; 1 Yes, to some extent; 2 Yes, a lot).

According to Wald-test of significance, the variables regarding age, gender, domicile, working hours, trade union participation and years of working experience are statistically insignificant and therefore, have been excluded from the model. Thus, the final model used consists of a dependent variable *(Q)*, as a function of eight independent variables, where: *YEd* refers to years of education; *C* to the country of residence; *T* to the calendar year dummy; *W* to the gross monthly wage; *U12* to whether or not respondents have been unemployed for more than 12 months in the past; *Cou* to whether or not the respondents attended any course/conference or anything that improved their knowledge; *Co* to cohabitation and *H* to the extent respondents are hampered by health issues in their everyday life. The existing relevant literature informs that variables regarding industry and occupational classification are also very

likely to affect the quality of job. However, since this thesis compares between countries, firm- and occupational-specific variables are more likely to take a very different meaning across countries and therefore, it has been decided that they are not suitable to be used as control variables in the three models, which are described below. Before proceeding with the estimation of all regression models, a descriptive analysis of all variables used for 2004 and 2010 has been conducted. This can be found in Appendix C (Tables C4 and C5).

In total, three statistical models have been estimated. Model 1 includes the variable regarding years of education; all control variables that are significant and an interaction between country *(C$_i$)* and calendar year *(T$_i$)*. This model shows the employment quality odds ratio (EQOR) for someone with educational attainment equal to each country's compulsory level in 2010 as opposed to 2004, treating the variable regarding years of education as a control variable.

Thus, for individual *i*:

$$JQ_i = f(YEd_i, C_i, T_i, W_i, U12_i, Cou_i, Co_i, H_i, T_i \times C_i)$$

Statistically, where *JQ* is Job quality, *(a)* is the constant, *(b$_1$...b$_9$)* the beta parameters and *(ε)* the error term, for individual *i* the model will estimate:

$$JQ_i = a + b_1(YEd_i) + b_2C_i + b_3T_i + b_4W_i + b_5U12_i + b_6Cou + b_7Co_i + b_8H_i + b_9(T_i \times C_i) + \varepsilon_i$$
$$(4.1)$$

Since this study is mainly interested in the EQOR differences with respect to education (EQOR$_{ed}$), recognising also that there are other factors apart from the educational attainment that contribute to this, two additional Models have been estimated: Model 2 refers to the 2004 data set, including all control variables and an interaction between the years of education and country variables. Model 3 includes the same variables, but this time using the 2010 ESS data set. Thus, these Models take the following form:

$$U_i = a + b_1 YEd_i + b_2 C_i + b_3 W_i + b_4 U12_i + b_5 Cou + b_6 Co_i + b_7 H_i + b_8 (YEd_i \times C_i) + \varepsilon_i$$

$$(4.2)$$

Therefore, hypothesis testing can be stated as follows:

$$H_0 : b_1 = 0 \rightarrow \text{Years of education has no effect on someone's Quality of Job}_{\text{after}}$$

$$\text{adjusting for country and year}$$

$$H_1 : b_1 \neq 0 \rightarrow \text{Years of education does affect someone's Quality of Job}_{\text{after}}$$

$$\text{adjusting for country and year}$$

The empirical analysis performed in this study uses odds ratio as a measure of effect size. This ratio is the odds of relative importance of the independent variables, in terms of effect on the dependent variable's odds. When logit coefficients are used instead of odds ratios, the interpretation lies on the relative importance of the independent variables, in terms of effect on the dependent variable's log odds, which under a comparison study analysis cannot provide adequate information and are less explanatory and intuitive (Field, 2009). Therefore, it has been decided that logit coefficients will not be used.

Furthermore, logistic regression among other requirements, such as the measurement of factors on the interval level and the creation of dummy variables, needs large samples to be accurate (Field, 2009). These requirements are met when using the ESS, due to the large size of the sample.

Finally, the analysis of the alternative hypothesis can be distinguished into two separate fragments. If $\exp(b_1) > 1$, there is a positive relationship between years of education and job quality and therefore, an additional year of education can increase the probability for someone to have a high quality job. If, on the other hand, $\exp(b_1) < 1$, the correlation is negative and thus, it is more likely for someone with a lower educational attainment to

have a low-quality job than a more educated one. The same applies to all other independent variables examined.

4.4 Hypothesis Testing and Analysis of Results

Table 4.4 presents the regression estimations (odds-ratios) for all significant control variables that have been used in Models 2 and 3. Concerning the wage variable, the information collected by the ESS is retrieved by two questions:

- "What is your usual gross[20] pay before deductions for tax and insurance?
- How long a period does that pay cover?"

Respondents were asked to choose from: hourly, daily, weekly, every two weeks, every four weeks, monthly and yearly. Approximately 74% of the participants reported monthly earnings data. Hence, all values found regarding gross pay have been transformed into a monthly format, using the technique found in Galasi (2008).

Table 4.4: Odds Ratios Estimations for Control Variables (Models 2 and 3)

	2004		2010	
Job Quality Status	**exp(b)**	**P>z**	**exp(b)**	**P>z**
Monthly wage	1.016	0.000	1.019	0.000
Long-Term Unemployment (U12)	0.699	0.000	0.710	0.000
Further Training (*Cou*)	2.342	0.000	1.905	0.000
Cohabiting (*Co*)	1.109	0.018	1.207	0.000
Health Condition (*H*)				
2. Hampered by Health Problems A Little	0.747	0.002	0.736	0.000
3. Hampered by Health Problems A Lot	0.560	0.000	0.704	0.009

Source: ESS Rounds 2 and 5 (Author's calculations)

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[20] ESS collects pay data in both net and gross format. In the first one, respondents, unfortunately, reported their remunerations as a raw number, without assign it into a period that this cover. Participants were rather reluctant to reply to the net part of the pay question and thus, the missing values consist of more than 70%. Therefore, it was decided not to be used in this study. On the contrary, this was not the case in the gross wage question and it just needs some transformation before used for comparisons.

Gross monthly wage, measured in Euros for all countries, has been rescaled in such a way, representing the effect of a 100 unit (Euros) increase, instead of just one unit, on the outcome variable. Interpreting the gross monthly wage, for every 100 Euros rise, the odds of having a high quality job compared to a low quality, increase by 1.6%. This shows that, remuneration is a rather weak determinant of job quality, as measured by this study, not taken into account the possible differences that might exist between countries.

Concluding, and since the purpose of this study is not primarily to analyse the effect of each control variable, results revealed that those that are paid more are also more likely to have a high quality job. However, the effect, even if it is significant, is rather weak. Moreover, those that have attended a course or those who cohabit are more likely to have a high quality job, assuming that all other variables are kept constant. Spells of unemployment seem to have some negative effect on the probability of someone to have a high quality job, as those who have experienced long-term unemployment for more than twelve months are more likely to be employed in low-quality jobs. Finally, those whose health situation hinders their working lives are more likely to have low quality jobs, compared with those that do not have any health problem. The odds ratios do not differ much for 2010.

The odds ratios corresponding to the interaction between educational years and country are presented in Table 4.5. EQOR refers to Model 1 and EQOR$_{ed}$ to Models 2 and 3 for 2004 and 2010, respectively. All countries are sorted by the welfare state regime they belong to. Odds ratios below the unit are presented in brackets. The last column shows whether the value, in terms of average odds ratio within each country, of an additional year of education has increased or decreased. Downward trends are illustrated by the red arrow and upward trends by the green one.

All interaction terms in all Models are highly significant. The interaction term between country and calendar year shows the difference, between 2004 and 2010, in the EQOR for someone with an educational attainment equal to the number of years needed for the compulsory level to be completed within each country.

Table 4.5: Odds Ratios Estimations for Models 1, 2 and 3

	(Model 1) EQOR in 2010 vs 2004	(Model 2) $EQOR_{ed}$ (2004)	(Model 3) $EQOR_{ed}$ (2010)	2004-2010 Temporal Trend in EOR_{ed}
Continental				
*Belgium (**BE**)*	1.89	1.01	1.03	↑
*Germany (**DE**)*	5.02	1.13	1.08	↓
*France (**FR**)*	1.23	1.08	1.07	↓
*The Netherlands (**NL**)*	1.79	1.03	1.02	↓
Liberal				
*Great Britain (**GB**)*	1.16	1.01	1.04	↑
*Ireland (**IE**)*	(0.23)	1.19	1.07	↓
Nordic				
*Denmark (**DK**)*	2.91	1.03	(0.97)	↓
*Finland (**FI**)*	1.73	1.14	1.09	↓
*Norway (**NO**)*	1.71	1.04	1.06	↑
*Sweden (**SE**)*	3.11	1.09	1.05	↓
Southern				
*Spain (**ES**)*	(0.53)	1.00	1.03	↑
*Greece (**GR**)*	1.79	1.08	1.15	↑
*Portugal (**PT**)*	1.25	1.00	1.05	↑
Eastern				
*The Czech Republic (**CZ**)*	1.83	1.13	1.21	↑
*Estonia (**EE**)*	1.32	1.14	1.13	↓
*Hungary (**HU**)*	1.99	1.14	1.07	↓
*Poland (**PL**)*	2.67	1.10	1.13	↑
*Slovenia (**SI**)*	1.54	1.06	1.10	↑
*Slovakia (**SK**)*	2.95	1.02	1.12	↑
Statistics				
N	19,031	9,150	9,875	
Pseudo-R^2	0.12	0.11	0.13	
AIC	0.324	0.295	0.352	

*Note: The interactions between country and calendar year estimated in Model 1 (EQOR), country and **YEd** ($EQOR_{ed}$) estimated in Model 2 and 3 for 2004 and 2010 respectively, have been found statistically significant at the 99% confidence level.*
Source: ESS Rounds 2 and 5 (Author's calculations)

Model 1 shows that in only two countries, Ireland and Spain, the EQOR have been decreased. This means that the probability of someone to have a high quality job is lower in 2010 compared to 2004. Contrariwise, Germany shows a remarkable increase in EQOR, as it increased by more than five times [exp(b)=5.02]. A positive effect is also clear in Sweden, Slovakia, Denmark and Poland. For the remaining countries, the EQOR has been estimated below 2.00; however, this is still a very strong effect, which ranges from 1.16 for the UK to 1.99 for Hungary.

In terms of welfare state regimes classification, since there are only two countries where the EQOR has been decreased, the trends for the remaining countries look similar and increasing. However, the magnitude of this increase ranges considerably even within regimes. Finally, the EQOR in Eastern countries seem to reveal the least divergence on the magnitude of this effect, compared with all other welfare state regimes.

Figure 4.2 illustrates the predicted job quality probability of each country, plotted over years of education. The solid line represents 2004 (Model 2) and the dashed 2010 (Model 3). The differences in the job quality probability, between 2004 and 2010, can be geometrically measured by the distance between the two curves in any point of the x axis (not shown in the figure). These curves, from now on, will be called *predicted job quality curves*. The slope on the predicted job quality curve, on each point of years of education, shows how much an additional year of education contributes to someone's expected job quality. Even if the logistic model is not considered as strictly linear, a strong pattern of linearity can be observed in all countries for both 2004 and 2010[21]. In countries where the slope is steeper, an additional year of education seems to have a bigger impact on the probability of having a high quality job. On the other hand, where the slopes are more flat, years of education do not play a prominent role to this and

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[21] Logistic regression concerns a maximum likelihood logit model, which calculates conditional means in terms of logits (log odds). In other words, the logit model can be seen as a linear model in log odds terms. Linear models are easier to handle compared to nonlinear. The assumption made in linear models is that the slopes and/or differences in means remain unchanged for different values of the independent variable. On the other hand, this does not necessarily stands for nonlinear models. However, strong patterns of linearity, as the ones found in this study, are not that uncommon.

therefore, the quality of job seems to be affected more by other reasons and less by additional educational attainment.

Figure 4.2: Models 2 and 3: Job Quality Probability Curves (2004 and 2010)
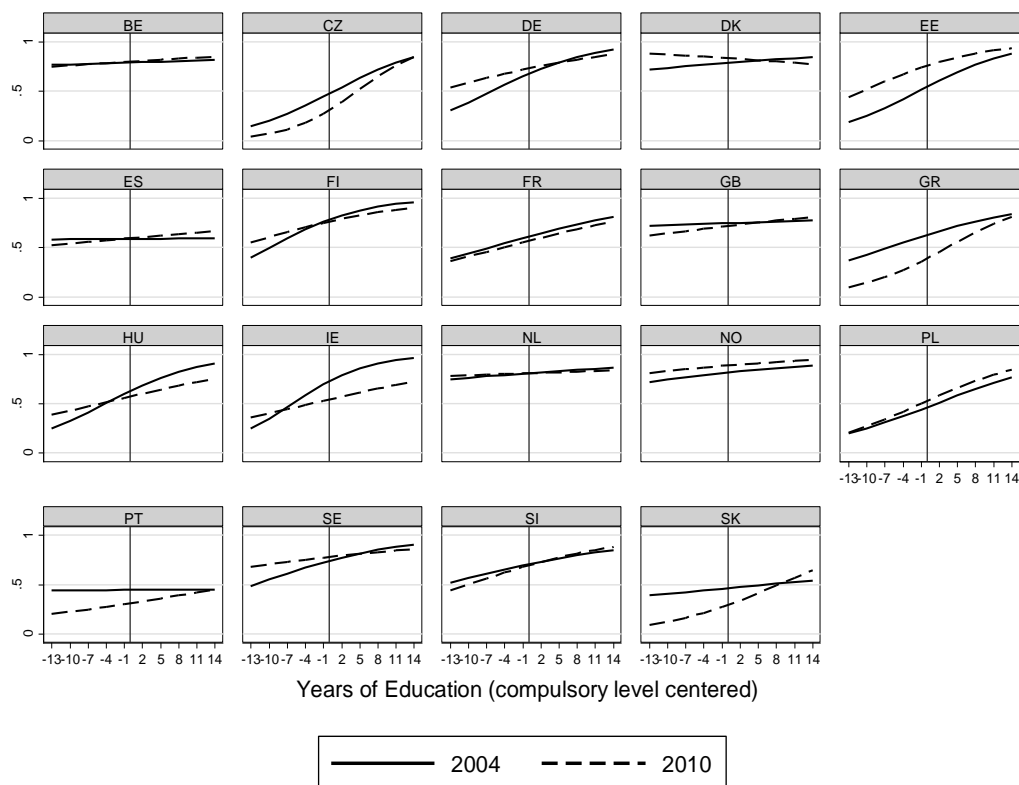
Source: ESS Rounds 2 and 5 (Author's calculations)

Looking at Model 2, the effect of an additional year of education on job quality seems rather small in all countries and particularly, in Portugal, Spain, the UK and Belgium. In these countries, the EQOR$_{ed}$ is equal to the unit or marginally above it (<0.01) and therefore, it seems that additional educational attainment is not a strong factor to increase the probability of someone finding a high quality job. Moreover, in Slovakia, the Netherlands, Denmark and Norway the effect is also relatively small, as it accounts for less than 0.05 in the odds ratio scale.

The literature is still unclear and quite limited on whether the higher-educated hold jobs of better quality, compared to the lower-educated. This is by large, due to the fact that job quality is a concept mainly described based on subjective judgements than objective

and strict criteria. The empirical analysis attempted in this study is based on ESS participants' perceptions, but it tried to minimise bias by focusing more on job characteristics that can affect the quality of job someone is doing, according to the relevant literature.

The results from Models 2 and 3 show that, in most countries, education has a positive effect on job quality, but the magnitude of this effect changes across countries and through time (Figure 4.3). The only exception is Denmark in 2010, where the effect is marginally negative. Regarding welfare state regimes, in most of them, no common temporal trend can be identified between the countries of each regime, as the 2004-2010 change in $EQOR_{ed}$ seems more country- than regime-specific. The Southern welfare state regime stands as an exception, as the $EQOR_{ed}$ shows an increasing trend for all its countries. However, the effect in Greece is much stronger compared to Spain and Portugal, for both 2004 and 2010.

Figure 4.3: $EQOR_{ed}$ (2004 Vs 2010)
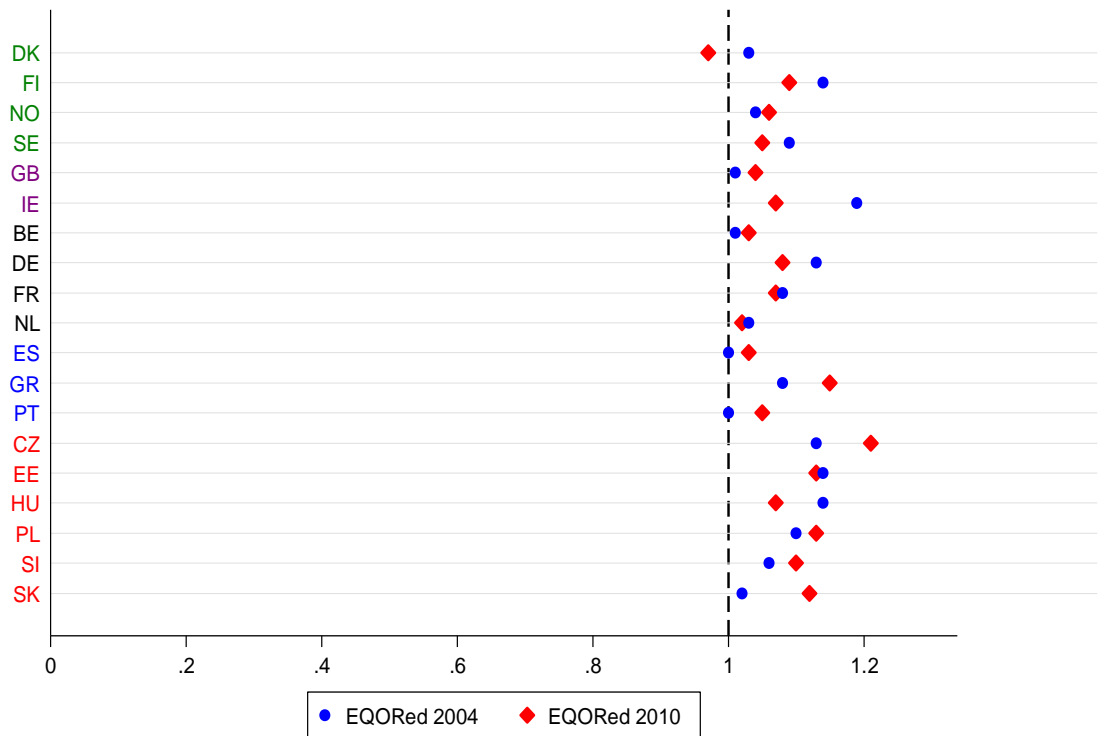
Source: ESS Rounds 2 and 5 (Author's calculations)

Summarising, it seems that the effect of additional educational attainment on the quality of job is positive in all countries, except Denmark for 2010. Moreover, in Southern countries the $EQOR_{ed}$ in 2010 is higher than 2004, but this is not the case in all other welfare state regimes.

The Models presented above inform that most countries performed in a rather uniform way, in terms of EQOR, but this is not the case with $EQOR_{ed}$. The quality of job, as defined in this study, has been negatively and extensively affected in Spain and Ireland, which was the two of the most affected countries in terms of GDP negative growth as well as unemployment increases. However, in other countries where recession had a considerable negative effect, such as Greece, Portugal Estonia, Hungary or the UK individuals' perceptions on the quality of their job increase , on average.

Moreover, the most recent recession, was very severe in some of these countries and might have affected people with particular characteristics more than others. Likewise, the same can be implied for the institutional settings and economic characteristics of each labour market.

This thesis accounts for the effect a bad economic climate has on the labour outcome of individuals, in terms of GDP growth and HUR (Section 1.3). The most recent recession is used as an example. Figure 4.4 shows the relationship between the temporal 2004-2010 $EQOR_{ed}$ change estimations and the temporal change in the four-year averages GDP growth rates prior to 2004 and 2010 (Section 1.3). The correlation between $EQOR_{ed}$ and GDP growth rate trends is very moderate (r=0.23), making the goodness-of-fit of this bivariate relationship low (0.05) and therefore, not statistically significant.

Figure 4.4: Temporal Change in EQOR_ed and Change in GDP Growth Rates
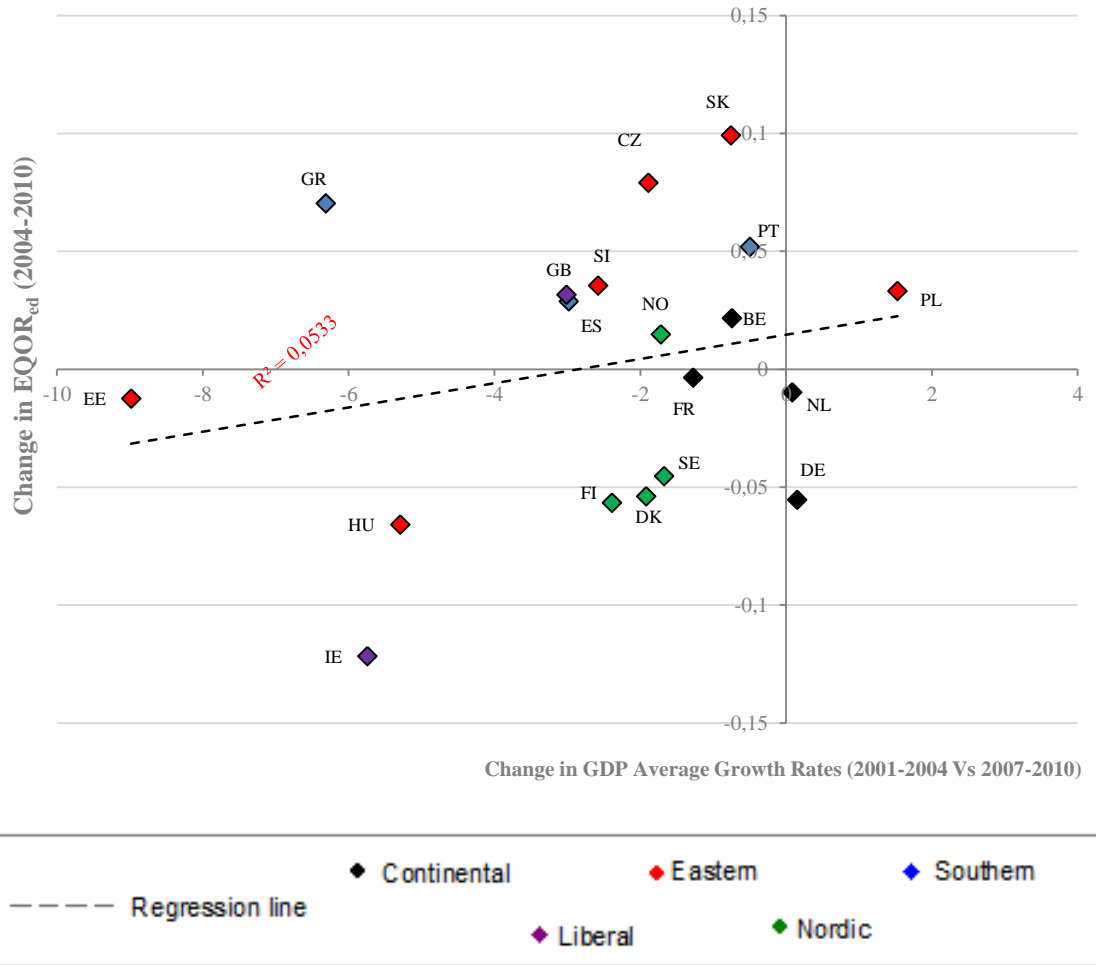
*Note: r=0.23

Source: ESS and World Bank (Author's Calculations)

Regarding Figure 4.5, the fluctuations on the average level of unemployment seems highly correlated (r=-0.44) with the change in EQOR_ed to all countries examined. The correlation is negative, but slightly statistically insignificant. However, it indicates a trend showing that when the unemployment is rising, the quality of job of a higher-educated, compared to a lower-educated, seems to fall. As it can be seen from the Figure, this trend is rather consistent between countries with the exception of the UK, Spain and Greece, where EQOR_ed rise along with the unemployment rate.

Figure 4.5: Temporal Change in $EQOR_{ed}$ and Change in HUR

Change in Average HUR (2001-2004 Vs 2007-2010)
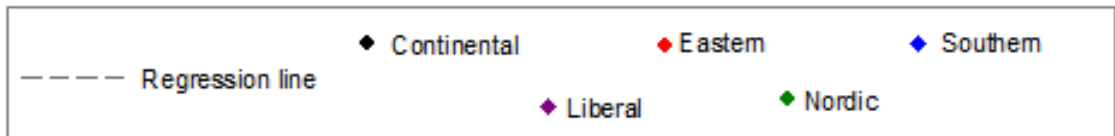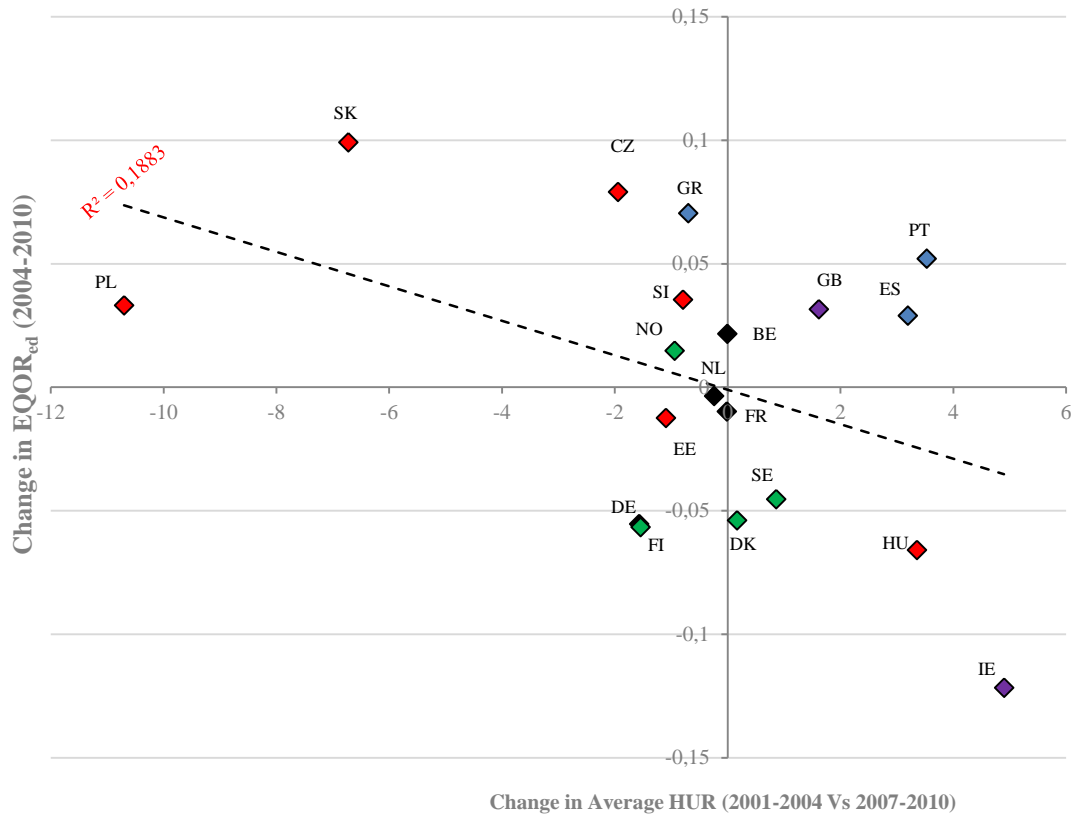
*Note: r=-0.44

Source: ESS and World Bank (Author's Calculations)

In terms of welfare state regimes, the Nordic countries show some consistency in both GDP growth rate and HUR terms, but such consistency is not apparent in all other regimes.

Generally, $EQOR_{ed}$ trends are characterised by some variation between countries. This is also true when countries are classified by welfare state regime, apart from the Southern regime, where the temporal change in $EQOR_{ed}$ seems rather uniform among countries.

Moreover, this study goes beyond the welfare state regimes, capturing the effect of each country's labour market settings on the quality of job between individuals with different educational attainment in terms of $EQOR_{ed}$, as these have been calculated by Models 2 and 3 using the two-step approach (Section 1.3). In total, nine different country-level variables, which capture the economic performance, the fiscal situation, wealth, labour market's flexibility and enrolment in higher education, have been employed, expressed in terms of 2001-2004 or 2007-2010 averages.

Table 4.6 shows that when all these variables are regressed over the estimated $EQOR_{ed}$, for both 2004 and 2010, none of these are significant in the 95% confidence level. Certainly, this is what it was expected, as a great level of multicollinearity exists due to the aggregate format of the variables as well as the small number of countries examined (N=19), especially when compared with the number of predictor variables (9).

Table 4.6: Macro-level Determinants of $EQOR_{ed}$: Two-step Approach Estimation Results

$EQOR_{ed}$	2004		2010	
	Coef.	P>t	Coef.	P>t
GDP growth	0.037941	0.407	0.004869	0.642
HUR	-0.00377	0.499	-0.00877	0.24
Size of Government	0.004817	0.388	-0.00247	0.368
Debt to GDP	-0.0008	0.561	5.15E-05	0.92
GDP/Capita	-2.13E-06	0.44	-1.15E-06	0.476
Part-time to Full-time	0.000814	0.88	-0.00261	0.295
Temporary to Permanent	-0.0873	0.875	-0.09253	0.732
EPL Strictness	-0.00834	0.922	-0.00315	0.929
Gross Enrolment Ratio	0.000164	0.944	0.000647	0.632
Goodness-of-fit:				
Adjusted-R^2	-0.19		0.16	

Source: ESS, Eurostat, World Bank, IMF, OECD, UNESCO (Author's Calculations)

Because of the above limitations a much simpler model would be preferable (Tabachnik and Fidell, 2007). Such a simple modelling technique is the two-step approach in a bivariate format, which has been suggested in the literature as an alternative to reconcile

single-step with multi-level regression techniques, as it manages to describe and visualise the effect between variables operating on a different level, when the requirements of multi-level regression techniques cannot be met adequately (Section 1.3).

Therefore, once each of the aforementioned macro-level determinants are examined in a bivariate manner and regressed over the estimations produced in Models 2 and 3, then some relationships look much stronger. On the other hand, R^2 is still very low and this informs that the results need to be interpreted with some additional caution. After testing all aforementioned variables, only two have been found as statistically significant for just 2010.

Table 4.7 presents the estimations of two regressions. In the first one, $EQOR_{ed}$ has been regressed over GDP/Capita. The relationship is insignificant for 2004, but it becomes significant in 2010. The effect seems rather weak, but is still negative. Therefore, it appears that the higher the GDP/Capita in a country, the more likely is for the $EQOR_{ed}$ to be lower. This means that the difference in the quality of job, between high- and low-educated, is estimated to be smaller in countries with higher GDP/Capita. Looking on the temporal trends, between 2004 and 2010, the change in $EQOR_{ed}$ has been also regressed over the average change in GDP/Capita [average (2001-2004)-average (2007-2010)] and has been found as highly insignificant. Therefore, it seems that no robust statistical argument can be made in terms of policy recommendations, as it is not clear whether an increase on the GDP/Capita is likely to drive $EQOR_{ed}$ downwards or vice versa. The $EQOR_{ed}$ seems to be much more related to the GDP/Capita level per se, rather than its fluctuations through time.

Table 4.7: Significant Macro-level Determinants of EQOR$_{ed}$: Two-step Approach Estimation (Bivariate Regressions)

EQOR$_{ed}$	2004		2010	
	Coef.	P>t	Coef.	P>t
GDP/Capita (000s)	-0.0004	0.582	-0.002	0.006
Goodness-of-fit:				
Adjusted-R^2	-0.04		0.33	
PT/FT ratio	-0.001	0.329	-0.003	0.006
Goodness-of-fit				
Adjusted-R^2	0.0006		0.33	

Source: ESS, World Bank and OECD (Author's calculations)

Likewise, the ratio between part-time and full-time employment (PT/FT) is insignificant in 2004, but it becomes significant in 2010. Looking at the 2004-2010 temporal trend, the average ratio change is also insignificant, which means that fluctuations through time do not seem to affect the direction EQOR$_{ed}$ is likely to move. However, the relationship between EQOR$_{ed}$ and PT/FT in 2010 seems to have a significant negative effect, meaning that the bigger the share of PT jobs in an economy the lower the EQOR$_{ed}$ and thus, the smaller the "job quality gap" between low- and high-educated.

The relationships between EQOR$_{ed}$ and GDP/Capita as well as EQOR$_{ed}$ and PT/FT are illustrated in Figures 4.6 and 4.7 respectively. In these figures, countries are highlighted in different colour, according to the welfare state regime they belong to. Nordic countries are highlighted in green, Continental in black, Liberal in purple, Southern in blue and Eastern in red. Hollow circles and plus symbols refer to 2004, whereas arrowheads to 2010. Plus symbols indicate that there has been an increase in EQOR$_{ed}$ between 2004 and 2010, while hollow circles show a decrease or that they have remain the same. Moreover, the dotted line that connects the arrowhead with the plus or hollow circles indicates the trends of each macro-level determinants between 2004 and 2010. Therefore, upward arrows show an increase, whereas downward a decrease. Finally, the two regression lines for 2004 and 2010 are also presented. The regression line for 2004

is depicted by the grey solid line, whereas the grey dashed line represents 2010.

Figure 4.6: Relationship between GDP/Capita and EQOR$_{ed}$
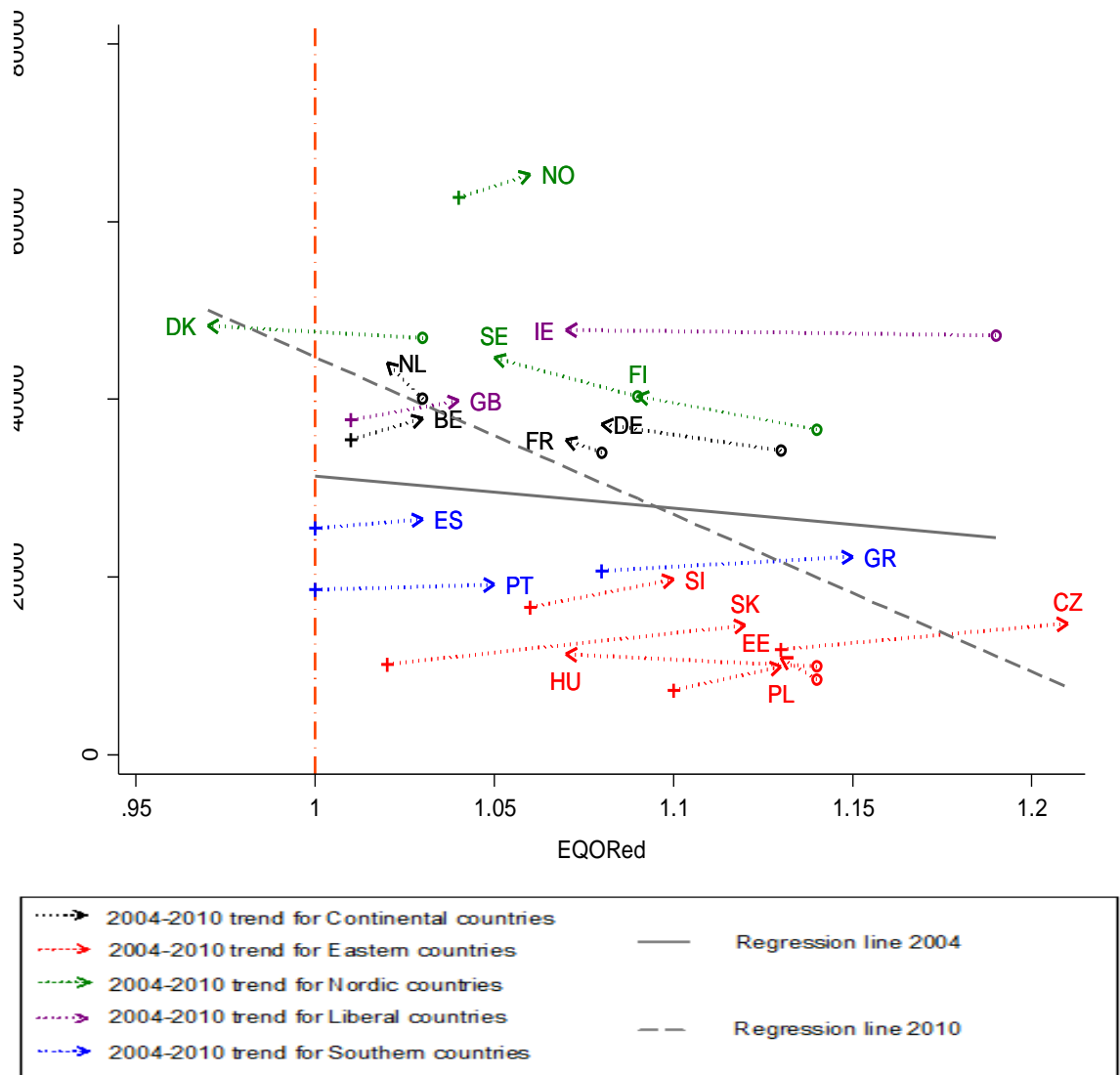
Source: Author's Calculations based upon Table 4.7

Figure 4.7: Relationship between PT/FT and EQOR_ed
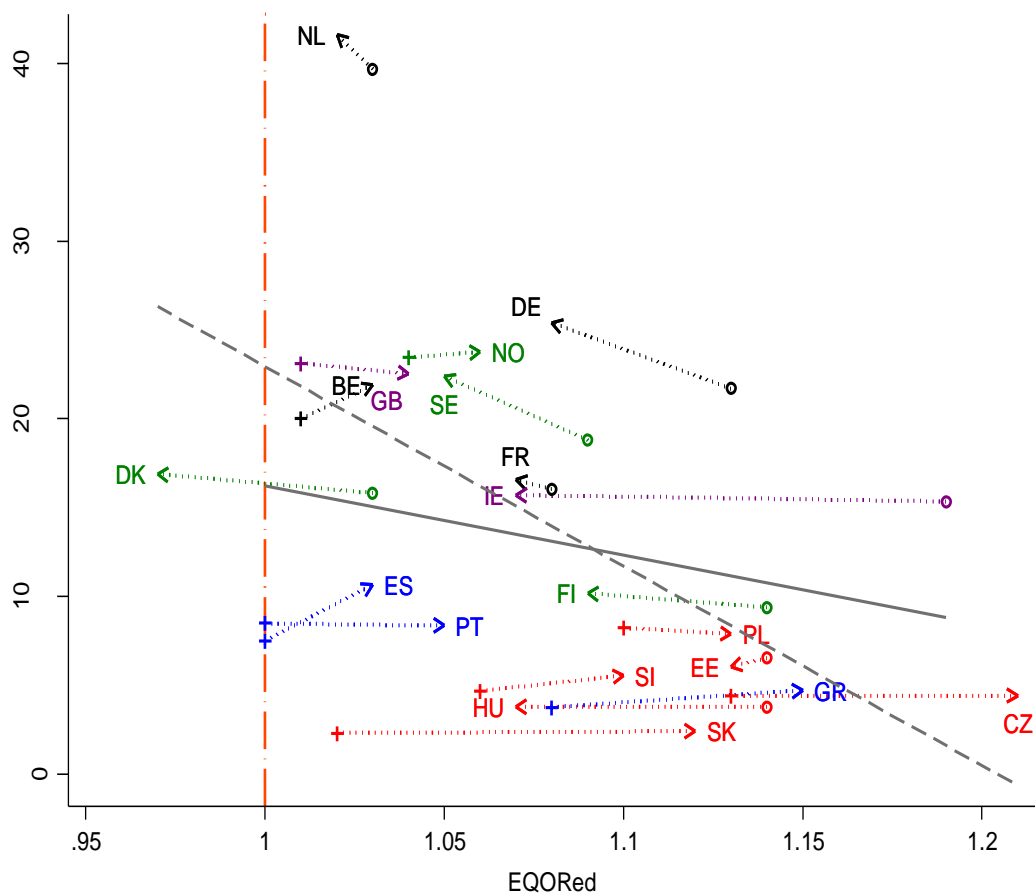
Source: Author's Calculations based upon Table 4.7

4.5 Summary and Conclusions

Job quality is a multidimensional concept, heavily influenced by individual preferences. This Chapter focused on presenting the most contemporary empirical literature on job quality across social science disciplines, where it seems that there is some positive relationship between higher educational attainment and job quality (Kalleberg and Vaisey, 2005 ; Kalleberg, 2011 ; Edgerton *et al.*, 2012 ; Ionescu and Cuza, 2012).

Nonetheless, the main problem lies on the measurement of this concept, which makes comparisons between studies a significantly complex and difficult task. This study builds on the current methodological framework promoted by institutions, such as the EU, ILO and UN, to construct a variable, which can encompass various factors that are related to the quality of job, based on the subjective judgements of individuals from nineteen European countries, who participated in the ESS in 2004 and 2010.

The null hypothesis that the educational attainment is not related to job quality has been rejected in most countries, but there are a few, where the effect of education does not seem that strong. It seems that quality of job, as defined in this study, is positively related to the educational attainment of an individual. Even if results are statistically significant, the model performs low in terms of goodness-of-fit[22]. This might inform that quality of job cannot be fully captured by quantitative tools. However, the construction of a composite variable, which includes certain dimensions commonly understood by the literature as factors that influence the quality of job, can offer just an indicative measure of working conditions within workplaces and therefore, more research is needed by testing the concept using different data sets and countries outside Europe as well.

This Chapter focused on the effect of educational attainment, in terms of years of education, on the probability of someone having a high quality job and how this effect is moderated by recessionary periods and the each country's labour market settings.

Comparing countries, when educational attainment is not taken into account, only in Spain and Ireland the EQOR seems to be much lower in 2010 compared to 2004. These countries have been severely hit by recession, but the same trend has not been revealed in Estonia, Hungary, Greece and Portugal, where recession has been also severe. Still, in these countries EQOR has increased at a much lower rate compared to the countries, where recession did not have a strong impact.

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[22] Model 3 seems to perform slightly better, compared to Models 1 and 2 in various statistical tests performed (Appendix C, Table C6).

In terms of the effect of a bad economic climate on job quality of individuals with different educational attainment, the existing literature, albeit very limited, seems to incline towards the argument that it has affected the low-educated more than the high-educated. The empirical analysis attempted in this study, showed that in both 2004 and 2010, additional years of educational attainment contribute positively on the job quality of individuals in all countries, except Denmark for 2010.

Examining the effect of each coyntry's economy and labour market settings on the quality of job of individuals with different levels of educational attainment, the GDP/Capita and the PT/FT between workers seem to have a minor negative effect that is also statistically significant, but only for 2010 $EQOR_{ed}$ estimations . All other macro-level determinats, analysed in Section 1.3, have been found as statistically insignificant. Looking at the GDP/Capita for 2010, it is quite uniform within all welfare state regimes, as all the countries within each regime share common figures. The relationship between GDP/Capita and $EQOR_{ed}$ is negative, indicating that the job quality gap between high- and low-educated is likely to be narrower in wealthy countries.

Finally, regarding the PT/FT ratio, there is a great variation between countries. In the Southern and Eastern countries this ratio is very low, indicating a non-flexible market, where PT work is not that widespread. The relationship between PT/FT and $EQOR_{ed}$ even negative is not significant in 2004. However, this negative relationship becomes statistically significant in 2010, indicating that higher educational attainment is more likely to lead to a high quality job in non-fexible labour markets.

5 CHAPTER 5: RETURNS TO EDUCATION IN EUROPE: AN EMPIRICAL ANALYSIS

5.1 Introduction

The mainstream view in economics sees education as an ordinary investment. The main reason someone consumes time and money to undertake higher levels of education is the high returns expected from the corresponding wage premium, when enters the labour market (Becker, 1964; 1993; Psacharopoulos, 1999; 2004). The greater the wage-gap between low- and high-skilled, the higher the returns and the greatest the investment incentive will be. But, given that higher educational attainment, most of the times, involves tuition fees as well as an opportunity cost, as the incentive to undertake higher education becomes greater, the demand rises, pulling up the costs and thus, increasing the general private costs incurred by individuals.

Furthermore, higher education institutions require bigger premises, more capital goods and members of staff to accommodate this rise in demand. The payment of such costs is usually subsidised by the state and therefore, an increase in government spending is necessary. This increase is inevitably covered by the introduction of higher fees, where these exist, the increase in taxation or even by government borrowing. The latter will increase public debt unavoidably, which will have to be repaid eventually by money usually collected from taxation. Therefore, it is assumed that, in the long-run, returns to the years of schooling will ultimately go back to their normal levels, where there are not incentives for fluctuations in the demand *(ibid)*. Nonetheless, in recession periods things are more complicated and this sequence of events is highly unlikely to sustain. Mainstream economics do not really accept that the economy is susceptible to extensive

periods of economic stagnation, where it fails to recover into its natural level of employment and output. However, the European economy is currently far from presenting reliable signs of a robust recovery, affecting also the economic meaning of human capital.

The issue of wage inequalities, between low- and high-skilled, has been investigated by Handel and Gittleman (2004), who observed a surge on wage inequalities during the 1980s. Up until then, low-skilled workers were earning wages, which were placing them around the mean income wage-earners of a middle-class household. After the continuous decrease of workers' participation in trade unions, occurred in tandem with the rapid deregulation of labour relations, real wages were reduced. Furthermore, the new paradigm of "high performance" work, which allegedly leads to a gradual rise in skills and wages, did not managed to achieve its goal since it is not necessarily associated with higher wages. Firms, which employed High Performance Work Practices (HPWP), did not reveal higher remuneration schemes for their workers, compared to the non-HPWP. The skills wage-gap is not caused by the implementation of HPWP, but it can be attributed to other individualistic or institutional factors, existing in the labour market. The form of this gap can differ substantially between labour markets of different institutional context.

Machin (2003) placed the shift in demand towards more high-skilled workers into the spectrum of technological rapid growth. Based on the empirical research, which investigates the rise in wage inequalities between high- and low-skilled workers, Machin argued that this can be explained by the boost of technology applications in workplaces. Therefore, employers ask for candidates that are familiar with innovation in technology-oriented job tasks. However, he is not concerned whether or not the higher education institutions are willing to adjust to the new trends or how the policy-makers perceive these changes in the labour market.

Job requirements, according to Acemoglu (2002), have increased and the low-skilled workers fail to meet them, ending up in low-paid jobs, if not in long-term unemployment. He argued that graduates' wage premium in the US has been increased

since 1970, as technological innovations are constantly upgrading the job requirements and therefore, the former low-skilled workers have been displaced by high-qualified fresh entrants. This skill-biased technological change causes a continuous increasing wage-gap between the low- and high-skilled workers. Its intensity differs between countries and periods of time, depending on the share of high-skilled workers in a domestic market as well as the magnitude and the technical characteristics of the market itself.

Schlitte (2012), reviewing the empirical literature regarding technological change and the composition of skills between different regions, argued that there is an increasing pattern of wage inequalities between low- and high-skilled workers. The latter are those who benefit more from the technological advancement of job tasks. As a consequence, this leads to a gradual displace of low-skilled jobs and thus, wage inequalities and unemployment rates of low-skilled workers are rising.

The remaining part of this Chapter has been constructed as follows: Section 5.2 presents a literature review on the issue of wage inequalities between low- and high-educated, focusing particularly on the returns to education. Then, the data specification along with a description of the methodology employed is discussed in Section 5.3. Section 5.4 employs an empirical investigation on the relationship between educational attainment and wages using the two-step approach, as an attempt to incorporate the effect of the economic climate as well as the economic and institutional context of each country's labour market to its analysis. Finally, Section 5.5 summarises and discusses the findings in relation to the existent literature.

5.2 Literature Review

Empirical literature on returns to education is dominated by the use of Mincerian wage equation in many variants and therefore, in this study, particular attention has been paid. Additionally, age, race, tenure, gender or various proxies, used to capture the effect of a higher educational attainment on wage, are among the most important factors that can

influence wage levels. Concluding, various macro-level determinants, as defined in Section 1.3, and the external economic climate can also affect the rate of returns to education.

Parent (2002) employed a statistical test of the job matching and human capital theories, examining the covariance structure of the typical Mincerian log earnings equations' residuals. The theory of job matching, where decisions are based on mutual benefit, did not fit the data adequately, but human capital theory was strongly supported, especially for men with higher educational attainment.

Stevens (2003) provided an alternative theoretical basis on the tenure bias that exists between observable human capital and unobserved match quality. He argued that because wages are not predetermined, as human capital implies, but are set through a bargaining process, selection bias is very likely to occur, since wage offers made by a firm can be declined or accepted by a worker under unclear and unobservable circumstances. The positive effect of job matching to the returns to tenure is rejected. Even though, OLS estimates reveal that highly-matched workers experience longer tenure of work and higher wages, the earnings equations are negatively biased by the specific to tenure human capital effects.

Regarding earnings differentials, Wright (1991), using a pooled cross-sectional data set for Britain, argued that a cohort size negative effect is evident for people with medium or higher qualifications, but it waves out with ageing. There is no cohort-effect for low-skilled individuals in large cohorts. Furthermore, he determined the specific point, where the negative cohort-effects are balancing out by ageing. This "take-over" point, as Wright defines it, is 26 years of age for the medium qualified worker and 33 for the higher-educated. Unlike Dooley (1986), Wright defines cohorts by age, rather than the level of educational qualifications. He concluded that smaller cohorts of younger males[23] will be relatively better off in terms of earnings. Brambor *et al.* (2006) argued that the younger high-skilled workers not only enjoy relatively better pay, but also are

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[23] Females have been excluded from Wright's empirical analysis for controlling for the gender effect.

more employable. However, this argument seems that, during an economic turmoil, is quite uncertain, at least for particular cohorts.

Lately, there have been made some attempts to enhance the ordinary Mincerian equation by the inclusion of different levels in the statistical analysis. This can be seen as an improvement towards realisation and contextualisation of estimations produced by OLS models (Cardoso, 1999; Brekke, 2007; Bickel, 2012; Veiga *et al.*, 2014). In particular, Brekke (2007) investigated ethnic disadvantages, in terms of employability and pay between vocational graduates of different generations and ethnic minorities in Norway, by implementing multi-level linear and logistic regression analysis, using data from 1997 to 2001. She argued that there is discrimination in pay between western and non-western nationals as well as between first and second generation ethnic minorities. The wage-gap between immigrants and natives becomes wider depending on the number of years passed after graduation. When the analysis focuses only on full-time employers, then this gap becomes narrower. Brekke also incorporated local unemployment rates as a macro-level variable, concluding that high unemployment rates do not really affect the employability of vocational graduates from different ethnic groups, but it does affect downwards their earnings and job quality.

Black *et al.* (2006) provided an estimation of wage-gaps between different ethnic minorities and native population in the US, using non-parametric techniques also accounting for field of study. No major significant differences have been found, concluding that:

> "Perhaps skin colour or ethnicity per se is not the key factor in discriminatory practice, but rather prejudice aimed at minority men who are seen as "not fitting in" in the majority culture" (Black *et al.*, 2006: 312).

They suggested that ethnic wage disparities can be mainly mitigated through the removal of barriers, which hamper the general skill acquisition of the minority children and young adults. Wage disparities are more likely to be improved by the provision of equal opportunities, in acquiring productive skills.

Langevin *et al.* (2013) investigate the determinants of employability and wage inequalities between second generation immigrants and natives in France, using probit and Mincerian wage equation models. They used cross-sectional data collected between 2008 and 2009. Education, along with family background, is a major determinant of employment and wage inequalities between natives and second generation immigrants. The inequalities not only exist between them, but also within immigrants of different origins. Asian, Southern or Eastern Europeans earn less than French natives, but considerably more than immigrants coming from Africa or Turkey. This can be attributed to the relatively low educational level of the population and can be intensified by the lack of international recognition of higher education institutes, especially for Africa.

However, the current thesis does not investigate the effect of ethnicity or migration flows on the employability or wages of individuals, as the situation is very different among all nineteen countries examined. Certainly, as the migration flows have been increased dramatically lately and given the current economic climate in Europe, which seems rather stagnant, it would be very interesting to examine whether and in what way ethnicity can affect the labour market outcomes of the individual. Yet, a research on this issue is rather incompatible with a large-scale comparative research framework, as immigrants, especially the high-skilled, are much more interested in working in high-income countries, where demand for skills is higher. So, there is a considerable selectivity bias issue and thus, inferences are likely to be misleading. However, an analysis on this issue through time, focusing on a single European country or on countries with similar legislation for immigrants as well as flows, is anticipated to inform future research conducted by the author of this study.

Europe is currently experiencing an ageing working population. It is argued that this transforms the European labour market and thus, certain demographic and labour market policies have to be reoriented to meet these new challenges (EC, 2011a). Recently, Lisenkova *et al.* (2013), in a study conducted using Over Lapping Generations-Computable General Equilibrium (OLG-CGE) modelling techniques, investigate the impact of population ageing on the labour market, focusing on Scotland.

Population ageing, is a major challenge for Scotland in its effort to keep its public finance in a sustainable and balanced level. It seems that, contractionary policies, such as public spending cuts, taxation and the increase on the state pension entitlement age, are very likely to be introduced soon. Other long-term policies, which can mitigate this problem, are the increase in the net migration rate or the introduction of incentives for older people, in order to remain active in the labour force. In this context, low-educated individuals seem to be the first that will be negatively affected.

Examining the widening of higher education participation rates in a human capital context after WWII, Card and Lemieux (2001) observed that the slowdown of this rate coincides with the "baby boomers" generation after mid-70. At the same time, in Canada, the US and the UK, the wage-gap between graduates and non-graduates has doubled, from the late 70's since 1998. However, this huge rise was mainly caused by the wage-gap observed in younger workers (26-35 years old) rather than the older (46-60 years old). Therefore, it seems that Mincer's argument, the wage-gap increases along with age, is seriously challenged by this evidence. Finally, they observed that the increase on the demand for high-skilled workers was due to the rapid technological growth.

Fenton and Dermott (2006) conducted a research on careers' fragmentation using a random sample of young adults in Bristol. Their findings revealed a steady and stable pattern of employment for the high-paid young adults as well as discontinuity and fragmentation for those in low-paid jobs. Individuals with less educational attainment, lower status and wages are more likely to experience fragmentation, as opposed to the higher-educated. Finally, their main idea revolved around their belief of the endurance of socio-economic and gender inequalities in the contemporary labour market.

Bernhardt *et al.* (2000) offered an assessment on job stability for two cohorts of white people, aged between 14 to 22 years old, using the National Longitudinal Survey (NLS) for the US. The two cohorts were followed during the periods of 1966-1981 and 1979-1994. After providing a critical examination of the NLS, assessing its advantages over similar surveys in terms of attrition analysis, the authors argued that the cohort of 1979-

1994 perceives job stability differently than the 1966-1981 one. This study is in line with previous empirical findings regarding the increase on job instability, attributing it more in residual factors and less in the level of education or in the individual's choice to work in rather volatile sectors, such as the service sector. In terms of wage analysis, the study revealed a greater and persistent inequality in wage growth, especially to individuals with lower educational attainment, as they grow older.

Garicano and Rossi (2006) developed an equilibrium theoretical model, where knowledge is a vital input in production, while the ability of workers is being characterised by heterogeneity. They concluded that low-skilled workers learn and earn relatively less. Furthermore, the understanding of the internal structure of teams and the incorporation of hierarchies into this equilibrium framework are very crucial factors in order for the main determinants of wage inequality and the organisation of the production process to be identified.

Moreover, Bowles and Gintis (2002), in response to critiques concerning their famous article "Schooling in capitalism America: Educational reform and the contradictions of economic life" (1976), published a revised version, providing a more nuanced justification on the importance of intergenerational persistence and economic status. Furthermore, they criticised the heritability of IQ and its implications on employment and wage inequalities. Particularly, they claimed that innate characteristics were not as important as the acquired ones. Finally, according to the authors, personality traits seem to increase the possibility of success in the labour market, but, once more, the econometric effect of such traits is rather impossible to be measured and captured by a large-scale comparative analysis between countries.

The EC (2009), evaluating the equality in pay and work in terms of gender, observed that in highly segregated labour markets it is more likely the wage-gap, between men and women, to be high. This is because there is a big proportion of women in the low-paid sectors, who also remain in the lower pay scales for long periods of time, as barriers in such rigid and immobile labour market sectors with low skill requirements, offer very poor opportunities for career advancement and change (Smith 2012). On

average, in the European Union women are still underrepresented in high-paid jobs and sectors. Statistics from Eurostat showed that in 2010 in very large companies only 10% of the members of management boards were women. The numbers for the management and senior engineering positions as well as scientists show that women are still greatly outnumbered, as they consist of just a third of the people working in such jobs. In a period of economic crisis, women seem to perform worse than men in terms of both pay and job security (Hurley, 2011; Vandekerckhove *et al.*, 2012).

There are also studies that investigate earnings, using proxied measurements of higher education institutions, such as the teacher to students' ratio, number of publications or the prestige of higher education institutions (Dale and Krueger, 1999; Chevalier and Conlon, 2003; Triventi and Trivellato, 2012). Suhonen (2013), after controlling for the field of study as captured by the Finish administrative data set, measures the effect an institution of a good quality has on its graduates four years after their graduation. Institutions' quality is measured by various ratios, such as teacher to students', applicants to those finally admitted as well as the volume of publications per member of staff. All these proxies did not reveal large statistical effects, but most of them are rather statistically significant. As expected, due to the fuzziness a proxy variable can bring to a model, the level of heterogeneity is usually high and this is something that can affect validity.

Brown and Lauder (2006) examined the impact of the fundamental changes on education, as related to the influence that various socio-economic and cultural factors have on policy-making. Remaining sceptical against the empirical validity of human capital theory, they concluded that it cannot be guaranteed that graduates will secure employment and higher wages. They also challenged the notion of *magnet economy*, which refers to the resolution of problems related to inequality, opportunity and social conflict through the development of human capital investments. Contrary to Card and Lemieux's (2001) findings, the authors, relying on Mishel *et al.* (2003) evidence, argued that when the wage premium is not measured by averages, but is split in deciles within graduates, it is only the high-earning graduates that have experienced an increasing wage-gap through time. Increasing incidences of overeducation, due to the

high rates of graduates' supply compared with the growth rates of high-skilled jobs, have been also observed. Since the wage premium, assigned to overeducated individuals, is more likely to be lower than the one corresponding to those individuals with the same educational attainment, working in jobs commensurable to their education, the increasing incidences of overeducation can imply a downward effect on the wage premium associated with the total number of graduates. Thus, it is argued that the majority of graduates nowadays, compared with those in 1970's, do not receive any considerable additional premium on their human capital investments, even if they are still better-off from the lower-educated. Any differences in pay, between graduates and non-graduates, can be ascribed more to the stagnation of the latter's pay, rather than to graduates' additional pay, because of their higher educational attainment.

Russell and McGinnity (2014) investigate the wage-gap between graduates and non-graduates in a bad economic climate, arguing that during an economic crisis this gap becomes wider, especially for the younger cohorts.

Barro and Lee (1993) argued that it is very complicated to separate and decompose each level of education and its contribution to labour market outcomes. Numerous skills can be obtained outside the formal education and these consist one of the major factors that determine the added value of human capital in the labour market. Labour market determinants, such as differences in business productivity caused by factors other than educational attainment, the concentration of trade unions, the nature of employment contracts, the ratio of part-time to full-time employment or the EPL strictness, can affect the measurement of the market value of human capital. Therefore, institutional context is very important, as individual behaviour can change depending on the country, region, industry or time period examined.

This Chapter attempts an empirical investigation on the returns to education in nineteen European countries employing an extended version of the Mincerian wage equation. In addition to that, the analysis has been performed in pre and during recession economic periods to test whether or not returns to education show any indication of cyclicality. Finally, the economic and institutional context of the labour market of each country

examined has been taken into account by the selection of nine macro-level determinants. The modelling method used is the two step approach, which has been described in Section 1.3. The following Section (5.3) provides a more detailed explanation of the data and methods used.

5.3 Data and Methodology

The economics of education assume that, ceteris paribus, the income curve of the higher-educated, plotted over the age distribution, starts below the curve corresponding to the lower-educated. However, the slope is steeper and therefore, the two curves intersect in the earlier stages of workers age, so the higher-educated can cover costs related to education, quite fast. By this, the assumption made is that the higher-educated gain higher wages, while the lower-educated have an incentive to accept directly a work task, avoiding the cost related to higher education attendance. The two curves should be concave because of the depreciation of human capital, which follows the law of diminishing returns on individuals' productivity, gradually reduced during the working life (Johnes and Johnes, 2004; Psacharopoulos and Patrinos, 2004; Checchi, 2006; Hanushek et al., 2011). This relationship is illustrated in Figure 5.1.

Figure 5.1: Stylised Age-Earnings Profiles
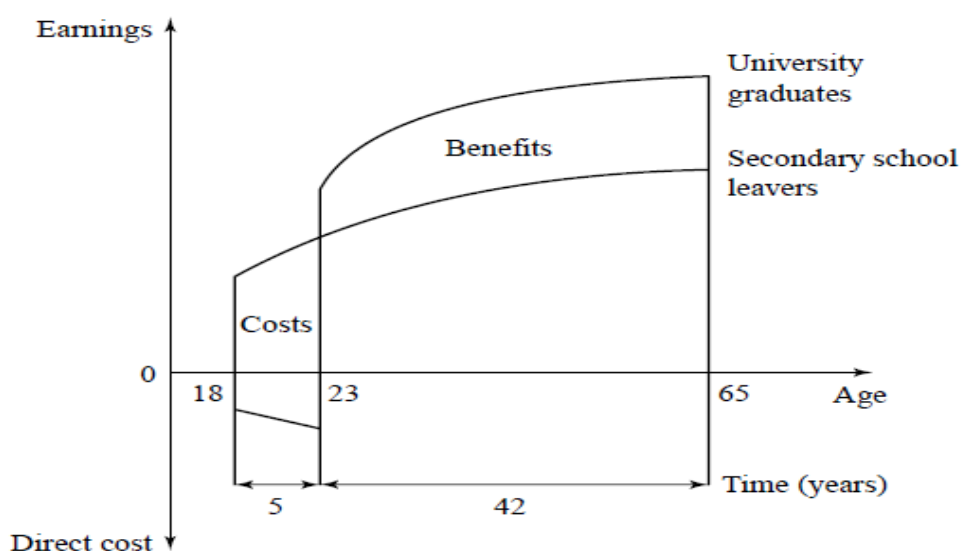
Source: Psacharopoulos and Patrinos (2004: 4)

One of the pioneers on human capital measurements was Professor Jacob Mincer, who developed a model known as *"earnings function"* (Mincer, 1958; 1970; 1974). The "Mincerian" method makes use of the earnings function by incorporating individualistic elements, as following:

$$\ln W_i = a + \beta_1 S_1 + \gamma_1 EXP_i + \gamma_2 EXP_i^2 + \varepsilon_i \qquad (5.1)$$

where:

S is the years of education and ***EXP*** the potential working experience of the individual in labour market (EXP=AGE-S-School Starting Age) and not the actual one (e.g., various intervals of absent, such as maternity, educational or non-paid leaves as well as unemployment and inactivity periods of time are not accounted for[24]). The term ***β₁*** represents the private returns of the investment in human capital gained by a typical year of study, not taking into account the educational level.

The *extended version of Mincerian method* refers to equation 5.1 by adding more control variables, which according to the empirical literature can also affect wages.

The Mincerian method can also be used with educational level by replacing *S* with a sequence of dummy variables, which take the values of 0 and 1, according to the educational level of the individual[25].

$$\ln W_i = \alpha + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \gamma_1 EXP_i + \gamma_2 EXP_i^2 + \varepsilon_i \qquad (5.2)$$

where:

D₁, D₂, D₃ denote low, intermediate and higher educational levels respectively.

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[24] This is more likely to bias the results as, for example, a female worker could return to her job as part-time after giving birth. Likewise, in a country where big rates of structural unemployment or labour market inactivity are present, returns to education might be underestimated.

[25] Illiterate people are omitted.

The Mincerian model is usually calculated in a log-level format, meaning that in equation 5.1 **EXP** and **S₁** are expressed in unit terms, while the dependent variable has been transformed into log terms (ln), as it can be seen in equation 5.3.

$$d[\log W_i] = dS_i \beta_1 \Leftrightarrow \frac{dW_i}{Wi} = dS_i \beta_1 \qquad (5.3)$$

If both sides are multiplied by 100 and rearranged, then the equation 5.3 takes the following form:

$$\frac{100 \times dW_i}{W_i} = 100 \times dS_i \beta_1 \Leftrightarrow 100 \times \beta_1 = \frac{\frac{100 \times dW_i}{W_i}}{dS_i} = \frac{\% \Delta W_i}{\text{unit } \Delta S_i} \qquad (5.4)$$

This means that β_1, when multiplied by 100, can be interpreted as percentage change in W_i for a unit increase in S_i, assuming that all other variables in the model are kept constant. Similarly, all beta coefficients, corresponding to each independent variable on the model, can be interpreted in the same way.

Finally, the Mincerian model is also amenable to adjustments by the inclusion of variables, such as real income, mortality, unemployment, taxes and innate ability, just to mention the most commonly used in the literature.

The hypotheses testing attempted in this study, concerns the wage-gap between low- and high-educated as well as its evolution through different economic times and also across countries, which labour markets do not share the same economic and institutional context. As in the previous Chapters, the same nineteen countries, time reference points and macro-level determinants are examined. In particular, the research hypotheses testing take this form:

$$H_0 : b_{ed} = 0 \rightarrow \text{Years of education has no effect on somebody's wages}_{\text{after}}$$

$$\text{adjusting for state and calendar year}$$

$$H_1 : b_{ed} \neq 0 \rightarrow \text{Years of education does affect someone's wages}$$ after

adjusting for state and calendar year

Concerning the wage variable, most of the literature uses an hourly format of net wages, but due to limitations regarding the method employed for such information to be collected from the ESS, this was not possible. Particularly, in this Section, the outcome variable concerns the natural logarithm of the gross monthly wage, as this have been calculated by the researcher, using the relevant information found in the ESS. This information is retrieved by two questions:

- "What is your usual gross[26] pay before deductions for tax and insurance?
- How long a period does that pay cover?"

Respondents were asked to choose from: hourly, daily, weekly, every two weeks, every four weeks, monthly and yearly. Approximately 74% of the participants reported monthly earnings data. Hence, all values found regarding gross pay have been transformed into a monthly format, using the technique found in Galasi (2008).

The control variables that have been used in Chapters 3 and 4 are also used here, adding some new that could offer more explanatory power to the model. The variable regarding years of education have been centred, taking into account the compulsory level of education of each country examined. The steps of analysis are similar to the ones followed in the previous Chapters, but the methodology is different using a linear OLS regression analysis.

The new control variables added are specifically applied to working population and these are:

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[26] ESS collects pay data in both net and gross format. In the first one, respondents, unfortunately, reported their remunerations as a raw number, without assign it into a period that this cover. Participants were rather reluctant to reply to the net part of the pay question and thus, the missing values consist of more than 70%. Therefore, it was decided not to be used in this study. On the contrary, this was not the case in the gross wage question and it just needs some transformation before used for comparisons.

- Quality of job (**JQ**), as this has been constructed by the author of this study based on the subjective judgements of the ESS respondents (Chapter 4); and

- Participation in trade unions (**TU**) [Categorical variable: 0 No; 1 Yes, currently; 2 Yes, previously].

Before proceeding with the estimation of all regression models, a descriptive analysis of all variables used has been conducted for 2004 and 2010 separately. This can be found in Appendix C (Tables C7 and C8).

A Wald-test of significance has been performed for all variables, showing that **TU** is statistically insignificant for all Models estimated, which are explained below, and therefore, it has been excluded from the final models used[27]. Thus, for individual **i**:

$$W_i = f(YEd_i, C_i, T_i, F_i, YExp_i, Jbh_i, U12_i, Cou_i, Co_i, H_i, JQ_i, YEd \times C_i)$$

where:

YEd denotes years of education, centered on the compulsory educational level of each country examined.

Statistically, where **(a)** is the constant, **(b₁...b₁₁)** are the beta parameters and **(ε)** is the error term, for individual **i** the model will estimate:

$$\ln w = a + b_1 YEd_i + b_2 C_i + b_3 F_i + b_4 YExp_i + b_5 Jbh_i + b_6 U12_i + b_7 Cou + b_8 Co_i + b_9 H_i + \\ + b_{10} JQ_i + b_{11} YEd_t \times C_t + \varepsilon_i$$

$$(5.5)$$

where:

lnw denotes the natural log of the gross monthly wage.

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[27] The age variable is very highly correlated with **YExp**. Because of this, when both variables are used as covariates in the regression equations, results are misleading. Both variables were significant when entered in the model, but for the reasons explained in Chapter 3, only **YExp** has been used.

Two regression equations have been performed for 2004 and 2010, respectively. Hereafter, these will be called Model 2 and Model 3. However, in total, three different models have been estimated. Model 1 starts by treating **YEd** as control variable, taking the following form[28]:

$$\ln w = a + b_1 YEd_i + b_2 C_i + b_3 T + b_4 F_i + b_5 YExp_i + b_6 Jbh_i + b_7 U12_i + b_8 Cou + + b_9 Co_i + b_{10} H_i + + b_{11} JQ_i + b_{12} T_i \times C_i + \varepsilon_i$$

$$(5.6)$$

Then, Models 2 and 3 are estimated in a fixed-effects format, where **C** interacts with **YEd**. With this method, returns to education are estimated for each country separately and represent averages.

If $b_1 > 0$, there is a positive relationship between educational attainment and wage. Therefore, the higher-educated are likely to experience higher earnings compared with the lower-educated, while, on the other hand, if $(b_1) < 0$ the opposite stands. The same applies to all other independent variables used. Since the regression equation concerns a semi-log relationship, all beta coefficients can be interpreted as percentages, after multiplying them by 100[29].

5.4 Hypothesis Testing and Analysis of Results

Table 5.1 presents all control variables used in Models 2 and 3. Wages for females are expected to be lower than men by 28% for 2004 and 23.1% for 2010, while **YExp** do not seem to affect wages much. This is rather unexpected, as it is empirically known

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[28] The regression that concerns the pooled sample has also been estimated and it is illustrated in Appendix C (Figures C5 and C6).

[29] Finally, a quadratic, cubic or quartic spline specification of the **YExp** in the Mincerian equation could also be used. These specifications are very common in the literature (Polachek, 2008), but since all Models perform very high in terms of R^2, such specifications have been avoided for brevity. A Kernel density plot has also been drawn to illustrate the underlying distribution of the YEd (Appendix C- Figure C7). From Figure C7, it can be seen that the Kernel density curve is very similar to a bell-shaped and therefore, normality can be assumed

that *YExp* play an important role on determining the level of wages. However, according to the data estimated, *YExp* have a positive and statistically significant effect on wages, which is rather weak. Therefore, further research is needed testing this relationship with data from different sources. The effect of *YExp* might be offset due to the apparent heterogeneity between countries, calendar year and occupational categories, in terms of gross wages. Since this variable has been only used to control the effect of *YEd*, no further examination is conducted, but is anticipated to inform research in the future.

Table 5.1: Wage Predictions for All Statistically Significant Control Variables
(Models 2 and 3)

Gross Monthly Wage (lnw)	2004		2010	
	Coef.	p>|t|	Coef.	p>|t|
Female	-0.281	0.000	-0.237	0.000
Years of Working Experience (YExp)	0.007	0.000	0.007	0.000
Working Hours (Jbh, Ref: 1-15h)				
1. 16-35h	0.647	0.000	0.642	0.000
2. 36-60h	0.874	0.000	0.889	0.000
3. More than 60h	1.110	0.000	1.151	0.000
Long-term Unemployment (U12)	-0.166	0.000	-0.154	0.000
Further Training (Cou)	0.139	0.000	0.159	0.000
Cohabiting (Co)	0.031	0.009	0.055	0.000
Health Condition (H)				
1. Hampered by Health Problems A Little	-0.061	0.000	-0.047	0.001
2. Hampered by Health Problems A Lot	-0.102	0.015	-0.125	0.004
Quality of Job (JQ)	0.081	0.000	0.106	0.000

Source: ESS Round 2 and 5 (Author's calculations)

The variable regarding working hours (*Jbh*) is a very important factor, as its effect on gross monthly earnings (*lnw*) increases depending on the hours worked. In Model 2, after treating 1-15h as the reference category, it is expected that individuals who work between 15-35h earn approximately 65% more, while those working more than 35h are expected to have even higher wage differences. Similar results are estimated for 2010. Incidents of long-term unemployment (*U12*) decrease the expected wage by approximately 17%, but it is likely that this loss is compensated by attaining a course

related to skills enhancement, especially in 2010. The 2004 estimations for those cohabiting (*Co*) showed that they earn 3.1% more, compared to those that do not, but this rate almost doubles in 2010. Moreover, not hampered by health issues on daily activities seems to increase the likelihood of getting a higher wage for both years. Lastly, quality of work (*JQ*) does seem to increase the monthly wage by almost 8% and 10%, respectively.

The regression wage estimations for Models 1, 2 and 3 are illustrated in Table 5.2. Specifically, the second column includes the estimations of the interaction between country and calendar year (*T*), the third and fourth columns present the estimations for 2004 and 2010 respectively, where the interaction between country and *YEd* has been calculated. So, returns to education (REd) for all nineteen countries are presented in the third and fourth columns. Moreover, the countries have been classified according to the welfare state regime they belong to (Section 1.3). Finally, the last column shows the 2004 to 2010 temporal trend in terms of REd. Temporal increases in REd are depicted by a green arrow pointing upwards and decreases by a red downward-pointing arrow.

Table 5.2: Wage Predictions for Models 1, 2 and 3

	(Model 1)	(Model 2)	(Model 3)	2004-2010 trend in REd
Continental				
Belgium (BE)	11.9	2.9	4.2	↑
Germany (DE)	3.5	5.2	6.1	↑
The Netherlands (NL)	3.4	3.7	3.9	↑
France (FR)	3.4	5.5	3.7	↓
Liberal				
Great Britain (GB)	-2.3	8.1	4.1	↓
Ireland (IE)	6.9	5.5	6.0	↑
Nordic				
Denmark (DK)	16.3	3.3	2.2	↓
Finland (FI)	18.2	3.9	3.2	↓
Norway (NO)	28.7	3.7	3.1	↓
Sweden (SE)	17.0	4.8	3.5	↓
Southern				
Spain (ES)	13.3	3.9	4.6	↑
Greece (GR)	-16.2	2.9	3.8	↑
Portugal (PT)	-3.9	7.3	8.0	↑
Eastern				
The Czech Republic (CZ)	58.2	5.7	5.1	↓
Estonia (EE)	57.9	7.8	7.8	-
Hungary (HU)	1.1	9.9	6.4	↓
Poland (PL)	46.7	6.8	7.5	↑
Slovenia (SI)	36.9	8.7	8.1	↓
Slovakia (SK)	64.1	4.8	4.2	↓
Statistics				
N	18,300	8,747	9,553	
R^2	0.76	0.79	0.75	

*Note: The interactions between country and calendar year estimated in Model 1, country and **YEd** (REd) estimated in Model 2 and 3 for 2004 and 2010 respectively, have been found statistically significant at the 99% confidence level.*
Source: ESS Round 2 and 5 (Author's calculations)

Figure 5.2 illustrates the average expected wage differences, between 2004 and 2010, by country of residence, irrespective of educational attainment. On average, Greece, the UK and Portugal reveal a decrease in the predicted wages. However, the decrease in

Greece seems much higher. On the other hand, the estimated wages for the Eastern countries have been significantly increased, with the exception of Hungary. Considerable increases have also been estimated for the Nordic countries. In the Continental countries the increases were smaller and from the Liberal and Southern regimes, it was only in Ireland and Spain, where the gross monthly wages have increased. Within welfare state regimes, the trend is consistent in Nordic, Southern and Continental countries, apart from France.

Figure 5.2: Expected % Wage Differences Irrespective of YEd Attained between 2004 and 2010 (Model 1)
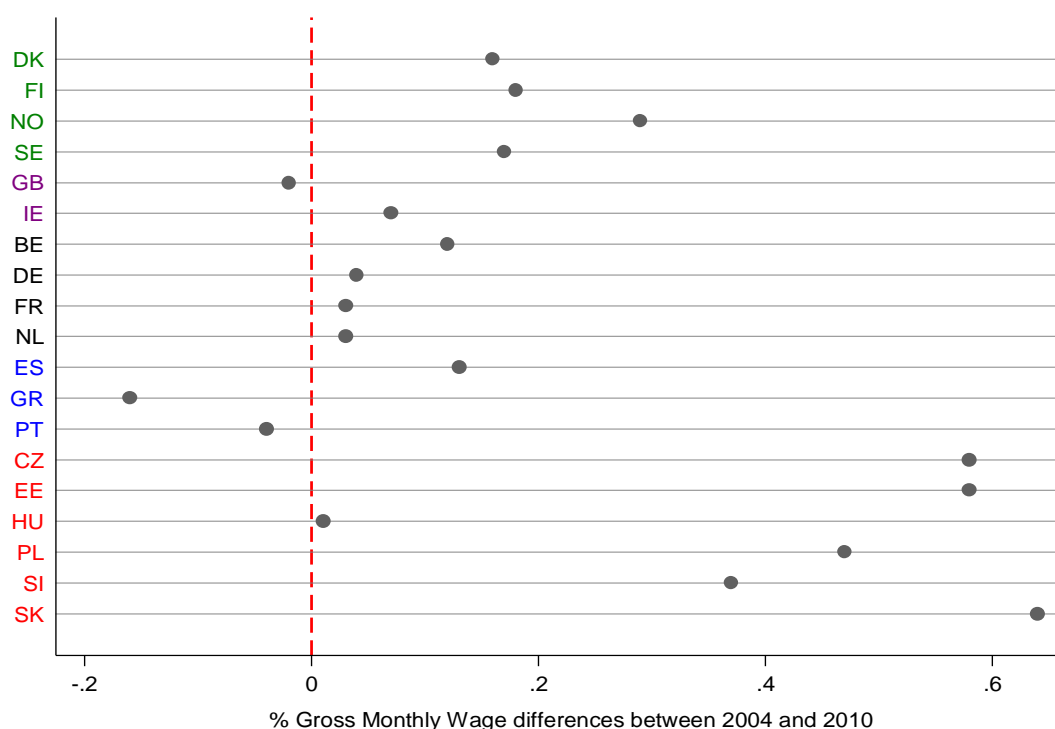
Source: ESS Rounds 2 and 5 (Author's calculations)

At this point, it is important to recall that wage predictions refer to gross monthly wages, estimated in Euros and not adjusted to the fluctuations in the price levels for each country. Figure 5.3 shows how the estimations change once adjusted by the price level. For this reason the Harmonised Index Consumer Price (HICP) has been used.

The HICP-adjusted wage differences change significantly. In most countries, the increasing trend waves off and real wages seem to have increased from 2004 only in Eastern and Nordic countries. In all other countries, real wages have decreased. In fact, for Greece the estimations showed that wages lost more than one third of their 2004 real value (-37.3%). Considerable decreases of more than 10% are estimated for Hungary, the UK and Portugal, while in all other countries the decrease is estimated to less than 10%.

Figure 5.3: Expected % Wage Differences Irrespective of YEd Attained between 2004 and 2010- HICP-Adjusted (Model 1)
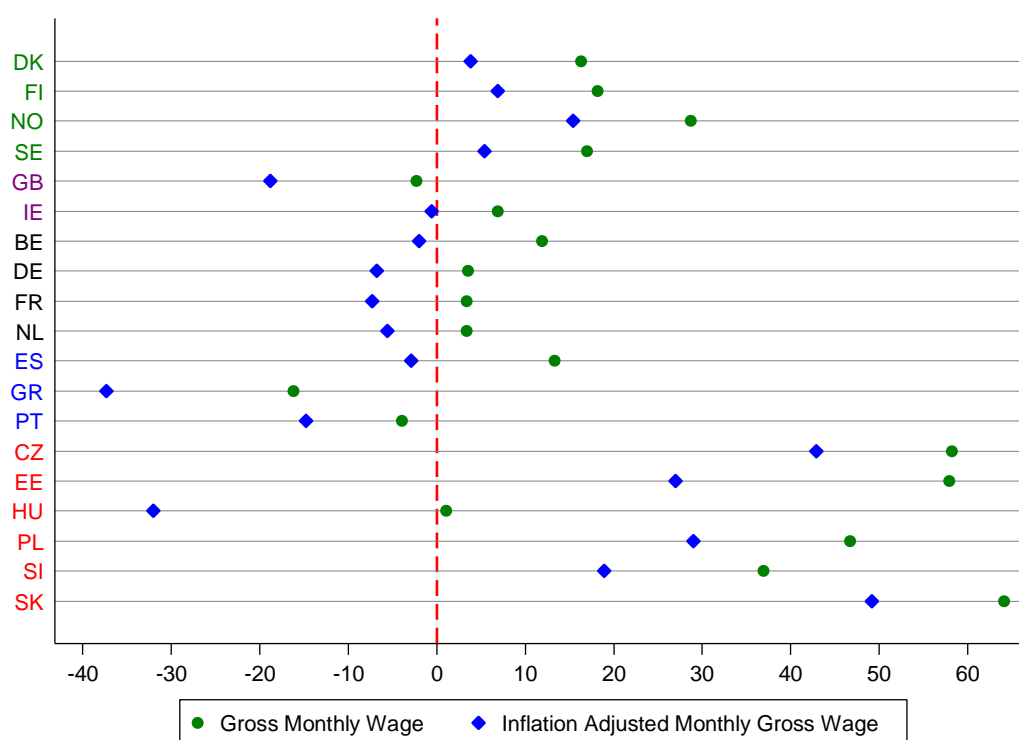
Source: ESS Rounds 2 and 5 (Author's calculations)

As shown in Table 5.2, *YEd* seem to play a major role on determining wages, as returns are positive to all countries for both 2004 and 2010. For example, an additional *YEd* for someone who lives in Belgium, in 2004 can yield a return of approximately 3%. Estimations for returns to education are statistically significant.

Figure 5.4 illustrates the REd coefficients for both 2004 and 2010. The returns to education in Nordic countries are lower in 2010 compared to 2004, whereas they are higher in the Southern and Continental. However, in France REd is lower in 2010. Regarding all other regimes, in the two Liberal countries the trend is increasing in Ireland, but decreasing in the UK, while in most of the Eastern countries is decreasing expect Poland (REd are higher in 2010) and Estonia (REd remain the same).

Figure 5.4: REd 2004 and 2010 (Models 2 and 3)
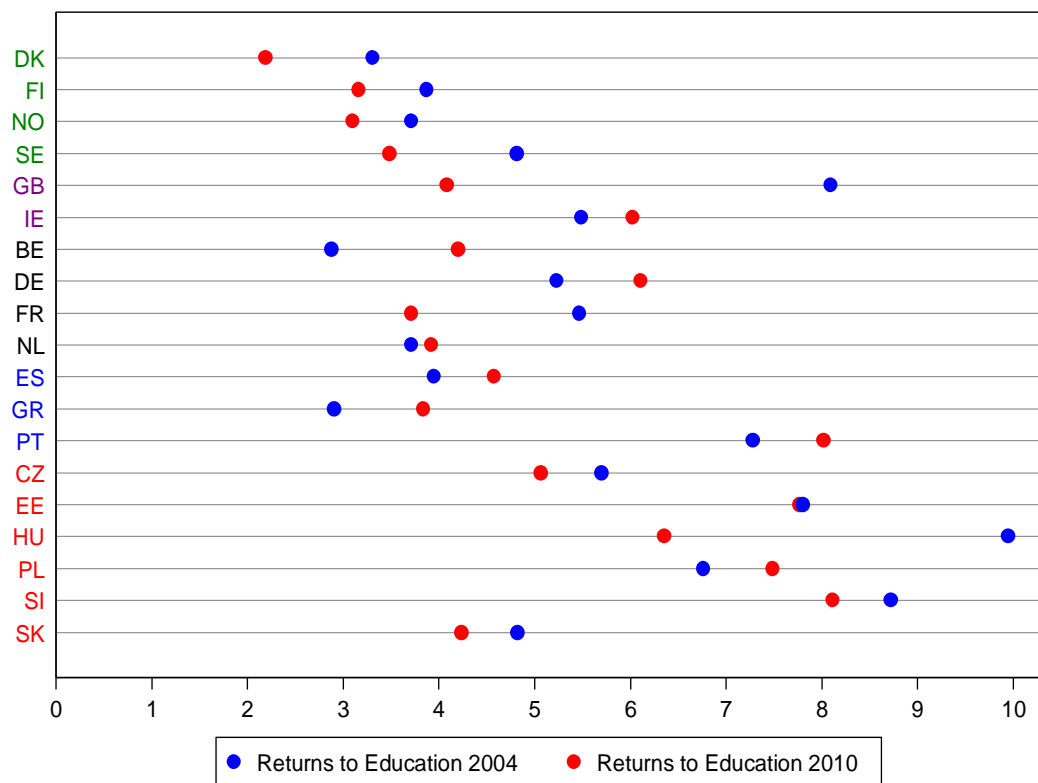
Source: ESS Rounds 2 and 5 (Author's calculations)

This thesis accounts for the effect a bad economic climate has on the labour market outcomes of individuals. The most recent recession is used as an example. The severity of this effect is presented in terms of negative GDP growth rate, but since this is correlated with job losses the HUR is also examined. For reasons explained in Section 1.3, four-year averages prior to the two reference points, 2004 and 2010, have been used for comparison purposes.

Figure 5.5 shows the relationship between the temporal changes of REd (single year estimations) and average GDP growth rates. The correlation between these two magnitudes is quite low (r=0.17) and therefore, the goodness-of-fit of this statistical relationship is also low (0.03), making it statistically insignificant. Thus, it seems that REd do not follow a consistent trend across countries, with respect to their economic climate, revealing a rather acyclical pattern. These results are in line with past research from Hart *et al.* (2009) as well as Mendez and Sepulveda (2012), with the difference that these studies concern a panel analysis, using data from a single country. The current thesis investigates this relationship, arriving to the same conclusion, using a cross-country analysis of nineteen European countries and cross-sectional data from 2004 and 2010.

Figure 5.5: Temporal Change in REd and in GDP Growth Rates
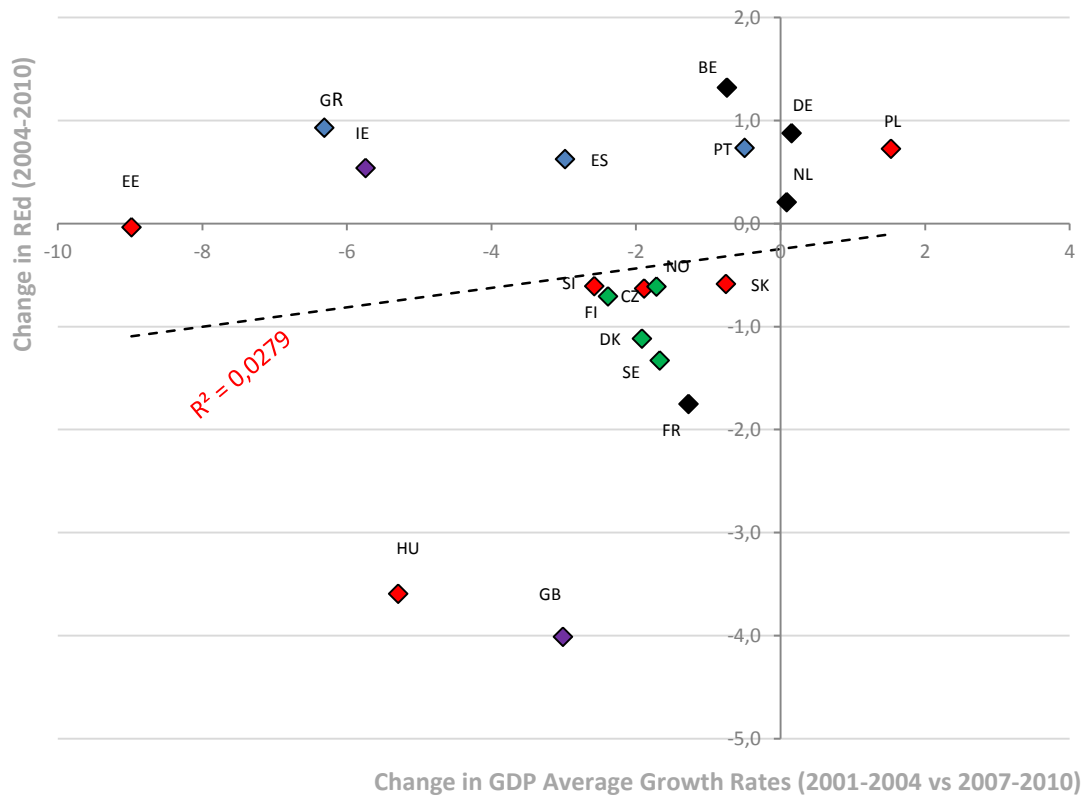
Note: r=0.17

Source: ESS and World Bank (Author's calculations)

In terms of welfare state regimes, the greatest consistency can be found among Nordic and Continental, as countries within both regimes follow a similar pattern in REd and GDP growth rates. Within all other regimes, country patterns are rather different. However, it is clear that in most countries, irrespective of the welfare state they belong to, the GDP growth rate was lower in the 2007-2010 compared to 2001-2004. This indicates that recession has affected the growth rate in most countries, but in Estonia, Greece, Ireland, Hungary, the UK and Spain the effect was rather severe. The only exception to this pattern is Poland, where GDP growth rate was higher in the 2007-2010. The growth rates in Germany and the Netherlands have slightly increased,

whereas minor decreases have been observed in Portugal, Slovakia and Belgium. In all other countries the decrease was rather modest.

The fluctuations on the average level of unemployment seem rather uncorrelated with the temporal change in REd, between 2004 and 2010, in all countries examined. Figure 5.6 depicts the relationship between REd and HUR, where countries are very scattered and this causes a very low score in r as well as in R^2 goodness-of-fit measure.

Figure 5.6: Temporal Change in REd and Change in HUR
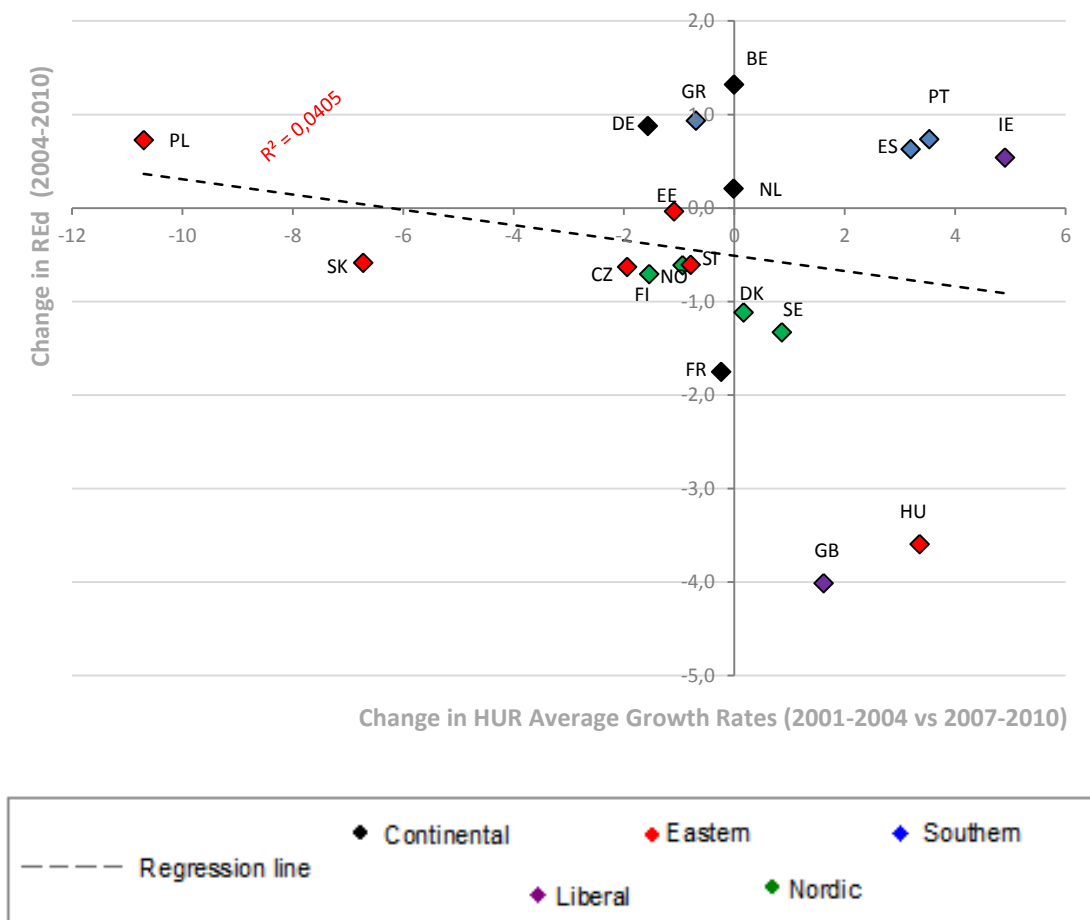
Note: r=0.20

Source: ESS and EUROSTAT (Author's calculations)

In general terms, REd as well as their temporal trends are characterised by some heterogeneity between countries. In some cases, this can be explained by the welfare state regime they belong to, but this does not stand for all. As explained in Section 1.3,

countries are classified under welfare state regimes because they share common characteristics, but sometimes it appears that this is not the case. Therefore, this study moves beyond this classification, capturing the effect of each country's labour market economic and institutional context on REd scores and temporal trends (Models 2 and 3). In total, nine different country-level variables that capture the economic performance, the fiscal situation, level of wealth, labour market flexibility and enrolment in higher education have been employed, expressed in four-year averages (Section 1.3).

As Table 5.3 shows, when all these macro-level determinants are regressed over the estimated REd, for both 2004 and 2010, they have been found as statistically insignificant at the 95% confidence level, except HUR for 2004, which was marginally significant (p=0.048). Certainly, this is what it was expected, as a great level of multicollinearity exists due to the aggregate format of the variables as well as the small number of countries examined (N=19), especially when this is compared with the number of predictor variables (9).

Table 5.3: REd Regressed Over All Nine Macro-level Determinants

REd	__2004__		__2010__	
	Coef.	**P>t**	**Coef.**	**P>t**
GDP growth	-0.015	0.167	0.006	0.089
HUR	-0.003	0.048	-0.003	0.256
Size of Government	-0.002	0.201	-0.001	0.176
Debt to GDP	0.00001	0.756	-0.0002	0.328
GDP/Capita	-0000001	0.093	-0.0000005	0.332
Part-time to Full-time	-0.001	0.287	-0.0002	0.743
Temporary to Permanent	0.19	0.170	0.11	0.187
EPL Strictness	-0.04	0.083	-0.009	0.427
Gross Enrolment Ratio	-0.00006	0.902	-0.0002	0.547

Source: ESS Round 2 and 5, IMF, EUROSTAT, OECD, World Bank, UNESCO (Author's calculations)

Because of the aforementioned limitations, a much simpler model would be preferable (Tabachnik and Fidell, 2007). Such model is the two-step approach in a bivariate format, which has been suggested in the literature as an alternative to the single-step or multi-level regression techniques, since it manages to capture the effect of variables

operating in a different level, when the assumptions of multi-level regression techniques cannot be met adequately (Section 1.3).

Therefore, once each of these determinants is regressed over the REd estimated by Models 2 and 3, then some relationships look much stronger. REd has been used as a dependent variable and each macro-level determinant is placed on the right-hand side of the regression equation. There were only two variables out of nine that have been found statistically significant at the 95% confidence level. These are the SOG and the GDP per capita. The relationships seem negative, indicating that the largest the SOG or the higher the GDP/capita is, the lower REd are likely to be. However, for 2004 SOG is marginally insignificant. The 2004-2010 temporal trends for all aforementioned macro-level determinants have been also examined and found as statistically insignificant. Therefore, temporal changes on the SOG or GDP/capita are not necessarily associated with how REd changes between 2004 and 2010.

Table 5.4: Statistically Significant Macro-level Determinants: Two-step Estimations (Bivariate Regression Results)

REd	**2004**		**2010**	
	Coef.	**P>t**	**Coef.**	**P>t**
Size of Government	-0.107	0.079	-0.130	0.027
Goodness-of-fit				
R^2		0.17		0.37
GDP/capita (000s)	-0.070	0.018	-0.075	0.002
Goodness-of-fit				
R^2		0.28		0.44

Source: ESS Round 2 and 5, IMF, OECD, World Bank, (Author's calculations)

The relationships of REd with SOG and GDP/capita are presented in Figures 5.7 and 5.8 respectively, where countries are highlighted by different colour, according to the welfare state regime they belong to. Nordic countries are highlighted in green, Continental in black, Liberal in purple, Southern in blue and Eastern in red. Hollow circles and plus symbols refer to 2004, whereas arrowheads to 2010. Plus symbols indicate that there has been an increase in REd between 2004 and 2010, while hollow circles show a decrease. Moreover, the line that connects the arrowhead and the plus or

hollow circles indicates the temporal trends of each macro-level determinant. Therefore, upward arrows show an increase, whereas downwards a decrease. Finally, the two regression lines for 2004 and 2010 are also presented by a grey sold line and a dashed line respectively.

Figure 5.7 shows that countries, within welfare state regimes, indicate some consistency in terms of SOG. Nordic countries have a traditionally large SOG, followed by the Continental ones. In Southern and Liberal countries SOG is smaller, as governments' revenues range between 35-40% of their GDP. Finally, in Eastern countries the SOG rate differs substantially between the countries, ranging from almost 25% to around 45% for Slovakia in 2004. The change in SOG from 2004 to 2010 is rather small, with the exception of Slovakia and Estonia, where SOG has been increased relatively more. Some minor increases have been also observed in Norway, Portugal, the Netherlands and Ireland; however, in most of the countries SOG is lower in 2010 compared to 2004. As mentioned above, the relationship between REd and SOG is negative for both 2004 and 2010. This means that in countries, where SOG is large, REd are more likely to be lower compared to all other countries. Nonetheless, the change in SOG, through time, does not seem to be associated with the temporal change in REd, as the correlation between the two is very low (r=-0.07). Therefore, the drop or increase in the one magnitude does not seem to affect the other in a specific way.

Figure 5.7: The Relationship between SOG and REd
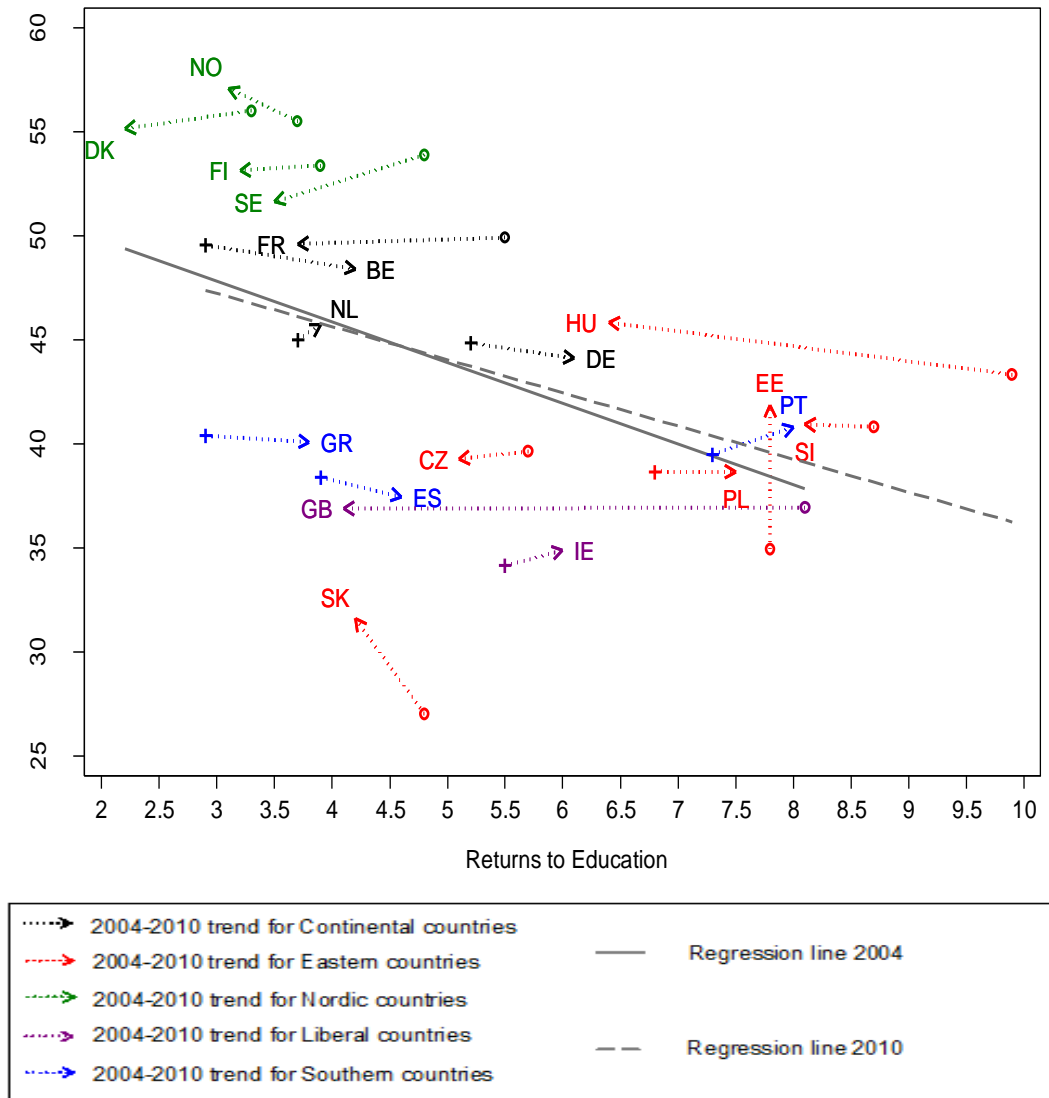
Source: Author's calculations based upon Table 5.4

Moreover, GDP/capita seems very highly and negatively correlated with REd irrespective of the time point selected [r(2004) = -0.54, r(2010) = -0.66]. In other words, as Figure 5.8 illustrates, the higher the GDP/capita is, the lower REd are expected to be. The relationship is stronger for 2010, even if there has been an increase in REd in Germany, Belgium, Ireland and the Netherlands, which are high-income countries with GDP/capita of more than €35,000. However, in the Nordic countries, where GDP/capita is traditionally very high, and especially in Norway, REd between

2004 and 2010 dropped, even when GDP/capita was higher. When Nordic countries are excluded from the analysis, then the relationship becomes weaker and statistically insignificant at the 0.95 confidence level. Looking at the relationship in the temporal trends, the correlation between the two magnitudes is very weak (r=-0.03), indicating that the increase in the GDP/capita is unlikely to affect REd in a specific way.

Figure 5.8: Relationship between GDP/capita and REd
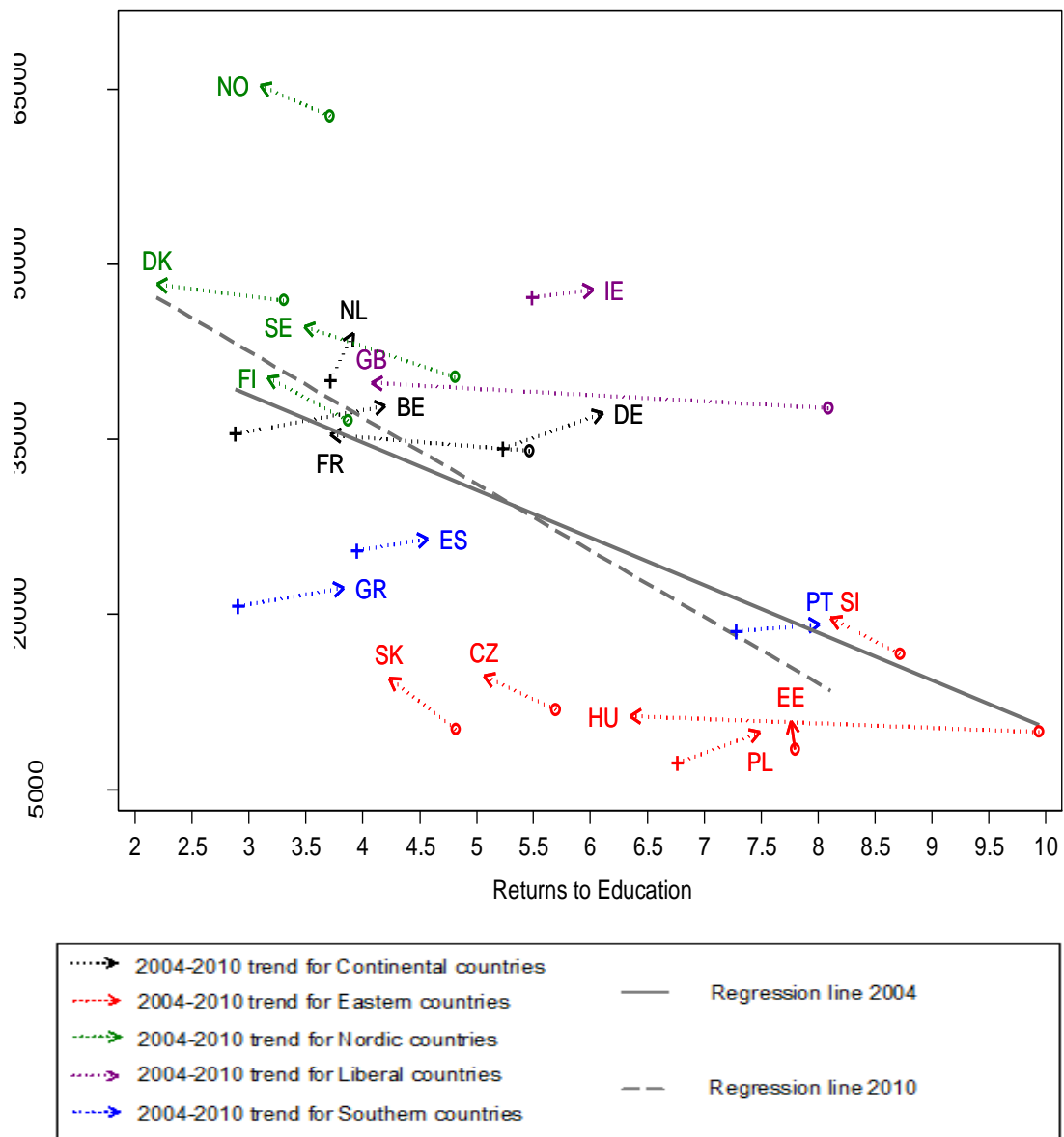
Source: Author's calculations based upon Table 5.4

5.5 Summary and Conclusions

Concerning wage inequalities, past literature informs that there are also other factors, apart from the higher educational attainment, such as age, race, tenure, gender or various proxies that affect wages. Furthermore, there is literature that investigates the evolution of skills wage premia through time, but results are rather conflicting. Such correlations are examined in the literature, mainly by the implementation of the Mincerian wage equation, adjusted to each hypotheses tested and data used. However, other researchers remain very sceptical towards the human capital theory, claiming that it fails to capture the institutional dynamics in labour market and thus, it is rather misleading.

Further research focuses on the obsolescence of skills and the decline of human capital accumulation, after the first entry in the labour market. It also focuses on the way educational attainment and ability-tests reflect productivity differences as well as on the effect that technology-oriented changes have on the individuals' future occupational choices (Card and Lemieux, 2001; Rothstein, 2001; Campbell *et al.*, 2002; Handel, 2003; Handel and Gittleman, 2004).

Empirically, this thesis investigates how educational attainment affects the wages of individuals in nineteen European countries, taking into account the external economic circumstances as well as the economic and institutional context of each country's labour market and the welfare state regime these countries belong to. Summarising, the effect of one additional year of education on wages seems positive in all countries and therefore, the null hypothesis that educational attainment has no real effect on wages has been rejected.

All countries examined, reveal positive returns to an additional year of education, but the returns do not necessarily increase/decrease according to the general economic climate. However, across countries some convergence has been observed in 2010

compared to 2004, where REd seems to differ a lot, as there were countries, such as Belgium or Greece, where an additional year of education yields close to 3% return, while in others, like Hungary, the return seems much higher (9.9%). In terms of welfare state regime, Nordic and Continental countries seem to have a more stable, but lower yield, whereas in the Southern and especially, Eastern and Liberal countries, the yield seems rather volatile, but relatively higher.

This thesis also accounts for each country's labour market economic and institutional context using a two-step regression approach. From all nine macro-level determinants examined, only two have been found statistically significant. The SOG as well as the GDP/capita seem to be negatively associated with REd.

Finally, since Nordic and Continental countries are traditionally countries where SOG is relatively large, it appears that REd are low. However, even if the relationship between SOG and REd seems negative, there are still some countries, such as the UK and Hungary, where REd and SOG are either both low or high. For both 2004 and 2010 the relationship between REd and GDP/capita is strongly negative, presenting a picture where REd is more likely to be lower in wealthy countries. This relationship is consistent among all welfare state regimes apart from the Liberal, where some inconsistency between the UK and Ireland has been observed.

6 CHAPTER 6: JOB MISMATCH, OVEREDUCATION AND UNDEREMPLOYMENT: EMPIRICAL EVIDENCE FROM EUROPE

6.1 Introduction

In terms of labour market, traditional approaches, concerning the noticeable discrepancies between supply and demand, generally accept that when the labour supply exceeds demand this creates unemployment; and when demand exceeds supply, unfilled vacancies and skill shortages appear. However, exogenous imbalances have become part of the neoclassical labour market approach, when the notion of imperfectly competitive labour market is acknowledged. Hence, these approaches argue that the wages will automatically adjust upwards in case of excess demand and downwards in case of supply surpluses. In practice, the interacting forces in the labour market could be greater than the traditional approaches expect. There might be an adjustment-gap between the expected and actual wages, as this automatic procedure could be left incomplete because other factors (i.e., social, institutional and/or cultural) might play a significant role and prohibit market clearance.

Wieling and Borghans (2001) investigated the discrepancies in the relationship between labour supply and demand, finding that these can impact on school-leavers' occupational experiences. Statistically, they have used a multi-level approach with a random coefficient component for types of education, in both level and fields of education terms; and thus, different types of adjustments have been highlighted. Their findings revealed that an excess in supply drives high-educated individuals to accept lower wages and work on jobs incommensurate to their educational levels, but this is

not true for all types of education. Unemployment affects people with both low and high educational attainment, who are not willing to accept lower wages, temporary and part-time jobs or jobs with lower educational requirements. The type of education is indeed very important, but it is very hard, if not impossible, to be empirically tested in a cross-country comparison analysis like the one attempted by this thesis. Therefore, this thesis treats all fields of education as having the same effect on the labour market, particularly focusing on the effect of one additional year of education and its variation through European countries with different labour market context as well as through economic times.

Hudson (2007) argued that even for workers who work in the same job, industry, firm and occupation, compensation could be relatively different. He used a framework, where job market is divided into two main sectors: the primary, where all "good" jobs are located; and the secondary, which is mainly occupied by low-skilled and low-paid jobs, where working conditions are worse. Hudson argued that those who are related with the primary sector, employers and employees, are very keen to propagate the unequal distribution of pay and working conditions. Moreover, this two-tier labour market has different characteristics, as non-standard arrangements and citizenship are much more important determinants, compared with sex and race. Educational level is still a strong factor, as high-educated individuals are more likely to be part of the primary sector. Finally, those working on the more degraded sector (secondary) are feeling more insecure and are more likely to participate in trade unions. This implies that, since it is more likely the primary sector to be dominated by the high-educated and the secondary by low-educated, it is expected that the effect of one additional year of education is stronger in flexible markets, where trade unions are weaker. However, this effect can be moderated by the degree trade unions could influence labour market outcomes.

According to Jacobsen and Skillman (2004), the determination of both labour demand and supply functions, can also include factors related to acquired abilities and education, training commensurable with the job, experience at work, innate ability, such as talent, work effort or productivity as well as features associated with the well-being on

workplace. This thesis attempts to incorporate most of these factors in its analysis, given the limitations of the data and methods used, moving even further by accounting for the institutional and economic labour market context of the nineteen European countries examined, in prosperous and recessionary economic time periods.

Mortensen and Pissarides (1994) tried to explain the persistence of unemployment even at times when job vacancies soar. The existence of a significant number of buyers and sellers is not enough for an optimum transaction within the labour market. Additionally, these buyers and sellers should be able to allocate each other as well as a common marketplace, instead of waiting until they find a better offer. These transactions are not made automatically, but only after a process of market research, which can be costly for both employers and employees. This means that markets can be effective, ineffective or not existent at all. The frictions in the process of job matching, and specifically in the process of finding the most appropriate applicant, can lead to inefficiencies in the labour market. As a consequence, the market leads to a situation where unemployment persists, even when there are workers who are happy to work for the wages that employers are willing to pay. Pissarides (2013) analysed the labour market situation in Europe during recession and concluded that unemployment in Southern countries has been higher, due to the lack of a flexible labour market system, which can be adaptable to the up and downs of business cycles. In that context, policies that encourage productivity growth, mobility, creation of different types of high-skilled jobs and low minimum wages, can be considered as the best remedy to drive the European labour markets out of this deep recession.

In this Chapter job mismatch is examined under a similar conceptual framework as in Chapters 3, 4 and 5. First, empirical literature is presented along with methodological issues pertaining to its definition and measurement. Then, a detailed calculation of job mismatch has been estimated using 2004 and 2010 data in order to examine possible differences or similarities that exist between different countries, classified under welfare state regimes as well as between good and bad economic times. Specifically, Section 6.2 presents literature on incidents of job mismatch and their implications on individuals' wages. Then, the data specification along with a description of the

methodology employed is discussed in Section 6.3. Section 6.4 employs an empirical investigation on the relationship between educational attainment and wage-premiums/penalties associated with job mismatch, using the two-step approach technique as an attempt to incorporate the effect of the economic climate as well as the economic and institutional context of each country's labour market to its analysis. Finally, Section 6.5 summarises the findings, discussing them in relation to the existent literature.

6.2 Literature Review

Sattinger's (1993) "assignment theory" indicates the possibility of close matches between workers and firms, providing a basic comprehensive framework on how qualification mismatch can be approached (McGuinness, 2006). However, not all studies conceive overqualification in the same way. Psychologists use the idea of skill underutilisation in order to interpret job mismatch (Johnson *et al.*, 2002). Subsequent studies from Economics, on the other hand, tend to distinguish between skill underutilisation and overqualification. For example, Green and McIntosh (2007) showed that there is a positive, but imperfect correlation between overqualification and skill underutilisation, suggesting a clear distinction between these two conditions. Moreover, there are some interesting findings in Green and McIntosh (2007) as well as Allen and Van der Velden (2001) studies, implying that there are negative effects of skill underutilisation on wages and job satisfaction, even after conditioning for overqualification.

Chevalier (2003) attempted to define the term of overqualification by dividing it into two categories: *apparent overqualification*, where a graduate is in a non-graduate occupation, but satisfied with the match between qualification and job; and *genuine overqualification*, where a graduate is in a non-graduate occupation, but dissatisfied with the mismatch. These two types of overqualification have different associations with pay, unemployment and other outcome variables. However, the empirical analysis attempted by this study does not distinguish between the two, due to data limitation.

The variable used to define mismatch has been constructed using participants' responses on their subjective judgements regarding the years of education required for the job they are doing, as compared with their educational attainment measured in years. Issues of job satisfaction are not directly examined in this Chapter.

Livingstone (2009) challenged the mainstream view, arguing that there is no fundamental reason for someone to believe that education and labour market should match each other, as they have different philosophical departures and institutional purposes to fulfil. Education and contemporary labour market are rather contradictory than complimentary and any attempt to see them as the latter, leads to arbitrary and ambiguous outcomes, which are very difficult to stand as methodologically robust and therefore, to inform policy-making. Moreover, he distinguished underemployment from overeducation by placing the former within the framework of segmented labour market theories and thus, within the structural inability of the labour market to generate well-matched jobs. Additionally, overeducation is placed within the ongoing tendency of educational institutions to produce a growing number of high-qualified workers, intensifying labour market's problem of underemployment, especially in periods of economic downturn[30].

There has been a growing literature related to the issue of technology-biased discrimination in workplace, which in turn, results to the creation of a large pool of overeducated and underutilised workers. Di Pietro (2002), in a research paper regarding the European labour market, examined the time-gap that exists between the upgrade of skills the workers hold and these that the labour market demands. These discrepancies are mainly caused by the acquirement of advanced technical knowledge from the graduates, which cannot be easily applied to the bulk of workplaces. Firms are not so keen on responding promptly to technological progress and this can be partially attributed to the rigid labour market regulations for employment protection. Because it

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[30] The author of this thesis acknowledges that there are other definitions of underemployment. The most common refers to individuals, irrespective of their educational attainment, who involuntarily work part-time, but would prefer to work for more hours. Certainly, there are differences between the definitions existing in the literature. However, this study treats underemployment as synonym to overeducation, unless it is stated differently.

is impossible for firms to immediately substitute their current workers with others that hold more technologically-advanced skills, they are discouraged from adopting new hi-tech procedures and machineries. As a result, business growth and vacancies for high-skilled workers do not follow an incremental trajectory and this causes an increasing supply trend of workers that end up unemployed or considered as overeducated in the labour market.

The argument of the rising demand for "knowledge workers" has been challenged by Brown and Hesketh. (2004). In a research focused on the US and the UK, they argued that the market demand for high-skilled workers is not that great as the governments often claim. Usually, governments fail to adjust to labour market's reality. The issue of mismatches between education and work as well as the ongoing expansion of higher education, without reforming the labour market accordingly, could worsen graduates' employability. The competition for securing a high-skilled job has been very tough and employers are more interested in identifying rigorous individualistic characteristics between equally skilled candidates, such as their tendency in brand loyalty or their previous experience and indices of personal ambition. Moreover, an alternative view of labour supply is provided, by partitioning job candidates in two categories: the players and the purists. The players try to adjust their skills and experiences to labour market demands, with the marketisation of their CV's usually through middle agent companies, while the purists are mainly concerned in finding employment commensurable with their skills obtained in higher education.

In a mixed-method study, commissioned by the SSDA, Bevan and Cowling (2007) were interested in identifying the skills of workers that are the most demandable in the British and European labour market as well as the factors that lie behind the issue of job mismatch. Initially, the authors offered a statistical analysis of the EWCS conducted in 1996 and 2000, where employees assess their experiences regarding job mismatch. Furthermore, in-depth interviews with HR managers, in four organisations based in the UK, have been conducted in order to test the statistical findings from the EWCS as well as to offer a qualitative insight on why and how the incident of job mismatch occurs. The authors' concluded that job mismatches, both over-skilling and under-skilling, are

highly related to the significant low rate of labour utilisation and labour productivity growth. Moreover, job mismatch has negative implications to salary progression, employees' career and skill development as well as to job satisfaction. The rates of improvement of job mismatch are considerably higher in the EU-15 than in the UK, but demand-side causes are often neglected compared to the supply-side ones, in both. Finally, on-the-job training can offer a considerable alleviation of job mismatch, especially to under-skilled workers.

Overeducation, or otherwise called overqualification, usually entails a pay-penalty for those individuals with certain qualifications, who are not performing the task they are supposed to undertake. Their pay is compared with that of those individuals, who perform tasks commensurable to their educational level (Sloane, 2003). Sloane estimated that this penalty lies in the range of 10-25% approximately, depending on the data and definition used. Moreover, other studies approach overeducation from a different perspective, finding that, when comparing individuals who work in a job with certain educational requirements, overeducated workers have slightly higher pay than the less-educated but matched co-workers; and in that case, overeducation is associated with a wage premium (Verdugo and Verdugo, 1989; Bauer, 2002). The latter approach has been used in the empirical part of this Chapter, where workers who perceived themselves as mismatched are compared against those who reported that their educational attainment is perfectly matched with what their job requires. Finally, in more qualitative terms, overqualification can be associated with substantially low job satisfaction and well-being at work (Allen and Van der Velden, 2001; Pollmann-Schult and Buchel, 2004; Maynard *et al.*, 2006; Vaisey, 2006; Green and McIntosh, 2007).

The key concepts in the relationship between higher educational attainment and employment are the utilisation of the acquired knowledge and skills in the labour market and the effect of educational mismatches to wages and job satisfaction. Allen and de Weert (2007) investigated the aforementioned concepts by offering a more in-depth statistical analysis of the CHEERS survey. Focusing on only five- Germany, the Netherlands, the UK, Spain and Japan- out of the thirteen countries participated in this survey they revealed a negative and statistically significant impact of the occupational

mismatches on both productivity and earnings, especially for those with lower qualifications. Although the analysis showed that educational and skill mismatches are indeed related, the authors suggested that Sattinger's assignment theory, which sees occupational mismatches as implying mismatches between available and required knowledge and skills, should be rejected. Finally, the effects of overeducation on graduates' wages are not the same across the five countries examined, as graduates in Germany and the Netherlands experience smoother wage differentials compared with the UK, Spain and Japan.

Many researchers argue in favour of the great importance that the first job has on graduates' subsequent occupational career. Some claim that it is a stepping stone (Rubb, 2003), suggesting that overeducation is just a temporary situation. However, lately, there has been a growing literature supporting the *entrapment hypothesis* or *opportunity trap hypothesis*.

Audas *et al.* (2005) presented an econometric model, using a panel data set of Hungarian graduates over the period of 1994-1998, in order to capture the level of importance graduates' first occupational decisions have, to their subsequent careers. After acknowledging the limited empirical research in transition countries, they mainly focused on the first four years of graduates' occupational destinations. The more mismatched one can be in his/her first job, the bigger the possibility of negative consequences on his/her career development.

There are considerable evidence showing that young people have been hit much harder by the most recent recession (Bell and Blanchflower, 2011a; 2011b; Dietrich, 2013; Lindner, 2013) and since the recession was a prolonged one, this might have led to an "entrapment" of young people into long-term unemployment for the unskilled and to part-time low-quality jobs for those with higher educational attainment and credentials.

Due to the lack of reliable ad-hoc data sets for graduates, the EU's Framework Programme 6 (FP6) has financed a Specific Targeted Research Project (STREP). This project has been named as The Flexible Professional in the Knowledge Society

(REFLEX), which concerns data collection for graduates' situated in fifteen countries. This particular data set examines individuals graduated in 1999-2000, who were interviewed five years later. It contains questions related to their employment status after graduation, distinguishing between their first and current job, vertical and horizontal mismatch as well as skill mismatches. Other questions, which refer to the nature of work, organisation and individual competences, have been also included.

McGuiness and Sloane (2011) were amongst the first scholars who used this data set. Their findings showed that overeducated graduates are subjected to considerable pay-penalties when compared with individuals with the same level of education, who are well-matched in their jobs, irrespective of their gender. Moreover, in terms of skills, women who are considered as over-skilled face the same pay-penalties, but this does not seem to be the case for over-skilled men.

In a case study for Northern Ireland, McGuiness and Bennett (2007) examined whether overeducation is more frequent among individuals placed on the lower levels of graduate wage distribution. Their findings revealed only a partial support of the hypothesis that overeducation is linked to lower levels of ability, as gender seems to be an equally important determinant. It was found that overeducation is more persistent in women, irrespective of their ability. This does not apply to men, as overeducated males with low- and mid-abilities earn significantly less than their counterparts with high-abilities.

Various empirical studies indicate that the condition of overeducation seems to be continuous throughout the career progression and it is still unclear of what its costs and consequences are in the long-term (Dolton and Vignoles, 2000; Rubb, 2003; Frenette, 2004).

Scherer (2004) conducted a cross-national comparative research in three countries-former West Germany, the UK and Italy- using longitudinal data extracted from the GSOEP for Germany, the BHPS for the UK and the Indagine Longitudinale sulle Famiglie Italiane (ILFI) for Italy. She focused mainly on the impact that "under-

qualified" jobs and temporary contracts have on graduates' career development, in countries with different labour market structures. The stepping stone hypothesis is not strongly supported by the data. Contrariwise, the entrapment hypothesis seems to fit the data better, but, on the other hand, the findings that can significantly support this hypothesis are rather weak. The British labour market seems to be more flexible for graduates in order to make up potential initial disadvantages. The Italian and West German labour market rigidities do not allow for such thing and thus, the entrapment hypothesis finds greater application in these countries. Examining the type of contract offered and accepted, she did not find any negative effects on graduates' subsequent careers in any of the three countries. However, job stability is one of the main concerns that graduates have in mind, when entering the labour market.

The employment experiences of individuals on their initial stages of their professional career seem to play a very important role in their subsequent development. However, the empirical analysis performed in this Chapter does not distinguish individuals by age or the broader age-group they belong to. This is because the data used do not include adequate number of individuals that can allow an investigation on whether there are any differences on the labour market outcomes of individuals of different age-groups in order for the entrapment hypothesis, between different economic times and countries, to be tested. Therefore, it is a research question that is anticipated to inform future research, when large-scale comparative data will be available for subsequent to the economic crisis years.

Lenton (2012), reviewing the contemporary empirical literature, suggested that overeducation is measured by four separate methods: the analysis of the expertise required for a job; the self-assessment of the commensurability of an individuals' educational attainment with the job requirements; an individuals' direct mismatch perception related to the job task, irrespective of his/her education; and the realised matches method, which can be statistically revealed by comparing a worker's attained education with the mean or mode level within a specific occupation, as these can be retrieved from the data. None of the methods seem to prevail over others and the researchers' decision is exclusively dependent on the properties of the data available.

Moreover, in the same study, Lenton (2012), using data from the UK Quarterly Labour Force Survey (QLFS) during a six-year period (2002-2008), investigated issues of the realised mismatches, providing an estimation of the pay-penalty of the overeducated male workers. She used modal educational level within industries and occupations across the UK, as the correct level of education required for a job. Each unit of standard deviation, above or below, the correct level is considered to be as over- or under-education respectively. Even if, such methodology is supported by the literature (Verhaest and Omey, 2012), QLFS seems to be rather problematic because it does not provide comprehensible information on earnings and therefore, estimations can be misleading, especially when pooled data is used, where attrition in valid cases is mainly unavoidable. Secondly, the assumption that the modal or mean educational level of a job is the correct one, fails to recognise the structural defects of the labour market in periods of recession, where workers struggle to find a job commensurable to their educational level and are likely to accept a non-matched one. When credential inflation is in operation, the methodology of realised mismatches is upward biased and the mean or modal educational level required for a job, may include a big proportion of already overeducated individuals. The same bias can be assumed in declined industries, due to the general negative economic circumstances or due to the trends in the labour market in favour of a specific sector, such as the impact of deindustrialisation process and the gradual increase of services over manufacturing (Kromydas *et al.*, 2012).

Garicano and Rossi (2006) proposed an assignment theory in a closed economy, where low-skilled agents specialise in production, while, on the other hand, the high-skilled concentrate in problem-solving. Based on this, they recommended a two-tier equilibrium model, distinguishing between North and South, where North differs from South in terms of its workers' ability. In this model there are no barriers to mobility. For the sake of simplicity, they named this integration procedure "globalisation". According to the findings, globalisation leads to better matches for all Southern workers, while it is only the best of the Northern workers that end up appropriately matched. Finally, their findings revealed that globalisation results in the rise of wage

inequalities among non-managers in the South, but no definite conclusion can be made for the North, as the findings are mixed.

Other studies attempted to enhance the understanding of the dynamic aspect of the graduate labour market: is overqualification growing or falling over time? Hartog (2000), using samples from the Netherlands (1960-1995), Spain (1985-1990) and Portugal (1982-1992), found some evidence of growing overqualification in these countries. For the UK, Chevalier and Lindley (2009) argued that the proportion of both the "apparent" and "genuine" overeducated has doubled from 1990 to 1995. An earlier study for the UK by Felstead *et al.* (2002), showed a continual increase in overqualification and job mismatch in the period of 1986-2001.

Examining job mismatches at a regional level, there is a significant volume of empirical studies that focus on inter-regional wage and unemployment differentials. Research based on data from the UK and US, showed that institutional factors, such as wage bargaining structures, as well as individual factors with regards to workers' characteristics, such as education, are related to the aforementioned inter-regional disparities (Goldfarb and Yezer, 1976; Shah and Walker, 1983; Farber and Newman, 1987; Elliot and Hemmings, 1991; Gabriel *et al.*, 1993). Other researchers argue that regional disparities indicate a strong persistence in unemployment, which may have adverse consequences for the regions occupying the bottom positions in unemployment rankings (Martin, 1997; Pehkonen and Tervo, 1998; Dixon *et al.*, 2001). Aragon *et al.* (2003) argued that the increase in unemployment disparities cannot be solely imputed to labour market disequilibrium. The results of their study revealed that overeducation exists in Spain, as graduates initially take on jobs inferior to what would correspond to their educational attainment. The data used by the current study is not adequate to examine educational mismatches on the regional level within countries. Instead, the empirical analysis is performed on a European level, examining the incident of mismatch and its relationship with the labour market's economic and institutional context of nineteen countries separately as well as in relation to the welfare state regime they belong to.

Jensen and Slack (2003) suggested that underemployment measurements should be also used from governmental statistic agencies. They define underemployed individuals by splitting them into four parts. Those underemployed by low hours (less than 35h/week), those by low income (less than the poverty threshold), those by occupational mismatch (using the realised match definition) and finally, those that feel that there are no jobs available (the discouraged workers). Alternatively, they argued that both unemployment and underemployment measurements should be imposed, as unemployment alone fails to capture important individual characteristics of the labour force. Moreover, incidents of underemployment have been identified, especially among individuals belonging to vulnerable population (e.g., women, minorities, first entrants, low-skilled), arguing that those who reside in rural areas or central cities face all forms of underemployment more often and in greater severity. Finally, Jensen and Slack (2003) observed some reluctance on behalf of federal statistical agencies to collect data and create variables regarding underemployment. They admit, though, that this is more because of the complexity of underemployment measurement and less because of the unwillingness expressed by the government to do so, since it already gathers data for equally sensitive topics, such as the displacement of workers.

Underemployment has been also examined under a local context. The study of Van Ham *et al.* (2001) examined the *discouraged worker effect* on local underemployment on deprived geographical areas, in terms of available job opportunities. The authors, based on the Dutch Labour Force Surveys (DLFS) conducted between 1994 and 1997, focused mainly on the geographical aspect of job mismatch and its effect on employment outcomes. The discouraged worker effect can be considered as valid and well-applied to the Dutch labour market, as limited chances of finding a good job or even just a job, lead to the individuals' unwillingness to participate on job searching procedures.

Wilkins (2006; 2007) defined underemployment as the willingness of part-time employees to work for more hours. Using data collected by the 2001 Household, Income and Labour Dynamics in Australia (HILDA), tried to identify factors related to underemployment, focusing mainly on personal, social and job characteristics and their

effect on both underemployment and unemployment. His findings revealed that unemployment and underemployment have many predictors in common, such as age, educational attainment, disability and labour market history. On the other hand, housing situation and location of residence appeared not to have an effect on unemployment or underemployment. There are also predictors, such as family type, number of dependent children and number of jobs held in the preceding year, which affect unemployment and underemployment in different directions. Finally, Wilkins suggested that supply-side factors, which cannot be directly related to job characteristics, can be considered as more important predictors of underemployment than other job characteristics or demand-side factors.

Maynard *et al.* (2006) found that the sense of underemployment and overqualification or any other negative stance towards the nature of the job is mainly expressed by full-time employees. On the other hand, temporary workers do not show such negativity regarding their job. Nabi (2003), using a sample of 203 Business School graduates, admits that graduate underemployment, with regards to educational mismatch, can influence the UK labour market negatively. His findings revealed that graduates, who are considered as underemployed, reported a decline in their skills utilisation, which in turn, influences their job performance, career and salary progression and even, their sense of satisfaction regarding their living standards.

Van der Meer (2006) tested the classification system, first introduced by Huijgen *et al.* (1983) and then improved by Hallaby (1994), regarding overeducation and the levels of required education for a specific job. For that purpose, he juxtaposes Huijgen *et al.* classification system with the system developed by Statistics Netherlands, the official statistical agency of Netherlands. Specifically, he offered a comparison of standard errors for both measurement methods, between the rate of return for over- and under-education, in order to test their statistical validity. In a nutshell, the smaller the standard errors are, the greater the goodness-of-fit of the model. Findings indicated that even if both systems seem to reveal similar trends of over- and under-education, the Statistics Netherlands approach provides a more robust and adequate measurement of these trends.

There are other researchers, who try to measure over- and under-education by implementing various techniques and classifications. Verhaest and Omey (2006; 2010), using data from Flemish school leavers, found useful insights of the measurements of over- and under-education. In both studies, measurements are being distinguished in terms of job satisfaction, mobility, training participation and pay. They argued that different measurement methods provide different outcomes, regarding the magnitude and the significance of statistical effects. The findings revealed that overeducated workers do not seem satisfied with their work, when attained education is used as a control variable. Moreover, when controlling for required education in a job, the findings are not statistically significant. For undereducation the findings proved to be vague and thus, no statistical explanation could be provided. Previous job experience along with higher schooling grades are major determinants for not being overeducated at work, but this is less straightforward when skills are defined more generally, including innate and acquired competencies outside schooling. Regarding gender, women are more unlikely to be overeducated, at least in terms of the standard Realised Mismatch (RM). However, when more detailed occupational codes and additional observations are being used, this statistical effect is not valid anymore. Surprisingly, technology-biased mismatch does not seem to be supported by the data.

A cross-national study, contacted by Wolbers (2003), examined the effect of horizontal job mismatches within the EU, meaning the mismatches that reflect differences between educational fields and job performed, using EULFS 2000 ad-hoc module on school-to-work transitions. Apart from individualistic, structural and job characteristics, which affect the probability of someone being mismatched, there is significant evidence revealing the major influence of the educational system orientation to job mismatches. Wolbers suggested that individuals whose educational system is vocational-oriented are more likely to be mismatched, when compared to those whose educational system is a more generic one. Moreover, mismatched workers, with a low occupational status, are more prone to participate in life-long learning programmes as well as to look for another job more frequently, than matched workers. These effects seem to be smoother in countries with a vocational-oriented educational system.

Handel (2003; 2005) argued that institutional changes and management practices are often discounted, when occupational mismatches are under examination. These mismatches might influence the degree of workers' dissatisfaction, in various workplaces. Until now, empirical evidence has failed to offer a robust statement on whether job requirements surpass workers' capacities at work. The main bottleneck is the lack of an up-to-date, definite and robust method that can assess the actual job requirements, due to the significant distance that exists between the advertised vacancy requirements and the actual job content.

There are also some limited evidence regarding people's job satisfaction when occupationally mismatched, both in terms of obtained education and skills (Johnson and Johnson, 2000; Allen and van der Velden, 2001; Green and McIntosh, 2007). Looking at the economy as a whole, this mismatch implies that the transition from education to work is not that deterministic, as other factors, apart from credentials or skills play a role when somebody is searching for a job. These factors, individualistic or institutional, can affect employment outcomes in various ways. Looking into the pecuniary aspects, mismatched workers, in terms of the educational level required for a job, when compared with matched workers, reveal some wage-premia if undereducated or wage-penalties if overeducated, but the effect becomes much bigger when skills mismatch are taken into account (Green and McIntosh, 2007). However, when mismatched workers are compared against their matched co-workers, then wage-premia and wage-penalties take the exact opposite form. In Badillo-Amador and Villa's (2013) study, both educational and skills mismatches seem to have a negative effect in workers job satisfaction levels, but again the effect of skills mismatch is much stronger. Moreover and as expected, when pay is taken into account when measuring job satisfaction, undereducation does not seem to have any significant effect in the reported job satisfaction levels.

Until now, there is not an official definition of overeducation and underemployment, generally accepted by the majority of academic community and policy-makers. This is mainly due to the heterogeneity of labour market and educational systems around the

world, which affects all relevant methods of job mismatch calculations[31]. The great complexity of the decision-making process in the individual level as well as the different approaches followed by various institutions, in a national and international level, to address overqualification, render any attempt to define both overqualification and underemployment an extremely dubious task.

6.3   Data and Methodology

This Section attempts to identify incidents of job mismatch and their implications on wages, due to the discrepancy between the years of education someone actually attained and the years of education a job requires, as this is perceived by the ESS respondents. In other words, this is called vertical mismatch and differs from the horizontal, where fields of studies are compared with subsequent occupational areas. The data used allow only for the vertical mismatch approach to be performed, given that certain assumptions are met. In particular, the ESS asks respondents the following two questions:

- "If someone was applying nowadays for the job you do now, would they need any education or vocational schooling beyond compulsory education?
- About how many years of education or vocational schooling beyond compulsory education would they need?"

A similar to Duncan and Hoffman's (1981) model has been employed. This is a model that is very common in the literature (Hartog, 2000; Chiswick and Miller, 2008; Galasi, 2008; Korpi and Tahlin, 2009; Kucel, 2011) and given that the ESS data used by the current thesis allow for this model to be constructed, it has been decided to be implemented accordingly. The variable regarding how many years of education a job requires is a scale variable. In order to assess whether someone is undereducated, overeducated or perfectly matched, the job requirements need to be compared with the

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[31] The analysis of the expertise required for a job; the self-assessment of the commensurability of an individuals' educational attainment with the job requirements; an individuals' direct mismatch perception related to the job task, irrespective of his/her education; and the realised matches method, which can be statistically revealed by comparing a worker's attained education with the mean or mode level within a specific occupation, as these can be retrieved from the data.

educational attainment variable, in terms of years of education. Specifically, this variable comprises of eight different bands, shown in Table 6.1.

Table 6.1: Bands and Frequencies Regarding the Years of Education beyond the Compulsory Needed for a Job

Years of Education beyond Compulsory Needed by Applicant for Your Job	Freq.	Percent	Cum.
1. Less than 1 year	1,427	7.53	7.53
2. About 1 year	1,631	8.61	16.14
3. About 2 years	2,113	11.15	27.29
4. About 3 years	4,496	23.73	51.02
5. About 4-5 years	4,919	25.96	76.99
6. About 6-7 years	2,177	11.49	88.48
7. About 8-9 years	1,350	7.13	95.60
8. 10 years or more	833	4.40	100
	18,946	100	100

Source: ESS Rounds 2 and 5 (Author's calculations)

Following Duncan and Hoffman's ORU model (1981), the construction of a variable in a continuous format, showing the years of education required for a specific job (R), is necessary. The next step is to compare R with the actual years of educational attainment of an individual (A). Someone is considered as undereducated when the overall number of years of education attained is below the sum of years of education required for a job ($A<R$). Likewise, overeducation exists when $A>R$. In the case where $A=R$, the individual is considered as matched. However, from the relevant ESS questions there is no clear way how academic and vocational schooling can be decomposed and this make estimations on mismatch difficult to be interpreted, as related to higher educational attainment in credential terms. Therefore, the estimations performed below would concern marginal returns to one additional year of over/under-education, treating tertiary and higher education as having the same impact on the results.

In the sample of this study, the A is a continuous variable and does not include information about compulsory education. Moreover, it includes non-integer values, which might represent drop-outs or extended periods of study, but there is not any reliable way of deriving this information. However, as shown in Table 6.2, R is a scale

variable and therefore, it needs to be transformed into a continuous one in order for the ORU model to be calculated properly. Thus, the bands of **R** need to be reconstructed into actual numbers for each individual. Therefore, it is up to the researcher to provide justification for this transformation. Nonetheless, a common practice in the relevant literature, followed for example by Galasi (2008), is to assign non-integer values to the bands on the original variable, which include one-year range (bands 5-7), constructing a continuous variable that contains both integer and non-integer values (mid-interval points). This transformation has been followed in this Chapter as well; and is illustrated in Table 6.2. Then, since this data includes nineteen countries with different levels of compulsory education, a new variable has to be created to assess how many years, under or over, an individual is from the official level set by the country he/she works in. In Belgium, for example, the compulsory level of education is twelve years. Thus, someone who lives in Belgium with sixteen years of educational attainment, working in a job that requires about two years of education over the compulsory level, is considered as overeducated by two years. From Table 6.2 it can be also seen that there is some inconsistency between bands 5 and 6 as well as 6 and 7. This is because of the way they are constructed and thus, no value can be assigned between 4.5 and 6.5 as well as 6.5 and 8.5 years.

Table 6.2: Values of the Original and Transformed Variable Regarding Years of Education Required for a Job

Years of Education Beyond Compulsory Needed by Applicant for Your Job	Transformed Variable
0. No compulsory education needed	0
1. Less than 1 year	0.5
2. About 1 year	1
3. About 2 years	2
4. About 3 years	3
5. About 4-5 years	4.5
6. About 6-7 years	6.5
7. About 8-9 years	8.5
8. 10 years or more	10.5

Source: ESS Rounds 2 and 5 (Author's calculations)

As a result, these values can cause some loss of information. The same applies for band 8, as the transformed variable assigns to all individuals with 10 years or more the value of 10.5. Based on the description above, the decomposition performed is subjected to data limitations because of the way variables have been originally constructed[32]. Nonetheless, such limitations affect only a small fraction of the decomposed variable and therefore, the transformation can be consider as rather realistic.

A new variable has been constructed after deducting the *A*, centred by compulsory level, from the continuous variable regarding the years required for a job. This new variable includes negative and positive values as well as zero. Negative values denote years of undereducation, positive years of overeducation and the zero value represents individuals who have the exact years of education their job requires[33]. Moreover, all control variables are the same as in Chapter 5, where returns to attained education have been calculated. Estimations regarding their coefficients derive very similar results and therefore, they have been excluded from the tables presented below.

Thus, the model takes the following form:

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[32] Diverting from ORU model, another way to measure job mismatch is to convert the bands of the *R* variable into years required for a degree, by using each country's average years needed for a degree to be completed as a threshold that distinguishes jobs that require a degree or not. Once again, this transformation may cause a great loss of information and produce misleading results, as it equates the credential with the additive effect of each country's average years needed for a degree to be completed. Secondly, it cannot be assumed that all participants, when responded to the question concerning the years of education required for a job, had perfect information regarding the average years needed for a degree to be completed or even for how many years it is designed for. In some countries, Medical degrees require six years minimum to be completed before the degree is awarded. Thus, the transformation of years of education required into degrees does not seem methodologically sound. Acknowledging the aforementioned data limitations, this study used the ORU model, constructing all the necessary variables.

[33] Respondents, whose educational attainment is below the national compulsory level, working in jobs that do not require compulsory education, are considered as matched, regardless the number of years of education they actually attained. In Spain, for example, an individual with five years of educational attainment, working in a job that does not require more years over the compulsory level, is considered as matched, but the same stands for an individual with eight years of education, working in a job where the educational requirements are below or the same with the compulsory level.

$$\ln w_i = a_i + (b_1 YR_i + b_2 YU_i + b_3 YO_i) + b_4 F_i + b_5 Exp + b_6 JbH_i + b_7 U12_i + b_8 Cou_i + b_9 Coh +$$
$$+ b_{10} H_i + b_{11} JbQ_i + b_{12}[(YR_i + YU_i + YO_i) \times (C_i)] + \varepsilon_i$$

(6.1)

where:

YR, **YU** and **YO** represent years of required education, under- and over-education respectively; and [**(YR$_i$+YU$_i$+YO$_i$)×(C$_i$)**] is a product of variables denoting the two-way interaction between **YR/YU/YO** and the country variable. **YR**, **YU** and **YO** are estimated separately for 2004 and 2010, using the same regression equation format. As a result, equation 6.1 is broken down into the following:

$$\ln w_i = a_i + b_1 YR_i + b_2 YO_i + b_3 YU_i + b_4 F_i + b_5 Exp_i + b_6 JbH_i + b_7 U12_i + b_8 Cou_i + b_9 Coh + b_{10} H_i$$
$$+ b_{11} JbQ_i + b_{12}(YR_i \times C_i) + \varepsilon_i$$

(6.2)

$$\ln w_i = a_i + b_1 YR_i + b_2 YU_i + b_3 F_i + b_4 Exp_i + b_5 JbH_i + b_6 U12_i + b_7 Cou_i + b_8 Coh + b_9 H_i$$
$$+ b_{10} JbQ_i + b_{11}(YU_i \times C_i) + \varepsilon_i$$

(6.3)

$$\ln w_i = a_i + b_1 YR_i + b_2 YO_i + b_3 F_i + b_4 Exp_i + b_5 JbH_i + b_6 U12_i + b_7 Cou_i + b_8 Coh + b_9 H_i$$
$$+ b_{10} JbQ_i + b_{11}(YO_i \times C_i) + \varepsilon_i$$

(6.4)

6.4 Hypothesis Testing and Analysis of Results

Table 6.3 shows the percentage distribution of workers in the sample regarding their mismatch status, for both 2004 and 2010. A consistent pattern exist between all countries, as it seems that individuals that report themselves as undereducated have decreased. The highest decrease has been calculated in France and the lowest in

Greece, which is the only country where the number of people who consider themselves as overeducated has also decreased. This might be attributed to the very high proportion of overeducated among all other workers, which is over 80% in both 2004 and 2010. In all other countries, the incidence of overeducation has been increased. For matched workers, the trends seem to be mixed between countries.

Table 6.3: Distribution of Mismatch Status 2004 and 2010

Country	2004			2010			2004-2010		
	% Ued	% Med	% Oed	% Ued	% Med	% Oed	Δpp Ued	Δpp Med	Δpp Oed
Continental									
BE	35.3	28.0	36.7	31.9	25.0	43.1	-3.4	-3.0	6.4
DE	58.2	25.7	16.1	49.3	30.1	20.6	-8.9	4.4	4.5
FR	56.4	18.5	25.0	36.6	17.2	46.3	-19.9	-1.3	21.2
NL	71.8	12.6	15.7	53.4	18.0	28.6	-18.4	5.4	12.9
Nordic									
DK	20.3	9.0	70.8	18.1	11.0	70.9	-2.2	2.1	0.1
FI	36.9	13.7	49.4	34.1	11.5	54.5	-2.8	-2.3	5.1
NO	46.1	13.7	40.2	35.9	11.9	52.2	-10.3	-1.7	12.0
SE	49.2	12.5	38.3	39.8	12.7	47.5	-9.3	0.1	9.2
Liberal									
GB	35.6	36.9	27.5	26.5	28.2	45.3	-9.0	-8.7	17.8
IE	17.3	19.4	63.4	9.6	7.8	82.6	-7.7	-11.6	19.2
Southern									
ES	24.2	27.8	48.0	15.5	24.8	59.7	-8.7	-3.0	11.6
GR	7.7	9.3	83.0	7.3	12.1	80.6	-0.4	2.8	-2.4
PT	13.8	58.7	27.5	11.8	59.0	29.3	-2.0	0.2	1.7
Eastern									
CZ	27.0	14.6	58.4	20.9	13.5	65.6	-6.1	-1.1	7.2
EE	11.7	9.9	78.4	8.7	8.1	83.2	-3.0	-1.8	4.7
HU	58.9	12.8	28.3	40.2	13.9	45.9	-18.6	1.1	17.6
PL	32.5	9.9	57.6	20.3	11.5	68.2	-12.2	1.6	10.6
SI	62.7	11.6	25.7	51.3	14.8	34.0	-11.4	3.2	8.3
SK	39.9	15.5	44.6	25.7	11.0	63.4	-14.3	-4.5	18.8
Average	37.1	19.0	43.9	28.3	18.0	53.8	-8.9	-1.0	9.8

Note: Ued: Undereducated, Med: Matched, Oed: Overeducated
Source: ESS Rounds 2 and 5 (Author's calculations)

Table 6.4 shows all calculations regarding returns to years of education required for a job (RREd), years of under- (RUEd) and over-education (ROVEd) as well as attained education (REd) for both 2004 and 2010 in all countries examined, which are sorted according to the welfare state regime they belong to. The estimations regarding all types of returns are based on equations 6.2, 6.3 and 6.4, where a fixed-effects format has been employed by the interaction of the variable regarding *YR*, *YU* and *YO* with the country variable respectively. Thus, they show each country's average marginal returns. All interactions have been found statistically significant. In all countries, except Greece, for 2004 RREd are higher than all other returns estimated, indicating that jobs with higher educational requirements are better paid compared to these with lower. Finally, since RREd>REd, an indication of mismatch becomes apparent.

The RUEd are negative in most countries, except the UK, Greece, Portugal and marginally the Czech Republic for 2004 as well as the UK, Spain and marginally Finland for 2010. Negative RUEd imply a clear wage-penalty when undereducated individuals are compared to the matched ones, meaning the individuals with more years of education who work in jobs that require exactly this amount of educational attainment. Moreover, in countries where RUEd are positive, undereducated individuals earn more than the matched ones. For 2004, in Greece and Portugal RUEd have been estimated in very high levels and in the case of Greece, RUEd is even higher than RREd. RUEd in the UK and the Czech Republic have been also estimated as positive. For 2010 RUEd are positive in the UK, Spain and marginally Finland. So, the only country that shows consistency, between 2004 and 2010, in positive RUEd is the UK. For 2010, all other countries show negative RUEd and the most striking rate has been estimated in Greece (-20.8%), especially when this is compared with the 2004 rate (7.8%)[34].

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[34] Greece's RUEd of almost -21% for 2010 means that each year of undereducation is associated with a drop of more than one fifth of the gross monthly salary a matched individual is getting paid.

Table 6.4: Returns to Years of Education Required for a Job, Undereducation, Overeducation and Years of Attained Education

(2004 and 2010)

Country	(RREd) % 2004	(RREd) % 2010	(RUEd) % 2004	(RUEd) % 2010	(ROVEd) % 2004	(ROVEd) % 2010	(REd) % 2004	(REd) % 2010	Returns (Comparisons)[1] 2004	Returns (Comparisons)[1] 2010
Continental										
Belgium	8.7	9.4	-6.0	-4.6	1.4	3.0	2.9	4.2	RRED>|RUED|>REd>ROVED	RRED>|RUED|>**REd**>**ROVED**
Germany	9.2	10.8	-2.1	-1.5	5.5	4.2	5.2	6.1	RRED>ROVED>REd>|RUED|	**RRED**>**REd**>ROVED>|RUED|
France	9.3	7.8	-2.6	-4.1	4.8	1.6	5.5	3.7	RRED>REd>ROVED>|RUED|	RRED>|RUED|>REd>ROVED
The Netherlands	8.1	8.8	-4.3	-3.7	2.5	2.5	3.7	3.9	RRED>|RUED|>REd>ROVED	**RRED**>**REd**>|RUED|>ROVED
Nordic										
Denmark	5.5	6.5	-4.2	-2.7	4.0	3.0	3.3	2.2	RRED>|RUED|>ROVED>REd	**RRED**>**ROVED**>|RUED|>REd
Finland	7.5	6.9	-4.6	0.1	1.6	1.0	3.9	3.2	RRED>|RUED|>REd>ROVED	RRED>**REd**>ROVED >|**RUED**|
Norway	6.4	6.8	-5.5	-3.6	2.8	0.6	3.7	3.1	RRED>|RUED|>REd>ROVED	**RRED**>|RUED|>REd>ROVED
Sweden	6.5	6.2	-5.9	-3.9	3.9	1.9	4.8	3.5	RRED>|RUED|>REd>ROVED	RRED>|RUED|>REd >ROVED
Liberal										
Great Britain	14.6	13.2	2.7	6.6	5.5	2.2	8.1	4.1	RRED>REd>ROVED>|RUED|	RRED>|**RUED**|>REd>ROVED
Ireland	10.9	10.1	-2.0	-6.0	3.1	1.2	5.5	6.0	RRED>REd>ROVED>|RUED|	RRED>**REd**=|RUED|>ROVED
Southern										
Spain	8.1	9.7	-4.1	1.5	4.9	3.4	3.9	4.6	RRED>|RUED|>ROVED>REd	**RRED**>**REd**>ROVED>|**RUED**|
Greece	7.3	5.9	7.8	-20.8	2.5	2.9	2.9	3.8	|RUED|>RRED>REd>ROVED	|**RUED**|>RRED>**REd**>**ROVED**
Portugal	14.6	14.4	7.8	-2.0	7.6	10.0	7.3	8.0	RRED>|RUED|>ROVED>REd	RRED>**ROVED**>**REd**>|RUED|
Eastern										
The Czech Republic	7.4	6.5	0.7	-5.7	6.1	4.4	5.7	5.1	RRED>ROVED>REd>|RUED|	RRED>|**RUED**|>REd>ROVED
Estonia	13.2	10.2	-1.9	-8.4	3.5	7.0	7.8	7.8	RRED>REd>ROVED>|RUED|	RRED>|**RUED**|>REd>**ROVED**
Hungary	10.9	8.7	-4.1	-5.1	6.8	3.0	9.9	6.4	RRED>REd>ROVED>|RUED|	RRED>REd>|**RUED**|>ROVED
Poland	8.5	8.0	-7.4	-2.1	5.9	8.1	6.8	7.5	RRED>|RUED|>REd>ROVED	RRED>**REd**>**ROVED**>|RUED|
Slovenia	12.5	11.8	-2.1	-1.8	5.0	3.2	8.7	8.1	RRED>REd>ROVED>|RUED|	RRED>REd>ROVED>|RUED|
Slovakia	7.1	5.5	-2.7	-4.5	5.7	6.5	4.8	4.2	RRED>ROVED>REd>|RUED|	RRED>**ROVED**>|**RUED**|>REd
Statistics										
N	8,747	9,553	4,966	4,507	5,284	6,682	8,747	9,553		
R^2	0.81	0.77	0.79	0.76	0.81	0.77	0.79	0.75		

Source: ESS Rounds 2 and 5 (Author's calculations)

[1] Notations in bold denote increases, while the underlined ones decreases.

ROVEd are positive in all countries for both 2004 and 2010. This means that the overeducated earn a wage-premium when compared to individuals with lower educational attainment, who are considered as well-matched to their job. However, in most of countries, this premium becomes smaller in 2010 compared to 2004. The only countries that show an increase are Belgium, France, Greece, Portugal, Estonia, Poland and Slovakia. In terms of welfare state regimes, Nordic and Liberal countries are the only two that show some consistency in temporal trends.

For 2004, in most countries, ROVEd are lower than REd except Germany, Denmark, Spain, Portugal, the Czech Republic and Slovakia. For 2010, the estimations show a similar trend. Denmark, Portugal and Slovakia are the only countries that maintain the ROVEd>REd pattern along with Poland, which in 2004 ROVEd was lower than REd.

Moreover, when it comes to the 2004-2010 temporal trend it seems that there is no clear pattern with regards to all types of returns calculated in this study. These patterns also differ within welfare state regimes. However, in terms of the actual rate in each of the two calendar years examined, RREd are higher than all other estimated returns in all countries, except Greece for 2004. For RUEd, Continental, Nordic and Eastern regimes show almost perfect consistency in terms of the negative sign of RUEd, while the Southern regime as well as the UK reveals a rather abnormal positive rate, especially for 2004. Finally, ROVEd are more likely to be lower than the REd in most of the Continental countries except Germany for 2004, in all Nordic countries, apart from Denmark, for both 2004 and 2010, as well as in the UK and Ireland, which consist the Liberal regime. The countries in the Southern as well as the Eastern regime reveal mixed results, as in some ROVEd are lower than REd, but in others the opposite stands.

In the sample, most of the respondents work in jobs that do not require compulsory education. Since there is no information in the ESS regarding the incidence of mismatch for those with lower to the compulsory level educational attainment, this study considers them as matched regardless of the years of education attained. Therefore, the wages for the matched workers might have been underestimated. On the

other hand, wages for the overeducated are less biased, as it is less likely for someone to work in a job that requires an advanced degree and thus, higher educational attainment, without having completed the compulsory educational level. When this happens is exceptional and can possibly apply to older workers with less years of education and more years of working experience, who might have started working in a job that required less years of education, but its requirements have been currently upgraded[35].

Moreover, the higher the number of years required for a job, the less likely for someone to be overeducated by many years. For example, it is rather impossible to find workers that are overeducated by five years in jobs that require more than eight years of education over compulsory level, simply because this means that they would have thirteen years of education over compulsory; and this, evidently, is highly unlikely, not to say impossible. In the current study, compulsory level is used as a threshold and the relevant questions asked in the ESS make it impossible to identify incidences of undereducation for jobs below that threshold. Furthermore, those individuals working in jobs that require more than ten years of education cannot be reported as overeducated by more than 10.5 years, irrespectively of their attained years of education. Likewise, undereducated individuals working in such jobs cannot be considered as more than 10.5 years undereducated, even if the number of their attained years of education is lower than the compulsory level. However, while, realistically, the limit on the years of overeducation cannot be extended much, this does not stand for years of undereducation, especially for older workers. Unfortunately, the latter is impossible to be identified and consists of a technical drawback because of the way data has been collected, raising some questions concerning the assumptions of linearity of the OLS model used.

Finally, it is likely that remuneration in certain jobs does not equally depend on years of education. Can it be assumed that jobs, which require certain years of education over

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[35] For example, a few years ago having a PhD was a desirable, but not a necessary requirement for someone to become a university lecturer. Nowadays, it is very rare for someone to apply for a job of that level, without having started a PhD, at least. The same applies for jobs that require a first degree, which numbers increases substantially. Alternatively, it is more likely for someone with a first or an advanced degree, to apply and, eventually, get a job that does not require one, simply because it is considered as well-paid. Jobs in sales or related with public relations can be considered as such.

the compulsory level, assign the same wage-penalty or premium to under- and over-educated workers? These are very strong assumptions indeed, but this study could not proceed with the ORU model estimations concerning the returns to under-, over- and required for a job years of education, without assuming as such. Therefore, the method followed for producing the estimations presented in Table 6.4, shows a general picture of how mismatches affect wages, but it pays less attention on the demand-side, meaning the particular characteristics of each job with different educational requirements. There is no reason not to assume that educational requirements for a certain job can be inflated, underestimated or even substituted by relevant working experience. Educational requirements do not have the same weight on the wage setting procedure for each job. In most of the countries, in order to become a university lecturer one must have a PhD, but there is no such requirement for someone who wants to get a well-paid job in a commercial company or pursue a career in certain industries, where professional experience and technical skills might appear more desirable than higher education credentials per se. This study is not equipped with such data, which can allow for an in-depth analysis of the aforementioned issues. Future research will attempt a more rigorous analysis, using a combination of more representative ad-hoc surveys.

Acknowledging the aforementioned limitations, a preliminary analysis has been conducted in order to illustrate how REd are distributed throughout jobs that require different educational attainment.

An OLS regression analysis has been used. The variable regarding the years of education someone has over the compulsory level is examined as statistically interacted with the variable regarding the educational requirements of a job, as these are reported by ESS participants. From this point onwards, this interaction will be called ***Reqed***. However, the job educational requirements variable has been re-coded into a categorical one, where respondents who work in jobs that do not require compulsory education are also included. Table 6.5 presents the values and frequencies of this variable.

Table 6.5: Re-Coded Bands and Frequencies Regarding the Years of Education beyond the Compulsory Needed for a Job

Job Type	Freq.	Percent	Cum.
1. Less than compulsory	7,666	28.77	28.77
2. Less than a year	1,432	5.37	34.14
3. About a year	1,633	6.13	40.27
4. About 2 years	2,116	7.94	48.21
5. About 3 years	4,512	16.93	65.14
6. About 4-5 years	4,934	18.52	83.66
7. About 6-7 years	2,180	8.18	91.84
8. About 8-9 years	1,343	5.04	96.88
9. 10 years or more	832	3.12	100
Total	26,648	100	

Source: ESS Rounds 2 and 5 (Author's calculations)

In the model, ***Reqed*** allows for predictions regarding REd to be calculated separately for each band. These values will be called as *job types*, hereafter. ***Reqed*** is not treated as a two-way interaction, but as a variable itself. Therefore, it shows REd by each job type. The model estimated for each job type for all countries, grouped in welfare state regimes (***W***), takes the following form:

$$\ln w_i = a + b_1(YEd \times JbT)_i + b_2 W_i + b_3 T_i + b_4 F + b_5 Exp_i + b_6 JbH_i + b_7 U12_i + b_8 Cou_i + \\ + b_9 H_i + b_{10} JbQ_i + b_{11}(YEd \times JbT)_i \times W_i \times T_i) + \varepsilon_i$$

$$(6.13)$$

where:

JbT represents job requirements and ***Reqed*** their interaction (*Reqed=YEd×JbT*). All other variables and interactions have remained the same as in the Models estimated above. All interactions have been found statistically significant. The adjusted-R^2 measurement of goodness-of-fit is estimated at 0.79, which shows that the model fits the data rather well[36].

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[36] Detailed estimations regarding ***REd*** for each job type for all countries, grouped in welfare state regimes can be found in Appendix C (Table C.16). This is not the main purpose of this research, but it will certainly inform research in the future.

Figure 6.1 depicts wage predictions plotted over the *YEd*, distinguishing between job types. However, it concerns the pooled ESS sample without taking country and time differences into account. This Figure indicates that the estimations regarding REd depend on the years of education required for a job, since the slope of each regression line that corresponds to a specific job type is different. Moreover, these estimations are very likely to change between countries, welfare state regimes and calendar years, as previously shown in Table 6.4.

Figure 6.1: Wage Prediction Lines Plotted Over Job Educational Requirements

Returns to years of education by educational job requirements
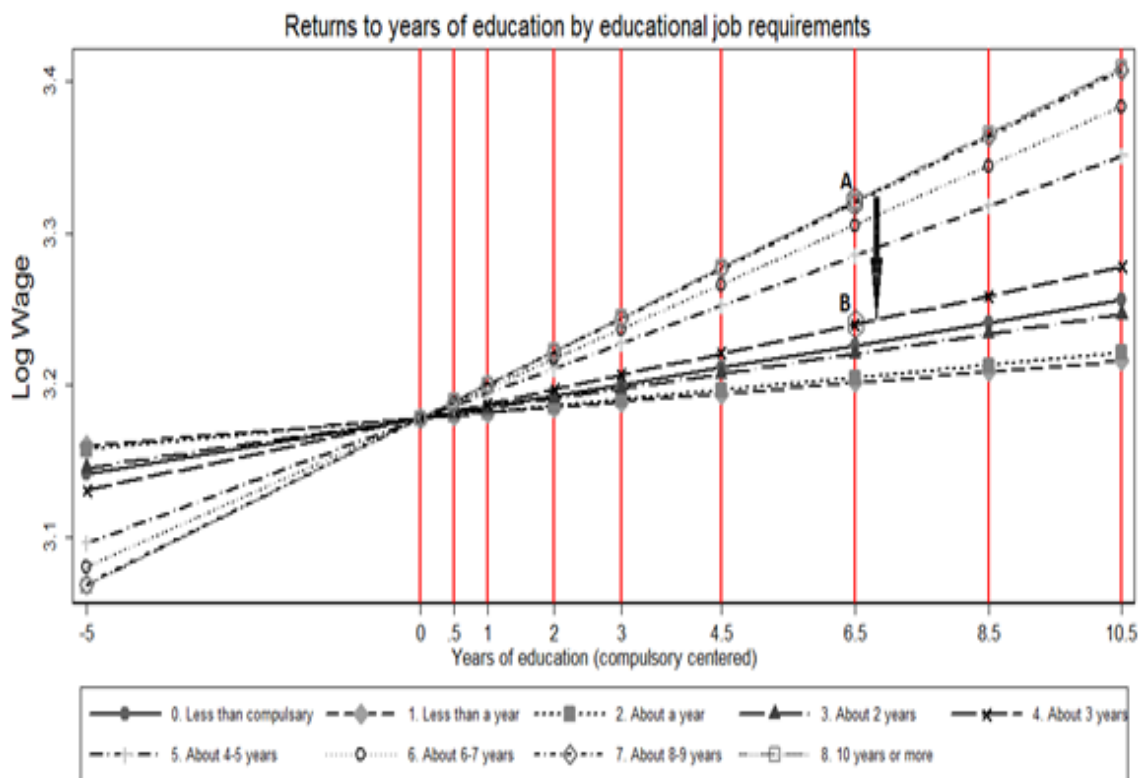
Source*: ESS Rounds 2 and 5 (Author's calculations)

This thesis utilises a more practical and illustrative way, where REd are estimated separately for jobs with different educational requirements. The red vertical lines represent workers with a certain number of *YEd*. For example, the line starting from zero upwards depicts all workers with attained years of education equal to the compulsory level or less. Therefore, taking into account job types, for example, matched workers are represented by the intersection between the zero vertical line and

the predicted wage regression line, corresponding to jobs that require zero or less years of education than the compulsory level. The same applies for all other job types.

Moreover, it can be seen that in a specific job, overeducated workers are expected to earn, on average, more than the matched, but less compared with those working in jobs with higher educational requirements, commensurable to their educational level. Likewise, undereducated workers are expected to earn less than the matched, but more compared with those working in jobs with lower educational requirements, commensurable to their educational level. Concluding, comparisons between points on the vertical lines represent wage differences between matched and under-/over-educated individuals with specific educational attainment, while horizontal comparisons on the predicted wage lines depict wage differences between individuals of different educational attainment, who work in a job with certain educational requirements.

Therefore, for example, someone who has 6.5 years of education over the compulsory level, working in a job that requires ten or more years, is undereducated by four years (point A), but enjoys higher pay from someone with the same level of education, working in a job that requires three years of education over the compulsory level and is considered as overeducated by 3.5 years (point B). This difference is presented by the vertical distance between A and B in the red line, which starts from the 6.5 point in the x axis, representing years of educational attainment. The above illustration indicates that the job assignment model is more likely to stand compared to the two "extremes"; meaning the human capital theory and job competition model. However, more in-depth analysis is required by the use of more detailed data, where comparisons between countries could be feasible to be implemented.

There is a clear indication that REd are significantly affected by the educational requirements of each job and therefore, they can be affected by the composition of educational requirements between available jobs[37]. Recalling from Section 1.2.3, where

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[37] Returns to required, under- and over-education have been calculated, paying no attention to the horizontal mismatch, meaning the mismatch that exists between fields of study and job tasks. Unfortunately, the data used does not offer adequate information and therefore, this study assumes that

various labour market theories were discussed, it seems that the estimated REd, which are based on the human capital theory is unlikely to have realistic applications if not complemented by Thurow's job competition theory, where returns are mostly affected by the educational requirements set by employers and not by individual's educational attainment per se. Usually, these two theories are considered as rival in the literature, where human capital theory is a purely supply-driven and, on the other hand, job competition theory pays sole attention to the labour demand-side. The empirical juxtaposition of these theories in the literature has been mainly tested through the use of two paired statistical tests (Galasi, 2008). In human capital theory under- and over-education are unrelated to wages ($b_{required}=b_{overeducted}=-b_{undereducted}$). Contrariwise, in job competition model the null hypothesis concerns that the two coefficients are equal ($b_{overeducted}=b_{undereducted}$). However, results are rather conflicting, as they heavily depend on researchers' data and method specifications (Bauer, 2002; Galasi, 2008; Iriondo *et al.*, 2013; Van der Velden *et al.*, 2013). Finally, the job assignment model (Sattinger, 1993) acknowledges that there is interplay between labour supply and demand, reconciling the two rival models. This model, according to the literature, seems to find more empirical application (B_Chel *et al.*, 2003).

The empirical analysis of this thesis accounts for the effect a bad economic climate has on the labour outcomes of individuals. This Chapter is particularly interested in job mismatches. The most recent recession is used as an example. The severity of this effect is presented in terms of negative GDP growth rate, but since this is correlated with job losses the HUR is also examined. As explained in Section 1.3, four-year averages prior to the two reference points, 2004 and 2010, where regressions have been estimated in the individual level from the ESS, have been used instead.

Figure 6.2 shows the relationship between all RREd, ROVEd and RUEd and the difference in the GDP growth rate as well with HUR change as defined above. The correlations between GDP growth and each of the aforementioned types of returns can be found in Table 6.6. The 2004-2010 temporal change in RREd seems positively

wage-premia and wage-penalties are unrelated with horizontal mismatch. Future research would attempt to encompass horizontal mismatches in its analysis, given that data allows for such technique to be used.

correlated with the change in GDP growth rate during the same period (r=0.60). The same can be implied for the change in RUEd, but the correlation, even still considerable, is quite lower (r=0.47). However, the change in ROVEd seems highly uncorrelated with the change in GDP growth rate. Regarding the correlations with the change in HUR, this is much stronger with ROVEd and, as expected, negative.

Table 6.6: Correlations between the Temporal Changes in GDP Growth Rate as well as HUR and 2004-2010 Change in RREd, ROVEd and RUEd

	GDP Growth Rate Change	HUR Change
2004-2010 RREd change	0.60	0.09
2004-2010 ROVEd change	0.02	-0.41
2004-2010 RUEd change	0.47	-0.13

Source: ESS Rounds 2 and 5 (Author's calculations)

The estimations from the bivariate regressions between all types of returns and the GDP growth rate as well as the HUR change are presented in Table 6.7.

Table 6.7: Bivariate OLS Regressions between RREd, ROVEd and RUEd on GDP Growth Rate as well as HUR

	GDP Growth Rate Change		HUR Change	
	Coef	p>|t|	Coef	p>|t|
2004-2010 RREd change	0.29	0.007	0.33	0.697
R^2		0.35		0.00
2004-2010 ROVEd change	0.13	0.945	-0.24	0.081
R^2		-0.000		0.17
2004-2010 RUEd change	1.41	0.043	-0.27	0.617
R^2		0.22		0.01

Source: ESS Rounds 2 and 5 (Author's calculations)

Figure 6.2: Relationship between Change in the GDP Growth Rate (Four-year Averages) as well as RREd and RUEd
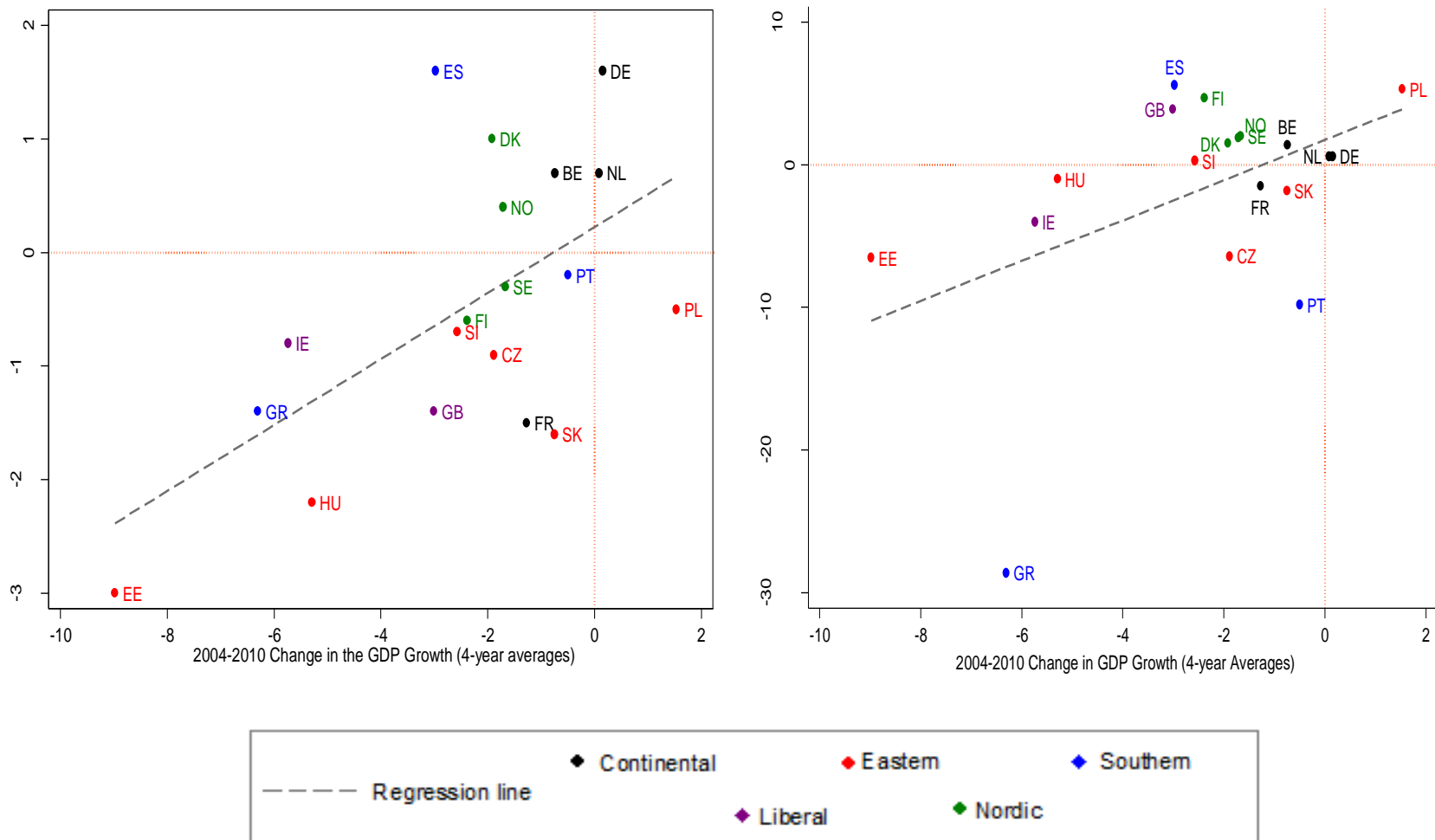
Source: Author's calculations based upon Table 6.7

The effect of 2004-2010 change in GDP growth rate on RREd is significant and positive, meaning that returns are changing in the same direction with the GDP growth rate. This effect has been estimated to 0.29, which means that a unit change on the GDP growth rate is expected to change RREd by 0.29. Moreover, the effect of GDP growth rate change on RUEd is also significant and positive; and therefore, it is expected that they change, through time, towards the same direction. Since RUEd, mainly concerns negative figures, it means that when the GDP growth rate, from one period to another, rises/fall, the wage-penalty associated with undereducation is expected to increase/decrease as well. These regressions are visualised in Figure 6.2. In this Figure, countries are highlighted by different colour, according to the welfare state regime they belong to: Nordic countries are highlighted in green, Continental in black, Liberal in purple, Southern in blue and Eastern in red. Most countries, except Poland, Germany and the Netherlands, have experienced a decrease on the GDP growth rates. However, the increase is high, almost 2 percentage points (pp), only in Poland, while in Germany and the Netherlands, even positive, this seems rather negligible. On the other hand, the countries that have been affected more in terms of GDP growth rate are Estonia, Greece, Ireland, Hungary, the UK and Spain. Finally, even if the relationships described above have a clear positive trend, does not seem to be related to the welfare state regime each country belongs to.

Regarding the effect of HUR temporal change, it has been estimated as non-significant at the 95% confidence level. However, since the analysis concerns nineteen countries, each belonging to one of the five welfare state regimes (Section 1.3), the situation in some countries differs with the general pattern observed in the regime they belong to.

Table 6.8 shows the change between 2004 and 2010 in all types of returns calculated above. Moreover, Table 6.9 depicts the correlation between all. REd is highly and positively correlated with ROVEd (r=0.67) and this means that in most countries, the 2004-2010 change in ROVEd and REd move to the same direction. Looking closely within welfare state regimes, this relationship looks much stronger in the Nordic countries.

Table 6.8: 2004-2010 Change in REd, RREd, ROVEd and RUEd

	REd	RREd	ROVEd	RUEd
Continental				
Belgium (BE)	1.32	0.70	1.58	-1.44
Germany (DE)	0.88	1.60	-1.32	-0.62
The Netherlands (NL)	-1.75	-1.46	-3.24	-1.52
France (FR)	1.32	0.70	1.58	1.44
Liberal				
Great Britain (GB)	-4.01	-1.40	-3.30	3.85(+)
Ireland (IE)	0.54	-0.78	-1.84	3.92
Nordic				
Denmark (DK)	-1.12	0.94	-0.96	-1.51
Finland (FI)	-0.71	-0.54	-0.62	-4.71
Norway (NO)	-0.61	0.43	-2.26	-1.89
Sweden (SE)	-1.33	-0.26	-1.98	-2.02
Southern				
Spain (ES)	0.63	1.64	-1.46	-5.60
Greece (GR)	0.93	-1.49	0.42	28.56
Portugal (PT)	0.73	-0.20	2.37	9.75
Eastern				
The Czech Republic (CZ)	-0.63	-0.89	-1.69	6.30
Estonia (EE)	-0.04	-3.05	3.47	6.51
Hungary (HU)	-3.59	-2.24	-3.85	1.02
Poland (PL)	0.73	-0.48	2.20	-5.30
Slovenia (SI)	-0.61	-0.77	-1.72	-0.29
Slovakia (SK)	-0.59	-1.52	0.74	1.85

Source*:* ESS Round 2 and 5 (Author's calculations)

With regards to RUEd the picture is quite different. The correlation with all other types of returns is relatively modest (r=0.26) and that means that they do not really follow the same trend from 2004 to 2010. However, some common trends within regimes can be observed. In Nordic countries, RUEd in 2010 are negative, but lower than 2004; and this means that the wage-penalty associated with undereducation has decreased. This is also the case for Continental countries with the exception of the France, where the wage-penalty has increased. Southern countries, except Spain, show a very large

increase. In Greece a decrease of 28.56pp in RUEd has been estimated, while in Portugal this decrease accounts for 9.75pp. This is a quite remarkable, also concerning the fact that in 2004 RUEd were positive in both countries, meaning that undereducation was associated with a quite generous wage-premium. Liberal countries show mixed trends, as in the UK RUEd are consistently associated with wage-premium, which has been increased from 2004 to 2010 considerably, whereas in Ireland estimations reveal a decrease, which was also relatively large. Finally, Eastern countries reveal some mixed trends, as in the Czech Republic and Estonia the increase on the wage-penalty was relatively large, followed by Slovakia and Hungary. However, Poland reveals the exact opposite trend, as the wage penalty in 2010 has been 5.3pp smaller than 2004, while in Slovenia it was rather negligible.

Table 6.9: Correlations between REd, RREd, ROVEd and RUEd

	RREd	REd,	ROVEd	RUEd
RREd	1			
REd,	0.44	1		
ROVEd	-0.05	0.67	1	
RUEd	0.39	-0.27	-0.26	1

Source: ESS Rounds 2 and 5 (Author's calculations)

In general, countries belonging to the same regime allegedly share similar institutional characteristics; however, practically concerning labour market, this is not always true. This thesis goes beyond the welfare state regime classification by analysing the effect of different macro-level determinants on the labour markets outcomes of each of the nineteen countries examined. This Chapter is particularly interested in job mismatches. For examining the effect of the economic and institutional context of each country's labour market on the returns related to job mismatch, nine different country-level variables (macro-level determinants) have been employed, expressed in terms of four-year averages, prior to 2004 and 2010, where returns to all types of educations have been calculated from the ESS (Section 1.3).

As Table 6.10 shows, when all these macro-level determinants are regressed over the estimated RREd, most of them are statistically significant for 2004, but insignificant in

2010. Regarding ROVEd and RUEd for both 2004 and 2010, all determinants are statistically insignificant at the 95% confidence level. Certainly, this is what it was expected, as a great level of multicollinearity exists due to the aggregate format of the variables as well as the small number of countries examined (N=19), especially when this is compared with the number of predictor variables (9). The statistical significance of the relationship between RREd and most of macro-level determinants for 2004 is likely attributed to a serendipity effect.

Table 6.10: Statistical Significance of the Relationship between Macro-level Determinants and RREd, ROVEd and RUEd: Two-step Approach Performed for All Macro-level Determinants Simultaneously

	P>t (2004)			P>t (2010)		
	RREd	**ROVEd**	**RUEd**	**RREd**	**ROVEd**	**RUEd**
GDP growth	0.005	0.106	0.551	0.097	0.969	0.931
HUR	0.005	0.213	0.056	0.446	0.974	0.930
Size of Government	0.001	0.140	0.090	0.212	0.770	0.909
Debt to GDP	0.038	0.978	0.403	0.791	0.397	0.259
GDP/Capita	0.852	0.515	0.814	0.955	0.286	0.634
Part-time to Full-time	0.025	0.100	0.386	0.857	0.909	0.963
Temporary to Permanent	0.055	0.173	0.955	0.261	0.643	0.204
EPL Strictness	0.012	0.284	0.763	0.660	0.189	0.374
Gross Enrolment Ratio	0.640	0.478	0.424	0.389	0.562	0.259

Source: ESS Rounds 2 and 5, IMF, EUROSTAT, OECD, World Bank, UNESCO (Author's calculations)

Because of the above limitations a much simpler model would be preferable (Tabachnik and Fidell; 2007). Such a simpler modelling technique is the two-step approach, which has been suggested in the literature as an alternative to single-step or multi-level regression techniques, since it manages to capture the effect of variables that operate on a different level, when the assumptions of multi-level regression techniques cannot be met adequately (Section 1.3). Therefore, once these determinants are examined in a bivariate manner by regressing them over the three different types of returns estimated by the models described in equations 6.2, 6.3 and 6.4, some relationships look much stronger.

Regarding RREd, there was only one variable out of all nine examined that has been found statistically significant and this is the SOG. However, it is significant only for 2004. This relationship, for both 2004 and 2010, is presented in Table 6.11. The relationship between the temporal change in RREd and the change in all macro-level determinants has been also examined. All, except the temporal SOG change have been found as statistically insignificant.

Table 6.11: Statistically Significant Macro-level Determinants of RREd: Two-step estimations (Bivariate Regression Results)

RREd	2004		2010	
	Coef.	**P>t**	**Coef.**	**P>t**
Size of Government	-0.163	0.041	-0.1132	0.181
Goodness-of-fit				
R^2		0.22		0.10

Source: ESS Rounds 2 and 5 and IMF (Author's calculations)

Even if, in 2010 the relationship between RREd and SOG is not statistically significant, it is interesting to examine whether there is any relationship between the change of these two measures through the time period examined and uniform between the nineteen countries examined in this thesis. This relationship has been found as statistically significant. The results, found in Table 6.12, imply a positive relationship, which effect also looks very strong. The correlation between the two variables is very high (r=0.62). Therefore, the larger the drop in the SOG between 2004 and 2010, the lower the RREd in 2010 compared to 2004.

Table 6.12: Relationship between RREd and SOG (Temporal Changes)

RREd (Change between 2004-2010)	Coef.	P>t
Size of Government (**Change between 2004-2010**)	0.36	0.004
Goodness-of-fit		
R^2	0.39	

Note: r=0.62

Source: ESS Rounds 2 and 5 and IMF, (Author's calculations)

Figures 6.3 and 6.4 depict the relationship presented in Tables 6.11 and 6.12 respectively. In these Figures, countries are highlighted by different colour according to the welfare state they belong to: Nordic countries in green, Continental in black, Liberal in purple, Southern in blue and Eastern in red. Hollow circles and plus symbols refer to 2004, while arrowheads to 2010. Plus symbols indicate that there has been an increase in RREd between 2004 and 2010, whereas hollow circles show a decrease. Moreover, the line that connects the arrowhead and the plus or hollow circles indicates the trend of each macro-level determinant between 2004 and 2010. Therefore, arrows pointing upwards show an increase, while these that point downwards a decrease. Finally, the two regression lines for 2004 and 2010 are also shown in the Figures by a grey solid and dashed line respectively.

Figure 6.3 shows that countries within regimes indicate some consistency, at least in terms of percentages used to describe the SOG, as explained in Section 5.4. As mentioned above, the relationship between RREd and SOG is negative for both 2004 and 2010, but significant only in 2004. This means that in countries, where SOG is larger, RREd are more likely to be lower compared to all other countries.

Figure 6.3: Relationship between RREd and SOG (2004 and 2010)
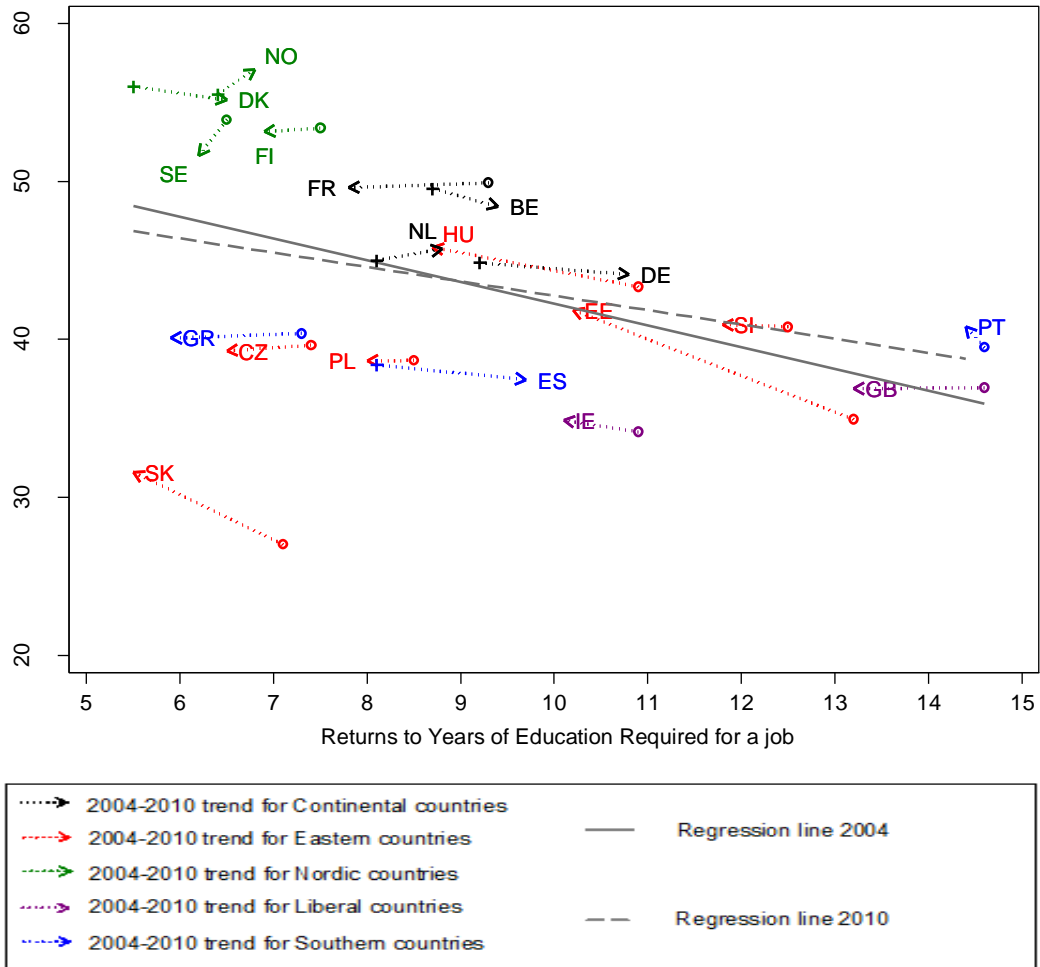
Source: Author's calculations based on Table 6.11

Figure 6.4 depicts the relationship between the 2004 to 2010 RREd change and the temporal change in SOG, as defined in Section 1.3. In this Figure, welfare state regime classification does not seem to have some impact on this relationship, as temporal changes seem more country- rather than regime-specific. However, the relationship between the two measures is positive and statistical significant, indicating that as SOG in becomes larger, RREd are more likely to increase.

Figure 6.4: Relationship between Change in RREd and Change in the Size of Government (2004-2010 Four-year Averages)
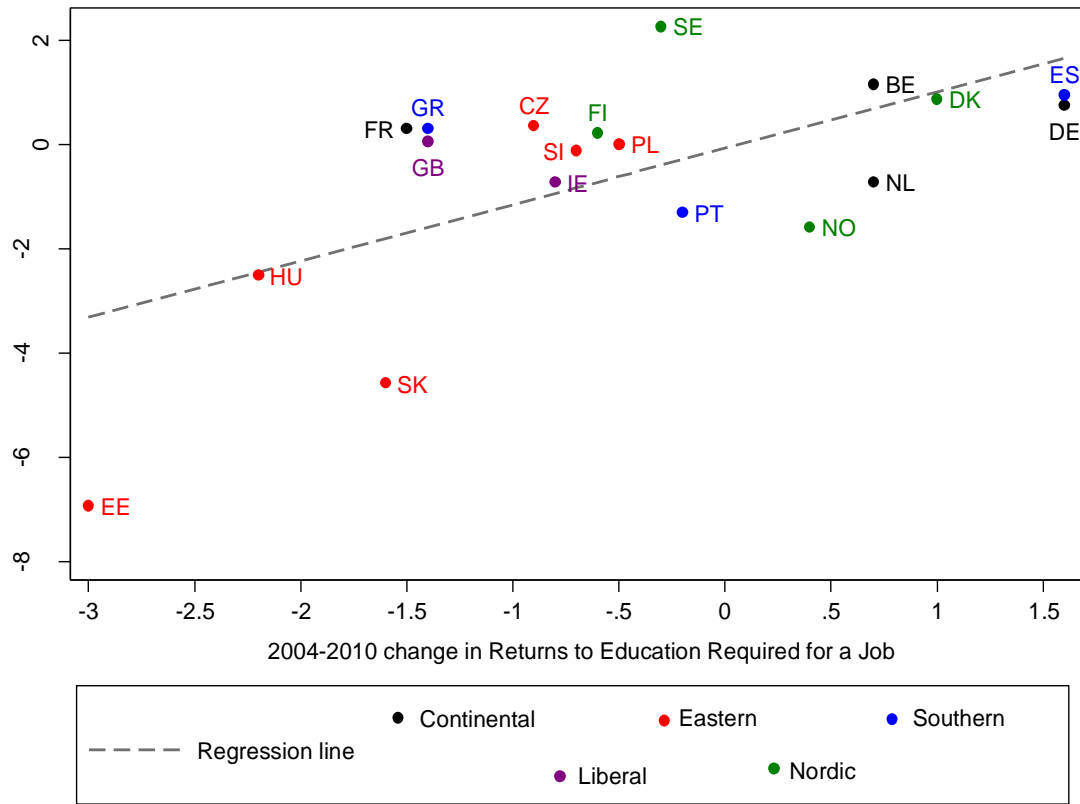
Source: Author's calculations based on Table 6.12

In terms of ROVEd, the macro-level determinants that have been estimated as statistically significant are the SOG, GDP/capita, EPL strictness and gross enrolment ratio. The relationship of ROVEd with these variables is depicted in Table 6.13.

The statistical relationships of ROVEd with SOG, GDP/capita and gross enrolment ratio in higher education seem negative, indicating that the largest the SOG, the higher the GDP/capita and the gross enrolment ratio, the lower the ROVEd are likely to be. However, for 2010 the gross enrolment ratio is highly insignificant, informing some discrepancy in its negative relationship with ROVEd. Recalling from Chapter 5 and specifically from Table 5.4, where REd is regressed over SOG and GDP/capita, ROVEd seem to follow the same pattern. The effect is also very similar, meaning that SOG and GDP/capita affects REd and ROVEd in a very similar way.

Table 6.13: Statistically Significant Macro-level Determinants of ROVEd: Two-step estimations (Bivariate Regressions Results)

ROVEd	2004		2010	
	Coef.	**P>t**	**Coef.**	**P>t**
Size of Government	-0.932	0.069	-0.168	0.041
Goodness-of-fit				
R^2		0.18		0.22
GDP/capita (000s)	-0.061	0.015	-0.113	0.001
Goodness-of-fit				
R^2		0.30		0.51
EPL Strictness	1.235	0.160	2.783	0.029
Goodness-of-fit				
R^2		0.13		0.25
Gross Enrolment Ratio	-0.786	0.011	-0.490	0.334
Goodness-of-fit				
R^2		0.34		0.05

Source: ESS Rounds 2 and 5, IMF, OECD, World Bank, UNESCO (Author's calculations)

However, two other macro-level determinants have been found as statistically significant, which was not the case with REd. These are the EPL strictness and the gross enrolment ratio, which relationship with ROVEd has been explained above. Particularly, EPL strictness seems to have a very strong effect on ROVEd, which is positive, but statistically significant only for 2010. Interpreting this relationship, it can be implied that a unit increase on the EPL strictness can be associated with approximately three units increase on ROVEd. All regressions from Table 6.13 are visualised in Figure 6.5.

The 2004-2010 temporal trends, in all the aforementioned variables, have been also examined and found as statistically insignificant. Therefore, changes on these determinants are not necessarily associated with the trends in the estimated ROVEd.

Figure 6.5: Relationship between ROVEd and Statistically Significant Macro-level Determinants
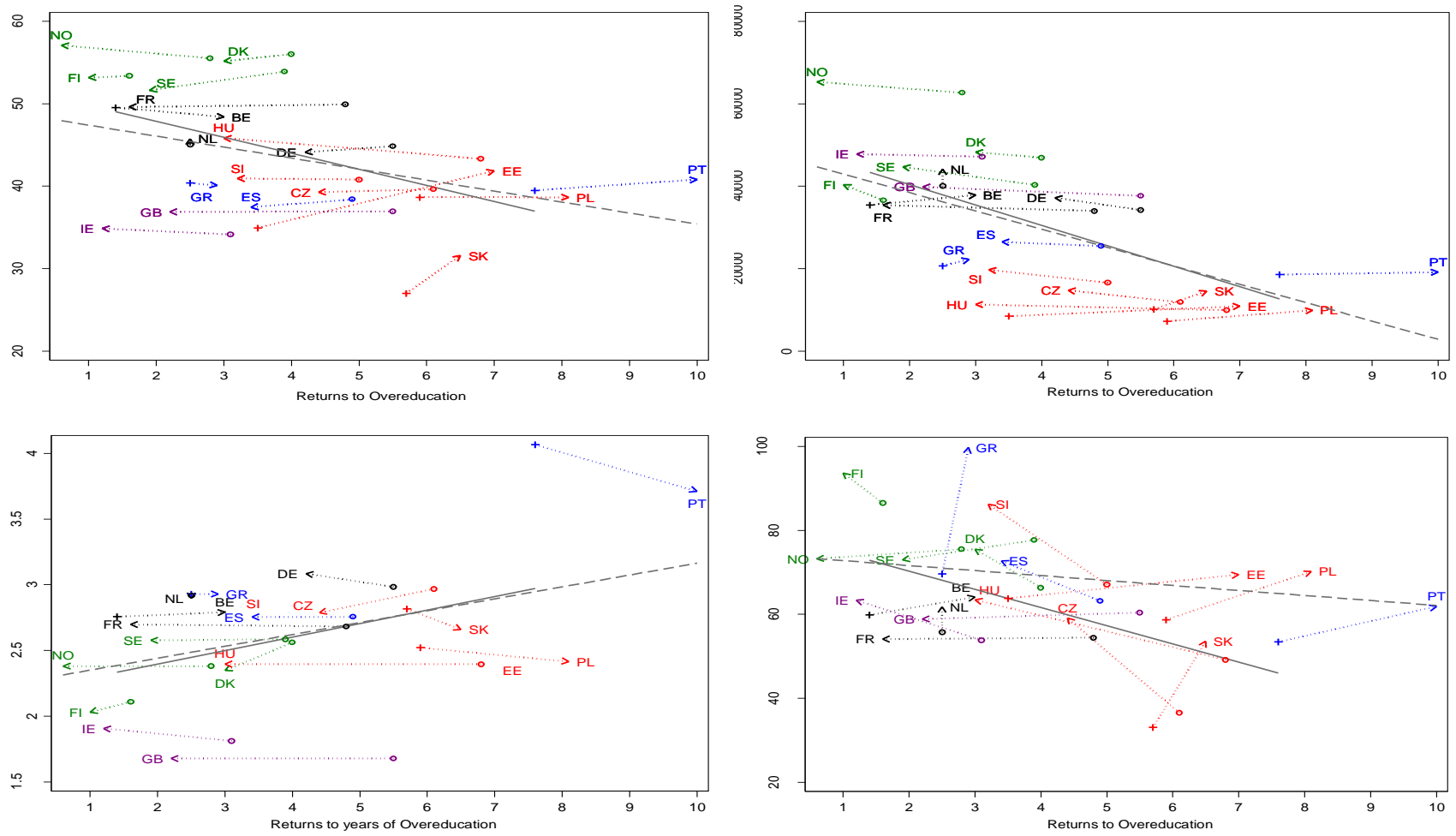
Source: Author's calculations based on Table 6.13

Finally, regarding RUEd, estimations have shown that the only significant macro-level determinant is debt to GDP ratio (Table 6.14). The relationship in 2004 seems positive, but it is statistically insignificant. However, in 2010 it becomes negative, but statistically significant, meaning that in a country with high debt, proportionally to its GDP, the RUEd are more likely to be lower. The coefficient of -0.086 simply means that an increase of one unit on the debt to GDP ratio is likely to decrease RUEd by 0.086. This relationship is depicted in Figure 6.6, which also shows that trends between countries are quite different and they remain as such when the countries are classified by welfare state regimes. Even if, RUEd are following a common pattern within regimes and the same stands for the debt to GDP ratio[38], the temporal change from 2004 to 2010 does not seem to be associated with how this ratio is moving, as the relationship has been estimated as statistically insignificant (p=0.228>0.05).

Table 6.14: Statistically Significant Macro-level Determinants of RUEd: Two-step Estimations (Bivariate Regression Results)

RUEd	2004		2010	
	Coef.	**P>t**	**Coef.**	**P>t**
Debt to GDP ratio	0.520	0.177	-0.086	0.046
Goodness-of-fit				
R^2		0.10		0.21

Source: ESS Rounds 2 and 5 and OECD (Author's calculations)

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[38] The debt to GDP is increasing in most countries, except the Nordic (Norway excluded), Belgium, Spain and Slovakia.

Figure 6.6: Relationship between RUEd and Debt to GDP ratio (2004 and 2010)
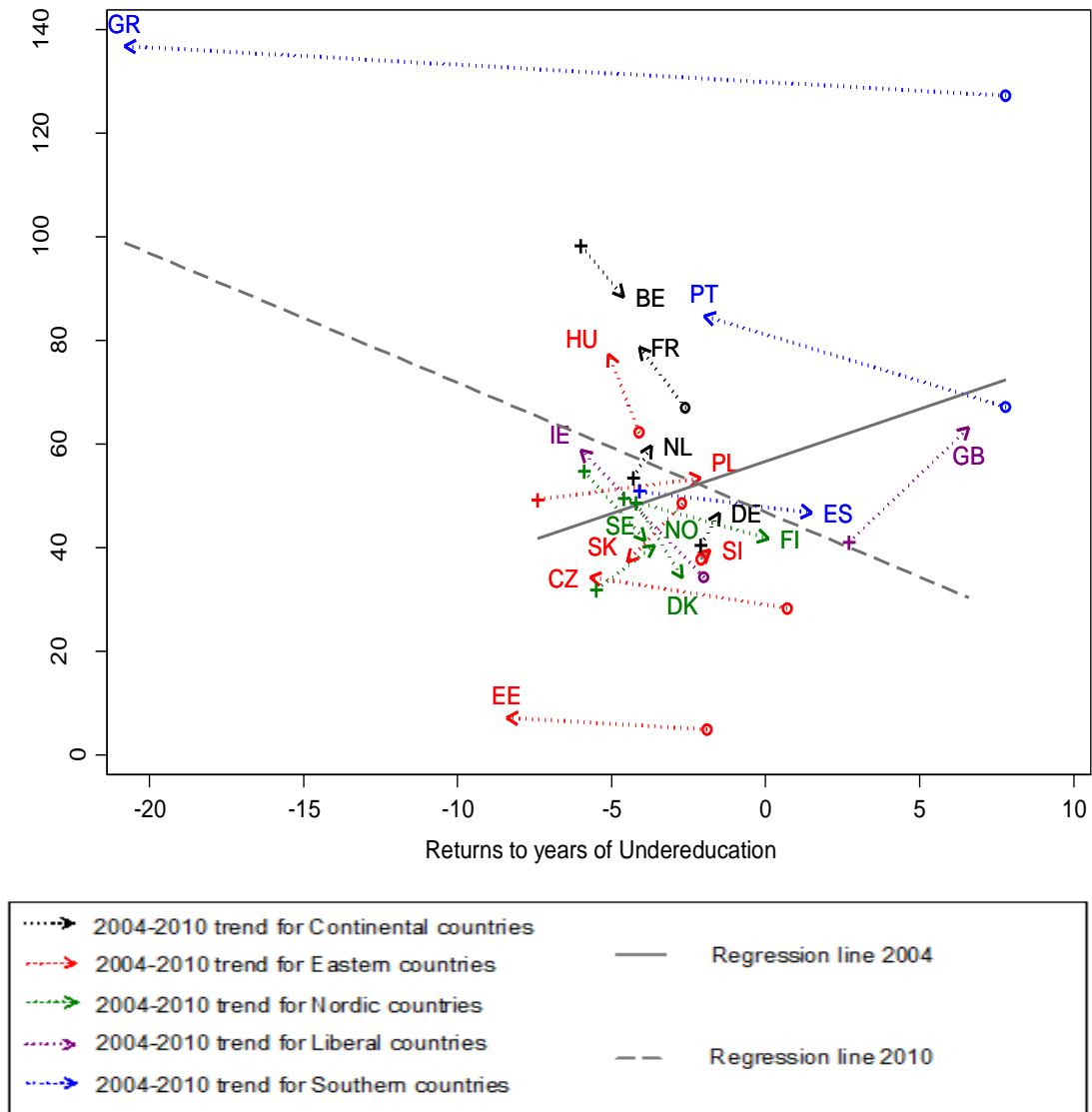
Source: Author's calculations based on Table 6.14

6.5 Summary and Conclusions

Overqualification is one possible problem, which may contribute to the disequilibrium in the labour market. This creates structural unemployment and degrades the internal added value of education, in terms of employment and wages. Lately, there is a growing interest on the issue of job mismatches. Research

conducted in various countries, using both quantitative and qualitative criteria, has produced empirical evidence, where there is no general agreement on whether or not the skills obtained from education match these needed by employers. Under the context of job mismatches, income and wage inequalities have been extensively examined, but again, the results seem very sensitive to the data and method used. Nevertheless, under the ORU approach, which has been used in this Chapter, where workers are classified as under-, over-educated or matched according to their educational level related to job requirements, evidence show that overeducated are subjected to a wage-premium and undereducated to a wage-penalty, when compared to those that are considered as matched. When REd are estimated, taking into account the educational requirements of jobs, matched workers earn more than undereducated, but less than the overeducated.

Empirical literature on job mismatch, generally, agrees in the four following conclusions (Hartog, 2000; Bauer, 2002; Chiswick and Miller, 2008; Galasi, 2008; Korpi and Tahlin, 2009; Kucel, 2011):

1. REd are lower than the RREd;
2. ROVEd are positive, but lower than RREd;
3. RUEd are negative and their absolute value is lower than RREd and lower than ROVEd; and
4. ROVEd are always significant, where for RUEd this is not usually the case.

The analysis performed in this Chapter mostly confirms the aforementioned conclusions. However, this is not true for all countries examined. The empirical results in this thesis agree that the REd are always lower than RREd, irrespective of the country and the calendar years examined. Likewise, ROVEd are always positive and lower than RREd. However, RUEd are not always negative and also their absolute value is neither lower than RREd nor ROVEd. Moreover, there are countries where RUEd is also positive- the UK, Greece, Portugal and the Czech Republic for 2004 and the UK, Spain and Finland for 2010. For 2004, in all Nordic countries as well as Belgium, Greece, Portugal and Poland |RUEd| is higher than ROVEd; and for 2010, this is also the case in most countries. With regards to

whether the estimations performed for ROVEd and RUEd are significant or not, this depends on the data and method used. In this study, Wald-tests of significance for each type of return and country have been performed and both ROVEd and RUEd have been found statistically significant at the 95% confidence level.

Moreover, a preliminary analysis has been performed showing that the level of wage depends on job educational requirements. The higher the educational requirements for a job, the steeper the regression line that represents REd is. In other words, an additional year of education seems to yield higher returns, when the job requirements are also high. However, due to data limitations the difference in this relationship between European countries and economic times has not been performed. Therefore, the conclusion above represents empirical analysis on the pooled data, merging the 2004 and 2010 data sets.

The empirical analysis attempted in this study positions itself within the existing literature, as explained above. However, it goes even further by calculating the wage-premia/penalties associated with job mismatch in nineteen European countries, examining, whether or not, a bad economic climate as well as the institutional and economic context of each country's labour market, can provide some explanation on the difference that exist on all types of returns' figures. Wage-premia and wage-penalties have been calculated for 2004 and 2010, representing pre- and during recession time periods, whereas the economic and institutional context have been captured by nine different macro-level determinants, which represent four-year averages prior to the two time reference points. The method used was the two-step approach (Section 1.3). With regards to the economic climate, this has been represented by two macro-level determinants: the GDP growth rate and HUR temporal changes between the four-year averages. RREd seem to show a cyclical behaviour, as the relationship between the temporal RREd and GDP growth rate change is positive and statistically significant. The same applies for RUEd, but this is not the case for ROVEd, as its relationship with GDP growth change is highly insignificant. Likewise, the relationship between RREd, ROVEd and RUEd as well as HUR has been also found as highly insignificant and therefore, it seems that the

level of unemployment does not really affect the wage-penalties or wage-premia associated with job mismatch. All countries have been classified by the welfare state regime they belong to. However, it seems that this is unrelated with the way wage-penalties and wage-premia associated with job mismatch, are moving between good and bad economic times.

Moreover, as the empirical analysis showed, RREd is positively correlated with SOG. In addition to this, RREd temporal change is also positively correlated with SOG temporal change, meaning that a change in the one magnitude likely affects the other in the same direction. However, this is not the case for ROVEd and RUEd. In terms of welfare state regimes, the aforementioned relationships seem to be more country- rather than regime-specific. Furthermore, ROVEd is negatively correlated with SOG, GDP/capita and gross enrolment ratio in higher education, but positively correlated with EPL strictness. In terms of statistical significance, GDP/capita is the only macro-level determinant, which relationship with ROVEd remains statistical significant for both 2004 and 2010. Thus, ROVEd seem to be lower in countries where SOG, GDP/capita and gross enrolment ratio in higher education is high. However, since ROVEd are positively correlated with EPL, it seems that in counties with less flexible labour market, ROVEd is higher. Regarding the temporal changes between 2004 and 2010, all relationships with the temporal ROVEd change have been found as highly insignificant. Moreover, the aforementioned relationship seems rather inconsistent with the welfare state regime classification, as countries within regimes seem to follow different patterns.

Finally, concerning the relationship between RUEd and each country's labour market settings, debt to GDP ratio is the only macro-level determinant that has been found as statistically significant and this is only for 2010. This relationship is negative, which means that in countries where the debt to GDP ratio is relatively high, RUEd are likely to be low compared to all other countries examined. Once more, the above relationship is more country- and less a regime-specific.

7 CHAPTER 7: CONCLUSIONS, IMPLICATIONS FOR POLICY, METHODOLOGY AND FUTURE RESERACH

7.1 Summary and Synthesis of the Main Findings

This thesis examined the effect of the recent economic crisis as well as the institutional and economic labour market context on the outcomes of individuals with different educational attainment in nineteen European countries, hereby captured by the employment probability, job quality, wage and occupational mismatch. In Chapter 1, a theoretical conceptualisation of the relationship between higher educational attainment and labour market outcomes has been attempted. The literature informs that educational attainment cannot be seen separately from the labour market, but this does not imply that they have the same purposes. Historically, their purposes differ substantially, but lately, higher educational attainment is perceived mainly as an avenue that promotes more beneficial labour market outcomes. Based on this, most of the labour market theories that refer to recessionary periods converge to an agreement that high-skilled workers are not affected much compared to the low-skilled, who seem much more vulnerable to a bad economic climate. Finally, the data, research settings and methods used by this thesis have been also discussed.

Chapter 2 presented literature of this relationship in a policy and institutional context. The general picture is that higher educational attainment is seen from the labour market as a pre-selector of the most capable candidates, who compete later on it. Scholars in social science, with an institutional background, challenge this view as

over-deterministic. Nevertheless, policy-wise this is the most dominant view regarding the purpose of higher educational attainment and this renders policy-making, as mainly informed by satisfying graduates' needs for increasing their subsequent labour market outcomes. Under this context, labour market dynamics are shifting in favour of the high-qualified and high-skilled workers, also increasing the competition for a place in higher education and through this, the likelihood of a better-paid, less-routine and high quality job. Preliminary findings, in the existing empirical literature, have shown that an economic recession can intensify this trend.

In terms of labour market outcomes, most of the literature informs that Southern countries, Ireland as well as some accession countries, such as Estonia and Hungary, have been affected more, while Germany and most of the Eastern countries seemed to have benefited from it. In Nordic countries, the effect of the economic crisis, if any, was rather minor (Gallie, 2013). The analysis performed in this thesis confirms these patterns. Moreover, the current literature reports that the difference in the unemployment rates between graduates and non-graduates, in most countries, is increasing (Lallement, 2011; Rose and Spiegel, 2011), while long-term and youth unemployment seem to have increased proportionally more to countries that have been seriously affected by the economic crisis (Bell and Blanchflower, 2011a; 2001b; Dietrich, 2013; Lindner, 2013). Temporary and part-time contracts have been increased to both high- and low-performing countries, implying a change in the working relations, which is not necessarily directly related with the economic crisis (Autor and Dorn, 2013).

Complementing the trends discussed above with some preliminary descriptive analysis, performed by the author of this thesis, it seems that the main reason for working part-time, in the countries that have been affected more, was the scarcity of full-time jobs available. More importantly, the rates, for this reason given, are higher to the 40-64 age-cohort compared to the younger one (15-39) and this indicates signs of discouragement, mainly caused by the general economic climate. The duration of working-life increases to all countries, but this is not accompanied by a rise in the productivity, which, except Ireland, seems to follow the same pattern with the

general labour market performance (Appendix B). Looking on the employment composition between occupational groups, existing empirical literature informs that there is an increasing trend for graduates, which implies a skill-upgrade (Hurley *et al.*, 2011; Smeeding *et al.*, 2011; Autor and Dorn, 2013; Gallie 2013). The skill-upgrade is a very important issue that has direct implication on both labour supply- and demand-side. This is a research field that will definitely concern researchers' interests in the future. A basic descriptive analysis has been performed though, using aggregate data from the Eurostat (Appendix B). The general conclusion that can be derived from this is that, regarding the employment composition between occupational groups, there is an increasing trend for graduates, but it is still unclear whether this implies a skill-upgrade or an overeducation pattern. However, this analysis needs to be complemented with more detailed data and more advanced modelling techniques in order more robust inferences to be drawn.

Moreover, empirical literature, along with findings from Chapter 5, informs that nominal wages have increased in most countries, even to these that have been affected more by this crisis. However, distinguishing between industries and occupational groups, past literature argues that certain observations can be made: The hotel and restaurant industry is the worst-paid before and during recession, whereas the financial intermediation as well as energy and consumption industries are among the best-paid. Nonetheless, the general trend shows that there has been a convergence in the wage-gap between the high- and low-paid workers in most countries (Vandekerckhove *et al.*, 2012; Hurley *et al.*, 2013).

Empirically, this thesis employed a series of simple models, where the effect of educational attainment was tested over different labour market outcomes, before and during recession. The labour market context of each country has been also taken into account, by using nine different macro-level variables to examine whether each country's economic performance, fiscal situation, level of wealth, labour market flexibility and tertiary education enrolment can have any effect on the labour market outcomes of individuals with different educational characteristics, as this can be shown by years of educational attainment.

After acknowledging the limitations, stemming out from the specific data and analytical methods used, findings indicate that there is a great heterogeneity between countries. The analysis has been performed employing the years of education variable, centered in the compulsory level of each country, as a measurement of educational attainment. Due to data limitations, the credential effect, meaning the effect of having a degree or not, has not been examined. Certainly, this will concern further research, as it seems plausible that not all years of education yield the same outcome. Moreover, the credential effect is not just a sum of years of education devoted by an individual until a degree is awarded, but represents an additional indication used by employers to screen the most capable candidates (Arrow, 1973; Ferrer and Ridel, 2002). However, more detailed and representative data sets are needed in order to capture this effect and make comparisons between different countries.

The empirical results in this thesis showed that not all countries have suffered by this economic crisis the same. In fact, some seem to perform better in 2010 than in 2004. As Table 7.1 shows, with respect to employability, in most of the nineteen countries tested educational attainment is valued higher in 2010 compared to 2004. However, the job quality of the high-educated does not seem to follow a similar trend, as more jobs for them does not automatically translate to better ones as well. In terms of welfare state regimes, the countries that shape the Southern regime seem to follow a very consistent temporal trend, as the effect of an additional year of education on employability and job quality is stronger in 2010; and therefore, quantitative and qualitative aspects of employment seem to follow a similar pattern. Since these countries are among the most hardly hit by the recent economic recession, it seems that a bad economic climate is more likely to increase the gap between high- and low-educated in the employment and job quality probabilities. This is also the case for the UK, where the recession had also a considerable effect. However, in other countries, where the effect of the recession was also very severe, while belonging to different regimes- Ireland, Estonia, and Hungary- such trend is not apparent. For example, in Ireland and Hungary, where the GDP growth rate has significantly

dropped, while unemployment has also increased, the effect of education on employability and job quality seems lower in 2010 compared to 2004. For Estonia, in 2010 the effect of education on employability seems higher, but lower for job quality. On the other hand, in Germany, where recession had no negative effect at all, in terms of GDP growth rates and unemployment, similar to the Southern countries increasing trends have been observed. Summarising, the analysis performed in this thesis shows no clear relationship between the economic climate and the effect of education on employability and job quality of individuals. Moreover, welfare state regimes, with the exception of the Southern, seem also a poor determinant of this relationship.

Table 7.1: Summary of Findings

	EOR_{ed}	$EQOR_{ed}$	REd	RREd	ROVEd	RUEd	GDP Growth Rate	HUR
2004-2010 Temporal Change								
Continental								
BE	↓	↑	↑	↑	↑	↓	-0.74	-0.01
DE	↑	↓	↑	↑	↓	↑	0.15	-1.57
FR	↑	↓	↓	↓	↓	↑	-1.27	-0.24
NL	↑	↓	↑	↑	↑	↓	0.08	-0.01
Liberal								
GB	↑	↑	↓	↓	↓	↓	-3.01	1.62
IE	↓	↓	↑	↓	↓	↑	-5.74	4.90
Nordic								
DK	↓	↓	↓	↑	↓	↓	-1.92	0.17
FI	↑	↓	↓	↓	↓	↓	-2.39	-1.54
NO	↑	↑	↓	↑	↓	↓	-1.72	-0.94
SE	↑	↓	↓	↓	↓	↓	-1.67	0.86
Southern								
ES	↑	↑	↑	↑	↓	↓	-2.98	3.20
GR	↑	↑	↑	↓	↑	↑	-6.31	-0.69
PT	↑	↑	↑	↓	↑	↑	-0.49	3.54
Eastern								
CZ	↓	↑	↓	↓	↓	↑	-1.89	-1.94
EE	↑	↓	↓	↓	↑	↑	-8.98	-1.09
HU	↓	↓	↓	↓	↓	↑	-5.29	3.36
PL	↓	↑	↑	↓	↑	↓	1.53	-10.70
SI	↑	↑	↓	↓	↓	↓	-2.58	-0.79
SK	↑	↑	↓	↓	↑	↑	-0.76	-6.72

Source: ESS Rounds 2 and 5 (Author's calculations)

Particularly, regarding the research hypothesis on the quality of job, the model built involved a composite variable, constructed by the author after grouping seven different variables (components), equally weighted. This variable can be seen as an index that represents the quality of job, as this is perceived by the ESS respondents. The construction of this variable was based on the contemporary literature on the application of specific metrics to measure quality of job. Therefore, the model attempts to measure the perceptions of the ESS respondents regarding certain specifications of their current job, which are then grouped into one variable, the job quality variable.

Results from this model suggest that the perception of the quality of job is affected by educational attainment, as in the majority of the countries individuals with high educational attainment seem to hold jobs that encompass most of the specifications used in this study to define job quality. As the model estimations showed, the probability of having a high quality job does not seem to be influenced by the economic climate, since it changes quite randomly regardless of how the labour market performs. However, due to the fact that responses concern individuals' perceptions, they can be given relatively to a counterfactual and therefore, they might include a subjective factor, which is extremely difficult to be identified by a quantitative research. Having said that, in Southern countries odds ratios are increasing, implying an incremental effect in favour of the high-educated, which resemble the relevant estimates for Germany and the UK. Nevertheless, in Ireland and Hungary, which have been also affected by this crisis, the effect of education drops to marginally positive figures, showing a big decrease compared to 2004. On the other hand, in countries where the labour market seems to perform better in 2010, the effect remains rather stable with only minor increases/decreases, except Slovakia, where the effect rises considerably (10pp).

With regards to the model fit, there is an indication that its prediction power is rather modest. There are other variables, found in the ESS survey, which can affect the perception of the quality of job. Working on weekends or at night and work-life

balance are only a few of them. However, as it was explained in Section 4.3, it has been decided not to add them in the quality of job model, leaving some space for future research.

Moreover, individual perceptions might be conditional to the general socio-economic circumstances. For example, in an uncertain climate, where lay-offs are common, a wage-cut or a deterioration of working conditions might seem a beneficial situation when compared to job losses. Thus, respondents, when asked for their perceptions on their current job specifications, might answer comparing them to the perception they have regarding the general job-climate around them. So, even if their job specifications did not actually change in 2010, they might not necessarily compare their current situation with the past, but their job with other at the time the interview was conducted. This is more likely to happen to individuals, who were recently employed, as they empirically lack the pre-recession reference point. Therefore, a concept like job quality is multi-parametric and extremely difficult to be adequately captured by a quantitative study. Qualitative analysis, by the usage of in-depth interviewing, might offer some more nuanced understanding of the concept, also looking on the main reasons respondents are answering the way they do[39].

Specifically for wages, previous literature has estimated returns to years of education at higher rates. Moreover, comparisons between estimations are very difficult to be done, due to the difference in the way variables are constructed between different surveys and methods used for statistical analysis. However, there is limited research, using the ESS to estimate returns to an additional year of education cross-nationally, performing standard Mincerian OLS regression estimation techniques, similar to the one used in this study. In Galasi (2008) returns to years of education have been regressed over the log of gross monthly wage of the ESS Round 2 participants. By controlling for additional explanatory variables and selection bias using Heckman sample selection estimator, he reports higher rates of returns to an additional year of education, than the ones estimated in the current study. Yet, he uses years of

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[39] However, it would be very hard to be implemented in a cross-country manner, given that the resources needed for such analysis to be carried out are extremely demanding.

education without centring it into the compulsory level of each country. Furthermore, there is no clear description on how the normalisation of data has been performed before proceeding to estimate the relevant regression coefficients and this might have affected estimations. Tahlin (2007), using the same data set, focusing on Germany, Spain, France, the UK and Sweden, reported also slightly higher returns than in the present study. In Tahlin's study log wages are approached in an hourly manner and, once more, there is no clear indication on the standardisation and normalisation procedures used. To the researcher's knowledge so far, apart from the current study, there has not been any research that uses the ESS to estimate returns in all nineteen countries participated in Rounds 2 and 5 and therefore, no relevant comparisons can be made.

In general, quantitative studies that estimate returns to education using the original or close variants of the Mincerian wage equation, report higher returns and this is probably due to the different samples as well the different data management techniques used.

The estimations performed in this thesis showed that, in terms of GDP growth and unemployment, European countries have been affected in different ways by the economic crisis. For example, the situation in the German labour market seems to have improved. This performance is far better than all other Continental countries, where the economic crisis have caused some kind of stagnation. Eastern countries, except Hungary and to some extent Estonia, followed Germany's trend. The Liberal countries, especially Ireland, have been affected considerably by this crisis. However, wages in Ireland have increased, while employment has dramatically dropped. On the other hand, in the UK wages decreased, whereas unemployment increased relatively less than Ireland. Nominal average wages, at least at the beginning of the crisis, seem that have not been affected much, but when HICP is taken into account, the picture drastically changes indicating a big decrease on the real gross average wage, especially in the Southern countries. Greece and Portugal are the Southern countries that appear to have been affected the most. However, big decreases have been also observed in Hungary and the UK.

Yet, there is some indication that high-skilled workers have been affected less, but this does not seem to be recession-specific. In 2010, the unemployment of individuals with higher education, as a percentage of the total unemployment, dropped in all countries, indicating a displacement of low-skilled workers from the European market and this is a common pattern observed in most countries (Table 3.1 and Appendix B). However, when the economic climate is bad, it is possible that individuals are willing to accept jobs that do not correspond to their educational level and therefore, job mismatch might rise. The estimations from Section 6.4 reveal a rather consistent trend between countries, where the incidence of overeducation increases, while undereducation decreases.

Nonetheless, the rate of returns to education is not a matter that can be considered as solely affected by the labour supply-side, as specific characteristics related to the demand-side are very likely to have a strong impact as well. Indeed, the preliminary analysis performed to estimate returns to education, separately for jobs that require different levels of educational attainment, using the polled sample, confirms that these seem to increase along with job's educational requirements, indicating that they are more affected by job-specific than individual factors related to educational attainment. Certainly, because of various methodological drawbacks of the relevant analysis performed, results should be treated with caution. Further research, using a more representative sample, is needed.

All rate of returns estimated in this study, seem to increase/decrease rather randomly, irrespectively of a bad or a good economic climate. Between welfare state regimes, there is some consistency observed in Nordic countries, where REd between 2004 and 2010 have decreased along with ROVEd, while RUEd have increased[40]. This indicates that wage-gaps, between the high- and low-educated, have likely decreased, along with wage-premiums associated with overeducation, while wage-penalties

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[40] Since RUEd, in most of the cases, is a negative number, increases, represented by the green arrow in Table 7.1, mean that the negative number in 2010 is bigger than 2004 and therefore, the wage-penalty associated with undereducation is also bigger. So, the green arrow in RUEd represents a negative labour outcome.

associated with undereducation increased. However, RREd show a mixed trend between these countries and therefore, wage-premia and wage-penalties seem to be affected by other reasons apart from the educational requirements of a job. Moreover, the effect of the recent recession was relatively smooth in these countries and thus, it seems that these temporal trends, do not have strong causal links with the external economic climate, but can be attributed to other reasons on the individual or institutional level.

Concerning the rest of the welfare state regimes, some consistency in the temporal trends can be observed in the Southern countries, where REd in 2010 have increased compared to 2004 as well as in the Eastern countries, where RREd have decreased. In Liberal countries, RREd and ROVEd have also decreased, but the trends between the UK and Ireland for REd and RUEd are mixed. Finally, Continental countries show a rather mixed trend for all types of returns. In terms of the recession effect, Southern and Liberal countries have been severely hit, whereas the Eastern, except Hungary and Estonia, and Continental countries have either benefited or not affected much. Moreover, recalling from Table 6.7, RRED and RUEd are more likely to have a cyclical relationship with GDP growth rate, meaning that it is more likely to move towards the same direction. However, the ROVEd temporal trends show no consistency between countries and therefore, its increase/decrease is not associated with GDP growth rate. Finally, each type of return temporal trends has been also regressed over the temporal HUR change and all have been found as highly insignificant. Therefore, these relationships can be best described as rather acyclical.

With regards to whether the labour market economic and institutional context of each of the nineteen countries examined affected the labour market outcomes in a specific way, it has been found that SOG is negatively associated with EOR_{ed}, REd and ROVEd, but positively associated with RREd. These associations though, do not stand as statistically significant for both 2004 and 2010. The negative associations stand only for 2010 and the positive for 2004. Therefore, in terms of employability, estimations from 2010 imply that in countries with large SOG educational attainment is valued less than in countries where SOG is small. Moreover, in countries with

large SOG, REd and ROVEd are more likely to be lower than in countries with smaller SOG. However, this is not the case for RREd, as it has been found as statistically insignificant. Nonetheless, when data from 2004 is used, this relationship becomes significant, indicating that the larger the SOG, the higher the RREd is likely to be.

Furthermore, EOR_{ed} are more likely to be higher in countries where the PT/FT ratio is relatively high. This statistical relationship is significant only when data from 2010 is used. The interpretation to this is that educational attainment is valued higher in countries where the proportion of part-time to the overall number of full-time jobs is relatively high. Since the creation of part-time jobs is more common to flexible labour markets, it can be implied that labour market flexibility is positively associated with the value of education. Data for 2004 though, showed that this macro-level determinant is not associated with EOR_{ed}. However, at the same year, it has been estimated that is positively associated with $EQOR_{ed}$ and thus, high-educated are more likely to find a high-quality job when the labour market is relatively flexible. Specifically, with respect to job quality, results from Chapter 4, using the 2010 data set, have also shown that the wealthier a country is, in terms of GDP/capita, the less likely for a high-educated is to find a high-quality job. However, in all the aforementioned relationships, albeit statistically significant, the magnitudes of the actual effects are rather small. On the other hand, for both 2004 and 2010, GDP/capita, and thus, the wealth a country creates, is negatively related with REd. This effect is also considerably large and of a similar magnitude in pre- and during recession periods, meaning that there is strong evidence that REd are more likely to be higher in less wealthy countries and therefore, an additional year of education seems to be valued higher. These findings are consistent with research conducted in a cross-country manner in a global level (Banerjee and Duflo, 2005; Psacharopoulos and Patrinos, 2012; Montenegro and Patrinos, 2013), where returns are more likely to be higher in low- or middle-income economies than in industrialised. The analysis in this thesis confirms this stream of literature, since results have shown that the wealthier a European country is, the more likely it is returns to education to be relatively lower.

The empirical analysis in this thesis has shown that this is also true when overeducation is taken into account, since ROVEd have been found negatively, but significantly associated with GDP/capita for both 2004 and 2010. Moreover, ROVEd have been found as positively associated with the EPL index for 2010 and this means that the highest the EPL in a country is, the more likely it is for ROVEd to be high. However, this relationship is not significant for 2004. Finally, ROVEd are more likely to be higher in countries, where the gross enrolment ratio in higher education is low and therefore, the wage-premia seem higher.

Regarding the relationship between the nine macro-level determinants and RUEd, the analysis performed in Chapter 6 showed that RUEd is only significant with debt to GDP ratio and their relationship is negative. Therefore, in highly indebted countries, it seems that the wage-penalty associated with undereducation is lower. However, the statistical significance of this relationship stands only for 2010, as when data from 2004 is used the significance is very low.

Finally, the relationships between each macro-level determinant temporal trends and the trends with EOR_{ed}, $EQOR_{ed}$, REd, RREd, ROVEd and RUEd respectively, have been estimated and found statistically insignificant, except the one between RREd and SOG, which was found significant and positive. This means that when SOG drops, RRED is more likely to follow suit. However, since the relationship is a bivariate one, many factors that can influence both measures have been treated as unobservable. Therefore, even if some indication on their association has been given, more analysis and further econometric instruments are needed in order to carefully examine and test the external validity of this relationship.

7.2   Discussion and Policy Implications

In Chapters 1 and 2 some policy analysis has been presented, focusing on the marketisation process of higher education and the implementation of policies related

to the Bologna Process, where the focus is given to the homogeneity of the curriculum and the employment prospects of students.

There are various methods of analysis, used by researchers, to reveal the influence of education on the distribution of income (Psacharopoulos and Patrinos, 2004). To a great extent, research has been revolved around the correlation that exists between income and individuals' characteristics, such as the educational level. According to the World Bank's (2013) report, investment in education can influence the distribution of income in many ways, mainly in developing countries. Education can contribute to a significant amelioration of the overall level of income, decreasing the number of poor people globally, as it can change the dispersion of income, providing greater opportunities for children coming from poor families and increase social mobility. On the other hand, there are other studies that do not only focus to strict economic factors, but also to the contribution of education to fertility and mortality rates as well as to the level of health. It is also stressed that education boosts the creation of more responsible and participative citizens, bolstering democracy and social justice (Council of Europe, 2004; Osler and Starkey, 2006; Cogan and Derricott, 2014). Therefore, higher educational attainment should be taken into thorough consideration from policy-makers, as it is one of the most important factors that can shape labour market trends worldwide and this, in turn, have serious social implications.

Realistically, the human capital definition cannot be reduced only to quantitative interpretation, as it has cultural, psychological, idiosyncratic and social implications. For example, the added-value of schooling acquired from an Oxbridge graduate is not the same as the one acquired from a graduate of a university in a developing country. There are notable differences in the quality of education, within and between universities, but it is rather impossible to be measured, at least at the moment, despite some commendable efforts by researchers (Betts, 1999). Even if proxies can be arguably used (e.g., linking school quality with achievements), this cannot provide robust measurements of school quality and its contribution to formatting individuals' human capital. To that extent, current research on human

capital and training has been concentrated in things that can be, somehow, reliably measured, such as years of schooling and degrees, excluding all non-official training acquired by empirical experience (Livingstone, 2009). Additionally, Hoxby (1996) argued that policy environment and systems of governance in higher education play a significant role to an individuals' decision-making process to obtain further education and unfortunately, economists overlook this aspect. There is also a considerable gap between micro- and macro-approaches, as evidence inform for a discrepancy between private and social returns, even within the same country (Pritchett, 2001; Johnes and Johnes 2004; Psacharopoulos and Patrinos, 2011).

Generally, there is a consensus among economists, with a neoclassical or institutional background, that human capital accumulation, as this is treated to each school of thought, is essential for enhancing the productivity of low income individuals, accelerating growth and reducing poverty in both developing and developed countries. Perry *et al.* (2006) tried to investigate the reasons why the poor Latin Americans cannot accumulate enough human capital as well as the implementation of policies, which ensure that they will get the minimum level of skills required in order to increase the utilisation of their human capital, breaking the cycle of poverty. The findings reveal that there is an educational segmentation, which keeps the lower-educated in persistent poverty, caused by a combination of liquidity constraints and uneven returns to schooling.

Lepori and Bonaccorsi (2013), following Latour and Woolgar's (1979) rationale of the great importance of vested interest in scientific endeavours, argue that higher educational attainment trends are too complex to be reduced and captured adequately by the various relevant economic indicators and econometric models. Nevertheless, the great merit of these indicators and models is that they can bring more transparency in the research enterprise. However, vested interests, politics and other power relations, should be taken into account closely, along with the institutional and time context. Context can offer some insight on why patterns emerge in the data analysis. That said, for better results, plausibility derived from intuitive arguments

and narrative should be complemented with robust econometric techniques and the use of economic indicators, placing them in their socio-economic and time context.

Concerning the bad economic climate, created by the financial crisis started at the end of 2007, national labour markets have been affected rather differently. At the beginning of this crisis, there were no joint efforts really pursued by all member-states to shield Europe from it, possibly because its depth and magnitude has been underestimated. The crisis started as a financial one, which affected mainly the housing market, but rapidly contaminated all other sectors of the economy. Public debt was already high in most of the countries and no growth rejuvenation strategy could proceed by each national government through stimuli packages. Europe has responded to this predicament with the implementation of strict austerity measures, accompanied by bail-out packages, especially to countries where the effect of the crisis was high. Unfortunately, these measures worked to the exact opposite direction than they were designed for, especially for the Southern countries, as unemployment increased even further and wages remain stagnant or in the case of Greece plummeted. Specifically in Greece, where the crisis has been very virulent, subsequent to 2010 data show that the GDP has been falling rapidly and the public debt to GDP ratio increased to unsustainable figures (Koutsogeorgopoulou *et al.*, 2013). In this context, the low-skilled seem to have suffered more. Under this climate, policy instruments are extremely limited and the negative effect on the labour market was extremely severe.

Under this uncertain European environment, evidence of increasing employment inequalities as well as polarisation of the occupational structure, between high- and low-skilled jobs, has been observed. Tahlin (2013a; 2013b) claims that low- and medium-skilled jobs decline, especially in manufacturing and construction industries. However, wage inequalities have not increased, as the higher wage-cuts rates have been observed in medium-paid, and in some cases in high-paid, jobs. Tahlin confirms Vandekerckhove *et al.* (2012) findings, which indicate a high wage growth in the transport, storage and communication sector in most countries as well as a constant stagnation in the hotel and restaurant industry. Given the de-

industrialisation process, which started long before the recession, where service constantly displace manufacturing, agriculture and fishing jobs as well as the ageing structure of the low-skilled jobs in these industries, which are mainly composed by older-workers, an ongoing recession like the one Europe is currently facing, can pose serious threats on their sustainability (Kromydas *et al.*, 2012).

This study also contributes to the relevant literature by arguing that only in some countries, where the effect of the recent recession was severe, non-graduates have suffered the most. In Southern countries, education appears to have worked as a cushion for the high-educated, while the position of the low- compared to the higher-educated seem to deteriorate. However, in other countries, such as Ireland, Estonia and Hungary, where recession was pretty bad, additional educational attainment does not seem to be valued higher compared to the pre-recessionary period, as the relative position of the higher-, against the lower-educated, remains stable or either deteriorates, indicating a different pattern compared to the Southern countries. On the other hand, in Germany and most of the Eastern countries, which performed relatively well during the same period, results have shown that it is not clear whether educational attainment can improve the situation of individuals in terms of their labour market outcomes. Moreover, in Nordic countries, especially in Denmark, it seems that even if recession did not have a significant impact on its labour market, the situation for the higher-educated compared to the lower-educated has not really improved. This might be attributed to Denmark's flexicurity model, which seems to work towards an amelioration of employment and wage inequalities, smothering the effect of a recession to the most vulnerable parts of the society. Certainly, Germany and the Eastern countries, except Hungary and Estonia, seem to perform better in 2010 compared to 2004. Germany's model appears as the most robust between all countries, showing no real signs of recession. Job prospects are better, returns to attained, required for a job and undereducation increase, while returns to overeducation decrease. However, the perceptions of higher-educated individuals, as compared to the lower-educated, on their quality of job have decreased and wages, on average terms, have remained rather stagnant.

Therefore, heterogeneity and economic divergence among European countries is very apparent and occupational polarisation between low- and high-educated in low-performing countries, especially the Southern ones, seems very likely. In that context, the notion of employability should encompass all individuals, low- and high-skilled, not only graduates. Minimum wage and EPL strictness should be carefully reconsidered to countries that have been affected the most, getting some examples from Germany, Denmark and the rest of the Nordic countries. However, there is a clear need for a general redesign of the current austerity policies, which have increased polarisation between countries, also having dramatically side-effects, mainly to the European countries of the South. The never-ending contractionary policies of austerity and fiscal adjustments that happened in tandem with the change in the working relations, which shifted towards a more deregulated and flexible format, seem that have deteriorated labour market performance, increased social tension, dismantling social cohesion, while discouraging people from having the trust needed to the institutional settings that can ensure social peace and justice (Blyth, 2013). As a result, in a hostile environment like that, highly-qualified people choose to migrate to high-performing countries, within or outside Europe. The human capital in their origin countries is constantly draining, while the crisis deepens, contaminating even the most productive labour force, whereas the skill-gap across countries widens. In parallel with that, placing all the above implications in a more broader dimension outside the strict boundaries of economic science, the negative effect of this crisis on individuals physical and mental health is apparent, while the rate of suicides, due to insurmountable financial constraints, have increased dangerously (Stuckler *et al.*, 2011; Chang *et al.*, 2013).

In countries, where the effect of recession was very severe, the prolonged character of this crisis has caused a significant increase to the numbers of individuals, both young and adults, who live in jobless households and an increase to people, who live under the risk of poverty. Furthermore, the figures for the lower-educated are striking[41] (Appendix D- Table D.3). Specifically, not taking into account the educational level, in Greece, Spain and Portugal, one fifth of the population live

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[41] Poverty cut-off point: 60% of median equivalised income after social transfers.

under the risk of poverty. However, Portugal shows some signs of improvement. Estonia also reveals high percentages. Once, these figures are divided by educational level, a clear pattern against the lower-educated is revealed. The highest percentages can be found in Hungary and Greece, where more than one third of people with pre-primary, primary or lower secondary education are under the risk of poverty. Nevertheless, irrespective of the economic performance of each country, these trends are apparent to all, but the rate of increase is significantly lower to the counties that have not been affected by this crisis much. What is mentionable at this point is that the only country, which shows a considerable improvement on the poverty rate, is most remarkably Ireland. One would expect that poverty rates would increase because of the negative effects of the economic crisis. On the contrary, these rates in Ireland were gradually decreasing. Certainly, this is an unexpected outcome, but it seems that there were country-specific circumstances, which triggered this change.

Notwithstanding this, it is very hard for someone to find a single economic indicator, which could apply, equally positively or negatively, to all European countries. This indicates that a great divergence exist between European countries, which this recession seemed to have accelerated. In such an environment, low-skilled people have suffered more and they tend to become economically and therefore, socially marginalised. Policy-making in the European level is in a historical turning-point point, where economic inequalities, social tension and radical euro scepticism are gradually rising in such levels that threatens the sustainability and even the existence of Europe as a union.

In a context like that, an increase in higher education participation, focusing particularly on the most vulnerable and deprived members of society, operating in tandem with an increase on the number and quality of jobs offered to low-skilled individuals, can alleviate this problem. Moreover, it is very likely to trigger positive social spillovers, as, apart from the pecuniary, there are also other non-pecuniary benefits associated with the increase in higher education participation, such as the improvement in the fertility and mortality rates as well as the general health condition of its members or the boost of active democracy and citizenship even

within workplaces, (David and Lopez, 2001; Bowles and Gintis, 2002; Council of Europe, 2004; Breenan, 2004; Brown and Lauder, 2006; Wolff and Barsamian, 2012).

7.3 Methodological Limitations and Implications for Future Research

This thesis examined the change occurred on the labour market outcomes of individuals with different educational attainment, in nineteen European countries, due to the ongoing economic recession, started at the end of 2007. The institutional and economic context of each country's labour market has been also taken into account. Findings revealed a big heterogeneity between countries on how each has perceived and responded to this economic predicament. Undoubtedly, such a broad research issue cannot be exhausted into the research boundaries of a PhD thesis. Moreover, social and economic phenomena are very complex and multi-parametric; and it is very unlikely their causes and effects to be captured and explained by a survey-based quantitative analysis, like the one attempted in this thesis. However, this study touches upon four very crucial areas in labour research, examining them under the same conceptual, political and time framework. This approach allowed for a simultaneous observation of the trends in employment, job quality, the distribution of wages and job mismatch of individuals with different educational attainment, under the strict methodological limitations of a quantitative analysis, which have been acknowledged mainly in Section 1.3.

Having said that, this study triggers the need for the establishment of an interdisciplinary research setting in labour market, leaving considerable scope for future research into the broader research area of social science.

Methodologically, the linear (Chapters 5 and 6) and log-linear (Chapters 3 and 4) fixed-effects models used by the author of this thesis, even very convenient, do not allow for the incorporation of contextual variables in the regression equation, as its

analysis is confined in the level the data has been collected and therefore, individual level micro-databases, such as the ESS, can only be estimated at a single level. Translating this methodological caveat to the data used, it means that single-level regression techniques cannot test the statistical effect of other macro- or contextual variables. A solution to this problem has been given by the use of the two-step approach. However, such approach, even very illustrative, allowing for certain relationships between individual- and country-level variables to be tested and visualised, is lacking the inferential robustness and applicability needed in order the conclusions drawn to be appropriately generalised to a much wider population. Along this line, nine macro-level determinants have been tested and used as representatives of each country's economic performance, fiscal situation, level of wealth, labour market flexibility and higher education enrolment rate. However, other factors, such as the level of long-term or youth unemployment, the level of employment and activity rate or other socio-economic indices, like the HDI and Gini coefficient for income inequality, can arguably provide some greater understanding behind the causes of certain labour market outcomes.

Future research will attempt to contextualise such macro-level variables by the use of a more representative data set, which will also allow the exploitation of more inferential econometric techniques, like multi-level modelling. Therefore, the empirical results from this thesis are anticipated to inform upcoming research, conducted by the use of a more advanced secondary data analysis with a panel component, as an attempt to focus mainly on the impact of institutional factors, which can be measured by various socio-economic indicators. As pointed out in this thesis, the structure of labour market can also affect employability, job quality, the level of wages and occupational mismatch in certain ways. For example, a country with a less strict EPL might be able to respond faster and better to rapid and prolonged fluctuations of the general economic climate. This was the case in the most Scandinavian countries. On the contrary, in Southern countries, where EPL is relatively high recession had a much more severe effect. However, even if such argument seem plausible, the use of the two-step approach, did not show evidence of strong relationship between EPL and the labour market outcomes of individuals with

different educational attainment. Obviously, a more detailed breakdown of the institutional settings in each country might reveal hidden patterns, which the present ESS data did not manage to capture. The use of a more representative survey, which will allow for a much more efficient statistical exploitation of its data, is anticipated to eliminate some of the methodological disadvantages associated with the regression analysis in the present study and might improve the goodness-of-fit of the models and thus, their external validity.

Therefore, further research is needed, using ad-hoc surveys, like the ones from EUROSTAT, where the questionnaires have been explicitly constructed to address issues related to the "Transition from School to Working Life" (2001) and the "Entry of Young People into the Labour Market" (2009). However, in these surveys, even if they look similar, questions are asked in many different ways and this makes them not directly comparable. Therefore, a comparison research, linking these surveys, is very difficult to be achieved. Future research will try to disentangle such methodological issues and is anticipated to shed some light to the relationship between individuals' labour market outcomes and educational attainment.

The current study tried to combine country-level data with regression estimations, using the two-step approach, taking into consideration the data limitations but also the methodological implications such approach entails. As Bryan and Jenkins (2013, p: 11) note:

> "The bottom line is that, even with a simple specification of country effects, we need to exercise considerable caution about country-level estimates and hence differences across countries. The two-step approach indicates that the parameters on individual-level predictors and their standard errors can be estimated reliably. But the regression parameters on country-level predictors and the variance of the country-specific effect are likely to be estimated imprecisely, and so too will their standard errors unless a specific adjustment is made (such as that implicit in the second-step regression). Hypothesis test of the country level parameters is also reliant on the

assumption that country effects are normally distributed, which is questionable."

Notwithstanding this, such combination of different data sets have paved the way for future research, since possible relationships have been identified, which would be attempted to empirically investigated further by the conduction of more advanced models. Therefore, future research will attempt to examine the influence of country- and regional-level variables by the implementation of multi-level modelling and mixed-effects techniques, in order to allow the inclusion of macro-contextual variables as well as the estimation of cross-level interaction of variables belonging to different levels. Particularly, regarding quality of job, future research will attempt to identify the relationship between these dimensions and the intensification in workplaces as well as under which circumstances this relationship is negative or positive.

Finally, in broader terms, there is a growing consensus among research scholars and policy-makers that the encouragement and imposition of alternative educational and labour market research practices consist of an imperative need (Pons-Vignon, 2011). Modern views, on social and political science, regard the formation of a new interdisciplinary paradigm in social science as of an urgent need. In a conference organised by The Institute for New Economic Thinking (INET, 2012), one of the most prominent and leading research institutes in the field of economics, chief economists, eminent scholars of social science as well as Nobel laureates, agree that the mainstream paradigm in economics has gone seriously astray. One of the reasons can be traced on the failure of the economics academic discipline to incorporate the evolution, which has occurred, in the last decades, in other disciplines of social science rendering itself, implicitly or explicitly, an inadequate and rather obsolete tool for explaining the dynamics of a rapidly changing social context. More sophisticated methods for collecting, extracting, synthesising and analysing data to explain and predict social processes are needed.

Summing up, researcher's future work will concentrate on quantitative analysis of social phenomena, using various sets of alternative data, focusing on the analysis of local and regional policy interventions, overcoming the constraints placed by the available traditional data sources. The basic axes will be higher educational attainment and labour market and their interactions.

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APPENDICES

APPENDIX A

Regarding the social returns to education, the level of analysis changes, taking place into an aggregated level, usually referring to a country level. The question regarding how much higher education contributes to the economic growth and development, is directly linked with educational planning and policies. Therefore, specific methods have been diachronically developed, targeting to evaluate education's contribution to the economic growth and development, in various countries worldwide. Neoclassical economists, on one hand, rely on human capital theory, where education is being considered as an ordinary financial investment. Solow (1956; 1957), argues that technological progress (T), is the "unknown" part of the rate of economic growth of a country (Solow's residual). Schultz (1963) used this postulation to investigate further the determinants of this technological progress. He suggested that education (E) can explain the unexplained residual of the rate of economic growth better than (T) per se, as it directly correlates with the research and development of technology. He argues that it is misleading if workers and employees are solely approached as quantities that determine the factor of production of labour in the production function:

$$Y = f(Land, Capital, Labour, u) \qquad \text{(A.1)}$$

This is because not all workers embody the same quality of work, as the more educated tend to be more productive. Abramovitz (1956: 11) calls this residual as the "measure of ignorance", in his attempt to determine the factors of economic growth.

Closer attention should be given to the *endogenous growth theory*, which opposes the neoclassical theory of growth (Romer 1986; Lucas 1988). According to the endogenous growth theory, economic growth is engendered from within an economic system, as a direct result of internal processes. Likewise, the development of a nation's human capital will lead to economic growth, in terms of new forms of technological development, which will in turn, create more efficient and effective means of production. This theory rejects the baseline of the neoclassical notion of diminishing marginal returns of (human) capital, as necessary condition in an economy, but without denying that human capital is a crucial driving force of economic growth (Barro, 1991; Glaeser, 1994; Simon, 1998; Florida, 2002; Lee *et al.*, 2004; Acs and Armington, 2006; Audretsch *et al.*, 2006).

Specifically, the case of the increasing marginal returns within the production function, can be construed by the rationale that the bigger the accumulation of knowledge an economy can succeed by the augmentation of its members' human capital, the most productive it can be. Educational levels are positively correlated with the increase of income levels and they can schematically fit in the production function as a multiplier of the other means of production (Land, Capital, Labour). Thus, by using the educational level as a multiplier and not as an actual means of production, the production function will take the form below:

$$Y = \bar{E} \, f(Land, Capital, Labour, u) \qquad \text{(A.2)}$$

where:

$\bar{E}$ is the average level of individuals' educational level. Lucas (1988) and Romer (1986) argue that the diminishing marginal returns assumption cannot always stand, as relatively large increases of the multiplier of education, can offset the diminishing marginal returns of the actual means of production creating increasing marginal returns and in turn, growth in the long-run. This assumption challenges the neoclassical approach to growth, which assumes that developed and developing countries converge in terms of their GDP per capita. But, it is more likely that developed and developing countries diverge instead of converge, as the differences in educational investment become bigger and bigger and thus, the multiplier boosts

economic growth in favour of developed countries, whose investment in education is gradually increasing pro rata. Moreover, it is still unclear in what way the economic climate can affect human capital and the returns associated with this.

APPENDIX B

Figure B.1: No Full-Time Job Available as the Main Reason for Having a Part-Time Job (2004-2010)[42]
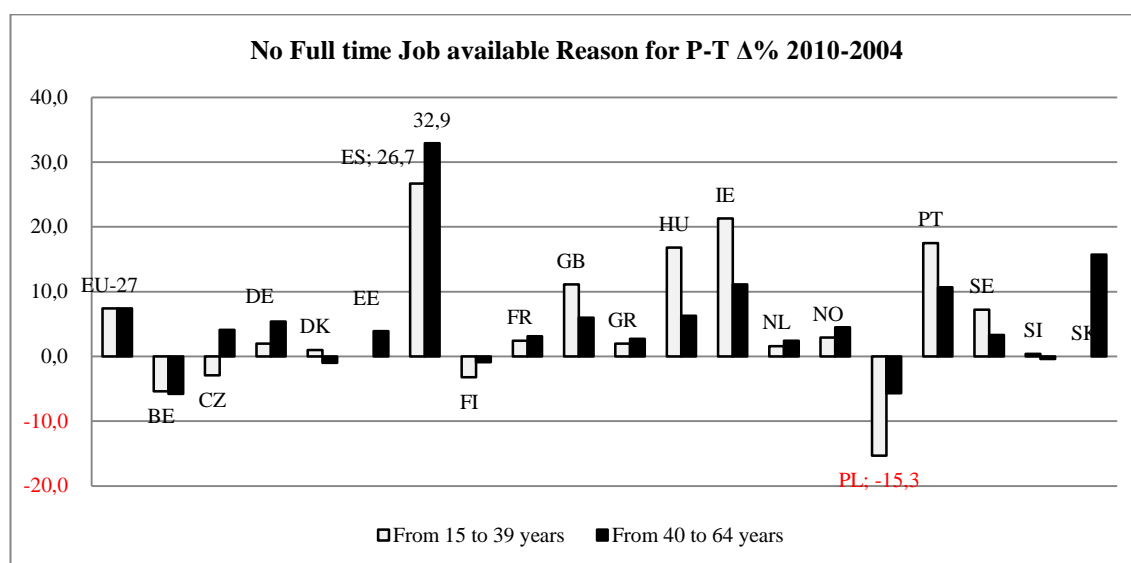
Source: Eurostat (Author's calculations)

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[42] There were no data available for Estonia and Slovakia in 2004. For that reason, they are not presented in this figure.

Figure B.2: Duration of Working Life (Percentage Points Changes Expressed in Years' Difference)

Duration of Working Life

	DE	ES	EE	SE	NL	HU	BE	FR	PL	EU-27	GB	NO	FI	CZ	DK	PT	SI	GR	IE	SK
2004-2011	2,5	2,5	2,0	2,0	1,9	1,7	1,6	1,6	1,5	1,4	0,9	0,9	0,7	0,6	0,6	0,6	0,5	0,3	0,2	-0,1

□2004 ▨2010 ■2011 ▲2004-2011
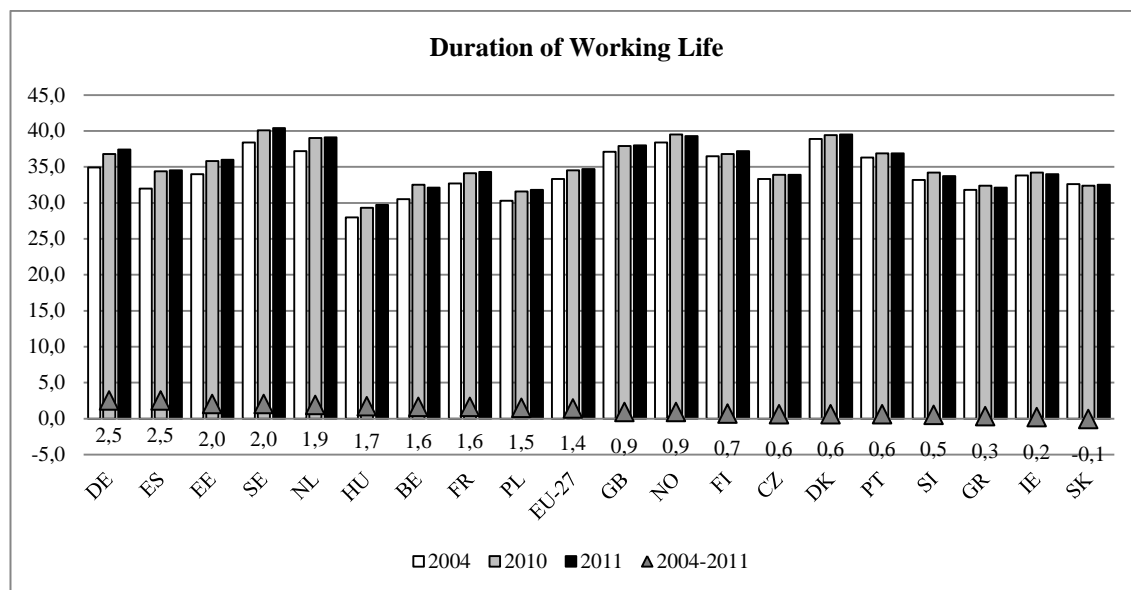
Source: Eurostat (Author's calculations)

Figure B.3: Labour Productivity per Hour between 2004-2010 and 2010-2012

Labour Productivity Per Hour

	PL	EE	SK	IE	ES	SI	SE	DK	PT	EU-27	DE	HU	FI	CZ	FR	NL	NO	BE	GB	GR
□Δ% 2010-2004	14,1	22,5	20,7	9,8	7,8	19,8	5,9	4,1	7,9	5,1	5,7	7,2	4,9	16,3	4,1	5,2	-4,2	2,0	4,4	2,0
■Δ% 2012-2010	13,2	8,6	8,4	8,2	7,0	6,3	5,7	5,5	5,5	4,4	4,0	3,8	3,4	2,6	2,6	1,1	1,0	0,7	0,0	-3,6
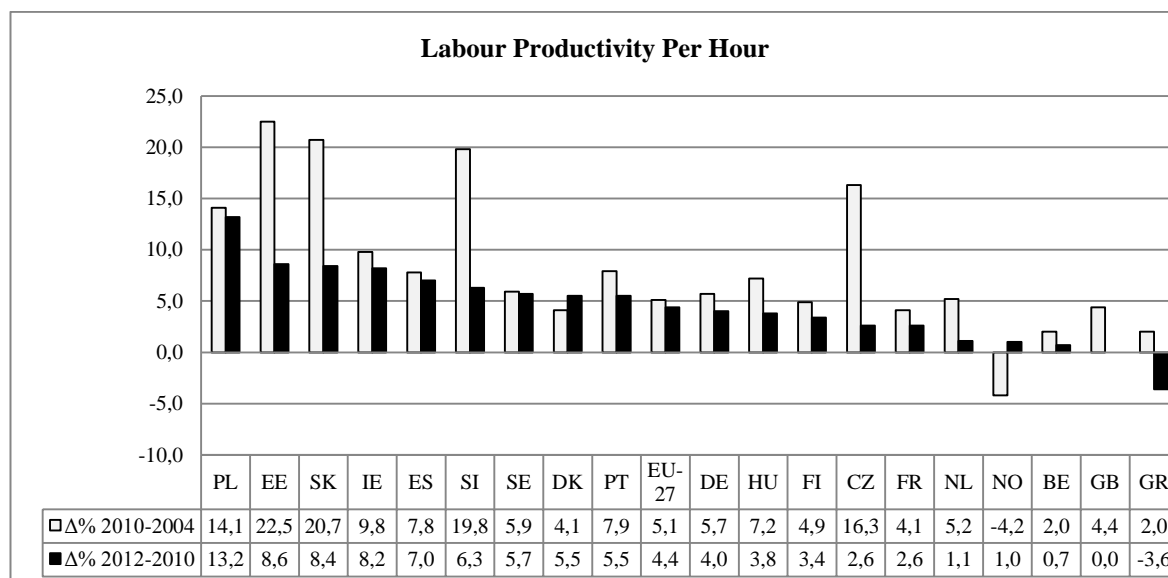
Source: Eurostat (Author's calculations)

Moreover, it will be interesting and more informative to explore this composition change within different occupations. Table B.4 depicts the pp change, between 2004 and 2010, of a total number of employees, aged between 25 to 64 years old, divided

by major occupational groups[43] and educational level. Low educated employees are shrinking in almost all countries and major occupational categories, except from Denmark and Norway. For employees belonging to the intermediate educational level, the shrinking pattern is less obvious; however, there are some considerable negative changes, especially for ISCO 1-3 and ISCO 4-5. Regarding ISCO 6-7 and ISCO 8-9, the changes are positive, but not relatively large in their magnitude, except from Ireland, where employees with intermediate educational level increased their share by 10.1pp and 7.9pp, respectively. Lastly, employees of tertiary educational attainment are constantly increasing their share to all occupational groups, apart from Denmark and Estonia.

From Table B.4 it can be implied that there is a pattern of job task up-skilling, but there is not any data available for intra-occupational mobility, as occupations belonging to different categories might require same skills and thus, there is always the chance of a career change, especially in recession and deindustrialisation periods. It is assumed that this effect is relatively small, based on the fact that employers are prone to eventually choose candidates, who have the most relevant experience for the particular job vacancy advertised. However, there is some uncertainty on how employers weight educational level with previous working experience. But, usually the competition in the selection process between candidates with low educational level and substantive experience and candidates with advanced degrees and low or no working experience, is very rare. The former category usually consists of older individuals than the latter and given the possible age bias pertaining to a job vacancy this case is very unlikely, at least in times, where the job creation growth rate is positive. On the other hand, in recession periods, where job creation growth rate is very low or negative, certain occupations or industries might experience mass lay-offs, which entails large shrinkages on their share in the total people employed and therefore, these people, if not long-term unemployed will eventually shift to different occupations, industries or even both.

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[43] These occupational groups are classified as follows: ISCO 1-3 for managers, professionals, technicians and associate professionals; ISCO 4-5 for clerks and sales, ISCO 6-7 for skilled agricultural and fishery workers, craft and related trades workers; and ISCO 8-9 for plant and machine operators and assemblers and elementary occupations.

Figure B.4: Percentage Points Change in the Composition of Employees within Major Occupational Categories by Educational Level (25-64 Years Old, 2004-2010)

GEO/ TIME	ISCED 0-2				ISCED 3-4				ISCED 5-6			
	ISCO 1-3	ISCO 4-5	ISCO 6-7	ISCO 8-9	ISCO 1-3	ISCO 4-5	ISCO 6-7	ISCO 8-9	ISCO 1-3	ISCO 4-5	ISCO 6-7	ISCO 8-9
EU-27	-1.6	-3.7	-3.5	-6.1	-3.2	0.3	2.7	5.1	4.8	3.5	0.9	1.1
BE	-1.0	-3.3	-10.7	-8.2	0.4	-1.0	8.5	6.9	0.5	4.4	2.1	1.3
CZ	-0.2	-1.6	-1.2	-4.1	-6.8	-0.4	0.7	3.8	7.0	2.2	0.5	0.2
DE	-0.8	-0.3	-0.8	-1.9	0.6	0.2	1.1	2.2	0.2	0.0	-0.3	-0.3
DK	3.3	9.4	9.0	5.2	0.2	-9.6	-8.9	-7.8	-3.5	0.2	-0.2	2.7
EE	0.0	0.0	-3.2	-0.7	-7.0	1.5	1.2	-1.5	7.1	-5.2	2.0	2.2
ES	-2.2	-3.6	-10.0	-6.3	-1.2	1.2	6.8	5.1	3.4	2.3	3.2	1.3
FI	-1.8	-4.8	-3.3	-8.5	-1.0	4.7	2.1	7.1	2.8	0.1	1.2	1.5
FR	-3.0	-3.8	-4.1	-7.3	-2.4	-0.6	2.0	5.3	5.5	4.5	2.1	2.1
GB	-2.2	-11.0	-2.1	-9.5	-3.2	4.5	-1.1	6.4	5.4	6.6	3.4	3.1
GR	0.3	-1.3	3.3	-2.9	-1.5	-2.3	-2.8	1.9	1.2	3.5	-0.5	0.9
HU	-0.2	-2.8	-3.3	-7.4	-6.2	-1.0	2.7	7.1	6.5	3.9	0.5	0.2
IE	-3.8	-8.2	-14.2	-12.0	-7.5	-4.2	10.1	7.9	11.4	12.5	4.1	4.0
NL	-0.7	-3.2	-1.7	1.3	-1.6	0.4	1.4	-1.4	2.3	2.8	0.3	0.0
NO	1.5	12.3	2.5	12.4	-9.4	-12.5	-1.2	-13.7	7.9	0.2	-1.3	1.3
PL	0.0	-0.5	0.0	-5.1	-10.5	-8.6	-1.3	3.9	10.5	9.2	1.3	1.1
PT	-3.7	-7.5	-5.6	-7.4	0.8	5.4	5.3	6.7	2.9	2.1	0.0	0.0
SE	-0.4	7.3	-1.9	0.6	-5.9	-11.9	-0.5	-3.5	6.4	4.5	2.4	2.9
SI	-0.4	-0.7	1.5	-9.4	-5.4	-2.9	-3.4	8.8	5.8	3.6	0.0	0.0
SK	0.0	-1.2	-1.8	-2.6	-9.1	-1.7	1.1	2.4	9.4	2.9	0.0	0.2

Source: Eurostat (Author's calculations)

In terms of the composition in employment, graduates seem to perform much better than non-graduates. Table B.5 presents the employment change, from 2004 to 2010 and from 2010 to 2012, for all people employed by educational level. Changes in the total working population can be quite misleading if these are not decomposed by educational level. In Ireland, for example, a small growth of 2.44% in the employment rate can be observed from 2004 to 2010, but once the data is divided by educational level, the differences between levels are very big. The employment rate for low educated people has been decreased by half, while for people with intermediate level of education this rate has not been affected a lot (-4.92%). On the other hand, the employment rate for graduates has increased (24.52%) and as a result, the total number of employed people went up by almost 2.5%. The same

applies for most of the countries, where graduates' employment rates increased by more than 10%. Only in Denmark a marginal decrease in graduates' employment rate (1.26%) along with a simultaneous increase of low educated individuals employed (17.34%) was observed. Consequently, Denmark experienced a marginal fall in the overall employment rate by 1.33%. From 2010 to 2012, the total number of people employed has fallen for all countries, except Estonia and Hungary where the employment rates went up by 8.57% and 2.49%, respectively. Both countries, in the 2004-2010 periods, had negative employment growth rates, which can indicate some signs of recovery. This decrease it also affected graduates, where the employment growth rates in all countries decelerate significantly, except Denmark. It seems that Greece has been affected most by this crisis, as it experienced a big fall in the total employment rates (16.63%), where none of the rates corresponding to each educational level remained positive. Additionally, there are still differences between educational levels, as graduates' experienced a decrease of only 2.41%, compared to the intermediate (15.84%) and the lower level (32.99%). Finally, from 2010 onwards it seems that people with intermediate educational level as well as graduates, are also starting to experience the negative effects of a prolonged economic crisis.

Figure B.5: Percentage Changes in the Employment Composition by Educational Level (All Age Groups in Employment)

GEO/ TIME	2004-2010				2010-2012			
	Total %	ISCED 0-2 %	ISCED 3-4 %	ISCED 5-6 %	Total %	ISCED 0-2 %	ISCED 3-4 %	ISCED 5-6 %
EU-27	4.32	-15.32	5.42	19.35	0.10	-8.45	-0.54	6.52
BE	7.68	-17.04	10.30	17.80	0.78	-5.45	1.87	2.70
CZ	4.15	-25.87	0.55	27.08	0.10	-13.90	-2.45	12.12
DE	8.45	3.86	12.79	14.21	3.35	-3.02	2.07	8.14
DK	-1.33	17.34	-17.48	-1.26	-0.65	-12.88	0.77	3.95
EE	-4.26	-26.29	-11.14	9.78	8.57	10.08	7.70	9.47
ES	3.20	-18.43	14.73	18.89	-6.80	-14.33	-7.60	0.70
FI	2.59	-27.34	3.45	12.82	1.44	-8.53	2.33	3.70
FR	4.52	-17.90	4.10	20.41	0.40	-6.06	-1.50	6.65
GB	2.35	-34.80	1.52	20.51	1.65	-5.99	-2.25	8.58
GR	1.32	-4.90	-2.79	14.66	-16.63	-32.99	-15.84	-2.41
HU	-2.99	-29.02	-4.26	12.62	2.49	-3.46	0.43	9.86
IE	2.44	-44.49	-4.92	26.95	-2.42	-13.94	-2.93	4.97
NL	3.21	-2.56	1.70	11.06	0.64	-3.09	-0.09	3.41

NO	9.10	44.12	-16.04	19.43	3.27	-1.48	1.74	6.94
PL	11.57	-31.39	6.22	36.41	0.75	-9.86	-1.80	8.71
PT	-2.94	-15.43	23.37	17.21	-7.41	-19.64	7.74	11.99
SE	4.71	6.34	-5.75	21.06	2.86	-3.55	1.78	7.21
SI	2.09	-21.80	-2.29	24.52	-4.57	-27.50	-6.68	8.16
SK	7.28	-22.38	2.74	30.27	0.49	-4.45	-1.04	6.69

Source: Eurostat (Author's calculations)

The same pattern becomes apparent in Tables B.6 and B.7, where employees of all ages and from all educational levels are furthermore split by ISCO-88 occupational categories. Table B.6 illustrates the percentage difference, for 2004 to 2010, of employees with different educational attainment and occupational ISCO-88 category. The results show that there are big differences between the period examined, especially in countries where activity, unemployment and employment rates deteriorated in 2010. Ireland had the highest decrease in low educated people in managerial occupations (-168.61%), followed by Portugal (-59.25%). The rest of the countries are very close to the EU-27 percentage (-19.91%), which is also high. This means that in 2010 the number of low educated managers was lower by approximately one fifth, compared with 2004.

Figure B.6: Percentage Changes in the Employment Composition by Level of Education and Occupational Category (2004-2010, All Age Groups in Employment)

2004-2010	ISCED 0-2				ISCED 3-4				ISCED 5-6			
GEO/ TIME	ISCO 1-3 %	ISCO 4-5 %	ISCO 6-7 %	ISCO 8-9 %	ISCO 1-3 %	ISCO 4-5 %	ISCO 6-7 %	ISCO 8-9 %	ISCO 1-3 %	ISCO 4-5 %	ISCO 6-7 %	ISCO 8-9 %
EU-27	-19.91	-8.39	-23.32	-12.50	2.95	8.13	-0.78	11.19	0.75	8.39	-6.17	-7.17
BE	-8.29	-8.53	-34.33	-14.63	13.45	4.50	13.15	14.50	-1.17	3.17	4.56	-0.63
CZ	No data	-14.98	-38.60	-24.00	2.42	3.27	-7.98	3.34	-9.00	17.37	0.76	-5.24
DE	-2.55	9.11	-4.27	7.31	15.45	12.67	5.82	15.63	2.88	14.79	-5.25	0.08
DK	48.53	29.68	16.38	-9.92	0.79	-6.70	-55.94	-44.99	-0.96	1.21	-3.10	-1.44
EE	No data	No data	No data	-38.20	-8.85	1.69	-22.90	-16.35	6.36	13.46	23.54	-2.79
ES	-13.96	5.31	-51.38	-15.78	13.12	17.89	5.55	17.34	-15.16	12.28	-14.87	-18.01
FI	-22.17	-24.85	-24.68	-35.67	7.47	5.03	-3.25	2.41	-3.93	15.65	0.83	-7.06
FR	-22.51	-12.09	-26.68	-14.65	8.14	1.87	-3.02	11.06	6.84	7.99	-28.32	-8.32
GB	-19.33	-46.31	-26.21	-36.27	-3.22	5.66	-6.10	5.52	9.63	-3.11	0.45	-13.98
GR	-6.23	-3.12	-10.38	4.33	-3.68	-1.81	-13.80	8.33	-28.26	5.90	-22.18	-32.96
HU	No data	-25.41	-46.65	-25.00	-13.14	2.52	-14.46	8.62	3.19	0.13	-4.66	10.39
IE	-168.61	-16.10	-17.98	-44.18	-38.28	7.23	0.33	-3.40	1.53	-11.19	1.63	0.46
NL	0.52	-4.98	-8.11	-1.67	-0.43	5.91	-1.44	-2.14	-5.42	10.67	15.13	-10.51
NO	42.14	53.73	31.52	34.16	-19.23	-10.14	-15.34	-30.16	5.80	-5.83	-1.92	-8.06
PL	No data	-4.03	-48.72	-11.45	-3.35	6.65	3.44	18.25	1.97	6.27	-3.99	-1.02
PT	-59.25	-6.70	-12.73	-11.37	2.24	22.02	No data	47.38	11.71	-11.63	-25.27	-11.04
SE	-1.15	20.78	-7.09	1.46	-4.30	-13.70	4.48	-2.22	5.45	2.85	6.92	-14.22
SI	No data	7.14	-47.22	-12.60	4.95	1.34	-27.57	7.70	-3.58	-4.19	11.44	-23.66
SK	No data	-15.17	No data	-8.51	-1.44	8.34	-8.15	10.28	-13.13	18.20	6.69	-3.70

In the period between 2010 and 2012, the situation deteriorates even more. Greece experienced a negative employment growth in all educational levels and occupational categories, except ISCO 4-5 and ISCO 6-7, where growth rates were relatively high. In these occupational categories a higher degree is not usually an essential job requirement. Thus, an overqualification pattern, in times where job creation rate is very low, can be implied. This is a situation where high educated individuals compete for the same jobs with their lower educated counterparts and therefore, employers could benefit from hiring graduates instead, underpaying them since remuneration remains in the same level as it used to be for the low educated individuals. As a result, the low educated are gradually displaced from the labour market, ending up in unemployment or even in long-term unemployment. However, this scenario, which is highly possible to have happened in Greece, it can be inferred for the majority of all other countries examined here, except Denmark and Germany, where the same occupational categories are composed by more graduates. Hence, it is not clear whether this is the result of an occupational up-skilling or of an overqualification process, where graduates are forced to apply for jobs incommensurable to their skills. Usually, job up-skilling requires an increase in the labour cost, which in the case of Greece and probably Ireland is highly unlikely, due to the economic predicament they were in, during the economic crisis.

Figure B.7: Percentage Changes in the Employment Composition by Level of Education and Occupational Category (2010-2012, All Age Groups in Employment)

2010-2012	ISCED 0-2				ISCED 3-4				ISCED 5-6			
GEO/ TIME	ISCO 1-3 %	ISCO 4-5 %	ISCO 6-7 %	ISCO 8-9 %	ISCO 1-3 %	ISCO 4-5 %	ISCO 6-7 %	ISCO 8-9 %	ISCO 1-3 %	ISCO 4-5 %	ISCO 6-7 %	ISCO 8-9 %
EU-27	-21.93	3.93	-14.12	-8.63	-5.88	8.06	-1.30	-6.31	3.72	-2.69	13.18	-1.79
BE	-40.27	-6.32	-0.21	1.68	-8.12	9.26	6.29	-2.88	-1.17	3.17	4.56	-0.63
CZ	No data	-9.06	-12.08	-17.29	-24.87	15.24	0.85	-3.52	7.42	52.36	20.22	0.00
DE	-19.10	4.83	-6.04	4.81	-7.79	15.50	2.95	-2.87	12.22	20.71	-77.72	-14.55
DK	-19.21	-10.56	-18.52	-10.71	-11.35	4.46	7.77	8.08	5.53	13.89	-123.53	-26.70
EE	No data	-18.18	36.00	-3.10	8.13	10.00	18.96	-2.89	5.09	28.28	31.37	-1.18
ES	-89.90	10.28	-20.78	-18.04	-36.84	10.29	-12.88	-17.38	-3.78	17.27	1.77	-19.28
FI	-47.37	13.43	-13.03	-9.25	-11.97	14.63	3.77	-5.21	1.18	20.31	9.23	-17.50
FR	0.07	6.84	-36.26	-5.70	7.29	6.18	-25.42	-7.98	7.49	14.55	-21.94	-37.23
GB	7.99	-10.20	8.39	-17.13	8.94	-4.63	-3.63	-15.38	9.79	5.33	4.28	3.52
GR	-168.40	8.45	-31.58	-47.80	-67.17	-0.97	-8.36	-17.82	-8.51	24.26	8.41	-15.63
HU	No data	-14.83	-15.01	4.95	-3.82	-1.60	-4.17	11.79	8.06	20.73	19.25	46.82
IE	-21.90	-17.76	-10.80	-8.88	-1.37	-11.52	2.93	9.42	4.56	-3.24	26.34	19.57
NL	-17.76	4.52	11.79	-11.96	-15.69	13.12	13.83	-11.01	1.46	12.34	39.49	2.79
NO	19.13	-3.08	-1.62	-12.96	21.29	-10.85	-3.35	-7.68	-2.41	7.45	5.73	18.48
PL	No data	6.09	-15.50	-5.11	-8.82	4.13	-2.91	-1.37	7.20	14.87	14.91	23.13
PT	2.06	-24.07	-27.99	-13.93	15.52	4.32	-1.64	4.56	13.80	-2.81	No data	No data
SE	2.16	0.87	-4.28	-12.94	5.82	0.89	9.16	-16.80	5.57	14.58	20.57	-1.43
SI	No data	-32.08	-7.32	-41.92	-19.14	-6.86	15.91	-16.91	5.62	28.57	27.42	36.11
SK	No data	No data	No data	-1.70	-27.22	14.92	6.08	-4.39	-0.95	50.00	No data	No data

APPENDIX C

DESCRIPTIVES- CHAPTER 3

Table C.1: ESS Descriptive Statistics of All Independent Variables for 2004 (Chapter 3)

GEO 2004	Statistics	Employment Status	Years of Education	Years of Working Experience	Long-Term Unem.	Course Attended	Co-habitation	Health Condition
BE	mean	0.91	0.67	20.71	0.18	0.33	0.76	0.23
	N	818	1245	1181	1249	1249	1249	1249
	sd	0.29	4.06	11.40	0.38	0.47	0.43	0.51
CZ	mean	0.91	3.49	24.09	0.09	0.23	0.75	0.34
	N	1374	2122	1722	2179	2032	2193	2163
	sd	0.28	2.25	11.99	0.28	0.42	0.43	0.57
DE	mean	0.87	0.45	23.15	0.18	0.32	0.74	0.29
	N	1349	2036	1869	2065	2062	2060	2061
	sd	0.34	3.33	11.72	0.39	0.47	0.44	0.54
DK	mean	0.92	4.94	23.89	0.15	0.56	0.77	0.26
	N	820	1096	1003	1095	1095	1099	1095
	sd	0.27	3.55	11.26	0.36	0.50	0.42	0.53
EE	mean	0.92	3.75	24.13	0.15	0.29	0.68	0.33
	N	965	1317	1262	1319	1315	1316	1319
	sd	0.28	3.23	11.67	0.35	0.46	0.47	0.63
ES	mean	0.93	0.74	17.83	0.15	0.26	0.73	0.16

	N	818	1126	933	1140	1140	1142	1143
	sd	0.26	5.56	11.64	0.36	0.44	0.44	0.45
FI	mean	0.91	3.22	23.37	0.18	0.52	0.74	0.36
	N	1051	1429	1376	1430	1431	1431	1431
	sd	0.29	3.94	11.87	0.39	0.50	0.44	0.60
FR	mean	0.92	1.02	22.34	0.19	0.31	0.80	0.24
	N	912	1302	1258	1326	1326	1325	1326
	sd	0.27	4.05	12.20	0.39	0.46	0.40	0.53
GB	mean	0.94	0.42	22.21	0.11	0.39	0.73	0.30
	N	876	1336	1211	1341	1341	1343	1342
	sd	0.24	3.04	11.14	0.31	0.49	0.44	0.59
GR	mean	0.86	1.35	20.09	0.14	0.09	0.78	0.16
	N	977	1660	1315	1660	1655	1660	1657
	sd	0.35	4.47	11.98	0.35	0.28	0.41	0.44
HU	mean	0.94	2.23	24.05	0.09	0.28	0.71	0.33
	N	661	1082	1030	1080	1081	1069	1083
	sd	0.24	2.94	11.89	0.29	0.45	0.45	0.62
IE	mean	0.97	2.72	20.70	0.07	0.31	0.76	0.18
	N	1024	1650	1446	1667	1675	1686	1645
	sd	0.18	3.46	12.05	0.26	0.46	0.43	0.45
NL	mean	0.95	-0.32	21.09	0.10	0.42	0.81	0.31
	N	896	1458	1376	1460	1455	1461	1462
	sd	0.23	3.64	11.49	0.30	0.49	0.39	0.58
NO	mean	0.95	2.72	22.11	0.06	0.55	0.77	0.32
	N	1039	1333	1276	1333	1333	1334	1334
	sd	0.21	3.61	11.13	0.24	0.50	0.42	0.57
PL	mean	0.86	2.85	20.62	0.27	0.22	0.78	0.34
	N	752	1154	1084	1154	1153	1156	1151
	sd	0.34	3.14	10.97	0.45	0.42	0.42	0.60

	mean	0.88	-1.75	22.09	0.11	0.11	0.78	0.20
PT	**N**	882	1385	855	1389	1390	1390	1390
	sd	0.33	4.58	11.89	0.31	0.32	0.41	0.48
	mean	0.94	2.73	23.60	0.10	0.57	0.74	0.34
SE	**N**	1104	1367	1291	1365	1363	1367	1368
	sd	0.24	3.31	11.55	0.30	0.50	0.44	0.59
	mean	0.92	2.77	22.74	0.15	0.43	0.76	0.39
SI	**N**	615	963	876	965	960	922	961
	sd	0.28	3.36	11.09	0.35	0.50	0.43	0.62
	mean	0.84	3.38	22.49	0.18	0.33	0.75	0.25
SK	**N**	723	994	887	1013	1012	953	1012
	sd	0.36	3.02	11.48	0.39	0.47	0.43	0.51
	mean	0.91	1.93	22.20	0.14	0.34	0.75	0.28
Total	**N**	17656	26055	23251	26230	26068	26156	26192
	sd	0.28	4.01	11.71	0.35	0.47	0.43	0.55

Source: ESS Round 2 (Author's calculations)

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Table C.2: ESS Descriptive Statistics of All Independent Variables for 2010 (Chapter 3)

GEO 2010	Statistics	Employment Status	Years of Education	Years of working Experience	Long-Term Unem.	Course Attended	Co-habitation	Health Condition
	mean	0.91	1.10	21.96	0.16	0.39	0.77	0.27
BE	N	828	1171	1135	1189	1189	1189	1189
	sd	0.28	3.76	11.87	0.37	0.49	0.42	0.55
	mean	0.92	3.89	23.12	0.08	0.16	0.71	0.30
CZ	N	1228	1794	1631	1826	1822	1835	1827
	sd	0.27	2.34	11.96	0.27	0.37	0.45	0.54
	mean	0.93	0.81	23.27	0.15	0.36	0.72	0.34
DE	N	1471	2102	1984	2105	2105	2109	2108
	sd	0.25	3.56	12.05	0.36	0.48	0.45	0.58
	mean	0.94	5.08	25.65	0.14	0.54	0.78	0.30
DK	N	819	1119	1038	1129	1129	1130	1129
	sd	0.23	4.58	11.68	0.34	0.50	0.41	0.57
	mean	0.89	4.29	24.13	0.19	0.36	0.69	0.30
EE	N	865	1186	1113	1188	1185	1188	1185
	sd	0.31	3.21	12.04	0.40	0.48	0.46	0.58
	mean	0.82	2.17	18.46	0.20	0.27	0.71	0.15
ES	N	1033	1335	1212	1357	1361	1362	1362
	sd	0.39	5.28	11.43	0.40	0.44	0.45	0.43
	mean	0.91	3.93	23.93	0.17	0.52	0.71	0.40
FI	N	904	1304	1265	1305	1307	1309	1308
	sd	0.28	4.01	12.50	0.38	0.50	0.45	0.63
FR	mean	0.91	2.00	23.16	0.18	0.32	0.75	0.26

	N	879	1240	1211	1241	1242	1242	1242
	sd	0.29	3.84	12.35	0.38	0.47	0.43	0.54
GB	**mean**	0.92	1.45	23.29	0.10	0.34	0.74	0.30
	N	1148	1692	1571	1703	1696	1704	1702
	sd	0.28	3.58	12.15	0.30	0.47	0.44	0.59
GR	**mean**	0.81	2.75	19.03	0.20	0.07	0.74	0.12
	N	1207	1868	1525	1881	1883	1884	1866
	sd	0.39	3.99	11.17	0.40	0.26	0.44	0.40
HU	**mean**	0.90	3.10	24.28	0.18	0.19	0.69	0.36
	N	751	1132	1076	1127	1132	1131	1132
	sd	0.30	3.76	12.21	0.38	0.39	0.46	0.63
IE	**mean**	0.76	4.11	18.04	0.19	0.20	0.68	0.16
	N	1153	1798	1734	1811	1811	1805	1811
	sd	0.43	3.49	11.69	0.40	0.40	0.47	0.44
NL	**mean**	0.96	0.78	22.37	0.08	0.42	0.80	0.33
	N	903	1374	1323	1394	1390	1394	1389
	sd	0.20	4.03	11.37	0.26	0.49	0.40	0.59
NO	**mean**	0.95	3.27	22.63	0.08	0.54	0.76	0.31
	N	898	1123	1070	1127	1126	1126	1126
	sd	0.22	3.64	11.82	0.27	0.50	0.43	0.57
PL	**mean**	0.90	4.02	21.42	0.18	0.21	0.75	0.30
	N	807	1168	1105	1166	1167	1170	1164
	sd	0.30	3.43	11.48	0.39	0.41	0.43	0.55
PT	**mean**	0.79	-1.23	22.58	0.20	0.08	0.75	0.18
	N	909	1356	1159	1403	1406	1406	1404
	sd	0.41	4.60	12.83	0.40	0.28	0.43	0.47

SE	**mean**	0.95	3.44	23.82	0.10	0.53	0.73	0.31
	N	806	1031	954	1027	1030	1031	1031
	sd	0.23	3.53	12.19	0.31	0.50	0.45	0.57
SI	**mean**	0.89	3.33	23.29	0.16	0.32	0.72	0.37
	N	644	986	953	986	987	991	990
	sd	0.32	3.63	11.97	0.37	0.47	0.45	0.64
SK	**mean**	0.91	4.67	24.54	0.12	0.25	0.74	0.30
	N	845	1374	1291	1380	1382	1374	1374
	sd	0.28	3.00	11.95	0.33	0.43	0.44	0.57
Total	**mean**	0.89	2.75	22.49	0.15	0.32	0.73	0.28
	N	18098	26153	24350	26345	26350	26380	26339
	sd	0.31	4.09	12.09	0.36	0.47	0.44	0.56

Source: ESS Round 5 (Author's calculations)

Figure C.1: Proportion of People Employed in 2004 and 2010
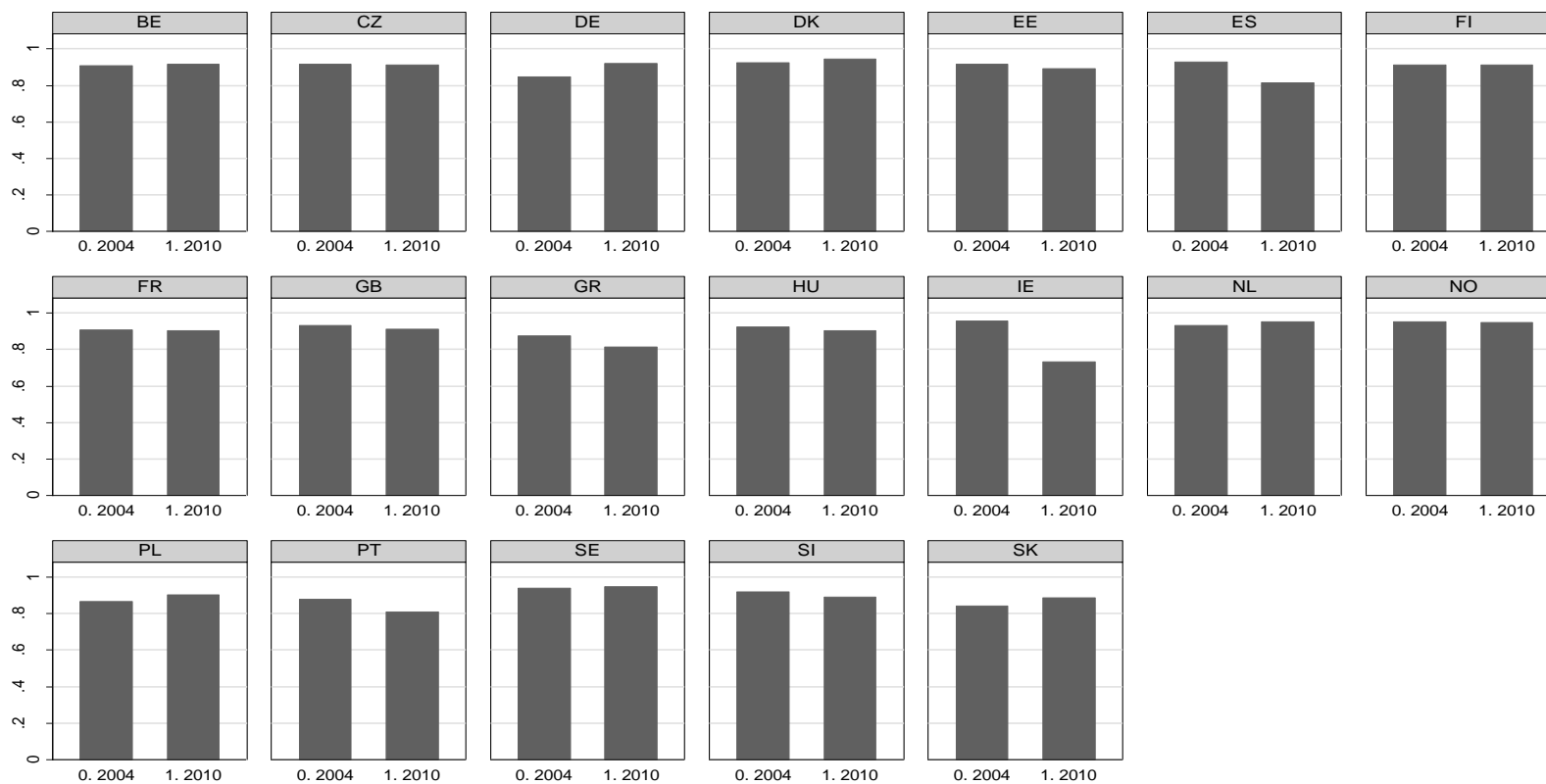
Graphs by state

Figure C.2: Proportion of People Employed in the ESS sample. (2004 and 2010)
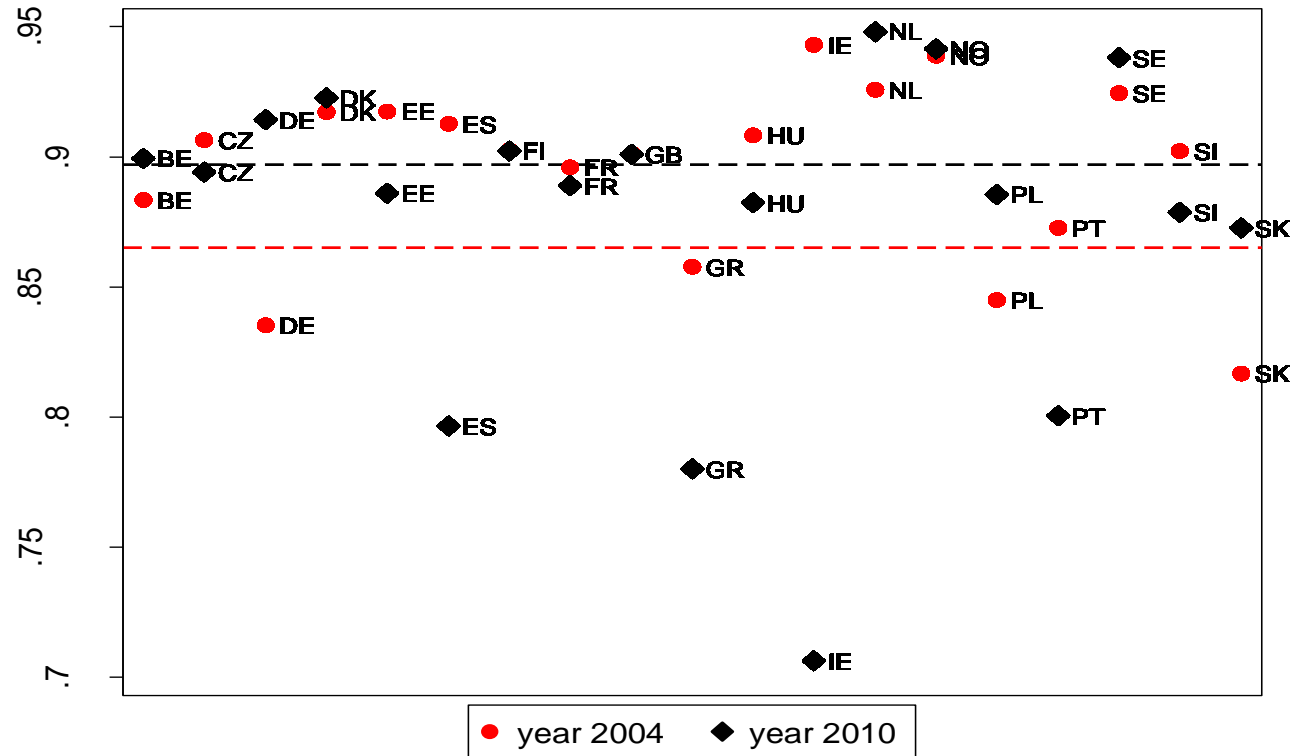
Note: The red dashed line represents the mean in all countries for 2004 and the black for 2010

Source: ESS Rounds 2 and 5 (Author's calculations)

Table C.3: Goodness-of-fit Measures for Model 1, 2 and 3 (Chapter 3)

	Model 1	**Model 2**	**Model 3**
Log-Lik Intercept Only:	-5170.162	-2957.267	-3963.496
Log-Lik Full Model:	6938.554	-2253.144	-2890.942
D(32217):	10340.323	4506.289	5781.884
LR(6):	35367.84	1408.246	2145.108
Prob > LR:	0.000	0.000	0.000
McFadden's R2:	0.255	0.238	0.271
McFadden's Adj R2:	0.245	0.222	0.259
Maximum Likelihood R2:	0.104	0.086	0.121
Cragg & Uhler's R2:	0.297	0.274	0.319
McKelvey and Zavoina's R2:	0.284	0.274	0.309
Efron's R2:	.	.	.
Variance of y*:	4.597	4.530	4.759
Variance of error:	3.290	3.290	3.290
CountR2:	.	.	.
Adj Count R2	.	.	.
AIC:	0.324	0.295	0.352
AIC*n	10476.323	4600.289	5875.884
BIC:	324148.105	-14562.378	-156009.326
BIC':	-3474.490	-1359.972	-2096.496

Note: (Efron's R2, Count R2, and Adj Count R2 cannot be calculated if pweight is used)
Source: ESS Rounds 2 and 5 (Author's calculations)

DESCRIPTIVES- CHAPTER 4

Table C.4: ESS Descriptive Statistics of All Independent Variables For 2004 (Chapter 4)

GEO 2004	Statistics	Job Quality	Years of Education	Wage	Gender	Long-Term Unem.	Course Attended	Co-habitation	Health Condition
	Mean	0.77	1.57	24.09	0.43	0.11	0.47	0.76	0.11
BE	N	643	760	372	762	762	762	762	762
	sd	0.42	3.93	12.58	0.50	0.32	0.50	0.43	0.33
	Mean	0.59	3.90	4.74	0.47	0.05	0.32	0.76	0.19
CZ	N	1038	1242	551	1282	1278	1187	1282	1265
	sd	0.49	2.26	2.10	0.50	0.23	0.47	0.43	0.44
	Mean	0.65	1.11	25.41	0.45	0.10	0.44	0.73	0.17
DE	N	985	1144	586	1158	1158	1157	1153	1155
	sd	0.48	3.15	14.26	0.50	0.30	0.50	0.45	0.41
	Mean	0.81	5.58	36.58	0.49	0.11	0.69	0.81	0.14
DK	N	673	764	613	766	764	765	766	764
	sd	0.39	3.25	14.04	0.50	0.31	0.46	0.39	0.38
	Mean	0.65	4.32	4.21	0.56	0.11	0.40	0.71	0.17
EE	N	810	908	445	910	910	907	909	910
	sd	0.48	2.99	4.47	0.50	0.31	0.49	0.45	0.43
	Mean	0.58	2.08	14.97	0.40	0.15	0.34	0.70	0.08
ES	N	616	770	332	776	775	773	774	776
	sd	0.49	5.36	11.56	0.49	0.35	0.47	0.46	0.31
FI	Mean	0.84	3.93	24.91	0.50	0.11	0.67	0.77	0.24

	N	824	974	743	974	974	974	974	974
	sd	0.36	3.76	12.57	0.50	0.31	0.47	0.42	0.48
	Mean	0.61	1.77	20.74	0.50	0.15	0.42	0.82	0.14
FR	N	737	832	570	842	842	842	841	842
	sd	0.49	3.83	17.49	0.50	0.36	0.49	0.38	0.39
	Mean	0.75	0.83	25.64	0.45	0.07	0.47	0.78	0.14
GB	N	702	833	535	837	835	836	837	837
	sd	0.44	3.10	21.81	0.50	0.25	0.50	0.42	0.39
	Mean	0.63	2.58	14.31	0.41	0.09	0.15	0.74	0.06
GR	N	556	879	194	879	879	878	879	877
	sd	0.48	4.43	9.63	0.49	0.29	0.35	0.44	0.27
	Mean	0.70	2.87	5.58	0.55	0.07	0.38	0.73	0.12
HU	N	535	622	403	624	622	622	615	624
	sd	0.46	2.69	4.65	0.50	0.26	0.49	0.45	0.35
	Mean	0.78	3.40	25.82	0.47	0.06	0.41	0.70	0.09
IE	N	800	989	524	1009	998	1003	1009	980
	sd	0.42	3.55	16.63	0.50	0.23	0.49	0.46	0.32
	Mean	0.79	0.45	26.47	0.45	0.08	0.57	0.81	0.19
NL	N	733	842	517	844	843	842	844	844
	sd	0.41	3.45	17.11	0.50	0.27	0.49	0.39	0.45
	Mean	0.83	3.09	34.44	0.45	0.04	0.66	0.78	0.21
NO	N	869	1003	845	1003	1002	1002	1003	1003
	sd	0.37	3.45	17.15	0.50	0.19	0.47	0.42	0.46
	Mean	0.55	3.83	4.48	0.44	0.24	0.36	0.81	0.17
PL	N	522	676	403	677	675	676	677	672

	sd	0.50	3.03	3.80	0.50	0.43	0.48	0.40	0.41
PT	**Mean**	0.44	-0.28	8.82	0.50	0.08	0.17	0.78	0.08
	N	624	794	219	798	795	796	797	794
	sd	0.50	4.55	8.56	0.50	0.26	0.38	0.42	0.29
SE	**Mean**	0.79	3.15	25.91	0.46	0.06	0.68	0.77	0.25
	N	919	1056	879	1056	1055	1055	1056	1056
	sd	0.41	3.15	11.07	0.50	0.24	0.47	0.42	0.51
SI	**Mean**	0.74	3.37	9.83	0.48	0.11	0.55	0.78	0.27
	N	505	568	279	555	570	567	542	566
	sd	0.44	3.11	5.48	0.50	0.31	0.50	0.41	0.53
SK	**Mean**	0.45	3.97	3.74	0.43	0.12	0.45	0.79	0.12
	N	522	611	304	621	622	620	585	620
	sd	0.50	2.93	1.94	0.50	0.32	0.50	0.41	0.35
Total	**Mean**	0.69	2.73	20.99	0.47	0.10	0.46	0.76	0.16
	N	13613	16267	9314	16373	16359	16264	16305	16321
	sd	0.46	3.83	16.90	0.50	0.30	0.50	0.43	0.41

Source: ESS Round 2 (Author's calculations)

**Table C.5: ESS Descriptive Statistics of all Independent Variables for 2010 (Chapter 4)**

GEO 2010	Statistics	Job Quality	Years of Education	Wage	Gender	Long-Term Unem.	Course Attended	Co-habitation	Health Condition
	Mean	0.77	1.77	28.61	0.49	0.10	0.54	0.77	0.15
BE	N	663	767	493	774	774	774	774	774
	sd	0.42	3.69	16.37	0.50	0.30	0.50	0.42	0.38
	Mean	0.49	4.15	8.62	0.45	0.04	0.22	0.72	0.17
CZ	N	938	1112	581	1134	1132	1126	1134	1130
	sd	0.50	2.32	4.57	0.50	0.20	0.42	0.45	0.41
	Mean	0.73	1.26	28.42	0.43	0.10	0.49	0.73	0.25
DE	N	1198	1367	978	1371	1371	1370	1371	1370
	sd	0.44	3.46	19.73	0.50	0.30	0.50	0.45	0.50
	Mean	0.81	5.57	45.23	0.46	0.11	0.70	0.82	0.20
DK	N	684	774	693	778	777	778	778	777
	sd	0.39	4.46	21.95	0.50	0.31	0.46	0.38	0.44
	Mean	0.82	4.73	7.60	0.55	0.11	0.48	0.70	0.17
EE	N	704	791	533	792	792	790	792	792
	sd	0.39	3.13	7.07	0.50	0.32	0.50	0.46	0.44
	Mean	0.59	3.49	18.72	0.44	0.14	0.36	0.70	0.06
ES	N	660	840	566	855	855	854	855	855
	sd	0.49	5.10	13.51	0.50	0.35	0.48	0.46	0.27
	Mean	0.81	4.77	31.16	0.47	0.11	0.66	0.75	0.26
FI	N	687	836	728	837	835	836	837	836
	sd	0.39	3.78	17.49	0.50	0.31	0.47	0.44	0.49

	Mean	0.62	2.61	21.36	0.51	0.13	0.43	0.76	0.19
FR	N	717	805	698	806	806	806	806	806
	sd	0.49	3.64	13.35	0.50	0.34	0.50	0.43	0.46
	Mean	0.71	1.89	25.36	0.51	0.05	0.46	0.76	0.15
GB	N	888	1065	776	1072	1072	1066	1072	1070
	sd	0.45	3.59	20.68	0.50	0.21	0.50	0.43	0.40
	Mean	0.55	3.81	11.79	0.48	0.11	0.11	0.68	0.07
GR	N	651	994	526	1000	999	1000	1000	994
	sd	0.50	3.79	8.32	0.50	0.31	0.31	0.47	0.31
	Mean	0.61	3.75	5.59	0.49	0.13	0.30	0.70	0.16
HU	N	595	690	480	690	688	690	690	690
	sd	0.49	3.55	3.38	0.50	0.33	0.46	0.46	0.41
	Mean	0.62	5.09	26.73	0.49	0.06	0.28	0.68	0.08
IE	N	696	868	500	871	870	870	870	870
	sd	0.49	3.39	18.24	0.50	0.23	0.45	0.47	0.30
	Mean	0.81	1.55	29.12	0.49	0.05	0.57	0.82	0.19
NL	N	734	867	562	873	873	873	873	871
	sd	0.39	3.91	17.26	0.50	0.22	0.50	0.38	0.43
	Mean	0.90	3.70	48.02	0.45	0.06	0.64	0.77	0.20
NO	N	790	861	824	862	862	862	862	861
	sd	0.30	3.51	21.14	0.50	0.23	0.48	0.42	0.46
	Mean	0.65	4.93	7.89	0.44	0.14	0.30	0.77	0.16
PL	N	612	759	492	761	759	759	761	756
	sd	0.48	3.28	6.69	0.50	0.35	0.46	0.42	0.39
PT	Mean	0.25	0.17	7.85	0.52	0.10	0.13	0.74	0.08

	N	611	730	260	751	748	751	751	750
	sd	0.43	4.57	4.81	0.50	0.30	0.34	0.44	0.30
SE	**Mean**	0.81	3.93	31.01	0.50	0.09	0.66	0.75	0.22
	N	653	772	731	772	770	772	772	772
	sd	0.40	3.31	13.76	0.50	0.28	0.47	0.44	0.47
SI	**Mean**	0.74	4.26	14.50	0.48	0.10	0.44	0.72	0.20
	N	500	579	329	581	578	578	581	580
	sd	0.44	3.54	8.89	0.50	0.31	0.50	0.45	0.47
SK	**Mean**	0.47	5.17	7.44	0.51	0.07	0.35	0.73	0.17
	N	620	753	431	761	761	760	756	758
	sd	0.50	2.95	3.57	0.50	0.26	0.48	0.45	0.42
Total	**Mean**	0.69	3.47	24.60	0.48	0.09	0.44	0.74	0.17
	N	13601	16230	11181	16341	16322	16315	16335	16312
	sd	0.46	3.93	20.03	0.50	0.29	0.50	0.44	0.42

Source: ESS Round 5 (Author's calculations)

Figure C.3: Proportion of people with high quality job in 2004 and 2010
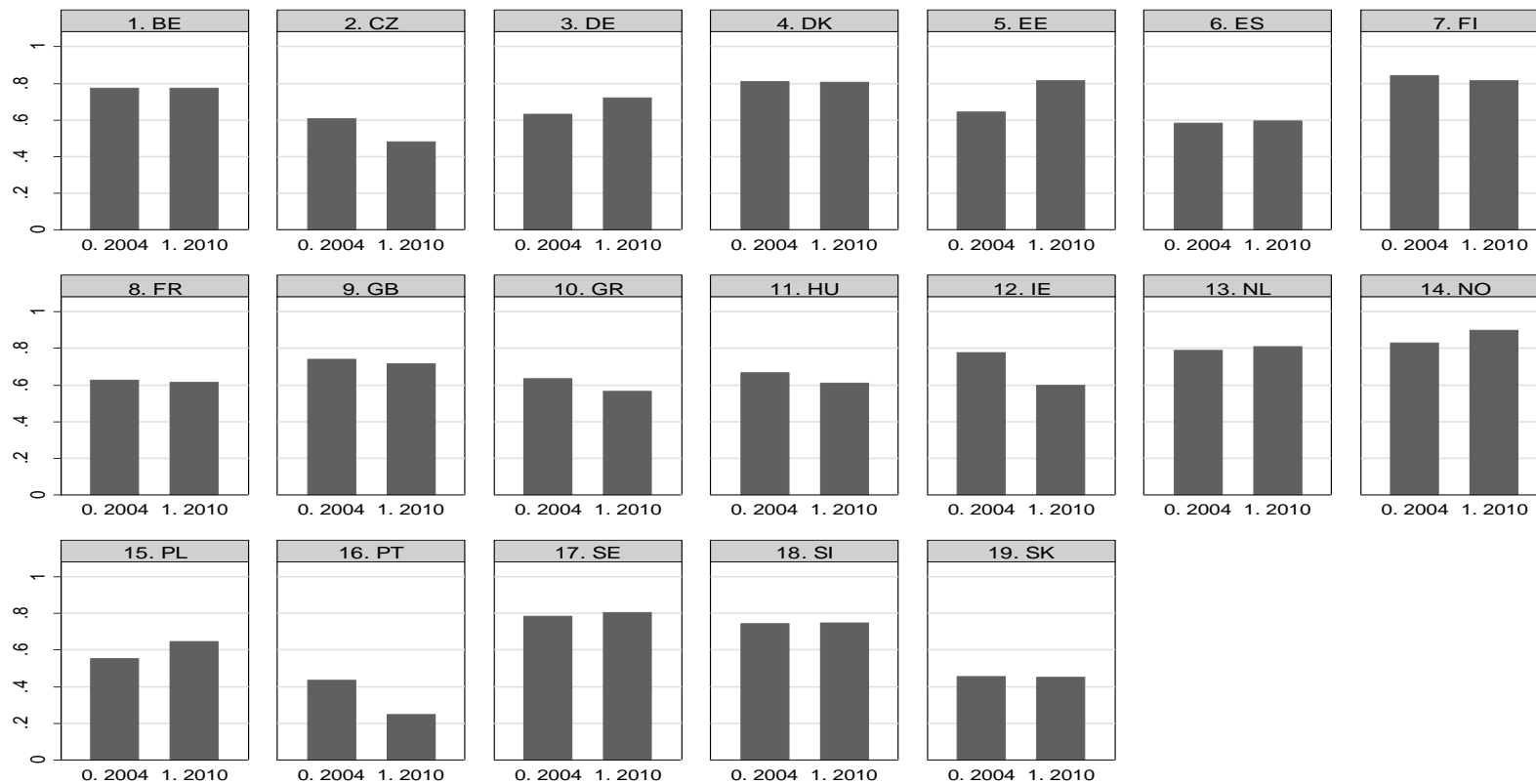
Graphs by state

Source: ESS Rounds 2 and 5 (Author's calculations)

Figure C.4: Proportion of People Having a High Quality Job in the ESS sample. (2004 and 2010)
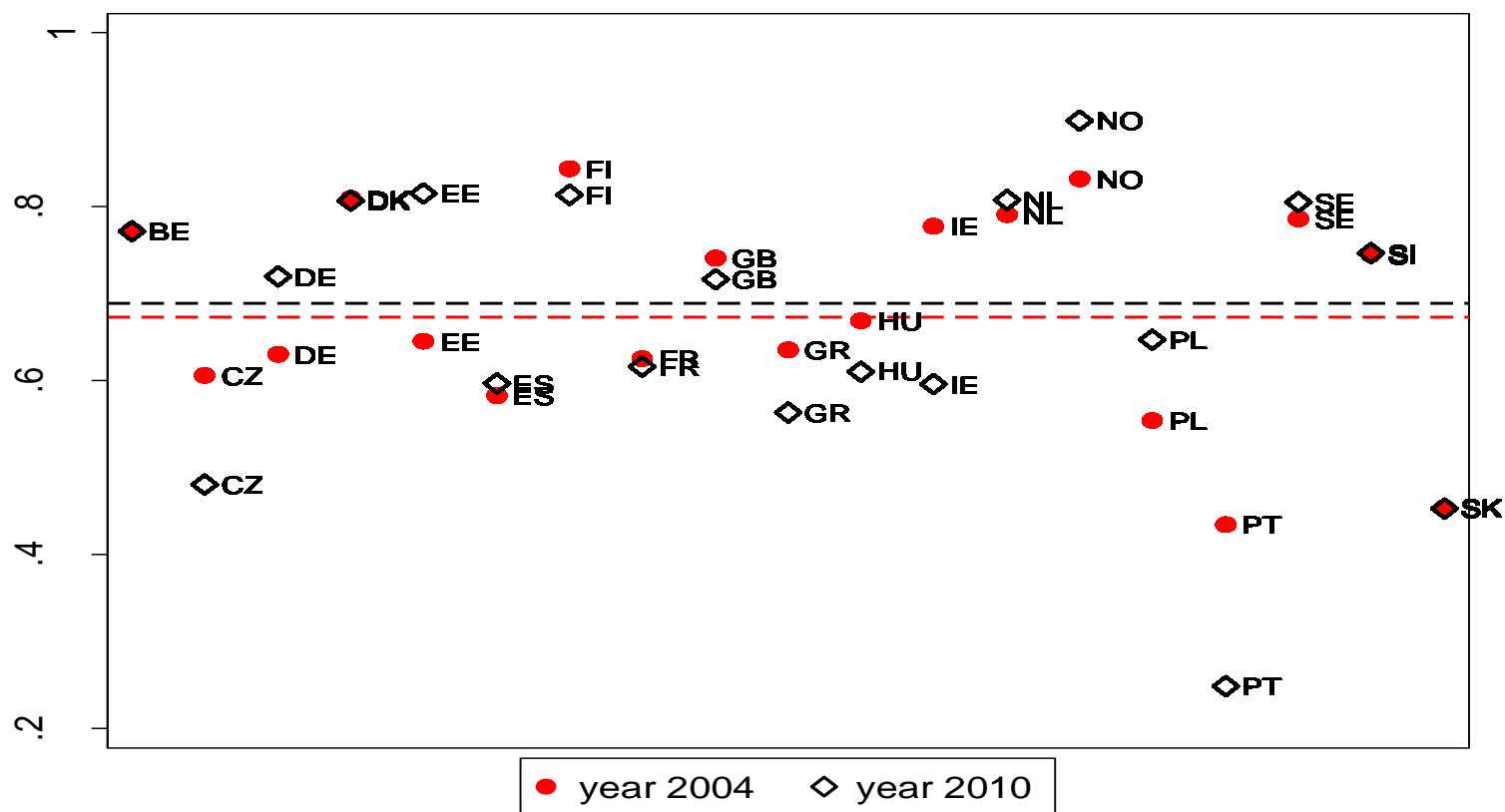
Source: ESS Rounds 2and 5 (Author's calculations)

* Note: The red dashed line represents the mean of the people with high quality jobs in all countries for 2004 and the black for 2010

Table C.6: Goodness-of-fit Measures for models 1.2 and 3 (Chapter 4)

	Model 1	Model 2	Model 3
Log-Lik Intercept Only:	-10020.081	-4634.969	-5381.688
Log-Lik Full Model:	-8855.527	-4116.453	-4690.693
D(32217):	17711.054	82.32.907	9381.386
LR(6):	2329.108	1037.031	13.81.989
Prob > LR:	0.000	0.000	0.000
McFadden's R2:	0.116	0.112	0.128
McFadden's Adj R2:	0.109	0.102	0.119
Maximum Likelihood R2:	0.115	0.107	0.131
Cragg & Uhler's R2:	0.177	0.168	0.197
McKelvey and Zavoina's R2:	0.185	0.176	0.208
Efron's R2:	.	.	.
Variance of y*:	4.035	3.992	4.153
Variance of error:	3.290	3.290	3.290
CountR2:	.	.	.
Adj Count R2	.	.	.
AIC:	0.938	0.910	0.960
AIC*n	17847.054	8328.907	9477.386
BIC:	-169147.020	-74791.070	-81005.017
BIC':	-2269.985	-973.180	-1317.605

Note: (Efron's R2, Count R2, and Adj Count R2 cannot be calculated if pweight is used)
Source: ESS Rounds 2and 5 (Author's calculations)

DESCRIPTIVES- CHAPTER 5

Table C.7: ESS Descriptive Statistics of All Independent Variables for 2004 (Chapter 5)

GEO 2004	Statistics	Log Wage	Years of Education	Gender	Years of Working Experience	Working Hours	Long-Term Unem.	Course Attended	Co-habitation	Health Condition	Job Quality
	Mean	7.67	1.57	0.43	19.37	2.66	0.11	0.47	0.76	0.11	0.77
BE	N	372	760	762	748	696	762	762	762	762	643
	sd	0.47	3.93	0.50	10.14	0.60	0.32	0.50	0.43	0.33	0.42
	Mean	6.07	3.90	0.47	21.41	2.94	0.05	0.32	0.76	0.19	0.59
CZ	N	551	1242	1282	1033	1208	1278	1187	1282	1265	1038
	sd	0.43	2.26	0.50	10.53	0.30	0.23	0.47	0.43	0.44	0.49
	Mean	7.66	1.11	0.45	22.22	2.64	0.10	0.44	0.73	0.17	0.65
DE	N	586	1144	1158	1085	1108	1158	1157	1153	1155	985
	sd	0.65	3.15	0.50	10.31	0.61	0.30	0.50	0.45	0.41	0.48
	Mean	8.13	5.58	0.49	23.66	2.78	0.11	0.69	0.81	0.14	0.81
DK	N	613	764	766	737	747	764	765	766	764	673
	sd	0.44	3.25	0.50	10.67	0.47	0.31	0.46	0.39	0.38	0.39
	Mean	5.80	4.32	0.56	22.26	2.88	0.11	0.40	0.71	0.17	0.65
EE	N	445	908	910	878	900	910	907	909	910	810
	sd	0.62	2.99	0.50	11.15	0.41	0.31	0.49	0.45	0.43	0.48
ES	Mean	7.15	2.08	0.40	17.79	2.79	0.15	0.34	0.70	0.08	0.58

	N	332	770	776	712	723	775	773	774	776	616
	sd	0.55	5.36	0.49	10.79	0.47	0.35	0.47	0.46	0.31	0.49
FI	**Mean**	7.72	3.93	0.50	21.89	2.88	0.11	0.67	0.77	0.24	0.84
	N	743	974	974	956	961	974	974	974	974	824
	sd	0.45	3.76	0.50	10.90	0.42	0.31	0.47	0.42	0.48	0.36
FR	**Mean**	7.45	1.77	0.50	20.45	2.33	0.15	0.42	0.82	0.14	0.61
	N	570	832	842	824	799	842	842	841	842	737
	sd	0.58	3.83	0.50	10.83	0.58	0.36	0.49	0.38	0.39	0.49
GB	**Mean**	7.54	0.83	0.45	22.05	2.56	0.07	0.47	0.78	0.14	0.75
	N	535	833	837	794	807	835	836	837	837	702
	sd	0.84	3.10	0.50	10.40	0.69	0.25	0.50	0.42	0.39	0.44
GR	**Mean**	7.15	2.58	0.41	19.26	2.79	0.09	0.15	0.74	0.06	0.63
	N	194	879	879	816	755	879	878	879	877	556
	sd	0.47	4.43	0.49	10.87	0.56	0.29	0.35	0.44	0.27	0.48
HU	**Mean**	6.14	2.87	0.55	22.29	2.90	0.07	0.38	0.73	0.12	0.70
	N	403	622	624	606	546	622	622	615	624	535
	sd	0.55	2.69	0.50	11.65	0.33	0.26	0.49	0.45	0.35	0.46
IE	**Mean**	7.67	3.40	0.47	21.51	2.64	0.06	0.41	0.70	0.09	0.78
	N	524	989	1009	912	940	998	1003	1009	980	800
	sd	0.65	3.55	0.50	11.66	0.66	0.23	0.49	0.46	0.32	0.42
NL	**Mean**	7.72	0.45	0.45	21.67	2.49	0.08	0.57	0.81	0.19	0.79
	N	517	842	844	831	792	843	842	844	844	733

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	sd	0.59	3.45	0.50	10.71	0.67	0.27	0.49	0.39	0.45	0.41
NO	**Mean**	8.05	3.09	0.45	22.28	2.72	0.04	0.66	0.78	0.21	0.83
	N	845	1003	1003	984	950	1002	1002	1003	1003	869
	sd	0.45	3.45	0.50	10.65	0.57	0.19	0.47	0.42	0.46	0.37
PL	**Mean**	5.93	3.83	0.44	18.30	2.90	0.24	0.36	0.81	0.17	0.55
	N	403	676	677	648	642	675	676	677	672	522
	sd	0.54	3.03	0.50	10.09	0.50	0.43	0.48	0.40	0.41	0.50
PT	**Mean**	6.58	-0.28	0.50	20.73	2.73	0.08	0.17	0.78	0.08	0.44
	N	219	794	798	592	707	795	796	797	794	624
	sd	0.56	4.55	0.50	11.24	0.50	0.26	0.38	0.42	0.29	0.50
SE	**Mean**	7.79	3.15	0.46	22.59	2.82	0.06	0.68	0.77	0.25	0.79
	N	879	1056	1056	1024	1019	1055	1055	1056	1056	919
	sd	0.38	3.15	0.50	11.19	0.44	0.24	0.47	0.42	0.51	0.41
SI	**Mean**	6.76	3.37	0.48	19.62	2.92	0.11	0.55	0.78	0.27	0.74
	N	279	568	555	541	438	570	567	542	566	505
	sd	0.51	3.11	0.50	9.80	0.35	0.31	0.50	0.41	0.53	0.44
SK	**Mean**	5.82	3.97	0.43	20.38	2.90	0.12	0.45	0.79	0.12	0.45
	N	304	611	621	559	578	622	620	585	620	522
	sd	0.44	2.93	0.50	10.21	0.41	0.32	0.50	0.41	0.35	0.50
Total	**Mean**	7.29	2.73	0.47	21.16	2.75	0.10	0.46	0.76	0.16	0.69
	N	9314	16267	16373	15280	15316	16359	16264	16305	16321	13613
	sd	0.94	3.83	0.50	10.84	0.54	0.30	0.50	0.43	0.41	0.46

Source: ESS Round 2 (Author's calculations)

Table C.8: ESS Descriptive Statistics of All Independent Variables for 2010 (Chapter 5)

GEO 2010	Statistics	Log Wage	Years of Education	Gender	Years of Working Experience	Working Hours	Long-Term Unem.	Course Attended	Co-habitation	Health Condition	Job Quality
	Mean	7.83	1.77	0.49	20.57	2.64	0.10	0.54	0.77	0.15	0.77
BE	N	493	767	774	767	725	774	774	774	774	663
	sd	0.50	3.69	0.50	10.84	0.59	0.30	0.50	0.42	0.38	0.42
	Mean	6.65	4.15	0.45	20.89	2.90	0.04	0.22	0.72	0.17	0.49
CZ	N	581	1112	1134	1058	1053	1132	1126	1134	1130	938
	sd	0.51	2.32	0.50	10.50	0.39	0.20	0.42	0.45	0.41	0.50
	Mean	7.71	1.26	0.43	23.21	2.60	0.10	0.49	0.73	0.25	0.73
DE	N	978	1367	1371	1343	1323	1371	1370	1371	1370	1198
	sd	0.75	3.46	0.50	10.78	0.61	0.30	0.50	0.45	0.50	0.44
	Mean	8.31	5.57	0.46	25.20	2.75	0.11	0.70	0.82	0.20	0.81
DK	N	693	774	778	748	734	777	778	778	777	684
	sd	0.48	4.46	0.50	10.54	0.51	0.31	0.46	0.38	0.44	0.39
	Mean	6.41	4.73	0.55	22.81	2.83	0.11	0.48	0.70	0.17	0.82
EE	N	533	791	792	763	776	792	790	792	792	704
	sd	0.64	3.13	0.50	11.21	0.45	0.32	0.50	0.46	0.44	0.39
	Mean	7.36	3.49	0.44	18.35	2.73	0.14	0.36	0.70	0.06	0.59
ES	N	566	840	855	825	791	855	854	855	855	660
	sd	0.60	5.10	0.50	10.51	0.51	0.35	0.48	0.46	0.27	0.49

FI	**Mean**	7.93	4.77	0.47	22.87	2.82	0.11	0.66	0.75	0.26	0.81
	N	728	836	837	822	824	835	836	837	836	687
	sd	0.46	3.78	0.50	11.37	0.49	0.31	0.47	0.44	0.49	0.39
FR	**Mean**	7.52	2.61	0.51	21.94	2.35	0.13	0.43	0.76	0.19	0.62
	N	698	805	806	799	778	806	806	806	806	717
	sd	0.55	3.64	0.50	10.87	0.59	0.34	0.50	0.43	0.46	0.49
GB	**Mean**	7.56	1.89	0.51	23.34	2.51	0.05	0.46	0.76	0.15	0.71
	N	776	1065	1072	1015	1020	1072	1066	1072	1070	888
	sd	0.78	3.59	0.50	11.32	0.69	0.21	0.50	0.43	0.40	0.45
GR	**Mean**	6.91	3.81	0.48	18.23	2.80	0.11	0.11	0.68	0.07	0.55
	N	526	994	1000	979	870	999	1000	1000	994	651
	sd	0.56	3.79	0.50	9.89	0.53	0.31	0.31	0.47	0.31	0.50
HU	**Mean**	6.18	3.75	0.49	22.15	2.91	0.13	0.30	0.70	0.16	0.61
	N	480	690	690	666	643	688	690	690	690	595
	sd	0.52	3.55	0.50	11.36	0.32	0.33	0.46	0.46	0.41	0.49
IE	**Mean**	7.70	5.09	0.49	19.35	2.53	0.06	0.28	0.68	0.08	0.62
	N	500	868	871	842	869	870	870	870	870	696
	sd	0.62	3.39	0.50	10.73	0.63	0.23	0.45	0.47	0.30	0.49
NL	**Mean**	7.82	1.55	0.49	22.73	2.45	0.05	0.57	0.82	0.19	0.81
	N	562	867	873	855	821	873	873	873	871	734
	sd	0.57	3.91	0.50	10.17	0.66	0.22	0.50	0.38	0.43	0.39
NO	**Mean**	8.38	3.70	0.45	22.59	2.77	0.06	0.64	0.77	0.20	0.90

	N	824	861	862	839	842	862	862	862	861	790
	sd	0.45	3.51	0.50	11.17	0.51	0.23	0.48	0.42	0.46	0.30
PL	Mean	6.48	4.93	0.44	19.26	2.88	0.14	0.30	0.77	0.16	0.65
	N	492	759	761	739	715	759	759	761	756	612
	sd	0.58	3.28	0.50	11.05	0.45	0.35	0.46	0.42	0.39	0.48
PT	Mean	6.53	0.17	0.52	20.90	2.67	0.10	0.13	0.74	0.08	0.25
	N	260	730	751	678	675	748	751	751	750	611
	sd	0.51	4.57	0.50	11.83	0.62	0.30	0.34	0.44	0.30	0.43
SE	Mean	7.96	3.93	0.50	22.94	2.77	0.09	0.66	0.75	0.22	0.81
	N	731	772	772	739	753	770	772	772	772	653
	sd	0.40	3.31	0.50	11.48	0.48	0.28	0.47	0.44	0.47	0.40
SI	Mean	7.12	4.26	0.48	19.96	2.96	0.10	0.44	0.72	0.20	0.74
	N	329	579	581	571	565	578	578	581	580	500
	sd	0.56	3.54	0.50	10.91	0.23	0.31	0.50	0.45	0.47	0.44
SK	Mean	6.52	5.17	0.51	22.10	2.94	0.07	0.35	0.73	0.17	0.47
	N	431	753	761	716	728	761	760	756	758	620
	sd	0.43	2.95	0.50	11.32	0.31	0.26	0.48	0.45	0.42	0.50
Total	Mean	7.48	3.47	0.48	21.64	2.72	0.09	0.44	0.74	0.17	0.69
	N	11181	16230	16341	15764	15505	16322	16315	16335	16312	13601
	sd	0.86	3.93	0.50	11.07	0.55	0.29	0.50	0.44	0.42	0.46

Source: ESS Round 5 (Author's calculations)

Figure C.5: Wage Prediction for the Pooled Sample over Years of Education and Calendar Years
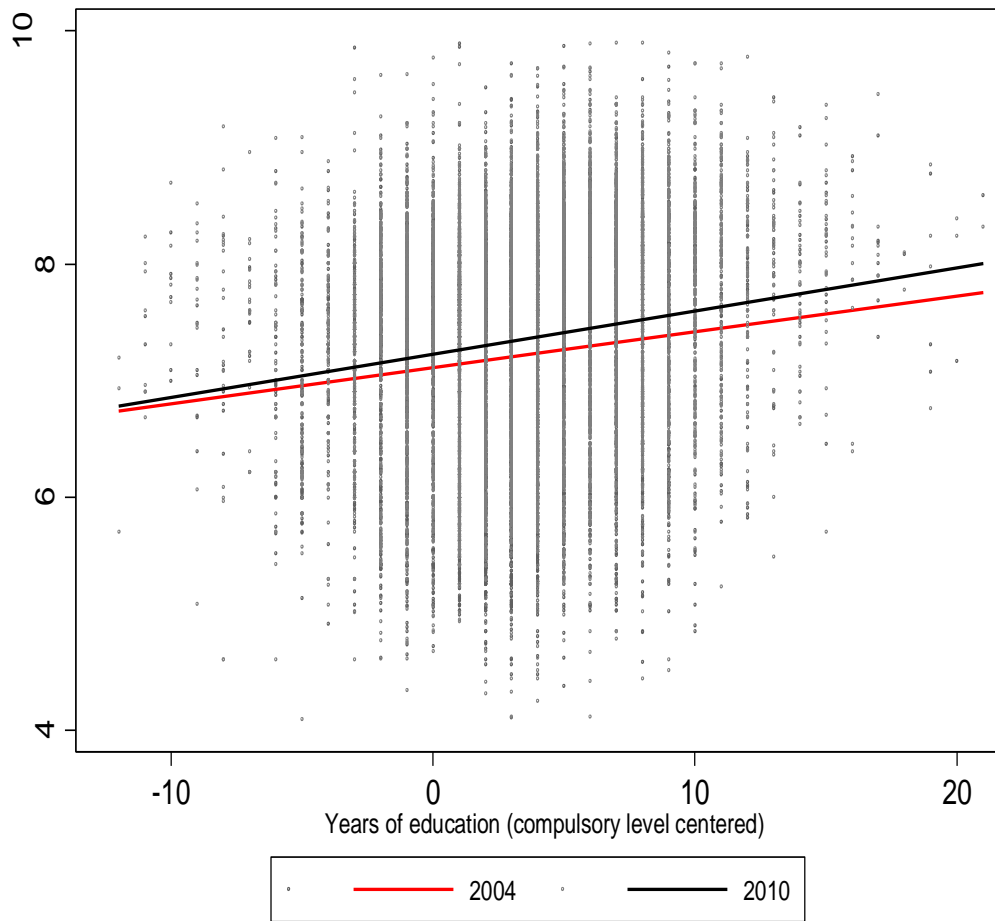
Source: ESS Rounds 2 and 5 (Author's calculations)

Figure C.6: Wage Predictions Over Years of Education and Calendar Years by Countries (Models 2 and 3)
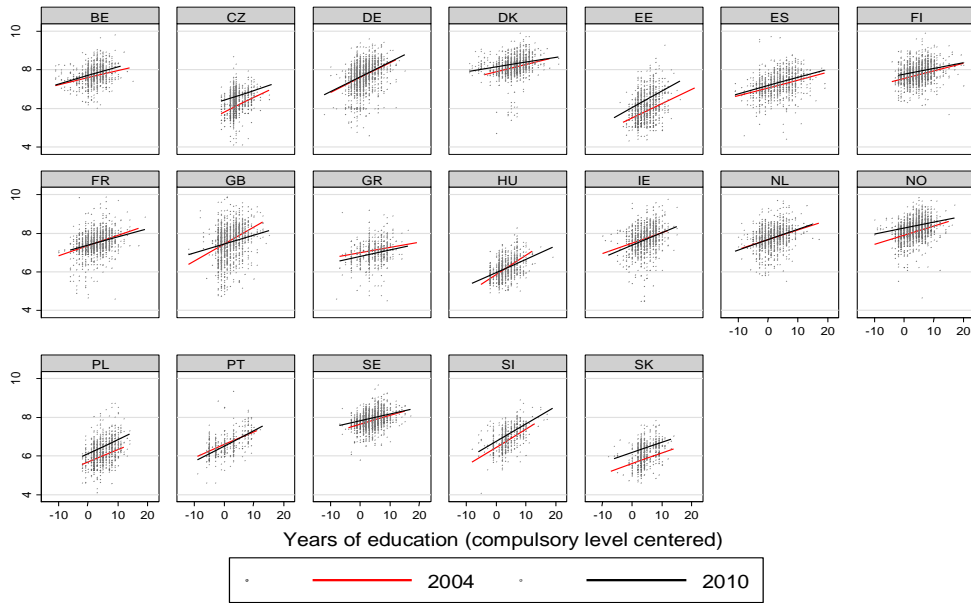
Graphs by state

Source: ESS Rounds 2 and 5 (Author's calculations)

Figure C.7: Kernel Density Plot
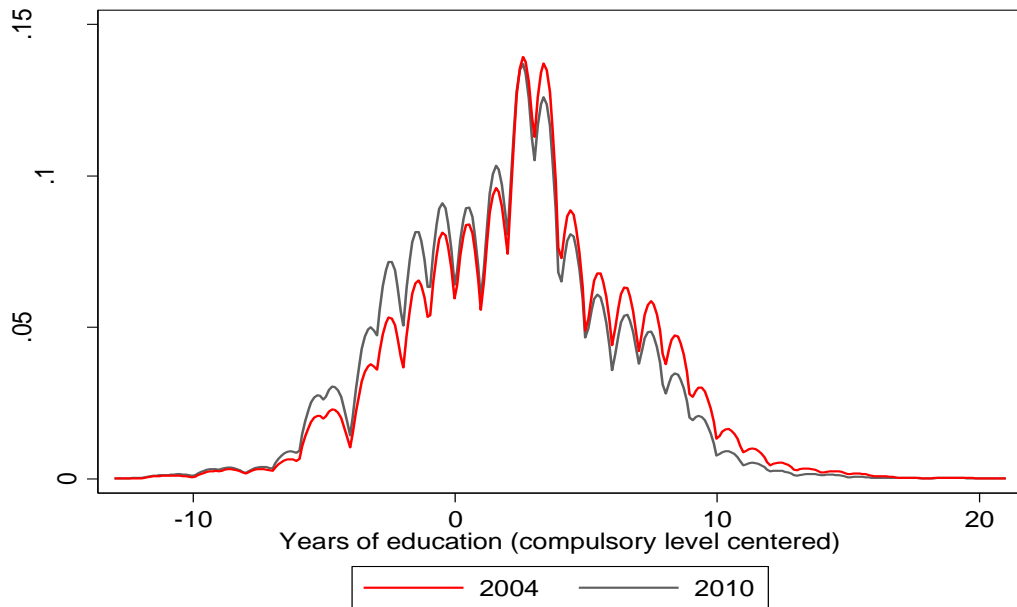
Source: ESS Rounds 2 and 5 (Author's calculations)

Table C.9: Returns to education by job type.

	Returns to education 2004	Returns to education 2010	Difference between 2004 and 2010
(No compulsory education-Nordic)	3.2%	2.2%	-1.0%
(No compulsory education-Liberal)	4.3%	1.5%	-2.9%
(No compulsory education-Continental)	4.1%	2.3%	-1.8%
(No compulsory education-Southern)	4.4%	4.3%	-0.1%
(No compulsory education-Eastern)	-1.0%	2.6%	3.7%
(Less than a Year-Nordic)	2.3%	2.4%	0.1%
(Less than a Year- Liberal)	-2.8%	-0.6%	2.2%
(Less than a Year-Continental)	3.9%	-0.6%	-4.5%
(Less than a Year-Southern)	2.2%	1.4%	-0.7%
(Less than a Year-Eastern)	-2.2%	2.6%	4.8%
(About 1 Year-Nordic)	-0.3%	1.0%	1.3%
(About 1 Year- Liberal)	2.4%	-1.8%	-4.2%
(About 1 Year-Continental)	1.3%	3.6%	2.3%
(About 1 Year-Southern)	3.6%	3.6%	0.0%
(About 1 Year-Eastern)	1.7%	3.8%	2.1%
(About 2 Years-Nordic)	2.4%	2.2%	-0.2%
(About 2 Years- Liberal)	2.4%	3.5%	1.1%
(About 2 Years-Continental)	1.3%	1.2%	-0.1%
(About 2 Years-Southern)	4.5%	6.0%	1.5%
(About 2 Years-Eastern)	1.3%	2.1%	0.7%
(About 3 Years-Nordic)	1.4%	2.6%	1.2%

(About 3 Years- Liberal)	6.0%	5.9%	-0.1%
(About 3 Years-Continental)	1.7%	2.5%	0.8%
(About 3 Years-Southern)	3.9%	6.2%	2.2%
(About 3 Years-Eastern)	2.4%	4.1%	1.7%
(About 4-5 Years-Nordic)	3.8%	5.0%	1.2%
(About 4-5 Years- Liberal)	8.1%	7.7%	-0.4%
(About 4-5 Years-Continental)	4.4%	5.4%	0.9%
(About 4-5 Years-Southern)	6.8%	8.8%	2.0%
(About 4-5 Years-Eastern)	4.6%	5.9%	1.4%
(About 6-7 Years-Nordic)	4.2%	5.1%	0.9%
(About 6-7 Years- Liberal)	11.7%	7.2%	-4.5%
(About 6-7 Years-Continental)	6.5%	7.0%	0.6%
(About 6-7 Years-Southern)	6.6%	8.4%	1.8%
(About 6-7 Years-Eastern)	5.9%	7.8%	1.9%
(About 8-9 Years-Nordic)	4.7%	6.2%	1.5%
(About 8-9 Years- Liberal)	10.4%	6.2%	-4.2%
(About 8-9 Years-Continental)	6.7%	6.9%	0.2%
(About 8-9 Years-Southern)	7.8%	8.5%	0.7%
(About 8-9 Years-Eastern)	8.8%	8.0%	-0.8%
(10 Years or more-Nordic)	5.2%	6.1%	0.9%
(10 Years or more- Liberal)	11.9%	10.0%	-1.8%
(10 Years or more-Continental)	4.8%	7.3%	2.5%
(10 Years or more-Southern)	6.5%	6.4%	-0.1%
(10 Years or more-Eastern)	9.9%	9.1%	-0.8%
Statistics:	**N=18036**	**R²=0.74**	

Source: ESS Rounds 2 and 5 (Author's calculations)

APPENDIX D

TABLES FROM CHAPTER 7

Table D.1: Children Aged 0-17 Living In Jobless Households: Share of Persons Aged 0-17 Who Are Living In Households Where No-one is Working

GEO/TIME	2004	2010	2012	Δ 2004-2010	Δ 2010-2012
GR	4.7	6.3	12.9	1.6	6.6
ES	6.2	10.8	13.8	4.6	3.0
PT	4.4	7.0	9.2	2.6	2.2
FR	8.9	9.7	10.4	0.8	0.7
IE	11.8	19.7	20.2	7.9	0.5
EU-27	10.0	10.7	11.1	0.7	0.4
PL	No data	8.7	9.1	No data	0.4
SI	3.5	3.9	4.1	0.4	0.2
NL	7.1	5.4	5.6	-1.7	0.2
CZ	9.1	7.8	7.9	-1.3	0.1
FI	5.7	4.4	4.4	-1.3	0.0
SK	12.7	10.2	9.9	-2.5	-0.3
DK	6.0	8.5	8.2	2.5	-0.3
BE	13.0	12.2	11.7	-0.8	-0.5
DE	11.4	9.6	8.5	-1.8	-1.1
HU	13.1	16.1	15.0	3.0	-1.1
GB	16.4	17.9	16.5	1.5	-1.4
SE	No data	9.4	7.3	No data	-2.1
EE	8.7	13.2	9.5	4.5	-3.7

Source: EU-SILC / EUROSTAT (Author's calculations)

Table D.2: People Aged 18-59 Living In Jobless Households: Share of Persons Aged 18-59 Who Are Living In Households Where No-one Works

GEO/TIME	2004	2010	2012	Δ 2004-2010	Δ 2010-2012
GR	9.1	10.3	17.5	1.2	7.2
ES	7.2	11.8	15.0	4.6	3.2
PT	5.3	7.2	9.9	1.9	2.7
IE	8.6	14.6	15.9	6.0	1.3
DK	9.4	9.5	10.2	0.1	0.7
EU-27	10.4	10.4	10.8	0.0	0.4
SI	7.7	8.3	8.6	0.6	0.3
BE	13.8	12.5	12.7	-1.3	0.2
SE	No data	10.9	11.1	No data	0.2
FR	10.2	10.4	10.5	0.2	0.1
NL	7.9	7.2	7.3	-0.7	0.1
FI	11.1	9.5	9.3	-1.6	-0.2
CZ	8.0	6.7	6.5	-1.3	-0.2
PL	15.5	10.3	10.1	-5.2	-0.2
GB	11.0	11.9	11.4	0.9	-0.5
SK	10.5	9.2	8.4	-1.3	-0.8
DE	11.1	9.1	8.2	-2.0	-0.9
HU	12.0	12.9	11.6	0.9	-1.3
EE	9.7	12.2	9.7	2.5	-2.5

Source: EU-SILC / EUROSTAT (Author's calculations)

Table D.3: Individuals at-risk-of-poverty rate by education level

GEO/TIME	TOTAL (ALL AGES)			ISCED 0-2			ISCED 3-4			ISCED 5-6		
	2004	2010	2012	2004	2010	2012	2004	2010	2012	2004	2010	2012
GR	**19.9**	**20.1**	**23.1**	25.5	29.3	35.7	14.3	19.4	25.2	5.2	5.9	10.1
ES	**20.1**	**21.4**	**22.2**	22.9	26.6	:	15.5	17.0	:	7.9	8.9	:
PT	**20.4**	**17.9**	**17.9**	18.7	19.1	20.6	10.2	9.3	12.1	4.4	3.3	3.6
EE	20.2	15.8	17.5	29.7	26.9	29.4	19.1	18.4	20.7	11.5	6.1	8.7
PL	:	17.6	17.1	:	33.3	33.4	:	17.6	17.4	:	5.0	4.8
EU-27	:	16.4	16.9	:	25.1	:	:	13.7	:	:	7.0	:
GB	:	17.1	16.2	:	28.0	:	:	15.6	:	:	7.8	:
DE	:	15.6	16.1	:	27.8	27.1	:	14.5	14.9	:	8.2	8.6
IE	20.9	15.2	15.7	27.8	21.9	:	12.6	14.6	:	5.8	7.8	:
BE	14.3	14.6	15.0	21.0	22.7	:	10.8	9.8	:	5.7	5.2	:
FR	13.5	13.3	14.1	19.4	18.8	:	10.8	11.4	:	6.6	6.9	:
SE	11.3	12.9	14.1	15.2	18.0	:	9.1	11.6	:	8.8	9.4	:
HU	:	12.3	14.0	:	27.4	36.4	:	9.7	10.1	:	2.1	3.0
SI	:	12.7	13.5	:	21.1	22.7	:	10.1	12.2	:	3.6	3.8
SK	:	12.0	13.2	:	26.8	:	:	10.8	:	:	4.6	:
FI	11.0	13.1	13.2	12.9	18.7	18.7	11.9	14.3	15.5	3.6	4.7	4.6
DK	10.9	13.3	13.1	12.1	14.8	18.1	9.9	12.4	13.9	7.0	9.2	9.0
NL	:	10.3	10.1	:	11.7	:	:	10.5	:	:	8.3	:
NO	10.8	11.2	10.1	10.4	14.9	17.1	10.4	9.0	9.0	7.2	9.4	9.1
CZ	:	9.0	9.6	:	21.5	21.5	:	7.1	9.1	:	2.8	2.8

Source: EU-SILC / EUROSTAT (Author's calculations)