# European Labour Market Trajectories Before and During the 2008 Financial Crisis: National, Regional and Individual Variation

Dafni Dima

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*To the victims of the Great European recession*

## Declaration

I declare that the work contained within this thesis has been composed by me and is entirely my own work. No part of this thesis has been submitted for any other degree or professional qualification. The responsibility for all the conclusions drawn from the data lies entirely with the author.

Dafni Dima

17th November 2017

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## Abstract

Since 2008 Europe has been in crisis, a financial and debt crisis that spread from the U.S. to all European countries. This thesis aims to provide evidence on the consequences of the crisis for individuals' labour market outcomes across different countries and regions of Europe and to analyse how the recession has differentially affected sub-groups of the European population. Through the analysis of the longitudinal component of the European Union Statistics on Income and Living Conditions (EU-SILC) dataset, the project sheds light on the labour market trajectories of more than 20,000 Europeans across 11 European countries and 41 regions, before and during the 2008 financial crisis (2005-2012). Sequence and cluster analysis are used to investigate the heterogeneity of individual labour market trajectories across countries and time, while multilevel models are used to study regional labour markets during the years in crisis. The concept of transitional labour markets, as well as theories of labour market segmentation, job competition and job mobility, provide the theoretical framework for this research. The empirical findings show that during the financial crisis, labour market trajectories appear more turbulent and fragmented for the already disadvantaged sub-groups, namely women, younger workers and low educated workers. Furthermore, during the Great recession, an increase in unemployment among men confirms the sectoral profile of the crisis, which hit harder the male-dominated sectors of construction and industry. At the same time, a decrease in inactivity among women is consistent with the added worker effect, according to which women in periods of economic hardship are pushed towards labour market activity in order to contribute to the household income. Countries with weak economies and underperforming labour markets prior to the crisis, such as Greece and Italy, unsurprisingly experienced a deep and persistent crisis, while countries with stronger economies and more inclusive labour markets, such as Denmark and Sweden, managed to survive the crisis with less social harm. The institutional context of the countries offering high chances of employment even during the financial crisis, such as the Nordic

countries, lies on the *flexicurity* of their labour markets. Indeed, flexible labour markets with the use of reduced working-time schemes, i.e. part-time forms of employment, contained unemployment during the financial shock. However, we need to be cautious about flexibility without security or partial deregulation of the markets, implemented in southern European countries, because during the crisis such policies led to further labour market segmentation and thus an increase in employment inequalities. Finally, the region of residence matters in employment outcomes, almost as much as the country of residence. In fact, from the regional analysis of individual employment outcomes during the years of the crisis, an uneven distribution of labour is detected even within the national borders. Summing up, the European crisis should be considered as the sum of national and regional crises.

## Lay Summary

A financial and debt crisis, known as the Great European recession, spread from the U.S to Europe in 2008. The crisis affected all European countries, to a different extent, and led to worsening economic and labour market conditions. This project studies the effects of the crisis on individual labour market outcomes over time (2005-2012) and across 11 European countries and 41 regions. Through the analysis of labour market pathways, I explore how the crisis affected different groups of the European population, such as women, youth and older workers. The main aim of this thesis is to study (new) labour market dynamics during the years in crisis and identify labour market patterns across countries, regions and individuals. To this end, using advanced statistical methods, I analyse the European Union Statistics on Income and Living Conditions (EU-SILC) dataset, provided by Eurostat. A key finding of the thesis highlights the differences in individual labour market trajectories across European countries and regions. Indeed, based on this thesis the European crisis should be studied as the sum of national and regional crises. Secondly, labour market trajectories during the years of the crisis appear more complex, including more labour market states and more transitions between these states. Another key finding suggests that countries with weak economies and underperforming labour markets prior to the crisis, such as Greece and Italy, were hit harder by the recession, while countries with strong economies and more inclusive labour markets, such as Denmark and Sweden, managed to recover faster from the economic shock. Finally, according to this study, countries with labour markets that combine flexibility to employers and security to employees offer high chances of employment and lower employment inequalities even during the crisis. However, flexible but not secure labour markets, often the case of southern European countries especially during the crisis, experience more employment inequalities and higher chances of non-employment.

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# 1

## Chapter 1 Introduction

Since 2008 Europe has been in crisis, a financial and debt crisis that spread from the U.S.. Each European country was affected to a different extent. Some countries reacted fast and managed to recover, while other countries were hit strongly and sank deeper into the crisis. In June 2013, the French President François Hollande declared that the crisis in the Eurozone was over. Despite some positive economic indicators, however, the European Commission President José Manuel Barroso believed in 2013 that the crisis was still ongoing. In 2015, Baldwin et al. argued that the Eurozone crisis is a "long way from finished" (Baldwin et al. 2015, p.1). One of the main motivations behind this thesis is Barroso's declaration, supported by a report of the British Institute for Public Policy Research[1]:

> "Some people believe that after this everything will go back to the way it was before. They are wrong. We will not go back to the 'old' normal; we have to shape a 'new' normal".
>
> (Independent, September 11, 2013)

> "The worst effects of the European recession risk becoming permanent in places, according to a left-leaning think tank."
>
> (BBC News, November 23, 2015)

[1] Institute for Public Policy Research 2015 Annual report, UK.

Besides the economic crisis, the last decades have seen the nature and structure of the labour market change due to technological development, the increase in female labour participation, an extensive use of non-standard forms of employment, a rise in people's educational attainment, changes in households' composition and the tertiarisation process (concepts discussed throughout the thesis). The increasing segmentation of the labour markets led to fragmented markets offering different employment and training opportunities and different levels of social security to workers based on their traits (gender, age and ethnicity) and skills (education and job specific skills), reinforcing in that way employment inequalities. In this complicated and always-changing context, it is crucial to understand the labour market dynamics, study the forms of employment used and explore the consequences of the crisis on employment trajectories in order to adopt policies that will ensure employment for all, as well as protect employees offering job security and, at the same time, job quality.

## 1.1 Research Aims and Contributions

This research project sheds light on European labour market trajectories at individual, national and regional level throughout the 2008 financial recession. It focuses on labour market trajectories across time (2005-2012), countries, regions and individuals by socio-demographic characteristics to analyse the employment patterns of more than 20,000 Europeans. The study has a dual comparative approach: individual labour market sequences are compared across space (11 countries and 41 regions) and two time periods (longitudinal aspect); the first period is before the start of the European financial crisis (2005-2008) and the second during the crisis (2009-2012).

A large body of research has been published on labour market transitions. Some studies focused on one-year transitions across countries (Madsen et al. 2013). Other studies analysed labour market transitions using either data from only before the recession (Ward-Warmedinger and Macchiarelli 2014) or data covering the first phase of the crisis (2008-2010) (Erhel et al. 2014). Yet others considered one or two countries as case studies (Bell and Blanchflower 2011). My contribution lies in the study of labour market transitions as whole sequences across a longer span, studying monthly labour market transitions during four consecutive years before and four years during the 2008 recession. The term *sequence* is defined as "an individual trajectory characterised by labour market states" (Erhel et al. 2014, p. 10). Instead of studying each transition between labour market states as a single event, I study all these events (transitions) as a whole labour market pathway of an individual before and throughout the recession.

Moreover, the study of the years before the crisis (2005-2008) is used as a control for the previous labour market performance in each of the countries in analysis. For instance, I explore whether the labour market performance indicators (employment, unemployment and inactivity rates) have reached the pre-crisis level at some point during the first or second phase of the crisis, or whether they went deeper into the crisis. Pre-crisis conditions undoubtedly affect the severity and consequences of the crisis at national and regional level as discussed in the following chapters. Another contribution to this particular field of research concerns the study of the two phases of the crisis (2008-2010 and 2010-2012). Each phase has different effects on individual labour market sequences and manifests in a different way (if at all) in each European country. Moreover, a main feature of this analysis is the study of employment inequalities before and during the years in crisis based on individual traits, such as gender, age, education and country of residence.

The main analytical framework used in this thesis is the transitional labour markets approach, which studies labour markets in a comparative perspective and in a dynamic way. This approach promotes more flexible boundaries between work and other activities, such as education and training, starting a family and other similar aspects, in combination with work security. In essence, workers are encouraged, through secure and flexible transitions, to adjust their labour market condition based on their (personal, education, etc.) needs.

The aim of this thesis is to understand the new dynamics of the labour markets and identify the institutional and geographical context that offer high chances of employment, even in the middle of the financial crisis. The Great recession of 2008 may not have been 'great' for all the European countries, but in some countries led to severe austerity measures and high unemployment rates (discussed in Chapter 4). Another originality of this project is that it compares 11 European countries and 41 European regions across time, in order to identify whether the employment patterns emerged in the times of crisis are country-specific and/or region-specific and to link the empirical findings to the context. A central feature of this study is the level of analysis, which is gradually disaggregated. Indeed, I study individual employment sequences first at the European level, then at the national level and finally with a more detailed analysis at the regional level.

## 1.2 Contextualising this Research Project

The financial crisis started with the collapse of the subprime mortgage market in the United States during the summer of 2007 (European Commission 2009; Leaven and Valencia 2010). In a short time, most of the European economies were hit – to different degrees – by the financial and banking crisis (ECB 2015). The European crisis had two distinct phases: the first started in 2008; and the second - known as the Eurozone crisis or European sovereign debt crisis or the 'double-dip', started in 2010 (ECB 2015; Baldwin et al. 2015). The second phase involved a sharp increase in the interest on the debts of Eurozone sovereign borrowers - Greece, Italy, Spain, Portugal and Ireland (Lane 2012, p.55; Woodruff 2014, p.27). The two phases have different causes and different impact, but they both resulted in the weakening of the labour markets (lower rates of employment, worse labour market conditions, etc.) and in job losses. In 2008-2009 alone, around 4 million people lost their jobs, mostly workers in sectors hit hard by the crisis, such as construction, manufacturing and transport (ECB 2015). The first phase of the crisis affected all the European economies, to a different extent, while the sovereign debt crisis affected mostly countries with "stressed" economies, namely Greece, Ireland, Italy, Portugal, and Spain (Eurofound 2013a; ECB 2015).

The place and time of analysis are two of the key features of this research. The analysis focuses on 11 European countries and 41 European regions comparing four years prior to the crisis with four years during the crisis. As aforementioned, the crisis affected all countries in Europe to a different extent. Indeed, some countries, such as the southern European countries, have been strongly affected by the crisis, demonstrating sharp increases in their public debt and unemployment rates and overall a substantial deterioration in their economies and labour markets, while, for instance, Nordic countries managed to recover at a faster pace and re-allocate dismissed workers. The national and regional heterogeneity regarding the consequences and responses to the crisis, as well as the employment outcomes during the years in crisis, are thoroughly discussed in Chapters 4 and 6. The effects of the crisis on individuals' labour market sequences disaggregated by gender, age, education and country of residence are analysed in Chapter 5.

## 1.3 Research Questions

The main research question that this study aims at answering is "**How did individual labour market trajectories across Europe change during the financial crisis at individual, national and regional level?**". This question is divided in three research questions, each one discussed in a separate chapter of the thesis.

**Q.1 How did individual labour market trajectories change during the Great recession across European countries?** This question is analysed in Chapter 4. Using sequence and cluster analysis, the heterogeneity regarding individual labour market trajectories between and within countries is analysed before and during the 2008 economic crisis.

**Q.2 Are employment inequalities more pronounced after the start of the 2008 financial crisis in Europe and if yes in which countries?** The second sub-question is addressed in Chapter 5. Labour market transitions in eleven European countries are studied before and during the financial downturn, focusing on the effects of gender, age and education level on employment outcomes.

**Q.3 Does the region of residence matter for individuals' chances of being employed during the crisis?** Finally, Chapter 6 focuses on the regional variation in employment outcomes during the Great recession taking into account 41 regions of eight European countries. This chapter explores which regions offer the highest chances of persistent employment during the economic shock.

## 1.4 Thesis Outline

The thesis is divided in five chapters. The first (Chapter 2) presents the theoretical framework of the research and literature review and discusses the changes in the nature and structure of the labour market across time, the main theories of labour markets segmentation and finally the transitional labour markets approach, which is the main analytical tool used in the thesis. Moreover, it discusses employment inequalities based on gender, age and education and the role of the country and region of residence on labour market outcomes. Chapter 3 presents and describes the dataset analysed, the sample of analysis and the methods used. As mentioned above, a method that allows a dynamic study of labour market trajectories has been used, namely sequence analysis, together with a multilevel analysis of regional employment outcomes. The structure of the empirical chapters of the thesis moves gradually from the bigger image, the European image (section 4.2 of Chapter 4), to the analysis of smaller units: European countries (section 4.3) and regions (Chapter 6), as well as individuals by socio-demographic characteristics within the countries analysed (Chapter 5). In detail, Chapter 4 defines the Great European recession, discussing its causes, consequences and responses by country and analyses the effects of the crisis on individual labour market sequences across 11 European countries. Chapter 5 studies the employment inequalities by country and whether they appear wider in times of crisis and Chapter 6 focuses on the role of the region of residence on the chances of being employed during the years of the economic shock. Finally, Chapter 7 summarises the key findings of this projects and offers a broader picture of the analysis of the individual labour market trajectories across countries and regions over time.

## 1.5 Central Findings of the Thesis

How did labour market trajectories change during the crisis compared to the years prior to the crisis? The answer depends on the context of analysis. Studying Europe as a whole provides a general image that is enriched by national and regional patterns. This thesis suggests that we should talk about multiple European recessions, i.e. the Greast European crisis being the sum of the national and regional crises. A strong between-country heterogeneity emerges in 2005-2008, which appears more pronounced during the years of the crisis, with poorly performing countries being worse off, as discussed in Chapter 4.

Overall, employment sequences during the years of the crisis appear more turbulent (including more labour market states) and more fragmented (including more job changes), especially in Greece and Italy. Chapter 4 highlights a decrease in full-time dependent employment and full-time self-employment during the crisis, together with an increase in part-time forms of employment, often used as part of the adjustment strategies to tackle the consequences of the crisis. Moreover, a decrease in inactivity is followed by an increase in unemployment and in part-time employment, which based on Chapter 5, is a female-driven pattern called the added worker effect. The thesis will argue that although non-standard forms of employment are always more widely used, full-time employment still remains the main pillar of employment, except for Greek and Dutch women, low educated people and workers above 55 yesars old. During the crisis, the gender gap that emerged in Chapter 5 appears more contained due to the sectoral profile of the recession that hit harder male-dominated employment sectors, such as industry and construction. Young and low-educated people during the economic hardship experience more turbulent and fragmented sequences. The Danish, Swedish, Finish, Dutch and Portuguese labour markets offer more equal chances of employment to all workers, independently of their gender, age and education. Women and younger workers seem more penalised in Greece and Italy.

The thesis will argue that using pre-defined country classifications to study European countries is not satisfactory. Strong country differences emerged between countries which are usually grouped together because of their similar welfare states, education and labour market systems. For instance, Portugal shows higher shares of full-time employment especially among women, compared to Greece and Italy. Finland shows a rather high share of full-time self-employment, similar to the Greek share, whereas in the other Scandinavian countries it is not a widely used form of employment. Belgium displays worryingly high shares of unemployment and the Netherlands is a unique case of a part-time based labour market. Therefore, this thesis suggests that future research should carefully analyse single country patterns before making generalisations across groups of countries.

# 2

## Chapter 2 Theoretical Framework and Literature Review

Chapter 2 includes a review of the labour market theories and research relevant to the project, aiming to highlight the changes across time to the European labour markets, outline the main determinants of these changes and define the context of analysis. Before analysing the theories used in this thesis, I briefly define the European financial crisis, which is then discussed in detail in Chapter 4. In the first section, I discuss the most influential labour market theories and their development across time, starting from classical economic and sociological theories that discuss the role of education in labour market outcomes. Then I focus on theories on the structure of the labour markets, stressing the employment disparities between sub-groups of the population, to finally move towards a more recent and dynamic theory, the transitional labour markets approach, which is the central theory of this project. Some theories are discussed in detail, whereas others are briefly mentioned since they are secondary to my study. I present the theories in themes and, mostly, in chronological order, with the purpose of forming a clear idea of the development of the theories over time.

The second section focuses on a review of the literature on employment inequalities during the 2008 Great European recession to examine whether occupational trajectories are affected by gender, age and the education level attained, as well as to study the country heterogeneity in inequalities relating to these characteristics. The third and fourth sections of this chapter define the place of analysis, namely European countries and regions. I discuss the most influential country classifications based on welfare states, labour market features and education systems in order to provide a broader understanding of the national context of the analysis. I also discuss studies that have focused on regional employment disparities with the aim to analyse the role of the region of residence in individuals' occupational trajectories. Finally, I present the research hypotheses emerging from the theories and empirical evidence and I link them to the research questions discussed in the introductory chapter.

## 2.1 Labour Market Theories: From a Single Market to Segmented Labour Markets and the Role of Education

In this section, I firstly discuss theories on the role of education in the individuals' occupational trajectories: the **human capital theory** (Schultz 1961; Becker 1964), the **theory of job signalling** (Spence 1973), the **job competition model** (Thurow 1975; Reskin 1991) and the **theory of career mobility** (Sicherman and Galor 1990). Secondly, theories on the structure of the labour market are discussed: **theories on labour market segmentation** (Doeringer and Piore 1971; Piore 1971) and the **theory of insiders and outsiders** (Lindbeck and Snower 2001). Finally, I discuss the **theory of transitional labour markets** (TLMs) (Schmid 1995; Schmid and Gazier 2002).

The TLMs theory is discussed in detail since it is the most relevant to my topic for several reasons. Firstly, because it is relatively recent and therefore takes into consideration the new structure of the labour markets, which is more flexible than in the past. Secondly, because it studies the labour market in a dynamic way and not in a static way as the theory of labour market segmentation does. The latter considers that there are very limited transitions between different employment segments, while the TLMs approach recognises and promotes a bigger variety of transitions. Finally, the TLMs theory is based on cross-country comparisons, and therefore is ideal for my project. All the above theories form a framework that allows me to understand and study the labour market across time and across countries; and to explore how the labour market outcomes are affected by gender, age and education.

### 2.1.1 Human Capital Theory: A Single Market Theory

Human capital theory, developed by economists – mainly by Gary Becker, Theodore Schultz and Samuel Bowles, in the 1960s - refers to the connection between education and labour productivity, as well as the returns (mostly income returns) to education and training (Becker 1964). Human capital theory emerged because traditional economists did not take into account the role of education when studying workers' outcomes within labour markets (Schultz 1961). Traditional economists[2], such as J.S. Mills and A. Marshall, overlooked that skill and knowledge constitute human capital, which can be enhanced with investment, i.e. overlooked that "people invest in themselves" (Schultz 1961, p. 2). Schultz, writing about the economics of education, in 1961 argues that there is no clear distinction between expenditure aiming at consumption (not intentionally an investment to augment productivity) and expenditure as an investment. Nevertheless, expenditure on education and training, as well as on health and territorial mobility in order to find a better job, can clearly be seen as human capital investments.

Gary Becker (1964), influenced by Milton Friedman and Theodore Schultz, claimed that people act rationally, i.e. in their own best interest and make investments based on the returns – wage and/or training returns. One of the most important concepts of Becker's work is that highly educated people earn more when compared to lower educated workers in developed and developing countries, as well as across time. Income inequalities were found strongly connected with health and education inequalities: earnings can be considered a consequence of education and health (Schultz 1961; Becker 1964). A critique to this theory has pointed out that also ascriptive characteristics can trigger income and education inequalities (Iannelli and Smyth 2008). For instance, women might be more disadvantaged in the labour markets, even if they achieve high levels of education (Iannelli and Smyth 2008).

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[2] With the exception of A. Smith, H. von Thünen, I. Fisher, M . Friedman and others.

Becker claims that human capital can increase through schooling, on-the-job training (general or specific[3]) and other sources of knowledge, such as an investment in information when job searching could lead to a better job position. Nonetheless, he also recognises that the labour productivity of a worker is not only influenced by education and training, but also by their ability, motivation and commitment (Becker 1964, p. 36). Becker, in line with Schultz, argues that young people invest more in education, not only because they have more free time (less time spent in family-related tasks and work), but also because they have more time to benefit from their investment, i.e. more future years in employment.

The economic returns of human capital consist of an increase in income over the life course (since at younger age people need to pay with their wages for their training). The investment in education and training depends heavily on the market and labour demand, as well as on rational decisions driven by the economic returns of the investment. In a society where the returns of education and training are uncertain – for instance in a society with high unemployment - the investment in human capital is going to be affected. In fact, the prospect of high unemployment prevents people from investing in education since it reduces the potential benefits of this investment (Fernández and Shioji 2000). Nonetheless, young people tend to be optimistic and aspire high regarding their education attainment and occupational outcomes (Schultz 1961; Becker 1964, p. 56; De Graaf and van Zenderen 2013, p. 130). The higher the aspirations on employment outcomes, the higher the investment and thus the higher the education qualification obtained (Paterson and Raffe 1995).

Finally, according to the human capital theory women spend fewer years than men in paid work and therefore are less motivated to invest in qualifications than men

[3] General training is spendable in any firm, whereas specific training is mostly used in the firm that provided the training (Becker 1964).

are. However, that might be the case in the 60s when the theory was developed, when women were also experiencing exclusion from the education and training system. During the post-World War II period (the mid-20th century), a time of economic prosperity and technological development, an expansion in education was observed across Europe, together with an increasing demand for higher qualifications (Müller and Wolbers 2003). Educational reforms tackled the gender education inequalities and resulted in an expansion of women's educational attainment, who during the last decades attain higher levels of education compared to men (Müller and Wolbers 2003; Smyth 2005; Iannelli and Smyth 2008).

### 2.1.2 Job Market Signalling Theory: An Alternative to Human Capital Theory

Michael Spence developed the job market signalling theory in 1973. The main difference between the human capital theory and the signalling theory is that the latter theory considers human capital (e.g. educational qualifications) as a 'signal' for workers' characteristics (e.g. ability, motivation, etc.) and not simply as workers' knowledge or skills that directly improve labour productivity. Spence argues that employers before hiring and invest in an employee have limited knowledge about the employee's human capital, i.e. skills. In other words, there is risk behind each hiring (Spence compares a job hiring to a lottery). Candidates can be described by two sets of attributes: indices and signals. *Indices* are observable and fixed traits, such as gender, ethnicity and age; while *signals* are indicators that can be improved, such as education, qualifications and work experience. People can invest in order to enhance their signals, but usually it is costly and time-consuming. Spence defines the costs of these investments as *signalling costs*. Individuals rationally invest in signals that offer higher returns when compared to the signalling costs (Spence 1973, p. 358). A limitation of this theory lies in the assumption that employers hire candidates based in meritocratic criteria, i.e. based on workers' qualifications and skills. Only if this is the case, do qualifications act as strong signals.

### 2.1.3 Job Competition Theory and Labour Queues

Lester Thurow, a political economist, developed the theory of job competition in 1975. According to this theory, education is the main factor that enables people to find a job. In line with the signalling theory, education acts as a signal of ability and knowledge that enables employers to scan candidates and to have an idea on how quickly potential employees could get firm-specific training. The possibilities of an individual to find a job depend on two factors: their position in the labour queue and the number of job vacancies. The higher the education level, the higher the possibilities of a better position in the queue. Indeed, first in the job queue are candidates who require less training, i.e. who are less costly for the firm. In a situation where the number of individuals with high education is higher than the job opportunities (over-education), highly educated workers accept jobs for which they are over-qualified. This means that lower educated people are pushed downwards, towards less qualified jobs or indeed towards unemployment (the phenomenon of crowding-out). Overall, the model of job competition links the signalling theory with the conditions in the labour markets (job vacancies, skills required, etc.).

Almost fifteen years later, in the early 1990s, sociologist Barbara Reskin in an attempt to explain gender segregation in the labour markets developed the queue theory, which examines the labour market stratification. The labour market consists of labour queues and job queues. A labour queue is a queue of workers waiting to be assigned a job from the employers, while a job queue is a queue of all available jobs for the workers. Employers will hire employees from the top of the queue and employees will choose jobs from the top of the job queues, leading disadvantaged workers in unemployment or towards low-qualified work positions (Reskin 1991).

### 2.1.4 Theory of Career Mobility

The theory of career mobility, developed by Nachum Sicherman and Oded Galor in 1990, also links education to labour market outcomes and in particular to occupational mobility. This theory is relevant to my project because *career* is defined as an employment trajectory consisting of episodes and it cannot be studied in a cross-sectional way (Maume 1999). Occupational mobility here refers mainly to job changes, in terms of promotions across firms and of mobility from unemployment to employment and vice versa ("status mobility", as called by Decreuse and Granier 2002).

The theory of career mobility points out that workers with high level of education have higher probabilities of upward occupational mobility. In this context, the returns of education can be translated in promotions. Sicherman and Galor argue that the chances of intra-firm mobility (in the form of promotion) are positively affected by education, ability and work experience. In fact, older workers, with more job experience, have a higher probability of being promoted and a lower probability of changing jobs. Therefore, older workers are expected to experience less turbulent labour market trajectories. On the other hand, young individuals, due to a high probability of unemployment, tend to accept 'bad' jobs aiming at gaining skills and work experience (Rosen 1972; Sicherman and Galor 1990). In addition, more educated workers face less job mobility with stable career paths and have higher chances of intra-firm mobility than inter-firm mobility (across firms). Sicherman and Galor (1990) claim that one of the reasons more educated workers experience less job changes in their careers is that they start their careers from already highly qualified job positions.

According to numerous sociologists, job mobility is directly influenced by job vacancies (among others: Rosenfeld 1992; DiPrete et al. 1997; Ng et al. 2007). Thus, contextual factors, such as regional economies, education and training systems and sectoral structure of employment, that affect the job vacancies, affect also the opportunities for job mobility (Ng et al. 2007). This theory, as well as many of the other theories, are undoubtedly influenced by the geographical context (countries/regions) and can be extended to a larger set of countries (Lück et al. 2006, p.5). It is easy to imagine how the Great recession might have influenced the mobility processes: high rates of unemployment in combination with a decrease in job vacancies (limited job opportunities) and an increase in non-standard contracts may result in an increase in job changes and reduce the chance of re-employment or negatively affect its quality (among others: Cha 2014).

Decreuse and Granier 2002 investigate the relationship between education, unemployment and job mobility. The authors raise an interesting point: during a period of job destruction[4], we can observe an increase in the unemployment rate, but also an increase in the years spent in education and training. According to the 'discouraged worker effect', during economic downturns with increasing unemployment rates, uncertain and fragmented transitions and limited job creation, many young people might choose to continue to further education, rather than become/remain unemployed and/or inactive (Müller and Gangl 2003, p. 8).

Summing up, the four theories discussed above are relevant to the role of education in labour market outcomes. The human capital theory is one of the first theories recognising the effect of education and training on employment outcomes, claiming that the higher the investment in education the higher the earnings and thus the better the labour market status. However, this theory was developed in the 60s, when the structure of the education system was different and the gender gap in educational attainment was still striking. The signalling and job competition

[4] During a period of economic depression, both job destruction and job reallocation rise, while, at the same time, the correlation between job destruction and job creation rates becomes weaker resulting in an imbalance between inflows and outflows from and towards unemployment (Davis et al. 1996; Arpaia and Curci 2010).

theories also link education to labour market outcomes but from different angles and argue that this link strongly depends on the labour market conditions, e.g. the number of job vacancies. The former claims that education works as a tool in order to get hired, to be selected among other candidates, while the latter that education defines the individual's position in the labour queue. Finally, the theory of career mobility connects the role of education to job changes.

### 2.1.5 Theories on the Segmented Structure of Labour Markets

The theories presented in the sections above consider the labour market as a single competitive market, where people choose jobs from a common pool of job vacancies. An alternative model was suggested by theories of labour market segmentation, developed at the beginning of the 1970s by the economists Michael Piore and Peter Doeringer. Doeringer and Piore (1971) developed the theory of internal labour markets (ILMs), emerged from the dual labour market theory, suggested by Piore in 1971 and influenced by previous works on labour market segmentation from Clark Kerr (1954) and John Dunlop (1966). The theories on labour market segmentation point out that labour markets are divided in two segments/markets - the internal and the external (Doeringer and Piore 1971; Williamson 1985) - or even in more segments of employment, offering different types of jobs, of working conditions, of security, of training and promotion opportunities, etc. (Reich et al. 1973; Fields 2007).

In detail, Doeringer and Piore (1971) outlined the distinction between internal and external labour markers, while Piore (1971) referred to primary and secondary employment segments[5]. The primary (or internal) sector consists of higher-status, stable and secure jobs, with higher wages, better working conditions and better career prospects (Doeringer and Piore 1971; Piore 1971). Key recruitment criteria are

[5] Primary and secondary segments can be further divided into upper and lower tiers: primary internal and external; and secondary internal and external (Piore 1975).

a high education level and work experience, therefore age. On the contrary, the secondary (or external) sector includes mostly low-qualified and low-paid jobs, involving limited opportunities for training and providing low job security and stability. The two markets are (if at all) connected by "ports of entry and exit", although transitions from one segment to the other are usually limited and very competitive (Doeringer and Piore 1971, pp. 1-2). The process of choosing employees from a job queue is used mainly in the primary labour market, and less frequently in the secondary, where all candidates are worth the same and can be replaced at low turnover costs (Doeringer and Piore 1971, p. 168). Secondary workers act as labour reserve for the primary sector and in the meanwhile they aim at acquiring the required qualifications to access the primary segment (Piore 1970). In fact, young workers are often integrated in the labour market's secondary sector to develop the required skills and increase their productivity in order to achieve labour characteristics essential for a position in the primary sector. Other typical secondary market workers are working mothers and working students, who may be unable to work longer hours in permanent jobs due to other duties/life roles, such as domestic and familial responsibilities and school attendance (Rosenberg 1991).

Overall, *segmentation* is the process of treating different groups of workers in different, often unequal, ways (Ryan 1981). Segmentation can occur before entering (pre-market) and after entering (in-market) the labour market (Ryan 1981). The *pre-market segmentation* regards the different education and training opportunities, which lead to different employability levels. For instance, we expect people with high education and high participation in training (maybe in the form of apprenticeship) to be more likely to find a 'good 'job in the primary, even in the upper levels of the primary, sector. The *in-market segmentation* occurs when people of similar qualifications and employability receive different jobs with different working conditions, different career prospects and, often, different wages for the same level of productivity. Workers may be also offered different on-the-job training opportunities.

Paul Osterman (1975) argues that the human capital theory is valid only for workers of the primary labour market segment. In fact, investment in secondary workers, both from the firm and from themselves, is limited. Overall, there is one main difference between the human capital theory and the theory of labour market segmentation. Based on the former, people according to their preferences (working hours, etc.) and skills (acquired through education, training and work experience) choose the best job that can pay them off for their investment. On the other hand, the latter theory suggests that individuals can choose jobs from separate job segments that offer different returns and require different skills and qualifications. Not everyone has the same chances of getting educated and trained and therefore of choosing a job based on their preferences.

#### Other Labour Market Distinctions

Another distinction that stresses the dualisation of the labour market exists since the 80s. Assar Lindbeck and Dennis Snower, two economists, developed the theory of insiders-outsiders in 1984, with the aim to explain the rising unemployment rates of outsiders. Insiders are people with stable and secure jobs, while outsiders have less secure jobs or are unemployed (Rueda 2006). The theory distinguishes workers, not based on working conditions and job tenure (as the labour market segmentation theory), but based on their turnover costs. Turnover costs are the costs corresponding to replace an employee and in particular the costs of hiring, firing and training-related costs. In fact, a firm needs time and money to screen, interview and hire a new employee and there are always risks linked to a new hiring; for instance, the new employee's production level might be lower than expected. According to Lindbeck and Snower (2001), the turnover costs are defined by employers, giving insiders great bargaining power. Insiders can decide to push their wages up and still firms will not substitute them with outsiders because it may still cost them more.

An interesting aspect of the insider-outsider division is that it can be extended to any type of distinction between workers of different market power: employed versus unemployed; good versus bad jobs; informal versus formal sector; unionised versus non-unionised workers; standard versus non-standard employment relations; permanent versus fixed-term contracts; full-timers versus part-timers, etc. (Lindbeck and Snower 2001, p. 166).

Finally, I briefly discuss another well-known distinction of the European labour markets: the internal labour markets (ILMs) organised around firms (France and Italy) and the occupational labour markets (OLMs) organised around industry (Britain and Germany) (Maurice et al. 1982; Eyraud et al. 1990; Marsden 1990). While ILMs offer job mobility within the firm, OLMs offer - through an apprenticeship system – skills that could be used across firms and not in one specific firm. However, according to Marsden (2009), in the early 2000s significant changes occurred in the industrial labour markets, especially in the British market. Indeed, already from the 90s, changes in technology, transformations in the forms of work organisations (e.g. collective agreements), an expansion of the service sector, etc. weakened the industrial labour markets leading to a distinction not anymore between ILMs and OLMs, but between firms based on the firms' size (small and medium firms versus bigger firms).

### Critiques of Labour Market Segmentation Theories

Labour market segmentation theories have been criticised as static, when the need for flexibility within the labour markets was already emerging since the 1980s (Rosenberg 1991; Petit 2007; Lamotte and Zubiri-Rey 2008). According to these authors, the labour segments still exist in the 90s and 2000s, but their form have changed. In fact, there is a "variety of internal labour market systems ranging from 'strong' to 'weak'" (Grimshaw and Rubery 1998, p.200; Petit 2007). This variety in the primary sector depends on labour market conditions: the unemployment rate, number of job vacancies, choices of employees, skills available in the external labour force, technological change, rigidity of employment legislation, employment policies, increase in flexible forms of employment, employers' different strategies to adjust to labour demand, trade unions' power for collective bargaining, and, finally, changing economic conditions. Although the form of the secondary segment remains similar as defined in the 70s, typical secondary jobs in large industries become limited, due to the tertiarisation process, i.e. the increase in the services sector (Petit 2007). Furthermore, the increase in female labour market participation led to a new secondary segment (Rubery 1994; Petit 2007).

Another critique regards the determinants that may influence individuals' position in the primary or secondary labour segment. Doeringer and Piore (1971) consider individual characteristics (such as age and education level) as crucial for being part of the primary rather than the secondary labour segment. Rosenberg (1991, p.73) however argues, "Individual behavioural traits are no longer pointed to in explaining who is working in each labour market segment". She considers life choices the main drive for different careers and employment trajectories. In fact, she argues that during an economic shock (in particular the 1974-1975 recession in the U.S.) women, youth, older and low educated workers transited from inactivity into the secondary segment of the labour market because of their different needs (e.g.

contributing to household income) and not because they were not able to do so prior to the crisis.

Finally, according to the theories on labour market segmentation there are limited chances for workers to transit from one segment to the other. Several authors emphasize the need of a theory, which studies the internal and external labour markets as interconnected and not as two detached labour sectors and takes into consideration the links between paid work with other activities, like family-related tasks and education (Gazier 2002; Petit 2007; Lamotte and Zubiri-Rey 2008).

### 2.1.6 Need for More Dynamic Theories: The Concept of Transitional Labour Markets

The theory of labour market segmentation suggests that labour markets are not unified, but segmented. In fact, since the beginning of 1970s, although full-time employment was still the most prevalent type of occupation, new flexible non-standard forms of employment emerged and were more frequently used compared to the previous years (Schmid 2002, p.152). The 'old' model of lifelong permanent full-time (40 hours or more per week) for the main breadwinner of each household, usually men, is no longer feasible and full-time employment is not the only alternative to non-employment[6] (although still the most common form of employment) (Schmid 1995; Schmid and Gazier 2002). For this reason, a study of labour market transitions between employment, unemployment and inactivity is not enough anymore; other forms of employment should be taken into consideration (Gazier and Gautié 2011; Brzinsky-Fay 2010). Indeed, the transitional labour markets (TLMs) approach promotes a more flexible and reduced-hour weekly working pattern.

[6] Non-employment consists of the states of unemployment and inactivity and refers to non-paid work.

**The Normative Aspect of the TLMs Concept**

With the aim to tackle the increasing unemployment in developed countries, often in the form of persistent unemployment with the risk of social exclusion, and to explain the dynamics of labour markets with new structures[7], Günther Schmid identifies the need of new institutional arrangements that will promote TLMs (Schmid 1995). Schmid attempts to overcome the labour market rigidity, affecting mainly workers of the secondary labour market segment, and move towards flexibility and mobility (Schmid 1998). He suggests a number of policies in order to reduce the working hours, at least temporarily, which he believes will enhance labour productivity and decrease labour market segmentation. Indeed, according to Booth and Van Ours (2013), the use of part-time employment and reduced working-time schemes may result to a waste of human capital and skills of highly educated people, but boosted female labour force participation. TLMs support flexible forms of employment with the purpose to promote 'transitional phases' during life courses, i.e. periods when individuals want/need to work less hours. TLMs are the "institutional arrangements that allow such intermediate phases" (Schmid 1998, p. 5).

The concept of the TLMs was inspired by three characteristics of the labour market: 1) the vulnerability of the labour market to shocks and the need of adjustment strategies; 2) the definition of the labour markets as a 'social institution' that should not use as their main adjustment strategy the wage flexibility, but needs to use employment flexibility; 3) the potential benefits for workers of having more free time, which can be used for future investments (training, acquiring new skills) or for other activities (Schmid 1998, p. 6).

[7] We observe changes in the employment systems, such as an increase in female participation and an increase in the number of pensioners because of ageing. We also observe demographic and household changes, such as an increase in single parents and divorces and an overall decrease in births (Schmid 1998).

In essence, the concept of TLMs, developed by Schmid in the 1990s, is a set of policies (an institutional concept) that promotes:

- flexibility between paid work and other activities, such as education, starting a family, taking care of someone, taking a career leave, by subsidies addressed to those who undertake transitional intermediate states (for example shorter working hour job positions because of family responsibilities or training) (Schmid 1995, p. 441) ;
- flexibility within labour markets in order to prevent dead-end transitions and social exclusion and to boost maintenance (between employment forms) and integrative (from non-employment to employment) transitions (Schmid and Gazier 2002, Preface, p. xii).

The concept of TLMs is an institutional concept or else an employment strategy based on the reduction of the working hours and income redistribution. The strategy aims at a new institutional framework based on the combination of labour market flexibility with a necessary level of social security: "more flexibility with reasonable levels of security" (Schmid 2006, p. 29) or "(…) new institutional arrangements (…) to regulate discontinuous employment trajectories" (Schmid and Gazier 2002, p. 183).

#### Transitions According to the TLMs Approach

The key word of TLMs is *transition*, defined as "any sequence in a career, leading to a change from one stable middle-term position to another" (Gazier and Gautié 2011, p. 2) or as "status change" (Brzinsky-Fay 2010, p.7). During the last decade, transitions across the European labour markets (to a different extent) have become more complex for numerous reasons: the increase in the use of non-standard forms of employment, the saturation of the internal labour markets due to over-education and the limited job vacancies leading to an increase in the unemployment rate, especially during an economic shock. Complex transitions are defined as those including “a complex set of intermediate positions”, like part-time employment, fixed-term contracts and early retirement (Gazier and Gautié 2011, p.2).

According to the TLMs approach, labour market transitions can be integrative, of maintenance and exclusionary (O’Reilly et al. 2000; Brzinsky-Fay 2010). An *integrative* transition is from non-employment towards the labour markets, while an *exclusionary* transition leads from employment to non-employment. The *maintenance* transition is any transition - upward or downward, within employment, e.g. between full- and part-time or permanent and temporary contracts - and depends largely on the flexibility of the labour markets. Workers should have the opportunity to transit to a more satisfying labour market status if desired, such as from a low-paid job to a better-paid job or from an insecure job to a secure position (Muffels et al. 2002, p.5). On the other hand, integrative and exclusionary transitions are relevant to work security, or else the ability of employees to stay in long-term employment and to avoid long-term unemployment and inactivity. Interestingly, the outcomes of the same transition can be different based on workers’ sub-groups (O’Reilly et al. 2000). For instance, the transition to part-time employment is integrative for unemployed and inactive people who in a part-time job position will have an income, limited (but some) social security and probably training and promotion opportunities. However, the same transition is of maintenance for full-time workers. For them it represents a downward career step, which brings them closer to unemployment/inactivity. Finally, for low educated workers or workers interrupting their careers for several reasons (education/training, starting a family, etc.) can be an exclusionary transition if they are not able to go back to a more standard employment relationship.

### Labour Market Risks According to the TLMs Approach

Schmid (2006) identifies three major labour market risks, all possibly leading to long-term unemployment, inactivity and the increase in working poverty and precarious working patterns.

- The first risk concerns the effects of low levels of education on labour market outcomes. Highly educated people (in possession of a tertiary education degree) are more likely to be active in the labour force compared to low educated people, who are more likely to be among the non-employed.
- The second risk concerns young people (under 35 years old), and especially young women, being affected disproportionately by non-standard forms of employment. Indeed, Eichhorst et al. (2011) pointed out that since the late 90s there is a decrease in permanent contracts accompanied by an increase in atypical forms of employment, especially in the private sector. Theoretically, non-standard employment contracts have been implemented in the labour markets to offer more opportunities to non-employed people to re-integrate in the labour force, but in practice they can represent dead-end jobs leading to non-employment, job insecurity and discouragement (Schmid 2006, p. 11; Eichhorst et al. 2011).
- The third risk is caused by the saturation of the internal labour market. The internal labour market mainly includes highly educated people, who invested in their education and training; i.e. the people at the top of the labour queue. However, with the expansion of higher education, these workers are increasing and the market is not able anymore to offer full-time permanent and lifelong employment to all of them and this might lead to higher unemployment rates among already disadvantaged groups (women, young and older workers, low educated), but also among highly educated people.

**The Use of the TLMs as a Theoretical Framework**

Several labour market studies have been inspired and are using the concept of the TLMs (among others: Brzinsky-Fay 2010; Leschke and Jepsen 2011; Koster and Fleischmann 2012; Madsen et al. 2013; Gialis et al. 2015). This section discusses how several scholars have used the TLMs approach as a theoretical framework and why it is relevant to my research project. I chose these studies among others using this theoretical approach, because each one investigates one of the key aspects of my thesis: labour market transitions by age (Madsen et al. 2013), by gender (Leschke and Jepsen 2011); at national (Koster and Fleischmann 2012) and regional level (Gialis et al. 2015) and from an institutional perspective (Brzinsky-Fay 2010). The TLMs concept is valuable for my project because of its double nature: it is normative since it discusses employment institutions and policies; and it provides an excellent framework for cross-national empirical research of labour market transitions in a dynamic and not static way (Brzinsky-Fay 2010; Koster and Fleischmann 2012).

The concept allows us to understand and study the dynamics of the labour market (Schmid 2015; Schmid 2016). During the years of the European Great recession, especially the first years of crisis (2008-2010), the labour market was polarised due to the extended use of non-standard forms of employment (Schmid 2015; Schmid 2016). In fact, while full-time dependent employment decreased, part-time employment increased, especially among young women and workers above 55 years old (Schmid 2015; Schmid 2016). The role of the TLMs approach during the crisis is to "make work pay", "make transitions pay", "make workers fitter for the market" (by promoting education and training programmes and enhancing employability) and "the market fit for workers" (Schmid 2015, p. 71). In particular, the TLMs aims at securing risky transitions and encouraging workers to take decisions in order to improve their employment status, working conditions or other parts of their life, such as starting a family or continuing to further education and training. To this end, the TLMs secure the transitions between different working statuses, so the workers are able to adjust their working life based on their needs/desires, by increasing social protection (pensions, unemployment benefits, employment insurance, etc.) (Schmid 2015; Schmid 2016).

Several researchers use the TLMs approach because it allows them to study labour market transitions across European countries, getting away from the static indicators commonly used, such as duration in unemployment, and analysing them in a more dynamic way, which allows for numerous transitions between numerous labour market states (Koster and Fleishchmann 2012). Madsen et al. (2013) studying youth labour market transitions before and during (2008-2010) the crisis in the Nordic and southern European countries, argue that there is a need of TLMs policies that allow the boundaries between paid work and unpaid tasks, such as family-related tasks and education, to be flexible. Gialis et al. (2015) in their study of employment in Greece before and during the financial crisis, conclude that there is an urgent need for a TLM in order to promote 'protected mobility'. Finally, Leschke and Jepsen (2011) study whether the TLMs policies can contribute to reduce the female disadvantage in the labour markets. In line with Lewis et al. (2008), they conclude that it can, by securing transitions between paid work and other tasks, by promoting flexible working time schemes based on the workers' needs and by endorsing social security, such as public provision of childcare, parental leaves, carer allowance, etc.

**Critiques of the TLMs Approach**

One of the main criticisms against the TLMs concept refers to the high degree of intervention in the labour market suggested by the theory. In fact, the TLMs theory recommends an active role for the state in various policies: a working time reduction for the workers of the public sector, training opportunities funded by the state and more importantly the role of the state as a temporary employer with the aim to re-integrate unemployed people into the labour force (Schmid 1998). Nonsupporters of state interventions argue that the markets should be unregulated and any intervention, if needed, should be implemented from private actors and not collectively (Gazier 2002, p. 196).

Another drawback of the policies suggested by the TLMs theory is the risk of creating a more segmented labour market by promoting, even not intentionally, non-standard forms of employment (Gazier 2002; Gazier and Gautié 2011). The TLMs approach by promoting transitions between labour market states may lead to more turbulent labour market trajectories especially for disadvantaged sub-groups of workers, like women (Jepsen 2005; Gazier and Gautié 2011). Finally, TLMs has been criticised as a work-sharing strategy which focuses on how to re-distribute the existing jobs and income (work-sharing), rather than suggesting ways to create more jobs (job creation) (De Koning 2002; Gazier and Gautié 2011).

From the opposite perspective, the TLMs approach criticises the theories on segmented labour markets as being very rigid and no longer feasible (Gazier 2002). In detail, TLMs consider the internal and external labour markets as one entity for two reasons. Firstly, because the internal labour market is saturated and cannot offer anymore full-time permanent employment for everyone and secondly because the external labour market being more and more populated needs to be regulated in order to offer higher job security (Gazier and Gautié 2011). In fact, the purpose of TLMs is to substitute secondary labour markets with transitional labour markets that offer more flexible and secure jobs (Schmid 1995).

## 2.2 Employment Inequalities across Individuals during the Great Recession in Europe

Already from the theories above, a heterogeneity of labour market outcomes between different groups of workers emerged. The TLMs approach points out that non-standard employment appears more common among sub-groups of workers. This PhD project investigates the variation of occupational trajectories during the Great European recession between individuals with different characteristics, namely gender, age, education level (Chapter 5) and nationality in terms of the country (Chapter 4) and region (Chapter 6) of residence. This section presents research and theories that enable us to explore labour market trajectories disaggregated by gender, age and education. In essence, this section discusses the theories described above in light of the European financial crisis with the aim to study employment patterns during this period. In Chapter 5, I will empirically investigate whether employment inequalities based on these individual traits appear wider after the start of the crisis, across European countries.

Before proceeding to the study of each individual characteristic mentioned above, I state the reasons for which I explore employment inequalities across time and countries. Employment inequalities vary between countries in part because of the different impact of the crisis[8] on the economy and labour market, the pre-crisis economic conditions and labour market performance, as well as the institutional set up implemented in each country (Vaughan-Whitehead 2011). The need to reduce employment inequalities, rising during the crisis, became urgent (ILO-IMF 2010; Vaughan-Whitehead 2011). *Flexicurity*[9], implemented especially by the Nordic

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[8] A dedicated section on the causes and consequences of the European financial recession, as well as the adjustment strategies that European countries adopted to respond to the crisis, is presented in Chapter 4.

[9] "Flexicurity is defined as a policy strategy to enhance, at the same time and in a deliberate way, the flexibility of labor markets, the work organisation and employment relations on the one hand, and security –employment security and social security – notably for weaker groups in and outside the labor market, on the other hand" (Tros 2012, p. 4).

countries (also prior to the crisis), aimed at deregulating the labour markets and, at the same time, at securing workers in order to avoid/contract the rise of unemployment and decrease labour market segmentation (Clasen et al. 2012). However, in some countries, such as the southern European countries, what actually happened during the crisis was a partial deregulation of the labour market: policy makers eased the hiring procedure, but maintained a high level of protection for the insiders (Hipp et al. 2015). One of the results of this partial deregulation was the substitution of permanent workers with non-standard employees, i.e. part-timers, temporary and self-employed workers. In these countries, instead of reducing unemployment, which was the main aim of the market deregulation, labour market segmentation increased and the distinction between insiders and outsiders became even more pronounced (Hipp et al. 2015). Therefore, during the crisis I expect employment inequalities to appear stronger in countries with partially deregulated labour markets.

Indeed, it has been observed that during economic shocks there is a risk of an expansion of labour market segmentation (Tros 2012). The expansion in labour market segmentation broadens the disproportionate effects of the crisis itself, especially for disadvantaged groups, such as low educated, younger and non-standard workers (part-timers, temporary and self-employed) (ECB 2012, p. 10). More specifically, during the 2008 Great recession workers in the secondary employment segment were particularly affected when compared to primary segment workers and they were the first to lose their jobs during the beginning of the recession (Vaughan-Whitehead 2011; Tros 2012). Adjustments[10], such as reduced-hour schemes, were mainly addressed to core workers (adult workers), protected by the employment legislation and "(…) dual labour market led to a dual adjustment, external for temporary workers and internal for core employees" (Vaughan-Whitehead 2011, p. 33).

[10] Section 4.1.3 in Chapter 4 discusses thoroughly the adjustments against the financial crisis.

Leschke (2012) studies the impact of the 2008 financial crisis on labour market segmentation and argues that non-standard forms of employment (part-time, temporary and self-employment) have increased during the crisis, while, at the same time, employment protection for permanent, full-time workers remains high, reinforcing labour market segmentation. Non-standard forms of employment affect in particular disadvantaged groups of workers: more fixed-term contracts are observed among young workers, while part-time employment has a female connotation (Leschke 2012; Hipp et al. 2015). Transitioning from employment to non-employment during the crisis is more likely for non-standard employees and is riskier than before, because re-employment might be in the form of non-standard employment leading to dead-end and precarious jobs (Leschke 2012).

### 2.2.1 Gendered Labour Market Outcomes during the Economic Shock

The job destruction triggered by the financial recession was more evident in the male dominated sectors of manufacturing and construction and consequently men's unemployment increased more than women's, at least at the beginning of the crisis (Arpaia and Cruci 2010; Barakat et al. 2010; Vaughan-Whitehead 2011; Borghi 2012). For this reason, the recession is also known as "man-cession" (Engemann and Wall 2010). Women at the beginning of the recession seemed more protected against the effects of the crisis, but that does not mean that the female employment rate was unaffected when compared to the pre-crisis level (Arpaia and Cruci 2010). In fact, the female-dominated public sector was hit by the crisis but with some delay (Vaughan-Whitehead 2011; Rubery 2014). When studying the gendered effects of the recession, one should not compare women to men during the economic crisis, but women prior to the crisis with women during the crisis. A very interesting point raised by Bettio and Verashchagina (2014) and Karamessini (2014b) narrates that the crisis seems to have narrowed down the gender gap regarding employment, but at the same time this gap decreased not because women are doing better but because men are doing worse, due to the 'man-cession'. This section focuses on some explanations of gender employment inequality specifically linked to the 2008 financial crisis.

Marx (1867), in the first volume of the Capital, underlined the risk of the creation of a reserve army of labour, especially in the industry sector. The Marxist concept of *Reservearmee* refers to a group of people (not women in particular) waiting to be employed in marginal and temporary job positions. In detail, firms in order to adjust the production during market and seasonal fluctuations use, in addition to the core labour force ('effective labour'), a record of employees who could be employed when firms need to increase productivity. These employees are known as the "reserve labour force" (Miller 1971, p. 17). Irene Bruegel, a feminist socialist economist, in 1979 expands the concept of the reserve army of labour. Studying the crisis in the UK during 1974-1978, she confirmed that women act as a labour reserve voluntarily or involuntarily and she claimed that during a period of an economic shock, older people, part-timers and married women are the first to be dismissed.

According to a more recent study, the buffer labour reserve, consisting mainly of women, young and temporary workers (both men and women) is a result of labour market segmentation (Bettio and Verashchagina 2014). Consistent with Bruegel, in periods of economic growth, when labour demand is high, the buffer reserve is used in the labour markets, while during a recession the labour reserve is not being used due to a shortage in labour demand (Bettio and Verashchagina 2014). In fact, during a recession we expect workers from the secondary labour segment to act as a reserve labour force and to be stronger affected in countries with rigid employment legislation (Bertola et al. 2007; Rubery 2014; Bettio and Verashchagina 2014).

A different standpoint claims that the household income influences directly female employment rates (Fox 1981). Indeed, the economic shock pushed women in becoming active in the labour force in order to contribute in the household income, especially in countries with an increased male unemployment (ECB 2012; Bettio and Verashchagina 2014). This phenomenon, known as the 'added worker effect', has been initially studied by the economists Wladimir Woytinsky (1940) and Don Humphrey (1940) in an attempt of studying the impact of the Great Depression in the U.S. Back in the first half of the 20$^{th}$ century, researchers considered married women to be the largest part of the additional workers (Humphrey 1940; Fox 1981; Lundberg 1985). Nowadays we would feel safe to expand this theory to women sharing their household with another person, even without being officially married, and to consider that labour market patterns are not only driven by gender, but also by the composition of the household, i.e. by motherhood (Budig and England 2001; Boeckmann et al. 2015). During the last decades, more women enter the labour force by being employed or at least by searching for a job, transforming households from having a main breadwinner, usually male, to dual-earners households (Anxo et al. 2007, p. 236). The effects of the crisis on gender can be distinguished in 'first-round effects' caused by a contraction in employment and 'second-round effects', regarding decisions made in order to maintain household income (Sabarwal et al. 2010; Karamessini 2014b).

Among the reasons that leave women more susceptible towards lay-offs are: women often work in less organised and less unionised workplaces (mainly in the service sector), unskilled women are highly penalised and easily replaced by employers, women are less likely to change job but are more likely to be in unstable, precarious and seasonal jobs than men. Additionally, during the last decades, due to technological developments, ageing and increase in female participation in the labour force there is an increase in the service sector, a phenomenon known as 'tertiarisation' (Eichhorst et al. 2011, p. 284). Non-standard forms of employment (part-time, self-employment, fixed-term contracts) are more common within the service sector. The service sector has a female connotation, thus we can assume that there is an increase of atypical work contracts among women. The last decades, as mentioned already at the end of section 2.1.1, there is an increase in the rates of educational attainment among women, overtaking the male rates in many developed countries (Klesment and Van Bavel 2017). Nonetheless, women, especially low educated women, are still in disadvantage regarding occupational outcomes (Iannelli and Smyth 2008; Raffe 2011, 2014). This disadvantage might be linked to other factors, such as the choice of school subject and the choice of occupation, which is still gender-driven, as well as motherhood (Budig et al. 2012; Klesment and Van Bavel 2017; Jacob et al. 2017).

Female labour market patterns, as well as the gendered impact of the crisis differ significantly across European countries and are largely influenced by the context, the structure of the labour market, the welfare state, the gender division of labour, the institutional set up and the political will (Anxo et al. 2007; Rubery 2014; Boeckmann et al. 2015). Anxo et al. (2007) argue that men and women are offered a range of working time options depending on the 'working time regime'. In detail, the Nordic countries offer equal chances of employment to both men and women, while the rest of the European countries still present gendered labour market patterns. However, even in the egalitarian labour markets of the Scandinavian countries, men still have higher chances of being employed than women (Klesment and Van Bavel 2017). In countries where there is no option of reducing/increasing the hours worked, a large gap between the preferred number of working hours and the actual number of working hours was found (Anxo et al. 2007).

### 2.2.2 Younger and Older Workers during the Financial Crisis

Sharp contrasts emerged when reviewing the literature studying the impact of the crisis on different age groups (among others: Bell and Blanchflower 2011; Madsen et al. 2013). In times of economic depression and thus limited job vacancies, the gap between younger and older workers appears more pronounced (Barakat et al. 2010). Overall, youth is more susceptible to unemployment during periods of economic and labour market changes (Raffe 2011). Indeed, according to numerous studies, young workers (often defined as under 35 years old) were immediately and strongly affected by the economic downturn, as manifested with a sharp increase in youth unemployment rate, which is substantially higher than the total unemployment rate (Arpaia and Cruci 2010; Vaughan-Whitehead 2011; Bell and Blanchflower 2011; Madsen et al. 2013). Young people face numerous difficulties not only in their integration from education to labour markets, but also during employment transitions and are expected to experience turbulent employment trajectories (Kahn 2010; Madsen et al. 2013). They are more likely to be employed in low quality and low-wage non-standard forms of employment, which do not always act as a stepping-stone to more permanent and protected job positions (Madsen et al. 2013). Moreover, young workers' employment rates may be lower in countries with rigid employment legislation, which protects the insiders, usually adult workers (Bertola et al. 2007; Barakat et al. 2010; Bell and Blanchflower 2011).

Among the main reasons to explain why young workers have been affected by the crisis more is the "principle of last in, first out – the seniority principle" (Vaughan-Whitehead 2011, p. 7). According to the seniority principle, the first workers to lose their job during a decrease in labour demand are those who were most recently hired, usually younger workers. Secondly, workers with non-standard contracts, especially fixed-term contracts, were the first to lose their jobs and this type of contracts is very frequent among young people (Vaughan-Whitehead 2011). Finally, during an economic shock employers are often asked to adjust their labour force due to a decrease in labour demand. In such occasion, employers may use labour hoarding or firings. In both cases, the less experienced workers, often the case of young workers at the start of their careers, will more likely be the scapegoats.


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Based on the job competition theory, during an economic shock job vacancies are limited and at the same time competition among the unemployed to find a job is intense. In this case, young people are penalised due to their lack of work experience (Scarpetta et al. 2010; Barakat et al. 2010; Bell and Blanchflower 2011). To tackle this problem, researchers suggest policies that promote further education and training programs, on-the-job training and apprenticeships, all policies aiming at enhancing the human capital of young people (Raffe 2011). On the other hand, older workers (55-64 years old) were more lightly hit by the crisis than it was expected (Borghi 2012; ECB 2012). This pattern "(…) may reflect a labour supply response to losses in retirement savings and/or lower availability of early retirement options compared to previous recessions" (Borghi 2012, p.6). This new and quite surprising pattern regarding older workers in their 50s and 60s is endorsed by Vaughan-

Whitehead's book (2011). In Chapter 5, I discuss whether this pattern is supported by my findings.

### 2.2.3 The Role of Education on Employment Outcomes

Although I am focusing on labour market trajectories and not on school-to-work transitions[11], the literature on school-to-work transitions cannot be ignored for several reasons. The education and school-to-work transition systems of each country allow me to understand the country regimes better (see next section). School-to-work transitions might be affected by structural and institutional factors, such as the education and training system, the nature and flexibility of the labour market and the welfare state (Raffe 2011; De Graaf and van Zenderen 2013; Raffe 2014). Moreover, school-to-work transitions are very crucial for future transitions of workers (Müller and Gangl 2003). A 'good' or 'bad' first transition may have positive or negative effects on career prospects and may lead to discouragement if workers start their career on the wrong foot. Thus, I expect these transitions to directly influence transitions of people between 25-34 years old (the first age group of analysis). Finally, this literature stresses the role of education in employment outcomes, which is crucial as argued by the theories mentioned above.

David Raffe, a sociologist of education, carried out influential research regarding transitions from education to employment in a cross-country comparative perspective (Raffe 2000, 2008, 2011, 2014). School-to-work transitions were in the centre of the attention already for many decades. However, in the 70s the youth unemployment rate rose sharply and the need of best practices and policies from countries dealing more efficiently with this problem became urgent. At this point, we should keep in mind that the youth unemployment rate might be a biased

[11] The youngest age group in my sample consists of people above 25 years old. Excluding people under 25 years old, allows me to analyse in most cases the highest level of education attained and therefore to measure the real effect of education on labour market transitions (Engemann and Wall 2010).

measure of employment outcomes of young people. It is measured based on people moving from full-time education to full-time employment, counting those who continue into further education and training as unemployed. Thus, some countries that promote further education appear to have higher unemployment rates than it would have been expected. Many researchers use instead of the traditional unemployment rate, the NEET rate: young people either in employment, education or training (Raffe 2011). Raffe defined the school-to-work transitions as "the sequence of educational, labour market and related transitions that take place between the first significant branching point within educational careers and the point when –and if– young people become relatively established in their labour market careers" (Raffe 2014, p. 177). According to Raffe (2011), young people entering for the first time the labour market are generally at a disadvantage compared to workers who have already been in the market for some time. Young people (often outsiders) have to compete with people with more work experience (often insiders). As stated by the theories of job competition and signalling discussed above, employers will prefer to hire older people with specific skills, who need less training and display high productivity levels.

Another important factor that frames the education to work transitions is the role of education. According to the human capital theory, education is a tool to acquire all the necessary skills (technical and soft[12]) in order to enter successfully the labour market. Education provides people with skills so they are "readily employable"; similarly, skills are also gained through work experience (Mason et al. 2009). "[The] possession of the skills, knowledge, attitudes and commercial understanding will enable new graduates to make productive contributions to organisational objectives soon after commencing employment" (Mason et al. 2009, p. 1). According to the

[12] Soft skills are social skills, such as the ability to work in a team or to coordinate a team; language skills; and so on. The soft skills accompany the technical skills, which constitute the basic requirement in order for a job candidate to fill in a job vacancy.

signalling theory, education acts as a means for employers in order to scan potential employees and choose the most suitable for each job position.

Since the mid-20th century, we can observe a significant increase in education (Müller and Wolbers 2003) and therefore an increase in the age when young people enter the labour market, i.e. young people graduate later (Anxo et al. 2007; Raffe 2011, 2014; Mosher 2015). At the same time and especially during the economic downturn, there is an increased demand for higher education in most European countries (Douglass 2010; OECD 2010). It takes more time now compared to two decades ago for young people to get a permanent job position, in other words school-to-work transitions have become more turbulent, fragmented and complex (Müller and Gangl 2003). They do not necessarily consist in one simple and generally fast transition from education to permanent full-time employment. In fact, there are many intermediate states between the end of full-time education and full-time permanent employment: young people may return to education and training or have one or more non-standard jobs and may experience spells of unemployment and/or inactivity (Müller and Gangl 2003). Transitions are more "individualised", i.e. less standardised and less predictable, with more room for individual choices (Müller and Gangl 2003; Raffe 2011; Raffe 2014; De Graaf and van Zenderen 2013).

Low educated people still face the highest risk of unemployment and experience more turbulent and complex transitions. Scarpetta et al. (2010, p. 16) argue that "education pays" in their study of the role of education in labour market transitions of young people (15-29 years old) in OECD countries. In fact, people with tertiary education were more likely to be in employment when compared to lower educated young people, with the exception of Italy, where young people with upper secondary education registered the highest employment rate (Scarpetta et al. 2010, pp. 16-17).

**Low Educated or Highly Educated People More Affected by the Great Recession?**

There are contradicting views on whether the Great recession hit harder the low or the highly educated. On the one hand, low educated workers are more vulnerable towards work instability and more likely to transit from any type of employment to non-employment (Scherer 2004; Blossfeld et al. 2006; Muffels and Luijkx 2008; Bell and Blanchflower 2011). These studies claim that low educated people have been more negatively affected by the crisis (ECB 2012). Low educated people often work in the manufacturing and construction sectors, which were strongly affected by the crisis. Moreover, low educated people are in possession of skills that are easy and cheap for firms to replace and thus more vulnerable to lay-offs, while highly educated people have more firm-specific skills, which translate in better job security (Barakat et al. 2010; ECB 2012).

On the other hand, according to different studies, during the Great recession and considering Europe as a whole, people attained tertiary education qualifications, although their overall employment rate is high, are also likely to be or become unemployed (Bell and Blanchflower 2011; O'Higgins 2012). In fact, the Great recession affected both low and high educated workers in Europe (Vaughan-Whitehead 2011). In line with the theory of job competition, a possible explanation for highly educated people being also affected by the recession, especially in countries with low labour demand, lies in the combination of excessive number of people with tertiary education and a contraction in job vacancies due to the saturation of the internal labour market (Bell and Blanchflower 2011). This pattern leads to the problem of 'educated unemployment' (O'Higgins 2012, p. 324).

Summing up, a large body of empirical research confirms the influence of socio-demographic factors on individuals' labour market transitions (among others: OECD 2010; Erhel et al. 2014). As seen above, particularly during economic shocks already disadvantaged workers, such as young people, women, low educated and non-standard workers, appear to be vulnerable. Men, the core labour force (adult workers) and workers with full-time permanent dependent employment arrangements, although they have been affected by the crisis, remain better off (Borghi 2012). Overall, women appear more disadvantaged and highly likely to transit towards non-employment than men. Young workers tend to experience a greater turbulence in their trajectories than older employees who appear to be more stable, but with higher probabilities of transitioning from employment to inactivity. Gangl (2002) argues that youth labour markets are more vulnerable to socioeconomic changes, such as the financial crisis of 2008. As for the country groups, Nordic labour markets are more equity-based, in contrast to southern European labour markets where gender inequalities are significantly pronounced and the continental countries where age matters considerably (Erhel et al. 2014). Studying employment disparities during the first four years of the financial crisis in Europe aims at investigating the above patterns and at suggesting new patterns (Chapter 5).

## 2.3 Attempts of Classifying European Countries

This thesis focuses on cross-country comparisons of individual employment patterns across time. The theories discussed above are at the individual-level allowing to predict how the employment patterns will change during the crisis based on the socio-demographic characteristics of the Europeans in analysis. However, these theories strongly depend on the national context and more specifically on the economy, labour market structure, education and training system, as well as on the institutional set up. To this end, I present country characteristics using influential country classifications in order to link the above theories with the context of analysis. Theories at individual level allow me to formulate hypotheses for individuals' labour market patterns across time (see section 2.5), while linking these theories to country classifications allows me to formulate hypotheses at country level across time.

Numerous recent studies on labour market transitions are interested in cross-national comparison and/or comparison over time – such as Karamessini and Rubery 2014 who study gender employment inequalities in nine countries during the Great recession; Leschke (2012) who studies labour market segmentation in European labour markets during the economic shock; Ward-Warmedinger and Macchiarelli (2014) who focus on labour market transitions across country groups (Central Eastern, Nordic, Continental and Mediterranean) during 1998-2008; Arpaia and Curci (2010) focusing on the labour market adjustment strategies against the crisis during 2008-2009 across Europe; Vaughan-Whitehead (2011) studying work inequalities in Europe during the first year of the crisis; Erhel et al. (2014) who study labour market patterns across European countries during 2008-2010. My research project has a double comparative nature, comparing individual labour market trajectories across time (2005-2008 and 2009-2012) and across place (11 European countries and 41 regions).

Chapters 4 and 5 study each of the eleven European countries separately and not in country groups. Classifying countries in groups aims to reduce the complexity of national contexts and allows for cross-country comparative studies and comparative social policy studies when involving a large number of countries (Bonoli 1997). On the other hand, it requires a priori classifications and assumptions. For instance, Mediterranean countries share some characteristics, but I do not want to assume that their labour markets work in the same way nor that the effects of the crisis are the same in Greece and Italy, nor in Sweden and Denmark. My goal is to study each country separately, but present the results in country groups in order to confirm the country classifications used or suggest alterations. This section focuses on some of the most influential country classifications (the choice is not exhaustive) that help me describe the national labour markets and allow me to link the context of analysis with the labour market transition patterns emerged from the data analysis. More details on country-specific features are discussed in Chapter 4, section 4.1.

Country classifications may be based on only one characteristic, such as the welfare state (section 2.3.1), the labour market structure (section 2.3.2) or the education system (section 2.3.3); or on the combination of different characteristics, such as the link between education and labour market. Moreover, classifications based on welfare models may vary depending on the specific features they are based on: active or passive policies, quantity of welfare provision and beneficiaries of welfare provision. Classifications based on labour markets may use as a main criterion the distinction between labour market segments, the degree of (de)regulation of the labour market, the degree of *flexicurity*, the minimum wage, the strength of unions and collective agreements, and so on. Nowadays, a classification based on the effects of the Great recession in the economy and labour market of each European country would seem appropriate, although probably one-dimensional and short-lived.

### 2.3.1 Country Classifications based on Welfare States

#### Welfare Models in the 70s

Titmuss (1974) with his typology based on the role of the welfare state influenced the majority of typologies since the 70s. He defined three types of welfare states:

1) The residual welfare model, which assumes that the state only has a residual role. Titmuss argues that there are two 'natural' channels through which welfare is provided: the market and the family. Only when this system breaks, do social welfare institutions take an active but temporary role. Social welfare institutions work as the last resort of assistance. The purpose of the welfare state according to this model is to teach societies not to need a welfare state.

2) The achievement – performance model. This model attributes to welfare institutions an important role, as they are considered the main support for the economy. It is based on principles of incentives, effort (work performance) and reward. Welfare works for the employers, since it is increasing the capacity of the workforce and it stimulates demand when production is low. This has been the dominant model in Germany.
3) The institutional – redistributive model claims that welfare (e.g. public services, education, etc.) is provided for the population as a whole, based on need (not just to the poor). However, the institutional system has to apply some selective criteria for the beneficiaries in order to cover all the needs. On the contrary, the residual system offers universal services without applying any selectivity method.

### The Three Worlds of Capitalism

In 1990, Esping-Andersen presented his 'Three Worlds' model, a milestone for the welfare state research. Esping-Andersen based his classification on the concept of de-commodification, which he defines as "the degree to which individuals or families can uphold a socially acceptable standard of living independently of market participation" (Esping-Andersen 1990, p.37). A high degree of de-commodification means that people are able to maintain themselves without relying directly on the market. He defines three welfare models. The first model is the **liberal Anglo-Saxon** welfare regime in which the market has a central role, while family and state have marginal roles. The degree of de-commodification of this model is low, the labour market regulation limited and the entitlement in social welfare is based mainly on need. The countries included in this first category are the UK, Ireland, USA, Canada and other Anglo-Saxon countries. The second welfare regime is the **social-democratic Scandinavian** regime. Here the state has the central role and the role of the individual is central, while family and market only marginal roles. Solidarity is throughout the society (universal) and, therefore, the entitlement in social welfare is based on citizenship. Labour market regulation is moderate and the degree of de-commodification is high. The countries included in this cluster are Sweden, Denmark, Finland, Norway and the Netherlands. The third and last welfare regime is the **conservative or corporatist** regime, based on a conservative work-oriented social policy, in which the role of the family is central, followed by the market, while the role of the state as subsidiary. When the degree of de-commodification is modest, the entitlement is based on contribution and the model is based on the concept of social insurance. People who have not contributed are excluded from the social provision, as well as those on the highest incomes. This model includes mainly continental European countries, such as Germany, Italy, France, Austria and Belgium.

### The Fourth World of Capitalism

Although Esping-Andersen argues that a classification of welfare regimes should not be based only on expenditure on welfare, he still bases his own classification only on the quantity of welfare provision. Moreover, the model fails to classify southern European countries. In fact, Ferrera (1996) underlines that most of the southern European countries have been excluded from the main classification efforts of the late 1980s and early 1990s and adds a "Fourth World" to Esping-Andersen's classification. One of the common characteristics of the southern countries' welfare systems is the dualism of protection. On the one hand, they offer very generous protection to a group of beneficiaries and, on the other hand, there is a large group of under-protected workers: "peaks of generosity accompanied by vast gaps of protection" (Ferrera 1996, p.29). He also identifies other common traits of southern European countries: public and universal health systems, collaboration of state (low-intervention role) with institutions and clientelism (Ferrera 1996). Ferrera's classification, based on the eligibility criteria for benefits and the nature of benefits, identifies four welfare models: the **Anglo-Saxon** (UK and Ireland); the **Bismarckian** (Austria, Belgium, France, Germany, Luxemburg, the Netherlands and Switzerland); the **Scandinavian** (Sweden, Denmark, Finland and Norway); and the

**Southern** model (Greece, Italy, Spain and Portugal). Esping-Andersen in 1996 insisted that there is no need of a new welfare model. He considers the southern European countries still in transition and holds that they will be eventually placed in one of the three original regimes.

### More Dimensions Considered in the Country Classifications

Bonoli (1997) in disagreement with all the past attempts to classify countries based on welfare models suggests an alternative country classification, based on a two-dimension approach. He argues that past classifications have been based on only one dimension of social policy and thus he criticises Esping-Andersen's classification, for being partial since it is based only on the quantity of welfare provision and Ferrera's for neglecting the dimension of quantity and focusing only on the beneficiaries of the social provision. For Bonoli the ideal classification would combine the quantity of welfare provision (the 'how much' dimension) and the way in which welfare provision is delivered (the 'how' dimension). He, therefore, defines two dimensions: the extensiveness of welfare provision measured as a percentage of the GDP; and the financial channels of welfare states measured as the share of social expenditure covered by contributions (Figure 2.1).

**Figure 2.1 – Giuliano Bonoli's country classification - European welfare states according to the two-dimension approach**

| | |
|---|---|
| **High spenders covering the whole population:**<br>Denmark<br>Sweden<br>Norway<br>Finland | **High spenders covering only contributors:**<br>The Netherlands<br>Belgium<br>France<br>Germany<br>Luxembourg |
| **Low spenders covering the whole population:**<br>United Kingdom<br>Ireland | **Low spenders covering only contributors:**<br>Italy<br>Spain<br>Greece<br>Portugal<br>Switzerland |

Source: Based on a graph in Bonoli (1997, p. 361)

In the 2000s, numerous researchers (Boeri 2002; Saint-Arnaud and Bernard 2003; Sapir 2006; Dimian et al. 2013) confirmed the four social policy country models in Europe: the Social-Democratic Nordic model (Denmark, Finland, Sweden and the Netherlands); the Liberal Anglo-Saxon model (Ireland and the UK); the Conservative continental European model (Austria, Belgium, France, Germany and Luxembourg); and the Mediterranean model (Greece, Italy, Spain and Portugal). The Netherlands according to numerous researchers is a hybrid case, which can be classified somewhere between the Nordic and the Continental model (Boeri 2002; Ebbinghaus 2012).

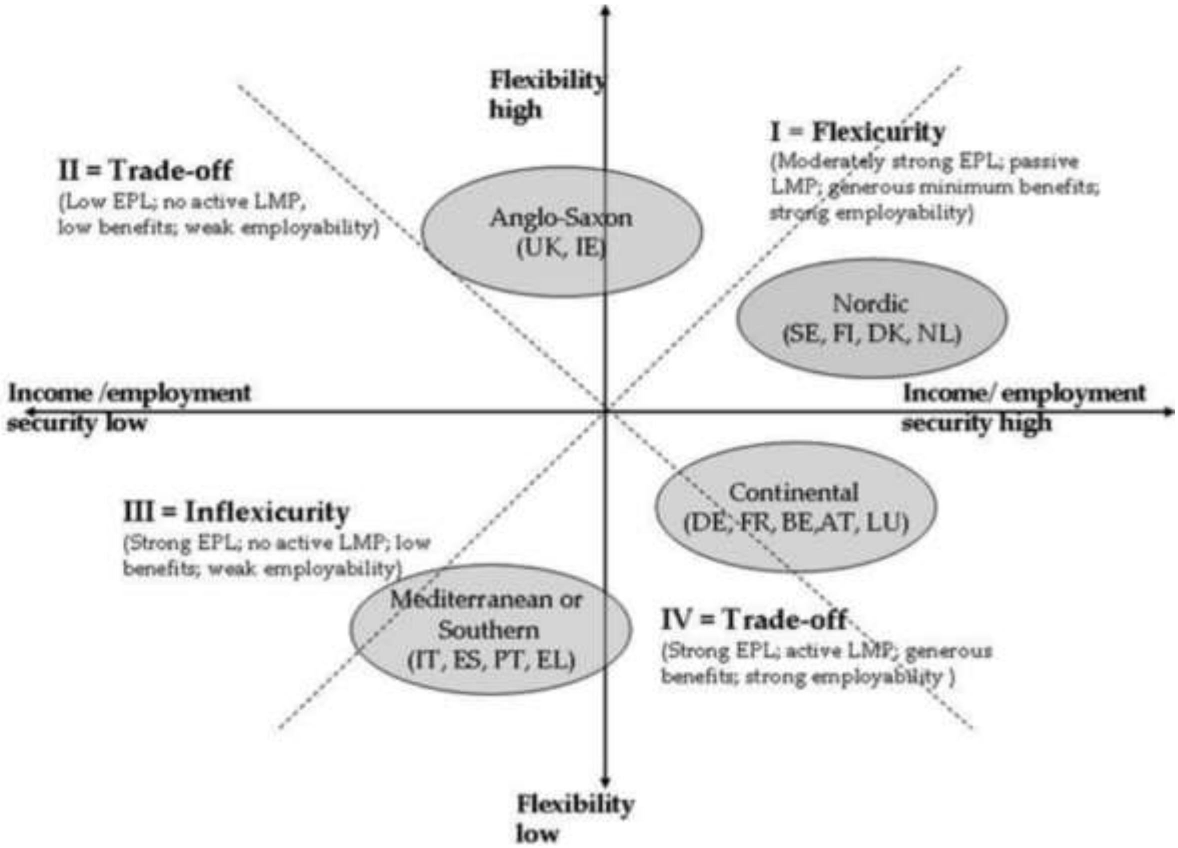
The welfare regimes present some drawbacks. They are gender blind, considering decommodification universal and focusing on the dichotomy between state and market, ignoring the role of households, which appears to be strong among women (Stadelmann-Steffen 2008). Indeed, the state-market relations should take into consideration family policies, the organisation of unpaid work and other gender dimensions (Orloff 1993). Moreover, welfare state classifications ignore the provision of services, such as services for children that promote work/family reconciliation and services to boost employment among older workers (Anxo et al. 2010). For instance, public provision on childcare promotes not only female employment but also good quality of female employment (Lewis et al. 2008; Booth and Van Ours 2013; Leschke 2015; Schmid 2016). Finally, country classifications based on welfare states may be unreliable since they ignore important factors that shape each country, such as the education and training system. Therefore, classifications that combine welfare states with labour market and education features, as well as gender characteristics are studied below and are considered more complete.

### 2.3.2 Country Classifications based on Labour Market Features

Muffels et al. (2002) study labour market transitions by country group during 1993-1996 and conclude that labour market flexibility and work security should be used when classifying countries. *Flexibility* here is defined as the workers' opportunities to transit between different forms of employment in order to maintain their status and improve their occupation conditions (number of flexible jobs and degree of job mobility). On the other hand, *security* refers to the chances of remaining in the labour market and not transiting towards non-employment. They study the linkage between the concept of TLMs and the welfare regimes defined by Esping-Andersen (1990) and Ferrera (1996). Overall, they conclude that labour markets are distinguished in those promoting flexibility, i.e. supporting maintenance transitions (between different forms of employment) and in those promoting work security, i.e. supporting integrative and exclusionary transitions.

Muffels and Luijkx (2008) study the impact of institutions on labour market mobility patterns in 14 European countries during 1994 and 2001, using the European Community Household Panel data. Figure 2.2 shows each of the four country regimes based on their relationship between labour market flexibility and security. In line with Muffels et al. (2002), the Anglo-Saxon and Continental regimes register a 'trade-off', showing high flexibility and low employment protection (Anglo-Saxon model) or low flexibility combined with strong employment protection (Continental model). That, however, does not imply that Liberal countries do not protect their workers, it means that they emphasize on the flexibility aspect. Finally, the Nordic regime shows high values of both flexibility and security, while on the contrary the Southern regime shows low flexibility with strong employment protection but without a generous welfare state. According to Muffels et al. (2002), in the southern labour markets there is an increasing number of flexible non-standard jobs, but limited transitions from flexible to standard employment.

**Figure 2.2 - The location of welfare regimes in the theoretical relationship between flexibility and income/employment security (Muffels and Luijkx 2008)**




Source: Reproduced from Muffels and Luijkx (2008, p. 225)

In Chapter 4, I present the individual labour market trajectories across time grouped in the country regimes defined by Muffels and Luijkx (2008). This particular classification is used because it combines features of the welfare states and the labour markets. It combines institutional features, such as the employment legislation protection (thoroughly discussed in Chapter 4), with welfare provision and employment outcomes.

### Gender Regimes Based on Features of the Labour Market

Changes such as the increase in female labour market participation, the increase in the services sector, the decrease in the number of children by household, the expansion of education, the technological development and so on urge the need of new country classifications that take into account the effect of these changes on gendered employment trajectories (Anxo et al. 2010; Cooke 2016). According to several researchers, gender dimensions should be included in country classifications (among others: Orloff 1993; Lewis et al. 2008; Stadelmann-Steffen 2008; Anxo et al. 2010). Several work and family policies promote female employment, such as the provision of childcare, leaves (maternal/paternal) and flexible working arrangements (as suggested by the TLMs framework) (Lewis et al. 2008). These policies aim at promoting "an adult worker family model" and leaving behind the traditional "male breadwinner/female carer model" (Lewis et al. 2008, p. 262). In other words, the goal of the states and of welfare should be a swift from the "maternalism model" (stay-at-home mothers) to "employment for all", succeeded mainly in the Nordic countries (Orloff 2006, p. 230).

Mutari and Figart (2001), in line with Bettio et al. (2013), conclude in four gender regimes: a solidaristic regime with high level of work flexibility and gender equality[13] (Denmark, France, Finland and Sweden); a regime including high flexibility and low gender equality (UK, Ireland, Austria, Germany, Luxembourg and Netherlands); a male breadwinner regime with low flexibility and low equality (Spain, Greece); and a regime with high equality but low flexibility (Portugal).

[13] Gender equality here is defined as equal share of women and men across working time schemes, an increase in female labour force participation and a decrease in the wage gap (Mutari and Figart 2001, p. 39).

Furthermore, Anxo et al. (2007) study the female labour market integration patterns across European countries and identify four gender models:

- The Nordic 'universal breadwinner' model (Sweden): high employment rates for both men and women, dual-earner couples, more equity-based gender labour division
- 'Modified breadwinner' model (France): The majority of women when they start a family transit to reduced hours working arrangements like in the Nordic countries, but there are some women who are constrained to exit the labour force and transit towards inactivity.
- The Mediterranean 'exit or full-time' model (Italy and Spain): countries with the lowest female employment rates and at the same time high male employment rates, therefore couples with a single-male-breadwinner.
- The 'female part-time work' (Netherlands, Germany and UK): Typically starting a family means for women a non-temporary (even when the children are older) transition from full- to part-time employment.

In Chapter 5, I present the female labour marker trajectories before and during the crisis in country groups, as defined by Anxo et al. (2007), because their classification combines features of gender equality, the use of part-time employment, the share of female inactivity and stresses the role of family, characteristics highly relevant to my research project.

### 2.3.3 Country Classifications based on Education and Training Systems

From the above country classifications, an important characteristic is missing; the role of education. In fact, even though people's welfare depended on more than one factor (e.g. social spending, work organisations and unions, taxes, etc.), the role of education has been overlooked in Esping-Andersen's welfare regime study (West and Nikolai 2013; Moscher 2015).  One possible explanation for this might lie in the cross-national differences regarding the connection of education and welfare systems, e.g. in the Scandinavian countries education is part of the welfare system, while in other countries, such as Germany, that is not the case (Peter et al. 2010). Education, especially during the tertiarisation process (increase in the services sector), has a crucial role in shaping welfare states and reducing inequalities (Peter et al. 2010; Busemeyer 2015; Mosher 2015). Education is also strongly linked to employment outcomes and wage inequality (Iannelli and Smyth 2008; West and Nikolai 2013; Moscher 2015). Due to the crucial role of education in labour market outcomes and to the country variation of education and training systems, numerous researchers suggest that education should be introduced in the welfare state regimes (among others: Room 2002; Allmendinger and Leibfried 2003; Peter et al. 2010; West and Nikolai 2013; Mosher 2015). In other words, they suggest a combination of the "education state" [14] and the "welfare state" (Mosher 2015, p. 242).

The heterogeneity among countries observed from the welfare classifications above, exists also when studying the cross-national variation in education and training systems, education expenditure and education inequality (Peter et al. 2010). Focusing on the education expenditure factor, the Anglo-Saxon countries (Liberal regime) invest more in the education state than the welfare state (Allmendinger and Leibfried 2003; Mosher 2015). According to the welfare classifications, the Liberal regime is considered a low-spender offering limited social security. However, this regime invests significantly more than the other regimes in education. In fact, "Liberalism has historically emphasized creating equality through equality of opportunity, often provided by education" (Mosher 2015, p. 257). Conservative continental countries are medium spenders regarding the welfare state and they invest in education state even less. Finally, Social-Democratic Scandinavian countries invest in both states adequately, favouring however the welfare state (Mosher 2015, p. 245).

[14] The education state, according to Mosher (2015), can be measured in years spent in education or in education expenditure. Mosher in his research uses the first measure.

Numerous researchers studying school-to-work transition processes in a comparative perspective across European countries use country classifications based on education and labour market features (among others: Müller and Shavit 1998; Gangl 2003; Iannelli and Smyth 2008; Raffe 2011). The "transition regimes", mainly a combination of the traditional welfare state with the addition of features of school-to-work transitions - have been suggested by Walther (2006) and Niemeyer (2007) and have been studied by various researchers (among others: De Graaf and van Zenderen 2013; Raffe 2014). The transition regimes are based on the education and training system (e.g. promotion of vocational education), the social security system, the functioning of the labour market (e.g. unemployment and NEET rates), the inequalities regarding the employment outcomes of young people, and the expenditure on education (De Graaf and van Zenderen 2013; Raffe 2011, 2014).

Walther's classification (2006) uses the social policy country models: Social democratic (Universalistic), Conservative (Employment-centred), Liberal and Southern (Sub-protective). Interestingly, he combines dimensions regarding education and training, social security, female and youth labour market indicators, employment inequalities and education policies (Table 2.1).

**Table 2.1– Transition regimes as defined by Andreas Walther in 2006**

| Regime | Universalistic | Employment-centred | Liberal | Sub-protective |
|---|---|---|---|---|
| **Countries** | Denmark, Sweden | Germany, France, Netherlands | UK, Ireland | Italy, Spain, Portugal |
| **School** | Not selective | Selective | Not selective | Not selective |
| **Training** | Flexible standards | Standardised | Flexible, low standards | Low standards and coverage |
| **Social security** | State | State/family | State/family | Family |
| **Employment regime** | Open, low risks | Closed, risks at the margins | Open, high risks | Closed, high risks, informal work |
| **Female employment** | High | Medium | High | Low |
| **Concept of youth** | Personal development, citizenship | Adaptation to social positions | Early economic independence | Without distinct status |
| **Concept of youth unemployment** | Not foreseen | Disadvantage | Culture of dependency | Segmented labour market, lack of training |
| **Concept of disadvantage** | Mixed | Individualised | Individualised | Structure-related |
| **Focus of transition policies** | Education, activation | (Pre-) vocational training | Employability | Some' status: work, education or training |

Source: Table reproduced from Walther (2006, p. 126)

Countries included in the Universalistic regime (Denmark and Sweden) are characterised by comprehensive compulsory education, strong general and vocational training, individualised education and training curricula, universal social security funded by the state, and overall high youth and female employment rates. The Liberal regime (UK and Ireland) includes countries with mostly comprehensive schooling, diversified after the compulsory education and flexible pathways leading to vocational training or higher education. The welfare state of this regime is not as generous as the one of the Universalistic group, but education allowances are provided to young people and overall youth and female unemployment rates are encountered. The Employment-centred regime (Germany, France, Netherlands) includes countries with selective schools, i.e. with segmented education and training paths and standardised vocational training pathways. The labour market segmentation is rather high, leading to medium female and youth unemployment.

Youth social benefits are based on their contributions. Finally, the worse performing countries are those of the Sub-protective regime (Italy, Spain, Portugal), where family and informal work have important roles. These countries offer comprehensive education and weak vocational training. Youth social benefits are very limited, obliging young workers to accept precarious and often seasonal job positions. The very high labour market segmentation leads to high levels of female and youth unemployment rates.

In Chapter 5, labour market trajectories across time and countries are disaggregated by age and education. In order to reduce the complexity of the comparing 11 European countries, the results are presented in country groups. The classification used in Walther's (2006) because it combines many aspects all relevant to my research project and it clearly distinguishes the countries.

#### Summing Up the Country Classifications

It is clear from the above discussion that each classification is based on different (and limited) aspects and thus explains only partially the country heterogeneity. The welfare state classifications lead to very similar country clusters: Social-Democratic Scandinavian model, Conservative Continental model, Liberal Anglo-Saxon model and Southern model. However, ignoring the features of the labour markets and education and training systems when grouping countries may result to misleading clusters. For instance, based on the welfare state the Liberal regime appears to be residual and not generous, but based on the education expenditure it invests more in education than any other regime. Indeed, the classifications based on numerous features of the education and training system, the labour market structure, the social security system and the employment or unemployment rate of disadvantaged sub-groups of the population are, in my opinion, more complete classifications. Therefore, in Chapter 4, Muffels and Luijkx (2008) classification is used, while in

Chapter 5, Walther's (2006) and Anxo's (2007) classifications are used to discuss employment trajectories by gender, age and education across European countries.

## 2.4 Regional Disparities: Theories and Evidence from Previous Studies

This project focuses on individual labour market trajectories not only across European countries (Chapters 4-5), but also within these countries, studying the regional labour markets (Chapter 6). The study of European regional economies and labour markets has been the centre of attention during the last few decades, especially after the formation of the European Monetary Union (EMU) in 1999, with the aim of suggesting and promoting efficient and suitable policies, adapted at the regional level, and not only at the national level. Research at regional level has been mainly carried out with the aim to reduce territorial disparities within and between countries and therefore the focus is mainly on regional inequalities regarding major economic and/or labour market indicators, such as GDP per capita, productivity growth, employment and unemployment rates (among others: Puga 2002; Marelli 2007; Bracalente and Perugini 2010). The European Union provides funds for this purpose (increase in cohesion) and the eligibility criteria for the Cohesion Fund are based on the GDP per inhabitant (calculated in purchasing power parity) (Eurostat 2015). Another reason for the research interest in regional studies lies in the belief that national inequalities, especially income inequalities, are driven or accentuated by regional disparities (Overman and Puga 2002). According to Decressin and Fatás (1995, p. 1628) "(…) the national labor market dynamics will be, from an economic point of view, a fairly arbitrary aggregation of many heterogeneous regional dynamics". In fact, 'problem regions', i.e. regions with high unemployment rates, trigger inequalities at regional and national level (Pfaff and Hurler 1983).

As mentioned above, most of the studies, both in Europe and the U.S, focus on regional inequalities and more specific on whether basic regional indicators are similar inter-regionally (among others: Decressin and Fatás 1995; Overman and Puga 2002; Niebuhr 2003; Bracalente and Perugini 2010). Other researchers study whether regional inequalities have increased or decreased during the period of increasing economic and monetary union, i.e. during the single currency period, which started in 2002 in Europe with the introduction of the *euro* (Martin and Tyler 2000 studied the evolution of regional employment rates; Marelli 2007). Moreover, there are numerous studies on the impact of economic shocks on regional economies and labour markets, as well as on the regional adjustment strategies (Decressin and Fatás 1995; Martin and Tyler 2000). In this section, I briefly present some of these studies focusing on regional analysis in Europe and discuss different theories and standpoints. The purpose of this section is to better understand the regional context of analysis, as well as to identify the main factors that can explain regional employment disparities (used in Chapter 6).

### 2.4.1 The Concept and Study of Regional Convergence

In the economic growth literature, it is often argued that poor economies (i.e. developing countries) grow faster than developed/rich countries, a concept known as *beta-convergence* (Balassa 1964; De Grauwe and Schnabl 2005; Marelli 2007). S*igma-convergence*, on the other hand, is the decrease of income inequalities across different economies, e.g. countries, regions, cities (Marelli 2007). Barro and Sala-Martin's study (1991) focused on the analysis of regional convergence of GDP per capita and has been criticised as inadequate because they do not take into consideration the effects of various economic, sectoral, demographic and organisational factors, as well as their interaction on income inequalities (Esteban 2000; Bracalente and Perugini 2010, p. 623). Indeed, numerous researchers studied the concept of regional convergence not only by GDP per capita, but also by GDP per worker (Lopez-Bazo et al. 1999; Esteban 2000), by employment and labour productivity (Marelli 2007; Marelli and Signorelli 2010), and by decomposing GDP in its main components (Boldrin and Canova 2001; Bracalente and Perugini 2010).

The concept of convergence is important especially in the context of the European Union, which aims for a balanced economic growth across countries and regions (Marelli 2007). According to Marelli, "(…) in Europe, even within the euro area, *real convergence* is far from complete" (Marelli 2007, p. 151). Real convergence can be measured comparing 'real economic variables' across different economies, such as production growth, GDP, real wages and employment indicators (Marelli 2007, p. 151). The author distinguishes real convergence in long and short term. Long-term real convergence regards the reduction of the structural differences across countries or regions, while the short-term real convergence concerns homogeneous reactions to economic shocks across countries and regions (Marelli 2007, p. 152). Regarding the short term real convergence, the impact of economic shocks on national/regional economies depends on the sectoral structure (development of each occupational sector), the difference in adjustment strategies adopted to tackle the effects of the shock, as well as on the degree of flexibility of labour markets (Marelli 2007, p. 152). Overall, regional convergence depends on the differences/similarities in sectoral structures and institutional set ups between regions.

According to the New Economic Geography, people choose to live in densely populated areas within developed countries and similarly industries are concentrated in specific geographical areas, increasing their degree of specialisation (Krugman 1991; Fujita et al. 1999; Andrew and Feiock 2010). Paul Krugman in 1993 predicted that the European Union and the Euro Area will not succeed in increasing the convergence across European economies and will lead to increased specialisation, which widens the disparities, but on the other hand is a valuable factor for economic growth (Marelli 2007, pp. 154-155; Warin et al. 2008; Marelli and Signorelli 2010). However, according to various empirical studies carried out during the last decade, specialisation is actually decreasing in Europe (Marelli 2004; Marelli 2007). Having said that, regional economies compared to national economies are usually more susceptible to economic shocks and are, overall, more specialised (Marelli 2007, p. 156).

Marelli (2007) studies specialisation and convergence in 250 regions, between 1980 and 2005, using the Cambridge Econometrics European regional dataset. The need for economic and social cohesion between and within countries makes this study and any study of regional convergence after the formation of the EMU and the *euro* as single currency of great importance. Marelli uses GDP per capita to study convergence at national level and claims that there is a relation between national GDP per capita and regional disparities: developing countries manifest larger regional inequalities. During the last two decades, regional disparities, studied with the sigma convergence estimates, have decreased in countries of the Euro Area, but have increased in countries outside the Euro Area, i.e. Sweden and the United Kingdom. The absolute beta-convergence analysis of the GDP per capita and productivity confirms the above results. Indeed, regional convergence was achieved in a higher degree in countries belonging to the Euro Area, when compared to the EU-15 group of countries. Similar results are obtained from the study of regional inequalities based on employment rates. The author concludes that there is a need for reduction of regional inequalities, which appears to prevail in Europe even after the single currency was introduced.

Marelli and Signorelli (2010) study whether EU-27 countries have converged after the EMU and the introduction of *euro* as a single currency, and how this convergence has been affected by the recent economic crisis. They analyse data provided by Eurostat and Cambridge Econometrics. They conclude that in countries using the single currency convergence regarding productivity, employment and unemployment increased between 19990 and 2007. Finally, they claim that during the first two years of the Great recession in Europe, convergence decreased.

Moving away from the commonly used convergence regional analysis, Bracalente and Perugini (2010) decomposed the regional GDP per capita in six components, which were considered to influence the regional development: industry sector, demographic structure, productivity rate, employment rate, indirect taxation and commuting. They linked the Cambridge Econometrics dataset with the Regio dataset provided by Eurostat and analysed 244 regions during 1995-2004. Instead of using GDP per capita, they 'adjusted' the measure and used GDP per employee (Bracalente and Perugini 2010, p. 631). In this way, they account for the added effect on the GDP by commuters, which strongly affects regional inequalities. They conclude that the sectoral structure and the variation of employment rates affect the interregional disparities. The effects of the demographic changes and indirect taxation appear to be weak. Finally, they cluster the European regions (only those with an indicator below the European average threshold of 75%) based on the GDP per worker and three southern European clusters are revealed: the Portuguese cluster with high employment rates but low productivity growth; the South Italian cluster (including French Corsica) with high productivity levels, but low employment rates; and the Greek cluster (including one Spanish region) with low productivity and low employment rates (Bracalente and Perugini, pp. 636-639).

### 2.4.2 Explaining Employment and Unemployment Disparities across Regions

Among the sources of regional labour market variation, Pfaff and Hurler (1983) identify a heterogeneous regional sectoral structure and variation in the unemployment rate among different groups of workers, such as women, low educated people, young and older workers, particularly in 'problem regions' (pp. 163-164). Decressin and Fatás (1995), analysing data from the OECD Regional Employment and Unemployment (1960-1987), the OECD Labour Force Survey (1966-1989) and the Eurostat Regional Databank (Regio 1991) examined regional employment, unemployment and labour force participation indicators in Europe (51 regions) and the U.S., as well as the impact of regional shocks on regional labour markets. Most importantly they stated that in Europe the shocks tend to be more apparent at regional level, rather than at national level, with the impact of the shock spread unevenly among regions even of the same nation. As expected, they also found that the regional labour markets were heterogeneous and each region specialised in different products and services. Moreover, they claimed that a growth in labour demand might permanently increase the regional labour force participation –in both Europe and the U.S., because it triggers migration from other regions with a lower labour demand.

Although, the majority of the regional studies until 2000s focused on income disparities, Martin and Tyler (2000) study regional employment variation in the EU-15 countries plus Norway between 1975 and 1998, using Eurostat's Regio dataset. They identify persistent regional gaps regarding the employment rates, leading to regional inequalities. Moreover, they claim that regions with economies that are based on the manufacturing sector register lower employment growth rates than regions with a highly developed tertiary sector. Finally, the density of the population in each region shows a weak correlation with the regional employment growth. Esteban, in 2000, examines whether regional disparities can be explained by productivity variation across regions or by regional sectoral structures, using data provided by Eurostat's Regio 1995. He concludes that the regional differences can be largely explained by the regional variation in productivity, while interregional disparities in GDP per capita can be attributed to differences in the unemployment or participation rates.

Finally, two more studies on regional disparities regarding employment and unemployment rates are discussed. Caroleo and Coppola (2005) use panel data to model the relationship between regional unemployment rate and contextual explanatory variables. They confirm the presence of "cluster of homogeneous regions – internally convergent but mutually divergent" and they conclude that the reasons for these clusters lie among the heterogeneity of regional labour market characteristics and institutional setups (Caroleo and Coppola 2005, p. 5). They stress that regional heterogeneity was still persistent in 2005, especially among the less-developed regions in southern Europe. In 2007, Perugini and Signorelli compare the EU-15 labour markets at national (1997-2006) and regional level (1999-2005), using both cross-sectional and panel data of the on-line Eurostat dataset. The originality of their paper lies in the use of more than one indicator of labour market performance: they use employment, unemployment and long-term unemployment rates. In accordance with Caroleo and Coppola (2005), they confirm substantial regional heterogeneity regarding all three indicators.

### 2.4.3 The Neighbour Effect and the Importance of the Geographical Position

Overman and Puga (2002) study regional disparities related to unemployment rates in 150 regions during 1986-1996. They model the change in regional unemployment in relationship with education, the sectoral composition of regional employment, the initial unemployment rate (in 1986) and the country of residence. The country heterogeneity regarding (un)employment rates can be explained by differences at national level (between-country variation), but also by differences at regional level (within-country variation) (Overman and Puga 2002, p. 119). Above all factors, the 'neighbour effect' can better explain regional disparities between but also within countries (Puga 2002; Overman and Puga 2002). Regions are more affected by what is happening to their neighbour region than by what is happening within the country itself, and therefore, national borders are not so evident when studying regions (Puga 2002). In other words, (un)employment rates may be more similar between regions that are geographically near (even across national borders) than between regions of the same country. The neighbour effect is able to explain regional differences, even after taking into account contextual factors that neighbouring regions might share, like occupational sectors (agriculture/industry), regional growth, characteristics of the labour force, such as age, gender and education. Furthermore, they argue that the institutional set up at national level is not adequate to explain unemployment variation at regional level; that regions with high concentration of low educated people are more likely to have higher unemployment rates; and that a prevalence of the manufacturing sector is linked to lower levels of relative unemployment.

Niebuhr (2003) study regional unemployment in 359 European regions during 1986-2000, using Eurostat's Regio dataset and the Cambridge Econometrics' European regional dataset. The explanatory variables included in the model are occupational sector (agriculture, manufacturing and services), population density and country of residence. In line with Overman and Puga (2002), she claims that regional labour market disparities can be explained mainly by the concept of 'spatial dependence'. In other words, there is "spatial interaction with respect to regional labour markets in Europe" (Niebuhr 2003, p. 19), indicating that the location of a region affects more its regional labour market, than for example its sectoral structure. Indeed, an economic shock in one region leading to an increase in the unemployment rate and to job destruction will have a have negative effects to the neighbouring regional labour markets, even outside the national borders. According to the author, a possible explanation for the above finding might lie in migration, commuting or trade between regions. Furthermore, regions with higher proportions of employees in the manufacturing and tertiary sectors are more likely to register a lower unemployment rate. On the contrary, densely populated regions tend to have higher unemployment rates.

Ezcurra et al. (2005) study regional bipolarisation, between 1977 and 1999, using the per capita income provided by Cambridge Econometrics data. Their research examines whether there is social cohesion in Europe or whether regions can be divided in two groups, the rich and poor regions, based on their growth level. One of their main findings supports that regional bipolarisation regarding per capita income decreases during 1977-1999. They conclude that the main explanatory feature for regional bipolarisation is the country (i.e. the national context of each region), followed by the geographical location of the region. Based on the geographical position of regions they classify them in central, intermediate, north and south periphery (Ezcurra et al. 2005, p. 991). More recently, in 2014, Karamessini argues that among the consequences of the Great European recession is the increase in polarisation between "the industrialised north and the increasing deindustrialised south" (Karamessini 2014a, p. 9).

### 2.4.4 Regional Resilience to Economic Shocks

The last part of this section focuses on the concept of regional resilience[15] to economic crises, or else the reasons for regional heterogeneity in the responses to economic shocks (Christopherson et al. 2010; Diodato and Weterings 2015) or the heterogeneous degree of regional development (Simmie and Martin 2010). The concept of regional resilience has been used to study the impact of shocks on regional context, as well as the ability of the region to tackle the causes and consequences of the shock (Davies 2011). The determinants of regional resilience relate to the reactions of firms and workers to these shocks (Diodato and Weterings 2015).

Diodato and Weterings (2015) study regional resilience from the workers' angle and, more specifically, regional job vacancies and skill-mismatch, which might influence the regional responses to shocks and might lead, especially after a shock, to a rise in unemployment. To model the regional job opportunities after a period of increased unemployment they take into account the labour market performance prior to the

[15] Resilience is defined as "the amount of change that a system can undergo while retaining its structure and functions, the degree to which it can reorganise, and the degree to which it can create and sustain the capacity to learn and adapt" (Davies 2011, p. 370). In the field of regional studies, resilience can be defined as "the ability of a local socio-economic system to recover from a shock or disruption" (Simmie and Martin 2010, p. 28).

economic shock. An economic shock usually is followed by a rise in the unemployment rate. Lay-off workers may quickly be re-allocated in growing sectors/firms, but if the growing sectors require different skills from the skills of the fired workers, then there is a problem of mismatch between job opportunities and available skills and, therefore, unemployed workers might remain in this status for a longer period or, if possible skill-wise, search for a job in a different sector (intersectoral job mobility). These workers may be obliged to migrate to other regions or even other countries with labour markets able to absorb them (interregional/territorial job mobility). According to Diodato and Weterings (2015), high regional resilience is associated with the ability to quickly re-allocated lay-off workers due to a crisis. On the contrary, low regional resilience is associated with longer unemployment duration and higher rates of migration for unemployed workers. Regions with more than one prevailing occupational sector have higher chances of dealing with crisis' consequences than regions with only one main sector (Davies 2011; Diodato and Weterings 2015). However, this is the case only if the sectors and jobs opportunities provided are not linked by 'buyer-supplier relationships', i.e. the phenomenon known as regional embeddedness. "Regional embeddedness is defined as the degree to which the mix of activities present in a region are linked to one another by buyer-supplier relationships" (Diodato and Weterings 2015, p. 725).

Furthermore, regions where the tertiary sector (services) is predominant manifest higher speed of re-absorbing lay-off workers and, therefore, faster times of recovery from the shock (Diodato and Weterings 2015). A possible explanation might lie in the fact that services require less specific skills than manufacturing or construction sectors; hence, workers suffer less from skill mismatching. Finally, Davies (2011) models the changes in regional unemployment rates in relation to indicators of regional economic and labour market performance, using data from national statistical offices and from Eurostat during 2008-2010. He claims that regions with low share of employment in the manufacturing sector are usually more resilient to crises and that the impact of an economic crisis on regions does not only depend on the region's economic performance, but also on its housing market, sectoral structure, public deficit/surplus and export/import rates (Davies 2011, p. 371).

## 2.5 Research Hypotheses

This chapter concludes with the research hypotheses that emerged from the theories and literature discussed. As mentioned already, I study individual labour market trajectories at national and regional level before and during the 2008 financial recession to address the question "**How did individual labour market trajectories across Europe change during the financial crisis at individual, national and regional level?**". The research question is divided in three sub-questions, each discussed in a separate chapter of the thesis. As stressed in this chapter, labour market trajectories are influenced by both individual (gender, age and education) and contextual (country and region of residence) characteristics. In fact, the research questions are related to both contextual characteristics (Questions 1 and 3) and individual socio-demographic characteristics (Question 2).

Based on the theories, country classifications and regional features discussed in this chapter, below I formulate research hypotheses for each of the research questions:

**Question 1: How did individual labour market trajectories change during the Great Recession across European countries?** The first research question will be investigated by examining labour market trajectories of Europeans between 25 and 64 years old in eleven of the EU-15 countries and is discussed in Chapter 4.

(1.1) Based on the TLMs approach, I expect overall more turbulent (transitions including numerous labour market states) and fragmented (transitions including numerous changes between labour market states) labour market trajectories after the start of the financial shock.

(1.2) Countries belonging to the country groupings as proposed by Muffels and Luijkx (2008) will show more commonalities between them regarding labour market trajectories than with countries of different groups: the Scandinavian cluster (Denmark, Sweden, Finland and the Netherlands), Continental cluster (Austria, Belgium and France), Anglo-Saxon (UK) and southern European group (Greece, Italy and Portugal).

(1.3) Based on the TLMs approach, countries with more flexible labour markets, such as those in the Scandinavian cluster and the UK, will appear to promote job mobility, i.e. transitions between standard and non-standard forms of employment. On the other hand, I expect southern European countries with rigid labour markets to register lower job mobility and more exclusionary transitions from employment to unemployment and inactivity, especially during the financial recession.

**Question 2: Are employment inequalities more pronounced after the start of the 2008 financial crisis in Europe and if yes in which countries?** In Chapter 5, I study labour market trajectories in eleven European countries before and during the financial downturn focusing on the effects of gender, age and education level on employment outcomes.

(2.1) According to the added worker effect, women during the crisis should experience more transitions towards paid work, i.e. from inactivity towards forms of employment.

(2.2) Moreover, following Anxo et al. (2007), I expect women in disadvantaged labour markets, such as those in the 'exit or full-time' countries, to register a high incidence of inactivity and be even more disadvantaged during the financial crisis. On the other hand, I expect women's trajectories in the universal breadwinner countries to be more stable with a dominance of employment and lower gender inequalities even during the crisis. Finally, in the modified breadwinner countries and in the part-time countries I expect a frequent use of female part-time employment during the crisis as a shock absorber.

(2.3) According to the TLMs framework, young people (25-34 years old) should experience more turbulent and fragmented labour market trajectories with more unemployment spells and a higher incidence of non-standard forms of employment (here part-time and self-employment), especially between 2009 and 2012.

(2.4) Flexible Universalistic Scandinavian countries and the Liberal UK, are likely to show lower unemployment among younger workers even during the economic crisis (Walther 2006). On the other hand, Employment-centred and Sub-protective countries with rigid and highly segmented labour markets are expected to display higher youth unemployment rates, with the southern European countries among the worst performers regarding youth employment, especially during economic hardship.

(2.5) In line with the theory of job competition and the TLMs approach, I expect low educated people to experience higher incidence of non-employment, and/or turbulent and fragmented trajectories including non-standard forms of employment, especially during the financial crisis.

**Question 3: Does the region of residence matter for individuals' chances of being employed during the crisis?** In Chapter 6, I study the regional variation in employment outcomes during the Great recession taking into account regions of eight European countries aiming at identifying which regions offer the best chances of being employed during the economic shock.

(3.1) Based on the theories and evidence from previous studies presented in section 2.4, a strong regional heterogeneity is expected in employment outcomes, especially across countries that are non-members of the Eurozone (Marelli 2007; Marelli and Signorelli 2010).

(3.2) Regions with high resilience to the economic shock, i.e. fast recovery from the crisis, are expected to offer higher chances of employment during 2009-2012 (Diodato and Weterings 2015). These regions usually have strong economies and labour markets that applied successful adjustment strategies, i.e. Nordic and Central European regions.

(3.3) Focusing on the geographical position of each region, a regional bipolarisation is expected to emerge from the study, dividing Europe in developed and less developed regions, i.e. in south and north, with the less-developed regions underperforming regarding the employment outcomes during the financial crisis (Caroleo and Coppola 2005; Ezcurra et al. 2005; Lapavitsas et al. 2010; Karamessini 2014a).

(3.4) The regional sectoral structure of employment is expected to affect the employment variation between regions (Niehburn 2003; Marelli 2007; Bracalente and Perugini 2010; Marelli and Signorelli 2010).

# 3

## Chapter 3 Data and Methods

This quantitative study uses data from Eurostat, namely the European Union Statistics on Income and Living Conditions (EU-SILC) longitudinal dataset - a large longitudinal secondary survey - to explore labour market trajectories in Europe before and during the 2008 Great recession in a sample of individuals between 25 and 64 years old. The aim of this chapter is to describe the dataset (section 3.1), sample and measures (section 3.2), as well as methods of data analysis (section 3.3) used to answer the main research question of this project "**How did individual labour market trajectories across Europe change during the financial crisis at individual, national and regional level?**".

## 3.1 The Dataset

This section presents and describes the EU-SILC longitudinal dataset used in this research project, the reasons I selected it, its advantages and drawbacks. Data limitations in cross-national studies are very common. Indeed, very few sources provide data covering both the 'micro' (individuals) and the 'macro' level (countries) and if they do, they tend to cover a limited sample of people or topics (Raffe 2014). Moreover, for many social science research projects cross-sectional data will be sufficient; however some projects will require or will be more innovative by using longitudinal data (among others: Goldstein 1968; Magnusson and Bergman 1990; Davies 1994). Longitudinal analysis offers several advantages over cross-sectional data analysis, such as the study of individual change over time, a better understanding of temporal ordering of events and the ability to control for the effects of previous states (Davies 1994).

Before choosing the most appropriate dataset for this research project, I identified and studied datasets used in recent labour market transition studies, including large-scale European secondary datasets (Breen 2004; Raffe 2014). Based on the research needs on specific variables and countries, I chose the EU-SILC dataset[16], successor of the European community household panel (ECHP), launched in 1994, which was the first longitudinal survey comparing countries (Iacovou et al. 2012, p.1). ECHP was an input-harmonized dataset and was interrupted in 2001 mainly due to its high costs. In 2003, the EU-SILC dataset, took the place of ECHP. I use the EU-SILC dataset for the following reasons:

- It is a comparative dataset that contains monthly and yearly labour information;
- Wide coverage of countries and topics (basic data, income, social exclusion, labour market participation and housing);
- Information is provided both at national and regional level;
- Sufficiently large sample sizes, allowing for analysis of small groups and small regions;
- Accessible without fees.

### 3.1.1 Structure of the EU-SILC Dataset

The EU-SILC is a European source for comparative statistics, which contains information on a large variety of household and individual characteristics: income and tax; material deprivation; housing conditions; employment; health and education. The EU-SILC project, successor of the ECHP dataset, was launched in 2003 after an agreement between Belgium, Denmark, Greece, Ireland, Luxembourg and Austria. All the EU-28 country members joined this dataset over time. EU-SILC provides annually two types of data: cross-sectional data referring to a given time period (2004 and onwards) and longitudinal data referring to individual changes

[16] For the application procedure, see Appendix A.

over time, observed over a four-year period (2005 and onwards)[17]. The longitudinal component is substantially more limited in sample size and number of variables compared to the cross-sectional component and it has a limited duration, usually of four years (discussed below).

The reference population of EU-SILC contains all private households and their current members[18]. The database is organised in two levels: the household level, including basic data, income, social exclusion and housing; and the personal level, including basic demographic data, education, labour information, health and income. For each level, the data are organised in four linkable files (four files for cross-sectional data and four for longitudinal data) per country and year (Table 3.1). For this research project, the unit of analysis is the individual and therefore the focus of analysis is on personal data. As mentioned above, the household and personal data (files) are linkable through unique keys (year, country, household and personal identifier) for both the cross-sectional and longitudinal dimension[19]. It is important to keep in mind that the longitudinal and cross-sectional data might come from different sources (registers and surveys) and thus they are not linkable. As Iacovou et al. (2012) argue, Eurostat elaborates the individual identifiers to ensure that the data cannot be linked (even when coming from the same source) and protect the privacy of the survey participants. Additionally, cross-sectional data cannot be linked across time (Iacovou et al. 2012, p. 12).

[17] The data are released in a User Database twice a year: on 01/03/YY the cross-sectional micro data of year YY-2; and on 01/08/YY the longitudinal micro data of year YY-2. Initially, I received the data in June 2014. In March 2015, EU-SILC revised 2011 and 2012 (new release) longitudinal datasets. Finally, in June 2015, they revised the longitudinal dataset of 2012, which I used to update the data analysis.

[18] For practical reasons, some small parts of the national population and the national territories are excluded (see Table 1 in Appendix A).

[19] More details on the data decryption and data linkage provided in Appendix A.

**Table 3.1 – The structure of the longitudinal EU-SILC dataset**

| HOUSEHOLD FILES | |
|---|---|
| **Household Register (D-File)** | **Household Data (H-File)** |
| Includes every selected household (also those where the address could not be contacted or which could not be interviewed). The data are collected from a single respondent in each household using a household questionnaire. | Includes all households which have been contacted and completed a household interview and at least one household member has complete record in the personal data file. The data are collected from a single respondent in each household using a household member roster. |
| 19 variables: household identifier, sampling design information, country and region of residence | 179-190 variables: basic household data, household income, social exclusion and housing |
| **PERSONAL FILES** | |
| **Personal register (R-File)** | **Personal Data (P-File)** |
| Includes every person currently living in the household or temporarily absent. For the longitudinal files: includes also persons registered in the R-File of the previous year or persons living at least three months in the household during the income reference period. The data are collected for the 'survey countries' directly at personal level, covering all persons in each household, while for the 'register countries' the data are collected from registers and other administrative sources (discussed below). | Includes only the reference population (persons aged 16 years or more) and only persons with a complete personal interview. This part is too complex to be collected through proxy and the information required is not available from registers or other administrative sources. |
| 56 variables: basic information such as sex, age, year of immigration, relationships between members of the household, etc. | 167- 201 variables: personal information on education, labour market, health and income. |

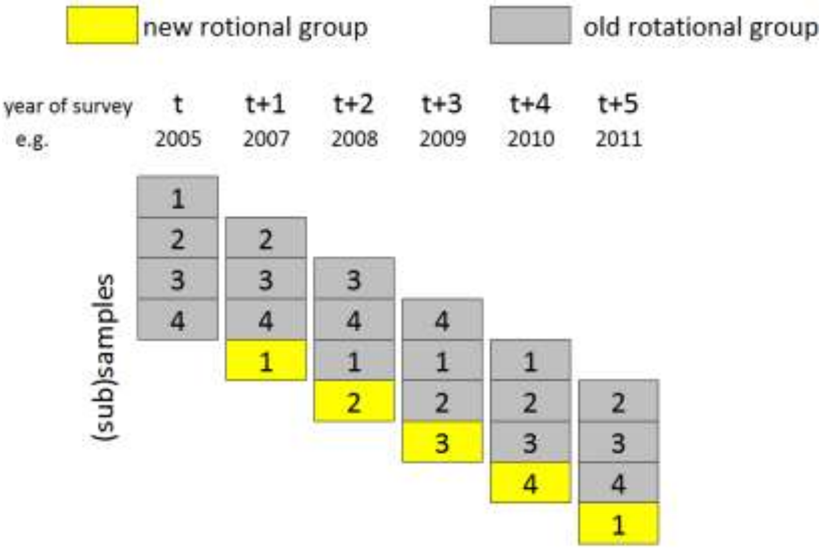
Source: EU-SILC documentation (Eurostat 2010a)

EU-SILC uses representative probability samples of the population residing in private households within each country, regardless their language, nationality or legal residence status (Eurostat 2010a). Representative probability samples are achieved for households and individuals. For the cross-sectional component, the minimum effective sample size to achieve is around 137,000 households including the EU countries, Norway and Iceland. For the longitudinal component, the size should not be under 103,000 households for the same countries, as defined by Eurostat (Eurostat 2010a).

### 3.1.2 The Survey Design

EU-SILC uses an integrated design, called 'the rotational design', rotating a part of the sample from year to year and retaining the other part the same[20] (Figure 3.1). The panel duration is 4 years, which means that the sample consists of four sub-samples or replications, similar in size and design, similar to the structure of the whole target and representative of the whole population that should be in the survey for up to four years. In the first year, there are selected four replications, each year one replication from the previous year is dropped and a new one in added. Between year T and T+1 the sample overlap is 75%, between T and T+2 is 50%, between T and T+3 is 25% and is zero for longer time intervals. There are some exceptions to the four-year rule: France with 9-year panel[21], Norway with 8-year panel and Luxemburg with a 'pure' panel (panel maintaining the same people across its whole duration).

**Figure 3.1 – The EU-SILC longitudinal rotational design**




Source: Figure reproduced from Wirth (2014)

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[20] The alternative survey design would be a long-term panel, retaining the same sample from year to year.

[21] France uses a 9-year panel and thus there are eight rotation groups in their longitudinal datasets instead of four. Eurostat argues that this difference does not affect country comparability (Eurostat 2010a).

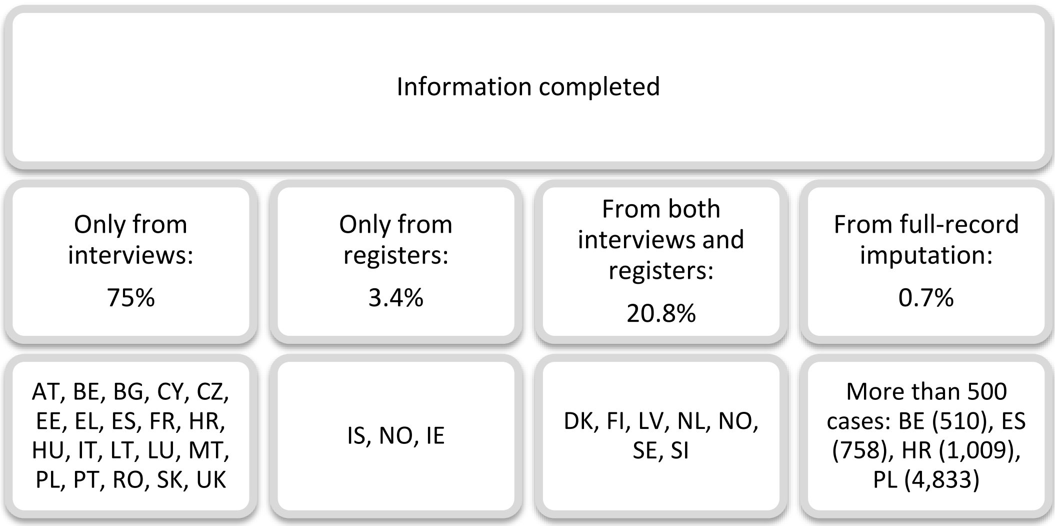
### 3.1.3 Modes of Data Collection

The EU-SILC dataset does not use a common survey or a common questionnaire but a common framework (output-harmonised dataset) (Eurostat 2010a). The framework outlines the harmonised variables that countries included in the project should submit to Eurostat - the statistical agency of the European Commission; common guidelines, procedures, concepts and classifications designed to ease the cross-national data comparability and to obtain a standardised output. Every year, Eurostat receives the harmonised micro-data from the National Statistical Institutes (NSI). In other words, the implementations of the EU-SILC data begins with surveys designed and carried out at national level, followed by the validation of micro-data first nationally and then by Eurostat, the dissemination of aggregated data (indicators) and, finally, the publication of national and European quality reports.

According to the EU-SILC documentation, the use of existing data sources - surveys or registers - and the use of national sampling design are strongly encouraged by Eurostat. Nevertheless, there is an integrated design[22] for those countries who want to launch a new survey (Atkinson and Marlier 2010). Not all the countries choose the same way of data collection. Figure 3.2 shows that several countries use registers, these countries are referred to as 'register countries', while the majority of the countries are 'survey countries', using interviews. "The data set contains an indicator for full-record imputation, but a careful check of the documentation provided no explanation of how full-record imputation is carried out" (Iacovou et al. 2012, p. 6). However, the share of full-record imputation cases is only less than 1% in my sample (section 3.2.3).

[22] This framework is provided by Eurostat and agreed between Eurostat and the NSI through the Working Group for Statistics on Living Conditions (Atkinson and Marlier 2010).

**Figure 3.2 - Modes of data collection, EU-SILC longitudinal dataset 2012**

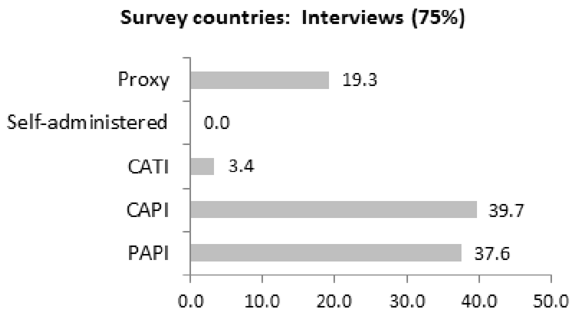


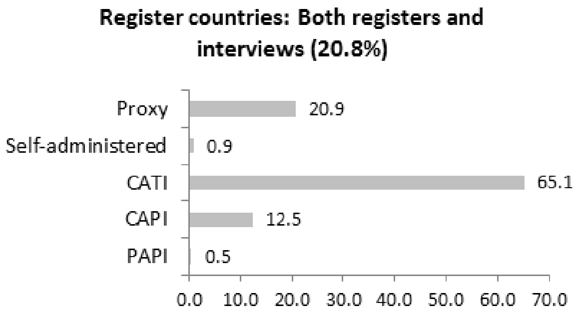

Source: EU-SILC 2009-2012

Household data are collected from a single member of the sample household using a household questionnaire, registers or other administrative sources. Personal level data must be collected at individual level and can be collected from all the members (16+ years old) of a sample household, or from only one person per sample household, the so-called *selected respondent*. Again, selected respondents are a representative sample of the population since they have been chosen using randomised selection techniques (Eurostat 2010a). Survey countries collect the personal data through personal interviews, while register countries through registers, such as population, business, employment or education registers (Jäntti et al. 2013). Some more detailed information at personal level, like monthly labour market, health conditions, etc. can only be collected through personal interviews since they are too sensitive to exist in an administrative source and too complex to collect through proxy interviews.

One of the main characteristics of the dataset, which can be considered both an advantage and a drawback, is the flexibility in the modes of collecting data and in wording the questionnaires. The modes of data collection are computer assisted telephone interviews (CATI), computer assisted personal interviews (CAPI), paper assisted personal interviews (PAPI), self-administered questionnaire and/or proxy interviews (Figure 3.3). Proxy is an interview when the respondent has someone else answer the questions for her/him either because the respondent is not willing or able to answer or because it is the producer's choice in order to lower the interviewing costs[23] (Eurostat 2008; Lohmann 2011). In the first case, the proxy respondent may differ from the originally selected respondent in basic traits, such as age and gender and the originally selected respondent may not be willing/able to respond for reasons such as being very old. Therefore, the *proxy effect* may not be distributed at random and may have an impact on the distributions, especially of specific sub-groups of the sample (Lohmann 2011). In the second case, rules are applied to guarantee the random selection of proxy respondents, reducing the *proxy effect* (Lohmann 2011). To ensure that there is no impact of the proxy effect on the variable distributions in my analysis, I ran, as a robustness check, some descriptive statistics using a control variable for proxy interviews and the results were unaltered. Proxy interviews are very common in Denmark and Finland (above 40% of interviews are proxy) and not commonly used in the Netherlands and Sweden (below 5%) (Verma 2007; Eurostat 2010b). Summing up, although proxy interviews may decrease the data quality, they do not alter the estimates of my model.

**Figure 3.3 – Types of interviews, EU-SILC longitudinal dataset 2012[24]**




Source: EU-SILC 2009-2012

[23] For instance, in Denmark and Finland, as a rule, only one person of the household is interviewed and answers for all the members of the household (Eurostat 2008).

[24] For the type of interviews used by each country, see Table 3 in Appendix A.

### 3.1.4 Data Comparability

As seen above, the EU-SILC is a large secondary dataset collected in numerous countries that includes variables on several topics both at a cross-sectional and longitudinal level, as well as at household and individual level. However, the survey design and the data collection procedures may affect the comparability of the EU-SILC data (Eurostat 2010b). In other words, the different sampling strategies, different national survey designs and different modes of data collection may reduce the cross-national comparability (Verma and Betti 2010; Gash 2011). Firstly, the survey design is based on a rotational panel and the countries may present variations in the number of rotations and the rate of non-response and attrition[25] (Jenkins and Van Kerm 2017). Most of the countries used the sampling design suggested by Eurostat, except for Sweden and Finland that used an existing survey (Wolff et al. 2010). Moreover, national surveys use mixed modes of data collection (survey/register), which might affect the response and thus reduce the comparability between countries (Lohmann 2011). Finally, the use of different types of interview and questionnaires, with various designs and wording of the questions may affect the responses (Jäckle et al. 2010; Gash 2011; Fessler et al. 2017).

De Leeuw (2005) compares data obtained by different types of interviews to conclude that they present only slight differences regarding the validity of the answers and data quality, with face-to-face interviews reducing the non-response rate and the self-administered questionnaire resulting in more reliable data. Gash (2011) examines the impact of different wording in national questionnaires on specific variables and concludes that there are differences (e.g. some countries provide examples in the question to make it clear) that should be taken into account but that do not represent an obstacle in conducting comparative research. Studying four different national questionnaires of the EU-SILC (see Table 4 in Appendix A),

[25] Attrition is defined as "any pattern of loss of individual records over time, including those cases where individuals may return to a study after missing measurement occasions" (Goldstein 2009, p.63).

there is no significant variation in the question on the employment status, which is the outcome variable of this project, thus I do not expect an impact from different wording in my analysis. Summing up, although there might be some issues of data comparability in the EU-SILC survey, I study the labour market variable and other socio-demographic variables, such as education, that are based on common definitions and standard classifications recommended by Eurostat and thus comparability is not an issue.

### 3.1.5 Panel Attrition

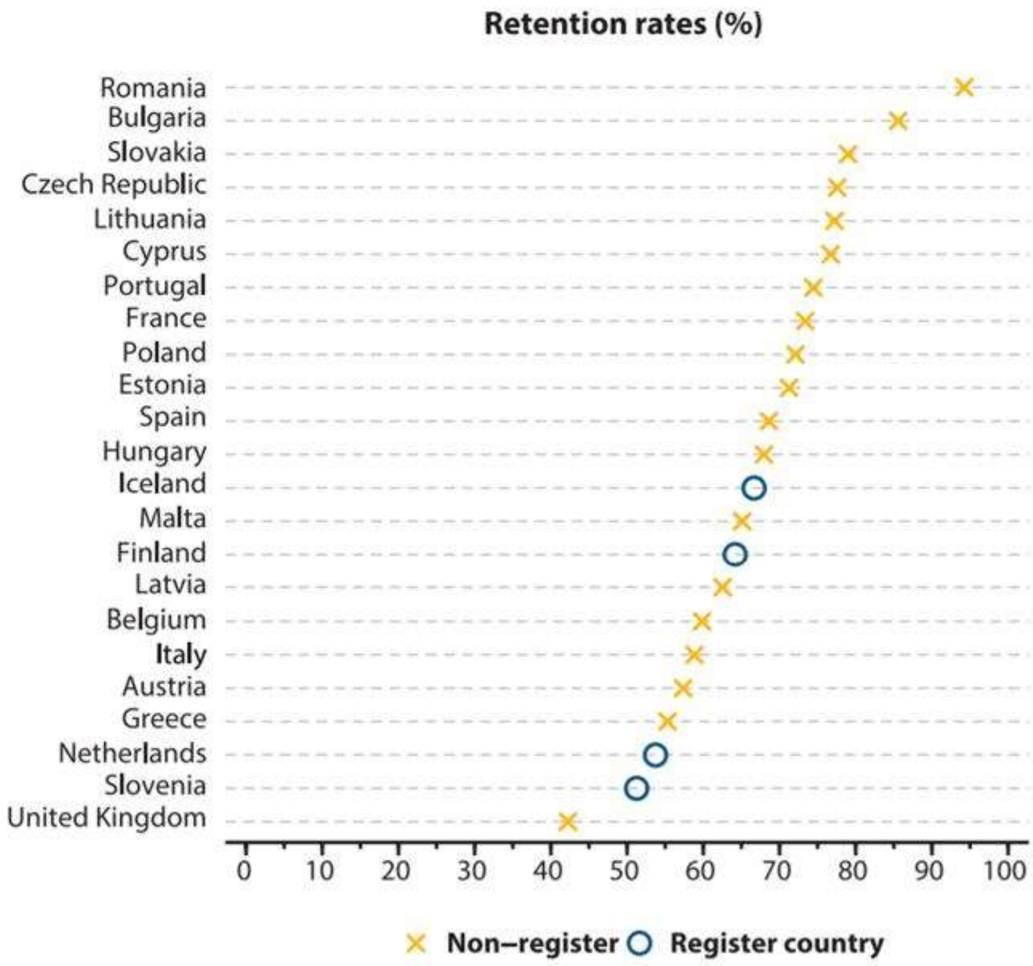
Panel attrition is a common problem in longitudinal studies and may result in a smaller sample size or even in a biased sample if attrition is not random[26] (Goldstein 2009). The decrease in sample size caused by attrition might result in larger standard errors and confidence intervals (Jenkins and Van Kerm 2017). According to Goldstein (2009), attrition can be dealt with by using appropriate sample weights or by applying multiple imputation techniques. Weights can be used to adjust for unit non-response and imputation for item non-response[27] (Verma and Betti 2010). The different ways of dealing with panel attrition varies across countries and that may affect country comparability (Iacovou et al. 2012).

There are four types of attrition in the EU-SILC dataset: selected respondents who leave the household, households or members of a household who drop out of the survey, individuals who are unsuccessfully contacted and individuals who refuse to complete the interview (Jenkins and Van Kerm 2017). The first two types are normal and reflect changes in the population, while the other two types may result in a non-representative dataset (Jenkins and Van Kerm 2017). Jenkins and Van Kerm 2017 study the retention rates of each country included in the 2008-2011 EU-SILC panel

[26] Attrition is not random if it is related to individual characteristics, for instance if poor people are more likely to drop out of the sample.
[27] Unit non-response is the total absence of an individual or household, while item non-response is the lack of answers to one or more questions.

data. They define the retention rate as "the proportion of individuals belonging to a respondent household at wave 1 which remains in a respondent household in each of the three subsequent waves" (Jenkins and Van Kerm 2017, p. 14). As we can see from Figure 3.4, countries vary significantly in their retention rates, with the UK registering the lowest rate of retention. A possible explanation lies in the use of proxy interviews in the UK sample (interviewers were not allowed to ask personal questions via proxy interviews – see section 3.2.3). According to Lohmann (2011), the use of proxy interviews in EU-SILC results in decreasing the non-response rate.

**Figure 3.4 – Retention rates by country, EU-SILC panel 2008-2011**




Source: Reproduced from Jenkins and Van Kerm (2017, p. 15)
Notes: The retention rate is the proportion of individuals belonging to a respondent household at Wave 1 (2008) which remains in a participating household in each of the three subsequent waves. Unweighted proportions of wave 1 sample. Calculations from 2011 EU-SILC Longitudinal data; 2008 rotation group only.

The EU-SILC is a 4-year rotational panel and thus 25% of the individuals are not followed (not eligible) from one year to the next (see Figure 3.1 in section 3.1.2). According to Eurostat (2008), 92% of the eligible individuals are followed. Indeed, "in many cases the re-interview figures are not too far away from the target response rates, and samples of reasonable sizes remain" (Iacovou et al. 2012, p.9). The lowest rates of eligible individuals who were followed belongs to the UK (75%, see Table 5 in Appendix A), followed by Austria (78%), while for the rest of the countries varies between 80-90%. According to Iacovou et al. (2012), the sub-group that was mostly not followed includes young people between 16-25 years old, excluded from my sample.

Jenkins and Van Kerm (2017) study attrition bias on the estimates of poverty rates in the EU-SILC longitudinal dataset and conclude that "[Our calculations] may provide some cheering news for analysts. Even with substantial attrition and hence relatively small sample sizes, standard errors for persistent poverty rates at the national level may be sufficiently precise" (Jenkins and Van Kerm 2017, p. 16). Moreover, Lehmann et al. (2015) study labour market transitions during the financial crisis and argue "This exercise [re-run all their models adding an attrition dummy] leads us to conclude that attrition does not seem to strongly affect the transitions from employment and unemployment and that the large flows between labour market states that we find during the Great Recession are certainly not driven by attrition" (p. 15). Summing up, my sample of analysis is rather large (more than 20,000 individuals across time) and I choose to analyse a balanced panel (four consecutive years), therefore I expect the impact of attrition on my estimates to be minimal. This is especially true since my main goal of analysis is not to infer information to the whole population, but to describe the labour market trajectories of individuals.

**Need for More**

In essence, the EU-SILC is a great source of comparative secondary European data that provide a wide range of rich information. After using the EU-SILC dataset for the analysis in this thesis, I identify some key points that would make the dataset even more complete and easier to use:

- Lack of clear household grid. It is hard (if not impossible) to reconstruct the relationships between household members, such as partners/spouses, parents, children etc. (Iacovou et al. 2012).
- Lack of a variable for the distinction between academic/general and vocational education.
- Linking the cross-sectional and longitudinal data or at least the cross-sectional data across time.

## 3.2 The Sample and Variables of Analysis

To study individual labour market trajectories before and during the European financial crisis, I analyse two data panels: the 2005-2008 and 2009-2012[28]. These are analysed separately as they are not linkable. The initial sample of 2005-2008 includes 408,992 individuals and 1,007,229 observations, while the 2009-2012 dataset includes 440,966 individuals and 1,090,088 observations. These individuals, based on the rotational survey design of the EU-SILC, may be followed from one up to four years.

Some studies analyse individuals followed for two consecutive years (Lehweß-Litzmann 2012), other studies focus on individuals followed for at least three consecutive years (Babos 2014) or individuals with complete four-year panel

[28] The file 2008, containing data for the years 2005, 2006, 2007 and 2008 - was revised in March 2015, while the file 2012 – covering the period 2009-2012- was released in March 2015 and revised in June 2015.

observations (Flek and Mysíková 2015). From the study of the distribution of some basic individual socio-economic characteristics[29] across the different sub-groups of the sample, it is evident that the structure of the groups of individuals followed for two, three and four years is very similar[30] (Tables 6-7 in Appendix A). Moreover, the country distribution among the people followed for two, three and four years also presents similar structures (Tables 8-9 in Appendix A). In essence, the empirical results emerged from the data analysis of individuals followed for four years can be extended also to the group of people followed for three years. In my opinion, the study of labour market transition patterns requires as much labour market status information for each individual as possible, and therefore I analyse all individuals followed for the full panel duration (Figure 3.5).

**Figure 3.5 – Structure of the longitudinal EU-SILC waves and years of survey**

| Year of the survey | | Waves | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2005 | 2009 | 1 | 1 | 1 | 1 | | 1 | | |
| 2006 | 2010 | | 2 | 2 | 2 | 1 | | | |
| 2007 | 2011 | | | 3 | 3 | 2 | 1 | 1 | |
| 2008 | 2012 | | | | 4 | 3 | 2 | 2 | 1 |

Source: EU-SILC 2005-2008 and 2009-2012

After omitting all individuals followed in the panel for less than four years, the two samples consist of:

- 2005-2008: 83,089 individuals with 332,356 observations;
- 2009-2012: 91,860 individuals with 367,440 observations.

Due to the integrated design of the EU-SILC I analyse two separate longitudinal samples in the two periods of interest, one for 2005-2008 and one for 2009-2012. An unintended consequence of using different samples is that results may be driven by cohort effects rather than period effects. Ideally if the data had been available I

[29] Gender, age, country of residence, marital status, education level attained and labour market status.
[30] Only the structure of those followed for one single year is slightly different.

would have used a single longitudinal sample from 2005 to 2012 to ensure I can isolate the impact of the crisis on employment outcomes. However, I mitigate this limitation by using panel data, with sufficient sample sizes in both periods, and thus studying four consecutive years and not only the first employment status of each individual. Even though I do not study the same individuals in the two periods I have two similar samples in terms of observable characteristics and I exclude groups, such as students. Therefore we can reasonably assume that with this approach it is still possible to distinguish period effects rather than cohort effects.

**Table 3.2 – EU-SILC longitudinal samples by panel year (all countries included)**

| **Maximum number of consecutive observations** | **2005-2008** | | **2009-2012** | |
|---|---|---|---|---|
| | **Individuals** | **Observations** | **Individuals** | **Observations** |
| 1 | 78,201 | 78,201 | 85,133 | 85,133 |
| 2 | 144,142 | 288,284 | 152,439 | 304,878 |
| 3 | 98,832 | 296,496 | 106,906 | 320,718 |
| 4 | 83,089 | 332,356 | 91,860 | 367,440 |
| *Total* | *404,264* | *995,337* | *436,338* | *1,078,169* |
| **Maximum number of NON consecutive observations** | | | | |
| 1 | 4,584 | 4,584 | 3,930 | 3,930 |
| 2 | 144 | 7,308 | 728 | 7,989 |
| *Total* | *4,728* | *11,892* | *4,658* | *11,919* |
| **TOTAL SAMPLE** | **408,992** | **1,007,229** | **440,996** | **1,090,088** |

Source: EU-SILC 2005-2008 and 2009-2012

As seen in section 3.1.3 (Figure 3.2), Eurostat provides records of data completed from interviews, registers and full-record imputation. The latter category represents less than 1% of the sample. "(…) these imputations might come from unit imputation for non-response" (Iacovou et al. 2012, p.6). The use of full-record imputed cases results in underestimated confidence intervals (significant results when they are not), biased relationships between variables and country comparability issues when imputation is not done in similar ways (Iacovou et al, 2012, p. 6). For all the above reasons, full-record imputation cases are excluded from the sample[31]. Moreover, Figure 3.3 of section 3.1.3 shows a 19-21% (respectively for the two data sets) of the sample answering the survey via proxy interviews. Proxy interviews are included in the sample of analysis due to the big loss of information if we were to exclude them. As mentioned in section 3.1.3, controlling for the proxy effect confirms that the results of data analysis remain similar when including proxy respondents.

### 3.2.1 Countries of Analysis and Weights

Table 3.3 shows the sampling design used in each country[32]. Although the most common sampling design uses stratification[33] –mainly geographical stratification - Denmark and Sweden do not use stratification. In many of the large-scale surveys, including the EU-SILC, the population of a country is divided in sub-populations, called Primary Sampling Units (PSUs) (Eurostat 2010a). PSUs refer to the first-stage of sampling. Each PSU is then divided into sub-populations, called Secondary Sampling Units (SSUs), which refer to the second stage of sampling. A multi-stage sampling design usually includes regional strata, divided in smaller clusters (using for instance postcodes) and then divided into even smaller clusters from which household and/or individuals are chosen to be included in the survey (Eurostat 2010a). The sample design and stratification might have an impact on the standard errors and confidence intervals (Goedemé 2013). However, the variable on sample stratification is not provided by Eurostat, while the variable regarding the sample clustering appears problematic in the longitudinal dataset since it is missing for several countries (Iacovou et al. 2012, pp. 4-6).

[31] 610 and 906 individuals respectively in 2005-2008 and 2009-2012 are deleted because they are completed from full-record imputation. Poland and Spain have the majority of the full-record imputation cases in both periods of analysis.
[32] The information in Table 3.3 is provided using SILC quality reports, since the sample design and stratification variables are not included in the user's database.
[33] "Stratification involves splitting a population into a number of mutually exclusive and exhaustive subgroups prior to selecting a sample" (Iacovou et al. 2012, p. 4).

**Table 3.3 – National sampling designs of the EU-SILC longitudinal dataset**

| Sampling design | Country |
|---|---|
| **Without stratification** | |
| Simple random sampling | **DK**, MT, IS, NO |
| Systematic sample | **SE** |
| **With stratification** | |
| Stratified sampling according to different design by rotational group | HU |
| Stratified simple random sampling | DE, CY, LT, **LU**, **AT**, SK, CH |
| Stratified and systematic sampling | EE |
| Stratified two-stage sampling | **IT**, HR, LV, **NL**, PT, SI |
| Stratified multi-stage sampling | **BE**, BG, CZ, IE, **EL**, ES, **FR**, **IT**, PL, RO, **UK** |
| Stratified two-phase sampling | **FI** |

Source: EU-SILC, National Quality Reports 2013

This research project focuses on the analysis of the EU-15 countries. Germany and Ireland have been excluded because they did not provide any longitudinal data for at least one of the time periods analysed[34]. Spain was dropped because it uses substitutes for non-respondents and thus the Spanish sample is considered non-representative[35] (Iacovou et al. 2012). From the regional analysis (Chapter 6), all countries that do not provide regional data have been excluded[36]. Instead of running one separate model for each country, all the countries are included in one model with the use of weights, because the comparability of labour market patterns emerged from separate country analyses might not be reliable[37]. One of the main

[34] Germany does not allow the analysis of the longitudinal component of EU-SILC outside Germany and Ireland did not provide longitudinal data for the period 2009-2012.

[35] "Spain and Ireland use substitutes for non-respondents. This means that if one household (or person) refuses to respond or cannot be contacted, a substitute household (or person) is approached with a request to respond. Non-response substitution undermines the probability nature of the sample. Ideally, substitutes would not be used – but alternatively, as a minimum, the data set should contain an indicator with which non-response substitutes may be identified. This would enable the analyst to delete substitutes, and to implement appropriate statistical analyses. Until these problems with data from Germany, Spain and Ireland are rectified, data from these countries should not be used in statistical analyses with the aim of inferring information about national populations". (Iacovou et al. 2012, p.4).

[36] More details on the sample of individuals and countries of the regional analysis at Chapter 6.

[37] The main reason for this choice is related to the methods used. Clustering is based on the distances between labour market states and the distances are calculated by a distance algorithm. In a separate country analysis, the distances and consequently the clusters would be based on different criteria, depending on the frequencies of each labour market status transition, and thus would not be comparable.

drawbacks of analysing all the countries together is the size of the dataset, which will be addressed in the methods section.

Table 3.4 and 3.5 show the different sample sizes of national subsamples. The sample sizes vary significantly between 584 and more than 5,000. These differences do not necessarily reflect the differences in the national populations, for instance Luxemburg has a much bigger sample than the UK. Countries with bigger samples are expected to influence more the overall results when analysing the whole dataset. In this case, without using weights, the European results would be highly influenced by the French and Italian results. Hence, weighting is necessary in order to avoid the sample size effect and to enhance comparability and representativeness (Schneider and Collet 2010, p. 32).

To calculate the country weights I firstly calculate the base weights (within-country weights), using the formula $\mathbf{w=N/n}$, where $N$ is the national target population and $n$ the national sample size (Verma et al. 2007; Schneider and Collet 2010; Skinner and Mason 2012; Kaminska and Lynn 2016). The national target population refers to the 2011 Census Data of Eurostat and includes all individuals between 25-64 years old, excluding students and armed forces to match my sample (described below). This weight allows the results to reflect the actual size of the population in each country. Secondly, I calculate the proportional weights (between countries weights), using the formula $\boldsymbol{\pi_K=(N_K/N)/(n_K/n)}$, where $K$ is the country for which we calculate the weight and $N$ and $n$ refer to France, the reference country (Verma et al. 2007). The proportional weight is used in more complex sampling designs, like the design of EU-SILC. When this weight is less than one, the country has been over-sampled, and vice versa when the weight is above one the country has been under-sampled. The proportional country weights, the most commonly used method in comparative studies, known as calibration, correct for the imbalances in sampling ratios and adjust samples to the population scale (Verma et al. 2007; Schneider and Collet 2010).

**Table 3.4 – Country Samples and Weights, EU-SILC longitudinal dataset 2005-2008**

| Country | National target population (N) | Sample size (n) | National weight (w=N/n) | Proportional weight ($\pi_\kappa=(N_\kappa/N)/(n_\kappa/n)$) |
|---|---|---|---|---|
| AT | 4,280,810 | 1,357 | 3,155 | 0.61824 |
| BE | 5,079,031 | 1,467 | 3,462 | 0.67852 |
| DK | 2,710,915 | 584 | 4,642 | 0.90973 |
| FI* | 2,886,694 | 1,026 | 2,814 | 0.55140 |
| FR | 29,360,218 | 5,754 | 5,103 | 1 |
| GR | 5,178,263 | 1,393 | 3,717 | 0.72852 |
| IT | 28,723,953 | 5,356 | 5,363 | 1.05103 |
| LU** | 289,657 | 3,407 | 85 | 0.01666 |
| NL | 8,400,009 | 1,896 | 4,430 | 0.86826 |
| PT | 5,137,492 | 1,150 | 4,467 | 0.87552 |
| SE | 4,161,432 | 794 | 5,241 | 1.02715 |
| UK | 30,699,930 | 1,679 | 18,285 | 3.58342 |

Source: Census 2011 dataset provided by Eurostat; Sample sizes by EU-SILC 2005-2008. *Including students and armed forces. ** Including students and armed forces, provided from Eurostat's online dataset and not Census 2011.

**Table 3.5 – Country Samples and Weights, EU-SILC longitudinal dataset 2009-2012**

| Country | National target population (N) | Sample size (n) | National weight (w=N/n) | Proportional weight ($\pi_\kappa=(N_\kappa/N)/(n_\kappa/n)$) |
|---|---|---|---|---|
| AT | 4,280,810 | 1,575 | 2,718 | 0.64403 |
| BE | 5,079,031 | 1,273 | 3,990 | 0.94540 |
| DK | 2,710,915 | 600 | 4,518 | 1.07060 |
| FI* | 2,886,694 | 849 | 3,400 | 0.80567 |
| FR | 29,360,218 | 6,957 | 4,220 | 1 |
| GR | 5,178,263 | 1,648 | 3,142 | 0.74454 |
| IT | 28,723,953 | 3,951 | 7,270 | 1.72266 |
| LU** | 289,657 | 3,957 | 73 | 0.01735 |
| NL | 8,400,009 | 1,327 | 6,330 | 1.49993 |
| PT | 5,137,492 | 1,593 | 3,225 | 0.76418 |
| SE | 4,161,432 | 683 | 6,093 | 1.44373 |
| UK | 30,699,930 | 1,246 | 24,639 | 5.83824 |

Source: Census 2011 dataset provided by Eurostat; Sample sizes by EU-SILC 2009-2012. *Including students and armed forces. ** Including students and armed forces, provided from Eurostat's online dataset and not Census 2011.

The above weights were included in the data analysis. Section 3.3 discusses thoroughly the methods and software used and how the weights were implemented in each of the models. For instance, I used TraMineR R for sequence analysis and WeightedCluster R package for cluster analysis because both packages allow the use of weights in the analysis. After applying the proportional country weights, the sample size of Luxemburg appears so small that the country is omitted from the analysis (Table 3.4 and 3.5). Summing up, for the study of national labour market patterns the sample includes Austria, Belgium, Denmark, Finland, France, Greece, Italia, the Netherlands, Portugal, Sweden and the UK (Chapters 4 and 5); while the sample for the regional analysis includes Austria, Belgium, Finland, France, Greece, Italy, Sweden and the UK (Chapter 6).

### 3.2.2 Age Definition

In the literature, the choice of the age group(s) of analysis depends on the research questions. Here I briefly report some examples of age groups analysed in previous studies of labour market transitions. The most commonly used age group for young workers lies between 26 and 35 years old (among others: Koster and Fleischmann 2012, Hanushek at al. 2011, Booth et al. 2002). Janine Leschke (2012) in her study on the effects of the economic crisis on labour market segmentation divided workers in young workers (15-24 years old), prime age workers (25-49) and elderly workers (50-64 years old). Koster and Fleischmann (2012), as well as Hanushek et al. (2011) used more age groups: 16-25; 26-35; 36-45; 46-55; 56-65; 66-70. Booth, Franscesoni and Frank (2002) studied temporary jobs for the age groups 16-24, 25-34 and 45-60. Dieckhoff (2007) in his study on the effects of training on labour market outcomes dropped all individuals over 25 years old to exclude apprenticeships and students. Finally, Ward-Warmedinger and Macchiarelli (2014) used the age groups 15-24, 25-29, 30-54 and 55-64.

In my sample, individuals younger than 25 years old and older than 64 years old, during the first year of each panel (2005 and 2009), have been excluded. All individuals under 25 years old are excluded to ensure the exclusion of the majority of students[38] from the sample of analysis (Dieckhoff 2007; Bell and Blanchflower 2011). The sample has been divided in the age groups that are most commonly used in Eurostat's reports: younger workers aged 25-34; core (adult) workers 35-54 and older workers 55-64 years old (Table 3.6).

**Table 3.6 - Number of observations by age group, EU-SILC 2005-2008 & 2009-2012**

| Age groups | 2005-2008 | | 2009-2012 | |
|---|---|---|---|---|
| | **Freq.** | **%** | **Freq.** | **%** |
| 25-34 | 20,796 | 13.24 | 17,980 | 12.1 |
| 35-54 | 62,132 | 39.55 | 55,440 | 37.32 |
| 55-64 | *28,416* | *18.09* | 28,636 | 19.27 |
| *Excluded from the sample** | 45,764 | 29.13 | *46,512* | *31.31* |
| **Total** | **157,108** | **100** | **148,568** | **100** |

Source: EU-SILC 2005-2008 and 2009-2012

*The observations excluded from the sample belong to individuals who were under 25 or over 64 years old during the first wave of the dataset (2005 or 2009).

### 3.2.3 The Outcome Variable and Missing Observations

The outcome variable of the study is an unordered categorical variable based on retrospective monthly information on individuals' labour market status. Individuals were interviewed one time per year and were asked to define their employment status across the whole duration of the past year (12 months). A common drawback when using retrospective monthly data is related to the 'recall bias', or else to memory issues and the ability of individuals to recall past events with precision (Bernard et al. 1984; Boeri and Garibaldi 2009, p. 423; Jäntti et al. 2013). Nevertheless, sequence analysis, as well as any method studying the dynamics of the labour market, requires longitudinal data with no gaps and categorical information on the labour market status (Brzinsky-Fay 2016). Therefore, the advantage of using monthly data consists in the rich labour market information across 48 months, instead of only four time points/years (Atkinson and Marlier 2010; Iacovou et al. 2012). Moreover, the recall bias in the EU-SILC data is expected to be relatively low

[38] Each country has a different education and training system, and provides different options for young graduates. These characteristics influence directly the age at which people start searching for a job and enter the labour market for the first time.

because the time between the interview and the episodes recalled is rather short (Brzinsky-Fay 2016). The monthly labour market status variable has been validated first at national level and then by Eurostat, controlling for weights, attrition, outliers and comparing results across panels, as well as by Jäntti et al. (2013).

In 2005-2008 the monthly variable that measures the economic activity of individuals is slightly different from the variable in the 2009-2012 dataset (Table 3.7). The difference between the variables lies among the inactive population of the sample. The solution of this comparability issue is to collapse the categories "Fulfilling domestic tasks" and "Disabled" into the "Other inactive" category.

**Table 3.7 – Differences in the monthly labour market status variable, EU-SILC205-2008 & 2009-2012**

| PL210/2008 | | PL211/2012 | |
|---|---|---|---|
| 1 | Employee (full-time) | 1 | Employee working full-time |
| 2 | Employee (part-time) | 2 | Employee working part-time |
| 3 | Self-employed (full-time) | 3 | Self-employed working full-time (including family worker) |
| 4 | Self-employed (part-time) | 4 | Self-employed working part-time (including family worker) |
| 5 | Unemployed | 5 | Unemployed |
| 6 | Retired | 7 | In retirement or in early retirement or has given up business |
| 7 | Student | 6 | Pupil, student, further training, unpaid work experience |
| 8 | Other inactive | 8,10,11 | Permanently disabled or/and unfit to work (8)<br>Fulfilling domestic tasks and care responsibilities (10)<br>Other inactive person (11) |
| 9 | Compulsory military service | 9 | In compulsory military community or service |

Source: EU-SILC 2005-2008 and 2009-2012

The two samples include some students older than 25 year old (less than 3% of the total individuals). Being a student at this age depends both on the individual trajectory but also on the national education and training system, labour market and financial situation. Individuals with a student status have been excluded[39] to have a more accurate cross-country comparison and focus on the employment trajectories of individuals in working age. By excluding all the individuals still in education, I measure the true labour market status, e.g. the actual non-employed without treating people in education and training as non-employed (Anxo et al. 2007; Bell and Blanchflower 2011). Moreover and for comparability reasons, people who spent at least one month in compulsory military service have been excluded (people in compulsory military service represent less than 0.05% of the total individuals[40]).

Individuals with missing values in the outcome variable were dropped from the analysis. The first type of missing value is due to the respondent's status and represents a unit non-response pattern of missing data (Little and Rubin 2002). Detailed variables, such as the monthly employment variable, are not necessarily collected for each member of the household, but only for selected respondents (Eurostat 2012, p.21). Some countries, especially the register countries, interview only a selected sample from within the household's members (see section 3.1.3). Therefore, all the non-selected respondents are omitted from the sample, and Eurostat claims that the remaining sample is as representative as the initial sample. The non-selected respondents are 3,754 in 2005-2008 and 3,028 in 2009-2012, less than 10% of the samples (Table 3.8). The countries that register missing values due to non-selected respondents are register countries: Denmark, Finland, the Netherlands and Sweden.

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[39] 604 and 601 individuals have been dropped respectively from the 2005-2008 and 2009-2012 samples.

[40] 16 individuals in 2005-2008 (6 in Greece and Italy, 2 in Finland and 1 in Austria and Sweden) and 12 in 2009-2012 (10 in Greece and 2 in Denmark) have been dropped form the sample. The majority of individuals in compulsory military service are young men (between 25 and 34 years old). They are not married and they have attained high levels of education. They declared to be in this status for a minimum of two months and a maximum of 12 months. Some of them enter in this status after exiting education or after being inactive for a significant amount of months. I decided to drop this status and not include it among the inactive population because it is country-specific since it is present only in Greece and Denmark.`

The second kind of missing observations is due to the different data collection approaches across countries. In 2005-2008 there are 418 individuals with at least one missing observation (1.5% of the total individuals), while in 2009-2012 there are 168 individuals, which is the 0.5% of the individuals. The majority of the missing observations in both panels are registered in the UK (310 and 147 individuals with missing observations respectively), followed by Denmark (respectively 89 and 14 individuals). The UK registers more than 70% of the total missing observations because interviewers are not allowed to ask questions considered personal (such as income, health, monthly labour activity) during a proxy interview, whereas in other countries this rule does not apply[41]. According to Eurostat, Denmark especially in 2005-2008 registers more than 20% of the missing values due to technical problems during the first year of the survey, in 2005. In fact, more than 90% of the missing values in Denmark are in 2005. In essence, the majority of the missing values is confounded with country and mainly depend on differences on the national ways of data collection (case of the UK and Denmark). The rest of the missing values represents a very small percentage of the total sample (less than 1% of the total individuals) and thus their exclusion from the sample does not affect the results (Little and Rubin 2002). For these reasons, I drop the individuals with a missing observation in the outcome variable in order to make the sample as comparative as possible.

[41] Email from Eurostat regarding missing observations on PL210x and PL211x: "Apart from the modifications required by the anonymisation rules Eurostat does not change anything on the micro-data transmitted to the researchers. Variables PL210x and PL211x are not affected by the anonymisation process. Eurostat only checks whether the rate of missing is too high (over 5%) therefore we never investigated why for some countries it is 0. Regarding UK's high rate of missing, which is over 5%, the reason is that these questions are not asked if the respondent is a proxy respondent".

**Table 3.8 – Sample sizes and number of individuals dropped, EU-SILC 2005-2008 & 2009-2012**

| | 2005-2008 | | 2009-2012 | |
|---|---|---|---|---|
| | **Freq.** | **% of original sample** | **Freq.** | **% of original sample** |
| **Original sample of individuals followed for 4 years** | **38,390** | | **37,185** | |
| *Number of individuals dropped* | | | | |
| Full-record imputation records | 50 | 0.1 | 46 | 0.1 |
| Under 25 or over 64 years old | 11,092 | 29.1 | 11,628 | 31.3 |
| Non-selected respondents | 3,754 | 9.8 | 3,028 | 8.1 |
| In compulsory military service | 16 | 0.0 | 12 | 0.0 |
| In education | 604 | 1.6 | 601 | 1.6 |
| Missing values in the outcome variable | 418 | 1.1 | 168 | 0.5 |
| *From which:* | | | | |
| Missing values in the outcome variable: UK | 310 | 74.2 | 147 | 87.5 |
| Missing values in the outcome variable: DK | 89 | 21.3 | 14 | 8.3 |
| **Final sample of analysis** | **22,456** | | **21,702** | |

Source: EU-SILC 2005-2008 and 2009-2012

### 3.2.4 Explanatory Variables

The explanatory variables used in this project are:

- age group (categorical variable; time constant based on the first year of each panel);
- gender (binary variable, time constant);
- highest level of education attained (categorical variable; time-constant);
- marital status (binary variable; time-constant);
- country and region of residence (categorical variable; time-constant);
- year and month of interview.

The variables are time constant, i.e. not variable across time. This choice was based on data evidence. Less than 1% of the sample showed a change in the education level and marital status during the four panel years. Moreover, less than 0.5% of the sample moved from one region into another and nobody changed country of residence.

After calculating the chi square and p-value of the association between the categorical explanatory variables and the dependent variable, I conclude that there is a statistically significant relationship between monthly labour market status, gender, level of education, marital status, country of residence and age group. The samples used for the national analysis of individual labour market trajectories (Chapters 4 and 5) consist of 22,456 individuals in 2005-2008 and 21,702 individuals in 2009-2012. Table 3.9 presents the sample distribution by gender, age, marital status, education and country of residence (all time-constant variables). The panels are strongly balanced since missing values were dropped and only individuals followed for the full duration of the panel are analysed. The sample for the regional analysis is discussed at the beginning of Chapter 6.

**Table 3.9 - Socio-demographic characteristics (constant across time) of individuals in analysis and country of residence, EU-SILC 2005-2008 & 2009-2012. Weighted data.**

| Socio-demographic characteristics (weighted data) | 2005-2008 | | 2009-2012 | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| *Gender* | | | | |
| Men | 10,521 | 46.85 | 10,169 | 46.86 |
| Women | 11,935 | 53.15 | 11,533 | 53.14 |
| *Age group* | | | | |
| 25-34 | 4,026 | 17.93 | 3,619 | 16.68 |
| 35-54 | 12,450 | 55.44 | 11,705 | 53.93 |
| 55-64 | 5,981 | 26.63 | 6,378 | 29.39 |
| *Marital status* | | | | |
| Married | 16,078 | 71.6 | 14,873 | 68.53 |
| *Education level* | | | | |
| Up to primary | 2,509 | 11.17 | 1,911 | 8.81 |
| Lower secondary | 3,836 | 17.08 | 3,746 | 17.26 |
| Upper/Post-secondary | 9,894 | 44.06 | 9,351 | 43.09 |
| Tertiary | 6,099 | 27.16 | 6,572 | 30.28 |
| Missing | 118 | 0.53 | 122 | 0.56 |
| **Countries** | | | | |
| Austria | 759 | 3.38 | 734 | 3.38 |
| Belgium | 901 | 4.01 | 871 | 4.01 |
| Denmark | 481 | 2.14 | 465 | 2.14 |
| Finland | 512 | 2.28 | 495 | 2.28 |
| France | 5,207 | 23.19 | 5,032 | 23.19 |
| Greece | 918 | 4.09 | 888 | 4.09 |
| Italy | 5,094 | 22.69 | 4,923 | 22.69 |
| Netherlands | 1,490 | 6.63 | 1,440 | 6.63 |
| Portugal | 911 | 4.06 | 881 | 4.06 |
| Sweden | 738 | 3.29 | 713 | 3.29 |
| United Kingdom | 5,445 | 24.25 | 5,262 | 24.25 |
| **Total** | **22,456** | **100** | **21,702** | **100** |

Source: EU-SILC 2005-2008 and 2009-2012

## 3.3 Methods

Quantitative statistical methods are chosen to answer the main research question and sub-questions discussed in Chapter 2. Firstly, the national variation of individual labour market trajectories across eleven European countries and across time is studied. Secondly, I investigate the effect of gender, age and education on individual labour market trajectories across countries and time; and finally, I focus on the effect of the region of residence on employment trajectories during the financial crisis. The first two points are addressed with the use of sequence and cluster analysis and a multinomial regression model, while the third with the use of multilevel modelling.

### 3.3.1 Sequence Analysis

*"Sequence analysis is now a key method used to study spans of life trajectories and careers"*

(Studer and Ritschard 2016, p. 481)

Sequence analysis (SA) is applied in order to study the occupational sequences of 20,000 Europeans in a dynamic way, i.e. as sequences of events or else trajectories or patterns instead of single events (Pollock 2007; Aisenbrey and Fasang 2010; Erhel et al. 2014). SA originated in biology and was introduced in the social sciences by the sociologist Andrew Abbott in the middle of the 1980s. It is "the statistical study of successions of states or events, (…) it compares chronological sequences of states within a holistic conceptual model instead of observing allegedly independent observations over time" (Blanchard et al. 2014, p.1). A sequence is defined as "a string of states of specific nature, with specific durations and a specific order" (Blanchard et al., 2014, p.2) or as "any life-course movement that includes at least two transitions between states" (Sackmann and Wingens, 2003, p. 96).

Individual life stories, called *narratives*, consist of four elements: event, stage, transition and trajectory (Abbott 2001). An *event* is something that occurs at a specific moment across an individual's life, such as birth, marriage and death. A *stage* is a life period and it can be stable or in process. A *transition* is the process of changing from one stage/state to another. A *trajectory* is a path, stable or turbulent, followed by an individual. In other words, transitions are the changes between different states and trajectories are paths that include the transitions. This study focuses on labour market sequences, where the event regards the labour market status, the stage (episode) is a spell of the same status (e.g. unemployment spells) and a transition is a change from one labour market status to another. Trajectories or sequences are the sum of labour market transitions experienced by each individual during the time of analysis. In essence, I use SA to analyse individual's employment trajectories as a whole and not employment statuses as isolated events.

The purpose of this project is to study labour market transitions in a dynamic and holistic way, i.e. to explore labour market patterns. Therefore I need a holistic method, such as SA. For this reason, event history analysis and survival analysis are excluded. The former focuses on the timing of an event and not on the duration, e.g. the start of an unemployment spell, while the latter on the period until a single event occurs (Tuma 1994; Han et al. 2017). Furthermore, event history analysis can be applied only if there is an event, while SA can be applied even if there is stability/continuity of the same element (Pollock 2007, pp. 175-176). In addition, I chose SA over latent class analysis (a method that classifies individuals to create typologies) because latent class analysis does not take into consideration the ordering of the states, for instance the sequence *aaabbb* is as likely as the sequence *bbbaaa* (Han et al. 2017). The ordering of the states is a crucial factor for describing labour market trajectories and thus I use SA which studies the timing, ordering and duration of the events (Abbott 1995; Blossfeld and Rohwer 2002; Aalen et al. 2008). Morover, Barban and Billari (2012) compared the classifications produced by these two methods and argued that latent class analysis performs better than SA when the events occur randomly. However, "(…) usually these events are associated with a duration and rarely have no effect on the following part of the life trajectory" (Barban and Billari 2012, p. 781).

Sequence analysis consists of the following steps:

1. Definition of sequence data and construction of a state sequence object;
2. Description and visualisation of the sequences;
3. Computation of a dissimilarity measure between each pair of sequences;
4. Application of a clustering algorithm to the dissimilarity matrix to build labour market transition typologies (section 3.3.2).

**Sequence Data and State Sequence Object**

The data is transformed in states-sequence format (also known as wide or multivariate format), the internal data format of the TraMineR R package (Gabadinho et al. 2011, p. 28). In this way, each individual represents one row of the dataset and includes 48 variables describing her/his labour market status for each time point (across 48 months). Subsequently, the alphabet, i.e. the list of all possible states, is defined (Table 10 in Appendix A). In this case, the alphabet includes seven states: Employee working full-time (FT), Employee working part-time (PT), Self-employed working full-time (SFT), Self-employed working part-time (SPT), Unemployed (U), Retired (R) and Inactive (I). The sequences are of equal length, 48 months, without gaps, since the dependent variable does not include missing observations (section 3.2.3). There are 4,614 unique sequences in 2005-2008 and 4,583 unique sequences in 2009-2012. The number of unique sequences can be used as an indicator of the data diversity.

The aim of SA is to identify typologies and construct classifications by grouping similar sequences. At the time of writing, there is not a procedure available in any statistical package to calculate the standard errors of the estimates associated with the sequences, but there is an ongoing debate on how to validate the sequence analysis results. The main outcome of this debate[42] is to use the cluster quality indices (see section 3.3.2) to validate the typologies emerged from the sequence and cluster analysis. Sequence and cluster analysis are used in this project to explore and describe the data and not for inferential purposes.

#### Description and Visualisation of the Sequences

The next step is to visualise and describe individual labour market trajectories. To this end, I use sequence plots that display individual and aggregated labour market sequences and more complex aggregated indicators. I use sequence index plots, suggested by Scherer (2001), which are the most commonly used graphical representation of sequence data. They are three-dimensional plots, including information of time points, states and observations. The unit of analysis is the individual sequence and is represented by a horizontal line, while each state is represented by a different colour (Brzinsky-Fay et al. 2006). One drawback of these plots is that when the observations are more than 400 (in my case they are some 20,000), there is a risk of over-plotting and then lines representing each sequence/individual become very thin (Brzinsky-Fay 2014, p. 270). A solution is to plot and study the distribution for the most frequent sequences and/or divide the sample in subgroups (Brzinsky-Fay 2014). Another solution is to present sequence frequency plots, which are much clearer to visualise. Hence, I present sequence index plots disaggregated by sub-groups of the sample, i.e. by gender, age and education, and sequence frequency plots.

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[42] Part of this debate was presented during the Society for Longitudinal and Lifecourse Studies Conference, held in 2017 in Stirling Scotland, and in particular, during the Symposium "Advances in Sequence Analysis and Related Methods for the Holistic Analysis of Trajectories", chaired by Matthias Studer.

Sequence frequency plots are three-dimensional and display the most frequent sequences: the x-axis represents time (48 months), the y-axis shows the cumulative percentage of the most frequent sequences, each colour marks a different labour market status, each horizontal line represents a sequence and the bar widths are proportional to the frequencies (Gabadinho et al. 2011). Moreover, I use state distribution plots when I think that these graphs give better insights in the dynamics of the labour market. A state distribution plot is a graph of the (weighted) state distributions, the x-axis refers to the sequence positions (i.e. months), while the y-axis regards the "prevalence of each element at each position of the x-axis" (Cornwell 2015, p. 104). This plot provides an aggregated image of labour market trajectories, compared to sequence index plots and frequency plots that graph the individual sequences (Gabadhino et al. 2011, p. 19).

The main aggregated indicators I use to describe the sequences are the entropy and turbulence[43] indices (further discussed in Chapter 4). In brief, the transversal entropy measures the diversity between sequences/individuals, the longitudinal entropy[44] measures the state diversity within a sequence and finally the turbulence measures the diversity between states and the sequences, i.e. the ordering of the states (Elzinga and Liefbroer 2007; Gabadinho et al. 2011).

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43 Turbulence is calculated using the formula $T(x) = \log_2 \left( \phi(x) \frac{s^2_{t,max}(x) + 1}{s^2_t(x) + 1} \right)$, where $x$ is a sequence, $T$ is the Turbulence, $\phi(x)$ is the number of distinct subsequences, $st^2(x)$ is the variance of the consecutive times $t_j$, $st^2,max(x)$ is the maximum value that the variance can take $s^2_{t,max}(x) = \left(\ell_d(x) - 1\right)\left(1 - \bar{t}(x)\right)^2$, where $t(x)$ is the mean consecutive time spent in the distinct states (Gabadinho et al. 2011, p. 23).

44 The longitudinal entropy index is calculated using the formula $h(p_1, \ldots, p_a) = -\sum_{i=1}^{a} p_i \log(p_i)$, where $p_i$ is the frequency of the ith state and $a$ is the size of the alphabet (Gabadinho et al. 2011, p.20).

#### Computation of a Dissimilarity Measure between Each Pair of Sequences

Finally, in order to build typologies of labour market patterns, a dissimilarity measure between sequences or else a quantification measure of how far (distant) two sequences are needs to be calculated (Gabadinho et al. 2011). Researchers have been using Optimal Matching analysis since Abbott and Forrest (1986) introduced it in the mid-80s. However, the last decade has seen - as part of the second wave of sequence analysis, consisting in technical advances in the method - the development of numerous algorithms capable of measuring the distance between sequences (Aisenbrey and Fasang 2010). The different distance measures can be distinguished in distances that measure differences in state distributions; that count common attributes between sequences; that measure matching subsequences; and in edit distances that measure the cost of transforming one sequence to another using editing (Gabadinho et al. 2011; Studer and Ritschard 2016). Studer and Ritschard (2016, p.481) compare some of the different measures of sequence dissimilarities and argue that "there is no universally optimal distance index, and that the choice of a measure depends on which aspect we want to focus on".

Each dissimilarity measure focuses on a different aspect in which sequences may differ. Studer and Ritschard (2016, p.3) identify the sequence aspects that social research is interested in:

- Experienced states: the elements of a sequence, i.e. labour market states;
- Distribution of states: total time (not necessarily consecutive) spent in each labour market status;
- Timing of states or spells: when (time point) each state occurs (e.g. the start of an unemployment spell, being in non-standard employment, etc.);
- Duration: consecutive time spent in each spell (time between the start and the end of a specific spell, e.g. duration of a jobless spell which allows us to differentiate long-term unemployment from several short-term unemployment spells);

- Sequencing: the order of successive states (e.g. transition from a spell of unemployment to a spell/state of employment).

Researchers choose the most appropriate distance measure based on the sequence aspect of interest, on the research questions, on the metric the measure is expected to produce (variable or matrix, metric or non-metric) and on computational factors (whether the measure has been implemented in the software used). I briefly describe the most commonly used measures.

#### Optimal Matching Distance

The most commonly used edit distance in social sciences is the **Optimal Matching Analysis (OMA)**, developed by Andrew Abbott and John Forrest in 1986 (Gabadinho et al. 2011; Elzinga and Studer 2015; Studer and Ritschard 2016). OMA uses the Levenshtein distance (Levenshtein 1966) to measure the minimum total cost that is needed to transform one sequence into another. The operations involved are insertion and deletion of elements (*indel*) and substitution between elements. Each operation has a cost and the distance is calculated by summing up the costs of the operations required to transform one sequence to another. The more operations needed the highest the distance and thus the highest the cost.

Several researchers criticised the method as driven mainly by the differences in durations of the various states between two sequences (Elzinga 2003; Elzinga 2005; Hollister 2009; Halpin 2010; Elzinga and Studer 2015). Lesnard (2010) argues that OMA does not take into account the position of the element that has been substituted. According to the above researchers, OMA is insensitive to the context of state transformation. Each of them suggested a different measure, variant of the OMA, described below. An advantage of OMA is that it allows time shifts of the sequence elements and that leads to better sequence comparisons (Hollister 2009, p. 238).

### Hamming and Dynamic Hamming Distances

A similar edit distance to the Optimal Matching is the **Hamming distance** (**HAM**) (Hamming 1950). While, OMA allows for insertion and deletion of elements, and can thus recognise similarities that are out of alignment, HAM does not take into account *indel* costs. This Euclidean distance by comparing all the elements of the sequences and summing up the distances between states at each time point, measures the inter-sequence distance (Hamming 1950). In other word, HAM is a function of the number of positions at which two sequences with equal lengths differ (Gabadinho et al. 2011). Therefore, HAM focuses on the timing of sequences. This measure has been criticised for not taking into account any similarity that is displaced in time (Halpin 2014). On the contrary, OMA uses deletion and insertion to allow for time dislocation, ignoring the timing of the events but focusing on their duration. HAM requires sequences of equal length (in my case balanced panels of 48 months). The **Dynamic Hamming distance** (**DHD**), suggested by Lesnard in 2010, calculates the inter-sequence distances in the same way, but this time the element-wise distances are dynamic: the observed transition rates of the states are used to set the substitution costs. This distance focuses on the position of the substitution (Lesnard 2010). Its main drawback is that the distance emerged is non-metric and thus cannot be used for further cluster analysis (Lesnard 2010).

### Localised Optimal Matching

Hollister in 2009 identifies two problems in the OMA. The first problem regards the way that *indel* are used and the second problem the lack of clear benchmarks to assess OMA's results. She therefore suggests an alternative OMA, which she calls **Localised Optimal Matching (LOM)**. The LOM approach gives a solution to the arbitrary definition of *indel* costs used in OMA. She argues that the OMA algorithm does not take into account the type of element that has been inserted or deleted in a sequence and therefore, "it allows a highly unusual element to be inserted without any additional cost" (Hollister 2009, p. 246). Her algorithm allows the researcher to set *indel* costs at lower levels, preventing the use of two *indel* instead of one substitution (pseudo-substitution: deletion of the unwanted element and insertion of a new element) (Abbott and Tsay 2000). This algorithm however produces dissimilarity measures that do not satisfy the triangle inequality and thus are non-metric and cannot be used for further cluster analysis (Halpin 2014).

#### Number of Matching Subsequences

Elzinga (2003, 2005), after criticising OMA for being insensitive to sequencing (state order), suggested a distance metric based on the **Number of Matching Subsequences (NMS)**. It is sensitive to the timing aspect and the context of sequences and is based on a subsequence vector space. The more subsequences two sequences share, the closer these sequences are. In this way, the dynamics of a subsequence, and thus of the sequence, can be analysed. The distance is Euclidean and metric. This measure has been criticised for considering all the states equally different (Elzinga and Studer 2015). Elzinga and Studer in 2015 developed the **Subsequence Vector Representation-based Metric (SVR spell)**, which is similar to the NMS metric and is Euclidean. It is based on the number of matching subsequences, which are weighted according to their length and duration of spells. It is sensible to state order and timing of the elements.

#### Choosing the Most Appropriate Distance for this Project

It is clear that there is no ideal measure that has all the required characteristics (such as aspects of interested covered, metric measure, etc.). In an attempt to choose the most suitable for the present research and based on the research questions, the nature of the data, and the type of further analysis needed, some of the distances have been excluded. Firstly, the majority of the clustering algorithms require metrics and, thus, non-metric algorithms have been excluded (DHD and LOM). Additionally, the sequence aspects are taken into consideration. **Timing** allows measuring changes in time, thus it focuses on the longitudinal nature of the data. Metrics (HAM, SVRspell, NMS) that focus on this sequence aspect allow for element shifting (position-wise distances). For example, these metrics consider ABAB and BABA similar. **Duration** focuses on the duration of spells, e.g. duration of an unemployment spell (OMA). **Sequencing** studies whether one state leads to another (e.g. whether temporary employment leads to a more permanent job position) or to the construction of life trajectories (Studer and Ritschard 2016). Studer and Ritschard (2016) argue that Elzinga's NMS despite its interesting characteristics, is insensitive to all three aspects and thus is to be avoided.

I chose to use OMA instead of HAM[45] because accounting for the timing of a transition rather than on the duration of an event, "comes at the expense of distorting episodes (not taking into account the duration) whenever they are different" (Lesnard 2009, p. 8). Moreover, the timing aspect is covered by the analysis of the two distinct panels, one before and one during the 2008 financial European crisis. The distances produced by the sequence comparison are the base of a cluster analysis with the aim of creating labour market transition typologies (section 3.3.2).

#### Defining the Insertion, Deletion and Substitution Costs

As mentioned above, OMA measures the minimum number of operations in terms of costs needed to transform one sequence into another (similarity). The costs should be defined for each operation type, i.e. insertion, deletion and substitution (Lesnard 2010). When are two sequences equal? For sequences of short length and with limited number of possible elements, two sequences can be considered equal

[45] For methodological completion, I computed both Optimal matching analysis and the Hamming distance. The two different algorithms produced very similar cost matrices and clustered in similar ways the sequences.

only if they are identical (Hollister 2009, p. 237). Insertions and deletions cost the same (Lesnard 2010). Substitution costs are, by default, assigned twice the cost of an *indel*, because it operates as the sum of an insertion and a deletion, but the cost should be defined manually as lower than twice the cost of an *indel*, otherwise substitution costs will not be included in the calculation of the distance (Pollock 2007, p. 181).

One of the main complexities and often a criticism to OMA is setting the substitution costs (Aisenbrey and Fasang 2010). There is no ideal cost setting and assigning the costs of transforming one sequence into another can be challenging (Rohwer and Potter 2005, p.496; Vichi et al. 2006). Substitution costs can be distinguished between unit costs (constant costs) and variable substitution costs (Hollister 2009). Unit substitution costs assume that all states are equally distant from each other, i.e. equally different. Unit costs allow measuring in a straightforward way the turbulence/stability of trajectories (the higher the cost, the more state changes are experienced by the individuals). However, I cannot assume that all distances between labour market states are the same since, for instance, employment is not equally distant from unemployment and self-employment.

Variable substitution costs can be defined using different strategies: based on theory, based on state attributes and based on the data (Abbott and Tsay 2000; Hollister 2009; Studer and Ritschard 2016). Theory-driven costs take into account whether two states are theoretically closer or more distant. An example of this application can be found in Halpin and Chan paper (1998), where they used the Erikson-Golthorpe scale to define which occupations (sequence elements) are closer and which are more distant. This method has been criticised as being arbitrary and subjective, mostly driven by the researcher (among others: Hollister 2009; Studer and Ritschard 2016). The second option, suggested by Hollister (2009, p.240), consists in identifying the traits of each state and comparing each pair of states across all these traits; the distance between each pair will then be the summary value of all the comparisons. This measure is more objective since it is using quantitative values (such as scores), but the information required to identify the attributes of each state may not be available and the choice is still driven by the researcher. This method is more commonly used when the states can be ordered.

The third option focuses on data-driven cost assignment (Lesnard 2010; Lesnard 2014). Substitution costs are calculated based on the observed transition rates in the data, i.e. the probabilities of transiting from one state to another between time t and t+1[46]. Transition rates provide information about state changes and stability of each state in the data. Transition rates' matrix is not symmetrical and the rates from one state to all other states (including from the state to itself) should equal to 1. Although the transition rate between state A and B can be different than the transition between state B and A, the substitution cost SC(A,B) is computed to be symmetrical[47], using the formula: $SC(A,B) = sc(B,A) = 2-p(A|B)-p(B|A)$, where $p(A|B)$ is the transition rate between state A and B and $p(B|A)$ is the transition rate between state B and A (Gabadinho et al. 2010). The more frequent the transition between two states, the lower the cost and thus the states are considered similar (Rohwer and Potter 2005). In other words, low transition rates between two states mean that these two states are far from each other, they are not connected and they might be part of different trajectories. High transition rates mean that the states are connected and are part of the same trajectory. The transition rates should not be confused with the substitution costs[48]. Substitution costs reflect the dissimilarities between states and not the probability of transition.

[46] For the observed transition rates in the data, see Table 11 in Appendix A.
[47] The substitution cost matrix should be symmetrical in order to result on a distance that satisfies the triangular inequality (Ritschard et al. 2012).
[48] For the substitution cost matrix, see Table 12 in Appendix A.

Defining the substitution costs based on the observed transition rates has been criticised, as there is no certainty that transition rates reflect state similarities (Halpin 2010; Studer and Ritschard 2016, p.11). Another criticism is that the data-driven distance measure depends on the specific sample that has been used in the given sequence data (Hollister 2009). However, using the transition rates as the base for substitution costs allows us to account also for the timing of the sequences (Ritschard et al. 2012). According to Lesnard (2009, p.9), "a transition matrix is a macro representation of individual trajectories between all the different states between two consecutive dates". Another reason for using the transition rates to estimate the substitution cost matrix is that this method is data-driven and not arbitrarily based on theory or on the researcher's choices.

Summing up, I use optimal matching analysis and define the *indel* costs equal to 1 (default) and the substitution costs based on the observed transition rates.

#### Software

For data management, I use Stata 14. For the sequence analysis I use the TraMineR R Package (version 1.8-11.1), developed by Gabadinho, Ritschard, Studer and Müller in 2009. I used this package instead of Stata for three reasons: because it has implemented various distance metrics, which are not available in other software (at least until the time of the thesis submission); because it allows the use of weights when setting the data as sequence data and when applying the clustering algorithm; and because the computational time required is by far smaller in R. Computationally, it was time, memory and machine demanding to calculate the pairwise distance between sequences (4GB of matrix) and to apply a hierarchical algorithm to cluster the distance matrix. Therefore, I ran R and R Studio through Citrix Receiver, a client that provides access to XenApp installations and used the memory of the University of Edinburgh server.

### 3.3.2 Cluster Analysis

Cluster analysis gives the ability to summarise large data sets and is the most commonly used method to cluster a dissimilarity matrix into groups (Studer 2013). "In life course studies (…), the method [cluster analysis] has typically been used in combination with OMA distances to identify distinct groups of sequences with similar patterns; that is to define a typology of sequences" (Gadadinho et al 2011, p.31). The dissimilarity distance emerged from the OMA is clustered using a clustering algorithm with the aim of identifying labour market transition typologies across time and countries and study employment inequalities among sample sub-groups. A clustering algorithm classifies homogeneous elements in the same group (low within-group variation) and, at the same time, heterogeneous elements in different groups (high between-groups variation) (Everitt et al. 2011). The cluster variable can be then used as the outcome variable in a logistic regression model with the aim of predicting the probability of each individual with specific socio-demographic characteristics being a member of each cluster (section 3.3.3).

National proportional weights have been used to ensure the country representativeness when defining the sequence object and also during the clustering process. For this reason, the WeightedCluster R package, developed by Matthias Studer in 2013, is used allowing for weights to be applied. After having defined the sequence data and computed the dissimilarity distance, a crucial step of the analysis is to choose the most appropriate clustering algorithm. Clustering algorithms are divided in two groups: hierarchical and non-hierarchical or partitioning (Everitt et al. 2011; Tagg 2011). Hierarchical algorithms can be agglomerative or divisive[49]. The most used hierarchical agglomerative algorithms are single, complete and average linkage, centroid and Ward's method (Tan et al. 2014). The single and complete algorithms were excluded[50] because they are insensitive to weighting (Studer 2013,

[49] Divisive clustering techniques are not often used (Everitt et al. 2011).
[50] For the same reason the algorithms McQuitty, median and beta-flexible are excluded.

p. 9). The average linkage is based on the average distance (similarity) between each pair of sequences, while the centroid linkage is based on the mean distance value of each sequence (Everitt 2011, pp. 61-62; Hair et al. 2014, p. 416). Both the algorithms are less affected by extreme values (outliers) compared to the rest of the agglomerative methods (Studer 2013; Hair et al. 2014). The average linkage "tends to generate clusters with small within-cluster variation", while the centroid method may result in "messy and often confusing results" (Hair et al. 2014, pp. 441-442). The Ward's linkage is based on the sum of squares between two clusters (Hair et al. 2014, p. 417). The strong points of the Ward's method are that the number of clusters should not be defined a priori and that it produces similar sized clusters. One of its weaknesses is that it is affected by outliers that can distort the results (Everitt et al. 2011).

"(...) agglomerative procedures are non-deterministic, particularly when the distance measure takes only a few different values, given rise to ties between which one has to decide; in particular, this can be the case with optimal matching or the Hamming distance" (Studer 2013, p. 9). Therefore, Studer suggests the use of a partitioning algorithm, known as partitioning around medoids (PAM). According to Hair et al. (2014, p. 445), the advantages of partitioning methods are their insensitivity to extreme distance values and their ability to analyse large data sets. Their main disadvantages are the need to define the number of clusters a priori and their sensitivity to the initial cluster. Solutions to both problems are discussed below.

#### Clustering Algorithm

To aid the choice of a clustering algorithm, I test the clustering results of the sequences with a selection of algorithms (average, centroid linkage, Ward's method and PAM) using cluster quality measures (Table 3.10). I also use these measures to define the optimal number of clusters that better describe the data structure. As mentioned above, the process of applying a clustering algorithm to a large dissimilarity matrix is computationally demanding and therefore a computer located in the University of Edinburgh with a better processor was used[51].

**Table 3.10 – Measures of the quality of a cluster partition suggested by Matthias Studer (2013)**

| Name | Abrv. | Range | Min/Max | Interpretation |
|---|---|---|---|---|
| Point Biserial Correlation | PBC | [-1;1] | Max | Measure of the capacity of the clustering to reproduce the distances. |
| Hubert's Gamma | HG | [-1;1] | Max | Measure of the capacity of the clustering to reproduce the distances (order of magnitude). |
| Hubert's Somers' D | HGSD | [-1;1] | Max | Measure of the capacity of the clustering to reproduce the distances (order of magnitude) taking into account ties in distances. |
| Hubert's C | HC | [0;1] | **Min** | Gap between the partition obtained and the best partition theoretically possible with this number of groups and these distances. |
| Average Silhouette Width | ASW | [-1;1] | Max | Coherence of assignments. High coherence indicates high between-group distances and strong within-group homogeneity. |
| Average Silhouette Width (weighted) | ASWw | [-1;1] | Max | As previous, for floating point weights. |
| Calinski-Harabasz index | CH | [0;+∞] | Max | Pseudo F computed from the distances. |
| Calinski-Harabasz index | CHsq | [0;+∞] | Max | As previous, but using squared distances. |
| Pseudo $R^2$ | R2 | [0;1] | Max | Share of the discrepancy explained by the clustering solution (only to compare partitions with identical number of groups). |
| Pseudo $R^2$ | R2sq | [0;1] | Max | As previous, but using squared distances. |

Source: Table reproduced from Studer (2013, p. 13)

According to Studer (2013), the first three indicators (PBC, HG, HGSD) measure the capacity to reproduce the distance matrix of each algorithm: the higher the values the better the algorithm reproduces the dissimilarity matrix emerged by OMA. A small value of Hubert's C (HC) indicates a good partition of the data, while the largest the squared F-statistic (CHsq) the better the algorithm. The Calinski-

[51] When I used my personal computer to calculate the dissimilarity matrices for both periods and to apply Cluster Analysis I had memory allocation problems. The memory allocation problem can be relevant to limitations of the machine used (limited memory and/or processor), or also relevant to the R software used. There are indeed memory limits on single R objects: the number of bytes in a character string is limited to *2^31 - 1 ~ 2*10^9*, which is also the limit on each dimension of an array. Moreover, it is not normally possible to allocate more than 2 GB to a single vector in a 32-bit build of R even on 64-bit Windows because of preallocations by Windows in the middle of the address space. I set R memory at maximum capacity to manage to run cluster analysis separately for each dataset.

Harabasz index according to Gabadinho et al. (2013) is the best cluster criterion. The weighted average silhouette width (ASWw) value signals how good the clustering solution is reproducing the real structure of the data[52].

Tables 3.11 and 3.12 present the cluster-quality measures for serval algorithms (average, centroid, Ward, PAM and PAM with Ward initial cluster) and several partitioning options (4-7 clusters).

**Table 3.11 – Measures of the quality of a partition by clustering algorithms, 2005-2008**

| 2005-2008 | average6 | centroid6 | Ward4 | Ward5 | Ward6 | Ward7 | pam6 | pam7 | pamWard6 |
|---|---|---|---|---|---|---|---|---|---|
| PBC | 0.856 | 0.866 | 0.779 | 0.873 | 0.898 | 0.804 | 0.919 | 0.923 | 0.919 |
| HG | 0.952 | 0.957 | 0.764 | 0.959 | 0.980 | 0.952 | 0.993 | 0.996 | 0.993 |
| HGSD | 0.952 | 0.957 | 0.764 | 0.959 | 0.980 | 0.952 | 0.993 | 0.996 | 0.993 |
| ASW | 0.687 | 0.678 | 0.600 | 0.674 | 0.704 | 0.654 | 0.729 | 0.739 | 0.729 |
| ASWw | 0.687 | 0.678 | 0.600 | 0.674 | 0.704 | 0.654 | 0.729 | 0.739 | 0.729 |
| CH | 9934 | 10215 | 10180 | 11831 | 11831 | 11124 | 12666 | 11645 | 12671 |
| R2 | 0.667 | 0.673 | 0.552 | 0.656 | 0.705 | 0.729 | 0.719 | 0.738 | 0.719 |
| CHsq | 20307 | 19298 | 14904 | 21997 | 26853 | 23918 | 32062 | 32547 | 32079 |
| R2sq | 0.804 | 0.795 | 0.643 | 0.780 | 0.844 | 0.853 | 0.866 | 0.887 | 0.866 |
| HC | 0.051 | 0.042 | 0.098 | 0.040 | 0.020 | 0.059 | 0.007 | 0.004 | 0.007 |

Source: EU-SILC 2005-2008

Note: average6=average linkage with 6 clusters; centroid6= centroid linkage with 6 clusters; Ward4=Ward's linkage with 4 clusters; Ward4=Ward's linkage with 4 clusters; Ward5=Ward's linkage with 5 clusters; Ward6=Ward's linkage with 6 clusters; Ward7=Ward's linkage with 7 clusters; pam6=PAM algorithm with 6 clusters; pam7=PAM algorithm with 7 clusters; pamward6= PAM with Ward initial cluster in 6 clusters.

[52] The Average Silhouette Width compares the average distance to members of the group to the smallest average distance to members of another group (Studer 2013). Interpretation of ASW measure provided by M. Studer (2013, p. 14):

| *ASW* | Interpretation proposed |
|---|---|
| 0.71 – 1.00 | Strong structure identified. |
| 0.51 – 0.70 | Reasonable structure identified. |
| 0.26 – 0.50 | Structure is weak and could be artificial. Try other algorithms. |
| ≤ 0.25 | No structure. |

**Table 3.12 – Measures of the quality of a partition by clustering algorithms, 2009-2012**[53]

| 2009-2012 | average6 | Ward4 | Ward5 | Ward6 | Ward7 | pam6 | pam7 | pamWard6 |
|---|---|---|---|---|---|---|---|---|
| PBC | 0.820 | 0.602 | 0.726 | 0.798 | 0.819 | 0.911 | 0.916 | 0.911 |
| HG | 0.933 | 0.604 | 0.857 | 0.935 | 0.957 | 0.991 | 0.995 | 0.991 |
| HGSD | 0.933 | 0.604 | 0.857 | 0.935 | 0.957 | 0.991 | 0.995 | 0.991 |
| ASW | 0.653 | 0.512 | 0.577 | 0.626 | 0.648 | 0.709 | 0.719 | 0.710 |
| ASWw | 0.653 | 0.512 | 0.577 | 0.626 | 0.648 | 0.710 | 0.720 | 0.710 |
| CH | 10311 | 10570 | 11618 | 13127 | 12913 | 14116 | 13044 | 14108 |
| R2 | 0.632 | 0.514 | 0.608 | 0.686 | 0.721 | 0.702 | 0.723 | 0.702 |
| CHsq | 19906 | 13735 | 17773 | 24187 | 27812 | 35553 | 36375 | 35542 |
| R2sq | 0.768 | 0.579 | 0.703 | 0.801 | 0.848 | 0.856 | 0.879 | 0.856 |
| HC | 0.064 | 0.221 | 0.139 | 0.074 | 0.049 | 0.008 | 0.004 | 0.008 |

Source: EU-SILC 2009-2012

Note: average6=average linkage with 6 clusters; Ward4=Ward's linkage with 4 clusters; Ward4=Ward's linkage with 4 clusters; Ward5=Ward's linkage with 5 clusters; Ward6=Ward's linkage with 6 clusters; Ward7=Ward's linkage with 7 clusters; pam6=PAM algorithm with 6 clusters; pam7=PAM algorithm with 7 clusters; pamward6= PAM with Ward initial cluster in 6 clusters.

The best partition for the 2005-2008 data seems the partition produced by the PAM algorithm in seven clusters (pam7): the partition in seven clusters reproduces better the distance matrix (PBC, HG, HGSD are higher) and is a better partition of the data (Hubert's C is smaller). The second best fit is the PAM partition in six clusters (pam6). As we can observe from the values, applying the PAM algorithm with the Ward initial cluster provides very similar results to the PAM partition. The Calinski-Harabasz index indicates that between Ward6 and Ward7, the partition in six clusters is a better fit (CHsq is higher). The weighted average silhouette width signals that Ward6, pam6 and pam7 partitions present a reasonable structure. Ward6 and pam6 produce very similar, almost identical, results. The difference between pam6 and pam7 is an extra cluster of 324 individuals (1.4% of the total individuals)[54].

The best partition for the 2009-2012 data is clearly the PAM partition in seven clusters, followed by the PAM in six clusters. Using the PAM algorithm with the

[53] The centroid algorithm has been tested and excluded since it produces clusters with only one observation.

[54] The dendrograms cannot be produced clearly by the software because of the amount of elements represented in each of them.

initial Ward solution provides very similar results to the PAM in six clusters. The difference between pam6 and pam7 is an extra cluster including 352 individuals (equal to 1.6% of the total individuals).

Summing up, for comparative reasons, centroid is excluded since it does not produce a reliable cluster solution for the data set 2009-2012. According to the cluster quality measures, the PAM algorithm produces more robust results. The partition in seven clusters seems the best fit of the data structures for both time periods. As mentioned above, the PAM algorithm has two weak points. The first is the need to define a priori the number of clusters and the second regards its sensitivity to the initial cluster. Both issues have been addressed by assessing that applying first the Ward algorithm, identify the best partition with the aid of the cluster quality measures and then use the same partition with PAM, provides very similar results as using directly the PAM algorithm. The results of the cluster analysis are used to describe individual occupational trajectories both in Chapter 4 and 5.

### 3.3.3 Multinomial Logistic Regression

The purpose of this model is to estimate the probabilities of being in a specific labour market cluster based on gender, age, education and marital status. To estimate the probabilities of different outcomes, here being in different employment clusters, the multinomial logistic regression model is the most appropriate to estimate the odds of being a member of a specific cluster over the odds of an alternative cluster (Hair et al. 2014). The dependent variable emerged from the cluster analysis. Each individual/sequence belongs to one specific cluster across the four years of analysis and thus the data used for the regression model can be treated as cross-sectional. I run two regression models, one for the 2005-2008 dataset and one for the 2009-2012, both including all the countries of analysis. To ensure representativeness and data comparability, I weight the data using country proportional weights, i.e. estimating the probability of an individual residing in a specific country (described in section 3.2.1). The results of the model are discussed at the end of Chapter 5 and mainly confirm the sequence and cluster analysis results.

### 3.3.4 Multilevel Modelling

Sequence and cluster analysis are used to explore and describe individual labour market trajectories across European countries and to study employment inequalities before and during the financial crisis (Chapters 4 and 5). The aim of the last empirical chapter (Chapter 6) is to study employment variations across European regions during the Great recession (2009-2012). In other words, the goal of the analysis is to explore how much variation in the employment status is explained by the region of residence and to establish which regions provide a better chance of employment during the Great recession. I also explore individual and contextual factors that might explain part of the regional variation in employment outcomes.

#### Model Development

I could apply SA to study the regional differences regarding labour market outcomes, but the high number of regions (41) would make the model computationally very demanding and the presentation of the results not easy to read and present. Therefore, to answer my last research question and predict the employment outcomes in European regions, I apply a multilevel model. Although I still use the monthly labour market data provided by the longitudinal component of EU-SILC, the sample of analysis presents some slight differences (discussed in Chapter 6) compared to the sample used for the sequence and cluster analysis.

Before discussing in detail the final model, I briefly present the brainstorming that led to the final model. The EU-SILC data are clustered in groups, meaning that individuals are clustered within regions, regions within countries and since the data are longitudinal, repeated observations across time within each respondent. Therefore, a simple single-level regression model would produce biased standard errors, ignoring the correlation between the observations[55], while a multilevel model would allow for random effects at the highest level of variation (Rabe-Hesketh and Skrondal 2012). I assume that people from the same region have some common characteristics and their labour market trajectories may be influenced by unobserved common regional characteristics, such as the unemployment rate, the rate of growth, the population density and employment sectors (the model that includes these contextual factors is discussed in section 6.4.3). If these unobserved shared factors were ignored, then the standard errors of the model would be underestimated (Plewis 1994). In fact, multilevel models take into account the unobserved characteristics.

Ideally, the outcome variable used in the model would be the variable emerged from the cluster analysis (see section 4.2.1), an unordered categorical variable including seven clusters of employment sequences: full-time, part-time, full-time self-employment, part-time self-employment, unemployment, inactivity and retirement. Based on the structure of the data and the nature of the outcome variable, ideally, I would apply a multinomial logistic regression with three levels of variation, time nested in individuals nested in regions (ignoring countries for reasons that I thoroughly discuss in Chapter 6). I tried to run this model using three different software MLwiN, Stata and R, and three different machines (my own computer, the University server and a very powerful University station), but it proved computationally too demanding. The software would almost immediately stop working, sometimes before I even set up the model. The main cause is linked to the size and the format of the dataset. The data were in long format, allowing one

[55] In fact, values from the same individual at different time points are usually highly correlated (Twisk 2006, p. 86). A biased independence assumption might lead to small standard errors and pseudo-significant relationships (coefficients appear more significant than they really are) (Goldstein 2003).

row for each month (48 months) for each individual: 862,416 rows corresponding to 17,967 individuals[56].

One solution would have been to use the yearly data but then the loss of information would be large. Moreover, the dataset was still large enough (more than 70,000 observations) and the analysis was computationally very demanding. Another alternative that seemed a better compromise was to reduce the complexity of the outcome variable. I run the model with various combinations of the labour market status variable[57]. I focused my attempts on the most parsimonious model, a multinomial monthly model with three levels of variation (time-individuals-regions) predicting an outcome variable consisting of four states (employment, unemployment, retirement and inactivity). It was not possible to run this model since the software (MLwiN) would run out of memory and would not converge. Estimation of a model without any explanatory variables would require at least two hours before even proceeding to the MCMC simulation method (discussed later, but necessary when modelling a discrete outcome) and most of the times the estimates would be zero, because they would not converge. In every attempt of adding some basic explanatory variables (age, gender and education level), the software would either stop working[58] or run for days without converging.

Finally, I decided to aggregate the monthly data in order to obtain a smaller dataset. To this end, I collapsed my original monthly data in order to obtain the mean proportion of months spent by each individual in each labour market status across the full duration of the panel. In this way, I obtained a dataset in wide format,

[56] I will explain later why the sample size has changed compared to previous analyses in Chapter 6.
[57] Monthly labour market status with 5 categories: employment, self-employment, unemployment, retirement, inactivity; with 6 categories: full-time employment, part-time employment, self-employment, unemployment, retirement and inactivity; with 4 categories: employment, unemployment, retirement, inactivity.
[58] Sometimes the model would run for a few iterations and I would be able to edit the starting values and proceed to an MCMC estimation that unfortunately would not run.

allowing for one row for each individual (17,967 observations). To answer my research question "Does the region of residence matter for individuals' probability of being employed during the 2009 financial crisis?" I needed to model the variable measuring the proportion of months spent in employment for each individual. Employment now includes full and part-time employment, as well as self-employment.

### The Method in a Nutshell

Multilevel models (also known as random coefficient analysis and hierarchical modelling) allow for two or more levels of variation, while single level models (also known as simple regression models) allow for one level of explanation (Rabe-Hesketh and Skrondal 2012). In essence, multilevel models are regression models fitted in data with a hierarchical structure (Plewis 1994; Goldstein 2003; Twisk 2006). This method is commonly used in the educational research field, because of the structure of the data; usually pupils nested in schools and schools in neighbourhoods (Plewis 1994, p. 119). For the same reason regarding the structure of the data, it is a method suitable for longitudinal data, where repeated observations are nested within individuals (Plewis 1994; Rabe-Hesketh and Skrondal 2012, p. 227).

To show the difference between a simple regression model and a multilevel model I use the following equations:

$$y_i = b_o + b_1x_{1i} + b_2x_{2i} + e_i \qquad (1)$$

$$y_{ij} = b_{oj} + b_1x_{1ij} + b_2x_{2ij} + e_{ij} \qquad (2)$$

Equation (1) is a simple regression model, while equation (2) has the added subscript *j*. In the second model, $y_{ij}$ is the employment outcome for individual *i* in region *j*. The intercept ($b_{oj}$) of equation (2) can vary across regions (random intercept model), while the slopes in this model are fixed[59] ($b_1$ and $b_2$) and $e_{ij}$ is the estimate of the regional variation (Plewis 1994, p. 122). A simple regression model estimates an error term which must be uncorrelated across individuals, while a multilevel model allows for the error term to vary across individuals and regions, assuming that individuals belonging to the same region might share some characteristics and thus be more similar compared to people residing in a different region (Rabe-Hesketh and Skrondal 2012). To account for this variation, I could include in a single-level model a binary variable for each individual and each region, but that would make the model computationally impossible. The multilevel model instead of estimating separately all the different intercepts, estimates the variance across intercepts (Twisk 2006, p. 9). In essence, the multilevel model estimates the between-region variance (level-2 variance) and the individual variance in a more parsimonious way. In fact,

$$b_{oj} = b_o + u_{oj} \qquad (3)$$

where $u_{oj}$ is the random level-2 variance (random effects).

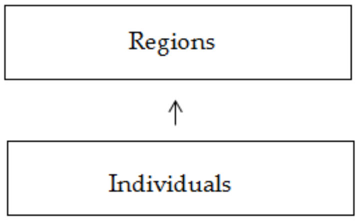
**Modelling Proportions: My Model in Detail**

My model is a 2-level hierarchical model, with individuals (level 1) nested within regions (level 2; Figure 3.6). More precisely, each observation is nested uniquely in each individual and each individual lives in only one region at the moment of the interview[60]. I aggregate the monthly data used in the previous analysis, transforming the labour market status into the proportion of months (out of a total of 48 months) spent in each of the labour market states. Therefore, the dimension of time is not a level of analysis anymore, but is included in the outcome variable,

[59] I do not allow for random slopes in the model because computationally it becomes too demanding and the software stops working as soon as I set a random slope model (even with half of the explanatory variables). Nonetheless, the focus of Chapter 6 is the regional effects on individual employment outcomes and thus I can answer my research question with a random intercept model. Caroleo and Coppola (2005), as well as Perugini and Signorelli (2007) also used fixed effects models.
[60] Very few individuals (less than 0.5% of the total sample) moved from one region into another during the panel years. These individuals have been dropped from the sample of analysis.

which measures the proportions of months spent by each individual in employment (full, part-time employment and self-employment).

**Figure 3.6 - Hierarchical classification diagram with two-level structure in the EU-SILC data**




Source: EU-SILC 2005-2008 and 2009-2012

I model the proportion of months being employed divided by the total number of months[61] (denominator of the model equals to 48 months; i.e. 4 years) using a non-linear model. To model proportions, I use a binomial model with a logit link function (Steele 2009; Rabe-Hesketh and Skrondal 2012; Paterson et al. 2013). The choice of the link function, between logit and probit, is based on the interpretation of the coefficients. According to Steele (2009), logit models are more commonly used in social sciences. For this reason and because I find it easier to interpret log-odds, I apply the logit function.

The model uses the following formula:

$\mathrm{logit}(\pi_{ij}) = b_{oj}\mathrm{cons}+b_1x_{1ij}+b_2x_{2ij}+b_3x_{ij3}+ u_{oj}$,

$boj=bo+uoj$

where $\pi_{ij}$ is the response probability, i=level 1 (individuals), j=level 2 (regions), and $u_j$ the error term for regions.

[61] My outcome variable does not have a linear distribution since 20.5% of the sample has never been employed during the 48 months of analysis, while 55.3% have always been employed. This is not a problem for MCMC estimation since it does not assume normality.

The outcome of the model is the logit of the probability of y=1 (Twisk 2006, p. 41). To calculate the predicted probabilities from the log-odds I need to exponentiate the coefficient (Twisk 2006, p. 41). The p-value of the model is obtained by calculating the Wald statistic: $(\text{coefficient/std. error})^2$ compared to a chi-squared distribution with one degree of freedom (Twisk 2006, pp. 41-42). Practically, the Wald statistic tests the hypothesis that b=0, in my case that the regional variance equals to zero (Steele 2009).

The most suitable estimation process for discrete outcome variables is the Bayesian estimation applying Markov chain Monte Carlo (MCMC) simulation method[62] (Goldstein 2003; Leckie and Charlton 2012; Paterson et al. 2013). I first explore the data and build my model using iterative generalised least squares IGLS, and more specifically 1st order marginal quasi-likelihood method (MQL1) and 2nd order penalised (or predictive) quasi-likelihood (PQL2). Then the full model is estimated using MCMC, with starting points emerged from PQL2 (Browne 2015, p. 64). In fact, from the IGLS methods, PQL2 gives the most robust estimates (Twisk 2006). I first fit a variance component model, which only accounts for the random effects (the intercepts) and not for fixed effects (no explanatory variables), and then a random intercept model, which includes explanatory variables (Browne 2015, p. 37).

To present a multilevel model, I present the equation of the model, comment on its Variance Partition Coefficient (VPC) and level-2 variance and plot the residuals using a caterpillar and/or a map. The VPC measures the percentage of the employment variance explained by the regions: $VPC = \sigma^2_u / (\sigma^2_e + \sigma^2_u)$, where $\sigma^2_u$ is the level-2 variance (at regional level) and $\sigma^2_e$ the level-1 variance (at individual level). In a logit model, there is a hidden logistic distribution (Browne et al. 2005).

[62] I use orthogonal parameterisation, hierarchical centering at level 2 and parameter expansion at level 2 to improve the speed of the model.

The variance of a logistic distribution equals to $\pi_{2/3}$=3.29 and this is the level-1 variance I use to calculate the VPC of the binomial model: VPC= $\sigma^2_u / (\sigma^2_u + \pi_{2/3})$.

To evaluate the robustness of an MCMC model, I first check the trajectories for each parameter and the accuracy diagnostics. The main accuracy diagnostics are the Raftery-Lewis (using the quantiles of the distribution) and the Brooks-Draper (using the mean) measures, both indicating an adequate length of the Markov chain, as well as the effective sample size (ESS), which must be higher than 200 iterations (Browne 2015, pp. 38-39). Finally, using the Deviance Information Criteria (DIC) I can compare models between them (Paterson et al. 2013). The DIC diagnostics take into account the quality of the model fit, together with the model complexity. The model with the smallest value of DIC is the best fit (the most parsimonious model).

#### Software

For this analysis, I used MLwiN (version 2.36), an open-source (to academics and students) specialised to multilevel models software, developed by the Centre for Multilevel Modelling based at the University of Bristol (Rabash et al. 2016). For the data management I used Stata 14.

## 3.4 Conclusions

This chapter discussed the research methodology of this project and described the data, sample, variables and methods used to answer each of research questions. Chapters 4, 5 and 6 present the data analysis and empirical findings and test the research hypotheses, mentioned in Chapter 2.

# 4

## Chapter 4 European Labour Markets in Crisis

*How did individual labour market trajectories change during the Great recession across European countries?* This chapter studies the labour market trajectories of Europeans between 25-64 years old across time and across eleven European countries with the purpose of exploring whether individual labour market sequences appear different after the start of the 2008 Great recession in the countries of analysis.

In detail, according to the Transitional Labour Markets (TLMs) approach, more turbulent (transitions including numerous labour market states) and fragmented (transitions including numerous changes between labour market states) labour market trajectories are expected after the start of the financial shock (**Hypothesis 1.1**). Moreover, I study whether the empirical results of this chapter confirm the country classification defined by Muffels and Luijkx (2008): the Scandinavian cluster (Denmark, Sweden, Finland and the Netherlands), Continental cluster (Austria, Belgium and France), Anglo-Saxon (UK) and southern European group (Greece, Italy and Portugal). I study each country separately and not as part of a country group in order to avoid ad hoc assumptions on the country classification and thus I am able to explore whether countries belonging to the same group show more commonalities between them regarding labour market trajectories than with countries of different groups (**Hypothesis 1.2**). Finally, based on the TLMs approach, it is presumed that flexible labour markets, such as those in the Scandinavian countries and the UK, promote job mobility, i.e. transitions between standard and non-standard forms of employment. On the other hand, southern European counties with rigid labour markets are expected to register lower job mobility and more exclusionary transitions from employment to unemployment and inactivity especially during the crisis (**Hypothesis 1.3**).

This chapter is divided in three main sections. Section 4.1 discusses the 2008 Great European recession, its causes and consequences, as well as the adjustment strategies adopted by the European governments to recover from the shock, using economic and labour market indicators at national level, provided by Eurostat and OECD online datasets (see notes below each table/figure). The aim of the first section is to provide insights on the time and place of analysis and a broader understanding of the economic and labour market conditions across European countries between 2005 and 2012. This understanding should ease the interpretation of the empirical findings obtained from the analysis of individual labour market trajectories first at European and then at national level. Sections 4.2 and 4.3 present the empirical findings of sequence and cluster analysis applied to the longitudinal component of the EU-SILC. Firstly, I discuss the labour market trajectories in Europe as a whole (all eleven countries analysed together) and then I study each European country separately to stress the differences and similarities across countries and the different extent of the impact of the Great recession.

Section 4.2 closely examines labour market patterns in Europe in relation to the financial crisis to conclude that the differences before and during the crisis in individual employment trajectories are not as pronounced as was expected, with an increase in non-standard forms of employment and unemployment. Section 4.3 focuses on cross-country comparisons regarding employment outcomes across time. A key finding of this chapter is a strong country heterogeneity, which appears even more pronounced after the start of the crisis and a second finding is the heterogeneity between countries belonging to the same cluster based on the country classification used. Finally, the employment patterns emerged before and during the years of the crisis are country specific, with countries with flexible labour markets offering more job change opportunities, while countries with rigid employment legislation experiencing more exclusionary transitions, with a high share of inactivity and self-employment.

## 4.1 The Financial Crisis in Europe: Causes, Consequences and Responses across Countries

### 4.1.1 The Causes and Consequences of the 2008 Economic Shock at the European Level

The causes of the current global financial and economic crisis and the succeeding sovereign debt crisis are part of the everyday discussion between economists and politicians, but not all actors agree on the same causes. A truly comprehensive review of the causes of the crisis is beyond the scope of this thesis, which focuses on its effects on individual labour market trajectories and thus I only briefly discuss the possible causes of the crisis. A large body of research[63] has been published on the causes of the crisis. Most of these studies consider the burst of the housing bubble in the U.S. that led to the fall in property prices and to the collapse of mortgage-backed securities, the main source of the banking system crisis that was rapidly spread globally (European Commission 2009). Other researchers argue that the economy was too dependent on financial markets which were not enough regulated and governments' spending was more reliant on financial capital and access to credit than on actual wages (among others: Boyer 2009; Lallement 2011).

A paper signed by sixteen scientists coming from different fields (political economists, economists, finance and banking, monetary policy experts, etc.) identifies as one of the main causes of the Eurozone crisis the imbalance between public and private debt (Baldwin et al. 2015). In fact, core European countries, such

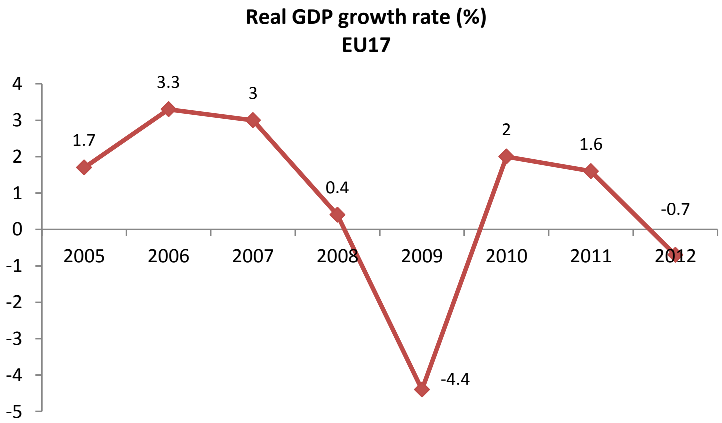
[63] Among them: Berkmen et al. 2009; Rose and Spiegel 2010; Blanchard et al. 2010; Claessens et al. 2010; Rose and Spiegel 2011; Giannone et al. 2011; Frankel and Saravelos 2012.

as Germany and France, loaned big amounts of money to peripheral countries, like Greece and Portugal, but "(…) assets were not being created to pay off the borrowing" (Baldwin et al. 2015, p.1). During the first phase of the crisis (2008-2010), an interruption of the cross-Europe loans caused financial imbalances to countries that based their economy on these loans. At this point, "(…) several governments had to take on some of their banks' debt, thus increasing national debt ratios even further. This is how a balance of payment crisis became a public debt crisis" (Baldwin et al. 2015, p. 2). In fact, the sovereign crisis in Greece manifested not only due to the high proportion of debt on the national GDP, but also because the debt was held externally, i.e. by foreign banks and governments (Karamessini 2014a, p.12). On the contrary, in Italy the debt (the second highest public debt after Greece), was mainly held nationally and not externally and thus the impact of the crisis was milder (Karamessini 2014a; Verashchagina and Capparucci 2014).

The consequences of the crisis on labour market performances (measured by the employment and unemployment rates) varied significantly across European countries, depending on numerous factors, such as the severity of the crisis, the reaction of the markets, the policies implemented, the pre-crisis conditions and the rigidity of labour markets (among others: OECD 2010; Eichhorst et al. 2010a; ECB 2012; Martin and Scarpetta 2012; Clasen et al. 2012). The impact of the crisis in some countries was short-lived and the recovery was relatively quick, while in other countries a re-intensification of the crisis was observed during a second phase. The Great recession mainly affected the production growth and the labour markets (Boeri et al. 2012). Indeed, one of the first consequences of an economic crisis is an increase in the unemployment rate, often – but not necessarily - together with a fall in the gross domestic product (GDP). A "shallow" economic recession results in an adjustment mainly in firm productivity, usually by reducing the working hours; while a "persistent and deep" crisis leads to job losses (Knotek and Terry 2009; Arpaia and Curci 2010, p. 33).

Figure 4.1 presents the GDP growth rate on average in Europe, a measure of economic capacity, while Figure 4.2 the employment and unemployment rates in EU-15, the main indicators of labour market performance. The start of the financial crisis in Europe, as well as the two phases of the crisis, is evident from both plots. It is clear that the GDP growth rate registers a sharp decrease, reaching negative values in 2008-2009, then an increase in 2010, followed by a decrease in 2011-2012. Similar are the patterns of employment and unemployment rates. The EU-15 employment rate dropped by, almost, two percentage points during the period 2008-2010. It seems rather stable in the biennium 2010-2011, but declines again in 2012. The average European unemployment rate (EU-15) registers a sharp jump in 2008-09 and a more contained increase in 2011-12. Overall, 2012 was the year with the highest unemployment and lowest employment rates since the start of the crisis. The real effects of the financial crisis have been moderated at the beginning of the crisis with the use of labour hoarding, a tool (defined in section 4.1.3) aiming to maintain the employment rates (Barakat et al. 2010). Therefore, the effects on the unemployment rate manifest with a certain delay, a phenomenon known as the 'hysteresis effect' (Marelli and Signorelli 2010, p. 51).

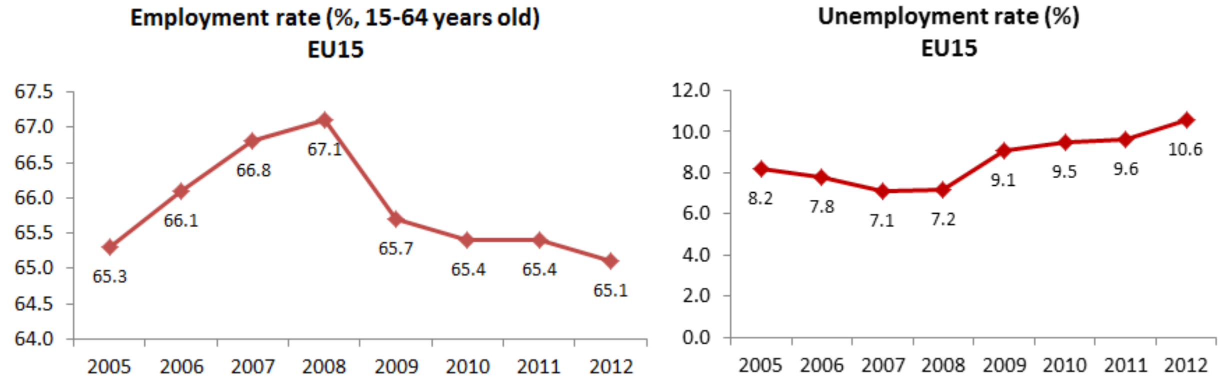
**Figure 4.1 – Real GDP growth rate (percentage change based on previous year) EU-17. 2005-2012[64]**




Source: Own calculation using data downloaded from Eurostat online dataset, code: tec00115. Extracted on 22/11/2016.

[64] The focus of my analysis is overall between 2005 and 2012 and thus the statistics of this section cover the period until 2012.

**Figure 4.2 – Employment and unemployment rates EU-15. 2005-2012**




Source: Own calculation using data downloaded from Eurostat online dataset, codes: lfsi_emp_a; une_rt_a. Extracted on 22/11/2016.

### 4.1.2 Crisis or Crises?

Looking at Europe as one entity conceals the fact that European countries differ substantially in the way they were affected by the crisis. The consequences of the financial crisis, as well as the responses to the recession, vary significantly across European countries. The country heterogeneity regarding the intensity and consequences of the crisis is a result of different institutions and employment policies, variation in sectoral structures and diverse pre-crisis national labour market conditions[65], which all led to different labour market reactions (Arpaia and Cruci 2010; Marelli and Signorelli 2010; Dimian et al. 2013; Theocharis and Van Deth 2015). By studying the effects of the crisis on the GDP, as well as on the employment and unemployment indicators, by country before and during the crisis my goal is to confirm the country heterogeneity regarding the effects of the crisis.

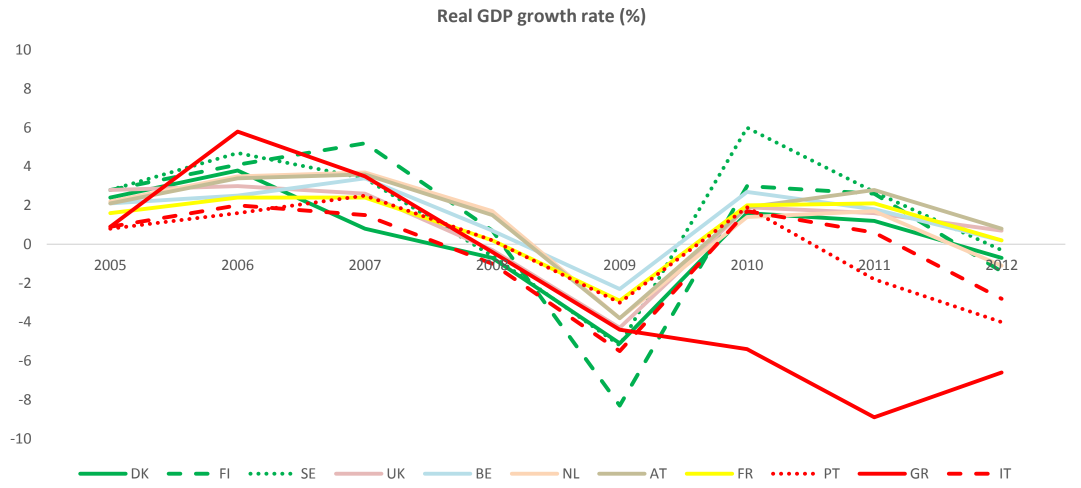
The growth rate of the GDP provided by Eurostat is a measure that allows us to compare the economic growth across time and across countries with economies of different sizes. All the countries[66] register a decrease in the GDP growth rate from

[65] For instance, the pre-crisis performance of the southern European countries, such as Portugal, already showed signs of vulnerability (low productivity and GDP growth, large public deficit), a condition that led to a full-on crisis (Carneiro et al. 2014).

[66] In this section, I study only the countries analysed empirically, i.e. 11 countries of the EU-15 and the period between 2005 and 2012.

2008 and a sharp drop in 2009 (Figure 4.3). The following year, 2010, a recovery of the rate is observed, with the exception of Greece, where the rate decreases even further. Displaying the effects of a second phase of the financial crisis, in 2011, the rate decreases once more in all the countries and especially in Greece (-5.4% in 2010 and -8.9% in 2011), with the exception of the Netherlands, Austria and France which show an increase, even slight, in the rate. In 2012, all the countries (except for Greece, which shows slight signs of recovery) still manifest a decreasing rate. Overall, the real GDP growth rate varies considerably across countries between 2005 and 2012. Greece differs substantially from the rest of the countries, registering a constant decline of the GDP and reaching its nadir in 2011 (-8.9%). On the other hand, Sweden reports the peak of the economic growth rate in 2010 (+6%). Sweden and Denmark (Nordic countries with strong economies based mainly on export of industrial goods) experience a sudden drop of their GDP during the financial crisis (Lallement 2011).

**Figure 4.3 – Real GDP growth rate per country (percentage change based on previous year). 2005-2012**




Source: Own calculation using data downloaded from Eurostat online dataset, code: tec00115. Extracted on 22/11/2016.

The employment and unemployment rates studied at European level earlier are disaggregated by country in Tables 4.1 and 4.2. In detail, Table 4.1 presents the employment rate by country across time. Italy and Greece display the lowest employment rates among the countries in analysis even before the start of the crisis, i.e. 2005-2008, confirming that the pre-crisis conditions of the labour markets are not irrelevant to the impact of the crisis. On the contrary, during 2005-2008, the highest rates were registered in Denmark and Sweden (77-79%). In 2009, there is a drop in the rate for all the countries, but of different extent. Between 2009 and 2012, Greece lost 10 percentage points in the employment rate, followed by Portugal (-4.8%), while other countries, such as Sweden and Austria, register an increase in the rate.

Focusing on the unemployment rate (Table 4.2), the highest rate in 2008 does not overcome a threshold of 10% (with the highest share in Portugal), while in 2012 it exceeds 20% (in Greece). The EU-15 increase in the unemployment rate anticipated in the previous section is mainly driven by the increase in the rate in specific countries (Arpaia and Curci 2010, p. 6). In line with Ward-Warmedinger and Macchiarelli (2014, p. 7), unemployment is substantially more frequent among the southern European countries, especially during the recession. In detail, Greece reaches the record of 24.5% in 2012, almost 12 percentage points above its rate of 2010, followed by Portugal (15.8%) and Italy (10.7%). The British unemployment pattern, together with the patterns of Greece, Italy and Portugal, reveals the two crisis phases with a first increase in 2009 and a second in 2011 (Clasen et al. 2012).

**Table 4.1 – Employment rate by country and year (20-64 years old; percent of the total population)**

| Country | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|
| AT | 70.4 | 71.6 | 72.8 | 73.8 | 73.4 | 73.9 | 74.2 | 74.4 |
| BE | 66.5 | 66.5 | 67.7 | 68 | 67.1 | 67.6 | 67.3 | 67.2 |
| DK | 78 | 79.4 | 79 | 79.7 | 77.5 | 75.8 | 75.7 | 75.4 |
| FI | 73 | 73.9 | 74.8 | 75.8 | 73.5 | 73 | 73.8 | 74 |
| FR | 69.4 | 69.4 | 69.9 | 70.5 | 69.5 | 69.3 | 69.2 | 69.4 |
| GR | 64.4 | 65.6 | 65.8 | 66.3 | 65.6 | 63.8 | 59.6 | 55 |
| IT | 61.5 | 62.4 | 62.7 | 62.9 | 61.6 | 61 | 61 | 60.9 |
| NL | 75.1 | 76.3 | 77.8 | 78.9 | 78.8 | 76.8 | 76.4 | 76.6 |
| PT | 72.2 | 72.6 | 72.5 | 73.1 | 71.1 | 70.3 | 68.8 | 66.3 |
| SE | 77.9 | 78.8 | 80.1 | 80.4 | 78.3 | 78.1 | 79.4 | 79.4 |
| UK | 75.2 | 75.2 | 75.2 | 75.2 | 73.9 | 73.5 | 73.5 | 74.1 |
| **EU15** | **69.4** | **70.2** | **71** | **71.3** | **69.9** | **69.6** | **69.6** | **69.3** |

Source: Own calculation using data downloaded from Eurostat online dataset, code: lfsi_emp_a. Extracted on 22/11/2016.

**Table 4.2 – Unemployment rate by country and year (total; percent of active population)**

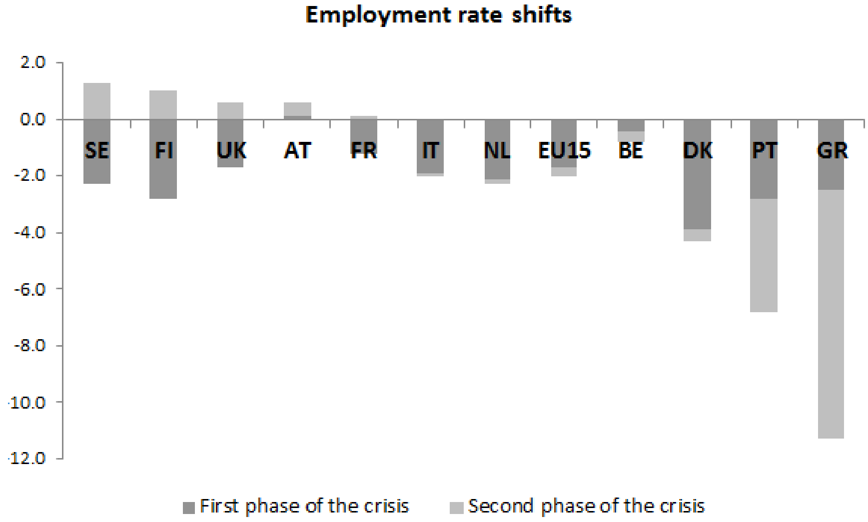
| Country | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|
| AT | 5.6 | 5.3 | 4.9 | 4.1 | 5.3 | 4.8 | 4.6 | 4.9 |
| BE | 8.5 | 8.3 | 7.5 | 7 | 7.9 | 8.3 | 7.2 | 7.6 |
| DK | 4.8 | 3.9 | 3.8 | 3.4 | 6 | 7.5 | 7.6 | 7.5 |
| FI | 8.4 | 7.7 | 6.9 | 6.4 | 8.2 | 8.4 | 7.8 | 7.7 |
| FR | 8.9 | 8.8 | 8 | 7.4 | 9.1 | 9.3 | 9.2 | 9.8 |
| GR | 10 | 9 | 8.4 | 7.8 | 9.6 | 12.7 | 17.9 | 24.5 |
| IT | 7.7 | 6.8 | 6.1 | 6.7 | 7.7 | 8.4 | 8.4 | 10.7 |
| NL | 5.9 | 5 | 4.2 | 3.7 | 4.4 | 5 | 5 | 5.8 |
| PT | 8.8 | 8.9 | 9.1 | 8.8 | 10.7 | 12 | 12.9 | 15.8 |
| SE | 7.7 | 7.1 | 6.1 | 6.2 | 8.3 | 8.6 | 7.8 | 8 |
| UK | 4.8 | 5.4 | 5.3 | 5.6 | 7.6 | 7.8 | 8.1 | 7.9 |
| **EU15** | **8.2** | **7.8** | **7.1** | **7.2** | **9.1** | **9.6** | **9.6** | **10.6** |

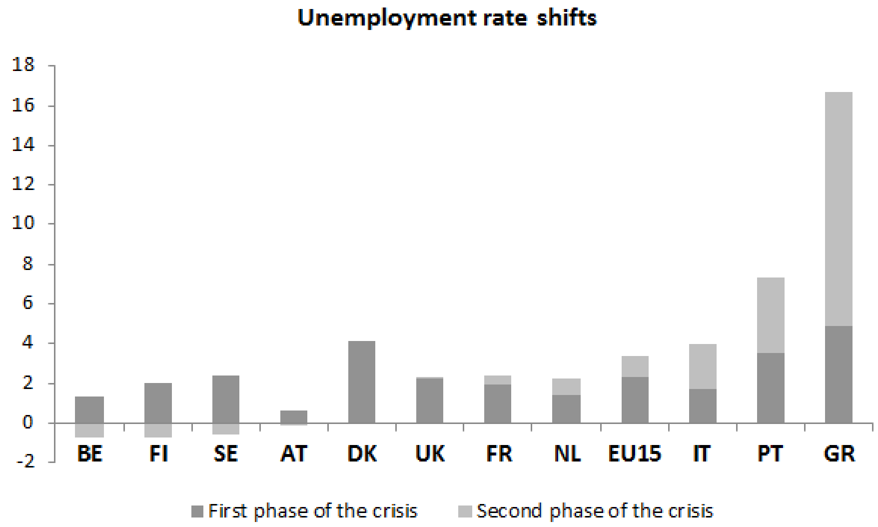
Source: Own calculation using data downloaded from Eurostat online dataset, code: une_rt_a. Extracted on 22/11/2016.

To summarise the tables above, I use two graphs focused on the period of the economic crisis divided in the two crisis phases: 2008-2010 and 2010-2012. Figure 4.4 shows the employment and unemployment shifts, with shifts being the difference in the rates between 2008 and 2010 and between 2010 and 2012. In this way, I can visualise which countries have been hit harder by the crisis and those with a speedy recovery. Regarding the employment shifts, during the first phase (2008-2010), the highest decreases in the rate are reported in Denmark (-3.9%), Portugal (-2.8%), Finland (-2.8%), Greece (-2.5%), Sweden (-2.3%) and the Netherlands (-2.1%). However, in 2010-2012, Sweden, Finland, France and the UK show signs of recovery, while Greece (-8.8%) and Portugal (-4%) go deeper into recession. Similarly, for the unemployment shifts, all countries register an increase between 2008 and 2010, with Greece (+4.9%), Denmark (+4.1%) and Portugal (+3.2%) occupying the three first places. While all the countries during the second phase of the crisis show only a very slight increase in their rates, the southern countries – Greece (+11.8%), Portugal (+3.8%) and Italy (+2.3%) – appear still in trouble. In fact, "the impact of the financial crisis and the 2008-2009 recession has been amplified for these countries [countries with troubled economies] during the subsequent euro zone crisis and associated retrenchment of public finances" (Eurofound 2013a, p. 6).

In essence, besides the country heterogeneity on the extent of the crisis, Figure 4.4 stresses that all the countries - Nordic and Mediterranean, with strong and weak economies prior to the crisis - have been hit by the recession during the first two years (2008-2010). However, the majority of these countries were on the recovery road already from 2010, except for the southern European countries, which went deeper into the crisis.

**Figure 4.4 – Employment (20-64 years old) and Unemployment (total) rate shifts by country across the two phases of the crisis (2008-2010 & 2010-2012)**




Source: Own calculation using data downloaded from Eurostat online dataset, codes: lfsi_emp_a; une_rt_a. Extracted on 22/11/2016.
Notes: Shifts are calculated based on the difference in the rates between 2008 and 2010 (first phase of the crisis) and between 2010 and 2012 (second phase of the crisis).

### 4.1.3 Labour Market Adjustment Strategies across Europe

The labour market adjustment strategies varied significantly across European countries (Vaughan-Whitehead 2011; Borghi 2012; ECB 2012). These differences can be linked to the heterogeneity of institutional factors and policies implemented (Eichhorst et al. 2010b; Arpaia and Cruci 2010; Clasen et al. 2012; Boeri et al. 2012), as well as to the different employment regimes[67] (Heyes 2013). "(…) governments have generally used arrangements or schemes already in place prior to the crisis, extending or more actively supporting them" (Vaughan-Whitehead 2011, p. 25). In other words, based on the intensity and effects of the crisis and the pre-crisis economic and labour market conditions, each country fostered a suitable adjustment strategy. For most of the European countries similarly to the two distinct phases of the crisis, the responses can also be divided in two phases (Clasen et al. 2012).

Clasen et al. (2012) identify three possible patterns of responses to the crisis, not necessarily mutually exclusive. The first reaction of most of the European governments during the start of the crisis was to support their banking systems, as well as to apply fiscal and employment policies, like expansion of public expenditure, and employment programmes with the aim to reduce or maintain a low unemployment rate and to boost employment. Secondly, or alternatively, when the public deficit reached worrying levels during the second phase of the crisis, the response was concentrated in reducing the public debt by cutting in public expenditure, unemployment benefits, etc. The second response pattern, common among southern European countries, is tougher for governments and citizens compared to the first one, which is usually supported by the public. The third possible response pattern considers the crisis as structural and therefore as an incentive to improve the economy and the labour market of a country, for example

[67] "The term 'employment regime' denotes a set of policies and institutions relating to work and employment, including the principles underpinning employment policies (such as the priority accorded to full employment) and the extent of welfare support for the unemployed" (Heyes 2013, p. 73).

by re-distributing income and expanding unemployment benefits. The first type of reaction protects mainly the core workers by avoiding lay-offs, while the third improves the conditions of secondary segment workers and finally, the second pattern does not offer any improvements for workers (Clasen et al. 2012).

#### Employment Protection Legislation

Labour market performance (measured by the employment and unemployment rates), as well as the policies implemented to avoid or reduce the effects of the crisis, depend on the national context, the degree of employment protection and the severity of the crisis (Bernal-Verdugo et al. 2012; CIPD 2015). Numerous studies claim that the more flexible the hiring and firing regulations, the lower is the unemployment rate and the higher is the productivity growth (Nickell et al. 2005; Bassanini and Duval 2006; Eichhorst et al. 2010b; Martin and Scarpetta 2012; Bernal-Verdugo et al. 2012; Dimian et al. 2013). In detail, flexible labour markets allow for job creation at lower costs, compared to rigid labour markets, which means that even during a recession it is easier and more frequent to create job vacancies and thus to reallocate unemployed workers (Arpaia and Curci 2010). On the contrary, rigid labour regulations are associated with poor labour market performance - high unemployment rates, especially among secondary workers such as young people and women, lower labour force participation and increased informal employment (Botero et al. 2004; Czeglédi 2006; World Bank 2008, p.19; Bassanini et al. 2008; Di Porto et al. 2016). Therefore, I expect that countries with flexible labour markets, such as Denmark and the Netherlands, may recover earlier from the economic crisis allowing for faster adjustments to economic shocks and reallocating dismissed workers in the labour force, when compared to countries with rigid employment regulations, such as Greece and Portugal (part of Hypothesis 1.3).

Nevertheless, there is an ongoing debate on the impact of employment regulations on the labour and economic growth. Protective labour markets can secure and promote job quality, protect workers' well-being and ensure stability (Blanchet 2006; Howell and Okatenko 2010). Besides, although a flexible labour market can avoid the rise in the unemployment rate by transferring workers from firms with financial difficulties and from declining sectors to new labour sectors with higher labour force demand, it may increase wage inequality and insecurity, especially for those less protected by the labour laws (CIPD 2015). An interesting point rose by the CIPD report (2015, p. 10) regards the phenomenon of partial liberalisation: labour market regulations favour one group of workers (insiders[68]) over another (outsiders) and restrictions on non-standard employment are eased but permanent employment remains highly protected. In this case, we may detect the substitution of permanent workers with non-standard workers (part-time, fixed-term and other atypical contracts). A perfect equilibrium between flexibility and security (*flexicurity*) is hard to achieve but seems the goal of some of the developed countries, such as Denmark and the Netherlands, which offer flexibility to employers and security to non-standard employees (World Bank 2009, p. 20; World Bank 2010, p.22). However, Tros (2012) argues that these *flexicurity* policies can be applied with success only in labour markets in growth and not during periods of economic shocks.

To determine which countries have a rigid/flexible labour market and to be able to test Hypothesis 1.3, I study the strictness of the employment protection legislation, provided by OECD[69], which measures the flexibility regarding individual and collective dismissals regarding regular contracts (Table 4.3) and fixed-term contracts (Table 4.4). It is measured on a scale from 0 (least restrictions) to 6 (most restrictions). The British labour market is the least rigid regarding both indicators. On the other hand, the strictest legislation appears in Portugal regarding dismissals and in France and Greece regarding non-standard employment contracts. In fact, these countries are known for their partial liberalisation of their labour markets, as

[68] For a definition of the insiders-outsiders, see Chapter 2, section 2.1.5.
[69] The OECD measure is chosen over the one from The World Bank, since the latter changed in 2010 the methodology of measuring employment protection and thus the data are discontinued.

well as for their dual system (primary/secondary labour segments) that overprotects permanent workers and does not secure non-standard workers, who often face difficulties in transiting into standard forms of employment (World Bank 2010, p. 25; Lallement 2011, p. 632; Bentolila et al. 2012). Interestingly, between 2000 and 2012 most of the countries (except for Belgium and Denmark) moved towards a more flexible legislation regarding dismissals. Especially countries with rigid labour markets – Greece, Portugal and Italy – did so with the aim to increase competitiveness and improve performance (ECB 2012). In particular, during the years of the crisis, France, Greece and Portugal together with the Netherlands reduced individual and collective protection against dismissals, while only Greece eased the restrictions concerning the use of temporary contracts in 2010/2011.

**Table 4.3 – Strictness of employment protection before and during the crisis (2000-2012) – Individual and collective dismissals, regular contracts**

| Country | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AT | 2.75 | 2.75 | 2.75 | 2.37 | 2.37 | 2.37 | 2.37 | 2.37 | 2.37 | 2.37 | 2.37 | 2.37 | 2.37 |
| BE | 1.85 | 1.89 | 1.89 | 1.89 | 1.89 | 1.89 | 1.89 | 1.89 | 1.89 | 1.89 | 2.08 | 2.08 | 1.89 |
| DK | 2.13 | 2.13 | 2.13 | 2.13 | 2.13 | 2.13 | 2.13 | 2.13 | 2.13 | 2.13 | 2.13 | 2.20 | 2.20 |
| FI | 2.31 | 2.31 | 2.17 | 2.17 | 2.17 | 2.17 | 2.17 | 2.17 | 2.17 | 2.17 | 2.17 | 2.17 | 2.17 |
| FR | 2.34 | 2.34 | 2.34 | 2.47 | 2.47 | 2.47 | 2.47 | 2.47 | 2.47 | 2.38 | 2.38 | 2.38 | 2.38 |
| GR | 2.80 | 2.80 | 2.80 | 2.80 | 2.80 | 2.80 | 2.80 | 2.80 | 2.80 | 2.80 | 2.80 | 2.17 | 2.17 |
| IT | 2.76 | 2.76 | 2.76 | 2.76 | 2.76 | 2.76 | 2.76 | 2.76 | 2.76 | 2.76 | 2.76 | 2.76 | 2.76 |
| NL | 2.88 | 2.88 | 2.88 | 2.88 | 2.88 | 2.88 | 2.88 | 2.88 | 2.88 | 2.82 | 2.82 | 2.82 | 2.82 |
| PT | 4.58 | 4.58 | 4.58 | 4.58 | 4.42 | 4.42 | 4.42 | 4.42 | 4.42 | 4.42 | 4.13 | 4.13 | 3.56 |
| SE | 2.65 | 2.65 | 2.61 | 2.61 | 2.61 | 2.61 | 2.61 | 2.61 | 2.61 | 2.61 | 2.61 | 2.61 | 2.61 |
| UK | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 |
| **OECD** | **..** | **..** | **..** | **..** | **..** | **..** | **..** | **..** | **2.17** | **2.16** | **2.15** | **2.12** | **2.08** |

Source: Downloaded from OECD.Stat (Version 1 (1985-2013))

Note: OECD measures the strictness of employment protection legislation studying the procedures and costs involved in dismissing individuals or groups of workers and the procedures involved in hiring workers on temporary employment (fixed-term or temporary work agency contracts). OECD defines regular all the workers with permanent contracts and stable social security and contributions.

**Table 4.4 – Strictness of employment protection before and during the crisis (2000-2012) – Individual and collective dismissals, temporary contracts**

| Country | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AT | 1.31 | 1.31 | 1.31 | 1.31 | 1.31 | 1.31 | 1.31 | 1.31 | 1.31 | 1.31 | 1.31 | 1.31 | 1.31 |
| BE | 2.38 | 2.38 | 2.38 | 2.38 | 2.38 | 2.38 | 2.38 | 2.38 | 2.38 | 2.38 | 2.38 | 2.38 | 2.38 |
| DK | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 |
| FI | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 |
| FR | 3.63 | 3.63 | 3.63 | 3.63 | 3.63 | 3.63 | 3.63 | 3.63 | 3.63 | 3.63 | 3.63 | 3.63 | 3.63 |
| GR | 4.75 | 4.75 | 4.75 | 4.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.50 | 2.25 |
| IT | 3.25 | 3.25 | 2.38 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| NL | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| PT | 2.81 | 2.81 | 2.81 | 2.81 | 2.56 | 2.56 | 2.56 | 2.56 | 1.94 | 1.94 | 1.94 | 1.94 | 1.94 |
| SE | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |
| UK | 0.25 | 0.25 | 0.25 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 |
| **OECD** | **..** | **..** | **..** | **..** | **..** | **..** | **..** | **..** | **1.75** | **1.75** | **1.76** | **1.74** | **1.74** |

Source: Downloaded from OECD.Stat (Version 1 (1985-2013))

Note: OECD measures the strictness of employment protection legislation studying the procedures and costs involved in dismissing individuals or groups of workers and the procedures involved in hiring workers on temporary employment (fixed-term or temporary work agency contracts).

During the first phase of the crisis, although countries with more regulated labour markets were expected to deal better with the amount of job destruction (Eichhorst et al. 2010b), they registered sharp increases in unemployment (Boeri et al. 2012). Indeed, during the crisis, the best balance between inflows and outflows from and towards unemployment are observed in Denmark, Finland and the Netherlands, all known for their *flexicure* labour markets (Arpaia and Curci 2010). Overall, Nordic countries with flexible labour markets and high expenditure in labour market policies reacted faster and more efficiently to the crisis, while the Mediterranean countries sank deep into the crisis (Dimian et al. 2013).

Noteworthy is the impact of the crisis on the welfare states of the countries hit by the sovereign debt crisis (Greece, Italy and Portugal), which had to implement austerity measures and make cut-backs from their welfare services and social expenditures, as well as from their public spending, in order to improve their national deficit and increase their competitiveness (Busch 2010; Diamond and Lodge 2013; Karamessini 2014a). Going into detail, in May 2010, Greece signed the first

Memorandum of Understanding, a Troika[70] loan program to help Greece achieve a GDP growth, increase competitiveness and reduce the unemployment rate, as well as the public deficit (Euro Challenge 2014; Karamessini 2014b). The country in return had to commit to austere reforms, including spending cuts, contraction of the welfare state and significant rise in taxes (Theocharis and Van Deth 2015). The second Memorandum was signed in March 2012 and the third in 2015. The Memoranda led to a deregulation of the Greek labour market, which resulted in the increase in non-standard forms of employment, a decrease in permanent full-time employment and in the minimum wage, cuts in pensions, a shift from collective sectoral agreements to firm-level agreements, as well as a significant increase in unemployment and in employment in the informal sector (Kouzis 2015; ECB 2015).

The Portuguese debt was a big share of the national GDP and, as explained above, a sharp increase in the debt's interest rate happened during the first couple of years of the recession. These circumstances obliged the Portuguese government to negotiate with the European Institutions and to finally sign an IMF-EU bailout package in 2011, leading to a significant loan, austerity measures and institutional reforms for a period of three years (Karamessini 2014a; Ferreira 2014; Carneiro et al. 2014). On the other hand, the Italian Government instead of implementing austerity measures, applied the pre-crisis existing *Cassa Integrazione Guadagni*, a government sponsored working hours reduction scheme and a wage guarantee for dismissed workers (Arpaia and Curci 2010; Vaughan-Whitehead 2011; Boeri and Bruecker 2011). In fact, Italy eased eligibility of working-time arrangements during the crisis (Hijzen and Venn 2011; Boeri and Bruecker 2011) and this is argued to be one of the reasons why the country has been moderately affected by the crisis (D'Amuri 2011).

[70] Troika is a group including the European Commission, the European Central Bank and the International Monetary Fund (IMF).

**Degrees of Flexibility across European Labour Markets**

Flexibility in labour markets, as aforesaid, might lead to a better and quicker way of dealing with an economic shock. Flexibility however can be applied in different ways and to a different extent in each national labour market, combined with social security or not. I look at different types of flexibility here in order to assert how it is used by national labour markets. Eichhorst et al. (2010b, p. 4) argue that across-European countries different patterns of labour market flexibility are observed: external and internal numerical; external and internal functional and wage flexibility. Overall, the internal flexibility promotes a flexible use of the labour force within firms, for example using working time adjustment schemes; and the external flexibility eases transitions between jobs (Heyes 2013). The external numerical flexibility leads to an adjustment of the work force through firings during a decrease in productivity and hirings during an increase in the productivity needs. The internal numerical flexibility leads to an adjustment of the working hours of employees and not in the actual number of employees. The functional flexibility suggests the adaptation of the labour force to changing labour market conditions and more specifically to changes in the required skills. The external functional flexibility solves this problem using active policies for job placement and training, while the internal functional flexibility by providing on-the-job training in order to acquire firm-specific skills and maintain employability. Finally, wage flexibility is applied when a firm adapts to an economic shock by changing the real wages (Eichhorst et al. 2010b).

The continental and Scandinavian countries (Finland, Germany, Belgium, Austria, Denmark, Sweden, Norway, Switzerland and the Netherlands) are known for generous social security systems and high internal and external functional flexibility (Eichhorst et al. 2010b; Lallement 2011). In detail, in Denmark and Sweden internal functional flexibility prevails, while in Austria, France, Belgium, Finland and the Netherlands there is a prevalence of working-time arrangements (Bredgaard et al.

2009; Vaughan-Whitehead 2011, p. 21; Tros 2012). Southern European countries have rigid labour markets with low levels of flexibility of any kind (Schmidt 2003, Lallement 2011). Finally, the UK, a market-based country, registers high external numerical and wage flexibility (Clegg 2010; Lallement 2011).

Based on the employment protection legislation and the degree of labour market flexibility, each country group used a different adjustment strategy to reply to the financial crisis. In fact, Lallement (2011) distinguishes three main mechanisms used to reply to the economic crisis: labour market segmentation, reduction of working hours and unemployment or underemployment. Countries with a high level of employment protection – the Mediterranean countries – used labour market segmentation as a shock absorber. The secondary labour force, i.e. the non-core workers (outsiders), usually in non-standard unprotected and unstable job positions, was hit first and hard. Anglo-Saxon countries used a reduction in wages as their main shock absorber. Countries with external flexibility, such as the UK, are more likely to show an increase in unemployment during a financial crash (Vaughan-Whitehead 2011). Indeed, Table 4.2 shows that the UK across time shows an increase in the unemployment rate higher than other Scandinavian or continental countries. Finally, countries with functional flexibility used adjustments in working time as the main tool against the consequences of the crisis.

**Labour Hoarding**

A common response to economic recessions is a process called labour hoarding. Firms need to reduce their productivity because of a decrease in demand and therefore adjust their labour force (Arpaia and Curci 2010). There are two ways of doing that. The first is by firing employees, which might be expensive in countries with rigid employment legislation, but also expensive in terms of the human capital lost by the firm when employees are lost who are likely to have been trained-on-the-job and to have firm-specific skills. The second way is by adjusting the working hours, i.e. instead of reducing the labour force, reducing the hours worked (labour hoarding), using "short-time work (STW) schemes[71]" in order to avoid the rise in unemployment (Dimian et al. 2013). By maintaining the jobs of trained personnel, the firm will be ready to increase productivity as soon as there is even a slight economic growth and labour demand. In some countries, e.g. Italy, during the 2008 recession a sharp GDP decrease is observed together with only a slight increase in the unemployment rate, which usually means that labour hoarding was adopted and firms managed to maintain the employment rate close to the pre-crisis levels (Arpaia and Curci 2010).

Hijzen and Venn (2011) argue that STW schemes help maintaining job positions during the economic shock (although some of these jobs may have been preserved even without the schemes), but at the same time increase labour market segmentation. In fact, these schemes are designed for permanent workers, leaving non-standard employees even more unprotected during a period of economic hardship and of increasing unemployment. Moreover, although STW managed to avoid some job losses during the crisis, they were not as successful in reallocating workers if their jobs were preserved for too long (ECB 2012, p. 9). A risk of excessive use of labour hoarding might be that while the economy is recovering and growing, employment does not increase ("jobless recovery": Borghi 2012, p. 6).

There is significant cross-country heterogeneity regarding the eligibility, entitlement criteria and cost of the STW programs (Boeri and Bruecker 2011). For instance, the Netherlands and Portugal promote training during STW schemes, Austria, France and the Netherlands do not allow dismissals of STW workers during the duration of the program and Italy has the least restrictive eligibility criteria (Boeri and Bruecker

[71] "Short-time work (STW) programmes are public schemes that are intended to preserve jobs at firms experiencing temporarily low demand by encouraging work-sharing, while also providing income-support to workers whose hours are reduced due to a shortened workweek or temporary lay-offs" (Hijzen and Venn, 2011, p. 6).

2011, p. 12). Overall, STW schemes were frequently used both by flexible and rigid employment regimes (Boeri and Bruecker 2011, p.38). Table 4.1 (in section 4.1.3) shows that most of the countries, such as Belgium, Italy, Finland and the Netherlands, register only a slight decrease in the employment rate during the first years of the crisis and that might be the result of STW schemes (Boeri and Bruecker 2011; Van den Berge et al. 2014). Labour hoarding in the UK, as a response to the crisis, was not as frequent as in other countries, and when implemented it was often without a financial compensation, offering poor quality part-time job positions (Anxo et al. 2007; Heyes 2013).

#### The Use of Non-Standard Forms of Employment

During the years of the financial shock, temporary and part-time contracts are two of the main tools employers use to increase labour market flexibility (Eurofound 2013a; OECD 2014). However, non-standard contracts[72] may not be used in favour of unemployed people, but at the expense of permanent employees, decreasing in this way their job quality and security (Clark and Postel-Vinay 2009). In fact, in countries with high labour segmentation and rigid labour regulation, hiring non-standard workers is quicker and less costly for the employers. Table 4.5 shows an increase in part-time employment between 2008 and 2012 in all the countries except for Sweden. By far the highest part-time share is observed in the Netherlands, where almost half of the workers were employed part-time. Greece, followed by Portugal, registers a substantially low use of part-time employment, with overall rates lower than 11%.

The phenomenon of part-time concerns mainly women. In fact, the share of women being part-time is significantly higher when compared to men, especially in the

[72] Here I present only evidence for part-time and self-employment, because they are the two forms of non-standard employment analysed. The monthly EU-SILC labour market status did not include information on temporary employment.

Netherlands, where, in 2012, 75.5% of women worked part-time in comparison to 20.7% of men in part-time employment. Not surprisingly, countries with rigid labour legislation that strongly protects permanent and full-time workers and offers insecure and low-quality part-time jobs, present the highest levels of involuntary part-time employment (Table 4.5). Involuntary workers are defined by Eurostat those who accepted a part-time job only because they were unable to find a full-time position. In southern European countries – Greece, Italy, Portugal and France – the share of involuntary part-time employment appears high and becomes even higher during the financial meltdown. In line with Fondeville et al. (2015), in Greece and Italy in 2012, around 6 out of 10 part-time workers would like to work more hours.

**Table 4.5 – Part-time employment (%, 20-64 years old) 2008 and 2012**

| Country | Part-time workers in % of total employment | | Men part-time workers | | Women part-time workers | | Involuntary part-time employment (% of total part-time employment) | |
|---|---|---|---|---|---|---|---|---|
| | 2008 | 2012 | 2008 | 2012 | 2008 | 2012 | 2008 | 2012 |
| AT | 23.2 | 25.7 | 6.8 | 7.9 | 42.3 | 45.6 | 11.1 | 10.1 |
| BE | 22.2 | 24.5 | 7.2 | 8.7 | 40.7 | 43.3 | 14.4 | 9.5 |
| DK | 19.8 | 20.9 | 9.4 | 10.9 | 31.6 | 31.9 | 15.3 | 21.1 |
| FI | 11.2 | 12.7 | 6.8 | 8.1 | 15.9 | 17.6 | 30.2 | 27.5 |
| FR | 16.7 | 17.6 | 5.3 | 6.3 | 29.3 | 29.9 | 34.8 | 34.1 |
| GR | 5.3 | 7.6 | 2.4 | 4.6 | 9.7 | 11.7 | 44.4 | 65.5 |
| IT | 14 | 16.7 | 4.7 | 6.5 | 27.6 | 30.8 | 41.2 | 58.4 |
| NL | 43.5 | 46.1 | 18.3 | 20.7 | 73.6 | 75.5 | 5 | 10 |
| PT | 8.7 | 11 | 4 | 8.1 | 14 | 14 | 40.6 | 47.8 |
| SE | 24.3 | 23.8 | 10.8 | 11.5 | 39.4 | 37.2 | 26.2 | 28.9 |
| UK | 22.5 | 24.5 | 7.9 | 10 | 39.5 | 41 | - | 19.6 |
| **EU15** | **19.7** | **21.6** | **6.8** | **8.5** | **35.5** | **37** | **26** | **27.8** |

Source: Own calculation using data downloaded from Eurostat online dataset, codes: lfsa_eppgacob; lfsa_eppgai. Extracted on 22/11/2016.

According to the European Commission (2010, p. 5), small and medium enterprises (SMEs) in 2010 represented two thirds of the total employment in Europe. During economic shocks, SMEs can create jobs, ease the re-integration of unemployed to work and boost the economy, as well as offer an alternative to dependent work

(Fondeville et al. 2015). In fact, the European Economic Recovery Plan implemented in 2009 policies in order to ease the start-up of small businesses (European Commission 2010, p. 5). However, during periods of financial crisis it might be difficult for new self-employed workers to be eligible for bank loans necessary for business start-up (Arpaia and Curci 2010, p. 33). According to the same report, self-employed people, especially those without employees, during liquidity hard times may transit towards non-employment. During the years of the financial downturn and in line with other studies (Fondeville et al. 2015; Baldassarini 2015), almost all the countries show an increase in self-employment, with the exception of Austria, Italy and Portugal (Table 4.6). The table clearly underlines that the southern European countries present by far the highest rates of self-employment: in 2012 almost four out of ten workers were self-employed in Greece, 1 out of 4 in Italy and 2 out of 10 in Portugal. According to Fondeville et al. (2015), the use of self-employment depends also on the sectoral profile of each labour market, varying across countries. For instance, while in the Netherlands and Belgium one out of two self-employed works in a managerial position, in other countries, such as Greece and Italy, the share is higher in sectors like agriculture[73] and construction (Fondeville et al. 2015).

[73] Almost 20% of the self-employed workers in EU in 2008 were employed in agriculture (European Commission 2010, p. 7).

**Table 4.6 - Self-employment rate as % of total employment across time and country**

| Country | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|
| AT | 12.6 | 12.1 | 11.7 | 11.5 | 11.5 | 11.5 | 11.1 | 10.4 |
| BE | 15.2 | 15.1 | 14.8 | 14.2 | 14.8 | 14.4 | 14.3 | 14.3 |
| DK | 8.9 | 9.1 | 9.0 | 8.8 | 9.3 | 9.1 | 9.1 | 9.1 |
| FI | 12.7 | 12.9 | 12.6 | 12.8 | 13.6 | 13.5 | 13.4 | 13.6 |
| FR | 9.0 | 9.0 | 9.0 | 9.0 | 9.2 | 9.4 | 9.7 | - |
| GR | 36.1 | 35.9 | 35.5 | 34.7 | 35.1 | 35.1 | 36.1 | 36.6 |
| IT | 27.0 | 26.7 | 26.4 | 25.7 | 25.2 | 25.6 | 25.3 | 25.2 |
| NL | 12.4 | 12.7 | 13.1 | 13.2 | 13.5 | 15.0 | 15.0 | 15.2 |
| PT | 25.4 | 24.3 | 24.5 | 24.4 | 24.2 | 23.2 | 21.7 | 22.2 |
| SE | 9.8 | 10.0 | 10.6 | 10.4 | 10.7 | 11.0 | 10.4 | 10.5 |
| UK | 12.9 | 13.1 | 13.3 | 13.4 | 13.6 | 13.9 | 13.9 | 14.6 |
| **EA19** | **16.9** | **16.8** | **16.6** | **16.3** | **16.2** | **16.3** | **16.0** | **16.0** |

Source: Downloaded from OECD (2016), Self-employment rate (indicator). doi: 10.1787/fb58715e-en (Accessed on 23 December 2016)

Summing up, this section provides insights on the pre-crisis economic and labour market conditions across European counties and on the effects of the crisis on national economies and labour markets. The European Great recession can be seen as the sum of many national crises with different consequences and responses due to different pre-crisis arrangements. Moreover, the adjustment strategies applied in each country are studied in order to understand the changes in the labour market that were provoked directly by the crisis and those provoked by adjustment policies that aimed at tackling the crisis consequences. For these reasons, this section is crucial when studying how individual labour market trajectories changed across time and countries and creates expectations on how each country reacted to the crisis and how their labour market features influence the individual labour market trajectories.

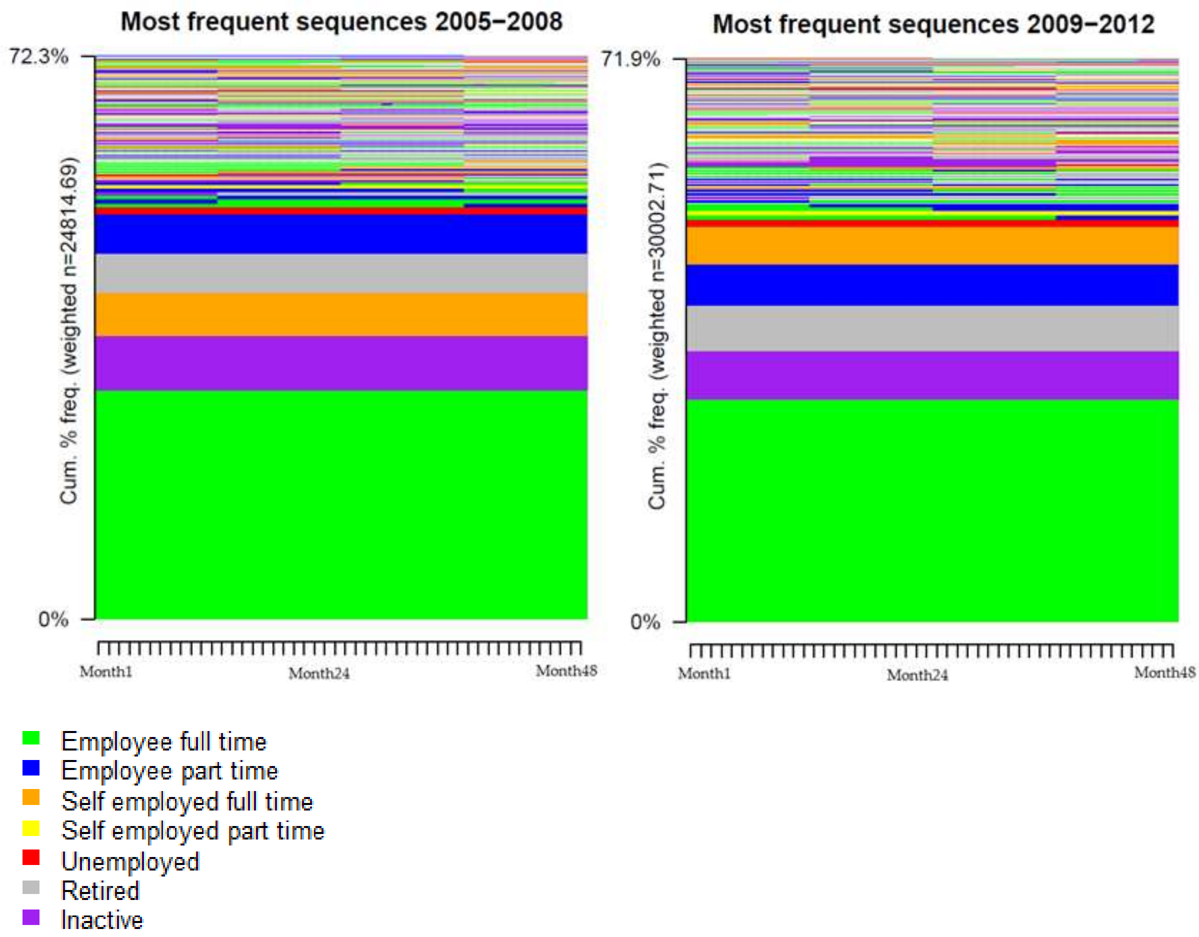
## 4.2 Individual Labour Market Sequences in Europe

The empirical part of this project is outlined as follows: firstly, I study all the countries in analysis as one entity to form the overall European image (section 4.2) and then I disaggregate the results by country (section 4.3), by individual characteristics (Chapter 5) and by region of residence (Chapter 6). In essence, I disaggregate the contextual level of analysis gradually. This section focuses on the analysis of individual labour market sequences in eleven European countries as a whole before and during the Great recession and explores whether the overall European image of individual labour market sequences changed during the years in crisis. To present the empirical findings, I use sequence plots[74] and complex indicators, such as entropy and turbulence.

Figure 4.5 presents two sequence frequency plots of the most frequent sequences (accounting for more than 70% of the total sequences) for all the European countries analysed during 2005-2008 and 2009-2012. It is clear from the homogeneous coloured blocks of the sequence frequency plots, indicating stability in the same status, that the probability of remaining at the same status across the four years of analysis is high, confirming Ward-Warmedinger and Macchiarelli (2014, p. 2) and Erhel et al. (2014, p. 17). In line with Schmid (2002) arguing that full-time work is still the most prevalent form of employment (Chapter 2), stability in full-time employment (plotted in green) appears the most prevalent labour market sequence in both periods: one third of the sample across time is in stable full-time employment. However, part-time work and self-employment are relatively common, confirming what is discussed in Chapter 2 about dependent full-time employment not being the only alternative to non-employment (Gazier and Gautié 2011).

[74] For details on the sequence plots used, see Chapter 3, section 3.3.1.

**Figure 4.5 – Most frequent labour market sequences (80 most frequent) before and during the financial crisis, 2005-2008 & 2009-2012**




Source: EU-SILC 2005-2008 and 2009-2012

Although individual labour market sequences do not appear drastically different after the start of the crisis, there are some differences observed from Figure 4.5. The ordering of the most frequent sequences is different:

- During 2005-2008 after stable full-time employment and inactivity comes stable full-time self-employment, followed by retirement, part-time employment and unemployment.
- During 2009-2012 after stable full-time employment and inactivity comes retirement, followed by stable part-time employment, full-time self-employment and unemployment.

During the years of the financial crisis (2009-2012) I detect a slight decrease in stable full-time employment (from 35% to 34%) and full-time self-employment (from 6.5% to 5.5%), as well as in persistent inactivity (from 8% to 7%). Stable part-time employment (in blue) appears to be slightly more prevalent in 2009-2012, as expected from section 4.1.3.

As anticipated, stability in one status (across the full panel duration, i.e. 48 months) is substantially prevalent among sequences and thus I focus on the stable labour market sequences. Nonetheless, I briefly discuss the sequences that include at least one transition between labour market states. The sequences with at least one transition account only for a small proportion of the total sequences and thus we need to be cautious when drawing conclusions. The most common sequence with at least one status change includes a transition from full to part-time employment, appearing slightly more often after the start of the crisis (from 1 to 1.5%), while the transition from part to full-time employment is the second most frequent and accounts for 1% of the sequences across time. Furthermore, sequences with more than one transition become more frequent after the start of the crisis and especially the following sequence "Part-time employment -> Full-time employment -> Part-time employment". In essence, after the start of the crisis the sequences with at least one transition appear more turbulent, with lower incidence of full-time employment and more transitions including part-time employment.

In essence, the differences across time are not as evident as expected from the section 4.1. A possible explanation might lie in the masking of national patterns when studying Europe as a whole. Indeed, disaggregating the results by country provides a better insight of the impact of the crisis on European labour markets, focusing on the national patterns, instead of the aggregated level (section 4.3). Nevertheless, studying the overall European patterns across time provides us a general idea of what happened in Europe and highlights the country heterogeneity in the next section.

Figure 4.6 displays the mean number of months (not necessarily consecutive months) spent in each labour market status, an aggregated indicator describing the sequences. Overall, in line with the above findings, in 2009-2012 Europeans spend slightly less time (fewer days) in full-time employment, full-time self-employment and inactivity, while they spend on average half a month more being unemployed and more days in part-time employment and part-time self-employment. Indeed, part-time employment, also in the form of part-time self-employment, increased during the economic shock (Fondeville et al. 2015). In section 4.1 (Tables 4.5 and 4.6), I argue that during the crisis an increased use of part-time and self-employment is observed. However, here although the use of part-time and part-time self-employment increases, the use of full-time self-employment decreases. A possible explanation might be the heterogeneity of the self-employees. Fondeville et al. (2015) compare the use of self-employment before and during the years of the crisis in Europe and claim that the main difference lies in the number of self-workers with employees and without employees. In particular, during the crisis the number of self-workers without employees increased, marking the phenomenon of 'bogus self-employment' indicating that the self-employee is not completely independent, but works at a company doing the work of a dependent employee having however a less secure contract and a lower payment than expected (Fondeville et al. 2015, pp. 3-4).

Finally, in response to labour market conditions during the years of the crisis, retirement appears more frequent in 2009-2012 (Figure 4.5), i.e. people spend on average slightly more time in this status (Figure 4.6). Overall, the 2008 crisis affected the retirement plans of Europeans and in 2012 less people worked until retirement compared to 2005 (Komp 2017, p11). In fact, transitions from inactivity to retirement are more frequent in my sample during the crisis (Figure 4.5). This project focuses on the study of labour market transitions of people in working age (up to 64 years old) and therefore labour market outcomes of older people are out of scope for this project, hence the retirement state will not be analysed in detail. In Chapter 5 (section 5.2) I discuss the employment trajectories of older workers.

**Figure 4.6 – Mean number of months (not necessarily consecutive) spent in each labour market status, 2005-2008 & 2009-2012**

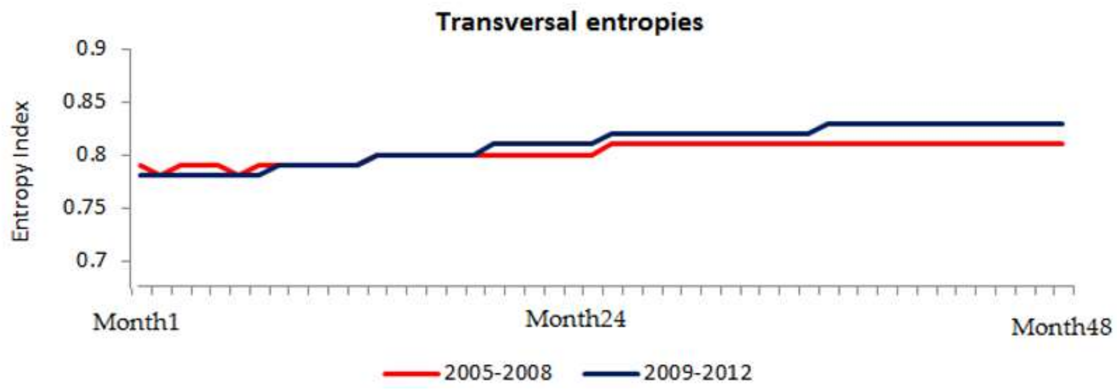

Source: EU-SILC 2005-2008 and 2009-2012
Note: FT=Full-time employment; PT=Part-time employment; SFT=Full-time self-employment; SPT=Part-time self-employment; U=Unemployment; R=Retirement; I=Inactivity

The transversal entropy of state distribution, an aggregated cross-sectional measure of diversity between sequences/individuals is presented in Figure 4.7. The transversal entropy equals zero when all the cases are in the same state (uniform/homogeneous sequences) and takes its maximum value[75] when the cases are equally distributed in all the possible states, making the sequences harder to predict due to high heterogeneity of states (Fussell 2005, p.99; Gabadhino et al. 2011, p.20; Widmer and Ritschard 2013, pp. 166-167). The transversal entropy in Figure 4.7 appears quite high (close to 1) indicating sequences including all the possible labour market states, i.e. strongly heterogeneous between them. The entropy remains rather stable (around 0.8) across time, increasing slightly during the second phase of the crisis (2010-2012) and reaching its highest value (0.83) in 2012 and its lowest

[75] The entropy index has been normalised and thus the range of values is between zero and one.

value (0.78) during the first months of 2009. Again, I expect more insights when studying the entropy by country and comparing the national trends to the average European in section 4.3.

**Figure 4.7 – Transversal entropy of labour market state distribution (sequence diversity), 2005-2008 & 2009-2012**

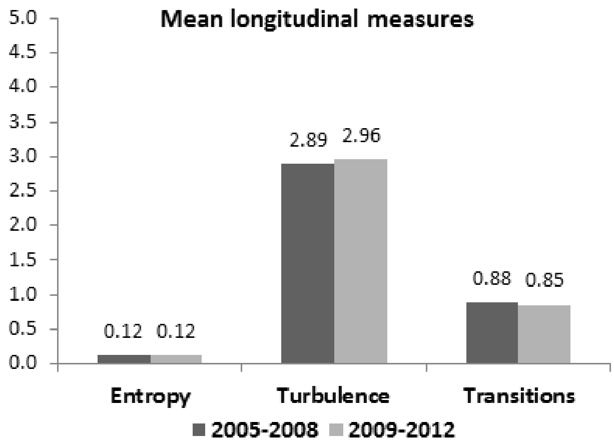


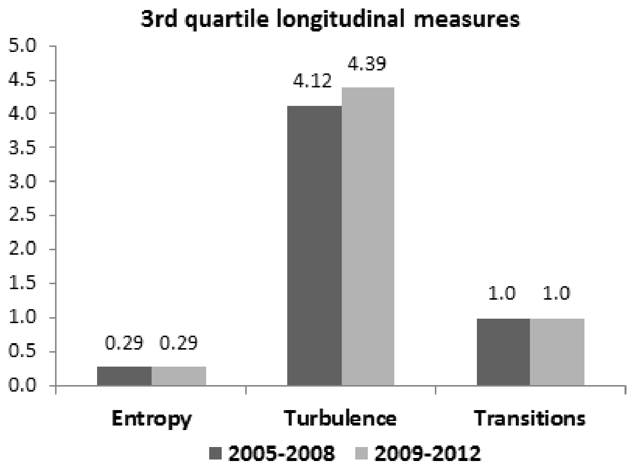

Source: EU-SILC 2005-2008 and 2009-2012
Note: Entropy=0 when all sequences are in the same status; Entropy=1 when sequences are equally distributed in all possible states.

Figure 4.8 shows three aggregated indicators of the sequences: the longitudinal entropy, turbulence index and the number of transitions included on average in the sequences. The entropy index this time is used as a longitudinal indicator (known as within-sequence entropy) measuring the state diversity within individuals/sequences instead of the between sequences diversity (Gabadinho et al. 2011, p. 67). This allows us to explore whether the sequences are fragmented (including many state changes) and if they appear more fragmented after the start of the crisis. The mean within-sequence entropy is close to zero (mean of 0.12), indicating a low within-sequence diversity. This is showing that there is low heterogeneity within the sequences as expected due to the prevalence of stability in the same labour market status across time and more particularly in full-time dependent employment.

The longitudinal entropy takes into account the time spent in each labour market status, i.e. the appearance of the states in a sequence without measuring the order of the states (Gabadhino et al. 2011, p.23; Widmer and Ritschard 2013, p.167). The order of the states is important because it measures how fragmented the sequences are. For instance, the sequence "E-E-E-E-E-U-U-U-U-U", where E is employment and U unemployment is completely different from the sequence "E-U-E-U-E-U-E-U-E-U". Although they include the same labour market states (E and U) and the same time spent in each of the states (5 months in E and 5 months in U), the second sequence is substantially more fragmented/turbulent. To account for both the status variation and the transition frequency the turbulence index, a measure suggested by Elzinga (Elzinga and Liefbroer 2007), is calculated. The turbulence in Figure 4.8 appears slightly higher in 2009-2012 when compared to the years prior to the financial shock, especially when focusing on the 3rd quartile measures[76], indicating more fragmented sequences during the financial shock, in line with Hypothesis 1.1. Finally, the number of transitions, i.e. of state changes, appear stable over time.

**Figure 4.8 – Distribution of longitudinal measures (entropy, turbulence and number of transitions): mean and 3rd quartile, 2005-2008 & 2009-2012**




Source: EU-SILC 2005-2008 and 2009-2012

[76] I present the mean values of the three indicators, as well as the values for the third quartile of the data. The mean of the indicators is affected by extreme value (small or large) and therefore studying the values for the third quartile may be more sensible. Studying the mean and the third quartile, the results are similar. For a more detailed description of the indicators, see the first two tables in Appendix B.

### 4.2.1 Typologies of European Employment Trajectories

The main aim of sequence analysis is to identify typologies of sequences. For this purpose cluster analysis is used to summarize the labour market sequences in labour market pattern groups and study the distribution of these groups by country (section 4.3) and individual characteristics (Chapter 5). A clustering algorithm was applied to a dissimilarity matrix measuring the distances between sequences (heterogeneity of sequences) (see Chapter 3, section 3.3.2 for the technical details). This process resulted in seven clusters, each cluster representing mainly stability in one labour market status, except for two clusters, which are more turbulent, i.e. include sequences with one or more transitions between labour market states. The clusters that emerged are the following:

1. Full-time employment cluster;
2. Part-time employment cluster;
3. Full-time self-employment cluster;
4. Non-standard turbulent cluster with high prevalence of part-time self-employment;
5. Unemployment turbulent cluster;
6. Inactivity cluster;
7. Retirement cluster.

Each cluster primarily includes sequences stable in one labour market status and therefore we might think that the clusters do not provide much new information on Europeans' labour market sequences. However, if the cluster analysis was based on single labour market states, then the concept of a dynamic study of the labour market would be neglected. Indeed, from the cluster analysis two turbulent clusters emerge (described below) that would have been masked without this type of analysis. Finally, the study of the composition of the clusters by gender, age and education level provides key insights on the employment inequalities before and during the Great recession (Chapter 5).

**Table 4.7 – Distribution of labour market clusters before and after the financial crisis (frequencies and percentages), 2005-2008 & 2009-2012**

| Clusters | 2005-2008 | | 2009-2012 | |
|---|---|---|---|---|
| | **Freq.** | **Percent** | **Freq.** | **Percent** |
| Full-time employment cluster | 10,649 | 47.42 | 10,601 | 48.85 |
| Part-time employment cluster | 2,542 | 11.32 | 2,418 | 11.14 |
| Self-employment full-time cluster | 2,291 | 10.2 | 2,075 | 9.56 |
| Non-standard turbulent cluster | 324 | 1.44 | 352 | 1.62 |
| Unemployment turbulent cluster | 1,104 | 4.92 | 1,258 | 5.8 |
| Inactivity cluster | 3,210 | 14.29 | 2,616 | 12.05 |
| Retirement cluster | 2,336 | 10.4 | 2,382 | 10.98 |
| **Total** | **22,456** | **100** | **21,702** | **100** |

Source: EU-SILC 2005-2008 and 2009-2012

The first and by far most frequent cluster (almost 50% of total clusters across time; Table 4.7) consists mainly of sequences stable in full-time employment (40 out of 48 months[77]). This cluster includes very few transitions -indeed more than 70% of the sequences consist of stability in full-time employment. After the start of the crisis, slightly more transitions from full to part-time employment are observed in this cluster (Figure 4.9). The second cluster accounts for 11% of the clusters and consists mainly of sequences in stable part-time employment (almost 50% of the sequences include stable part-time employment). The few transitions observed in this cluster in 2005-2008 are between full and part-time employment, as well as from unemployment to part-time employment leading to part-time self-employment or back to unemployment. During 2009-2012 I observe transitions from part-time self-employment to unemployment or from unemployment to part-time employment and back to unemployment, showing the precarious aspect of part-time forms of employment that sometimes represent dead-ends leading to unemployment especially during the financial crisis (Figure 4.9).

The third cluster represents around 10% of the sequences and has a high prevalence of full-time self-employment (68% in 2005-2008 and 61% in 2009-2012) and fewer

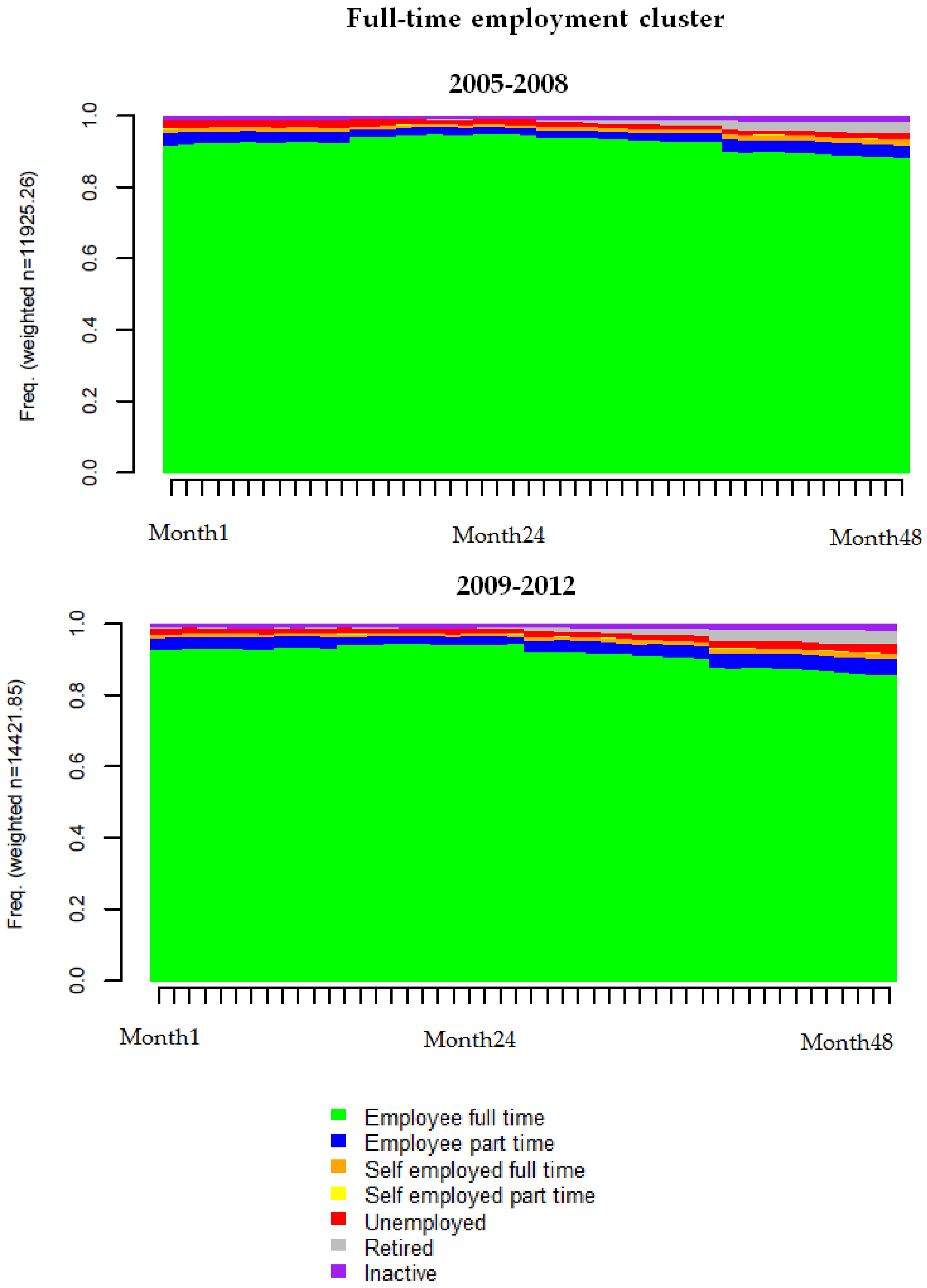
[77] A graph displaying the mean number of months spent in each labour market status by employment cluster is presented in Figure 1, Appendix B.

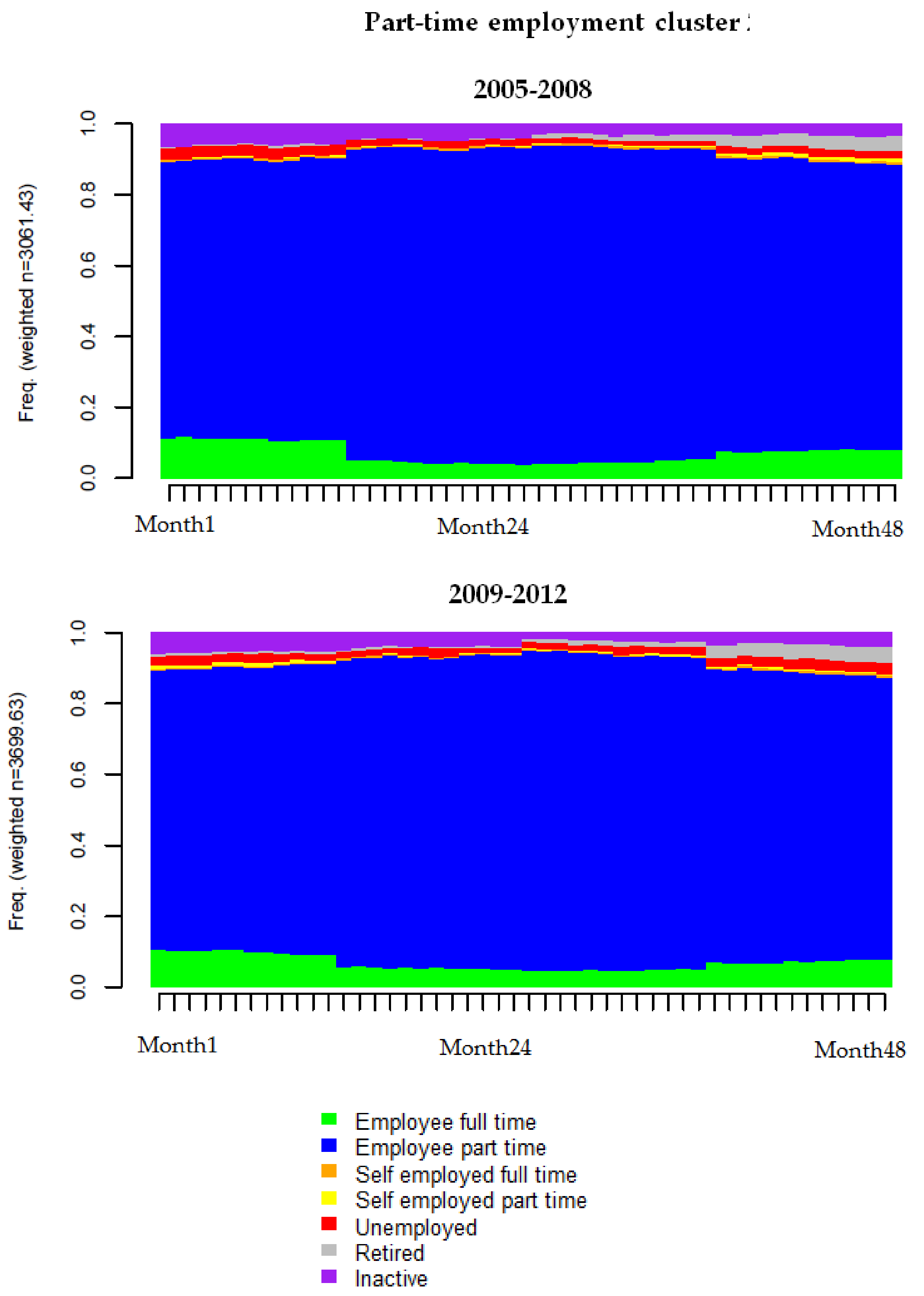
transitions between full-time dependent employment and full-time self-employment, as well as between full and part-time self-employment. During 2009-2012, this cluster presents higher incidence of unemployment and part-time self-employment. Although most of the clusters consist of at least 50% of sequences in stability in one labour market status (sequences with no transitions), two clusters that are more turbulent emerged. The non-standard turbulent cluster, which accounts for less than 2% of the total distribution (Table 4.7) and includes stability in part-time self-employment (21.5% in 2005-2008 and 25% in 2009-2012), as well as numerous transitions between full and part-time self-employment and part-time dependent employment, i.e. the non-standard forms of employment here analysed (Figure 4.9). This cluster includes also some full-time employees who, mostly the first year of the crisis, moved towards non-standard forms of employment. After the start of the crisis, the incidence of unemployment is higher in this cluster.

The unemployment turbulent cluster accounts for 5% in 2005-2008 and 6% in 2009-2012 and includes sequences in persistent unemployment (21.5% and 18.5% respectively). It also includes fragmented sequences with transitions from full-time employment to part-time employment and then to unemployment, or directly from part-time employment or part-time self-employment to unemployment. As expected, more sequences with a transition from full-time employment to unemployment are observed in 2009-2012 compared to 2005-2008 (5.8% and 3.8% respectively). In particular, during the first phase of the crisis (2009-2010) numerous transitions from all forms of employment to unemployment are registered.

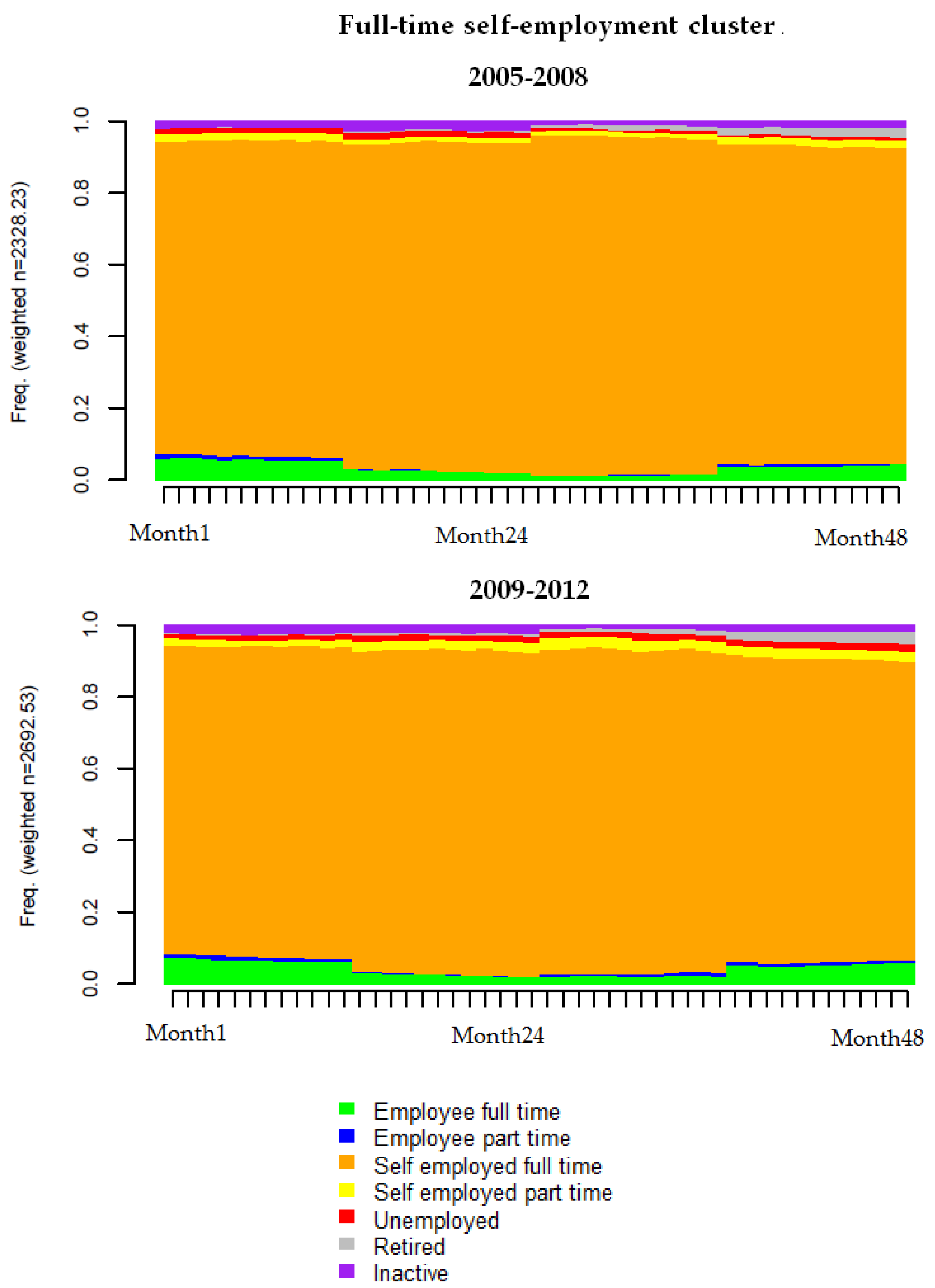
Interestingly, the cluster with a high prevalence of inactivity, with some transitions mainly between inactivity, unemployment and retirement, is the cluster with the most substantial distribution change across time (Table 4.7). Indeed, the inactivity cluster accounts for 14% in 2005-2008 and for 12% in 2009-2012. As mentioned above, a possible explanation might lie in the 'added worker effect', indicating that women transit from inactivity towards paid employment during the financial crisis in order to contribute to the household income (ECB 2012; Bettio and Verashchagina 2014). In Chapter 5, I thoroughly discuss women's reaction to the crisis and the gendered impact of the recession. Finally, the retirement cluster includes mainly sequences of stable retirement (people over 55 years old). Some sequences demonstrate that people move from full-time to part-time employment, then unemployment and finally retirement, or from full-time employment to full-time self-employment and then retirement.

**Figure 4.9 – Monthly proportion status plots of labour market clusters, 2005-2008 & 2009-2012**

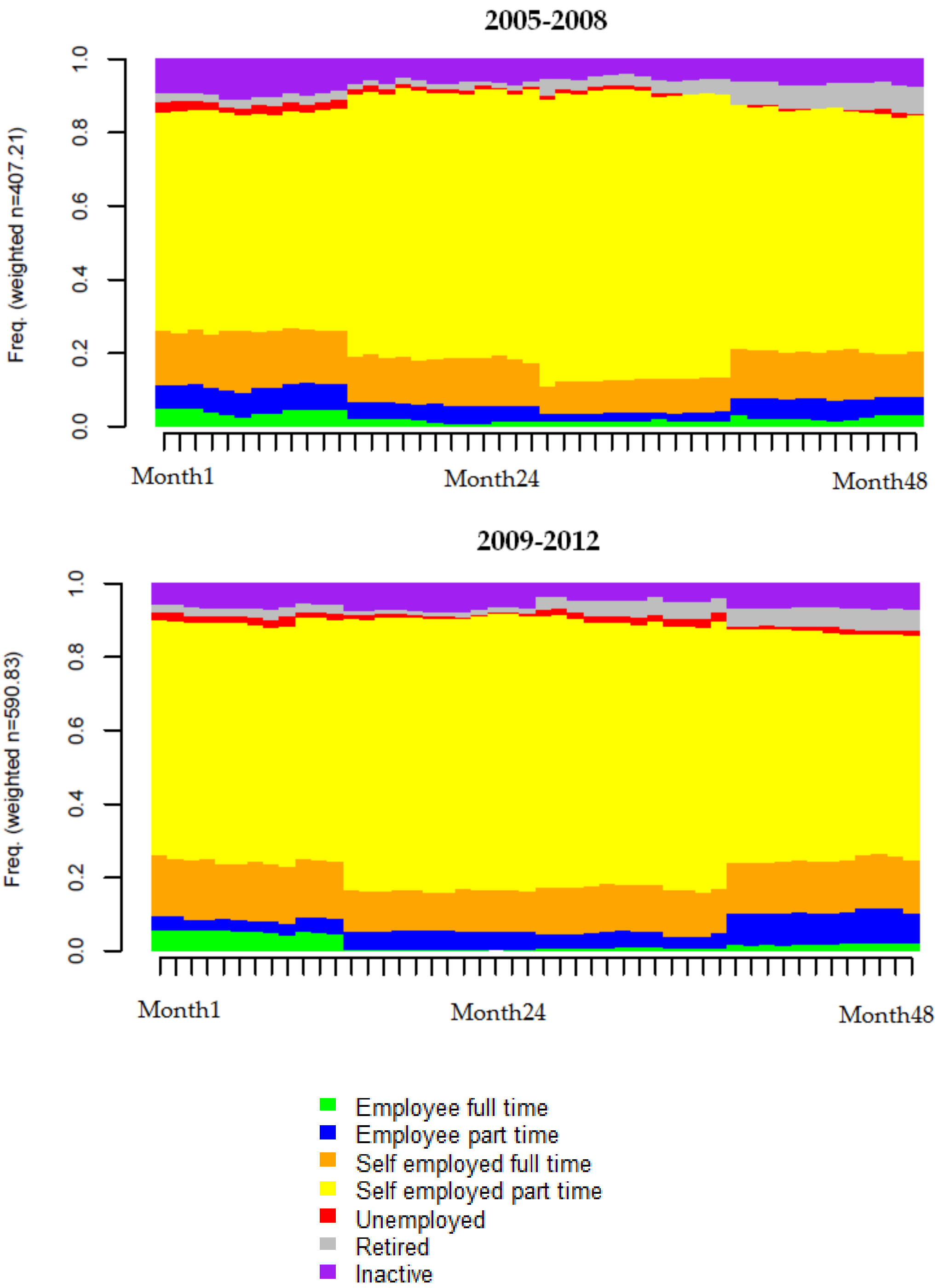


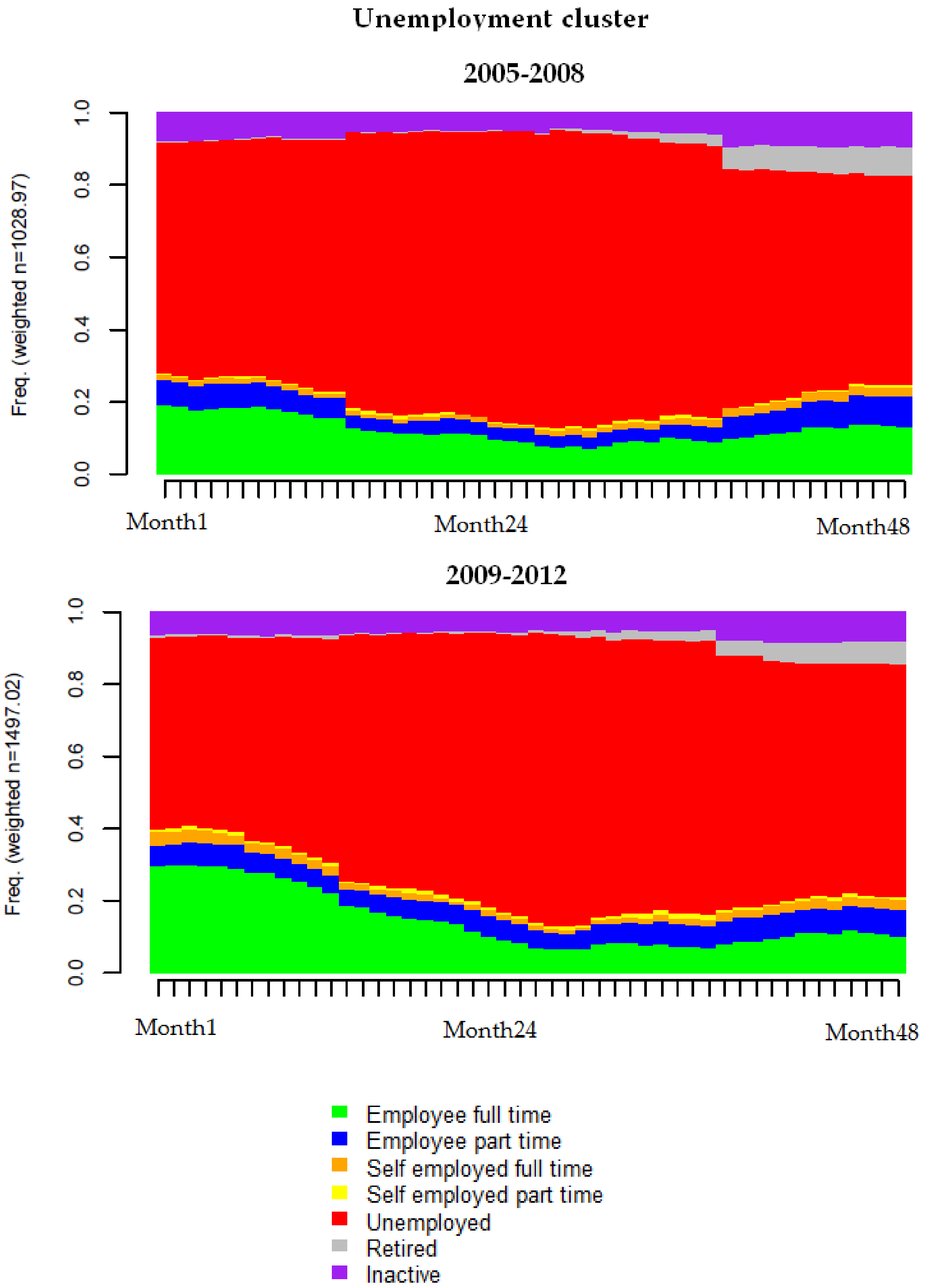


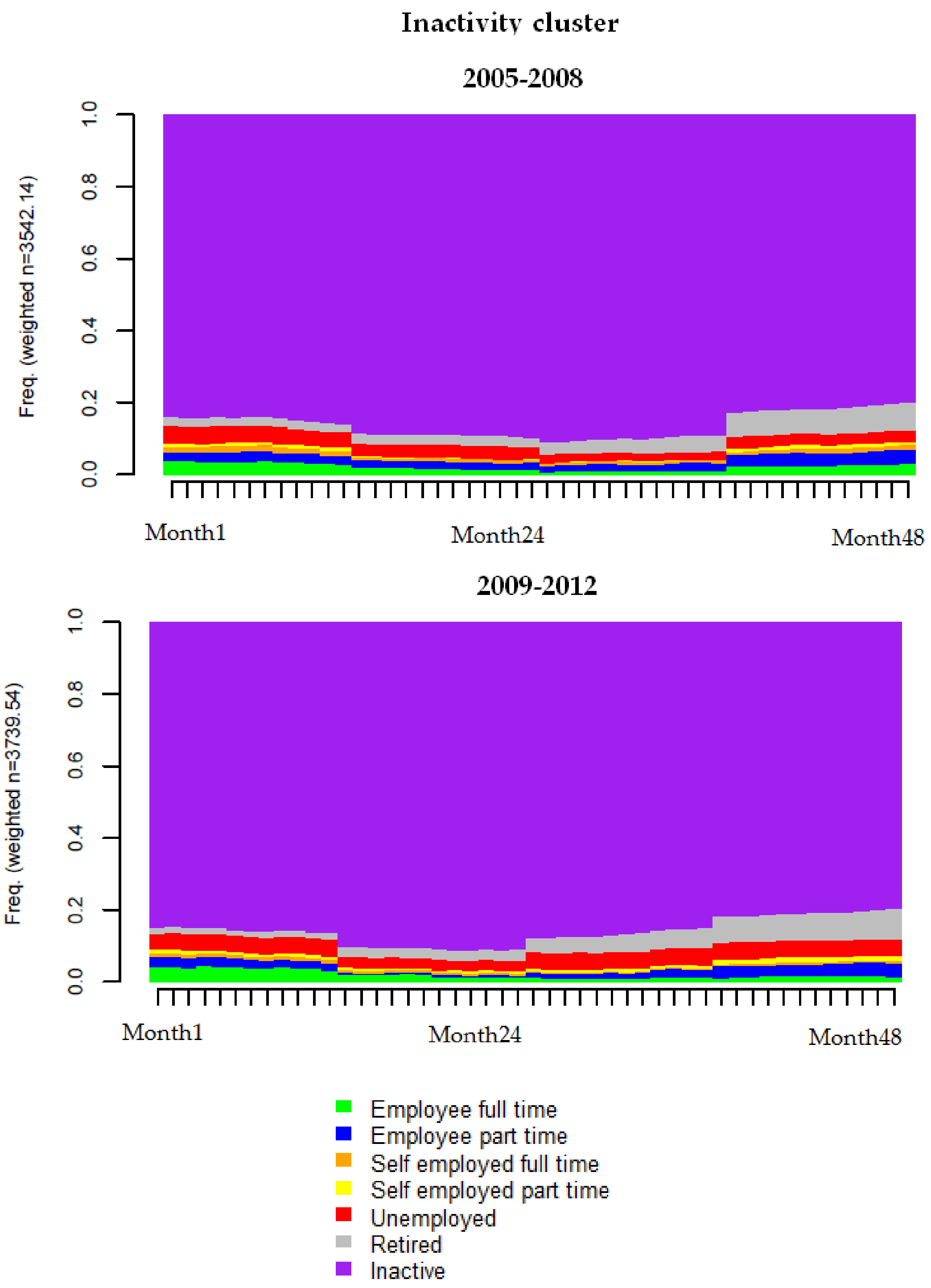
Part-time employment cluster :
2005-2008
Freq. (weighted n=3061.43)
0.0
0.2
0.4
0.6
0.8
1.0
Month1
Month24
Month48
2009-2012
Freq. (weighted n=3699.63)
0.0
0.2
0.4
0.6
0.8
1.0
Month1
Month24
Month48
Employee full time
Employee part time
Self employed full time
Self employed part time
Unemployed
Retired
Inactive


Full-time self-employment cluster
2005-2008
Freq. (weighted n=2328.23)
0.0
0.2
0.4
0.6
0.8
1.0
Month1
Month24
Month48
2009-2012
Freq. (weighted n=2692.53)
0.0
0.2
0.4
0.6
0.8
1.0
Month1
Month24
Month48
Employee full time
Employee part time
Self employed full time
Self employed part time
Unemployed
Retired
Inactive

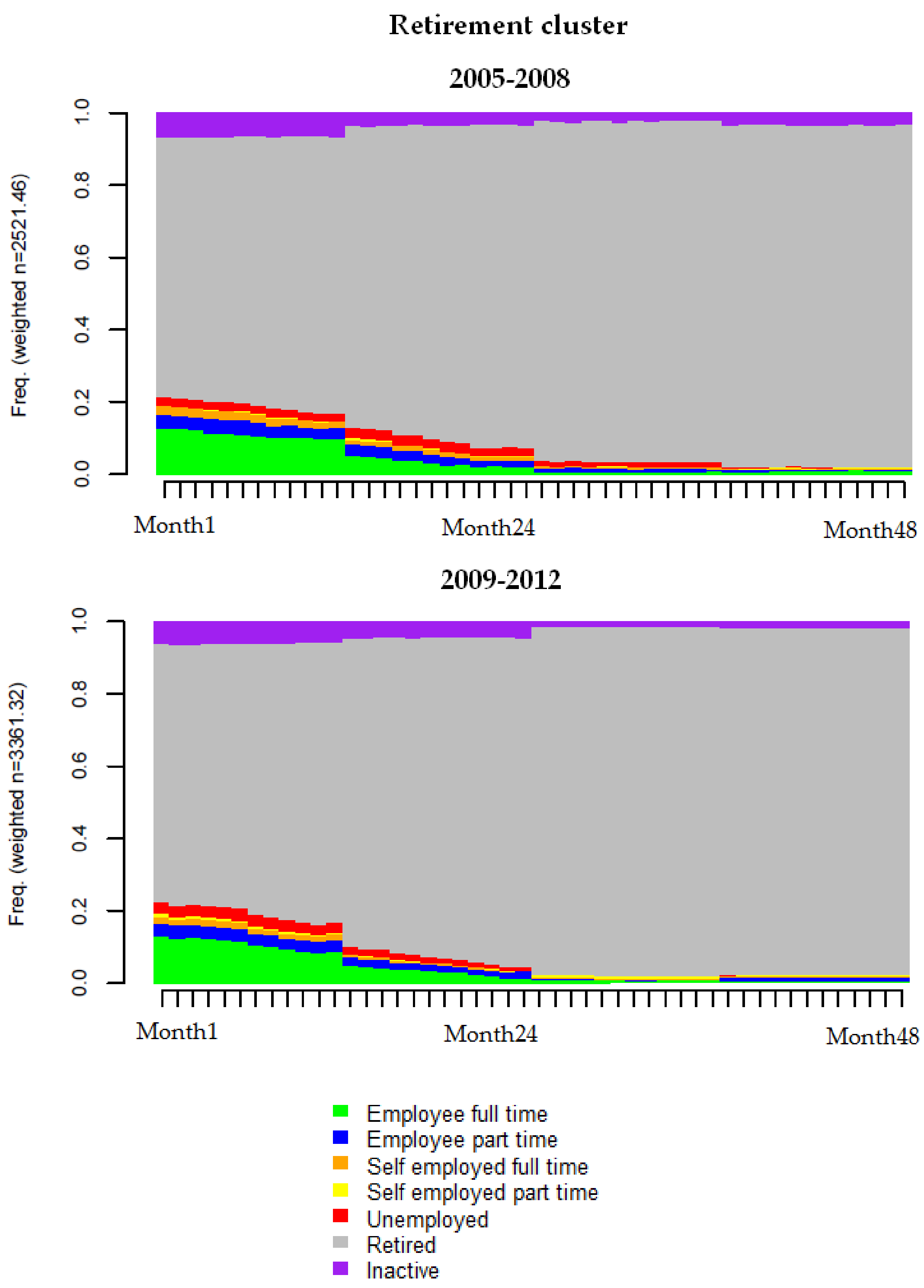
Part-time self-employment cluster




Unemployment cluster
2005-2008
Freq. (weighted n=1028.97)
0.0
0.2
0.4
0.6
0.8
1.0
Month1
Month24
Month48
2009-2012
Freq. (weighted n=1497.02)
0.0
0.2
0.4
0.6
0.8
1.0
Month1
Month24
Month48
Employee full time
Employee part time
Self employed full time
Self employed part time
Unemployed
Retired
Inactive



Inactivity cluster
2005-2008
Freq. (weighted n=3542.14)
0.0
0.2
0.4
0.6
0.8
1.0
Month1
Month24
Month48
2009-2012
Freq. (weighted n=3739.54)
0.0
0.2
0.4
0.6
0.8
1.0
Month1
Month24
Month48
Employee full time
Employee part time
Self employed full time
Self employed part time
Unemployed
Retired
Inactive




Source: EU-SILC 2005-2008 and 2009-2012

### 4.2.2 A European Image during the Economic Shock

Overall, Europeans after the start of the economic recession are less frequently in full-time employment (both dependent and self-employment) and more frequently in part-time employment (both dependent and self-employment). Furthermore, unemployment appears to have increased, while inactivity decreased. Indeed, one of the main consequences of the crisis is the increase in the unemployment rate (section 4.1), while as anticipated in Chapter 2 during a phase of increased unemployment some workers, usually women (added worker effect), move from inactivity to paid work in order to financially contribute to the household income (ECB 2012; Bettio and Verashchagina 2014). Finally, the study of the overall European trajectories reveals sequences different between them (high transversal entropy), often including only one labour market state (low within-sequence entropy) and on average zero or one transition. After the beginning of the financial meltdown (2009-2012), the sequences appear slightly more turbulent and more unpredictable when compared to the period before 2009, confirming Hypothesis 1.1.

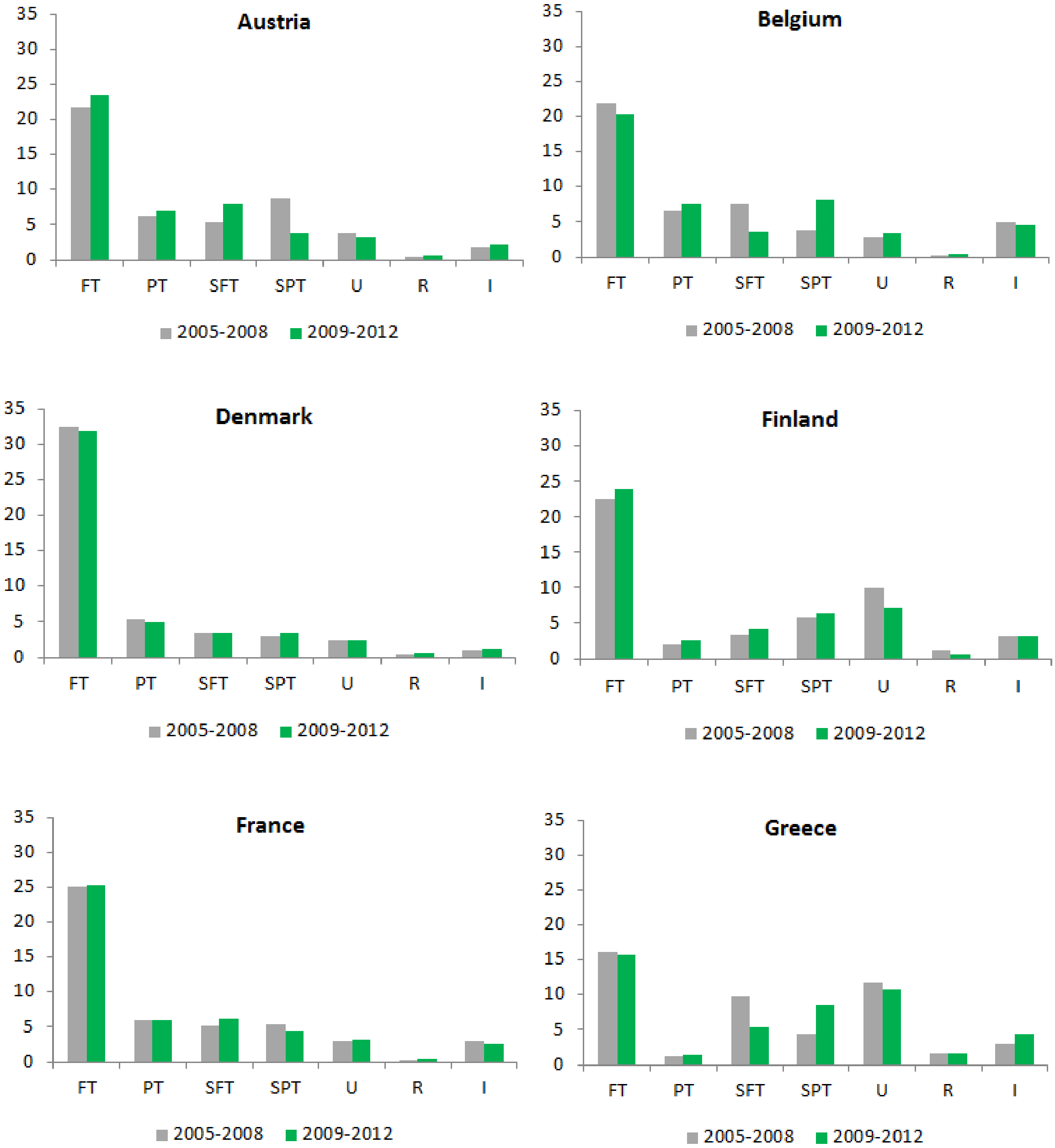
From section 4.2, I conclude that the overall European image of individual labour market trajectories does not present substantial differences across time or at least not as many as expected from the findings in section 4.1. Studying Europe as a whole conceals the national labour market patterns emerging in the next section and leads to very generic conclusions. Researchers should keep that in mind for future projects, and always take into account country heterogeneity regarding the labour market.

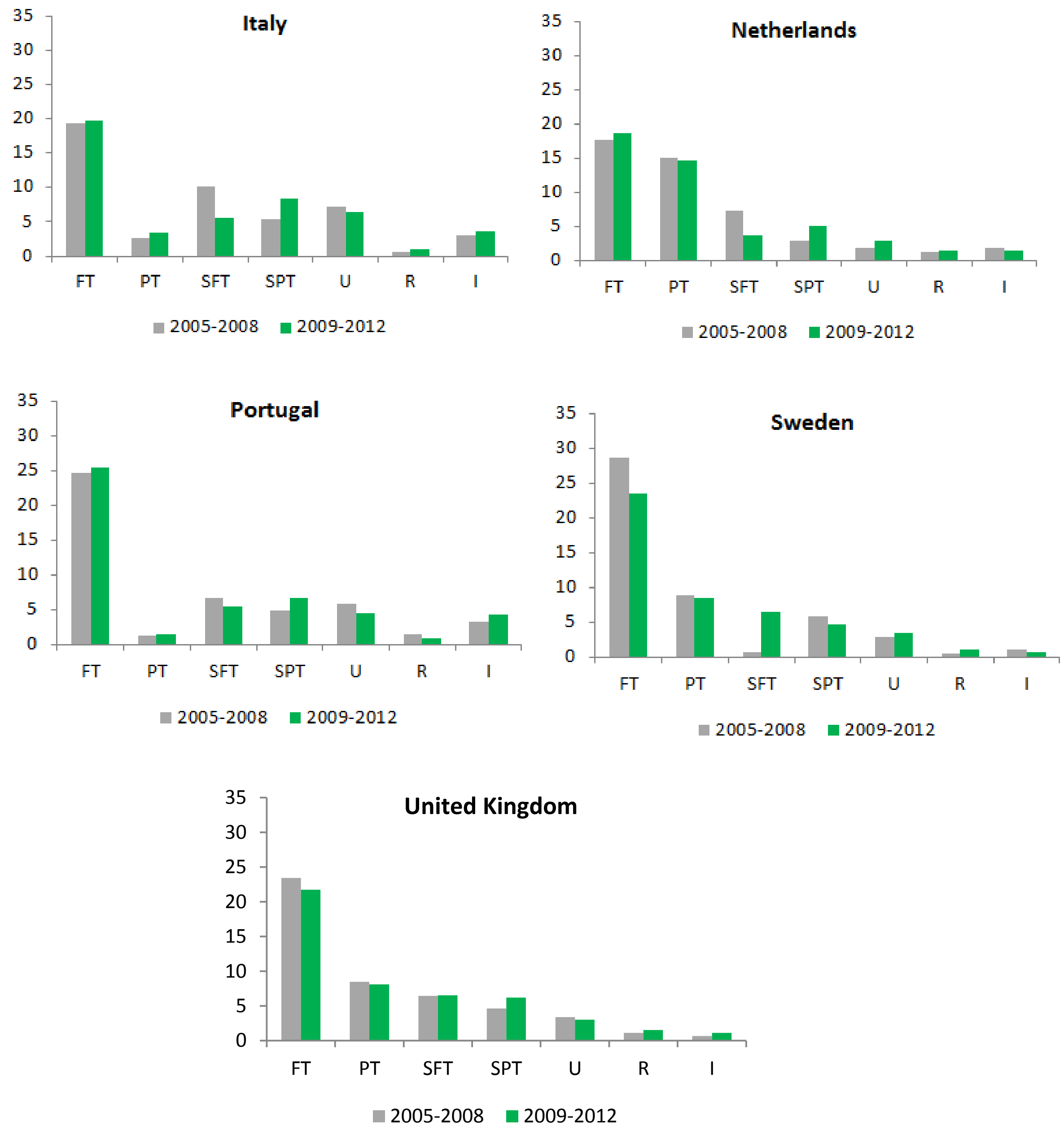
## 4.3 Individual Labour Market Sequences across Countries and Time

From the study of the labour market sequences of Europeans as a whole (section 4.2), one would assume that the labour market conditions of the sample of analysis are not very different before and during the financial crisis. However, from the literature and from the first section of this chapter it is known that European countries have heterogeneous labour markets and register a diverse impact of the crisis (among others Clasen et al. 2012; ECB 2015). Hence, studying the individual labour market sequences separately by European country is expected to unmask the national patterns across time. This section focuses on the study of the differences between countries, as well as on the differences within the same country before and during the European Great recession (within-country differences).

First, I analyse the number of months (not necessarily consecutive) spent on average in each labour market status (Figure 4.10). As expected, countries show marked differences between them. Focusing on the between countries heterogeneity, it is evident that Swedes and Danes spend on average more months in full-time employment (25-30 months out of a total of 48 months) when compared to the rest of the countries analysed, while Greeks and Dutch spend the fewer months in full-time employment (15 or slightly more months). Nonetheless, the Dutch sequences show the highest duration of part-time employment (on average 15 months spent in this status across time). In section 4.1.3, self-employment is argued to be more common among southern European countries, followed by the Netherlands, Belgium and the UK. Indeed, in 2005-2008 the mean duration of full-time self-employment was higher among Greeks and Italians (on average 10 months), followed by Belgium and the Netherlands (on average 7 months), while part-time self-employment was more common in Austria (on average 9 months), Finland, Sweden (on average 6 months), France, Italy and the UK (on average 5 months; Figure 4.10). Finally, Greeks, Finns and Italians spent in 2005-2008 on average 7-10 months in unemployment and Belgians, Greeks, Portuguese, Finns and Italians 3-5 months in inactivity.

**Figure 4.10 – Mean number of months (not necessarily consecutive) spent in each labour market status by country, 2005-2008 & 2009-2012**






Source: EU-SILC 2005-2008 and 2009-2012
Note: FT=Full-time employment; PT=Part-time employment; SFT=Full-time self-employment; SPT=Part-time self-employment; U=Unemployment; R=Retirement; I=Inactivity.

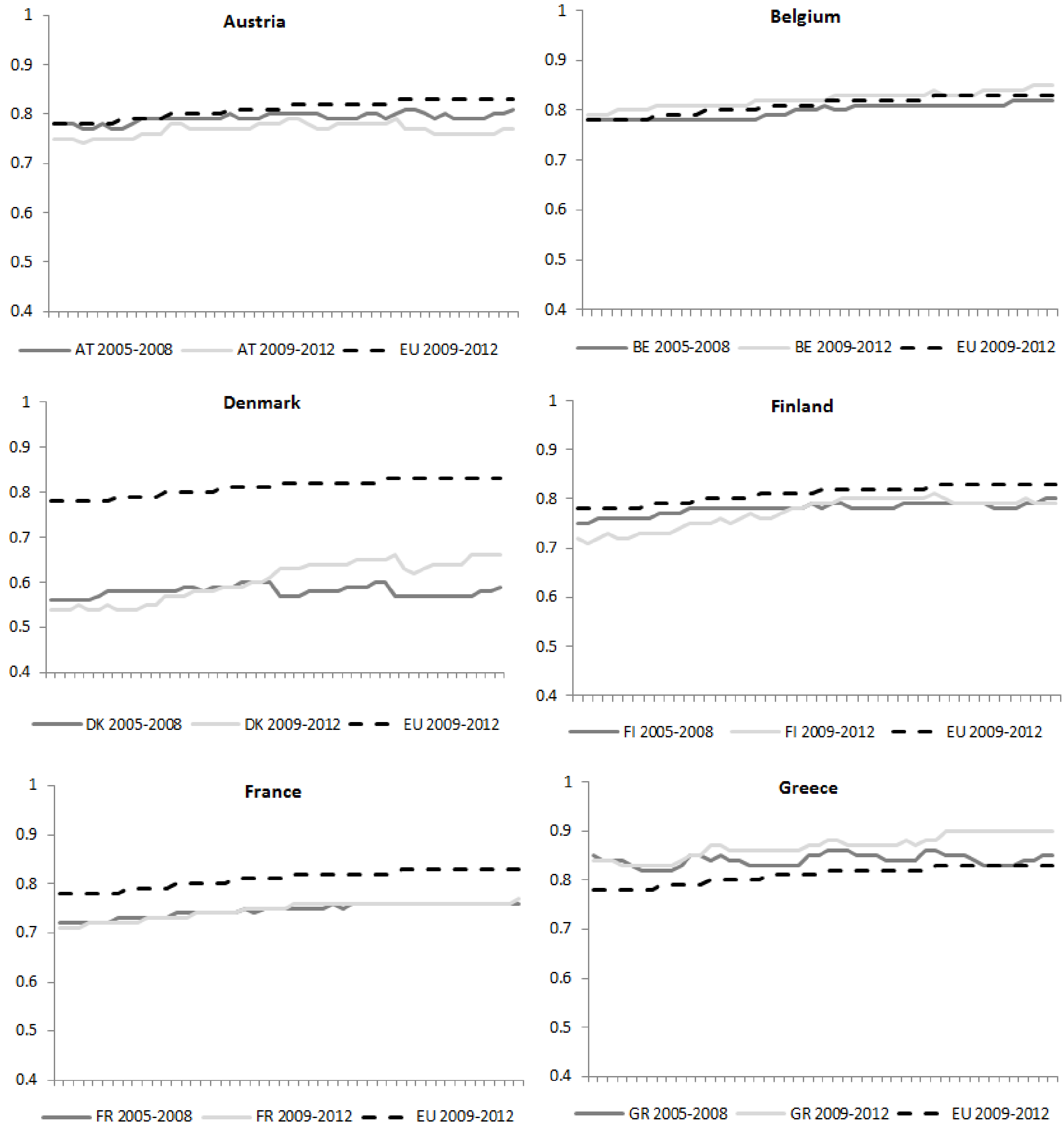
The patterns emerged for Europe as a whole revealed that during the financial crisis there was a decrease in stable full-time employment, both dependent and self-employment, and an increase in stable part-time forms of employment, as expected from the study of the labour market adjustment responses to the crisis (section 4.1.3). Based on the within-country variation of the average number of months spent in each labour market across time, the above patterns are confirmed in Belgium[78] and the UK and partially in Greece, Italy, Portugal and the Netherlands, where during 2009-2012 I observe a decrease in the mean duration of full-time self-employment (especially in Greece and Italy) and an increase in the mean duration of part-time self-employment (Figure 4.10). On the contrary, the highest increase in the months (not necessarily consecutive) spent in full-time employment during the economic shock is observed in Sweden (+3.4 months), followed by Austria (+2 months). Austria, with the use of the Austrian Active Labour Market Policies, labour hoarding and short-time work schemes, is one of the best European countries in preserving employment during the first years of the crisis (Stiglbauer 2010; Vaughan-Whitehead 2011; ECB 2012). Finally, the European pattern shows an increase in the mean duration of unemployment and a decrease in the mean duration of inactivity between 2009 and 2012. Does this pattern emerge from all the countries in the analysis? Again, the answer confirms the country heterogeneity. Unexpectedly, the unemployment duration decreases in six countries and mostly in Finland (-2.8 months) and Portugal (-1.5 months), while the duration of inactivity increases only slightly in the southern European countries, known for their high rates of female inactivity (see Chapter 5): Greece (+40 days), Portugal (+30 days) and Italy (+20 days).

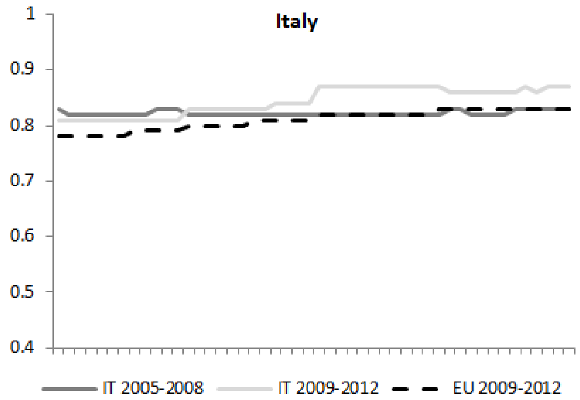
The study of the transversal entropy index of the European labour market sequences pointed out heterogeneity between sequences, slightly more pronounced during the years of the crisis (Figure 4.7 in section 4.2). Figure 4.11 indicates that while Austria, Belgium, the Netherlands, Finland and the UK behave similarly to the EU average, with an index around 0.8, two Scandinavian countries Denmark and Sweden are placed well below the EU average, showing less diverse sequences (around 0.5-0.6). After the start of the financial collapse, Sweden registers the

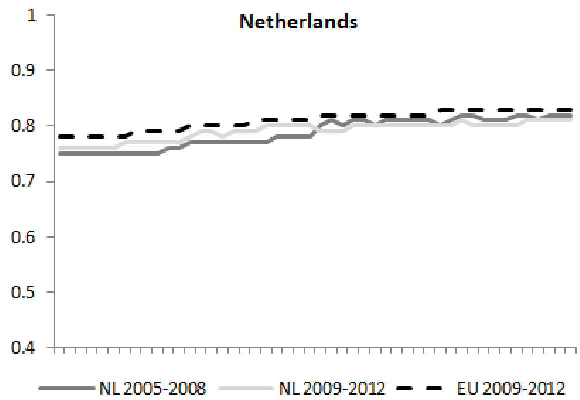
[78] In 2009-2012, Belgians spent on average -5 and -4 months respectively in full-time employment and full-time self-employment and +4 months in part-time self-employment when compared to 2005-2008. The United Kingdom in 2009-2012 showed a decrease in full-time employment (-1.7 months) and an increase in part-time self-employment (+1.6 months).

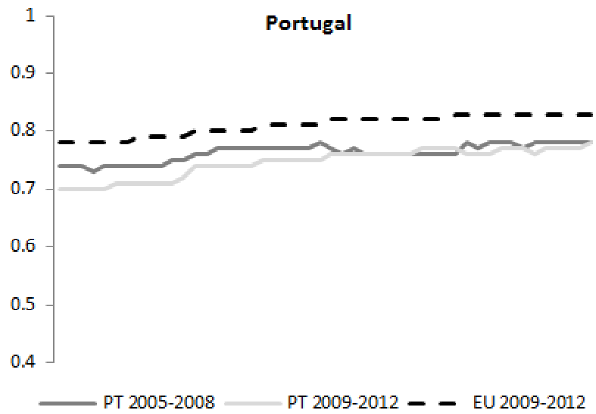
biggest decrease in entropy, while Denmark experiences a significant increase. Greece and Italy are the only countries placed above the European average, demonstrating high diversity of labour market sequences, i.e. more unpredictable sequences.

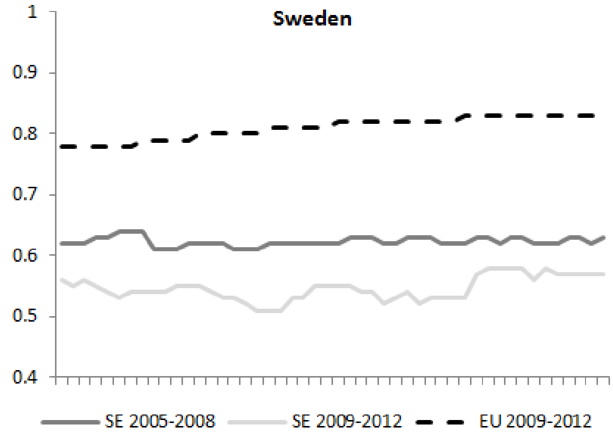
**Figure 4.11 – Transversal entropy index by country, 2005-2008 & 2009-2012**

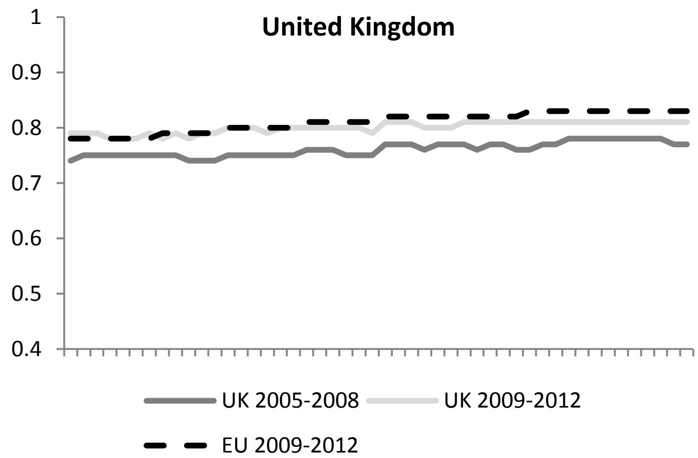




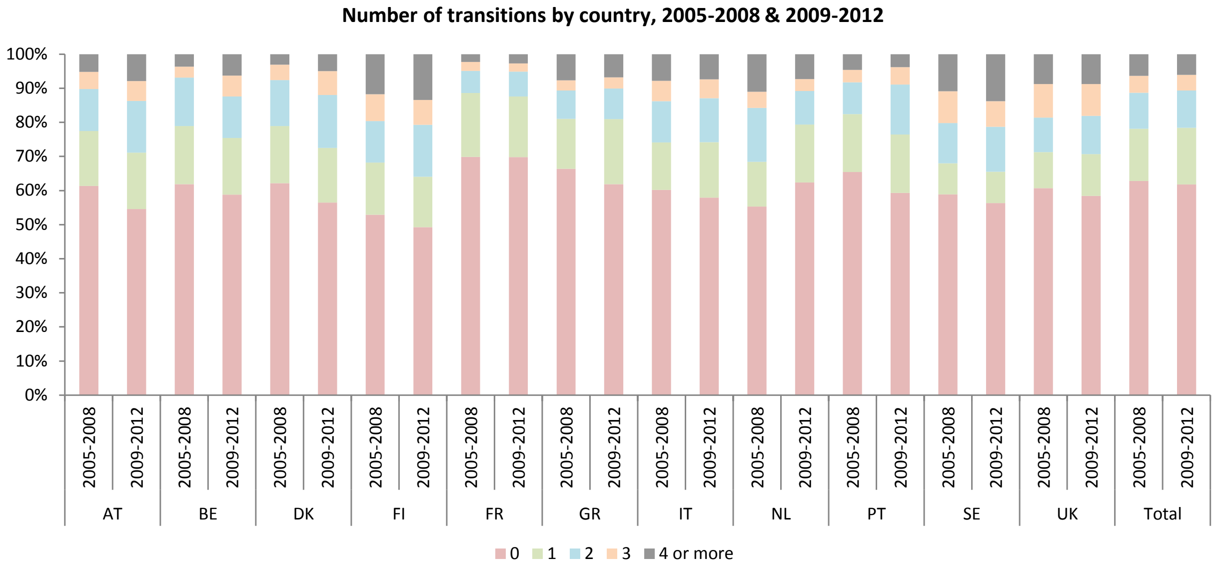

Source: EU-SILC 2005-2008 and 2009-2012
Note: Entropy=0 when all sequences are in the same status; Entropy=1 when sequences are equally distributed in all possible states.

These findings point out the existence of a Nordic model versus a southern European model, i.e. Sweden and Denmark versus Greece and Italy. In the first group of countries, the sequences appear more uniform and predictable, while in the southern European group the composition of the sequences is harder to predict, especially during the Great recession. In other words, in the southern European countries sequences are less uniform (more labour market states) compared to the Nordic, probably because of a smaller share in standard employment and higher share of other labour market states, such as inactivity. The composition of the sequences by country is addressed in the following section (section 4.3.1).

The last aggregated indicator used to describe individual labour market sequences is the average number of transitions included in the sequences by country (Figure 4.12). As anticipated, the majority of the sequences include stability in one labour market status across time. Indeed, 63% of the sequences on average do not include any transitions, percentage that only slightly decreases in 2009-2012 (62%). Two key findings emerge from the study of the following graph.

Firstly, in 2005-2008, the highest share of sequences with no transitions is observed in Greece, Portugal and France (more than 65%), while the lowest share is encountered in Finland, Sweden and the Netherlands (less than 60%). Not surprisingly, countries with rigid labour markets (Tables 4.3 and 4.4 in section 4.1.3) that do not ease job mobility register fewer transitions between labour market states. On the contrary, countries with flexible employment legislation promote transitions between forms of employment in order to boost employment and avoid the rise of unemployment, especially during periods of economic hardship, confirming Hypothesis 1.3. Secondly, all the countries of analysis show a slight decline in the number of sequences with zero transitions (except for the Netherlands) in 2009-2012, indicating more fragmented sequences after the start of the economic crisis, partially confirming Hypothesis 1.1 according to which sequences during the crisis are more turbulent.

**Figure 4.12 – Number of transitions in the labour market sequences by country before and during the financial crisis, 2005-2008 & 2009-2012**




Source: EU-SILC 2005-2008 and 2009-2012

### 4.3.1 Most Frequent Employment Sequences across European Countries and across Time

Previously in this section, the focus has been on the aggregated statistics describing individual labour market sequences, such as the mean number of months spent in each labour market status and the index of entropy. Now my attention turns to the study of labour market sequences by country at the individual level. To this end, I plot the individual trajectories using sequence frequency plots. To test Hypothesis 1.2, which argues that countries belonging to the same group show more commonalities between them than with countries of a different group, the results are presented in country clusters, as defined by Muffels and Luijkx (2008): Scandinavian cluster (Denmark, Sweden, Finland and the Netherlands), Continental cluster (Austria, Belgium and France), Anglo-Saxon (UK) and southern European group (Greece, Italy and Portugal). This particular country classification is used because it is based on labour market features relevant to the research question, namely the relationship between flexibility and security in the labour markets (for more details, see section 2.3.2). The UK is the only representative country of the Anglo-Saxon group and thus is presented together with the continental countries for presentation purposes.

The majority of the sequences show stability in one labour market status across the full panel duration (48 months) and thus, I first focus on the stable labour market sequences. Stability in full-time employment seems the most frequent sequence in all the countries during both periods, but to a different extent (green colour in Figures 4.13, 4.14 and 4.15). The highest frequency of stable full-time employment appears in Denmark (51% in 2005-2008[79]) and Sweden (43%), two Nordic countries with strong economies and flexible labour markets, closely followed by two Mediterranean countries with rigid employment legislation, France (41.5%) and Portugal (41%). France as anticipated in section 4.1.3 (Table 4.1) demonstrates a high and stable employment rate across time, while Portugal is known for a high share of female employment prior to the crisis when compared to the EU standard (Rubery 2014). On the contrary, stable full-time employment is less frequent in Greece (24% in 2005-2008 and 23% in 2009-2012), the Netherlands (23.6% and 28.2% respectively) and Italy (29% both periods). As anticipated, one of the reasons for the stability in full-time employment being less frequent in Greece and Italy, especially when compared to the Nordic countries, may be the high proportion of inactive women (see Chapter 5). On the other hand, the Dutch sequences register the highest share of stability in part-time employment (between 17-20% across time). In fact, the Netherlands is known for its good quality part-time contracts, guaranteeing job security (Anxo et al. 2007). Again, a Nordic and a Southern model are observed, but with the addition of other countries, Portugal and France being closer to Nordic

[79] To describe the sequence frequency plots using percentages, I used sequence frequency tables, which are not included in the thesis because of their large size.

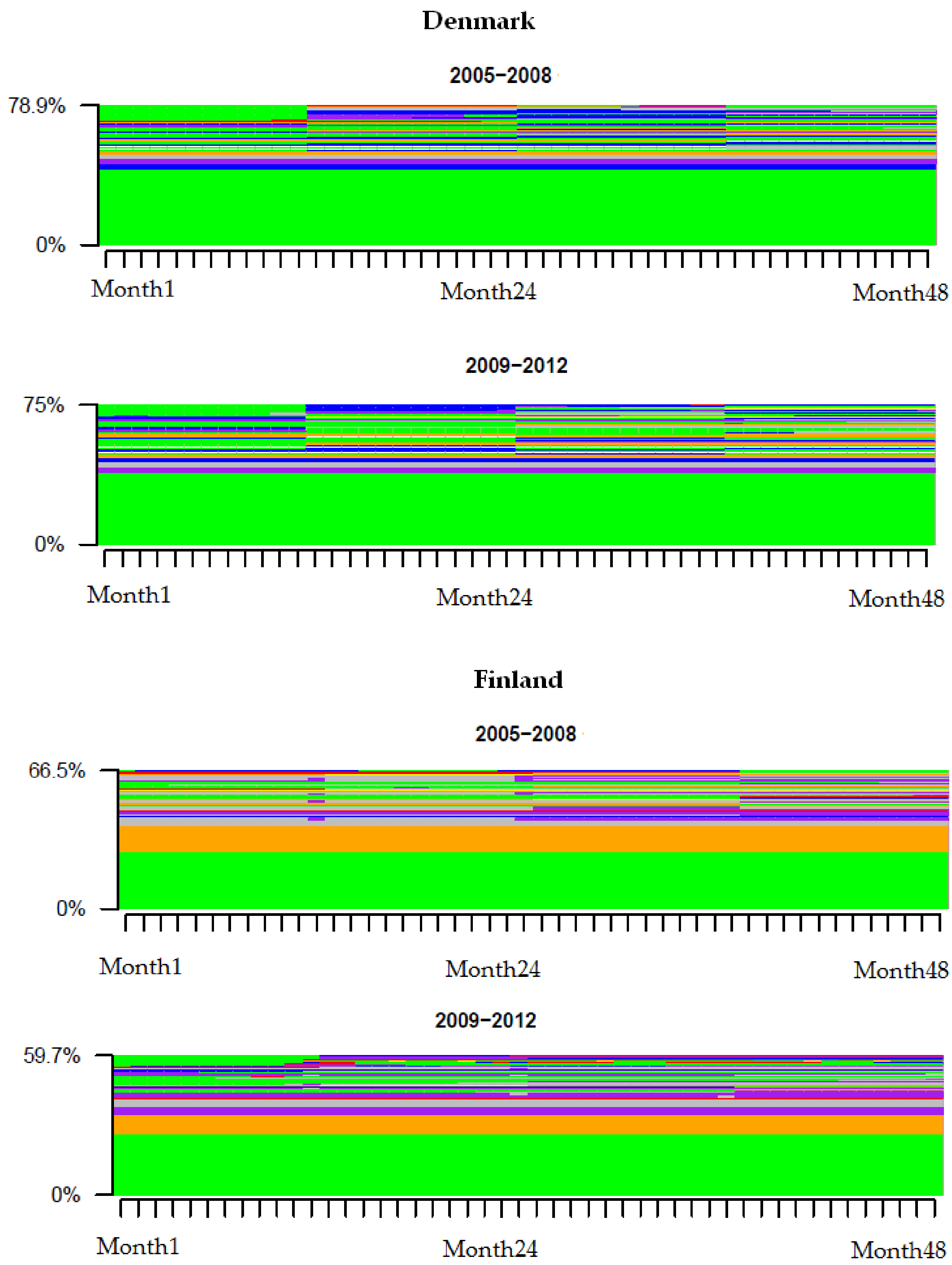
countries, while the Netherlands showing some similarities regarding full-time dependent employment with Greece and Italy, but for different reasons.

During the years of the Great recession, stable full-time employment appears overall less frequent compared to the period prior to the economic downturn, with the exception of the Netherlands (+4.6%) and Sweden (+3.6%; Figure 4.13), both known for their strong internal flexibility and the use of adjustments in working time especially during the first phase of the crisis (Lallement 2011). The biggest decrease in stable full-time employment is registered in Belgium (-5.1%), Denmark (-4.8%) and Portugal (-4%). Even though Belgium implemented working time arrangements (section 4.1.3), the decline in employment was not completely avoided. Moreover, the immediate fall in employment in Denmark during the first years of the economic shock was a result of the low employment protection (Jørgensen 2011). Nonetheless, the flexible Danish labour market reacted rather instantaneously to the business cycle fluctuations using its generous welfare system, tax reduction, promotion of youth employment and incentives for workers to extend their working hours in order to avoid persistent unemployment and to boost employment and consumption (Eichhorst et al. 2010a; Clasen et al. 2012). Finally, concerning the Portuguese labour market, it is among the most rigid across the EU-15, known for its dual nature, protecting the insiders and leaving unprotected the non-standard workers (World Bank 2010). Thus, I would expect the Portuguese decrease in employment to be especially pronounced among workers with non-standard work contracts.

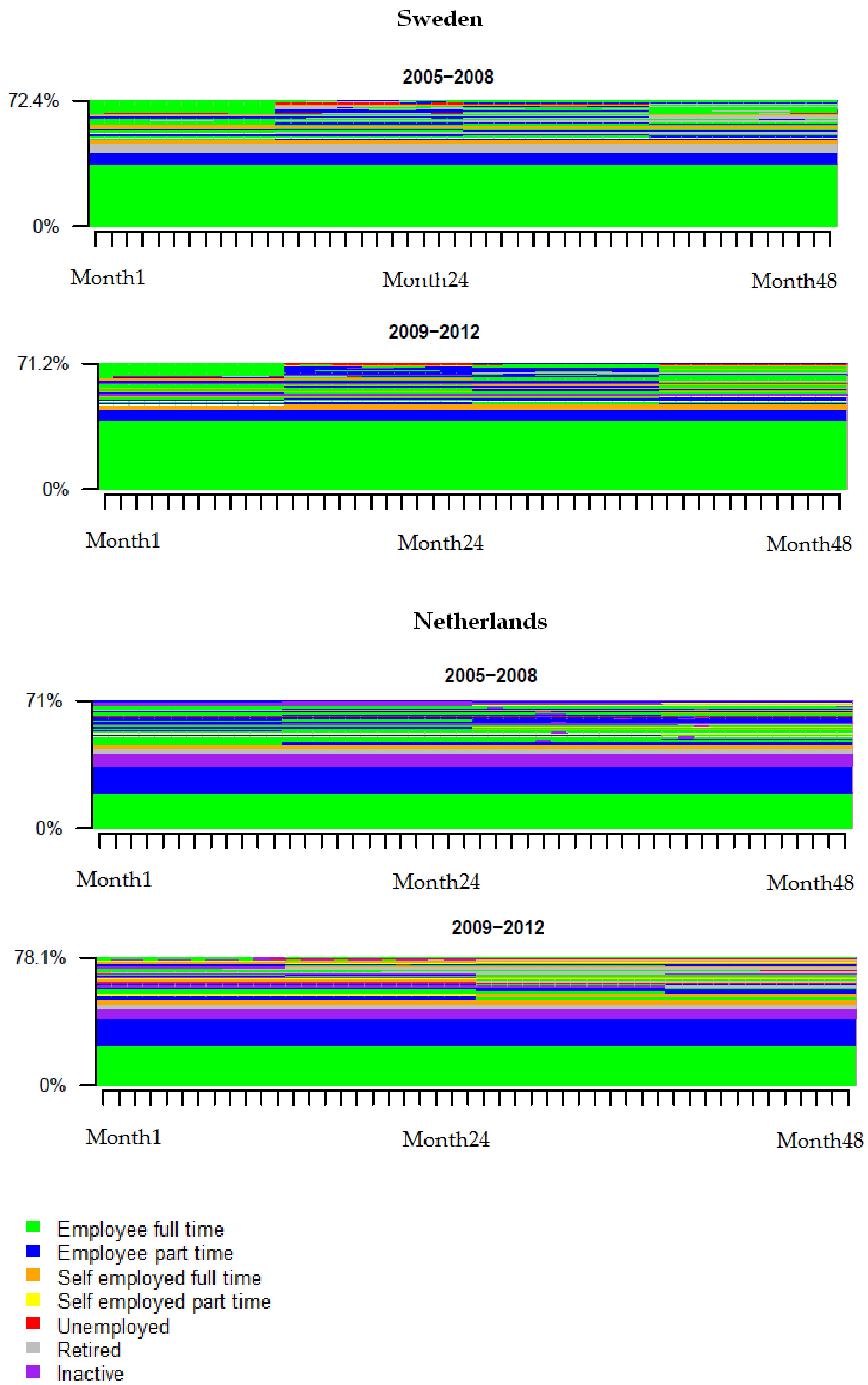
Part-time employment (graphed in blue) is a Dutch phenomenon, followed by Sweden (Figure 4.13) and the United Kingdom (Figure 4.15). In detail, stability in part-time employment concerns 17% of the Dutch sequences in 2005-2008 and 20% in 2009-2012. This labour market status is the second most frequent sequence for both periods in Sweden (around 7% across time) and the UK (around 8% across time). Finland (Figure 4.13), Greece and Portugal (Figure 4.14) do not commonly use part-time employment (here stability in this status accounts for less than 1%). Overall, during the years of the crisis an increase in stable part-time employment sequences is observed in the Netherlands (+3%), followed by Austria and the UK (less than 1%). As seen below, part-time employment appears frequently in sequences including transitions between different employment states.

Stability in full-time self-employment (plotted in orange in Figures 4.13-4.15) appears more evident in the southern European countries (in Greece is the second most frequent sequence after stability in full-time employment) and Finland. The Greek economy is known for its extensive use of self-employment and family businesses, very common among the agriculture sector (Karamessini 2014b). Indeed, almost one fourth of the Greek sample (18.5%) is in full-time self-employment, percentage that slightly decreases after the start of the crisis (16.5%). Similar is the Finnish pattern (14% and 10% respectively), the Italian (10% in 2005-2008 and 8% in 2009-2012) and Portuguese (8% and 5%), all registering a decrease in stable full-time self-employment after the start of the economic shock. The lowest frequencies of stable full-time self-employment belong to Denmark, Sweden and the Netherlands. Overall, a decrease in this status during the crisis is detected in most of the countries, except for Belgium and the Netherlands, which register just a slight increase (less than +1%). On the other hand, being in part-time self-employment (in yellow) across four consecutive years is not very common in the sample analysed. Between 2005 and 2008, it is more frequent in Greece (1%), the Netherlands (0.8%), Portugal (0.6%) and the UK (0.6%). Its frequency doubles after the start of the crisis in the UK (1.3%), where an increase in self-workers in agriculture or elementary occupations is observed (Fondeville at al. 2015, p. 17). The rest of the countries show a decrease in stable part-time self-employment during 2009-2012.

**Figure 4.13 – Most frequent labour market sequences (50[80]), Nordic countries 2005-2008 & 2009-2012**




[80] The number of sequences chosen to display in a sequence frequency plot depends on the visual clarity required and the richness of information. Plotting ten sequences would provide a very clear visualisation but the information would be rather poor, while plotting 50 or 80 (depending on the disaggregation level of the plot) is a good compromise between information and visualisation.

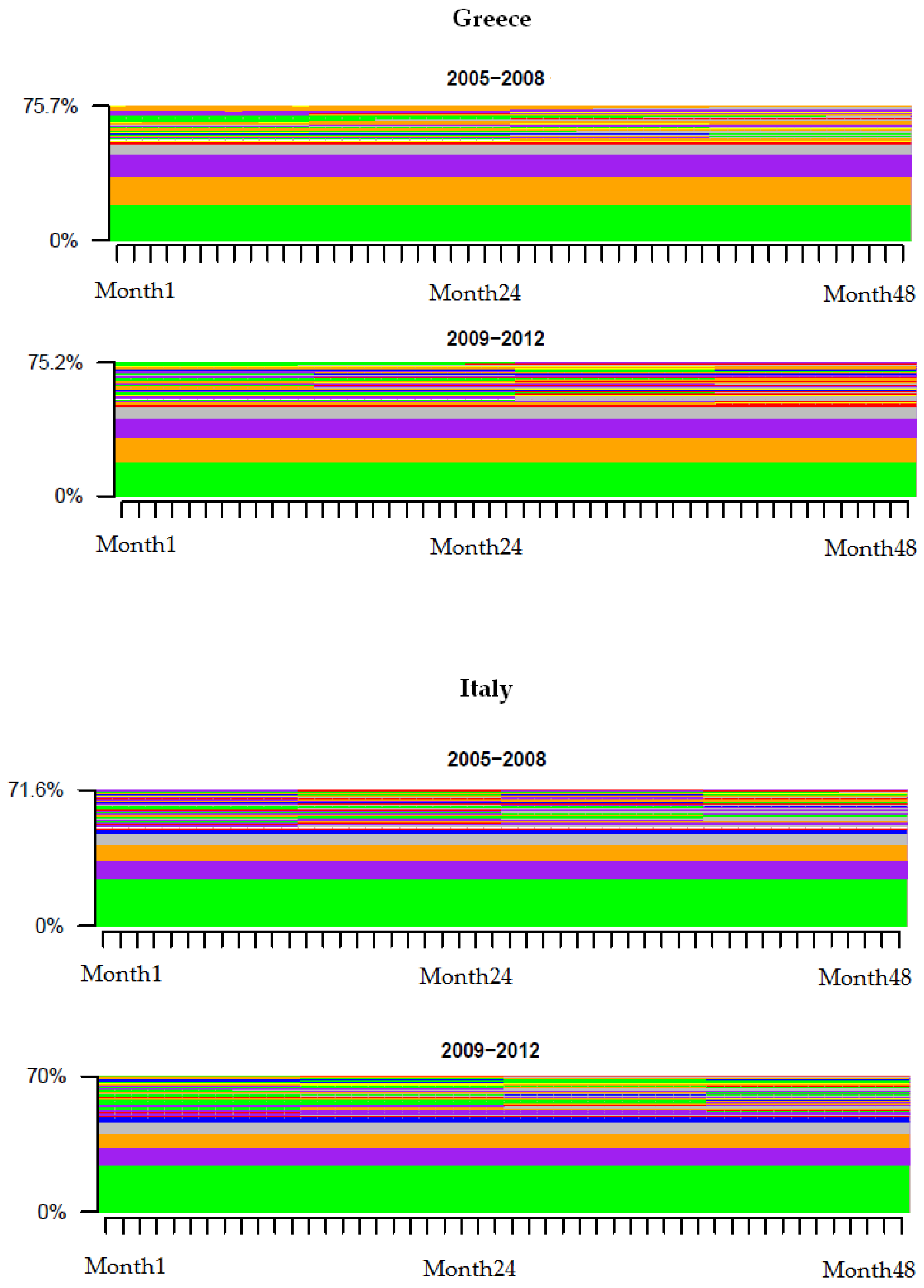


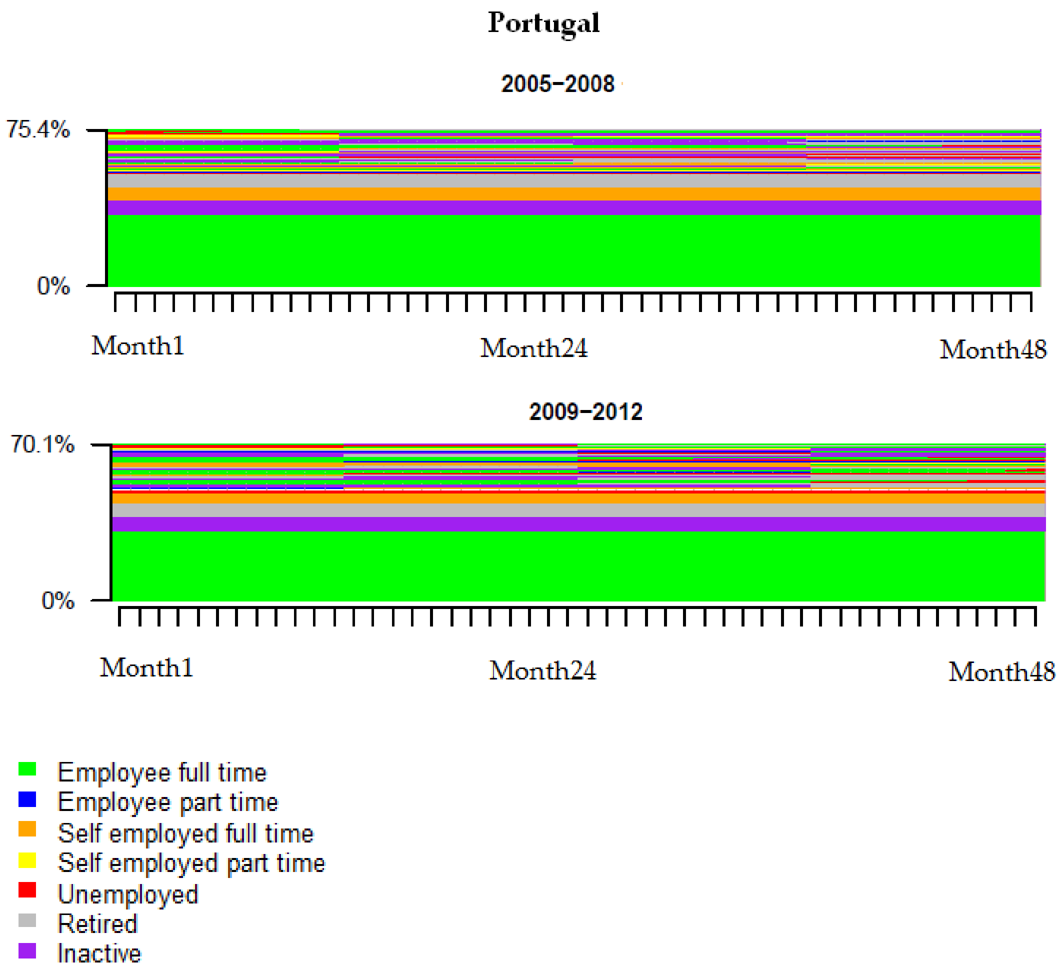

Source: EU-SILC 2005-2008 and 2009-2012

Persistent unemployment appears among the ten most frequent sequences in six countries, namely Belgium, France, Finland, Greece, Italy and Portugal, with the highest frequency in Belgium (4% in both periods). For the rest of the countries, the share of persistent unemployment is below 2%. Persistent unemployment does not appear among the 50 most frequent sequences in Denmark across time, while it appears in the Netherlands, Sweden and the UK only after the start of the crisis (at percentages below 1%). During the years of the economic shock, Belgium followed by Greece and Portugal register the highest shares of unemployment (respectively 4%, 1.7% and 1.6%), while only France show a slight decline in persistent unemployment (Figures 4.14 and 4.15). According to Ward-Warmedinger and Macchiarelli (2014, p. 15), who measured the probability of persistent unemployment between 1998 and 2008, Greece and Belgium registered the highest rates, while according to Erhel et al. (2014, p.17) stability in unemployment during the first phase of the crisis was more frequent in Portugal and Italy. Even though the Belgian Federal government introduced in 2009 the Economic Recovery Law[81] as a response to the financial crisis in order to protect and to re-integrate quickly in the labour market dismissed workers, Belgium registers a rather high unemployment incidence compared to the rest of the continental countries (Tros 2012).

[81] According to this law, employers before firing an employee need to create a 're-employment cell', which offers to dismissed workers training opportunities and eases their re-integration in the labour force (Tros 2012, p. 9).

**Figure 4.14 – Most frequent labour market sequences (50), Southern European countries 2005-2008 & 2009-2012**



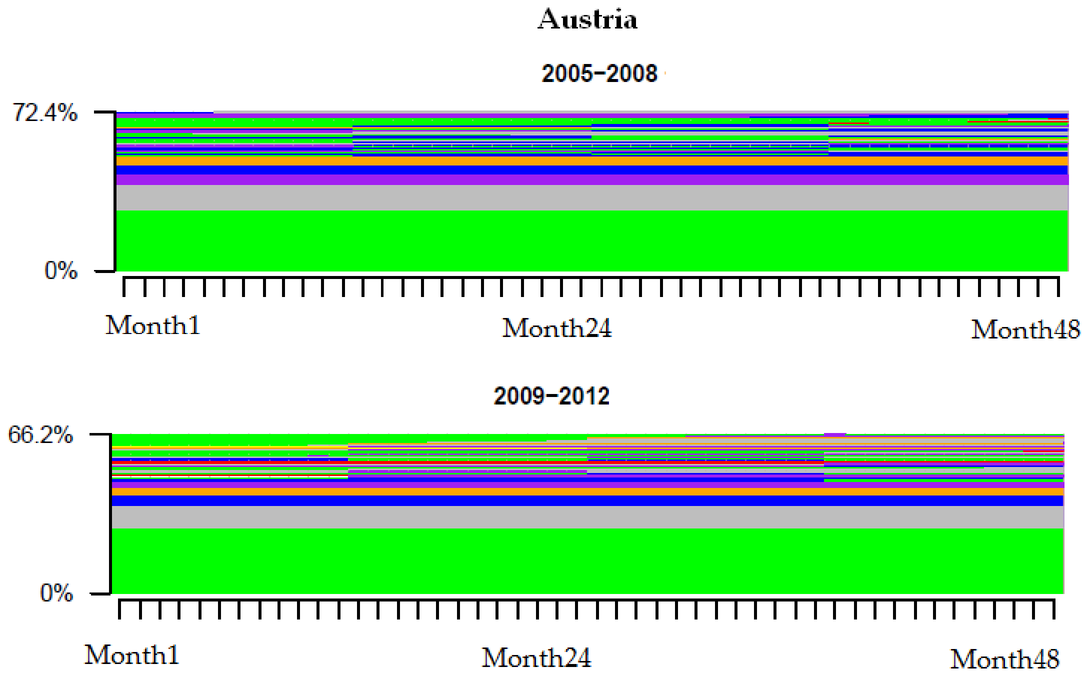


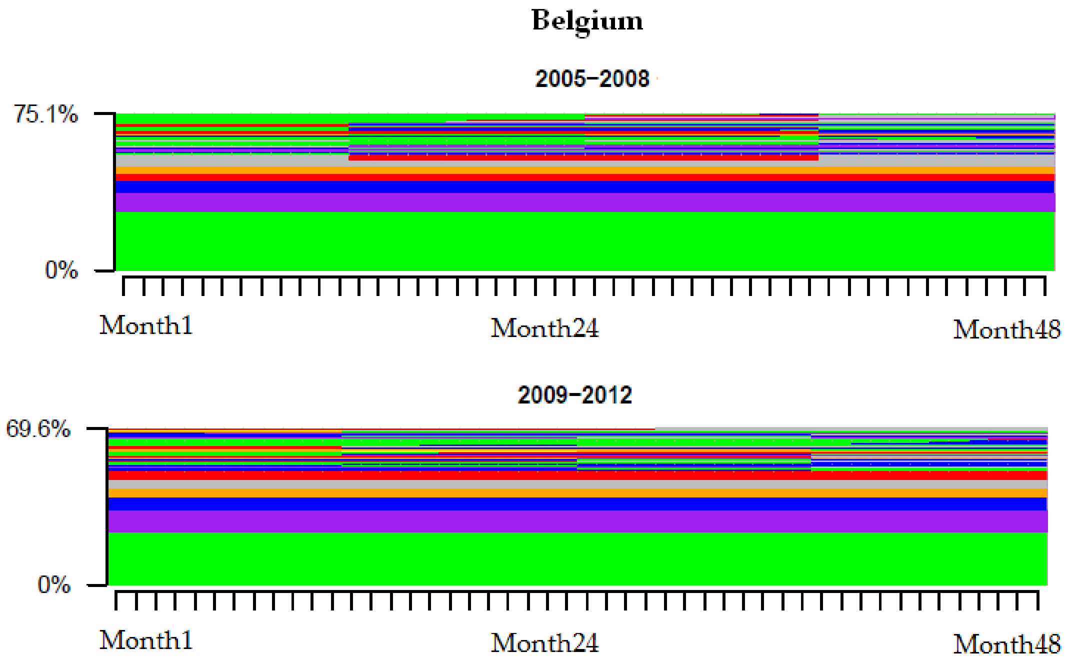

Source: EU-SILC 2005-2008 and 2009-2012

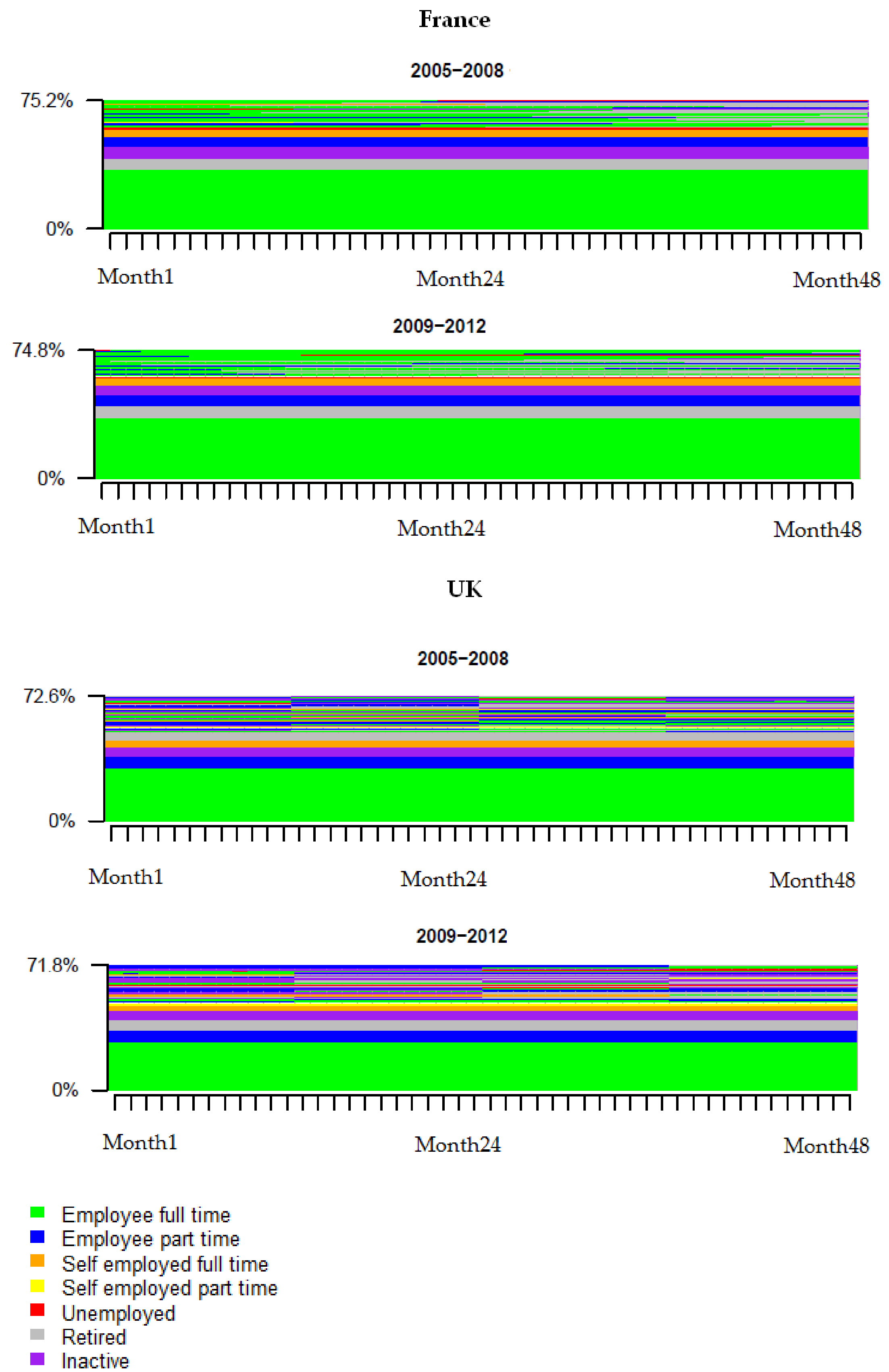
The last status of interest is persistent inactivity. More than 10% of the sequences indicate stability in inactivity in Greece, Italy and Belgium. Focusing on the period prior to the crisis, this status is frequent in Greece (15%), Italy (12%), Belgium (11%), the Netherlands (8.5%), Portugal (8%), France (7%), the UK (6%) and Austria (5.5%), mainly all the countries except for the three Scandinavian. During the financial crisis, the frequency of the status declined in Greece (-2.8%) and Italy (-1.7%), where as seen in Chapter 5 the female inactivity decreased during the crisis, but also in Austria (-3.3%) and the Netherlands (-2.3%). A possible explanation for the Austrian case lies, as seen at the start of section 4.3, in the immediate reaction of the Austrian labour market; in 2009, the government implemented employment reforms and adopted adjustment packages to promote employment of disadvantaged groups, easing their integration in paid work (Stiglbauer 2010). On the other hand, Finland marks the only noteworthy increase in persistent inactivity: from 0.8% to 3.5% in 2009-2012. As mentioned above, the Finnish labour market is flexible promoting job mobility. Indeed, Finland shows a rather low rate of sequences with zero transitions (Figure 4.12). Based on the TLMs approach, becoming inactive in Finland is not as 'exclusionary' as it might be in countries with rigid labour markets, since in the flexible Finnish labour market workers are quickly reallocated in paid work (Schmid and Gazier 2002).

Finally, I briefly mention sequences with at least one transition. In particular, after the start of the crisis, sequences with at least one transition from full-time to part-time employment are the most frequent after stable sequences, especially in Denmark and the Netherlands (2%; Figure 4.13). The Danish sequences in 2009-2012 include numerous transitions between full-time employment (FT) and part-time employment (PT) (for instance, PT->FT->FT->PT), as well as the Dutch sequences contain numerous transitions between all forms of employment including self-employment. In Greece after the start of the financial recession, the most frequent transitions are from full-time self-employment to part-time self-employment and from full-time employment to unemployment (respectively 1.2-1.3%).

**Figure 4.15 – Most frequent labour market sequences (50), continental countries and the UK 2005-2008 & 2009-2012**





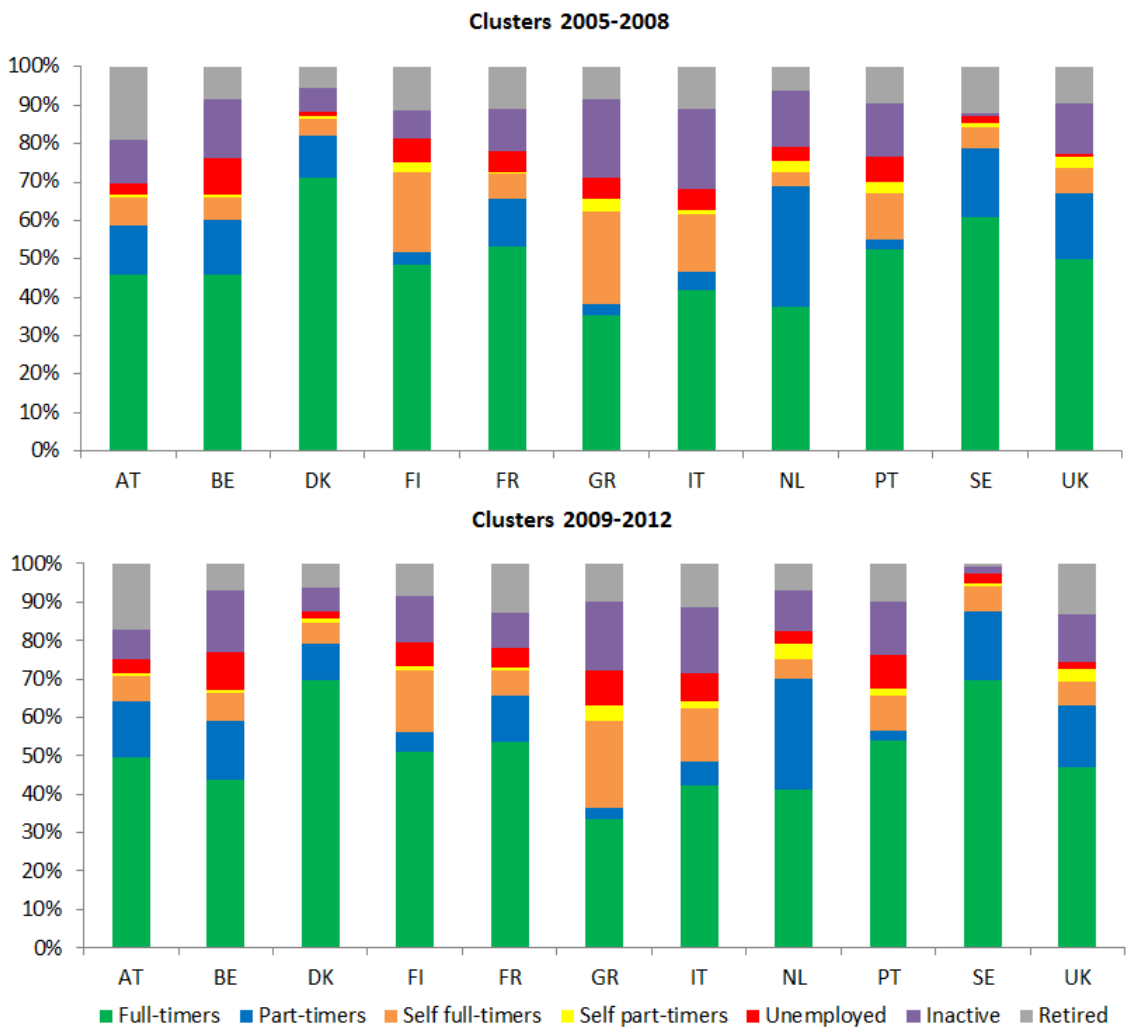

Source: EU-SILC 2005-2008 and 2009-2012

From the above findings, I conclude that although some countries belonging to the same country group appear similar, in some cases the within-group heterogeneity is evident. The Greek, Italian and Portuguese plots seem similar mainly due to the use of full-time self-employment and inactivity, confirming the southern European model, even though Portugal registers a higher share of full-time employment than the other two countries. Moreover, Finland appears more similar to the Mediterranean countries, than to Sweden and Denmark, because of the Finnish use of full-time self-employment. Finally, the Netherlands and the UK share their use of part-time employment. Hence studying the countries separately provides substantial insights on the national patterns that would be disguised if countries were studied in pre-defined groups. That said, I reject Hypothesis 1.2, because the empirical results of the most frequent labour market sequences by country do not lead to the country groups exactly expected, but in a slightly different formation, stressing both the between-group variation, together with the within-group dissimilarities.

The distribution of the countries across the labour market clusters, presented in section 4.2.1, confirms the results discussed above. Denmark and Sweden register the highest proportions of the full-time employment cluster (60-70% across time), with Sweden showing the highest increase in this cluster (+8.8%) during the financial crisis, followed by the Netherlands (+3.8%) and Austria (+3.5%). The part-time employment cluster is markedly present in the Netherlands (around 30% across time). The southern European countries and Finland register the lowest frequencies of the part-time cluster and, at the same time, the highest frequencies of the full-time self-employment cluster.

Focusing on the turbulent clusters, Greece (3.4%), the Netherlands (2.8%), the UK (2.8%), Portugal (2.7%) and Finland (2.3%) register the highest frequencies of the turbulent cluster with high prevalence of part-time self-employment and numerous transitions between non-standard forms of employment. In 2009-2012 the UK, Netherlands, Italy and Greece registered an increase in this cluster, with Greece and the Netherlands reaching the peak frequency of 4%. As seen above, Greece is known for its use of self-employment, while the Netherlands typically use part-time employment, which are both non-standard work forms. The second turbulent cluster with a high prevalence of unemployment appears more frequent in Belgium (9.5%), Portugal (6.5%) and Finland (6.4%). In 2009-2012 although the highest frequency still belongs to Belgium (9.7%), this time is followed by Greece, Portugal (both at 8.9%), Italy (7.3%) and Finland (6.2%). Not surprisingly, the highest increase during the economic shock belongs to the southern European countries: Greece (+3.7%), Portugal (+2.4%) and Italy (+2%). The inactive cluster is significantly more frequent in Italy and Greece, while it overall decreases in 2009-2012, with the exception of Belgium, Finland and Sweden. Finally, the retirement cluster does not present any substantial differences across time, except for Sweden. In Sweden during 2009-2012 there are only five individuals belonging to this cluster. That is because all the retired people in the Swedish sample of 2009-2012 (the 94% of the retired people in the Swedish sample) are aged between 64 and 81 years old and hence have been excluded from the sample of analysis.

**Figure 4.16 – Bar chart of labour market clusters by country (%), 2005-2008 & 2009-2012**




Source: EU-SILC 2005-2008 and 2009-2012

## 4.4 Conclusions

In this chapter we have seen evidence of a strong heterogeneity between European labour markets at the national level. The eleven countries studied show substantial differences in their labour markets' performances prior and during the crisis (section 4.3), as well as in the impact of the crisis and their responses to the 2008 economic shock (section 4.1). The answer to *"How did individual labour market trajectories change during the Great recession?"* depends on the unit of analysis. When studying Europe as a whole (the average of the 11 countries), the labour market sequences do not appear very different over time as I would expect from the study of the macro-data discussed in section 4.1, disguising the national patterns of employment trajectories. All the countries have been affected by the Great European recession, but to a completely different degree. Overall, in Europe the impact of the crisis, based on my sample, appears to be represented by slightly more turbulent and fragmented labour market trajectories during this time, confirming Hypothesis 1.1. Moreover, during the years of the crisis, we observe a slight reduction of full-time employment (dependent and self-employment) and of inactivity, and an increase in part-time forms of employment and unemployment. The increase in part-time employment after the start of the 2008 recession is a result of employment policies such as labour hoarding, which were implemented in order to avoid a massive rise in the unemployment rate. Clearly from the study of the sequences both in Europe as a whole and across countries, stability in one labour market status is the most common sequence and in particular stability in full-time dependent employment, which is still the main pillar of employment even though non-standard forms of employment are widely used, especially in some countries. Future research can investigate whether the study of a longer span of time (more than 4 years) would encounter more transitions between states in individual labour market sequences.

When disaggregating the labour market sequences by country, the between-country heterogeneity as well as the differences of the impact of the crisis become evident. First, I focus on the between-country heterogeneity before the start of the crisis. *What are the main labour market patterns during 2005-2008 across European countries?* Stable full-time employment (across 48 consecutive months) is more prevalent in Denmark and Sweden, two Nordic countries with flexible labour markets, where sequences are easier to predict because they are relatively homogeneous (stable in full-time employment). Together with the two Scandinavian countries, also Portugal and France show rather high frequencies of stable full-time employment. The lower share of sequences stable in standard employment is found in the Netherlands known for its extensive use of part-time employment, together with Greece and Italy known for a high share of full-time self-employment and inactivity, mainly female inactivity (see Chapter 5). Stable part-time employment is also frequent in Sweden and the United Kingdom, while stable full-time self-employment is frequently used in the southern European countries and Finland. Finally, persistent unemployment and inactivity (stable across time) are more common in Belgium and the southern European countries.

*How did individual labour market trajectories change during the 2008 crisis across European countries?* According to the TLMs approach, transitions are more complex when there is an increase in the use of non-standard employment and limited job vacancies, both evident during the crisis. A sequence is complex when it includes numerous transitions between labour market states (Gazier and Gautié 2011). Indeed, during the years of the crisis, sequences appear slightly more turbulent/fragmented and less predictable, especially in Greece and Italy, partially confirming Hypothesis 1.1. In contrast, the sequences in Denmark and Sweden are more uniform and easier to predict even during the economic crisis.

The within-country differences in individual labour market sequences across time are not as evident for all the countries analysed, indicating that the impact of the crisis varies across countries. In detail, during the years of the economic shock, the sharpest decrease in stable full-time employment is observed in Belgium, Denmark and Portugal, while full-time self-employment decreases in almost all the countries, except for the Netherlands and Belgium, where it only slightly increases (less than 1%). Furthermore, the observed pattern of the increase in stable part-time employment during the financial crisis is mainly seen in the Netherlands, Austria and the UK. The increase in part-time employment is also noticed from the sequences including transitions from full-time to part-time employment, which are frequent during the crisis, especially in Denmark and the Netherlands. Stable part-time self-employment is not very common in the sample of analysis. It appears more frequently in the UK during 2009-2012 and it is mostly seen in sequences with transitions from full-time self-employment to part-time self-employment, usually in Greece during the years of the crisis. Finally, unemployment increases in Belgium, Greece and Portugal, while inactivity declines mostly in Greece and Italy between 2009 and 2012.

Muffels and Luijkx (2008) divided the European countries in four groups, based on their labour market *flexicurity*: the Scandinavian, being the one with the highest *flexicurity*, the Continental and Anglo-Saxon having medium levels of *flexicurity* and the southern European with a low level of labour market flexibility, strong employment protection but without a generous welfare state. Although, the empirical results presented in this chapter recognise the presence of a Scandinavian and a southern European model, the overall distribution of the countries in groups leads to the rejection of Hypothesis 1.2. The Scandinavian model that emerges from this chapter includes Denmark and Sweden (high stability in full-time employment and uniform trajectories), while the southern European model consists of Greece and Italy (low share of full-time employment, use of full-time self-employment and high share of persistent inactivity). Finland shares some characteristics with the southern European countries (the use of full-time self-employment), while Portugal does so with the Scandinavian countries (high share of full-time employment). Moreover, Belgium differs from France and Austria (the continental countries) mainly because of its high share of non-employment, while the Netherlands, Sweden and the UK share a frequent use of part-time employment. This finding highlights the importance of studying each country separately not in pre-defined groups in order to identify national patterns of individual labour market sequences. In fact, by analysing European countries into one or more groups may lead to conclusions which do not apply to all countries.

Finally, according to the TLMs approach, flexible labour markets promote job mobility helping workers to re-allocate in paid work from non-employment, but also to maintain their employment status by changing forms of work and adjusting their working hours. On the other hand, rigid labour markets protect the permanent workers (insiders), but leave the outsiders (workers in non-standard forms of employment and non-employed) unprotected. The empirical findings of this chapter confirm this argument. Indeed, countries with flexible labour markets (such as Denmark, Sweden and the Netherlands) seem to respond better to the crisis with the use of part-time employment and by promoting labour market transitions (more transitions included in the sequences). Countries with strict employment legislation, such as Greece and Italy, register a higher share of sequences in non-employment, a lower share in full-time employment and overall fewer transitions between states, indicating limited job mobility and more exclusionary transitions, transiting from employment to non-employment, especially during the years in crisis, confirming Hypothesis 1.3.

The next chapter focuses on the study of labour market trajectories before and during the financial crisis in 11 European countries by gender, age and education, using sequence and cluster analysis, as well as a multinomial regression model. This study aims at interpreting the patterns emerged from Chapter 4. For instance, is the decrease in inactivity equally corresponding to women and men? Do young people experience trajectories that are more turbulent during the years of the economic shock?

# 5

## Chapter 5 Employment Inequalities in Europe during the Great Recession

*Are employment inequalities more pronounced after the start of the 2008 financial crisis in Europe and if yes in which countries?* Chapter 4 focuses on the study of individual labour market trajectories across time and European countries, whereas this chapter investigates the effects of specific individual characteristics on labour market sequences across countries and time. Numerous studies confirm that employment inequalities appear more pronounced for specific sub-groups of the population, such as youth, women and low educated workers (among others: European Commission 2009; Borghi 2012; Leschke 2012). Workers were influenced by the 2008 financial crisis to a different extent according to their socio-demographic characteristics (Eurofound 2013b). Moreover, employment inequalities vary significantly across countries (Barakat 2010; Vaughan-Whitehead 2011; Rubery 2014); and thus I explore in which countries these disparities appear more pronounced and whether the economic crisis has accentuated them. In essence, this chapter's aim is to explain the patterns emerged in Chapter 4 using the individual variation in employment outcomes, based on gender, age, education and country of residence. To this end, I study the labour market trajectories of individuals, before and during the financial crisis, by gender, age and education level attained. As mentioned already, I study each European country separately and not aggregated in country groups, in order to avoid making a priori assumptions on the similarities/disparities of the countries. However, I present the results organised in country groups based on the country classifications suggested by Anxo et al. (2007) (section 5.1) and by Walther (2006) (sections 5.2 and 5.3) and thus I can confirm the country classifications used or suggest alterations.

The chapter is organised in separate sections, one for each characteristic (gender, age and education). In each section, I present the sequence and cluster analysis results that are relevant to the research hypothesis (discussed at the start of each section). The results are discussed firstly at European level to identify general European patterns and then at national level to examine whether these patterns are country-specific. In detail, the first section outlines the effect of gender on employment outcomes across countries and in relation to the financial crisis. A key finding of this section demonstrates that women experienced more turbulent and fragmented sequences during the years in crisis than men, although men were hardly hit because of the sectoral profile of the crisis. Indeed, women moved from inactivity towards paid employment, especially part-time forms of employment. Women are more penalised in Greece and Italy with high shares of female inactivity. Next, the chapter examines the effect of age on employment trajectories in relation to the financial crisis. Young workers experienced more turbulent and fragmented sequences during the crisis, with a higher incidence of unemployment. Young workers are more penalised in Greece and Italy. The third section focuses on the effect of education on labour market patterns across countries and time: highly educated people are better off both before and during the crisis. To understand the role of socio-demographic characteristics on employment outcomes during the crisis, the last section of this chapter provides a summary discussion of the previous sections using a multinomial logistic regression model.

## 5.1 Employment Inequalities by Gender

Gender employment inequalities have been at the centre of researchers' attention for many decades. Several studies have found that women are generally at a disadvantage in the labour market when compared to men (among others: Jepsen 2005; European Commission 2009; Borghi 2012; Erhel et al. 2014) and that women are more susceptible to economic shocks (Karamessini 2014a). More precisely, according to the dual labour market theory, women are often part of the secondary employment market, i.e. in unstable, low-qualified and low-paid jobs with limited opportunities for promotions and further training (Piore 1971; Rosenberg 1991). According to the more dynamic TLMs approach, women are more likely to be affected by the increased use of non-standard forms of employment, and especially part-time employment, and less likely to experience 'good' transitions towards full-time employment (Schmid 2006; Leschke 2012; Hipp et al. 2015).

According to previous studies, during a period of economic depression, such as the Great recession in Europe, the labour reserve[82], which consists mainly of women (and other disadvantaged groups of workers), would not be used due to a decrease in labour demand (Bettio and Verashchagina 2014). On the contrary, according to the added worker effect, women would become active in the labour market during an economic downturn because of an overall decrease in their household income, i.e. out of need to contribute to the household budget. During the first phase of the crisis (2009-2010), a sharp decrease in employment (especially in some occupational sectors) led to an increase in unemployment among men, while a contraction of the household income during the second phase of the crisis (2011-2012) is expected to boost labour market activity among women, needing to increase their household income (Sabarwal et al. 2010; Karamessini 2014b). According to the added worker effect, women during the crisis should experience more transitions towards paid work, i.e. from inactivity towards forms of employment (**Hypothesis 2.1**).

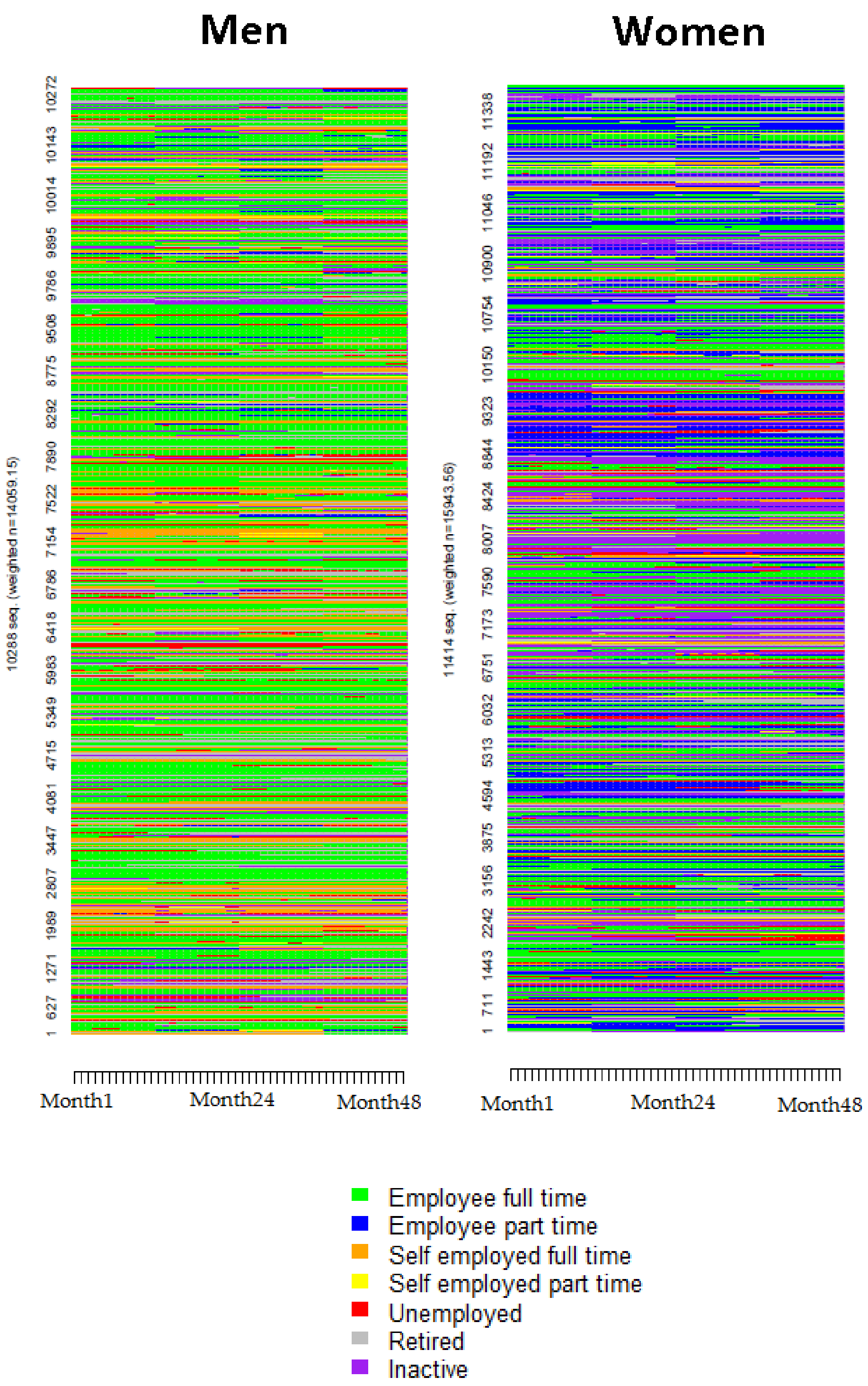
The first part of the section consists in an overall comparison of the occupational trajectories of women and men before and during the Great recession in Europe. To measure the effect of the crisis on women's employment sequences, I explore their occupational trajectories across time, in order to compare the period before the crisis

[82] A concept developed by Marx in 1867 and further discussed in Chapter 2, section 2.2.1.

to the period during the crisis. Indeed, Bettio and Vershchagina (2014) argue that during the crisis, the gender gap appears more limited, not only because women's labour market participation rates increased, but also because men suffered high unemployment rates due to the sectoral profile of the crisis ('man-cession'). In the second part of this section the comparisons are extended across the eleven European countries in analysis.

### 5.1.1 Occupational Patterns in Europe by Gender

**Figure 5.1 – Sequence index plots (all sequences) by gender, 2009-2012**




Source: EU-SILC 2009-2012

A quick look at the sequence index plots[83] of men and women during the financial crisis is enough to emphasize the gender differences on labour market trajectories (Figure 5.1). Men's trajectories are greener, stating the high prevalence of full-time employment and slightly less colourful, indicating fewer labour market transitions and thus, more stable trajectories. On the other hand, women's plot is more colourful, with a prevalence of blue and purple lines, standing for part-time employment and inactivity, consistent with the TLMs approach claiming that women are employed more often in non-standard employment and overall experience more turbulent occupational sequences. In the following pages, the aim is to decompose this statement, by studying a more detailed composition of the sequences by gender, as well as more complex indicators at an aggregated level.

#### Composition of Employment Sequences by Gender

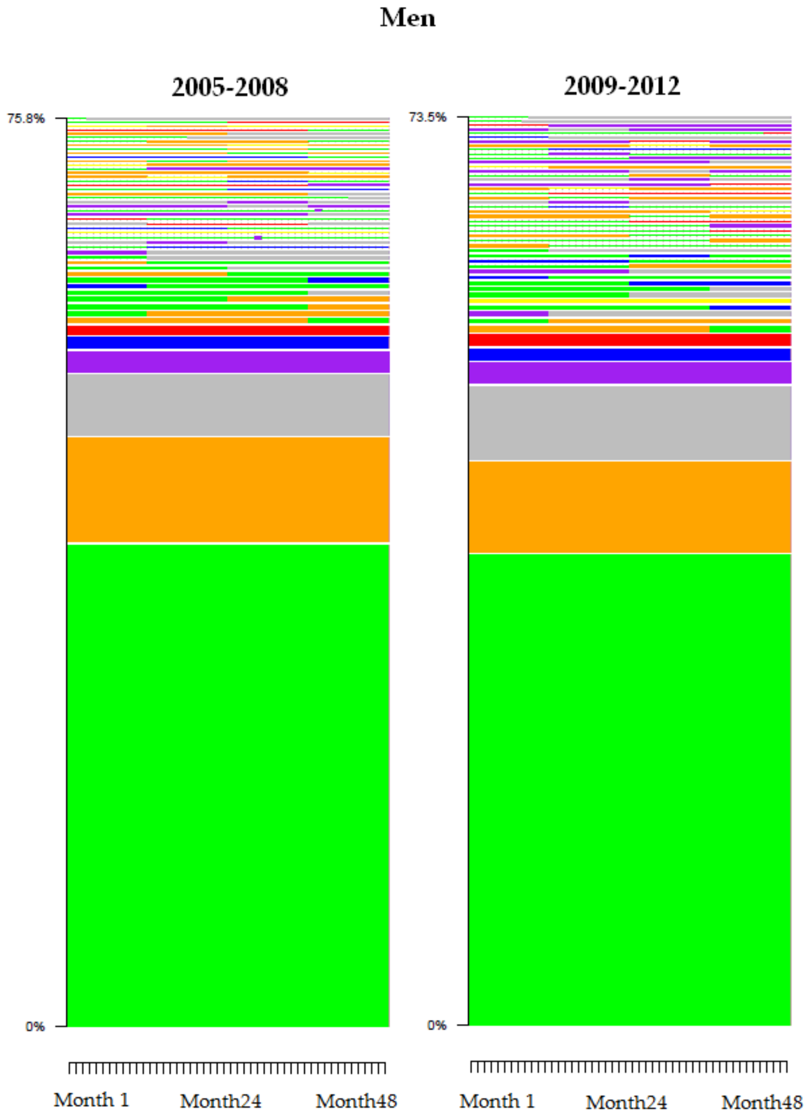
*Are the gender differences in employment trajectories seen in Figure 5.1 more evident during the 2008 financial crisis*? This section focuses on the composition of the labour market trajectories of men and women across time and discusses sequence frequency plots by gender (Figure 5.2), as well as the mean duration of each state during the four years of analysis (Figure 5.3). Both figures lead to similar conclusions, but in different ways: the sequence frequency plot displays the individual sequences by their frequency, while the second figure displays aggregated descriptive statistics.

Figure 5.2 points out two key findings. Firstly, stability in the same employment status is the most common form of trajectory for both men and women (blocks of uniform colours). Secondly, consistent with previous research conducted by Erhel et al. (2014) and with Figure 5.1, the main gender differences are related to the incidence of inactivity and part-time employment, both states being more frequent

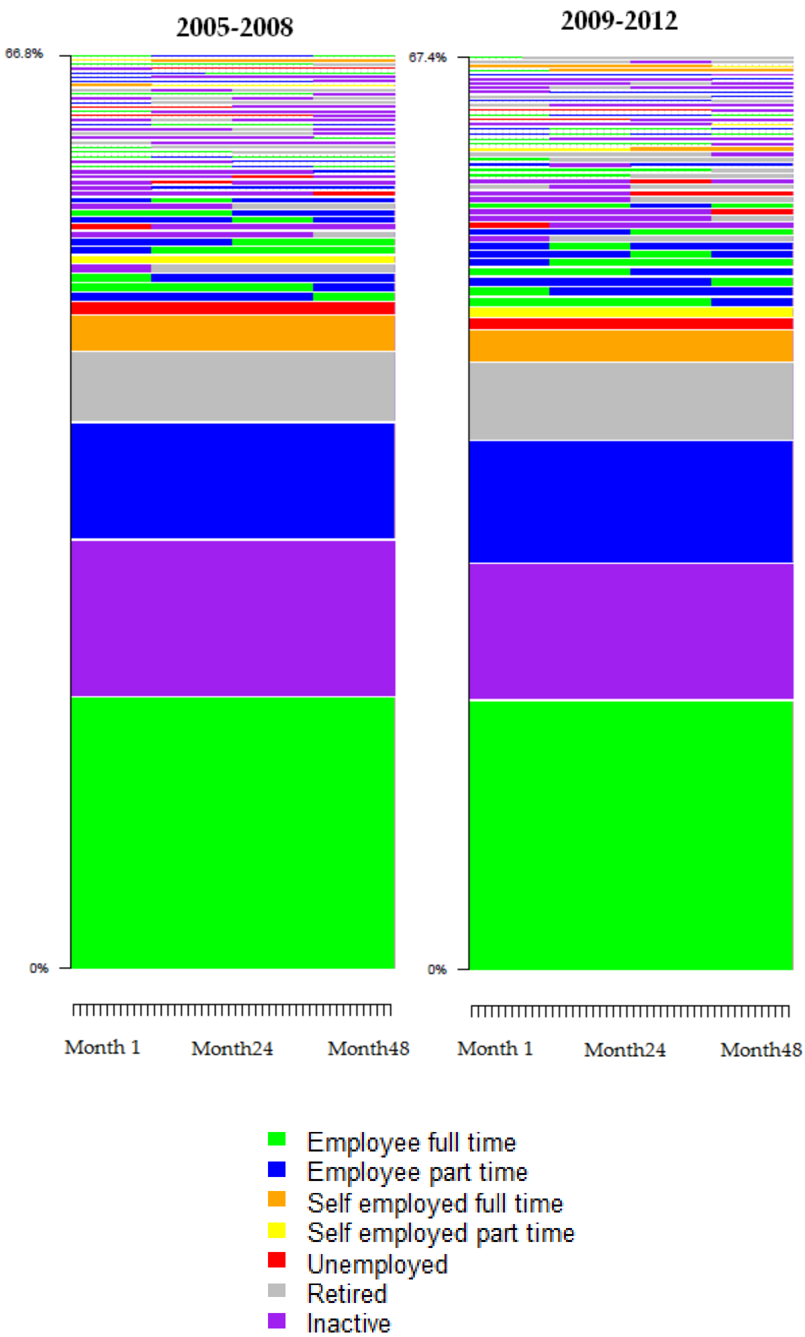
[83] The state distribution plots by gender, age and education across time are included in Appendix C (Figures 1, 2 and 4).

among women. Additionally, there is a clear male dominance in full-time employment, both dependent and self-employment. Although stability in full-time employment is the most prevalent sequence in both men and women, it registers completely different proportions based on gender. In fact, almost one out of two male trajectories appears stable in full-time employment (graphed in green), this percentage decreases by 2.5 percentage points after the start of the crisis, compared to 23% among women during both periods. The second most frequent trajectory for men is full-time self-employment (orange), which accounts for 10.4% in 2005-2008 and 8.7% in 2009-2012, compared to 3% for women, consistent with Hipp et al. (2015).

**Figure 5.2 – Most frequent sequences (50) by gender, 2005-2008 & 2009-2012**



Women

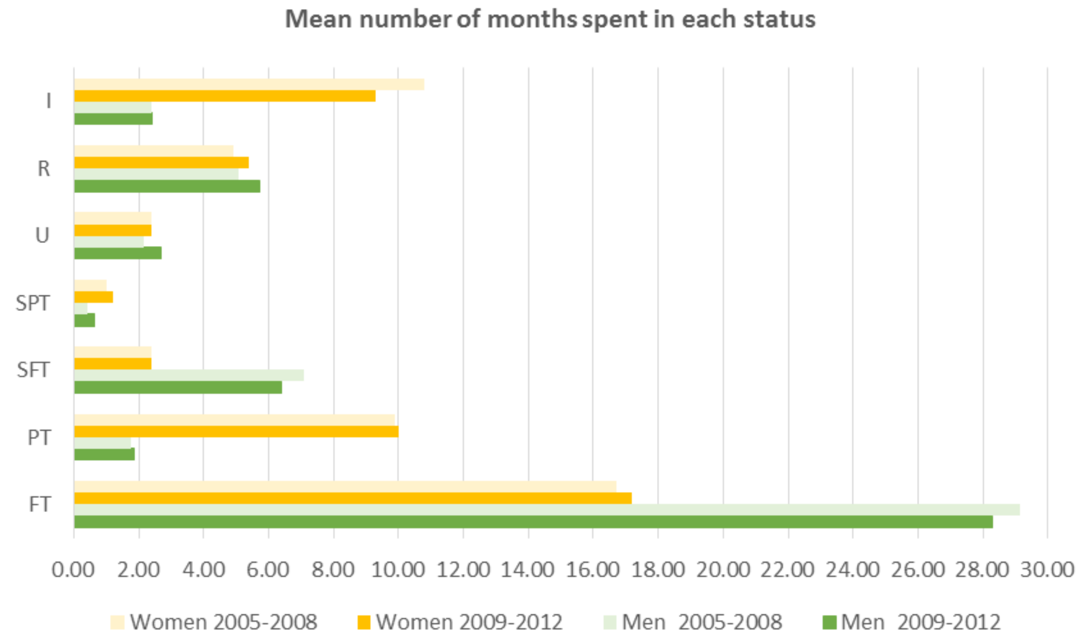



Source: EU-SILC 2005-2008 and 2009-2012

Notably stability in inactivity (purple) is the second most frequent trajectory among women, registering 14% during 2005-2008 and a decrease after the start of the crisis (11.5%). Indeed confirming the added worker effect and in accordance with Hypothesis 2.1, women during the crisis need to enter the labour force in order to financially contribute to their household income (Sabarwal et al. 2010: Karamessini 2014b.). According to Rubery and Rafferty (2014), women trying to integrate in the labour market, often accept non-standard job positions. In fact, stability in part-time employment is the third most common trajectory between women (10% in both periods), compared to only 1% for men. Interestingly, women are not more likely compared to men to experience persistent unemployment (Vaughan-Whitehead 2011; Erhel et al. 2014). Persistent unemployment (persistent during the whole duration of the panel, i.e. for 4 consecutive years) is the sixth most common trajectory for both men and women and accounts for less than 1.5% for both genders. Although I would expect men to experience more unemployment spells during the years of the crisis because men-dominated sectors of employment (industry and construction) were badly hit by the crisis (Arpaia and Cruci 2010), in 2009-2012, men register only a very slight increase in this status (from 0.8% to 1.1%). Finally, part-time self-employment accounts overall for less than 1% for both genders, but appears to be more frequent among women, especially during the financial downturn (in 2009-2012 women register 0.65% in part-time self-employment against a 0.3% of men).

When focusing on the sequences with at least one transition between labour market states, there are still gender dissimilarities. In detail, the most common transition among men across time is between full-time employment and full-time self-employment, followed by transitions between full and part-time employment. The differences in these transitions across time are very limited. Furthermore, men experience slightly more exclusionary transitions from full-time employment to unemployment during the years of the financial shock (from 0.1% to 0.6%). A possible explanation for this trend lies in the sectoral profile of the financial crisis (Erhel et al. 2014). On the other hand, 2.7% of women's most common sequences in 2009-2012 include more than two transitions (compared to 2.1% in 2005-2008 and to 1.8% for men in 2009-2012). The most common sequences with one transition consist of status changes between full-time and part-time employment. In 2009-2012, women register an increased proportion of sequences with numerous transitions between part-time (PT) and full-time (FT) jobs (e.g. PT/12months -> FT/12months -> PT/12 months -> FT/12 months), accounting for 1% in 2005-2008 and 1.6% in 2009-2012. Finally, in accordance with the added worker effect, I expect women to transit from inactivity to labour market activity during the years of the financial shock in order to contribute to the household income, especially when men are affected by the crisis. In fact, there are slightly more sequences from inactivity to unemployment, part-time employment or part-time self-employment in 2009-2012 (1.2%), when compared to the period before the crisis (0.8%), confirming Hypothesis 2.1.

**Figure 5.3 - Mean number of months spent in each labour market status (not necessarily consecutive) by gender, 2005-2008 & 2009-2012**



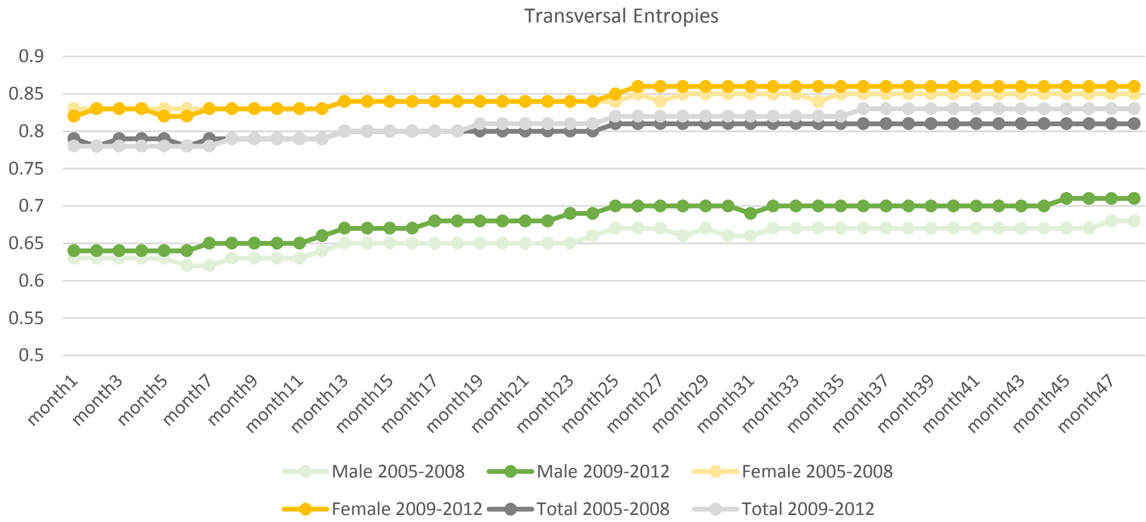

Source: EU-SILC 2005-2008 and 2009-2012

The study of the mean number of months spent in each labour market status gives insights on the aggregated data by gender (Figure 5.3). The gender gap regarding full-time employment is clearly evident: men spend on average 28-29 months in full-time employment (out of a total of 48), while women spend on average 17 months in this labour market status. After the start of the financial crisis a decrease in full-time employment for men (a month) and a slight increase for women (half month) are observed. Clearly, part-time employment has a female connotation. In fact, women spend on average 10 months in part-time jobs, while men less than two months. Self-employment is substantially more frequent among men. Men spend on average 6-7 months in self-employment, while women almost 2 months. Interestingly, considering only part-time self-employment, it is more prevalent among women (1-1.2 months for women versus almost half month for men). Men spend on average less than three months in inactivity, while women spend between 9 and 11 months in this state. However, women appear to spend on average one month and a half less in inactivity after the start of the crisis, in line with the theory of added worker. Women spend on average 2.4 months in unemployment during both periods, while men register a slight increase in unemployment during 2009-2012 (from 2.2 to 2.7 months).

#### Entropy and Turbulence of Gendered Employment Sequences

When measuring the transversal entropy (a cross-sectional measure of diversity between sequences/individuals, see Chapter 4, section 4.2 for details) of the state distributions of men and women across time, women demonstrate a measure of heterogeneity between their sequences above the average, while men are placed significantly below the average values (Figure 5.4), indicating that men present more uniform and easier to predict sequences compared to women. After the start of the financial crisis, the sequence diversity appears higher especially for men, indicating more heterogeneous sequences during the crisis. Women show their highest value of transversal entropy (equals to 0.86) between 2010 and 2012, indicating more diverse and unpredictable trajectories during the second phase of the crisis, a phase that found women in need to contribute to their household income.

**Figure 5.4 - Transversal entropy index by gender, 2005-2008 & 2009-2012**




Source: EU-SILC 2005-2008 and 2009-2012
Note: Entropy=0 when all sequences are in the same status; Entropy=1 when sequences are equally distributed in all possible states.

Table 5.1 highlights that women's labour market sequences register higher values of within-sequence heterogeneity (longitudinal entropy) and turbulence, indicating more fragmented sequences including more labour market states compared to men. During 2009-2012, women present a slight increase in the entropy index, while both women and men present an increase in the turbulence index (less that one point), slightly higher among men. Taking into account the number of transitions included in the sequences, the trajectories overall appear to be rather stable: more than half of the trajectories (67-68% of men; 57-58% of women) include zero transitions, indicating stability in one's labour market status. Nonetheless, women experience more transitions than men.

**Table 5.1 – Sequence indicators by gender, 2005-2008 & 2009-2012**

| Indicators | Men | | Women | | Total | |
|---|---|---|---|---|---|---|
| | **2005-2008** | **2009-2012** | **2005-2008** | **2009-2012** | **2005-2008** | **2009-2012** |
| Entropy | 0.100 | 0.105 | 0.136 | 0.142 | 0.119 | 0.124 |
| Turbulence | 2.625 | 2.704 | 3.134 | 3.182 | 2.890 | 2.955 |
| Number of transitions | | | | | | |
| 0 | 67.9 | 66.8 | 58.1 | 57.3 | 62.8 | 61.8 |
| 1 | 13.1 | 14.2 | 17.3 | 18.7 | 15.3 | 16.6 |
| 2 | 9.5 | 9.5 | 11.7 | 12.2 | 10.6 | 10.9 |
| 3 | 4 | 3.7 | 5.8 | 5.4 | 4.9 | 4.6 |
| 4 | 1.9 | 2.4 | 2.8 | 2.8 | 2.4 | 2.6 |
| 5 | 1.1 | 1.2 | 1.4 | 1.4 | 1.3 | 1.3 |
| 6 | 0.9 | 0.7 | 1 | 0.9 | 0.9 | 0.8 |
| 7 | 0.5 | 0.6 | 0.6 | 0.4 | 0.6 | 0.5 |
| 8 | 0.4 | 0.4 | 0.5 | 0.3 | 0.5 | 0.4 |
| 9 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 |
| Ten or more | 0.5 | 0.3 | 0.5 | 0.2 | 0.5 | 0.3 |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** |

Source: EU-SILC 2005-2008 and 2009-2012

### 5.1.2 Gendered Labour Market Sequences in 11 European Countries across Time

The focus of this section is on the gender differences across eleven European countries assuming that the national patterns of gendered employment trajectories are veiled when studying the overall aggregated European image of the labour market sequences. Although I study each European country separately, I present the results in country groups as defined by Anxo et al. (2007). The classification is based on female labour market participation rates and distinguishes the European countries in four groups:

- Universal breadwinner countries (Sweden, Denmark and Finland) supporting gender equality in their labour markets (high employment rates for both men and women). These countries are known for their egalitarian policies that protect and promote female employment (Stadelmann-Steffen 2008);
- Modified breadwinner countries (France, Belgium and Austria) where women starting a family either reduce their working hours or move towards inactivity;

- ‘Exit or full-time’ countries (Greece, Italy and Portugal) where women exit in inactivity and men work full-time. These countries are known for high shares of female inactivity due to a lack of work-family policies that allow a successful combination of work and family-related tasks, such as public provision of childcare (Boeckmann et al. 2015). Men in these countries are expected to be primarily in full-time employment even during a period of economic hardship;
- Part-time countries (Netherlands and the UK) where women adjust their working schedules based on their needs transitioning between full and part-time jobs.

Based on the above classification, I expect women in disadvantaged labour markets, such as those in the ‘exit or full-time’ countries, to register a high incidence of inactivity and be even more disadvantaged during the financial crisis. On the other hand, I expect women to experience more stable trajectories with a dominance of employment in the universal breadwinner countries, where gender inequalities are expected to be rather low even during the crisis. Finally, in the modified breadwinner countries and in the part-time countries I expect a frequent use of female part-time employment during the crisis as a shock absorber (**Hypothesis 2.2**).

#### Gender Division of Occupational Trajectories in Eleven Countries

Using the cluster distribution[84] (described in Chapter 4, section 4.2.1), women’s occupational trajectories are compared to those of men by country (Figure 5.5). In the previous section, sharp gender inequalities have been witnessed regarding individual labour market sequences, with women being clearly in disadvantage, registering lower frequency of full-time employment and full-time self-employment

[84] For the detailed composition of the labour market clusters by gender, age, education and country across time, see Tables 1-2 in Appendix C.

and higher frequency of part-time employment and inactivity. Part-time employment is considered as an indication of disadvantage when it represents the only way for women of participating in the labour force, especially when having family responsibilities and it is often expressed as involuntary (see Chapter 4, section 4.1.3). In some countries, especially those with high quality part-time contracts, part-time employment may be a choice made mostly by women with young children (Booth and Van Ours 2013). Furthermore, being employed part-time may represent a bridge towards full-time employment (like in Sweden) or a more permanent job position (Booth and Van Ours 2013).

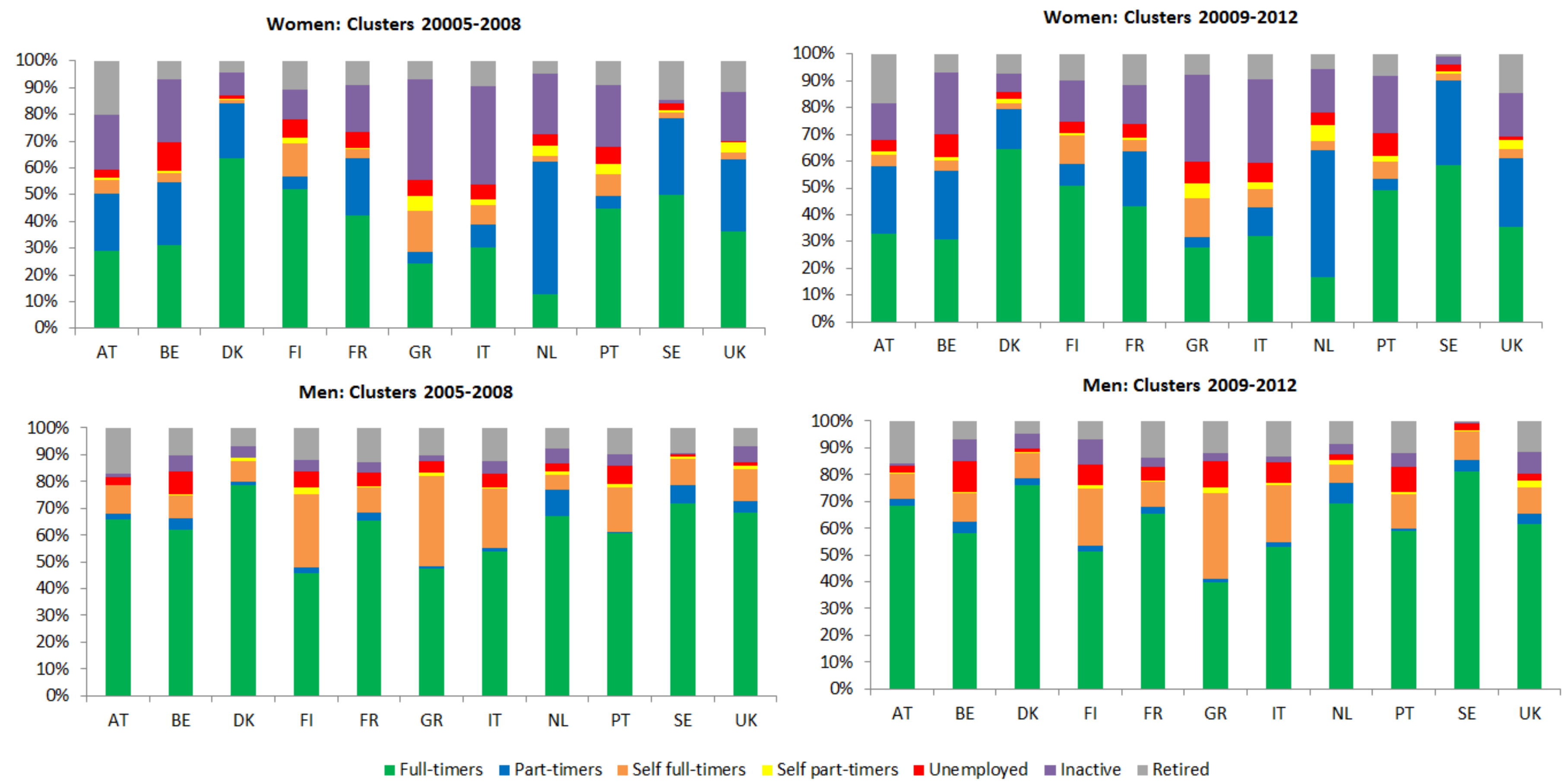
Firstly, I investigate the gender gap regarding the full-time employment cluster. In 2005-2008, the most equal labour markets (with the lowest gender disparities) regarding this cluster are the Finnish (52% of women versus 46% of men), followed by the Danish and the Portuguese (Figure 5.5). The largest gender gap belongs to the Netherlands with more than 50 percentage points of difference between men and women in the specific cluster (13% of women versus 67% of men). However, almost half of the Dutch women in analysis are in the part-time employment cluster. Austria, Belgium and the UK also register noticeable gender gaps (around 30-37 percentage points of difference between men and women). Furthermore, from section 5.1.1 emerged that besides full-time dependent employment, also full-time self-employment is more common among men. Indeed, the biggest differences between the shares of men and women in the full-time self-employment cluster are in Greece (35% of men versus 15% of women), Finland (28% of men versus 12% of women), Italy (22% versus 8% of women) and Portugal (17% versus 8% of women); all countries with an extensive use of full-time self-employment as anticipated in Chapter 4. The above results confirm the similarities emerged in Chapter 4 between Finland and the southern European countries regarding the use of this form of employment.

Part-time employment is substantially more frequent among women and its use is particularly popular in the Netherlands, followed by Sweden and the UK (Chapter 4). Indeed, Figure 5.5 shows that in 2005-2008 one out of two Dutch women are in the part-time employment cluster (in blue), followed by Swedish women (29%) and British women (27%). Between 20-23% of women are in the same cluster in the continental countries Belgium, France, Austria, with the addition of Denmark, while this form of employment is not common among Greek, Finnish, Portuguese and Italian women (overall less than 8%). Men register proportions lower than 5% in the part-time employment cluster, with the exception of the Netherlands (9.7%) and Sweden (6.7%). Finally, the part-time self-employment cluster, one of the clusters including the most fragmented labour market sequences, is not highly populated in the sample, although in some countries is slightly more frequent, especially among women in Greece (5.5%), followed by women in the UK, the Netherlands and Portugal (all at 4%).

Focusing on the non-employment clusters, as expected, Greece and Italy show the highest share of women in the inactivity cluster: 37-38% compared to less than 5% of men in 2005-2008. During the same period, the lowest share of female inactivity corresponds to Sweden (1.5%) and Denmark (8.2%), while the highest share of men in the inactive cluster is registered by Belgium (6.2%), the UK (6.2%) and the Netherlands (5.4%). The unemployment cluster, including turbulent and fragmented sequences, does not register substantial gender differences, with the exception of Belgium, where women appear more frequently in this cluster compared to men (respectively 11% versus 8%). In 2009-2012, as seen in the previous section, women experience a decrease in the inactive cluster and a slight increase in the full-time employment, while men a decrease in the standard employment cluster and a slight increase in the turbulent unemployment cluster. The question addressed here focuses on whether this pattern is country-specific or is evident in all the European countries in analysis. The answer is that during the years of the economic crisis (2009-2012), the pattern for men and women's cluster composition is confirmed in almost all the countries of analysis, with few exceptions discussed below.

After the start of the Great recession, the gender disparities regarding the full-time employment cluster appear more contained in all the countries of analysis, excluding Sweden where the gap slightly increases and Finland where there are no significant differences observed across time (Figure 5.5). The explanation for the less pronounced gender gap regarding full-time employment during the crisis lies in the increase in the female share in this cluster in most countries (except for Belgium, Finland and the UK) and the decrease in the male share in this cluster in most countries (except for Austria, Sweden and the Netherlands). In detail, the most significant decrease in men's full-time employment cluster is observed in Greece (-8 percentage points) and the UK (-7%), while the sharpest increase in female full-time employment occurs in Sweden (+8.6%). Focusing on the non-employment clusters during 2009-2012, the inactive cluster among women decreases in all the countries of analysis, except for Finland (+4.6%) and Sweden (+1.6%). The most noticeable decrease in female inactivity takes place in Austria (-6.8%), the Netherlands (-6.2%), Italy (-5.7%) and Greece (-5.5%). Male unemployment increases during the crisis in all the countries, except for Austria and the Netherlands. In particular, the increase is more significant in Greece (+5%), Italy and Belgium (both at +3%), consistent with Erhel et al. (2014).

**Figure 5.5 – Labour market clusters by gender and country (%), 2005-2008 & 2009-2012**



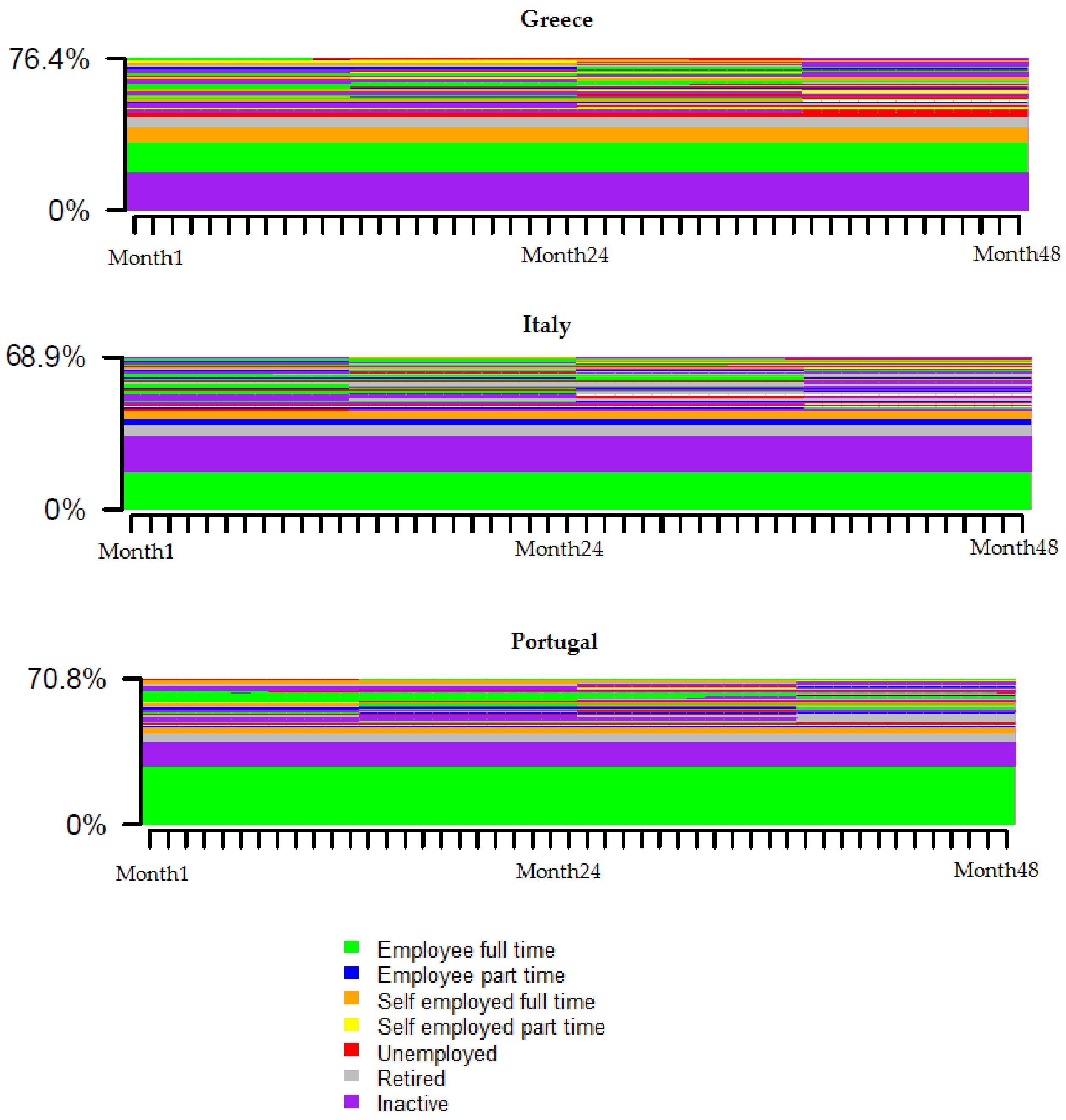

Source: EU-SILC 2005-2008 and 2009-2012

### 5.1.3 Women's Labour Market Sequences during the Great Recession

Figures 5.6-5.9, presenting the most frequent sequences of women during the crisis, confirm the heterogeneity across European countries regarding women's sequences. As anticipated, in all the countries, the most frequent trajectory includes stability in full-time employment, except for two countries: Greece (Figure 5.6) where the most frequent trajectory consists of persistent inactivity and the Netherlands with high prevalence in stable part-time employment (Figure 5.9). The Scandinavian countries (mostly Denmark), together with Portugal and France demonstrate the highest proportions of stability in female full-time employment. A substantial heterogeneity regarding female inactivity (in purple) emerges from the figures below. Women in Scandinavian countries – Sweden, Finland and Denmark, have the lowest frequency of inactivity, while Greece registers worryingly high shares of female inactivity (23%) persistent across the four panel years, followed by Italy (19%) and Belgium (17%).

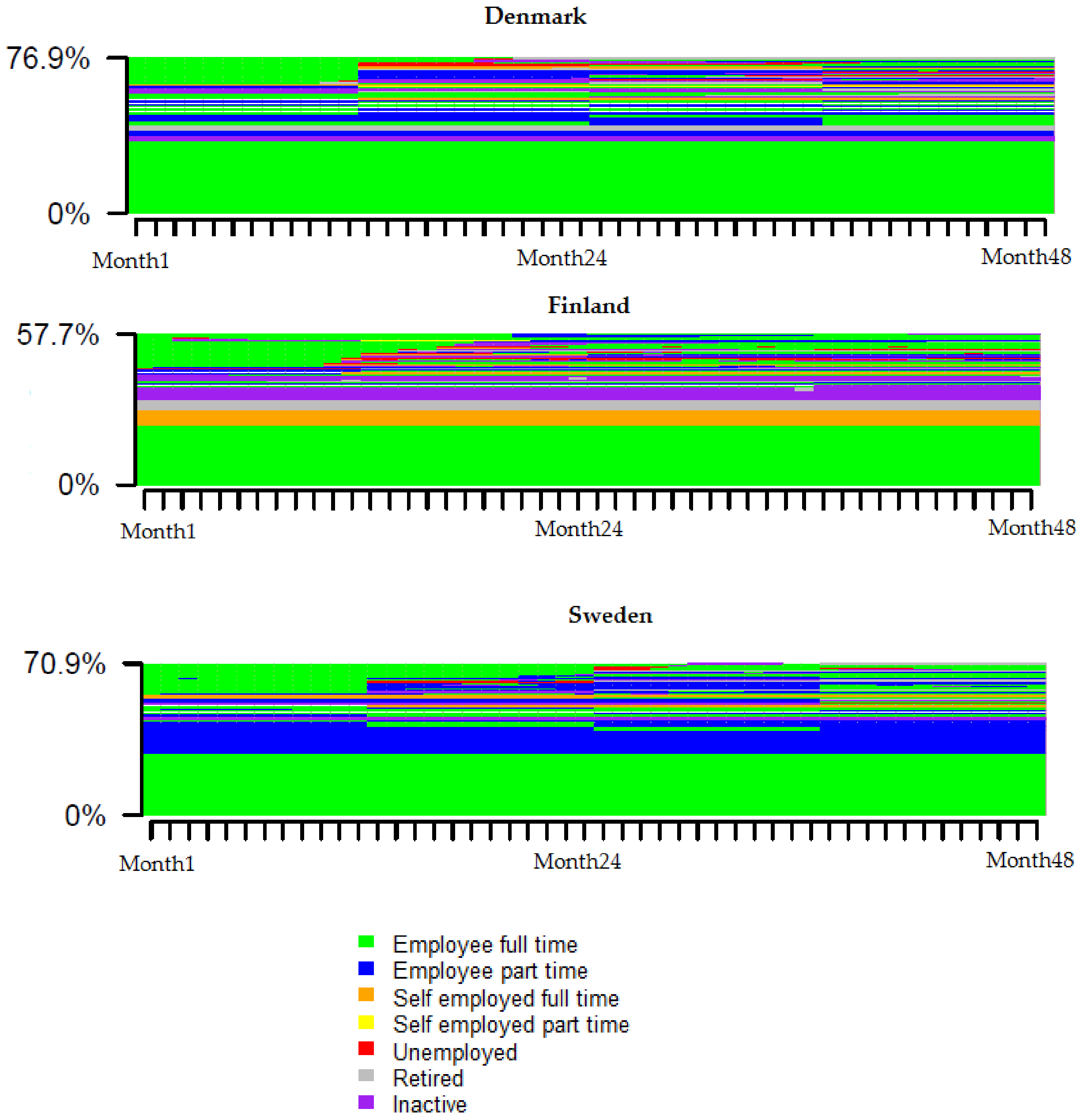
Part-time employment trajectories appear more common among the Dutch, British, Swedish, French and Belgian women. Greece and Italy register rather low female stable part-time employment trajectories and high share of female inactivity, while stable full-time self-employment is relatively frequent in Greece (9%) and Finland (7%). Maintenance transitions, i.e. transitions between different forms of employment, and especially between different working time regimes, are predominantly seen in countries with flexible labour markets and in particular among the British, Swedish, Danish, Dutch and French women. The exclusionary transition from full-time employment to unemployment is seen in only 2% of the Greek women during the crisis (the highest proportion compared to all the other countries in the analysis).

**Figure 5.6 – Most frequent sequences (50) of women – 'Exit or Full-time' countries, 2009-2012**



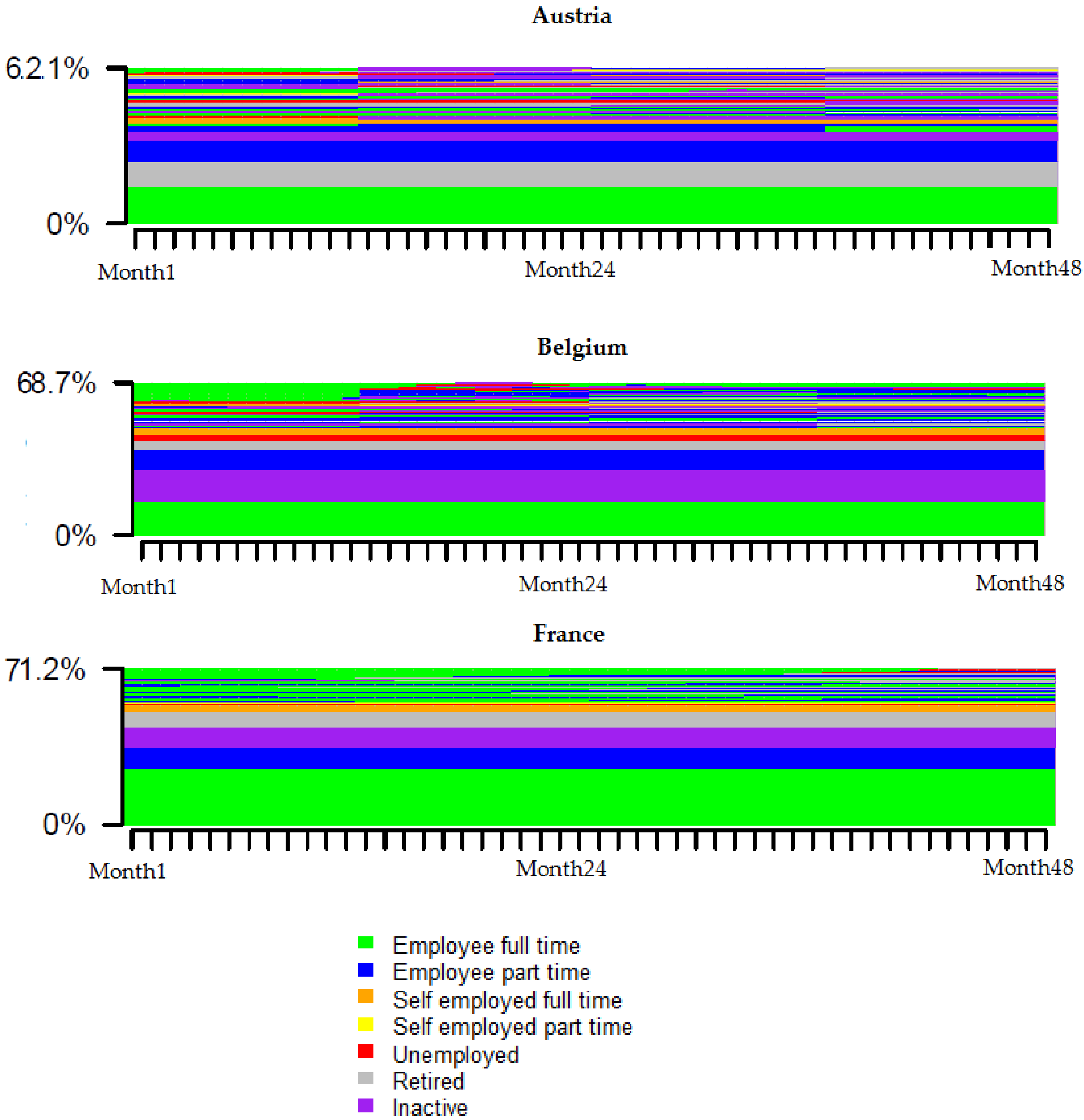

Source: EU-SILC 2009-2012

**Figure 5.7 – Most frequent sequences (50) of women – Universal breadwinner countries, 2009-2012**



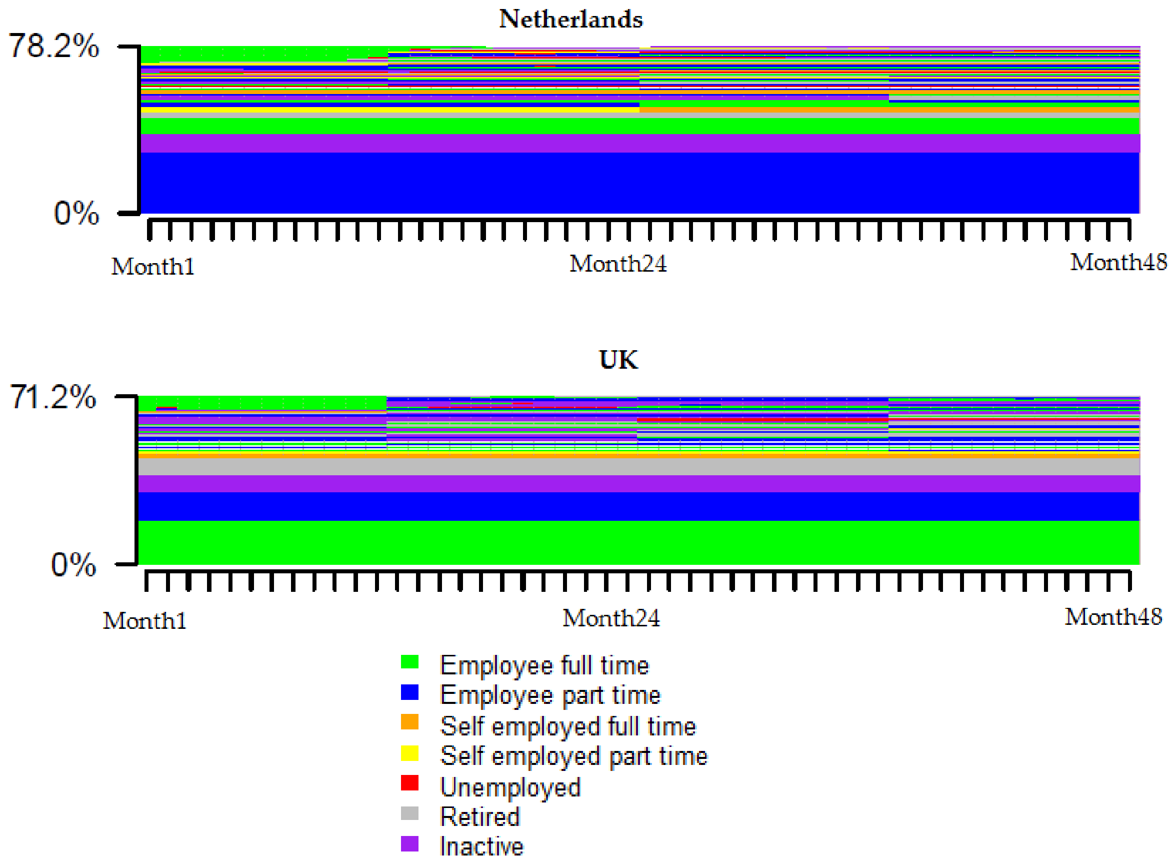

Source: EU-SILC 2009-2012

**Figure 5.8 – Most frequent sequences (50) of women – Modified breadwinner countries, 2009-2012**




Source: EU-SILC 2009-2012

**Figure 5.9 – Most frequent sequences (50) of women – Part-time countries, 2009-2012**




Source: EU-SILC 2009-2012

In essence, the most evident finding from the above figures is a strong country heterogeneity concerning women's labour market sequences during the crisis. Every country presents different patterns and for different reasons, such as different institutional policies and different social services (public childcare provision, etc.). The country classification suggested by Anxo et al. (2007) cannot be endorsed given the dissimilarities between countries belonging to the same group. In detail, France offers high chances of full-time employment to women, more similar to the Scandinavian countries, than to Belgium, which presents a higher share of female non-employment. Indeed, Mutari and Figart (2001) classify France, based on work-time regimes, together with Denmark as highly equal labour markets. Furthermore, Portugal shows a higher share of full-time employment and a lower share of female inactivity compared to Italy and Greece, while Finland shows some similarities with Italy and Greece regarding the use of full-time self-employment and inactivity. Italy and Greece also differ, with the female standard employment being more frequent in Italy compared to Greece. Finally, among the countries with a high incidence of (female) part-time jobs, besides the Netherlands and the UK, I would also add Sweden.

Summing up, Hypothesis 2.2 can be confirmed only partially. Female inactivity is significantly high in Greece and Italy, whereas not so much in Portugal. After the start of the crisis, Greek and Italian women transit towards employment instead of showing an increase in inactivity as was expected. The part of the hypothesis regarding the Scandinavian countries can be confirmed, since I observe stable sequences in full-time employment among women both before and during the financial crisis together with low gender employment inequalities. Finally, Belgium, Austria, France, the UK and the Netherlands, together with Sweden, have the highest shares of female part-time employment during 2005-2008. During 2009-2012, only Austria and Belgium show an increase in this form of employment among women, together with Finland, Sweden and Italy.

## 5.2 The Disproportionate Effects of the Crisis on Different Age Groups

The focus of this section is on the effects of the Great recession on European workers of different age groups. The purpose is to identify the labour market patterns of different age group workers across European countries and to explore whether these patterns have changed during the years of the financial crisis and whether a specific age group has been more affected by the financial shock compared to the rest. The sample of analysis has been divided in three age groups: the younger group aged between 25 and 34 years old, the core labour force between 35 and 54 years old, and the older group between 55 and 64 years old, in accordance with Eurostat's age division and numerous studies (among others: Hanushek et al. 2011; Koster and Fleischmann 2012; Ward-Warmedinger and Macchiarelli 2014 - for more details see section 3.2.2 in Chapter 3). As anticipated in Chapter 3, age is defined based on the first year of each panel, i.e. the age of the respondent in 2005 and in 2009.

According to the labour market segmentation theory, younger workers are often in disadvantage in the labour market compared to the core workers (35-54 years old), being part of the secondary employment segment (Piore 1971), while according to the TLMs approach, youth is in disadvantage because they are more affected by non-standard and less secure forms of employment, due to their lack of job experience (job competition theory) and their need for costly training (among others: ECB 2012; Leschke 2012; Hipp et al. 2015). Moreover, numerous studies have shown that young workers were disproportionately affected by the effects of the recession on the labour markets (Bell and Blanchflower 2011; Borghi 2012; Madsen et al. 2013; Erhel et al. 2014). Indeed, based on the concept of TLMs and particularly in the labour market risks identified by Schmid (2006), as well as in the job competition theory, young people (25-34 years old) should experience more turbulent and fragmented labour market trajectories with more unemployment spells (principle of 'last in- first out' discussed in Chapter 2) and a higher incidence of non-standard forms of employment (here part-time and self-employment), especially between 2009 and 2012 (**Hypothesis 2.3**).

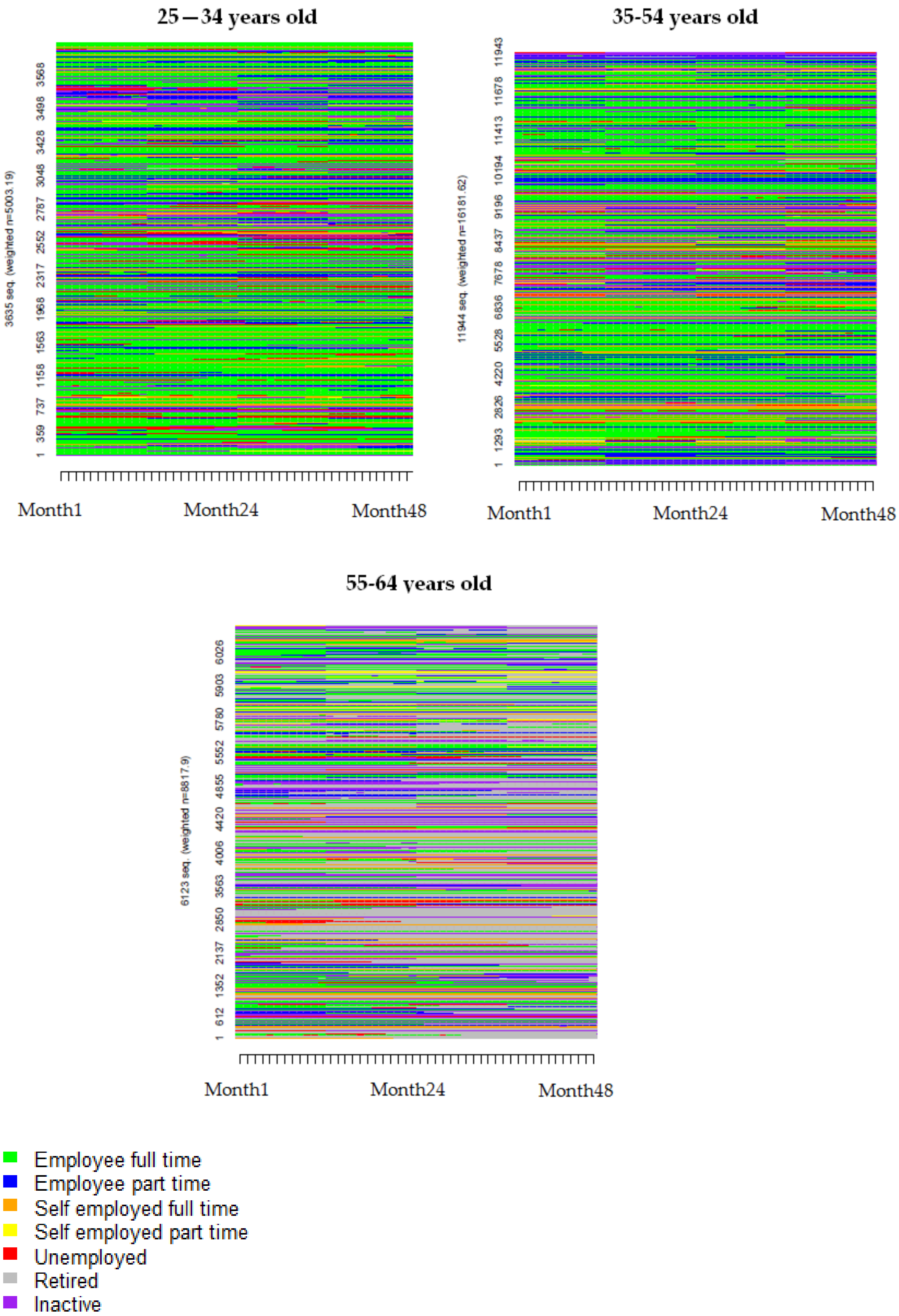
Furthermore, according to the theory of job mobility, older workers are more likely to get promoted and remain in a stable job with upward career mobility opportunities and, in accordance with previous studies, workers aged between 55 and 64 years old were not hit as hard by the recession as it was expected from previous crises, but still were not unaffected (Barakat et al. 2010; Vaughan-

Whitehead 2011; Borghi 2012; ECB 2012). Based on this pattern, I expect older workers to be less affected by the crisis, especially when compared to young people.

### 5.2.1 Employment Trajectories across Time and Age Groups in Europe

A first glance in Figure 5.10, underlines that the greener sequences during the financial crisis belong to the young and core workers, indicating a higher incidence of full-time employment among workers between 25 and 54 years old. Based on Hypothesis 2.3, I would expect a higher incidence of unemployment (graphed in red) among the 25-34 years old people, who however show a high prevalence of full-time employment, in line with Ward-Warmedinger and Macchiarelli (2014) findings. Interestingly, the sequences of young people in the sample are overall in Europe similar to the core labour force sequences. A possible explanation might lie in the choice of age groups, probably if I would study the younger group between 18-25 years old, I would be able to detect different labour market sequences compared to the other age groups, but that would not be consistent with my research aims.

**Figure 5.10 – Sequence index plots by age group, 2009-2012**



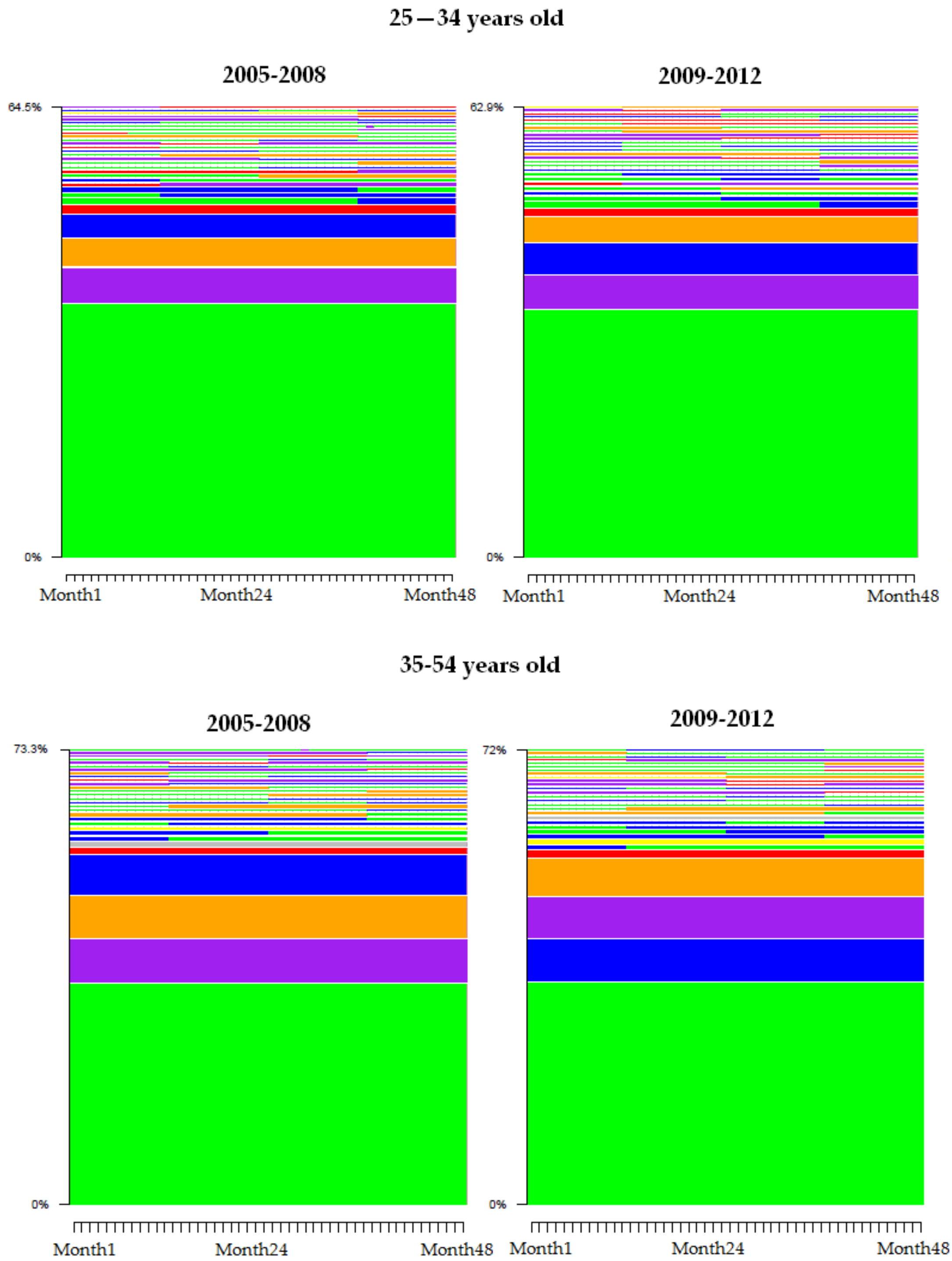

Source: EU-SILC 2009-2012

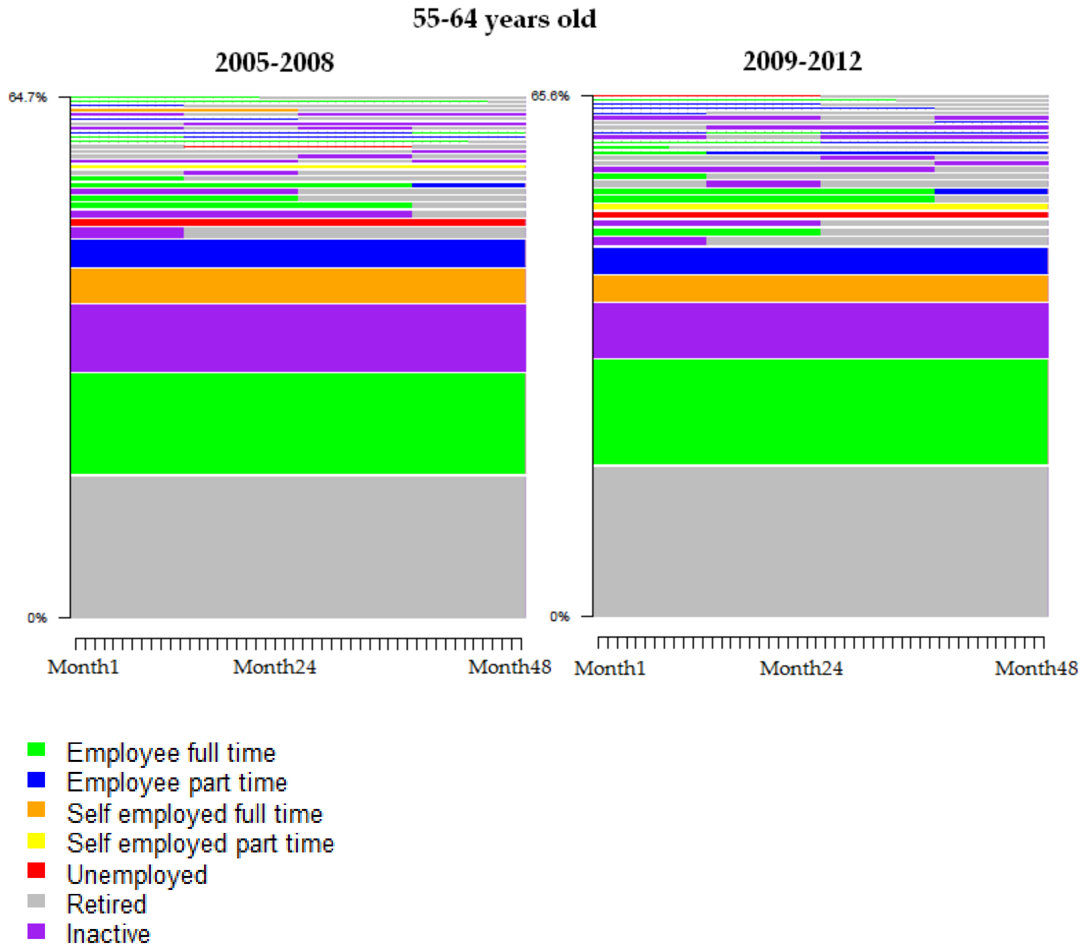
With the aid of more detailed graphs, I study the labour market sequences of different age groups across time to assess whether they appear different after the start of the crisis and how they differ between age groups. It is clear from Figure 5.11 that labour market trajectories differ substantially among age groups. However, the main difference is among people aged between 25-54 years old (young and core workers) and the older group (55-64 years old). Indeed, one of the first conclusions drawn from the sequence frequency plots (Figure 5.11) is that stability in full-time employment (green) is significantly less frequent among people aged 55-64 (15% against around 40% of the other two groups), who, not surprisingly, present a prevalence of retirement (grey; 20% of the sequences). Moreover, core workers register the same frequency of full-time employment as the younger group (43% versus 42%), but, at the same time, a higher frequency of full-time self-employment (8% versus 5% respectively) and of part-time employment (respectively 7% versus 4%). Finally, older workers register the highest share of persistent inactivity (in purple; 10% compared to 8% of the core workers and 6% of the younger workers), consistent with Erhel et al. (2014) finding. Focusing on the trajectories including at least one transition, the first two age groups register numerous transitions between full and part-time employment, while older people towards retirement[85].

*Are these patterns different after the start of the financial crisis*? Figure 5.11 does not outline any substantial differences across time for any age group. Although workers between 25 and 54 years old register a decrease in full-time dependent employment in 2009-2012 (-2%), older workers show a slight increase in the same state (+1%), which may be connected to a reduction in retirement savings or fewer opportunities for early retirement (Borghi 2012, p. 6). Finally, young workers show a slight increase in part-time employment (+1%).

[85] Very similar results are obtained from the study of the mean number of months spent in each labour market status across time and divided by age groups (Figure 3 in Appendix C).

**Figure 5.11 – Most frequent sequences (30) by age group, 2005-2008 & 2009-2012**



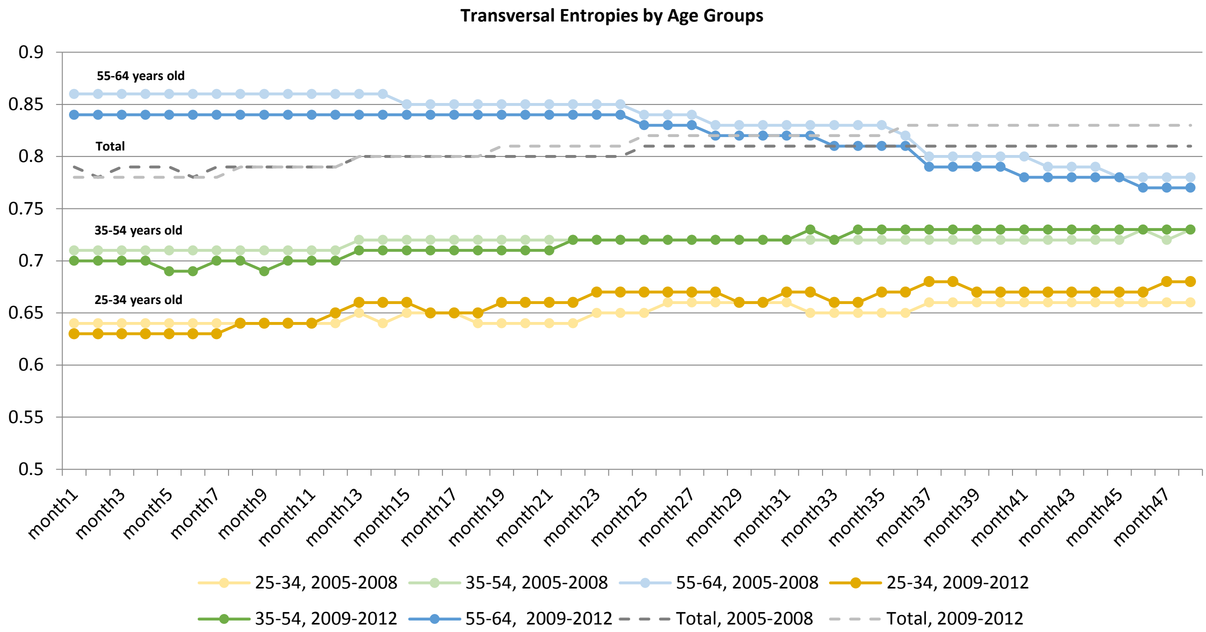



Source: EU-SILC 2005-2008 and 2009-2012

**Entropy and Turbulence of Employment Sequences by Age Groups**

Figure 5.12, displaying the transversal entropy of the sequences (the heterogeneity between sequences), shows that older workers register a higher entropy index and thus more unpredictable sequences compared to the other two groups. Not surprisingly, the transversal entropy of older workers decreases with age, when people transit permanently to retirement. In other words, the lower the age is, the more uniform and predictable the sequences, including prevalently stable full-time employment. After the start of the crisis, the more pronounced increase in the index belongs to young people, indicating more unpredictable and heterogeneous sequences during the years of the economic shock.

**Figure 5.12 - Transversal entropy by age group, 2005-2008 & 2009-2012**




Source: EU-SILC 2005-2008 and 2009-2012
Note: Entropy=0 when all sequences are in the same status; Entropy=1 when sequences are equally distributed in all possible states.

Based on Table 5.2, core workers, between 35 and 54 years old, present the lowest value of longitudinal entropy, i.e. of within-sequence heterogeneity, indicating fewer labour market states within their sequences or else less fragmented sequences, with more than 65% of the sequences including zero transitions. On the other hand, young people experience on average the most turbulent trajectories, especially during 2009-2012, as well as the highest within-sequence heterogeneity in 2009-2012. In essence, young people during the financial crisis experience the most fragmented (entropy index) and turbulent labour market sequences, as well as unstable (number of transitions), confirming part of Hypothesis 2.3. The highest share of sequences including one transition corresponds to older workers, indicating the transition towards retirement[86].

[86] This conclusion is drawn from the state distribution plot included in Figure 2 in Appendix C.

**Table 5.2 – Sequence indicators by age group, 2005-2008 & 2009-2012**

| Indicators | 25-34 | | 35-54 | | 55-64 | | Total | |
|---|---|---|---|---|---|---|---|---|
| | 2005-2008 | 2009-2012 | 2005-2008 | 2009-2012 | 2005-2008 | 2009-2012 | 2005-2008 | 2009-2012 |
| Entropy | 0.139 | 0.147 | 0.102 | 0.111 | 0.141 | 0.137 | 0.119 | 0.124 |
| Turbulence | 3.182 | 3.299 | 2.679 | 2.789 | 3.144 | 3.076 | 2.890 | 2.955 |
| Number of transitions | | | | | | | | |
| 0 | 57.2 | 55.5 | 67.7 | 66.1 | 56 | 57.2 | 62.8 | 61.8 |
| 1 | 14.2 | 14 | 12.3 | 13.1 | 22.5 | 25 | 15.3 | 16.6 |
| 2 | 13.7 | 14.8 | 9.7 | 10.5 | 10.5 | 9.5 | 10.6 | 10.9 |
| 3 | 6.5 | 6 | 4.2 | 4.3 | 5.4 | 4.5 | 4.9 | 4.6 |
| 4 | 3.5 | 4 | 2.1 | 2.5 | 2.2 | 2 | 2.4 | 2.6 |
| 5 | 1.5 | 1.9 | 1.1 | 1.3 | 1.5 | 0.8 | 1.3 | 1.3 |
| 6 | 1.4 | 1.4 | 0.9 | 0.8 | 0.7 | 0.4 | 0.9 | 0.8 |
| 7 | 1 | 0.8 | 0.6 | 0.5 | 0.3 | 0.3 | 0.6 | 0.5 |
| 8 | 0.4 | 0.7 | 0.5 | 0.4 | 0.4 | 0.1 | 0.5 | 0.4 |
| 9 | 0.2 | 0.4 | 0.3 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 |
| Ten or more | 0.5 | 0.3 | 0.6 | 0.3 | 0.3 | 0.2 | 0.5 | 0.3 |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |

Source: EU-SILC 2005-2008 and 2009-2012

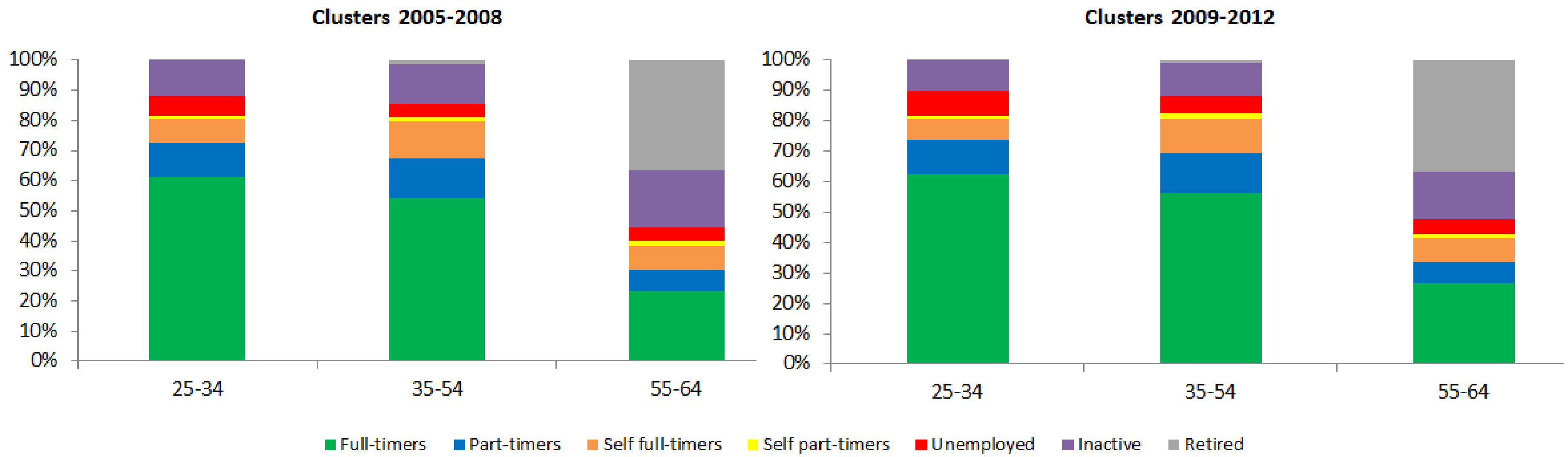
### 5.2.2 Gender Division of Occupational Trajectories by Age Groups

*Are younger workers more in non-standard forms of employment and unemployment during the financial crisis*? To test part of Hypothesis 2.3, the results of the cluster analysis are used. From the cluster distribution of sequences by age (Figure 5.13), the main conclusion drawn is that with the increase in age, membership in the full-time employment cluster (green) decreases significantly: this cluster accounts for 61-62% among young people, 54-56% among the core workers and 23-26% among the older people, who register a proportion of 36% in the retirement cluster. Moreover, the unemployment cluster (red) is more frequent among younger workers, while the inactive cluster (purple) increases with age.

Disaggregating these results by gender provides interesting insights (Figure 5.14). Indeed, the part-time employment cluster is significantly more frequent among the female core labour force (35-54 years old), when compared to men of all ages and to older women. Both young men and young women register the highest percentages in the unemployment cluster, especially after the start of the financial crisis, with younger men registering the highest increase (+2%), consistent with Barakat et al.

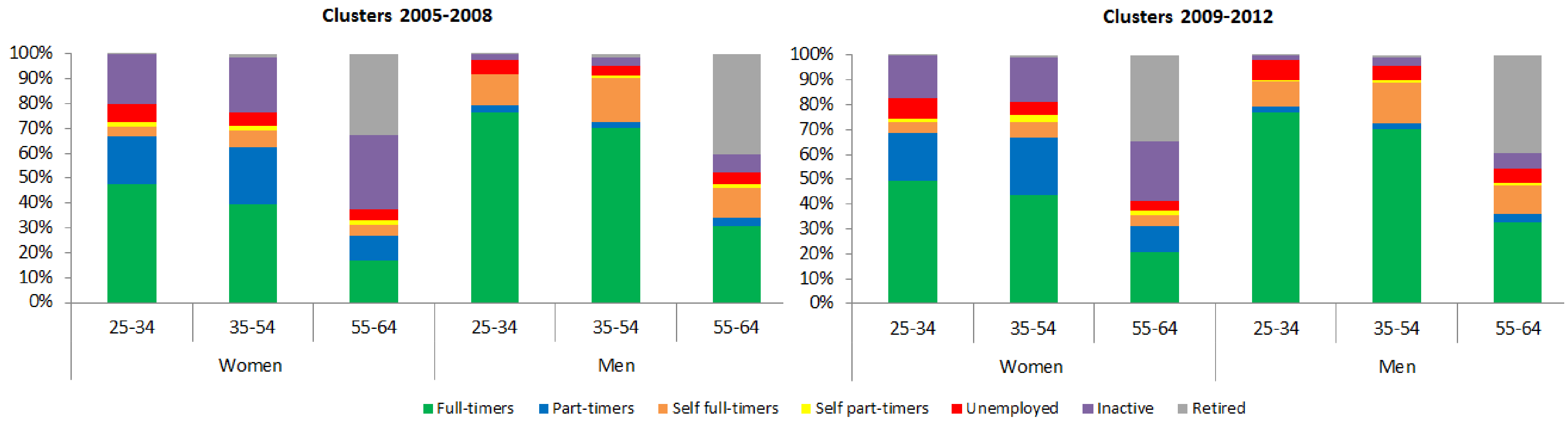
(2010). As anticipated in Chapter 4, overall inactivity decreases during the economic shock, especially among older women (-6%), followed by younger women (-2.6%). Summing up, younger workers reveal similar patterns to core workers (35-54 years old), with a prevalence in standard employment. Nevertheless, the unemployment cluster is more frequent among younger workers, especially in 2009-2012 for young men, confirming part of Hypothesis 2.3. Non-standard forms of employment dependent on the type: part-time dependent employment and part-time self-employment are more frequent among adult women, while full-time self-employment among adult men.

**Figure 5.13 – Bar chart of labour market clusters by age group (%), 2005-2008 & 2009-2012**




Source: EU-SILC 2005-2008 and 2009-2012

**Figure 5.14 – Bar chart of labour market clusters by gender and age group (%), 2005-2008 & 2009-2012**



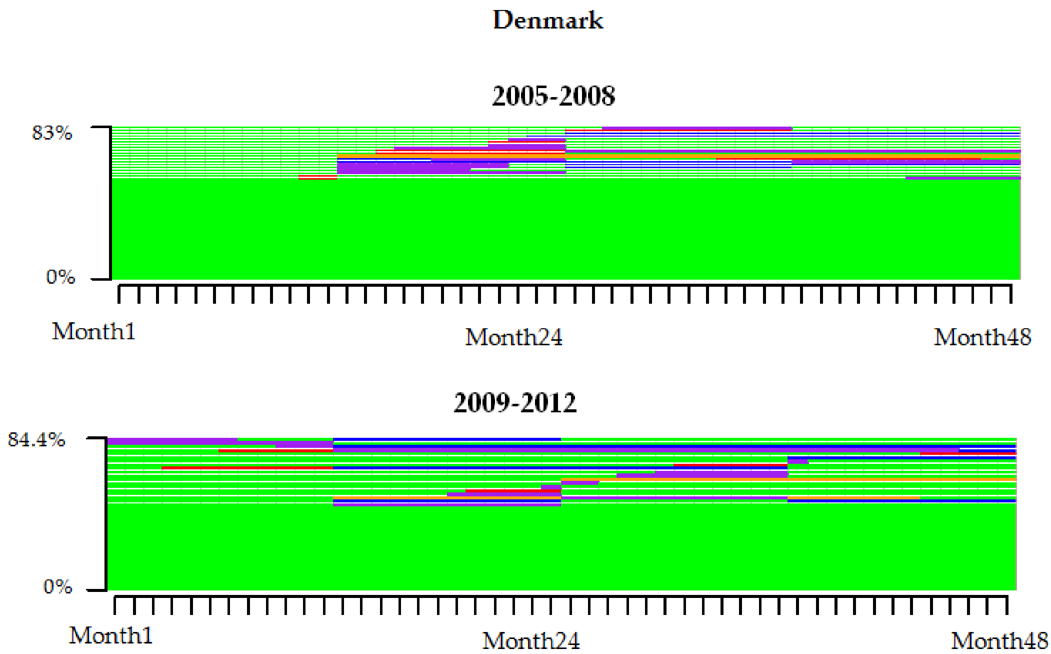

Source: EU-SILC 2005-2008 and 2009-2012

### 5.2.3 Young Workers across European Labour Markets

Studying the European patterns provides an overall idea of the employment trajectories of young, core and older workers across time, but no insights concerning the between countries dissimilarities. Based on Walther's classification (2006), flexible Universalistic Scandinavian countries and the Liberal UK are likely to show lower unemployment among young workers even during the economic crisis. On the other hand, Conservative (or else Employment-centred countries) and Sub-protective countries with rigid and highly segmented labour markets are expected to display higher youth unemployment rates, with the southern European countries among the worst performers regarding youth employment, especially during economic hardship (**Hypothesis 2.4**). To test this hypothesis, the analysis focuses on the labour market trajectories of younger people (25-34 years old) across countries. Although I study each country separately, the results are organised in the country groups defined by Walther (2006). Walther's classification is used because it is based on school-to-work transition regimes, which influence significantly young people's employment pathways (see Chapter 2, section 2.3.3). In detail, Walther (2006) distinguishes the European countries in four groups: Universalistic group (Scandinavian countries), Employment centred group (continental countries and the Netherlands), Liberal group (UK), Sub-protective group (southern European countries).

First and foremost, the sequence frequency plots in the following pages justify my decision to analyse each country separately and not aggregated in country groups (Figures 5.15-5.18). In fact, young people's sequences present substantial differences even between countries belonging to the same group. Focusing on the Universalistic countries, the frequency of stable full-time employment appears different among the three Scandinavian countries (Figure 5.15). In detail, in 2005-2008 the Danish youth sequences show the highest frequency[87] of stable full-time employment (64%), followed by Sweden (52%) and finally Finland (36%). All three countries demonstrate a decrease in full-time employment during 2009-2012, with the biggest decrease seen in Denmark (-11 percentage points). It is noteworthy the frequency in full-time self-employment observed among the Finnish youth (13% in 2005-2008 and 6% in 2009-2012) and in part-time employment among the Swedish youth (respectively 5.3% to 4%), both forms of employment not commonly seen in Denmark.

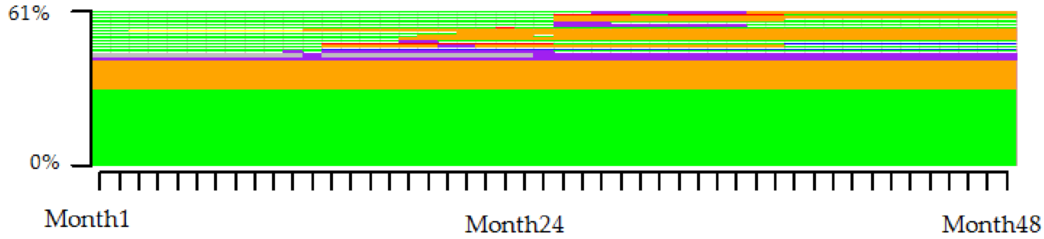
**Figure 5.15 – Most frequent sequences (20[88]) of young people (25-34 years old), Universalistic countries 2005-2008 & 2009-2012**



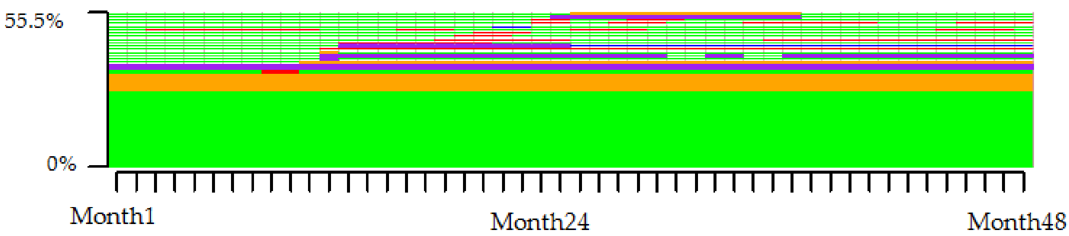

[87] In the x-axis of a sequence frequency plot the percentage of the most frequent sequences plotted is indicated and can be used as a guideline on how to read the graphs using precise percentages.
[88] I plot the 20 most frequent sequences by country because I want the plots to be as clear as possible. If I would plot more sequences then the lines (individual sequences) would be less visible.

**Finland**

**2005-2008**

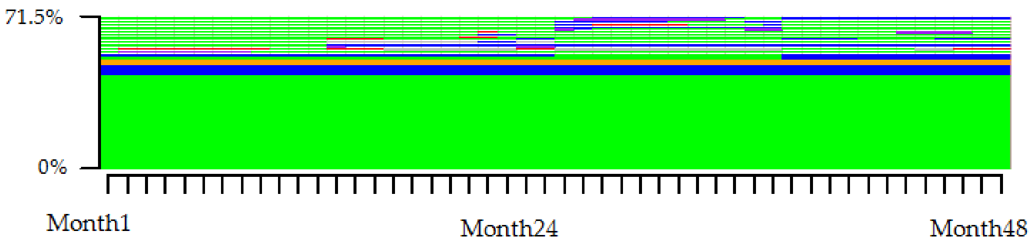



**2009-2012**

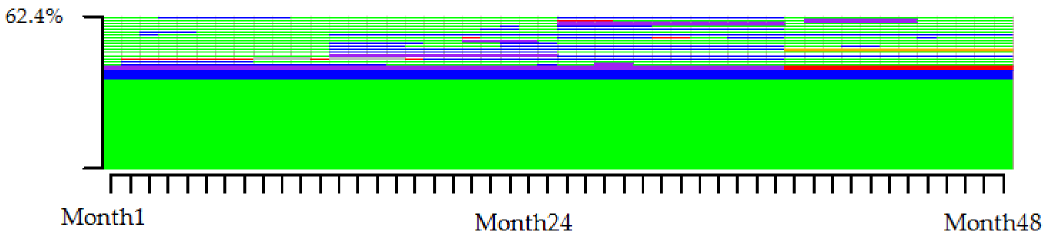


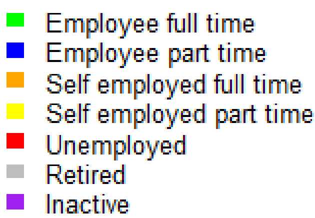

**Sweden**

**2005-2008**




**2009-2012**



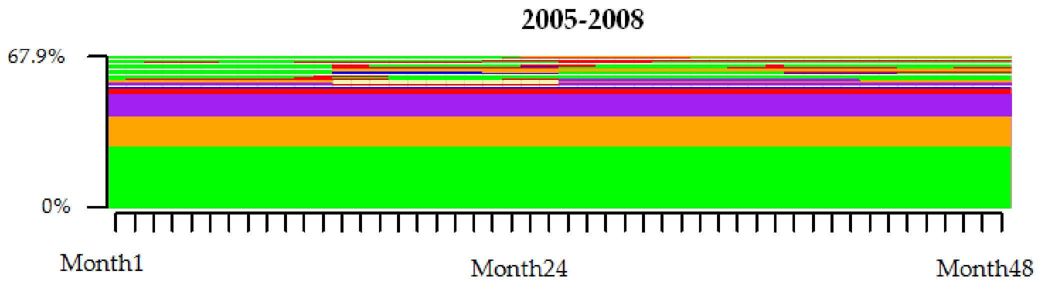

Source: EU-SILC 2005-2008 and 2009-2012

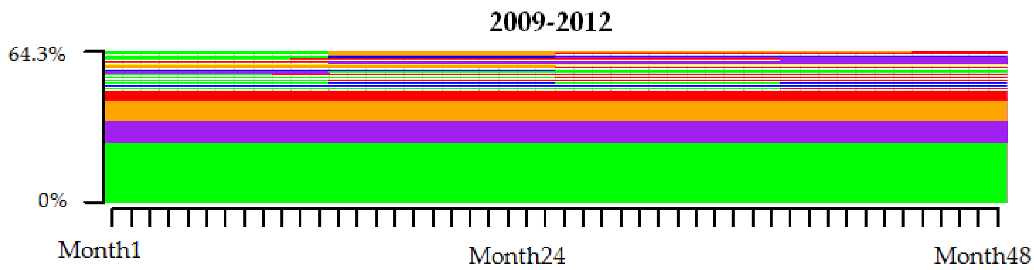
The southern European countries reveal significant differences between them regarding the youth labour market trajectories (Figure 5.16). Stability in full-time employment is the most frequent youth sequence in all three countries, but to a different extent. In 2005-2008, Portugal registers by far the highest incidence of youth stable standard employment (57.5%), followed by Italy (34%) and Greece (32%). All three countries show a decrease in this sequence during 2009-2012, with the highest decrease in Portugal (-9 percentage points), Italy (-3.3 points) and finally Greece (-2.6 points). The second and third most frequent sequences in the Mediterranean countries consist of stability in full-time self-employment and in inactivity. In particular, young Greeks register 15% of their sequences in full-time self-employment, a percentage that decreases after the start of the crisis (9%). Persistent inactivity among Greek youth accounts for 11% during both periods, followed by persistent unemployment, which doubles during 2009-2012 (from 2% to 4%). In Italy, during the years of the financial downturn, a very slight decrease in youth full-time self-employment (from 8% to 7%) and in persistent unemployment (from 3% to 2.3%) is detected. Finally, the second most frequent youth sequence in Portugal is stable inactivity across time, followed by full-time self-employment (from 1.7% to 3.3%). Interestingly, persistent unemployment is not among the twenty most frequent youth sequences in Portugal during 2005-2008, but it appears at the fourth position during 2009-2012 (equal to 1.2%). In essence, young Italians are the only category showing a decrease in unemployment during the economic crisis. A possible explanation for this pattern might be related to a deregulation of the Greek and Portuguese labour markets regarding the ease of firing workers (Madsen et al. 2013), as well as the use of *Cassa Integrazione Guadagni* in Italy, a tool that promotes working hours reduction schemes aiming at maintaining employment during the economic shock (Arpaia and Curci 2010; D'Amuri 2011).

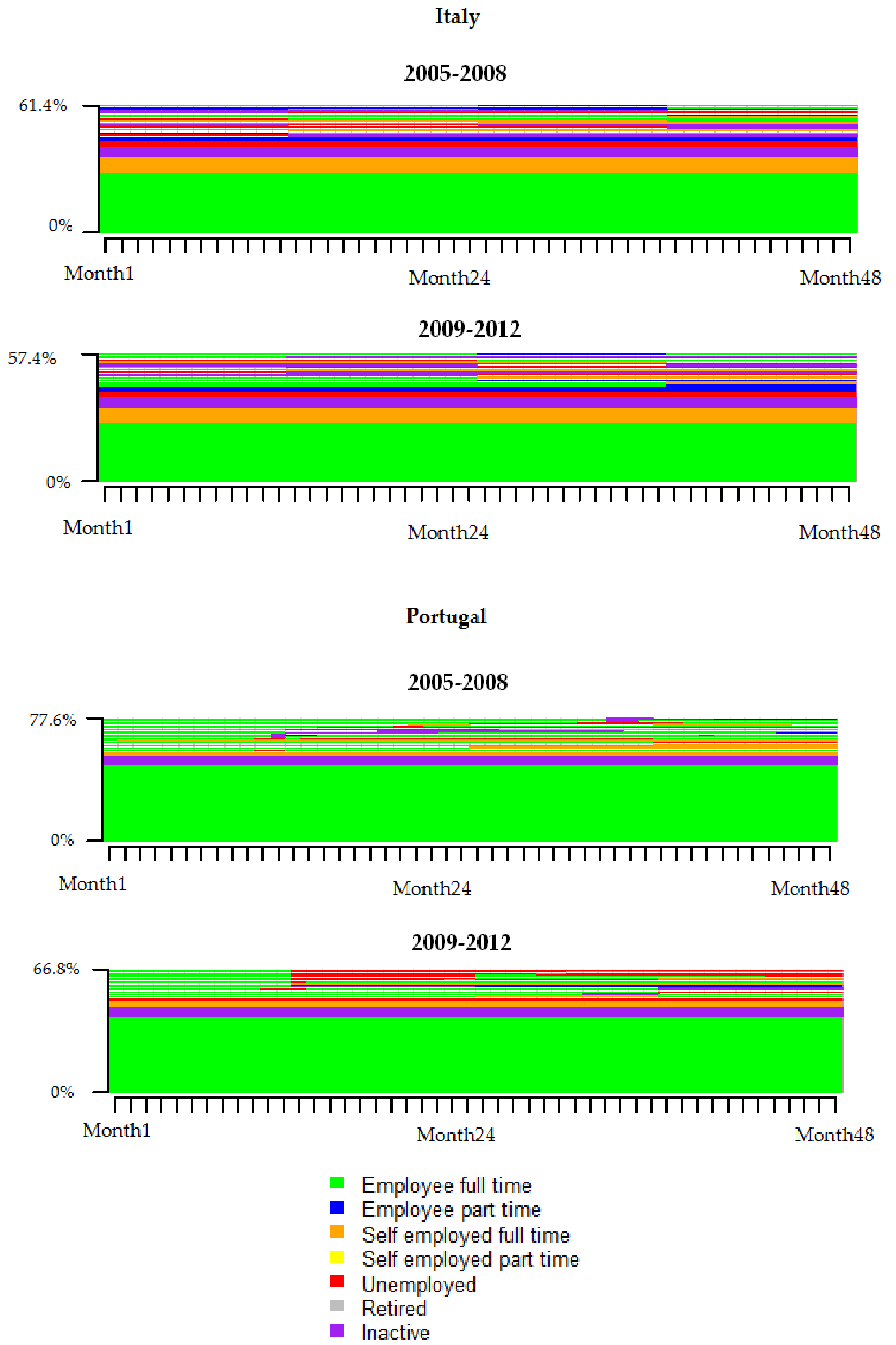
Focusing on the sequences including at least one transition, during the financial shock in Greece almost 5% of the sequences are 'exclusionary', including transitions from employment (full-time employment and full-time self-employment) to unemployment. The same percentage during 2009-2012 equals to 1% in Italy and Portugal. In Portugal after the start of the crisis, numerous transitions from employment to non-employment and back to employment are revealed, indicating how fragmented and precarious labour market transitions are especially for young people who often struggle to find their way into stable employment.

**Figure 5.16 – Most frequent sequences (20) of young people (25-34 years old), Sub-protective countries 2005-2008 & 2009-2012**

Greece






Source: EU-SILC 2005-2008 and 2009-2012

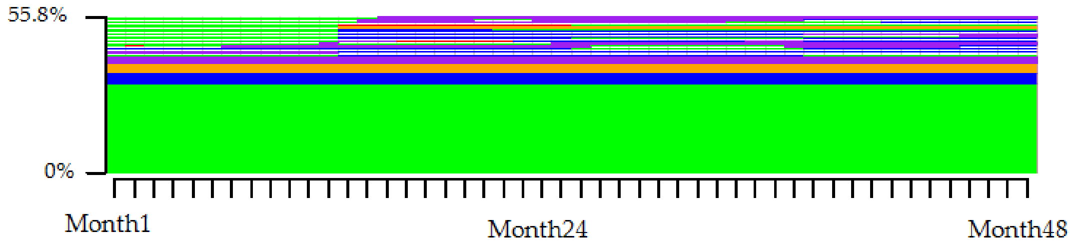
Walther (2006) classifies the Netherlands among the Employment-centred continental countries, instead of the Universalistic Scandinavian countries. In fact, as mentioned in Chapter 2, the Netherlands is a hybrid case, which can be classified somewhere between the two models (Boeri 2002; Ebbinghaus 2012). Figure 5.17 shows that the Dutch youth sequences consist of an extended use of part-time employment (blue) and thus the Dutch figure appears different from the rest of the analysed countries. In fact, stability in part-time employment accounts for 15% and 19% of the Dutch youth sequences respectively across time, while for the rest of the continental countries (Austria, Belgium and France) and Sweden (which is known for its extensive use of part-time employment) the same trajectory accounts no more than 5% (Figures 5.15 and 5.17). The Netherlands reaches the Finnish and Italian levels of stability in full-time employment: from 35% to 38% across time. Another interesting characteristic of the Dutch youth trajectories is the high incidence of sequences with numerous transitions between full and part-time employment (different working time regimes), which accounts for 11% during 2005-2008 and 13% during 2009-2012.

Compared to the other continental countries, France registers the highest incidence of stable full-time employment in both periods (from 48% to 49%) and together with the Netherlands are the only countries in the analysis that register an increase in full-time employment among young workers during the financial crisis. The proportion of Austrian young people in full-time employment is 38% in 2005-2008 and 37% in 2009-2012, while in Belgium respectively 44% and 38%. In fact, Belgium reveals a significant decrease in youth full-time employment during the years of the financial shock (-6%).

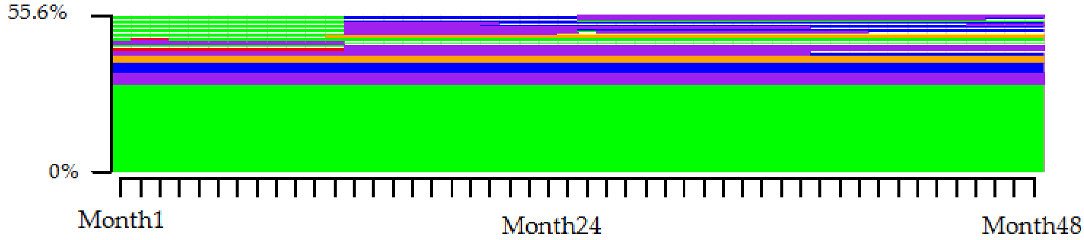
**Figure 5.17 – Most frequent sequences (20) of young people (25-34 years old), Employment-centred countries 2005-2008 & 2009-2012**

Austria

2005-2008

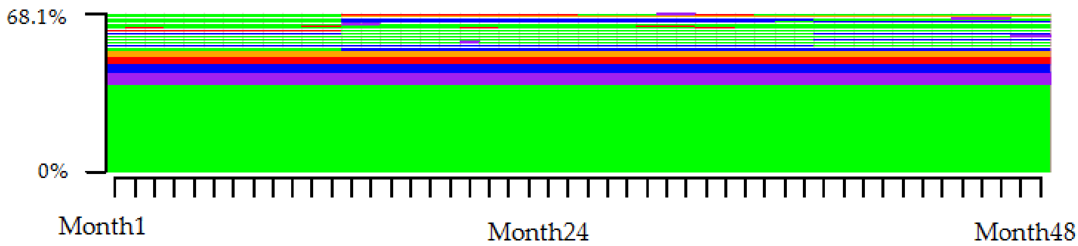



2009-2012

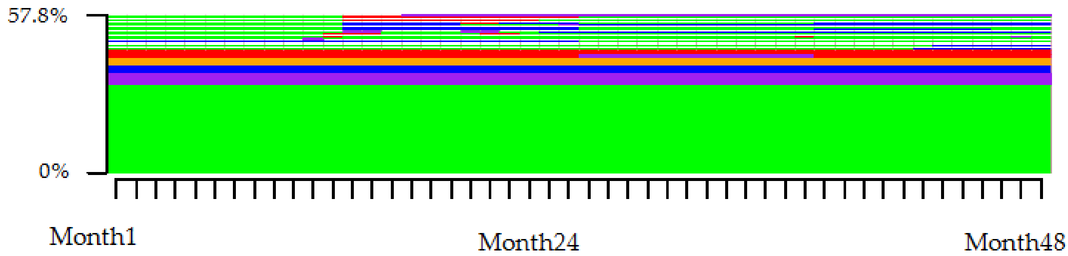


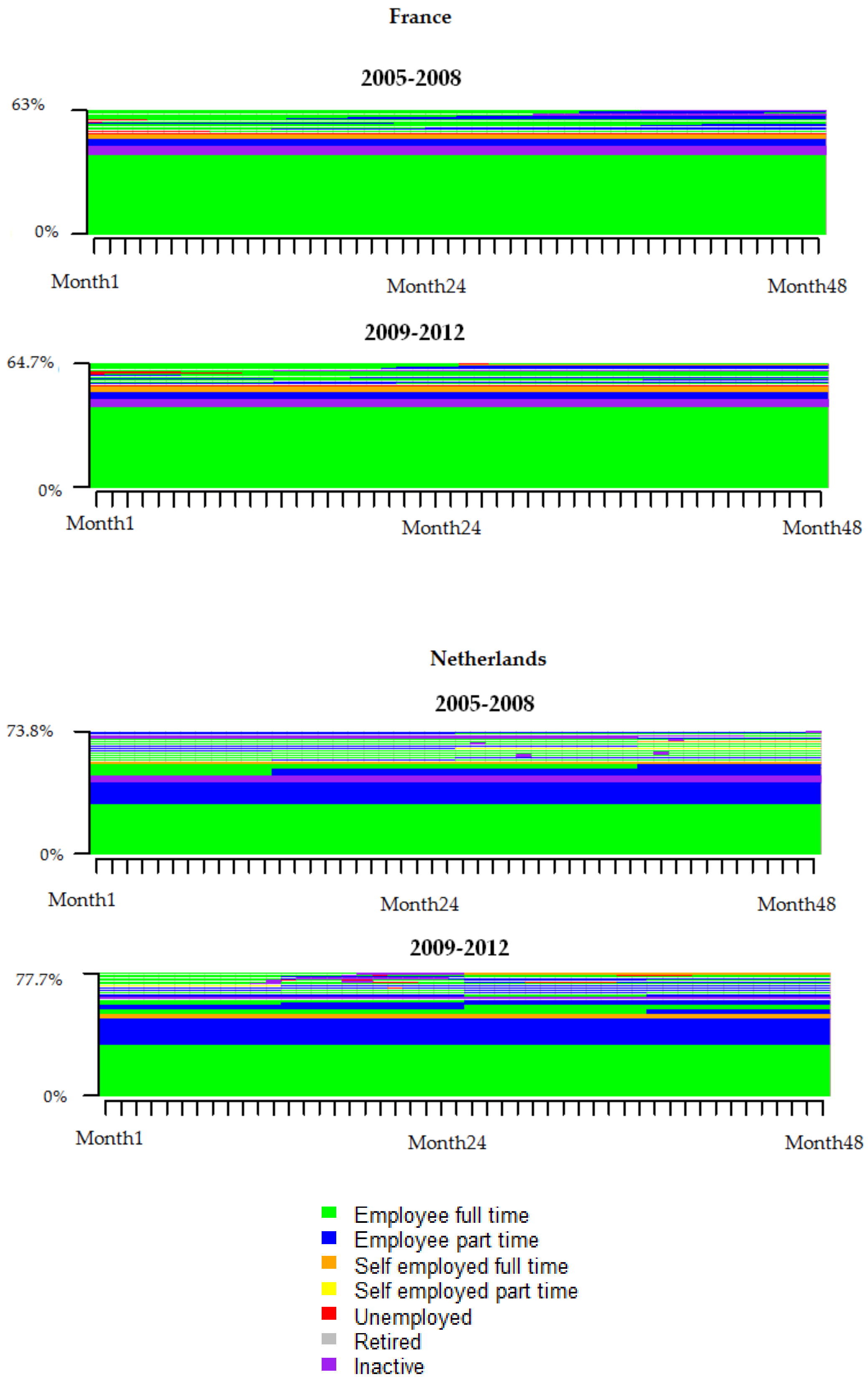

Belgium

2005-2008



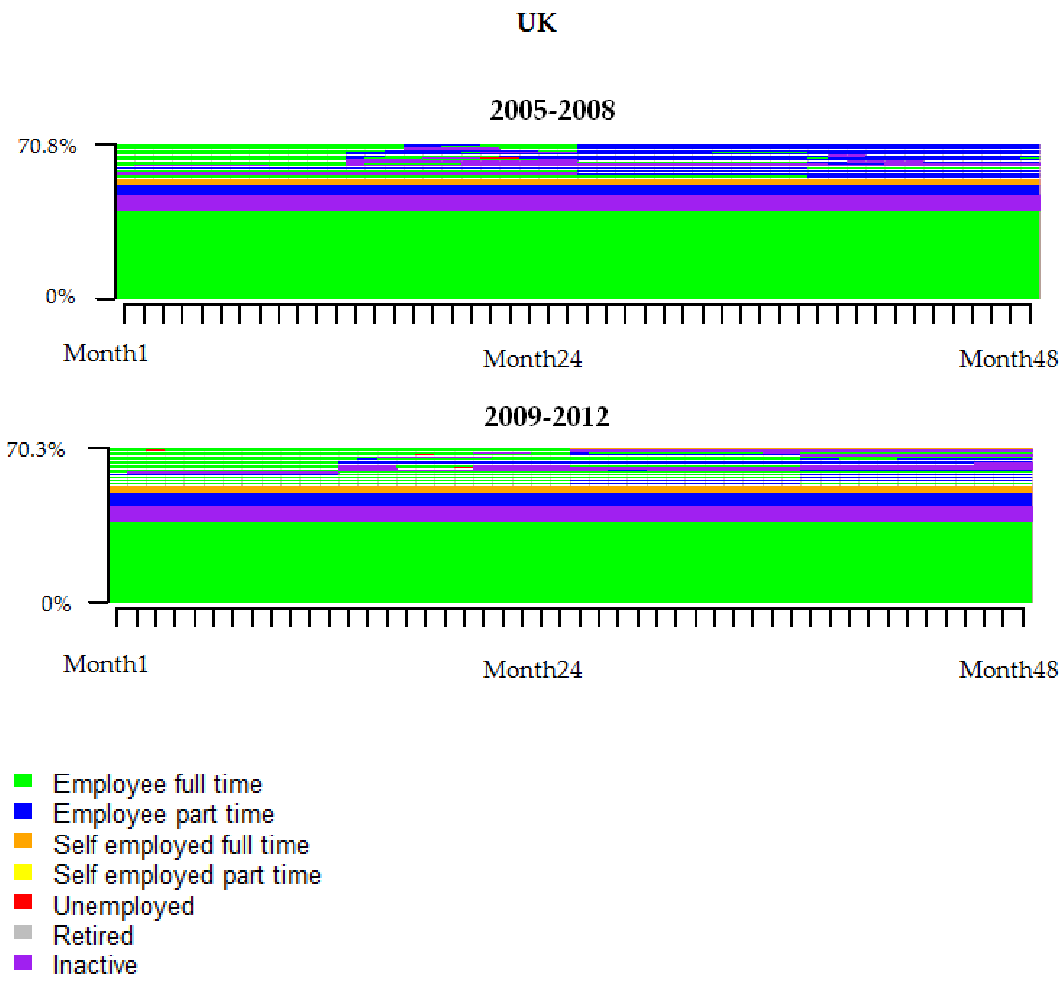

2009-2012






Source: EU-SILC 2005-2008 and 2009-2012

**Figure 5.18 – Most frequent sequences (20) of young people (25-34 years old), Liberal UK 2005-2008 & 2009-2012**




Source: EU-SILC 2005-2008 and 2009-2012

The United Kingdom, the only representative of the liberal Anglo-Saxon regime in this study, registers a 47% of the youth sequences in stable full-time employment, which decreases after the start of the crisis (43%; Figure 5.18). Interestingly, even though part-time employment in the UK during 2005-2008 is at the levels of the continental countries (5%), after the start of the crisis it reaches 7%. Persistent inactivity is the second most frequent sequence among youth in the UK (8-7% across time), while full-time self-employment is placed at the fourth place (stable at 3%).

The trajectories including at least one transition between full and part time employment[89] appear numerous during both periods.

Summing up, the highest incidence of stable full-time employment among people aged 25-34 years old in 2005-2008 is seen in Denmark (64%), followed by Portugal (57.5%) and Sweden (52%), i.e. two Scandinavian countries together with a southern European country. During the same period, the lowest youth standard employment is seen in Greece (32%), Italy (34%), the Netherlands (35%) and Finland (35%). The UK and France register similar full-time employment rates. After the start of the Great recession, only the Netherlands (+3%) and France (+1.5%) register an increase in the youth rate of full-time employment, while the highest decrease corresponds to the countries with the highest incidence during 2005-2008: Denmark (-9%), Portugal (-9%) and Sweden (-8.5%). Moreover, the Dutch youth are frequently (19%) in part-time employment, followed by British young people especially during the financial crisis (7%). Finland and Greece show the most extensive use of youth full-time self-employment, while Greece and Italy the highest rates of youth persistent inactivity. During the Great recession, sequences including stable unemployment increase in Portugal and Greece, while youth sequences appear more turbulent in the southern European countries.

In essence, Walther's classification is challenged based on the above findings. Denmark and Sweden appear to have similar sequences with Portugal (high full-time employment stability), which appears different from Greece and Italy (high youth inactivity). Furthermore, Finland and Greece share the use of full-time self-employment, while France and the UK register similar rates of youth standard employment, and the Netherlands and the UK a more frequent use of part-time employment among young workers. Overall, Hypothesis 2.4 is partially confirmed,

[89] A visual example of these sequences is FT/13-PT/1-FT/22-PT/2-FT/3-PT/7, where FT stands for full-time employment and PT for part-time employment. FT/13 means that this individual spent 13 months in full-time employment.

with Denmark and Sweden registering the highest share of youth employment and Greece and Italy the lowest. However, the part of the hypothesis that classifies Portugal among the southern European countries is rejected, since Portugal appears more similar to the Nordic countries in the sample.

## 5.3 Are Low Educated Workers More Affected by the Financial Crisis in Europe?

The role of education in shaping employment trajectories is crucial as discussed in several studies (among others: Müller and Gangl 2003; Raffe 2011; De Graaf and van Zenderen 2013; Raffe 2014). We have seen in Chapter 2 (section 2.2.2) that there are two standpoints regarding the effects of the Great recession on low and highly educated workers. During the economic shock, an expansion in higher education is observed, together with a decrease in job vacancies and an increase in unemployment (Barakat et al. 2010). That might lead to a phenomenon, known as 'crowding out', where low educated people are pushed downwards by highly educated people, who are obliged to accept jobs for which they are over-qualified. Based on the theory of job competition and the TLMs approach, I expect low educated people to experience higher incidence of non-employment, and/or turbulent and fragmented trajectories including non-standard forms of employment (**Hypothesis 2.5**). On the other hand, among the consequences of an economic crisis is a decrease in labour demand and a high unemployment rate, which certainly has an effect also on highly educated people. According to the labour market risk discussed by Schmid (2006) regarding over-education (see Chapter 2, section 2.1.6) and the saturation of the internal labour market, i.e. the inefficiency of the market to absorb all highly educated workers, I expect an increase in unemployment among highly educated people, who appear to be affected by the consequences of the crisis but at a lesser degree.

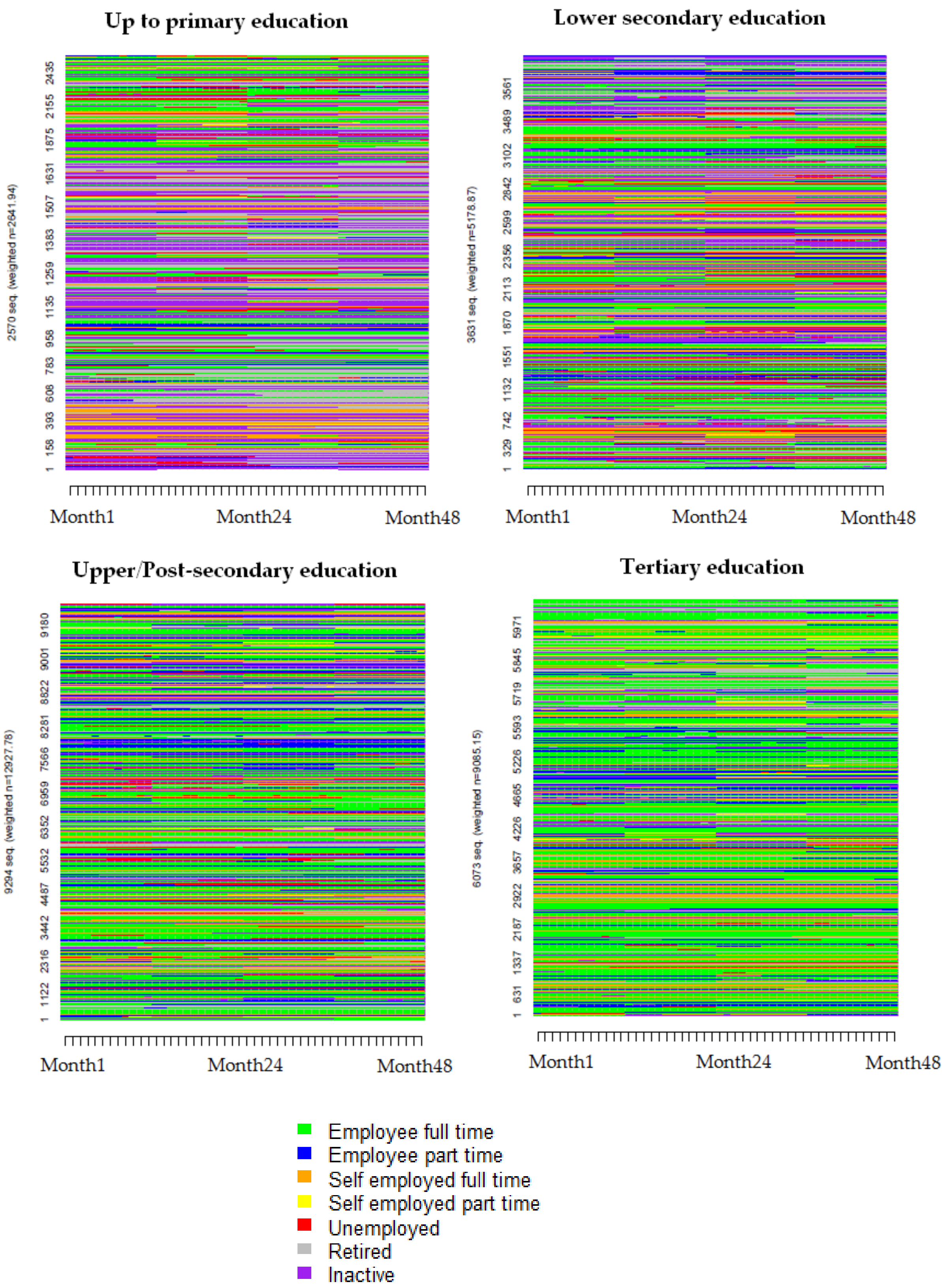
The aim of this section is to study the two standpoints mentioned above, which represent two sides of the same hypothesis. To test Hypothesis 2.5, I study the individual labour market sequences by level of education attained at European and national level. Education here is measured as the highest level of education attained by each individual. The ISCED classification is used by the EU-SILC dataset, while the variable has been recoded in order to have fewer categories[90], but without compromising the richness of the data.

### 5.3.1 The Role of Education in Individual Employment Trajectories across Time

The sequence index plots of individual labour market sequences by education level in 2009-2012 (Figure 5.19) clearly state that the higher the education level attained, the more prevalent full-time employment (green). Additionally, the lower the level of education, the more frequent the inactivity (purple) and the more turbulent the trajectories (more colourful plots, indicating more transitions between states). The differences between different education levels are thoroughly discussed below, confirming that with the increase in the education level there is an increase in dependent employment  (full and part-time) and a decrease in non-employment.

[90] The original variable of the highest level of education has been recoded in order to obtain a variable with fewer categories. The new variable includes the following categories: 1) Up to primary education (including pre-primary and primary education), 2) Lower secondary education, 3) Upper/post-secondary education (including upper secondary and post-secondary non-tertiary education) and 4) First state of tertiary education. For more details, see Chapter 3, section 3.2.4.

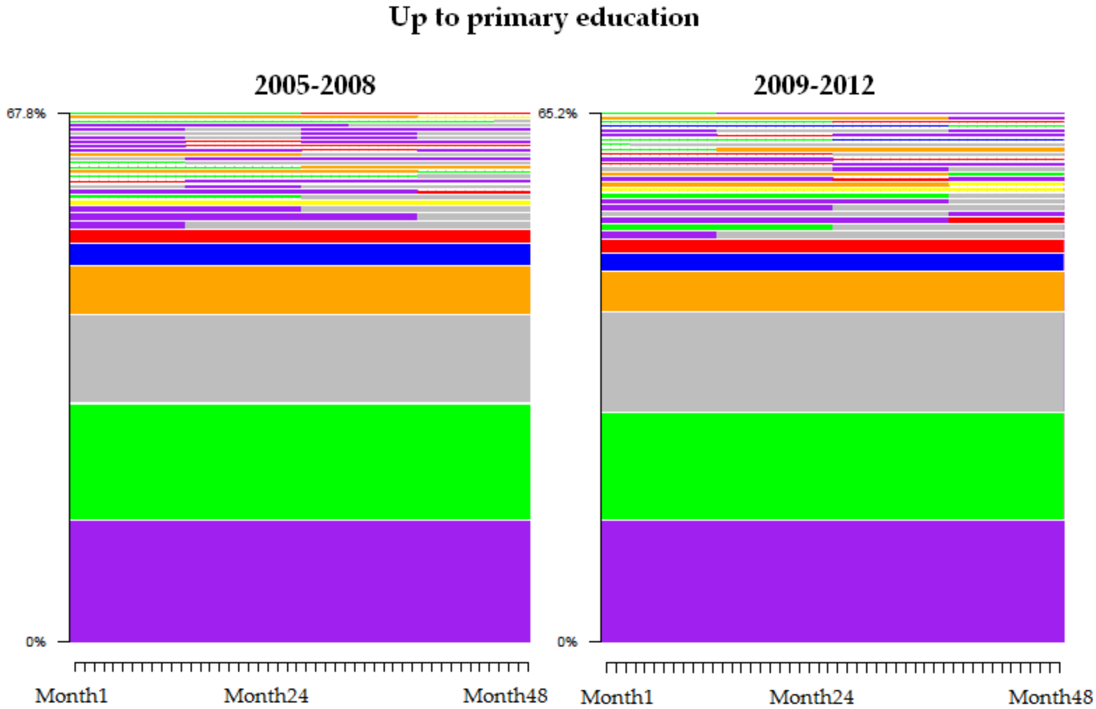
**Figure 5.19 – Sequence index plots by education level, 2009-2012**

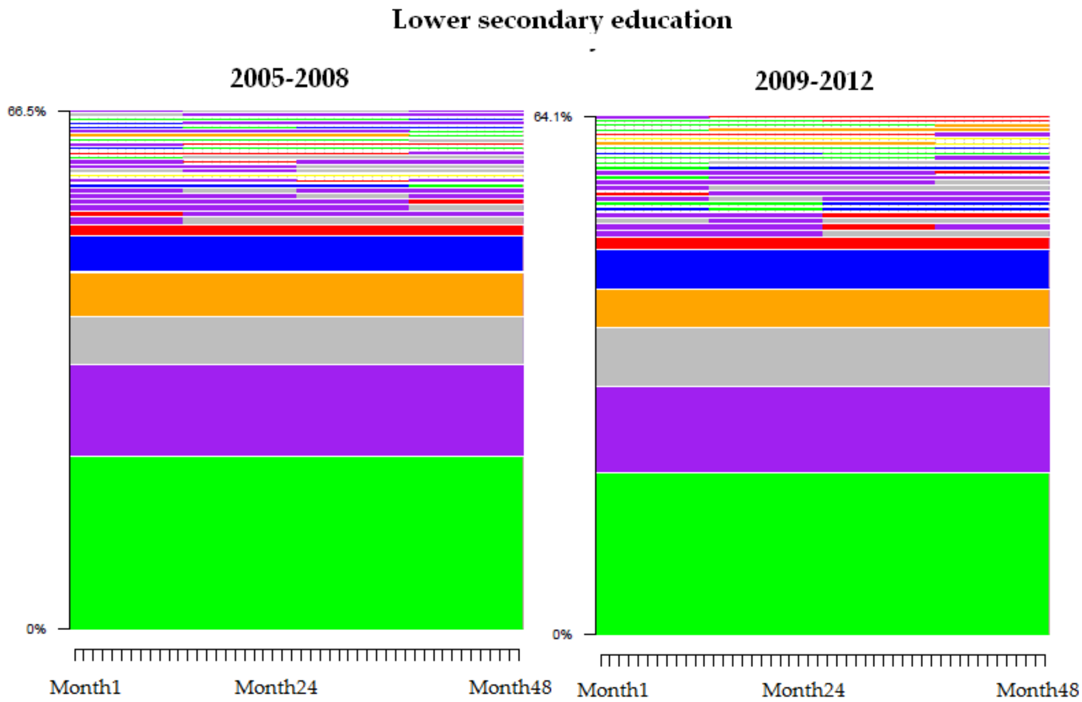


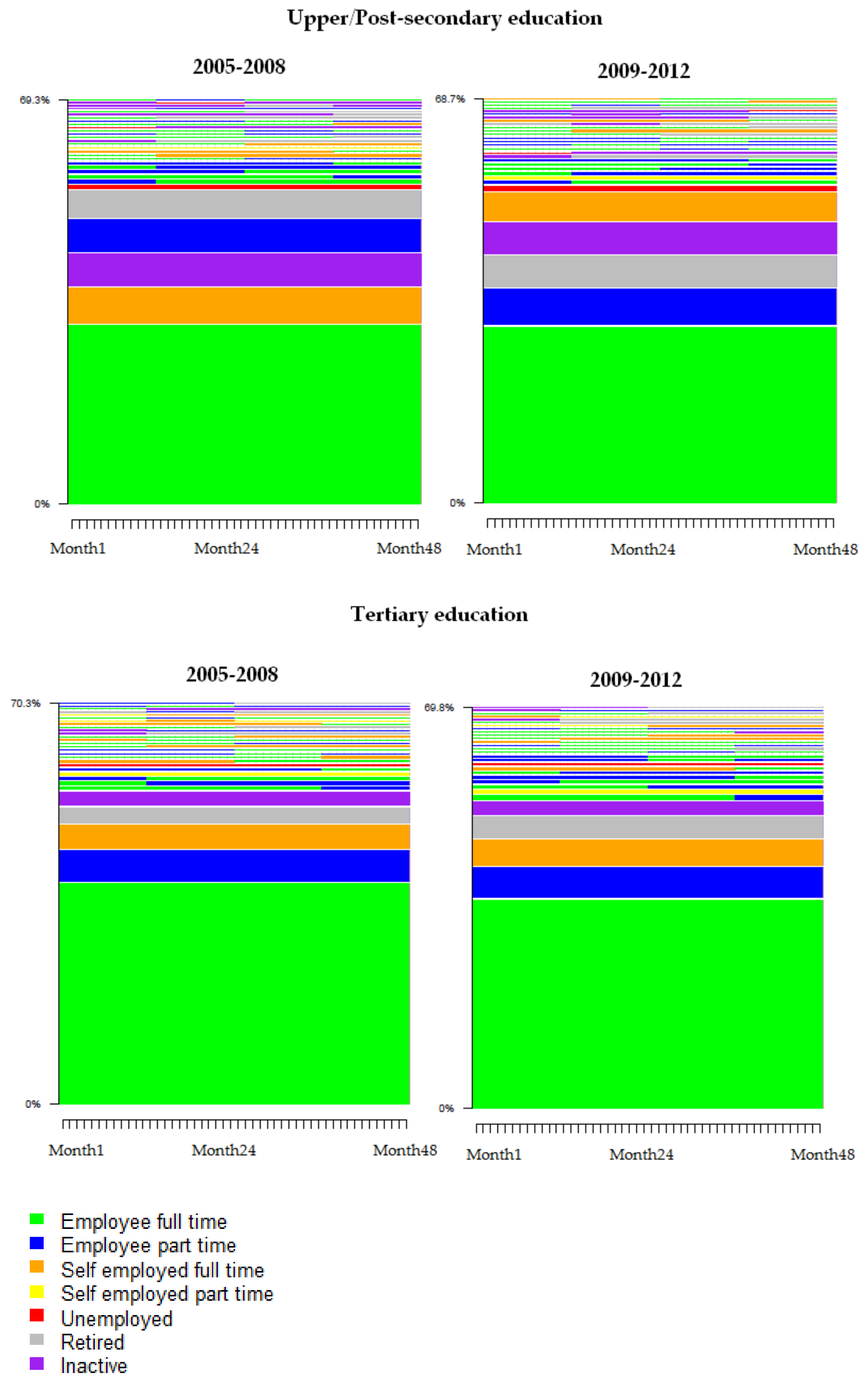

Source: EU-SILC 2009-2012

"(…) all kinds of trajectories are reduced in favour of stable employment trajectories when the level of education increases" (Erhel et al. 2014, p. 14). In fact, Figure 5.20 confirms that stability in full-time employment (green) increases with the education level, while the opposite happens for stability in inactivity (purple). More precisely, during 2005-2008 the proportion of people in stable full-time employment accounts for 46% among those with tertiary education, 36.5% for people with an upper/post-secondary education, 26% for those with lower secondary education and finally 17% for the low educated people. Also stable part-time employment (blue) appears more frequent among people with higher levels of education, registering a rate of 3% among low educated against 6.5% among people with an upper secondary or tertiary degree. Among the low educated people, inactivity is the most frequent sequence (18%), which appears substantially lower for the highly educated (3%). Even though persistent unemployment (red) is overall not frequent, during 2005-2008 it is more frequent among the low educated (2%) compared to people with tertiary education (0.4%).

**Figure 5.20 – Most frequent sequences (30) by education level, 2005-2008 & 2009-2012**






Source: EU-SILC 2005-2008 and 2009-2012

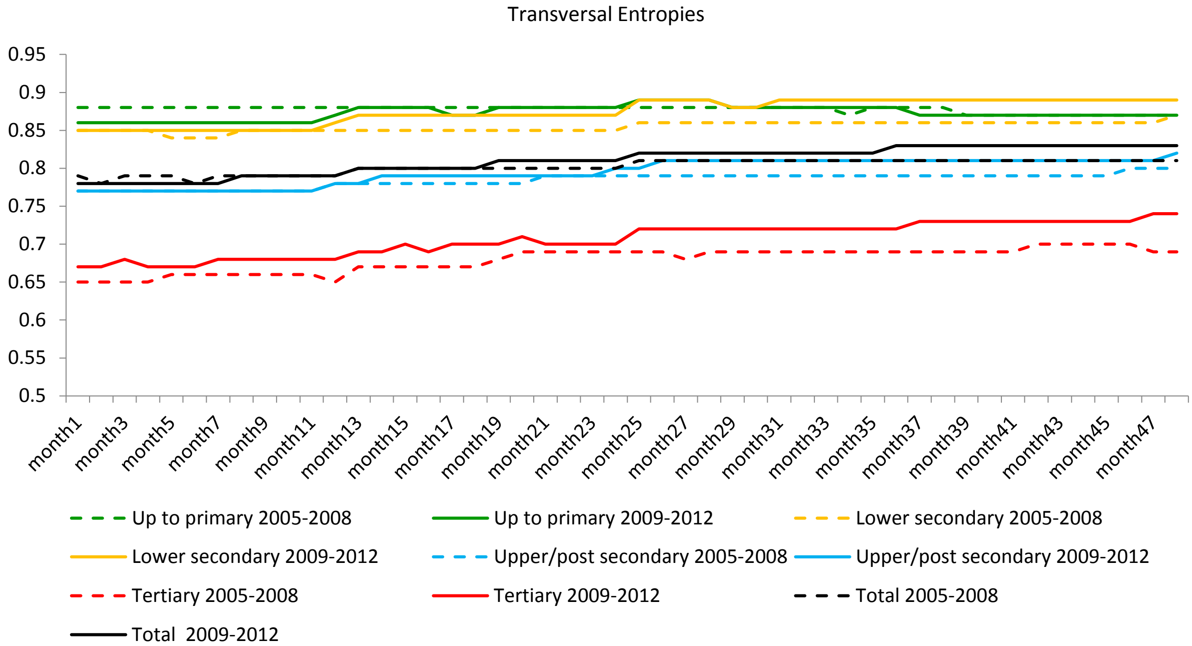
The occupational patterns discussed above remain similar across time. Overall, after the start of the crisis, a decrease in stable full-time employment is observed for all the groups, especially among the highly educated people (-3%). Nevertheless, highly educated people show a slight increase in self-employment, both full and part-time (less than 1%). In accordance with this finding, the mean number of months spent in full-time employment increases only for low educated people (see Figure 5 in Appendix C). Ward-Warmedinger and Macchiarelli (2014) argue that unemployment during the crisis increases mainly among low educated people. In fact, in 2009-2012 low educated people spend on average slightly more months in unemployment and inactivity, but fewer months in part-time and full-time self-employment.

### Entropy and Turbulence of Employment Sequences by Education Level

Figure 5.21 points out the differences especially between two groups: the group consisting of people with up to primary and upper secondary education (top of the graph) and the group of people with higher levels of education (bottom of the graph). The most uniform and predictable sequences are those of highly educated people who present the lowest cross-sectional entropy, with a significant increase in the second phase of the financial crisis, i.e. between 2011 and 2012. The entropy of people with an upper/post-secondary degree is very similar to the average and also shows an increase during 2011-2012. Interestingly, the entropy of people with lower secondary education in the middle of 2011 exceeds the entropy of low educated people, indicating that lower secondary graduates experience more diverse and unpredictable sequences.

Based on Table 5.3, the longitudinal entropy, measuring the within-sequence diversity, indicates that although during 2005-2008 differences across education levels appear contained, after the start of the financial crisis the sequences of lower educated people (up to lower secondary education) become more diverse including more states compared to highly educated people. In addition, according to the turbulence index, lower educated people also present the most turbulent sequences, especially during the economic shock. Finally, the higher the education level attained, the fewer transitions are experienced across the time in analysis: 65% of tertiary education graduates have stable sequences with zero transition, while they have the smallest proportion of sequences with up to three transitions when compared to the lower educated groups. In essence, sequences of people with low levels of education appear more fragmented and turbulent and less uniform, especially during the financial crisis, confirming part of the Hypothesis 2.5.

**Figure 5.21 - Transversal entropy by education level, 2005-2008 & 2009-2012**




Source: EU-SILC 2005-2008 and 2009-2012
Note: Entropy=0 when all sequences are in the same status; Entropy=1 when sequences are equally distributed in all possible states.

**Table 5.3 – Sequence indicators by level of education attained, 2005-2008 & 2009-2012**

| Indicators | Up to primary | | Lower secondary | | Upper/post-secondary | | Tertiary | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2005-2008 | 2009-2012 | 2005-2008 | 2009-2012 | 2005-2008 | 2009-2012 | 2005-2008 | 2009-2012 | 2005-2008 | 2009-2012 |
| Entropy | 0.12 | 0.14 | 0.13 | 0.14 | 0.12 | 0.12 | 0.11 | 0.11 | 0.12 | 0.12 |
| Turbulence | 2.99 | 3.15 | 3.19 | 3.27 | 2.82 | 2.90 | 2.75 | 2.77 | 2.89 | 2.96 |
| Number of transitions | | | | | | | | | | |
| 0 | 61.2 | 58.2 | 59.5 | 57.3 | 63.7 | 62.7 | 64.7 | 64.8 | 62.8 | 61.8 |
| 1 | 19.3 | 20.8 | 14.4 | 18.5 | 15.1 | 15.9 | 13.7 | 14.7 | 15.3 | 16.6 |
| 2 | 9.3 | 11.7 | 11.8 | 11.4 | 10.3 | 10.7 | 11.1 | 10.6 | 10.6 | 10.9 |
| 3 | 4.5 | 4.4 | 5.7 | 5.2 | 4.8 | 4.4 | 5.0 | 4.7 | 4.9 | 4.6 |
| 4 | 2.1 | 2.2 | 2.8 | 3.1 | 2.4 | 2.8 | 2.2 | 2.3 | 2.4 | 2.6 |
| 5 | 1.2 | 0.9 | 1.7 | 2.0 | 1.3 | 1.2 | 1.1 | 1.2 | 1.3 | 1.3 |
| 6 | 0.9 | 0.5 | 1.1 | 1.0 | 0.8 | 0.9 | 1.0 | 0.7 | 0.9 | 0.8 |
| 7 | 0.4 | 0.5 | 1.0 | 0.8 | 0.5 | 0.4 | 0.5 | 0.4 | 0.6 | 0.5 |
| 8 | 0.7 | 0.4 | 0.7 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.5 | 0.4 |
| 9 | 0.1 | 0.2 | 0.4 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 |
| Ten or more | 0.6 | 0.1 | 0.9 | 0.2 | 0.4 | 0.4 | 0.3 | 0.2 | 0.5 | 0.3 |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |

Source: EU-SILC 2005-2008 and 2009-2012

### 5.3.2 Does Education Matters More in Women's Employment Trajectories?

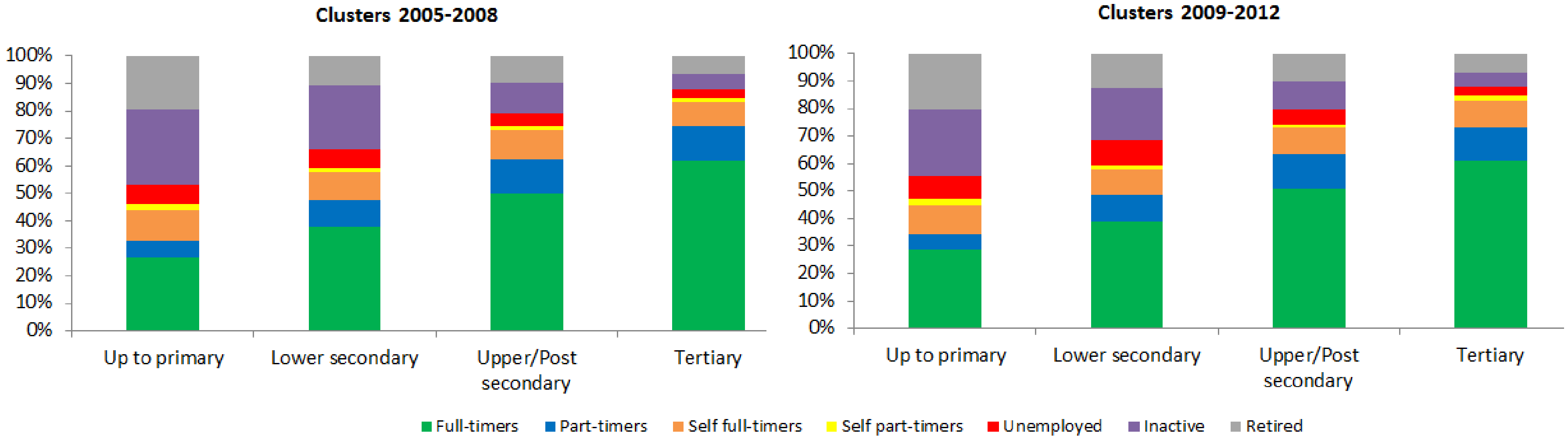
Before studying the effects of education on gendered labour market sequences across time, I briefly summarise the findings of the previous section, using the cluster distribution of sequences based on education level (Figure 5.22). The main pattern emerged from the above analysis and confirmed by Figure 5.22 is that the proportion of full- and part-time employment clusters increases while the proportion of non-employment clusters decreases as the level of education increases. More precisely, the full-time employment cluster accounts for 27% among low educated people, while it goes up to 62% for highly educated people, and the part-time cluster doubles as education increases (from 6% to 13%). Furthermore, 27% of the sequences of low educated people belong to the inactive cluster, compared to 6% of the highly educated people sequences.

During the years of the financial downturn, an increase in the full-time employment cluster and a decrease in the full-time self-employment cluster is noted for all the groups, except for the highly educated people, who present a slight decrease in the full-time employment cluster (-1%) and an increase in the cluster of full-time self-employment (+1%). The full-time employment cluster increases mainly for the low educated people (+2%). Regarding the non-employment clusters, the differences across groups and across time are slightly more visible. In 2009-2012, all the groups register an increase in the unemployment cluster and a decrease in the inactive cluster, but each group to a different extent. People with up to lower secondary education show the highest increase in unemployment (+1.4% for people with up to primary education and +1.7% for people with lower secondary) and the highest decrease in inactivity (respectively -2.8% and -3.6%). This finding might mean that low educated people become active in the labour market and start searching for a job during the crisis probably because they need to contribute to their household income and/or balance for a recently unemployed household member.

*What is the effect of gender on the above patterns? Do gender differences in labour market clusters remain across educational levels?* Interestingly, gender differences diminish at higher educational levels. Indeed, the graph bars for women and men with a tertiary education degree appear more similar than those of low educated women and men (Figure 5.23). Although the full-time employment cluster is prevailing among men independently of their level of education, the gap is lower between highly qualified women and men and higher for people with lower secondary education (16 percentage points of difference between highly qualified men and women against 23 points between low qualified women and men in 2005-2008). This gap decreases during the economic shock due to an increase in full-time employment among all women (especially lower educated women), and at the same time, a decrease in this cluster among men. Furthermore, education matters substantially for the incidence of the inactivity cluster among women. This cluster accounts for 41% among women with low levels of education and 9% among highly educated women, pattern that remains similar across time.

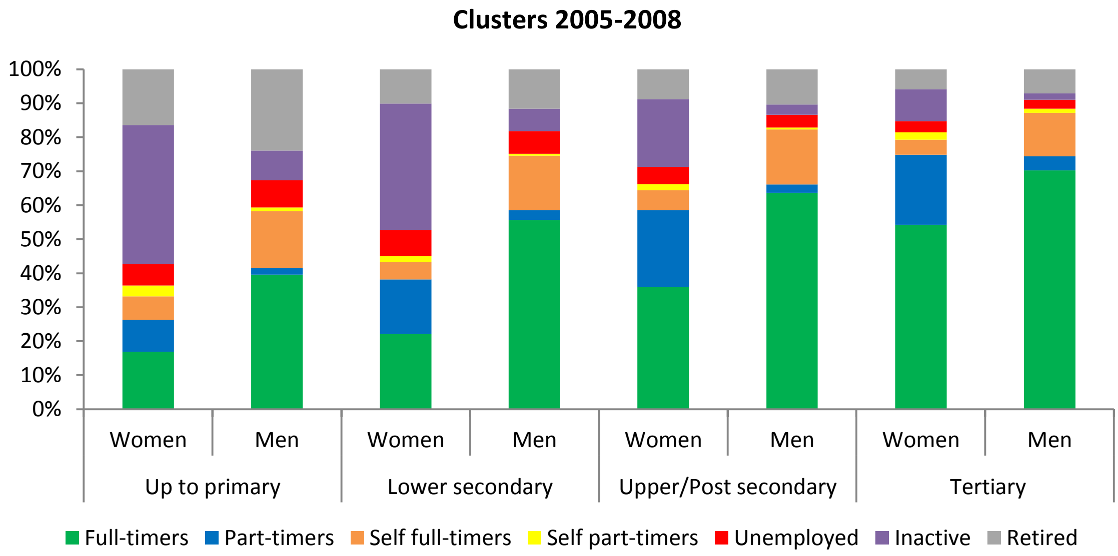
In essence, education matters more for female employment, since the differences regarding employment (full and part-time) are substantially higher between women of low and high levels of education, compared to the differences between men with low and high levels of education, in line with Erhel et al. (2014). As expected, the part-time cluster has a strong female connotation, especially among highly educated women similarly to full-time employment: it accounts for 9% among low educated women and for 21% among women with tertiary education. Finally, after the start of the financial crisis in Europe, the unemployment cluster increases substantially among men with low levels of education (+2.5% for men with up to primary education and +3% for men with lower secondary compared to only +0.5% for low educated women).

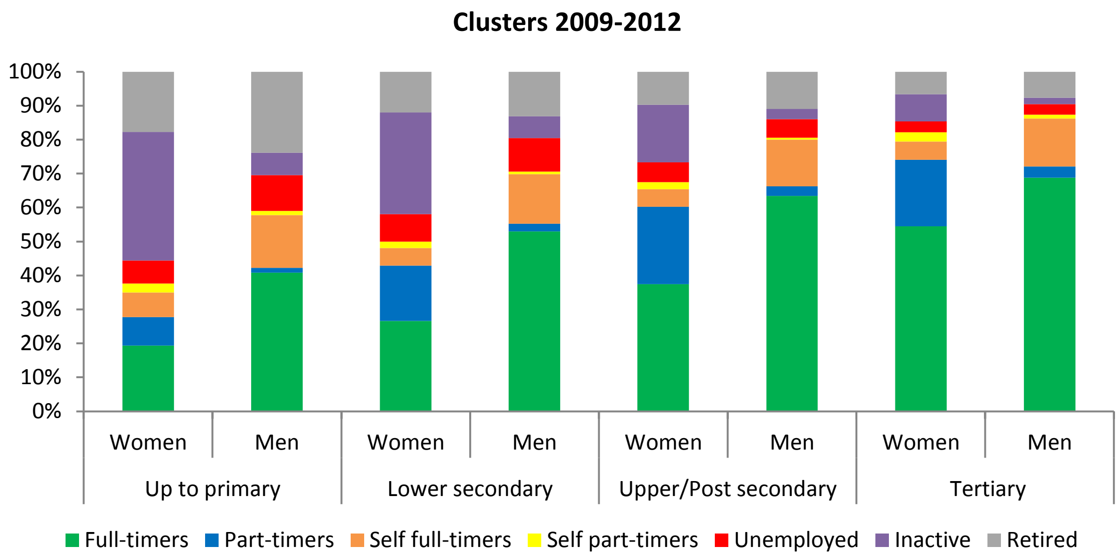
**Figure 5.22 – Labour market clusters by education level (%), 2005-2008 & 2009-2012**




Source: EU-SILC 2005-2008 and 2009-2012

**Figure 5.23 – Labour market clusters by gender and education level (%), 2005-2008 & 2009-2012**




Source: EU-SILC 2005-2008 and 2009-2012

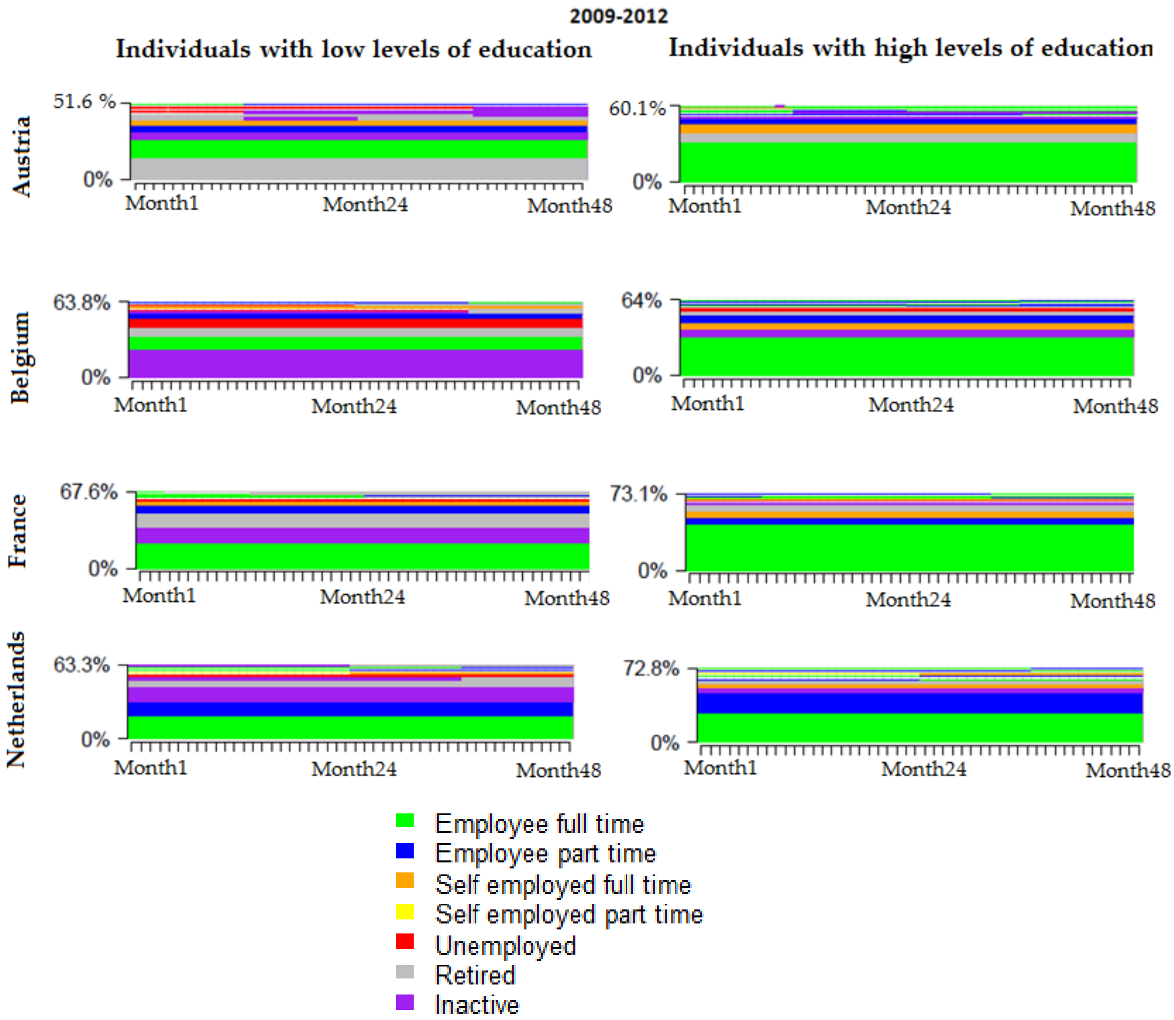
### 5.3.3 European Variation of the Effects of Education on Employment Trajectories

From the above analysis, it is evident that highly educated people have an advantage in the labour market (high frequencies of full- and part-time employment and low frequencies of non-employment), which remains even after the start of the financial crisis. *Is this pattern manifesting in all the European countries of analysis or is it country-specific?* To address this question, I examine the sequence frequency plots for each country; comparing the plots of low educated people[91] to the plots of people in possession of a tertiary education degree. According to the previous sections, the differences of the sequences by education level before and during the financial crisis are small and this is also confirmed by the study of the sequence frequency plots across time. Thus, I include in the text the sequence frequency plots regarding the period 2009-2012.

Again each country is studied separately, but the sequence frequency plots are presented in country groups aiming at confirming the already defined country classification or suggesting alterations. Walther's classification (2006) is used as in the previous section, because it is based on a combination of education systems and labour market features. Overall, Figures 5.24-5.27 show substantial heterogeneity between countries regarding the labour market trajectories of low and high educated people, indicating that the role of education is diverse across countries. *Is this heterogeneity more evident between or within the country groups?*

[91] In this category, I include both levels of lower education: up to primary education and lower secondary education. I would have liked to study separately the trajectories of people with up to primary education by country, but that was not possible because of the small frequencies in some countries (Austria, Denmark, Finland and the UK).

**Figure 5.24 - Ten[92] most frequent sequences by education level, Employment-centred countries 2009-2012**




Source: EU-SILC 2009-2012
Note: Low levels of education include up to primary education and lower secondary education, while high levels of education refer to tertiary degrees.

First of all, stable full-time employment (green) is significantly more frequent among highly educated people and this is true for all the countries, but to a different extent. The countries that register the wider gap between high and low educated in stable full-time employment are Portugal, Greece and Finland, followed by the UK,

[92] In this section, the sequence frequency plots show the ten most frequent sequences across countries and by education level. I decided not to plot more sequences, as in the previous sections, because these graphs were sufficient for the information I needed to answer my research hypothesis.

Belgium, France, Italy and Austria[93], i.e. in these countries education matters more for being in full-time employment stability. The Swedish labour market seems to offer equal chances for full-time employment to everyone, independently of their education level (a gap equals to 3%). The second and third more contained gaps regarding full-time employment belong to the Netherlands (11 points) and Denmark (14 points).

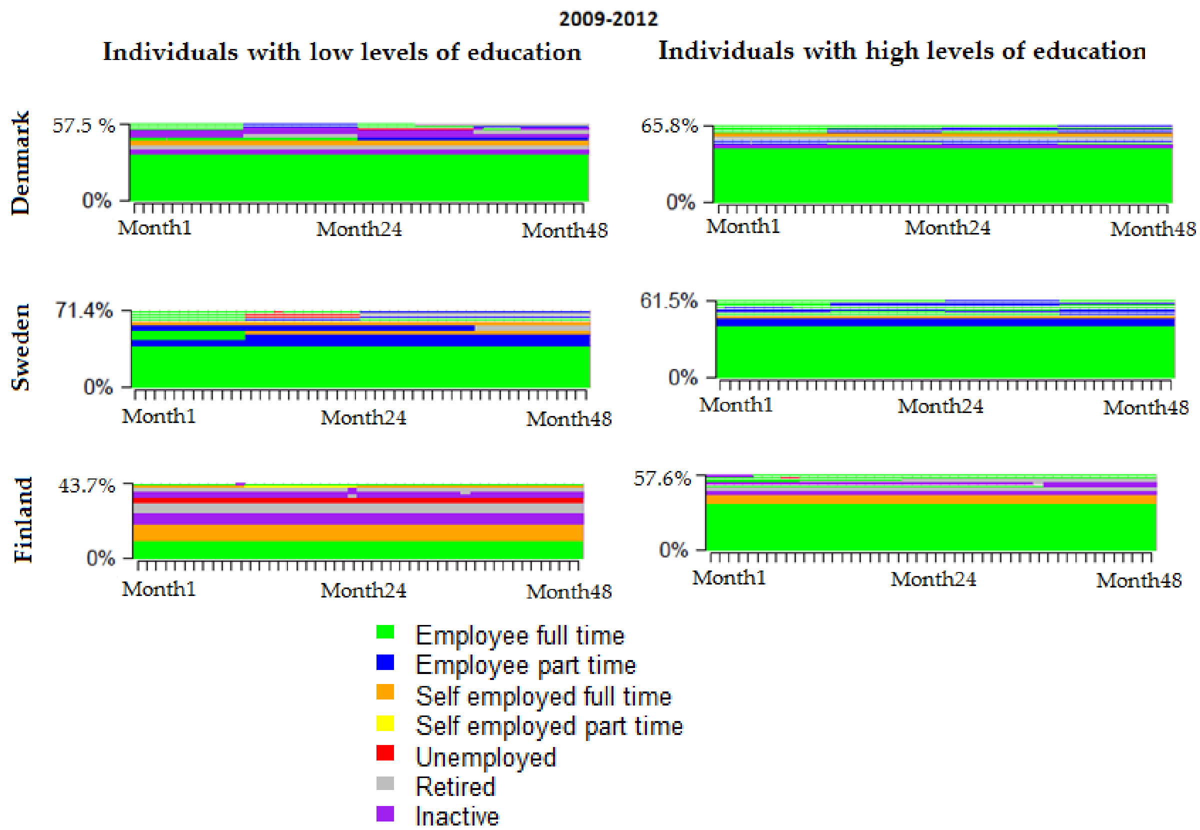
Secondly, regarding non-standard forms of employment (here part-time and self-employment) countries show again significant heterogeneity. Focusing on the use of part-time employment, we have seen in Chapter 4 that is more extensive in the Netherlands, Sweden and the UK. Disaggregating this pattern by education level, part-time employment appears more frequent among highly educated people in the Netherlands (21% versus 13% of the low educated in stable part-time employment) and in Belgium and Sweden but at lower rates and with more contained differences (2 percentage points). On the contrary, stable part-time employment is more frequent among low educated people in the United Kingdom (11% versus 6%) and with only slight differences (between 1-2 percentage points) in Italy and Portugal[94]. A possible explanation might lie in the quality of the part-time contracts.

High quality part-time contracts in terms of wage, social security and precariousness might attract also highly educated people, especially when they want/need to combine paid and unpaid work (Lyonette et al. 2016). In other words, a part-time job position in one country might be similar to a full-time position, while in another country might be considered as a 'bad job' leading to dead ends and precariousness (Gallie et al. 2016). Indeed, in countries with less welfare state provision flexible work arrangements often result in precarious and insecure work

[93] Portugal registers a gap equals to 35 percentage points between the frequency in full-time employment among people with low and high levels of education, followed by Greece (32 points) and Finland equal to 30 points, while the rest of the countries mentioned range between 25 and 23 points.
[94] The use of part-time employment in Greece is almost inexistent in my sample, here less than 1%.

contracts and this is the case of southern European countries, where part-time employment is frequent mostly among low educated workers (Gialis et al. 2015). The other country with higher levels of part-time employment among low educated workers is the UK, where according to previous studies, this form of employment offers relatively low wages and low-quality jobs when compared to standard workers in the UK and part-time workers in the rest of Europe (Aston et al. 2004; Lyonette et al. 2016). On the contrary, Nordic countries with flexible labour market regulations, such as Sweden and the Netherlands, offer high quality part-time employment (Lyonette et al. 2016).

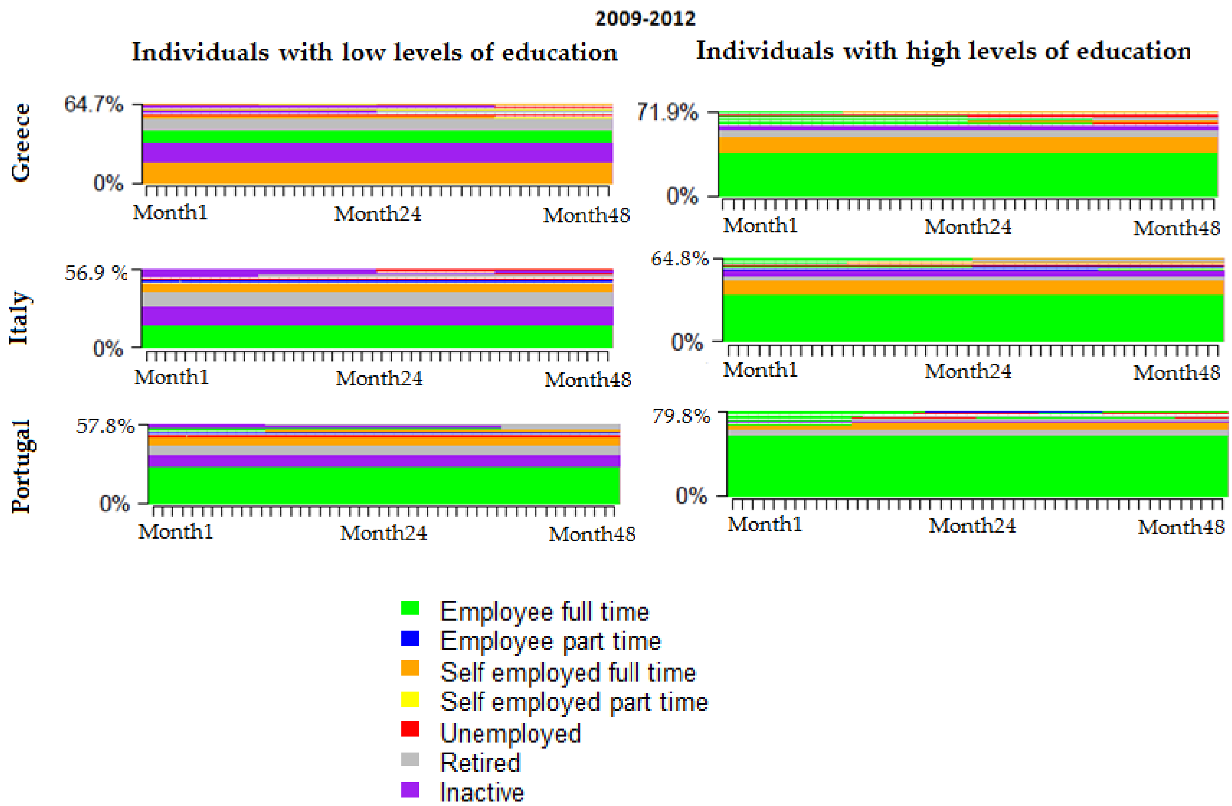
**Figure 5.25 - Ten most frequent sequences by education level, Universalistic countries 2009-2012**




Source: EU-SILC 2009-2012
Note: Low levels of education include up to primary education and lower secondary education, while high levels of education refer to tertiary degrees.

Focusing on the use of full-time self-employment, again in some countries it is more frequent among the low educated whereas in other among the high educated. In detail, in the Scandinavian countries, together with Greece and Portugal, the use is more frequent among low educated people, while the opposite trend emerges from the continental countries, Italy, the Netherlands and the UK. As anticipated in Chapter 4, the use of full-time self-employment is substantially more common in Greece, Italy and Finland. Among the low educated Greeks stability in this status represents the most frequent sequence (20%), compared to 14% of the highly educated Greeks and to 10-11% of the low educated Finns and high educated Italians. In accordance with the analysis presented in Chapter 4, the use of part-time self-employment is very limited among the sample, with low educated Greeks and highly educated Britons registering the highest frequencies (1.5-2%).

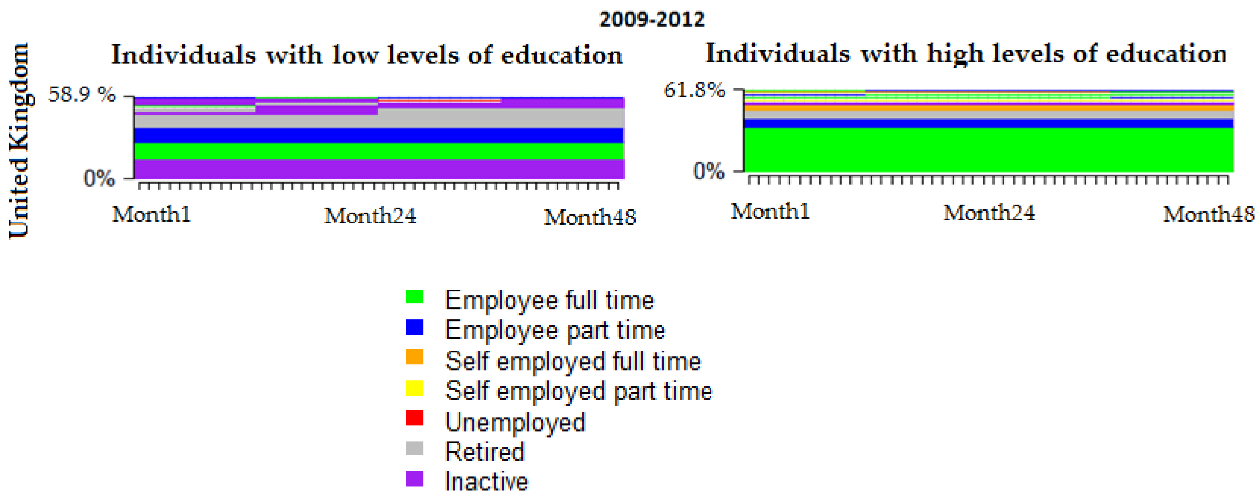
**Figure 5.26 - Ten most frequent sequences by education level, Sub-protective countries 2009-2012**




Source: EU-SILC 2009-2012
Note: Low levels of education include up to primary education and lower secondary education, while high levels of education refer to tertiary degrees.

Finally, as outlined before persistent unemployment[95] (red) and inactivity (purple) are more frequent among low educated people and, after the start of the recession, unemployment increases with the exception of low educated people, while inactivity decreases for all. Indeed, both states are significantly more frequent among people with low levels of education in all the countries examined. In particular, persistent unemployment is more frequent among the low educated Belgians (7%), while all the other countries register shares smaller than 3% in this status. Interestingly and as seen above, the inactivity levels vary substantially across countries. In Belgium and the UK this status represents the most frequent sequence among the low educated (27% and 15% respectively), while at similar levels with the UK are low educated Greeks (17%), Italians (15%), French (15%) and Portuguese (13%). Among the highly educated, inactivity is not commonly observed. The highest inactivity experienced by highly educated people is in Belgium (6%).

**Figure 5.27 - Ten most frequent sequences by education level, Liberal UK 2009-2012**




Source: EU-SILC 2009-2012
Note: Low levels of education include up to primary education and lower secondary education, while high levels of education refer to tertiary degrees.

[95] By persistent I mean stable unemployment across the whole duration of the panel analysed.

Summing up this section, highly educated people appear overall in advantage in the labour market, showing a high prevalence of employment and low frequencies of non-employment. Across the eleven European countries, the pattern regarding non-employment is confirmed in all of them, with low educated people being more frequently in unemployment and inactivity compared to people with high levels of education. Nonetheless, regarding full- and part-time employment, the Swedish, Danish and Dutch labour markets offer similar chances (high) to both low and highly educated workers, while Portugal, Greece, Finland and the UK show significant gaps between the shares of full-time employment based on the education level of the workers. Finally, as we can observe from the figures above, there is strong country heterogeneity. Countries belonging to the same group as defined by Walther (2006) are not necessarily presenting more similarities between them. For instance, as emerged also in the previous section, I detect similarities between Finland, Greece and Italy, especially among the low educated, while Sweden appears close to the Netherlands and Portugal differs from the southern European group, as well as Belgium from the Continental group.

## 5.4 Predicting the Effects of Socio-Demographic Characteristics on Individual Employment Cluster Membership

The previous sections focused on the effects of gender, age and education on individual labour market sequences before and during the crisis with the aim to investigate whether the employment inequalities that emerged in 2005-2008 appear wider after the start of the 2008 financial crisis. The purpose of this section is to predict the membership of each individual in a different labour market cluster based on their socio-demographic characteristics, studied above with the addition of the marital status. Table 5.4 presents the multinomial regression model of the eleven European countries pooled, taking into account the proportional country weights (see Chapter 3, section 3.2.1). The model controls for gender, age, education level attained and marital status, as well as for country of residence[96].

Firstly, I run a model controlling only for individual characteristics and then a model controlling also for the country of residence. As expected, the second model explains a larger share of the variation of the membership in employment clusters[97]. The results from the multinomial logistic model are consistent with the results of the sequence and cluster analysis. In 2005-2008, women have 13 times greater odds than men of being in the part-time employment cluster over the full-time dependent employment cluster, as well as 2 times greater odds of being in the unemployment cluster and 11 times greater odds of being in the inactivity cluster. On the other hand, men have greater odds of being in full-time dependent employment and full-time self-employment compared to women. Older workers (55-64 years old) have 1.4 and 1.5 times greater odds of being respectively in the part-time employment and the full-time self-employment cluster compared to core workers (35-54 years old), as well as higher chances of being in the unemployment and inactivity clusters. Young people (25-34 years old) have lower chances of being in any form of employment compared to core workers and 1.3 times greater odds of being in the unemployment cluster. People with low levels of education (up to primary education) have greater odds of being in non-standard employment clusters (part-time and full-time self-employment) compared to the rest of the sample, as well as in the non-employment clusters.

In essence, women, low educated workers and older people appear in disadvantage in the labour market, presenting higher odds of being in non-standard forms of employment and in non-employment in 2005-2008. *Are these inequalities wider after*

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[96] The coefficients of the country binaries are not presented in Table 5.4 to ease the reading of the table, but are all statistically significant ($p<0.01$).
[97] The pseudo-$R^2$ is larger for the model controlling also for country binaries, as well as the total proportion of correctly predicted cases emerged from the classification table.

*the start of the financial crisis*? Overall, the two models do not present any substantial differences. The only noteworthy difference concerns women having in 2009-2012 less odds of being in non-employment compared to the previous period. As anticipated, men experience more transitions towards unemployment due to the sectoral profile of the crisis, while some women become active in the labour force in order to balance the male unemployment regarding the household income.

**Table 5.4 – Relative Risk Ratios of being member in each labour market cluster against being a member of the full-time employment cluster, Multinomial regression model[98] 2005-2008 & 2009-2012. Weighted data.**

| Clusters | 2005-2008 | | 2009-2012 | |
|---|---|---|---|---|
| | Coeff. | Std. Error | Coeff. | Std. Error |
| Full-time employment | *(base outcome)* | | | |
| **Part-time employment** | | | | |
| Women [Ref.: Men] | 13.29*** | 1.09 | 12.67*** | 1.15 |
| Age groups [Ref.: 35-54] | | | | |
| 25-34 | 0.86*** | 0.07 | 0.84*** | 0.07 |
| 55-64 | 1.39*** | 0.12 | 1.30*** | 0.12 |
| Education [Ref.: Up to primary] | | | | |
| Lower secondary | 0.75** | 0.09 | 0.88 | 0.12 |
| Upper/Post-secondary | 0.58*** | 0.06 | 0.68*** | 0.08 |
| Tertiary | 0.39*** | 0.04 | 0.39*** | 0.05 |
| Married [Ref.: Not married] | 1.64*** | 0.12 | 1.34*** | 0.1 |
| **Full-time self-employment** | | | | |
| Women [Ref.: Men] | 0.61*** | 0.04 | 0.61*** | 0.04 |
| Age groups [Ref.: 35-54] | | | | |
| 25-34 | 0.57*** | 0.04 | 0.68*** | 0.07 |
| 55-64 | 1.49*** | 0.12 | 1.36*** | 0.11 |
| Education [Ref.: Up to primary] | | | | |
| Lower secondary | 0.76*** | 0.08 | 0.73*** | 0.08 |
| Upper/Post-secondary | 0.77*** | 0.07 | 0.67*** | 0.07 |
| Tertiary | 0.54*** | 0.05 | 0.64*** | 0.07 |
| Married [Ref.: Not married] | 1.04 | 0.07 | 1.22*** | 0.09 |
| **Part-time self-employment** | | | | |
| Women [Ref.: Men] | 5.91*** | 0.96 | 4.23*** | 0.74 |
| Age groups [Ref.: 35-54] | | | | |
| 25-34 | 0.78*** | 0.17 | 0.5*** | 0.12 |
| 55-64 | 2.91*** | 0.49 | 2.29*** | 0.40 |
| Education [Ref.: Up to primary] | | | | |
| Lower secondary | 0.41*** | 0.09 | 0.66 | 0.16 |
| Upper/Post-secondary | 0.43*** | 0.08 | 0.56*** | 0.11 |
| Tertiary | 0.43*** | 0.08 | 0.71 | 0.15 |

[98] The Wald chi-square of 7574 for the 2005-2008 and 5773 for the 2009-2012 model with 102 degrees of freedom and a p-value < 0.0001 indicates that the models fit significantly better that a model without any explanatory variables (a null model). The McFadden's Pseudo adjusted R2 for the 2005-2008 model equals to 0.214 and for the 2009-2012 model to 0.204, both values larger compared to the null model.

| | | | | |
|---|---|---|---|---|
| Married [Ref.: Not married] | 1.36* | 0.24 | 1.41** | 0.25 |
| **Unemployment** | | | | |
| Women [Ref.: Men] | 2.24*** | 0.16 | 1.60*** | 0.12 |
| Age groups [Ref.: 35-54] | | | | |
| 25-34 | 1.31*** | 0.11 | 1.37*** | 0.13 |
| 55-64 | 1.97*** | 0.18 | 1.58*** | 0.15 |
| Education [Ref.: Up to primary] | | | | |
| Lower secondary | 0.74*** | 0.09 | 0.78** | 0.09 |
| Upper/Post-secondary | 0.31*** | 0.03 | 0.38*** | 0.04 |
| Tertiary | 0.16*** | 0.02 | 0.16*** | 0.02 |
| Married [Ref.: Not married] | 0.48*** | 0.03 | 0.45*** | 0.03 |
| **Inactivity** | | | | |
| Women [Ref.: Men] | 10.65*** | 0.75 | 8.14*** | 0.69 |
| Age groups [Ref.: 35-54] | | | | |
| 25-34 | 1.08*** | 0.08 | 1*** | 0.09 |
| 55-64 | 2.80*** | 0.21 | 2.24*** | 0.18 |
| Education [Ref.: Up to primary] | | | | |
| Lower secondary | 0.54*** | 0.05 | 0.51*** | 0.05 |
| Upper/Post-secondary | 0.20*** | 0.02 | 0.20*** | 0.02 |
| Tertiary | 0.08*** | 0.01 | 0.08*** | 0.01 |
| Married [Ref.: Not married] | 1.32*** | 0.09 | 1.34*** | 0.1 |
| **Retirement** | | | | |
| Women [Ref.: Men] | 2.23*** | 0.16 | 1.91*** | 0.15 |
| Age groups [Ref.: 35-54] | | | | |
| 25-34 | 0.09** | 0.04 | 0.05 | 0.04 |
| 55-64[99] | 65.19*** | 6.60 | 96.32*** | 12.7 |
| Education [Ref.: Up to primary] | | | | |
| Lower secondary | 0.69*** | 0.07 | 0.76*** | 0.09 |
| Upper/Post-secondary | 0.49*** | 0.04 | 0.47*** | 0.05 |
| Tertiary | 0.29*** | 0.03 | 0.31*** | 0.04 |
| Married [Ref.: Not married] | 1.07*** | 0.09 | 1.13*** | 0.1 |

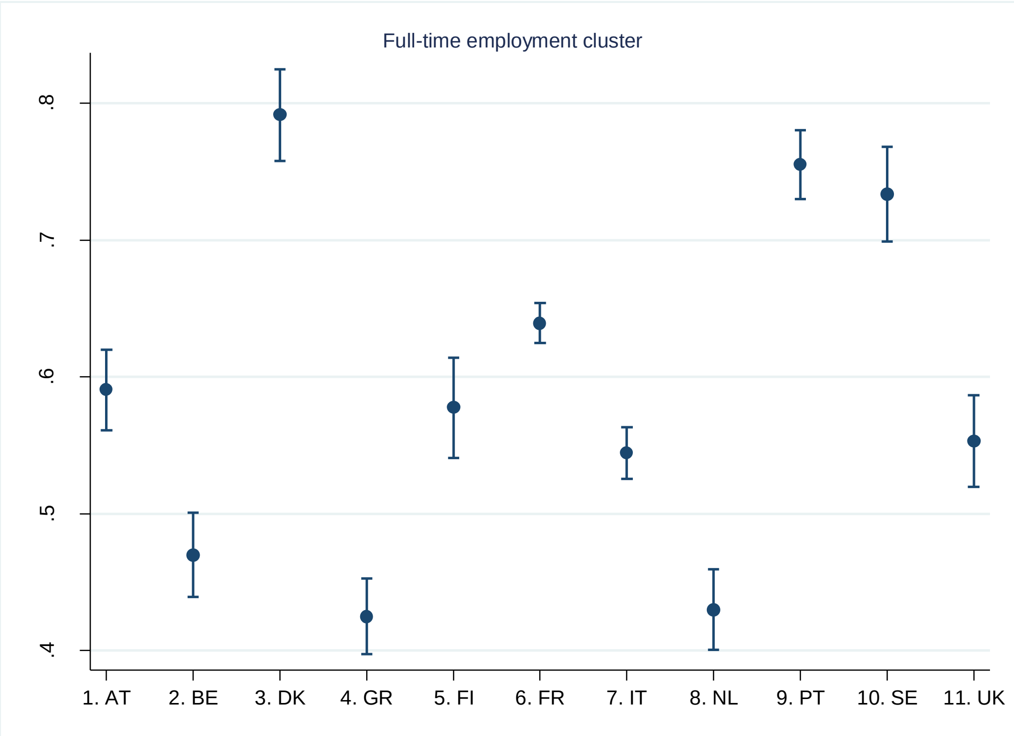
Source: EU-SILC 2005-2008 and 2009-2012
Note: 2005-2008 N=22,300, 2009-2012 N=21,568. Relative risks rations are given with robust standard errors in parentheses. * p<0.10, **p<0.05, ***p<0.01
The model controls for country binaries.

Figure 5.28 shows the plots of predicted probabilities by country of residence for each labour market cluster. The plots concern the period during 2009-2012; the plots of 2005-2008 do not demonstrate any substantial differences across time and thus are not discussed in the text. A higher position of the dot for each country indicates a higher probability of being a member of the respective cluster. Similarly to Chapter 4, the plots underline strong country heterogeneity. It is evident that some of the European patterns presented in Table 5.4 are driven by specific countries,

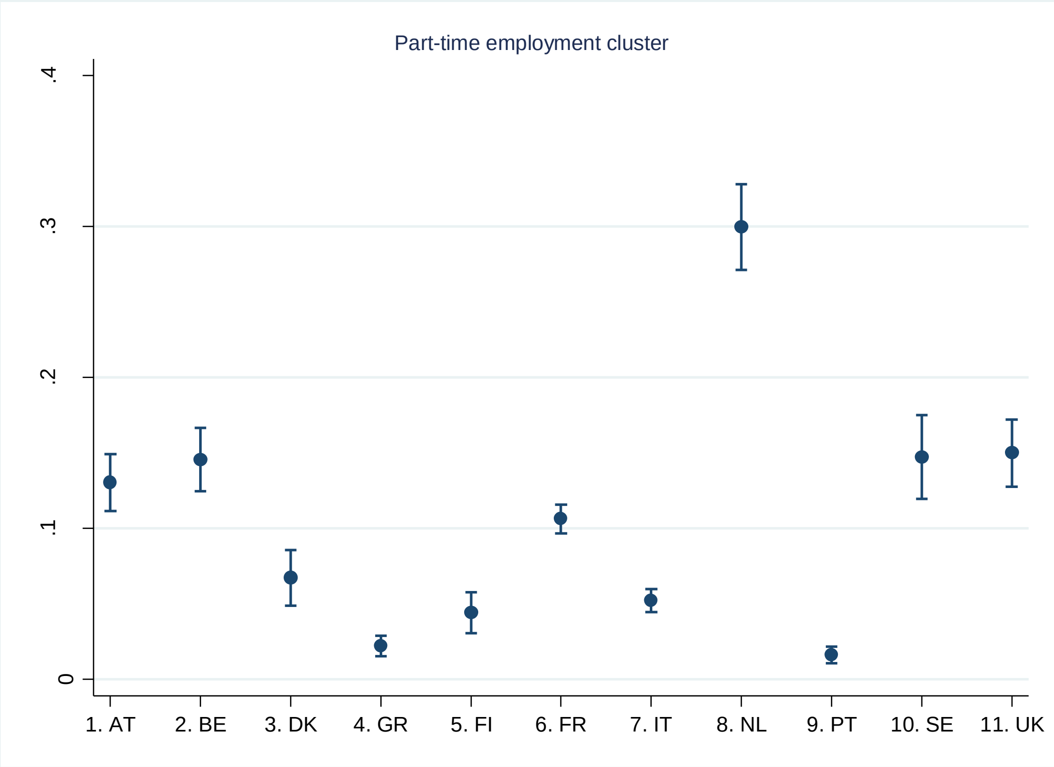
[99] The coefficients of the multinomial regression regarding the probability of being in the retirement cluster by age group appear very large for the older workers. That is because the vast majority of retired people are aged 55 years old and over: 92% in 2005-2008 and 95% in 2009-2012 of people belonging to the retirement cluster are between 55-64 years old.

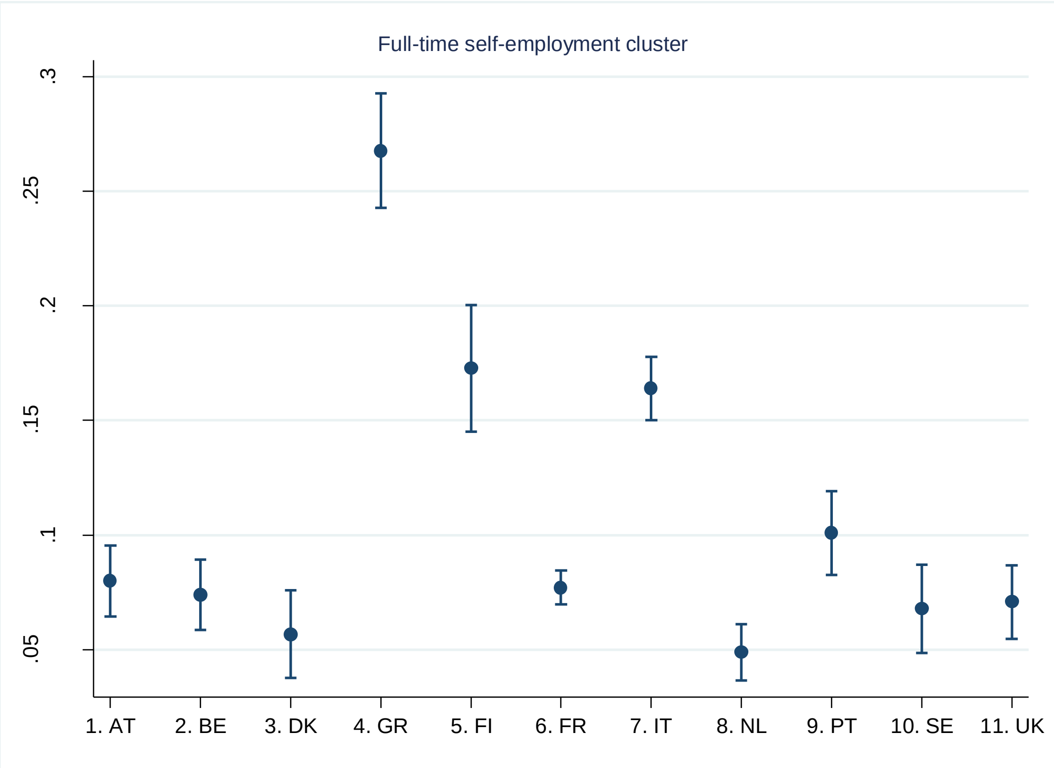
such as the frequency of the part-time employment cluster, which is driven by the Netherlands and of the self-employment cluster by Greece and Finland. Finally, after estimating a multinomial logistic regression model for each country separately[100], the patterns are confirmed, as well as the effects of the individual characteristics on these patterns.

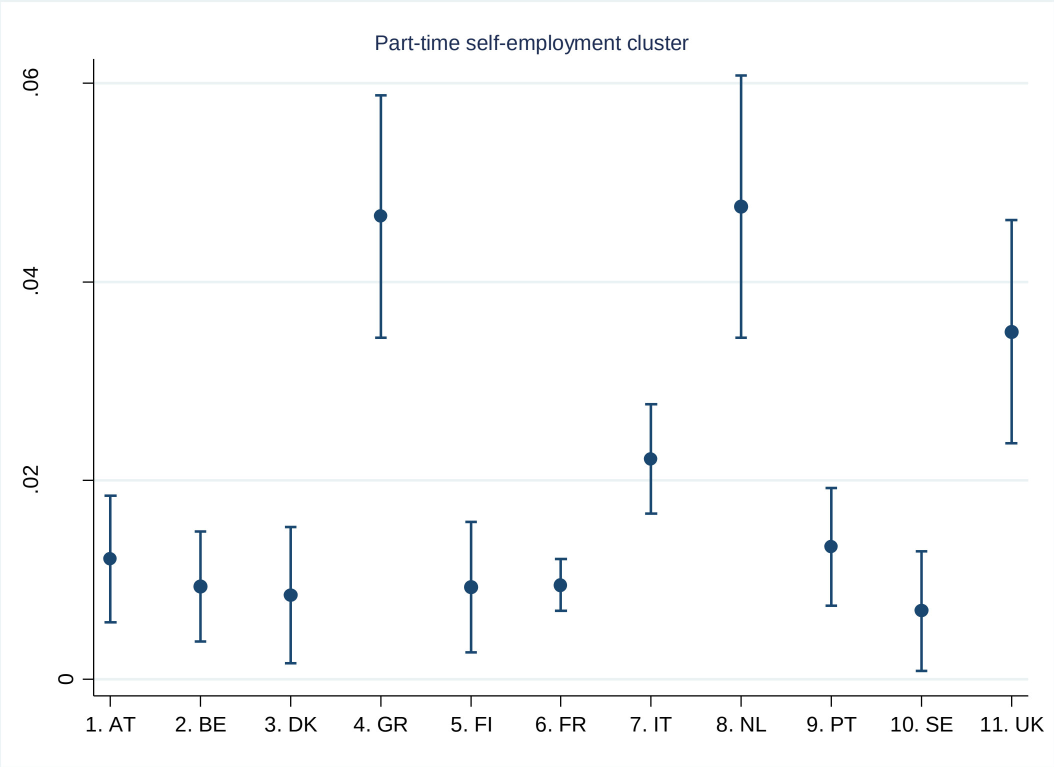
**Figure 5.28 – Predicted probabilities for membership in each labour market cluster by country, 2009-2012 [95% confidence intervals]**

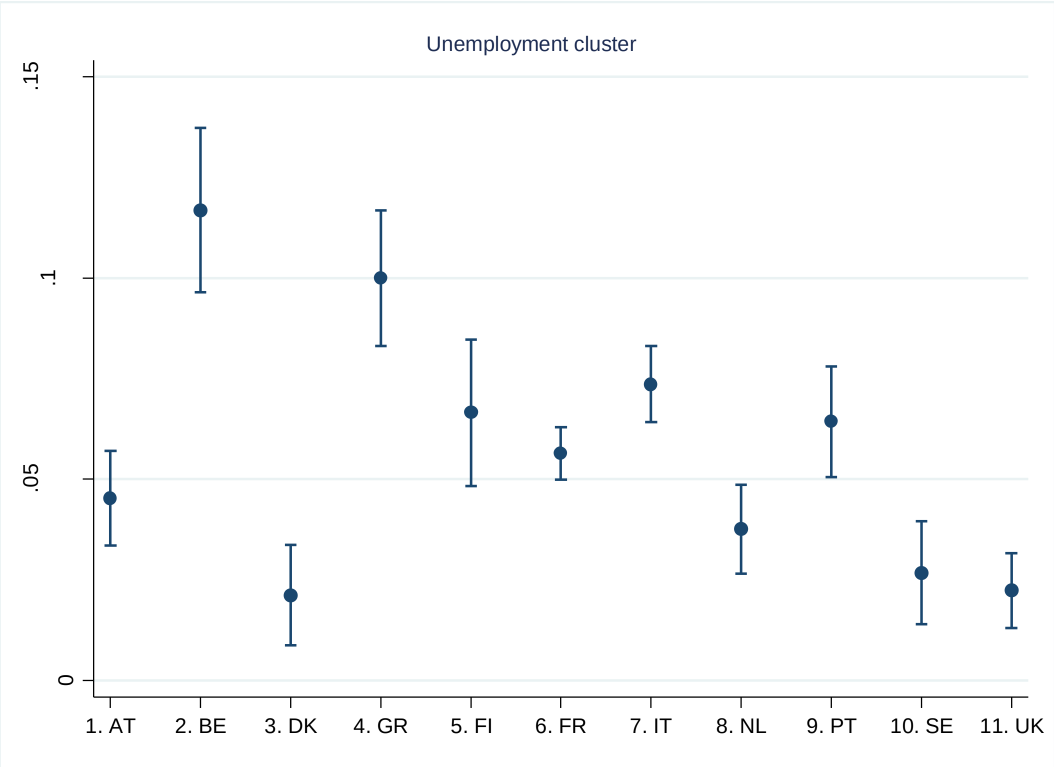



[100] I estimated 22 models, two for each country across time. I am not going into details about the country-specific patterns here because I have thoroughly discussed them in Chapter 4 and in the above sections.


Part-time employment cluster
0
.1
.2
.3
.4
1. AT
2. BE
3. DK
4. GR
5. FI
6. FR
7. IT
8. NL
9. PT
10. SE
11. UK


Full-time self-employment cluster
.05
.1
.15
.2
.25
.3
1. AT
2. BE
3. DK
4. GR
5. FI
6. FR
7. IT
8. NL
9. PT
10. SE
11. UK


Part-time self-employment cluster
0
.02
.04
.06
1. AT
2. BE
3. DK
4. GR
5. FI
6. FR
7. IT
8. NL
9. PT
10. SE
11. UK


Unemployment cluster
0
.05
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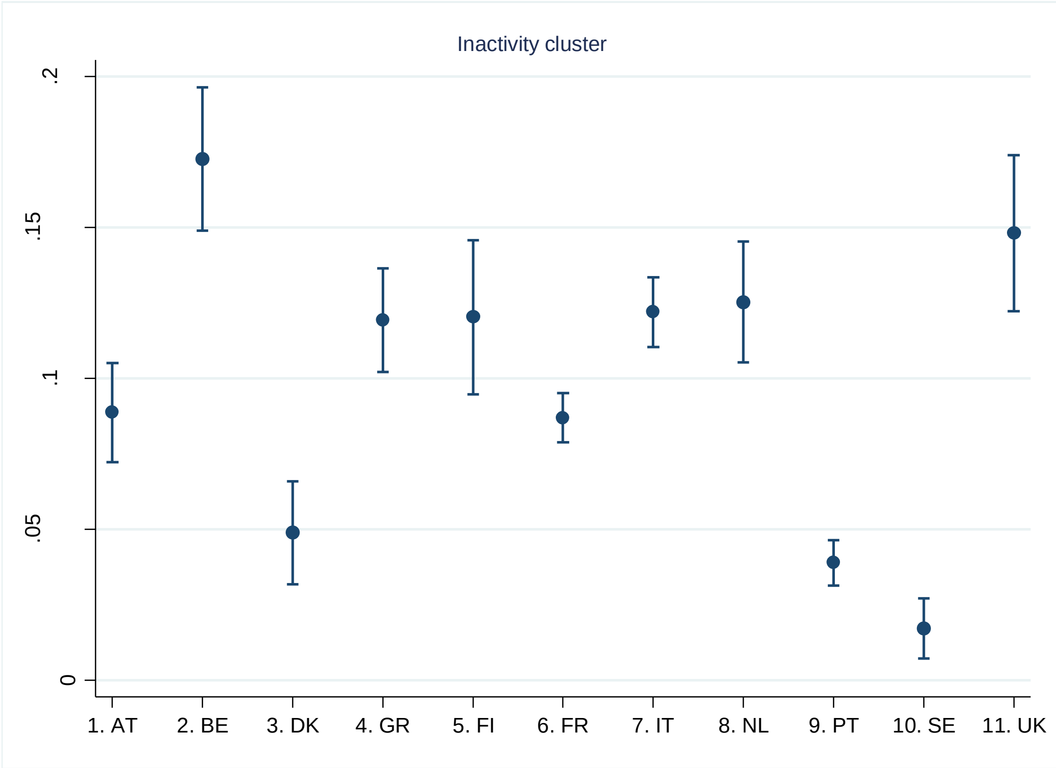
1. AT
2. BE
3. DK
4. GR
5. FI
6. FR
7. IT
8. NL
9. PT
10. SE
11. UK




Source: EU-SILC 2009-2012

## 5.5 Conclusions

*Are employment inequalities more pronounced after the start of the 2008 financial crisis in Europe and if yes in which countries?* In this chapter, I study the effects of gender, age and education on individual occupational trajectories across time – before and during the Great recession – and across eleven European countries.

First of all, during both time periods, stability in full-time employment is the most frequent sequence among individuals. However, this is not the case for all the sub-groups of the sample and countries in analysis. Greek women and low educated people are frequently inactive, Dutch women are often employed in part-time jobs, while people between 55 and 64 years old are frequently retired. According to the TLMs approach, stable employment is still the main pillar of paid work, although not the only alternative against non-employment (Schmid 1995; Gazier and Gautié

2011; Brzinsky-Fay 2010). In fact, part-time employment has a strong female connotation, especially among young women, and is frequent in the Netherlands, Sweden and the UK, as well as part-time self-employment, which is more common among Greek, British, Dutch and Portuguese women (overall at low rates), while full-time self-employment is more frequent among men, especially in Greece and Finland.

In essence, women's employment trajectories appear without a doubt more turbulent and fragmented compared to men's trajectories, which appear uniform and stable in full-time employment. The main gender differences lie in the use of part-time employment and inactivity, which are both dominant among the female labour force. Interestingly, these gender differences are less evident at higher education levels. In other words, education matters more for women: the gender differences regarding employment (full and part-time) appear more marked between women and men with low education levels, rather than between women and men with high levels of education.

During the years of the financial crisis, gender disparities in employment and unemployment appear less pronounced in most of the countries. The main reason for this pattern is the decrease in full-time employment among men rather than its increase among women. In fact, male full-time employment decreases in all the countries (except for Sweden) and, at the same time, male unemployment increases in all the countries (except for Austria and the Netherlands). Unemployment among men, especially among low educated men, increases particularly in Greece, Italy and Belgium. In accordance with Hypothesis 2.1, female inactivity decreases in most of the countries, especially in Austria, the Netherlands, Greece and Italy, with women becoming active in the labour force as a counter balance to the increased men's unemployment and thus a possible reduction in the household's income (added worker effect). Further investigation would be interesting of the labour market sequences of the spouses of these women who transit from unpaid work to labour market activity to explore the added worker effect. Moreover, focusing on women's labour market patterns during the financial crisis it would be crucial to study the composition of their households, a variable not available in my dataset. According to previous studies, several differences between labour market patterns are driven not by gender, but by the presence of young children (Boeckmann et al. 2015).

The effect of gender varies across countries (Erhel et al. 2014). Two Nordic countries (Denmark and Finland) together with Portugal and France offer the most equal chances of full-time employment in both men and women during the financial crisis, consistent only partially with Hypothesis 2.2. Furthermore, although female inactivity decreased in Greece and Italy during the years of the crisis, it still remains at worryingly high levels. Both countries are known for their limited support to women in order to combine family and work, as well for a high share of unpaid female workers in family businesses, leading to high rates of female inactivity and preserving as dominant the traditional model of households with a man breadwinner and a housewife taking care of family-related tasks (Anxo et al. 2007; Karamessini 2014b). Finally, in countries with dual working time regimes (Schmid 1998), mainly the Netherlands, Sweden and the UK, followed by Austria, Belgium and France, women are often employed as part-time workers. However, during 2009-2012, among these countries only Austria and Belgium show an increase in this form of employment among women. Nonetheless, numerous maintenance transitions between different working time regimes (full and part-time employment) are observed during the crisis in these countries, indicating that they offer more chances of adjusting one's occupational conditions without exiting to non-employment. In essence, Hypothesis 2.2 can only partially be confirmed.

According to the TLMs approach and the job competition theory younger people should be more affected by non-standard forms of employment and experience more turbulent employment sequences, especially during an economic shock. In fact, confirming Hypothesis 2.3, during 2009-2012, people aged between 25 and 34 years old appear more frequently employed in part-time jobs and in unemployment (especially young men) and experience more turbulent and fragmented sequences. At the same time, only older workers (55-64 years old) present an increase in full-time dependent employment and a decrease in inactivity registered by older women. Overall, during the crisis there is an increase in employment in favour of older workers, consistent with Bell and Blanchflower (2011). However, the effects of the crisis on the sequences of different age groups are not as evident as expected. A possible explanation might lie in the type of contracts analysed (the only available on a monthly basis). In fact, it is very common that young people have fixed-term contracts, zero-hour contracts and other forms of precarious contracts (Scarpetta et al. 2010). Furthermore, after excluding all individuals under 25 years old in order to avoid the majority of students and focus on labour market transitions, the sequences of the 25-34 and 35-54 years old groups appear overall similar and in my sample can all be considered as the core labour force and compared to older workers.

Hypothesis 2.4 states that countries with flexible labour markets offer more employment chances to younger workers compared to countries with rigid employment legislations and is partially rejected, since the best performers regarding youth full-time employment prior and during the crisis are Denmark and Sweden, together with Portugal, while the worst are Greece, Italy, Finland and the Netherlands. Finland however offers chances for full-time self-employment, while the Netherlands for part-time employment. Overall, young people appear more penalised in the Greek and Italian labour markets both prior and during the crisis, with more turbulent trajectories with higher incidence of non-employment and lower incidence of stable employment compared to the rest of the countries. Portugal shows some similarities with the Nordic countries, regarding full-time employment, while Finland has some similarities with the southern European countries concerning the use of full-time self-employment.

Highly educated people have an advantage in the European labour markets compared to people with lower levels of education; they are more frequently in stable dependent employment and the incidence of non-employment among their trajectories is not common. People with low levels of education (up to lower secondary education) besides being more often in non-employment, they experience more turbulent and fragmented employment sequences, especially during the financial crisis, consistent with Hypothesis 2.5. Although low educated people experience more fragmented (less uniform) trajectories during the economic crisis, they do not show a higher incidence of non-standard forms of employment compared to the other age groups. Education matters more for women, indicating that the gender inequalities diminish at higher levels of education and matters also more in Greece, Portugal, Finland and the UK, where the gap in stable dependent employment is larger between low and high educated compared to the rest of the countries in the analysis. Sweden, Denmark and the Netherlands on the other hand offer equal chances of full-time employment independently of the education level of the workers. During the financial downturn in Europe, there is a worsening of the occupational condition of highly educated workers, confirming the phenomenon of 'educated unemployment' and thus the employment disparities between workers of different education levels appear more contained, although still evident.

Last but not least, a key feature emerged from Chapters 4 and 5 is a significant heterogeneity between countries regarding individual labour market sequences. As mentioned above, I study each country separately, but I present the country sequence plots in groups of countries. The country heterogeneity is not only evident between country groups, but also within countries belonging to the same group. In this chapter I use two country classifications; one by Anxo et al. (2007) for women's employment sequences and one by Walther (2006) studying labour market trajectories by age and education. According to the empirical findings, in both country classifications there are alterations to suggest. Finland based on its use of full-time self-employment is more similar to Greece and Italy than the rest of the Nordic countries, while Portugal because of a high share of full-time employment appears more similar to Denmark and Sweden. Sweden and the UK show similarities based on the use of part-time employment, while Belgium and the Netherlands appear rather unique, or else hybrid cases. Hence, the decision of studying each country separately is justified and seems the only way of identifying the national patterns, which as seen in these chapters are masked if Europe is analysed as a whole.

# 6

## Chapter 6 Does the Region of Residence Matter in Employment Chances during the European Financial Recession?

The analysis presented in Chapters 4 and 5 highlighted the between-country heterogeneity in labour markets. There have been however indications in the literature that "the variation of regional labour markets can be as large as the variation between European countries" (Decressin and Fatás 1995; Elhorst 2003, p.1). Regional variation in the main labour markets indicators - employment and unemployment rates - has been often pointed out (Overman and Puga 2002; Caroleo and Coppola 2005). In this chapter, the analysis focuses on the likelihood of being employed during the four years of the financial European crisis (2009-2012) broken down by region, i.e. beyond the national borders.

**Does the region of residence matter for individuals' chances of being employed during the crisis?** I explore whether there is regional variation regarding the employment outcomes of individuals and which regions are associated with the highest employment proportions during the crisis. The research hypotheses tested in this chapter are formulated based on the literature review presented in Chapter 2, section 2.4. **Hypothesis 3.1**: A strong regional heterogeneity is expected in employment outcomes, especially across countries that are non-members of the Eurozone (Marelli 2007; Marelli and Signorelli 2010). **Hypothesis 3.2**: Regions with high resilience to the economic shock, i.e. fast recovery from the crisis, are expected to offer higher chances of employment during 2009-2012 (Diodato and Weterings 2015). These regions usually have strong economies and labour markets that applied successful adjustment strategies, i.e. Nordic and Central European regions.

**Hypothesis 3.3**: The geographical position of a region affects its performance. A regional bipolarisation is expected to emerge from the study, dividing Europe in developed and less developed regions with the less-developed regions presenting more pronounced divergence (Caroleo and Coppola 2005; Ezcurra et al. 2005; Lapavitsas et al. 2010; Karamessini 2014a). **Hypothesis 3.4**: The regional sectoral structure of employment appears to affect the employment variation between regions (Niehburn 2003; Marelli 2007; Bracalente and Perugini 2010; Marelli and Signorelli 2010).

Before presenting the results of the statistical analysis, I briefly discuss the multilevel model applied, as well as the sample of the analysis because it is not identical to the previous two chapters (see Chapter 3, section 3.3.4). Then the context of analysis, i.e. the European regions, is defined and described. Finally, I present a variance component model and random intercept models with the purpose of answering the research question. In the following pages, tables, figures and maps are presented to summarise the results. Some of these tables and figures are produced using the EU-SILC longitudinal component, while others using the Eurostat and GISCO online database (see notes of each figure).

## 6.1 Modelling the Employment Outcomes in Regional Labour Markets

This analysis focuses on the years of the financial crisis, 2009-2012. The sample (N=17,967) consists of all individuals followed for four consecutive years, aged between 25 and 64 years old during the first year of each panel (in 2009). The difference in the sample lies in the countries of analysis: eight countries out of the eleven previously analysed provided regional data; Austria, Belgium, Greece, Italy, Sweden, Finland, France and the United Kingdom. The next section discusses thoroughly the regions of analysis.

The aim of the analysis is to model the chances of employment offered by European regions throughout the financial crisis. Hence, I model the proportion of months spent in employment (including full and part-time dependent and self-employment) by an individual, i.e. the number of months spent in employment divided by the total number of months in the panel[101] (denominator=48 months). In other words, I model the proportion of months spent in (any form of) employment versus the proportion of months spent in unemployment, inactivity or retirement.

The initial plan was to model the variable emerged from the cluster analysis discussed in section 4.2.1, however that was proved computationally impossible (see section 3.3.4 for a detailed discussion). Therefore, I model employment at regional level. I chose to model the probability of being employed instead of the unemployment or inactivity incidence, because employment appears a more accurate indicator of regional labour market performance during the financial meltdown. Unemployment and inactivity may be the result of different reasons that are strongly dependent on the institutional set up of each country. For instance, Greece and Italy register high shares of female inactivity due to a lack of work-family policies (Boeckmann et al. 2015). Moreover, the unemployment rate without the NEET rate is incomplete, since it might count students among the unemployed (Raffe 2011). Changes in unemployment, as well as in employment but to a lower degree, may be due to various reasons, such as high inactivity rates, expansion of education and training (as a tool to avoid unemployment), migration of workers to other regions/countries (Marelli 2007, p. 173; Davies 2011). In fact, during the financial downturn there has been an experience of significant geographical labour mobility and especially intra-EU mobility (Holland and Paluckowski 2013), which might explain the decrease of unemployment in some regions, and especially in regions badly hit by the financial recession (Davies 2011, p. 379; Diodato and Weterings 2015).

[101] To construct this variable I collapsed my original monthly data in order to obtain the average number of months spent in employment across the full duration of the panel.

Another reason for modelling the probability of being employed lies in the characteristics of the sample. One of the main findings of Chapter 4 is that the most frequent labour market sequence in all the countries consists of stability in dependent full-time employment, i.e. being in standard employment during the whole duration of the panel (for 48 months). Therefore, I expect the mean employment duration to be relatively high in my sample. Indeed, the proportion of months spent in employment represents 70% of the total panel duration (see Table 6.3 in section 6.2). That leaves a heterogeneous group of unemployed and inactive people representing less than 20% of the whole panel. In detail, 6% were unemployed, 12% inactive and 12% retired. Consequently, the variable measuring the proportion of months spent in employment is not linearly distributed.

I fit a two-level binomial model with a logit function (Rasbash et al. 2012; Rabe-Hesketh and Skrondal 2012), using the MLwiN package (Browne 2015; Charlton et al. 2017). The first level of analysis consists of individuals, while the second of regions of residence. Time is not a level of analysis, since it is included in the outcome variable, i.e. in the proportion of months spent in employment. As anticipated in Chapter 3 (section 3.3.4), countries could be added as an extra level of variation. For reasons of the reliability of the model estimates, I decided not to do so. Only eight units in level-3 might lead to biased estimates, especially regarding the variance parameters (Bryan and Jenkins 2016). In fact, including countries as dummy variables provides more robust estimates (Bryan and Jenkins 2016).

## 6.2 European Regions of Analysis

In the sample of analysis, the region of residence of the household at the date of the interview is coded using the Nomenclature of territorial units for statistics (NUTS) classification[102]. In the longitudinal component of the EU-SILC dataset, the level of regional disaggregation for most of the countries (Austria, Belgium, Greece, Italy, Sweden and the UK) is at 1 digit (NUTS1), while for Finland and France at 2 digits (NUTS2). Finland according to NUTS1 is divided in two categories, one for mainland Finland and one for the autonomous Åland islands. Therefore, I analyse Finland at NUTS2. On the other hand, France needs to be transformed from 2 digits into 1 digit[103]. Three countries previously analysed were excluded from the analysis: Portugal and the Netherlands did not provide any regional data, while Denmark is coded as only one region (DK0) representing the whole country.

Table 6.1 presents the regions of analysis and their distribution and clearly underlines the different regional dimensions. Some of the regions, mainly Northeast England (UKC) and London (UKI), have small sample sizes, together with Northern Ireland (UKN) which is omitted from the analysis since there are only 5 individuals who reside in this region. Multilevel models control for differences in the sampling size across regions. Addittionaly, in the multilevel models presented in this chapter I control for variables used to create weights in my data, namely socio-demographic individual characteristics - gender, age, education, marital status - and also for some regional characteristics (such as population density). For these reasons, the application of weights is not required. Although the estimates of regions with small

[102] From 2008 and onwards, it was agreed by the Working Group to use the classification NUTS-08, replacing NUTS-03. In the dataset of 2012 the regional variable is coded according to NUTS-10.
[103] **FR1 Île de France**: Île de France (FR10); **FR2 Bassin Parisien**: Champagne-Ardenne (FR21), Picardie (FR22), Haute-Normandie (FR23), Centre (FR24), Basse-Normandie (FR25), Bourgogne (FR26); **FR3 Nord-Pas-de-Calais**: Nord - Pas-de-Calais (FR30); **FR4 Est**: Lorraine (FR41), Alsace (FR42), Franche-Comté (FR43); **FR5 Ouest**: Pays de la Loire (FR51), Bretagne (FR52), Poitou-Charentes (FR53); **FR6 Sud-Ouest**: Aquitaine (FR61), Midi-Pyrénées (FR62), Limousin (FR63); **FR7 Centre**: Rhône-Alpes (FR71), Auvergne (FR72); **FR8 Mediterranee**: Languedoc-Roussillon (FR81), Provence-Alpes-Côte d'Azur (FR82),Corse (FR83).

sample sizes are not biased[104], these regions will make a small contribution to the model (Snijders and Bosker 2012, pp. 221-222). According to the Centre for Multilevel Modelling, the application of weights when using the recommended Markov Chain Monte Carlo (MCMC) simulation methods is not available in MLwiN (at the time of writing of this thesis) and thus when analysing a binomial or discrete variable the use of weights is not recommended.

**Table 6.1 – Country and region of residence, EU-SILC 2009-2012**

| Country and Region of residence | Freq. | Percent |
|---|---|---|
| **Austria** | **1,568** | **8.72** |
| Eastern Austria (AT1) | 644 | 3.58 |
| Southern Austria (AT2) | 325 | 1.81 |
| Western Austria (AT3) | 599 | 3.33 |
| **Belgium** | **1,272** | **7.08** |
| Region of Brussels (BE1) | 160 | 0.89 |
| Flemish (BE2) | 658 | 3.66 |
| Wallonia (BE3) | 454 | 2.53 |
| **Greece** | **1,635** | **9.1** |
| North Greece (GR1) | 670 | 3.73 |
| Central Greece (GR2) | 404 | 2.25 |
| Attica (GR3) | 377 | 2.1 |
| Aegean islands and Crete (GR4) | 184 | 1.02 |
| **Finland** | **825** | **4.59** |
| Central Finland (FI19) | 240 | 1.34 |
| Helsinki-Uusimaa (FI1B) | 190 | 1.06 |
| South Finland (FI1C) | 212 | 1.18 |
| Northeast Finland (FI1D) | 183 | 1.02 |
| **France** | **6,833** | **38.02** |
| Île de France (FR1) | 990 | 5.51 |
| Bassin Parisien (FR2) | 1265 | 7.04 |
| Nord -Pas-de-Calais (FR3) | 533 | 2.97 |
| East France (FR4) | 684 | 3.81 |
| West  France (FR5) | 1150 | 6.4 |
| Southwest France (FR6) | 837 | 4.66 |
| Central-East France (FR7) | 734 | 4.08 |
| Méditerranée (FR8) | 640 | 3.56 |
| **Italy** | **3,946** | **21.96** |
| Northwest Italy (ITC) | 827 | 4.6 |
| South Italy (ITF) | 856 | 4.76 |
| Italian Islands (ITG) | 318 | 1.77 |
| Northeast Italy (ITH) | 1,015 | 5.65 |
| Central Italy (ITI) | 930 | 5.17 |
| **Sweden** | **672** | **3.74** |
| East Sweden (SE1) | 248 | 1.38 |
| South Sweden (SE2) | 308 | 1.71 |

[104] The model parameters ae expected to be biased only if the distribution of the residuals is related to the sampling design (Snijders and Bosker 2012, p. 222).

| | | |
|---|---|---|
| North Sweden (SE3) | 116 | 0.65 |
| **United Kingdom** | **1,221** | **6.79** |
| Northeast England (UKC) | 45 | 0.25 |
| Northwest England (UKD) | 155 | 0.86 |
| Yorkshire and the Humber (UKE) | 142 | 0.79 |
| East Midlands England (UKF) | 111 | 0.62 |
| West Midlands England (UKG) | 108 | 0.6 |
| East of England (UKH) | 128 | 0.71 |
| London (UKI) | 80 | 0.45 |
| Southeast England (UKJ) | 147 | 0.82 |
| Southwest England (UKK) | 92 | 0.51 |
| Wales (UKL) | 95 | 0.53 |
| Scotland (UKM) | 113 | 0.63 |
| Northern Ireland (UKN) | 5 | 0.03 |
| **Total** | **17,972** | **100** |

Source: EU-SILC 2009-2012

The regions do not vary only regarding their sample sizes but also concerning the distribution of residents based on individual characteristics, such as age, gender, education and marital status (Table 6.2). The average age of the sample is 46.3 years old. The oldest regions, with a mean age between 49 and 50 years old, are Central (FI19) and Northeast (FI1D) Finland and North Sweden (SE3), while among the youngest regions (mean age equals to 44-45 years old) are East Sweden (SE1) and the Greek capital (GR3). Men are underrepresented (below the average of 47.6%) in Northeast England (UKC), Southwest England (UKK) and Scotland (UKM), while they are overrepresented, with a rate of 63% in Northeast Finland (FI1D). In line with Eurostat (2015), significantly more married people are included in the Mediterranean regions of Greece and Italy, especially in North Greece (GR1), South Italy (ITF) and the Italian islands (ITG), together with Southwest England (UKK). On the contrary, East and North Sweden (SE1 and SE3) and Northwest England (UKD) present the lowest rates of married people, significantly below the average (68%).

Heterogeneity in the highest level of education attained is evident both between and within countries. For instance, while all the British regions demonstrate a relatively high rate of people with high levels of education (all significantly above the sample mean of 28.1%), Northeast England (UKC) is placed below (24.4%) the sample mean. Capital regions have the highest rates of people with a degree of tertiary education (above 40%): Brussels (BE1), Helsinki (FI1B), Paris (FR1), Stockholm (SE1), together with the Flemish region (BE2). Greek (except Attica GR3) and Italian regions register the lowest rates of people with a tertiary degree (below 20%). At the same time, three Greek regions show the highest rates of people with low levels of education (up to primary education), rates above 30%, compared to 12% of the Greek capital region Attica (GR3). Similarly, there are some within-Italy differences, with the south (ITF) and the islands (ITG) with a rate of 18-19%, against the rest of Italy that does not exceed 11% of people with low education. The British, Finish and Austrian regions do not include any people with low levels of education in the sample of analysis.

**Table 6.2 – EU-SILC regions by individual characteristics, 2009-2012**

| Region | Sample size (Freq.) | Mean age | Men (%) | Women (%) | People with tertiary education (% of total region) | People with up to primary education (% of total region) | Married (%) |
|---|---|---|---|---|---|---|---|
| AT1 | 644 | 46.1 | 47.8 | 52.2 | 30.1 | 0.2 | 63.7 |
| AT2 | 325 | 46.6 | 42.8 | 57.2 | 22.2 | 0 | 64 |
| AT3 | 599 | 45.1 | 47.6 | 52.4 | 25.9 | 0 | 69.3 |
| BE1 | 160 | 45.4 | 43.8 | 56.3 | 56.3 | 10.6 | 61.9 |
| BE2 | 658 | 46.3 | 46.8 | 53.2 | 41.3 | 6.5 | 67.9 |
| BE3 | 454 | 46.2 | 47.8 | 52.2 | 36.6 | 7.7 | 65.4 |
| GR1 | 670 | 46.1 | 49.9 | 50.2 | 18.2 | 29.9 | 82.4 |
| GR2 | 404 | 46.5 | 47.5 | 52.5 | 15.8 | 37.1 | 78.2 |
| GR3 | 377 | 44.9 | 49.9 | 50.1 | 36.1 | 11.9 | 77.5 |
| GR4 | 184 | 46.8 | 46.2 | 53.8 | 20.7 | 30.4 | 79.4 |
| FI19 | 240 | 49 | 47.9 | 52.1 | 30 | 0 | 67.9 |
| FI1B | 190 | 47.1 | 47.9 | 52.1 | 55.8 | 0 | 64.7 |
| FI1C | 212 | 48.5 | 48.6 | 51.4 | 36.8 | 0 | 64.6 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| FI1D | 183 | 49.7 | 62.8 | 37.2 | 27.9 | 0 | 62.8 |
| FR1 | 990 | 46.9 | 47.4 | 52.6 | 43.6 | 8.5 | 65.3 |
| FR2 | 1265 | 45.8 | 47.4 | 52.7 | 26.3 | 10.2 | 64.5 |
| FR3 | 533 | 45.4 | 47.1 | 52.9 | 23.1 | 11.4 | 64.7 |
| FR4 | 684 | 45.6 | 48.4 | 51.6 | 24.3 | 8.8 | 64.9 |
| FR5 | 1150 | 45.9 | 47.4 | 52.6 | 29 | 6.8 | 64.4 |
| FR6 | 837 | 46.5 | 47.6 | 52.5 | 27.7 | 7.6 | 60.3 |
| FR7 | 734 | 45.5 | 49.5 | 50.5 | 33.9 | 5.6 | 63.1 |
| FR8 | 640 | 46.9 | 44.5 | 55.5 | 32.2 | 6.7 | 63.8 |
| ITC | 827 | 46.7 | 48.4 | 51.6 | 16.4 | 11.7 | 73.5 |
| ITF | 856 | 45.7 | 46.7 | 53.3 | 11.4 | 18.1 | 77.7 |
| ITG | 318 | 46.1 | 44.7 | 55.4 | 12.3 | 18.9 | 75.2 |
| ITH | 1015 | 46.8 | 49.4 | 50.6 | 14.7 | 10.6 | 72.9 |
| ITI | 930 | 46.3 | 47.9 | 52.2 | 15.7 | 11.1 | 71.2 |
| SE1 | 248 | 44.8 | 50.4 | 49.6 | 48.8 | 1.6 | 56.9 |
| SE2 | 308 | 45.4 | 48.7 | 51.3 | 39 | 1.9 | 62.3 |
| SE3 | 116 | 49.3 | 44 | 56 | 34.5 | 4.3 | 58.6 |
| UKC | 45 | 46.6 | 40 | 60 | 24.4 | 0 | 64.4 |
| UKD | 155 | 48.3 | 45.8 | 54.2 | 37.4 | 0 | 56.1 |
| UKE | 142 | 46.3 | 43.7 | 56.3 | 48.6 | 0 | 66.9 |
| UKF | 111 | 47.6 | 44.1 | 55.9 | 30.6 | 0 | 68.5 |
| UKG | 108 | 48.3 | 43.5 | 56.5 | 36.1 | 0 | 73.2 |
| UKH | 128 | 47.8 | 46.1 | 53.9 | 43 | 0 | 72.7 |
| UKI | 80 | 46.1 | 48.8 | 51.3 | 52.5 | 0 | 72.5 |
| UKJ | 147 | 48.8 | 48.3 | 51.7 | 48.3 | 0 | 70.8 |
| UKK | 92 | 46.6 | 39.1 | 60.9 | 41.3 | 0 | 77.2 |
| UKL | 95 | 46.6 | 45.3 | 54.7 | 50.5 | 0 | 72.6 |
| UKM | 113 | 46.6 | 40.7 | 59.3 | 46.9 | 0 | 69.9 |
| **Total** | **17,967** | **46.3** | **47.6** | **52.4** | **28.1** | **9.2** | **68.1** |

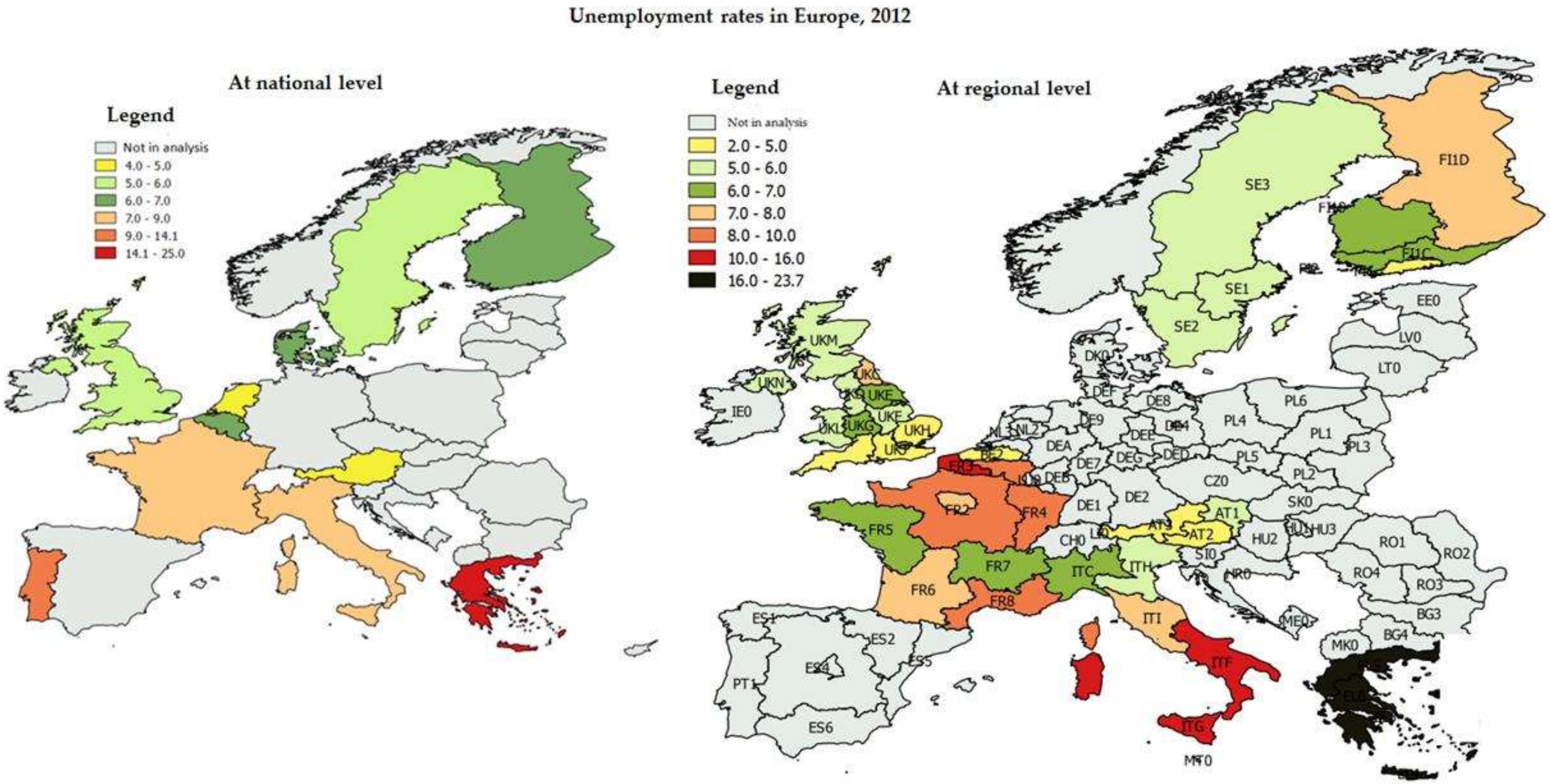
Source: EU-SILC 2009-2012

Two maps displaying the unemployment rate in 2012 at national and regional level have been constructed using online Eurostat and GISCO data and the software QGIS[105] (Figure 6.1). The maps highlight the heterogeneity regarding national and regional labour market performances. Regions belonging to the same country do not necessarily present similar unemployment rates and countries are affected by their regional breakdown. For instance, Italy is a good example of within-country heterogeneity, with the south underperforming compared to the richer and more

[105] Quantum GIS Development Team (2015). Quantum GIS Geographic Information System. Open Source Geospatial Foundation Project. http://qgis.osgeo.org

industrialised north. In line with Overman and Puga (2002) and Mussida and Pastore (2012), Italy is mapped using four different colours. *Mezzogiorno*, including southern Italy and the islands, is different from the centre, which is different from the northwest and northeast parts of the country. Similarly, France, the UK and Finland show at least 3 or 4 different colours within their territory. The only two countries with regional convergence are Greece and Sweden (only one colour used). Northwest Italy (ITC) and Centre-East France (FR7), neighbour regions, are mapped in the same colour indicating an unemployment rate between 6-7%, while the rest of the French and Italian regions register different rates (Figure 6.1).

**Figure 6.1 – Unemployment rates (%, people over 25 years old) at national (11 countries) and regional (42 regions) level, 2012**




© EuroGeographics for the administrative boundaries; Source: Unemployment data downloaded from Eurostat online dataset, codes: une_rt_a, lfst_r_lfu3rt. Extracted on 22/11/2016 and 19/05/2017. Unemployment rate as % of active population: at national level for people 25-74 years old; at regional level for people above 25 years old.
Geographic data downloaded from Eurostat GISCO: http://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/administrative-units-statistical-units/nuts#nuts13.
File name: NUTS_2013_10M_SH.zip. Software used: QGIS version 2.18.2 Las Palmas.

Focusing on the regional employment rate displayed in Table 6.3, the highest proportions are observed among the three Swedish regions (between 0.91 and 0.93), Southwest England with Bristol city being the main economic centre (UKK - 0.84), Helsinki (FI1B - 0.83) and Wales (UKL - 0.81). On the other hand, the lowest employment proportions belong to the Italian *Mezzogiorno* (ITG 0.52 and ITF 0.54), the Greek capital, North Greece (GR3 0.6 and GR1 0.62), the British capital region[106] (UKI - 0.63) and Belgian Wallonia (BE3 - 0.62), the region with the lowest GDP per capita in Belgium (Table 6.8). Concerning unemployment, the highest proportions (between 0.10-0.12) are observed in Brussels (BE1 - 0.13), South Italy (ITF), Wallonia (BE3), Italian islands (ITG), Athens and North Greece (GR3 and GR1), while the lowest (below 0.02) in seven British regions and North Sweden (SE3). Finally, the Italian *Mezzogiorno* has more than double the average inactivity (respectively 0.29 in the Italian islands and 0.27 in South Italy), followed by the Belgian capital (BE1 - 0.21), Northeast England (UKC – 0.20) and Central Greece (GR2 - 0.19), while the lowest proportion of inactivity appears in Sweden (0.02 in all three regions).

[106] We need to keep in mind the small sample size of London (UKI=80 individuals).

**Table 6.3 – Proportion of months spent in each labour market status by region, 2009-2012**

| Region | Employment | Unemployment | Inactivity | Retirement | Total |
|---|---|---|---|---|---|
| AT1 | 0.70 | 0.04 | 0.08 | 0.18 | **1** |
| AT2 | 0.66 | 0.06 | 0.07 | 0.20 | **1** |
| AT3 | 0.75 | 0.04 | 0.08 | 0.13 | **1** |
| BE1 | 0.64 | 0.13 | 0.21 | 0.03 | **1** |
| BE2 | 0.69 | 0.07 | 0.16 | 0.08 | **1** |
| BE3 | 0.62 | 0.12 | 0.17 | 0.08 | **1** |
| GR1 | 0.62 | 0.10 | 0.18 | 0.10 | **1** |
| GR2 | 0.65 | 0.08 | 0.19 | 0.09 | **1** |
| GR3 | 0.60 | 0.10 | 0.15 | 0.15 | **1** |
| GR4 | 0.64 | 0.08 | 0.16 | 0.11 | **1** |
| FI19 | 0.73 | 0.06 | 0.13 | 0.09 | **1** |
| FI1B | 0.83 | 0.03 | 0.08 | 0.06 | **1** |
| FI1C | 0.68 | 0.08 | 0.12 | 0.12 | **1** |
| FI1D | 0.65 | 0.08 | 0.18 | 0.08 | **1** |
| FR1 | 0.76 | 0.05 | 0.09 | 0.11 | **1** |
| FR2 | 0.72 | 0.06 | 0.09 | 0.13 | **1** |
| FR3 | 0.66 | 0.07 | 0.14 | 0.13 | **1** |
| FR4 | 0.71 | 0.06 | 0.10 | 0.13 | **1** |
| FR5 | 0.75 | 0.04 | 0.07 | 0.14 | **1** |
| FR6 | 0.72 | 0.05 | 0.09 | 0.14 | **1** |
| FR7 | 0.75 | 0.05 | 0.08 | 0.13 | **1** |
| FR8 | 0.70 | 0.05 | 0.12 | 0.13 | **1** |
| ITC | 0.65 | 0.05 | 0.14 | 0.16 | **1** |
| ITF | 0.54 | 0.12 | 0.27 | 0.07 | **1** |
| ITG | 0.52 | 0.12 | 0.29 | 0.08 | **1** |
| ITH | 0.70 | 0.04 | 0.12 | 0.13 | **1** |
| ITI | 0.66 | 0.07 | 0.14 | 0.12 | **1** |
| SE1 | 0.92 | 0.04 | 0.02 | 0.02[107] | **1** |
| SE2 | 0.93 | 0.03 | 0.02 | 0.02 | **1** |
| SE3 | 0.93 | 0.02 | 0.02 | 0.03 | **1** |
| UKC | 0.69 | 0.01 | 0.19 | 0.11 | **1** |
| UKD | 0.69 | 0.03 | 0.11 | 0.17 | **1** |
| UKE | 0.72 | 0.03 | 0.12 | 0.13 | **1** |
| UKF | 0.65 | 0.04 | 0.17 | 0.14 | **1** |
| UKG | 0.67 | 0.02 | 0.18 | 0.14 | **1** |
| UKH | 0.76 | 0.01 | 0.09 | 0.14 | **1** |
| UKI | 0.63 | 0.05 | 0.17 | 0.14 | **1** |
| UKJ | 0.73 | 0.01 | 0.13 | 0.13 | **1** |
| UKK | 0.84 | 0.01 | 0.06 | 0.10 | **1** |
| UKL | 0.81 | 0.02 | 0.08 | 0.10 | **1** |
| UKM | 0.69 | 0.01 | 0.17 | 0.13 | **1** |
| **Total** | **0.70** | **0.06** | **0.12** | **0.12** | **1** |

Source: EU-SILC 2009-2012

107 As anticipated in Chapter 4, the vast majority of the retired people in the Swedish sample (94%) are aged between 65 and 81 years old and hence are excluded from the sample of analysis.

## 6.3 Regional Effects on Employment Outcomes

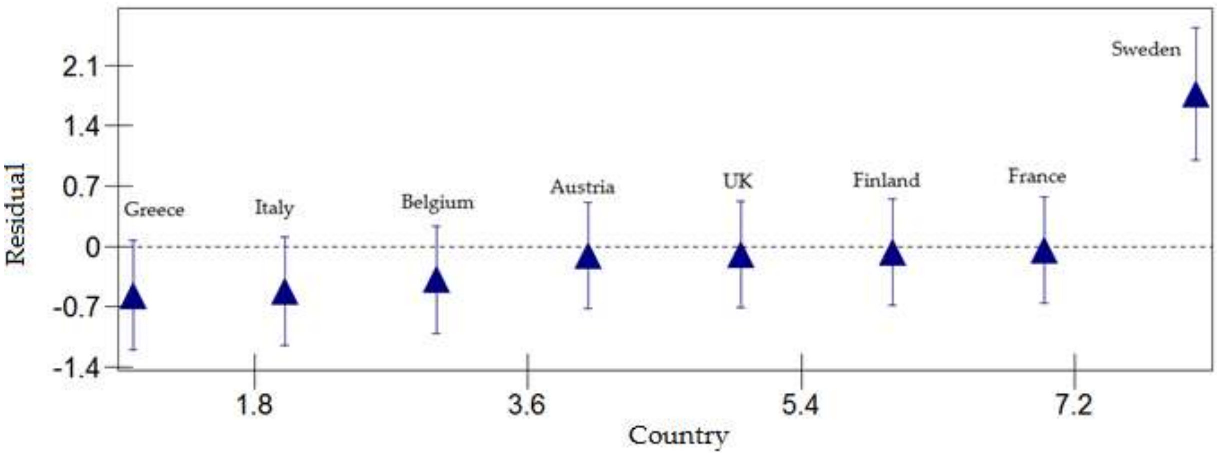
I firstly discuss a variance component (VC) model, which is a model without explanatory variables. The model decomposes the variance and analyses the sources of variation at random level, here at regional level. The purpose of the VC model is to explore how much variation in the proportion of time spent in employment is explained by the region of residence, to study the regional variation within and between countries and finally to establish which regions provide more chances of employment during the Great recession. This model can already answer part of my question on whether there is regional variation in the observed employment outcomes. However, before drawing any conclusions I also fit random intercept models (see next section) in order to control for individual and contextual factors.

As anticipated in section 6.1, the country of residence is not included as a level in the models. However, to justify empirically this decision, I fit a two-level variance component model with individuals (level-1) nested within countries (level-2). The country variance emerging from the model with countries at the highest level is 0.603, with a standard error of 0.446 and thus is not statistically significant. Moreover, based on the Deviance Information criterion (DIC), a model diagnostic that allows for model comparisons, the region-level model (discussed below - DIC=838,570) is better than the country-level model (DIC=845,979). A decrease in the values of the DIC measure (especially a decrease of 10 or more points) indicates a more parsimonious model, i.e. a better model (Jones and Subramanian 2009, pp. 193-194; Paterson et al. 2013). Nevertheless, the ratio of the between-country variance (level-2) to the total variance of the model, known as the variance partition coefficient (VPC[108], Goldstein 1991), indicates that the country variation explains 15% of the employment variation. As we can see from Figure 6.2, displaying the

[108] VPC is calculated by dividing the level-2variance by the sum of level-1 and level-2 variances (Plewis 1994, p. 122). In a binomial distribution with a logit link function the level-1 variance is 3.29.

random country-level residuals, Sweden appears to be ranked first, with the highest employment score (2.8[109]), while the score for Greece is 0.5.

**Figure 6.2 – Caterpillar plot of country effects on proportions of months spent in employment from variance component model**




Source: EU-SILC 2009-2012

Table 6.4 presents 2-level binomial logit models with individuals nested in regions, measuring the employment outcome in 2009-2012, with no explanatory variables (VC models). Table 6.4 shows the results of the same VC model using three different estimation procedures: a first order marginal quasi-likelihood (MQL1) estimation, a second order penalised quasi-likelihood (PQL2) procedure and finally a Markov chain Monte Carlo (MCMC) simulation estimation (more details in Chapter 3, section 3.3.4). It is known that MQL1 (and often PQL2) provides estimates often biased downwards (Browne and Draper 2006, p. 479; Leeuw and Meijer 2007, p. 189; Paterson et al. 2013, p. 177). In my case, both the results of MQL1 and PQL2 are biased downwards compared to the MCMC estimates. In fact, the level-2 variance according to the MCMC estimation equals to 0.325, slightly increased compared to the PQL2 estimation (0.303). Nonetheless, the PQL2 estimates are required as starting values for the MCMC simulation (Browne 2015). According to the MCMC

109 The score for each country is calculated by adding the intercept of the model (1.08) to the country residual.

model[110], 9% of the total variation in employment can be attributed to the differences between regions (VPC=0.09).

The equation of the model shown in Table 6.4 is logit($\pi_{ij}$)= $b_o$ + $u_{oj}$, where $\pi_{ij}$ is the probability for the proportion of months spent in employment during 2009-2012 for individual $i$ in region $j$, $b_o$ is the intercept of the model and $u_{oj}$ is the deviation of $j$ region from the average-region, i.e. the regional variation. The log-odds of the proportion of months spent in employment in an average region ($u_{oj}$=0) is estimated 0.918. The intercept for region $j$ is 0.918+$u_{oj}$, where the variance of $u_{oj}$ is estimated $\sigma_{uo}^2$=0.325. Using predicted probabilities, there is a 71.5% chance of being employed for 48 months in an average region.

**Table 6.4 – Binomial logit variance component models (MQL1, PQL2 and MCMC), log-odds of proportions of months spent in employment**

| Model | MQL1 | | PQL2[111] | | VC MCMC | |
|---|---|---|---|---|---|---|
| | Coeff. | S.E. | Coeff. | S.E. | Coeff. | S.E. |
| **Fixed Part** | | | | | | |
| Intercept | 0.878*** | (0.067) | 0.944*** | (0.086) | 0.918*** | (0.091) |
| **Random Part** | | | | | | |
| Level-2 variance | 0.185*** | (0.041) | 0.303*** | (0.067) | 0.325*** | (0.076) |
| Units: region | 41 | | 41 | | 41 | |
| Units: id | 17967 | | 17967 | | 17967 | |
| Estimation: | IGLS (MQL1) | | IGLS (PQL2) | | MCMC | |
| DIC: | | | | | 838569.7 | |
| pD: | | | | | 41.223 | |
| Burnin: | | | | | 500 | |
| Chain Length: | | | | | 5000 | |
| Thinning: | | | | | 1 | |

*p<0.10, **p<0.05, ***p<0.01; Source: EU-SILC 2009-2012

110 The trajectories of the VC MCMC model satisfy all the required conditions (see Figure 1, Appendix D). The Wald statistic for the VC MCMC model equals to 18.520, confirming that the regional variation is different from zero. The effective sample size of the model is 4,467. For more technical details on the diagnostics, trajectories and the Wald measure, please refer to Chapter 3, section 3.3.4.

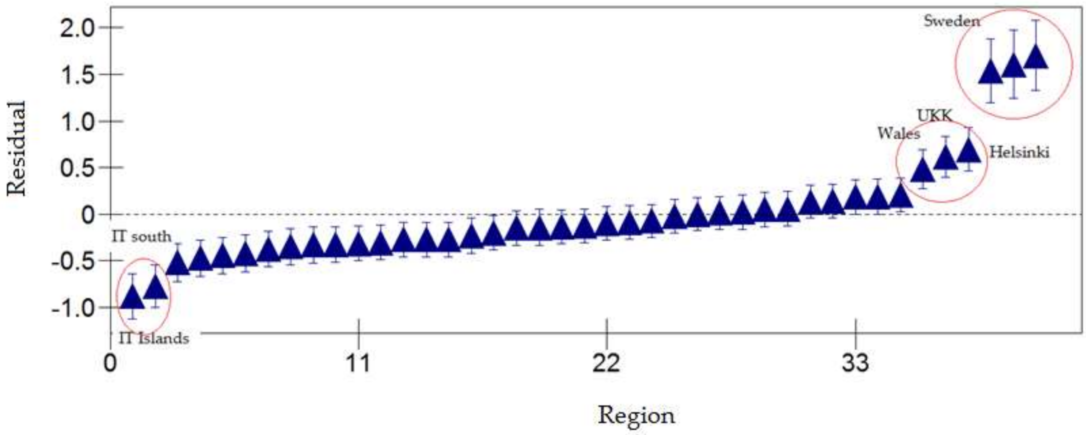
111 In the PQL2 model 8% of the variance in employment proportions can be explained by the regions. Moreover, using the Wald chi-square statistic, I confirm that the between-region variance is not zero (the test statistic equals to 20.652 significantly larger than 3.84).

Figure 6.3 displays the estimated level-2 residuals[112] for each region based on the MCMC parameters. The regional residuals indicate which regions have better or worse employment outcomes compared to the average employment proportion across all regions ($b_{oj}$), as well as the rank of the regions based on their random effect. From the caterpillar in Figure 6.3, three groups of regions distinguish from the rest of the data points. The three Swedish regions, followed by Wales, Southwest England (UKK) and the Helsinki region have a 95% confidence interval[113] that is above the horizontal line at zero, indicating that the proportion of months spent in employment is above average ($b_{oj}$=0.918). This finding is also confirmed by Table 6.3 in the previous section. On the other hand, the Italian islands and Italian south are below the line, indicating that being fully employed in *Mezzogiorno* is significantly below the regional average. In essence, on the upper side of the graph we have regions belonging to Nordic countries (Sweden and Finland) and the UK, while at the bottom left hand we have the Italian south.

[112] The level-2 residuals satisfy the assumptions of normality, linearity and homoscedasticity. The assumption of normality assumes that the distribution of the residuals is similar to a normal distribution, while the assumption of homoscedasticity assumes that the residuals do not present any pattern when graphed against one or more independent variables (Paterson et al. 2013, pp. 39-40). Table 1 in Appendix D shows the residuals, the standard deviation of the residuals and the regional ranking based on the residuals of this model.

[113] The confidence intervals (CIs) are relatively narrow mostly because of the large regional sample sizes. The size of the CI depends mainly on the sample sizes, but also on the estimates. As we can see from Figure 6.3 the three Swedish regions and the Italian islands present larger CIs (as well as larger standard deviation of the residuals – Table 1, Appendix D), indicating more unstable estimates and uncertainty in the extremes regions.

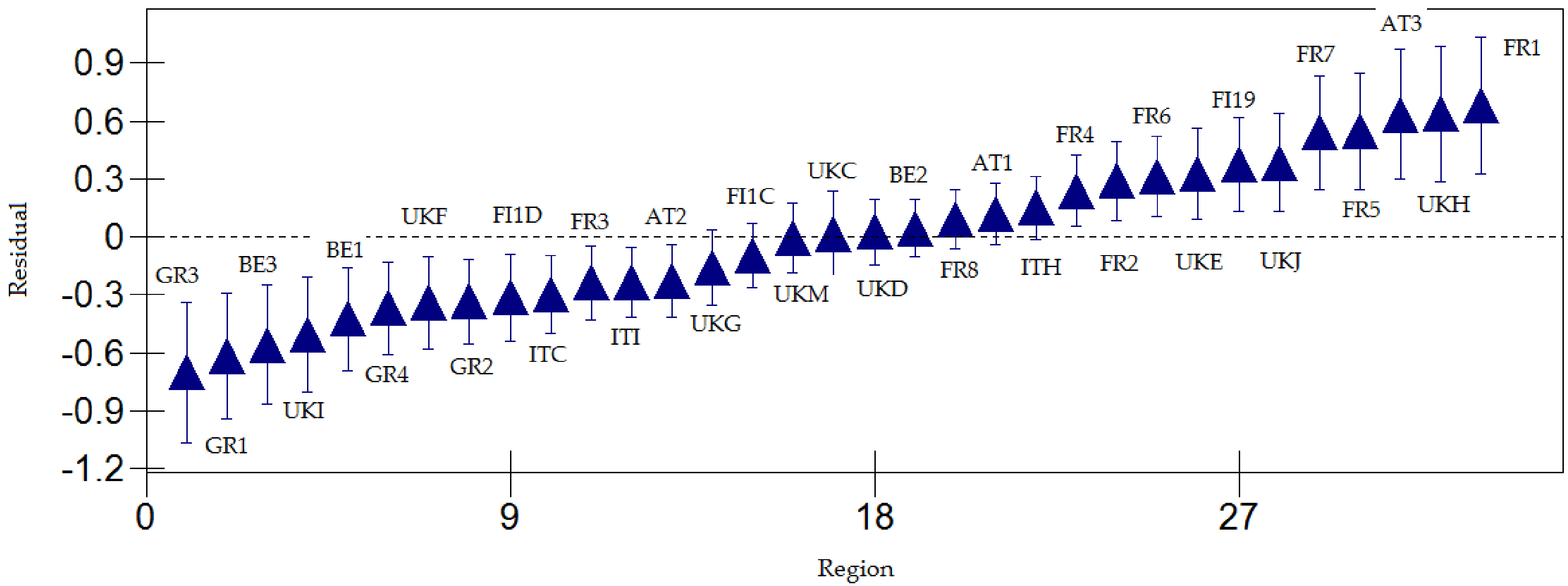
**Figure 6.3- Caterpillar plot of region effects on proportions of months spent in employment from the MCMC model**




Source: EU-SILC 2009-2012

A sensitivity analysis is conducted, excluding the outliers mentioned above from the analysis and plotting the region-level residual again (Figure 6.4). The residuals emerged from the two models are very similar and, consequently, the order of the regions in the two graphs (Figures 6.3 and 6.4) remains identical, indicating that the outliers should be included in the analysis.

**Figure 6.4 - Caterpillar plot of region effects on proportions of months spent in employment from the MCMC model – without the outliers**




Source: EU-SILC 2009-2012

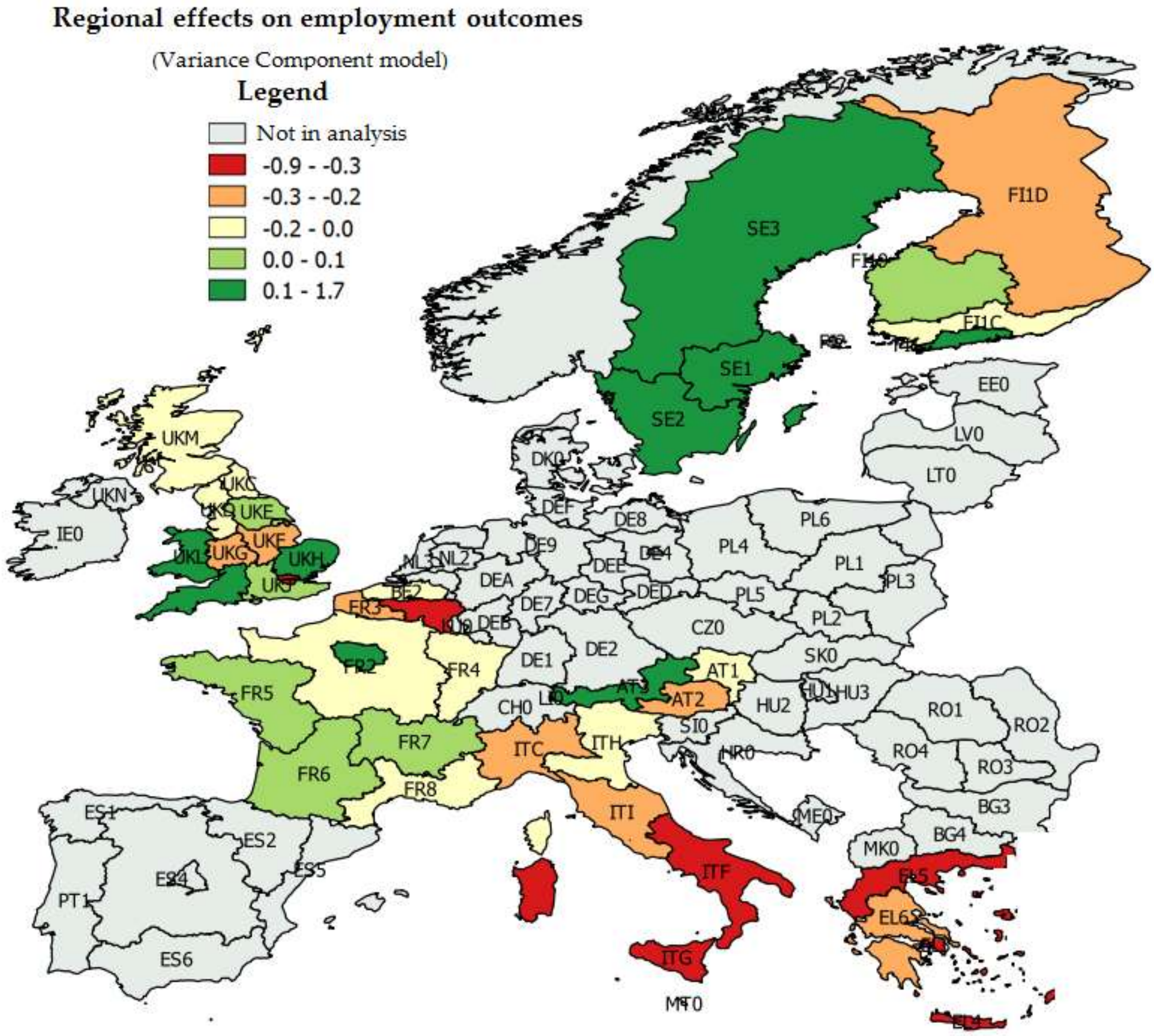
To visualise in a clear way the regional effects on employment outcomes, I construct a regional map of Europe using regional coordinates provided by Eurostat and regional residuals emerged from the VC MCMC model (Figure 6.5). The regions with positive residuals are mapped in shades of green, while the regions with the lowest residuals are mapped in dark red. The regions excluded from the analysis are mapped in grey. It is evident from the map that there is strong heterogeneity among regions regarding the employment outcomes during the financial crisis. Greece (except for the capital), South Italy, two Belgian regions (Brussels and Wallonia) and London[114] show the lowest employment proportions (dark red). Light shades of orange, indicating low levels of employment, are shown in Northeast Finland, the Greek capital and Northwest Italy, together with Southern Austria, Nord-Pas-de-Calais and two British regions (Yorkshire and the Humber; West Midlands England). On the other hand, respondents are more likely to be fully employed (for 48 months) in Sweden, Southwest England, Helsinki, Wales, the Paris region, East England and Western Austria (in dark green). I would expect countries with strong economies to offer higher employment chances within their borders (Hypothesis 3.2), but this is not the case here. Only Sweden fulfils this expectation. The other countries with strong economies, such as Finland and the UK, present heterogeneous patterns between their regions. Each Finish region is mapped in a different colour, similarly to the UK.

The map in Figure 6.5 reveals the presence of regional divergence in Europe, partly confirming Hypothesis 3.1. However, the two countries outside the Eurozone present different patterns, Sweden being the only homogeneous country, while the UK registers within-country heterogeneity, rejecting the second part of Hypothesis 3.1. Furthermore, no clear pattern of regional bipolarisation emerges between the south and the more industrialised north (Karamessini 2014a), but clear patterns of bipolarisation emerge within the national borders, dividing most of the countries in

[114] Caution is needed in the interpretation of the London results due to its small sample size (UKI=80 individuals).

two or more parts and confirming, at least partly, Hypothesis 3.3. Not surprisingly, Italy is divided in two parts, the south and the industrialised north, similarly to Greece, with the regions around Athens performing better that the north and the Greek islands. Southern France also presents better employment outcomes compared to Northern France, which is highly divergent. The British north (Scotland, Northeast and Northwest England) is homogeneous, while the rest of the country heterogeneous. Finally, although I do not analyse many neighbouring regions with regions of another country, I notice that Northeast Finland (FI1D) is the worst Finish performer and the only region neighbouring with Sweden, the best performer of this analysis. However, North Italy is definitely closer to Central Europe than to the South of Italy, which is clearly underperforming compared to the rest of the country (Verashchagina and Capparucci 2014).

**Figure 6.5 – Map of regional residual obtained from a binomial logit variance component model of log-odds of proportions of months spent in employment**



## 6.4 Individual and Contextual Effects on Employment Outcomes: Is the Region of Residence Still Important?

### 6.4.1 Individuals Factors

*What happens to the regional variation of employment outcomes after controlling for individual characteristics?* To answer this question, I fit a random intercept (RI) model to explore whether individual features (gender, age, education level and marital status) explain part of the regional variation in the employment status. In other words, I study whether the differences in employment between regions are due, even partially, to the differences in individual characteristics between the regional samples.

Before presenting and discussing the results of the RI models, I briefly describe the individual characteristics included in the models, all kept fixed (Table 6.5). All the individual characteristics studied in the model are time-constant. I control for gender (binary variable), age in 2009 (treated as a continuous variable and centred around the mean), a binary variable for tertiary education attainment[115] and a binary variable for married people[116]. I would have liked to include a binary variable for primary education as well, but as seen above some regional samples do not include people with lower levels of education (Table 6.2). I control for the education attainment as a proxy of human capital (Marelli and Signorelli 2010; Crescenzi et al. 2016). The marital status of individuals[117] is used because it is assumed to have an effect on their labour market outcomes, depending on the employment status and financial condition of the spouse and the division of domestic and familial tasks

[115] The variable measures the highest education level attained across the panel. Less than 1% of the sample showed a change in the education level during the four panel years.

[116] The binary variable marital status is kept constant: less than 1% of the sample showed a change in the marital status during the four panel years. The 'not married' category includes those who have never been married or who were separated, widowed or divorced.

[117] Controlling for the 'consensual union' variable together with the 'marital status' variable of individuals does not alter the results of the models, since individuals in consensual unions with a legal basis (including married people and registered partners) or without a legal basis are only 7% more than married individuals measured by the variable 'marital status'.

(Bittman et al. 2003; Anxo et al. 2007; Vaughan-Whitehead 2011). It is unfortunate that the longitudinal component of the EU-SILC does not provide information on the number of children.

**Table 6.5 – Individual characteristics of the EU-SILC longitudinal sample (time-constant variables), 2009-2012**

| Sample | Freq. | Percent |
|---|---|---|
| **Gender** | | |
| Men | 8,546 | 47.56 |
| Women | 9,421 | 52.44 |
| **Age groups (based on age in 2009)** | | |
| 25-34 | 3,049 | 16.97 |
| 35-54 | 9,879 | 54.98 |
| 55-64 | 5,039 | 28.05 |
| **Marital status** | | |
| Married | 5,724 | 31.86 |
| Not married | 12,243 | 68.14 |
| **Highest level of education attained** | | |
| Up to primary education | 1,645 | 9.16 |
| Lower secondary education | 3,037 | 16.9 |
| Upper/post-secondary education | 8,228 | 45.8 |
| Tertiary education | 5,057 | 28.15 |
| **Total** | **17,967** | **100** |

Source: EU-SILC 2009-2012

Table 6.6 presents three RI models, calculated using the MCMC simulation method[118]. Model I includes gender, age, education and marital status, while in Model II and Model III[119] interaction terms between gender and age and gender and tertiary education are added gradually.

[118] MQL1 and PQL2 RI models are presented in Table 2 in Appendix D. I use the estimates of the PQL2 process as starting values for the MCMC estimation.

[119] The equation of Model III is $\text{logit}(\pi_{ij})=b_0+b_1\text{women}_{ij}+b_2\text{agecentred}_{ij}+b_3\text{tertiary}_{ij}+b_4\text{married}_{ij}+b_5\text{women}_{ij}*\text{agecentred}_{ij}+b_6\text{women}_{ij}*\text{tertiary}_{ij}+\text{uoj}$, where $\pi_{ij}$ is the probability of the proportion of months spent in employment for individual $i$ in region $j$ during 2009-2012, $b_0$ is the intercept of the model, $b_k$ is the coefficient for each independent variable $k$, $x_{ik}$ is the value of $k$ independent variable for individual $i$ and $u_{0j}$ is the deviation of $j$ region from the average-region, i.e. the regional variation.

Before proceeding to the discussion of the coefficients, I briefly mention the diagnostics of Model III (the full model). The fixed part effects are all significant at the 1% level. The trajectories of the model satisfy all the conditions[120]. The level-2 residuals satisfy the assumptions of normality, linearity and homoscedasticity (see Figure 2 in Appendix D for Model III diagnostics). Furthermore, the Wald statistic equals to 17,894 which is significantly above the chi-squared critical value (3.841), confirming the significance of the level-2 variance. Finally, comparing the DIC diagnostics of the VC MCMC and the RI models, the DIC measure decreases sharply (from 838,570 to 681,433), indicating that Model III is substantially better at explaining the regional employment outcomes than the rest of the models presented in Table 6.6.

Model III explains the 11% (calculated using the VPC) of the variation in employment, while the simple VC MCMC model explains the 9%. The regional variation regarding employment outcomes equals to 0.325 in the VC MCMC model and 0.405 in Model III, controlling for individual-level predictors. The increase in level-2 variance indicates that the individual factors added to the model explain part of the variation in the whole sample, leaving however more within-region variation to be explained (Paterson et al. 2013, p. 59). In other words, individual characteristics affect the overall probability of being employed in the sample, but do not affect the regional variation in employment outcomes.

[120] I run the MCMC for 15,000 iterations as indicated by the Raftery-Lewis Nhat measure. Both the Brooks-Draper Nhat measure and the effective sample size (substantially above 1,000) confirm the robustness of the MCMC model.

**Table 6.6 – Binomial logit RI models controlling for individual characteristics, log-odds of proportion of months spent in employment (MCMC estimations)**

| Model | VC MCMC | | Model I | | Model II | | Model III | |
|---|---|---|---|---|---|---|---|---|
| | Coeff. | S.E. | Coeff. | S.E. | Coeff. | S.E. | Coeff. | S.E. |
| **Fixed part** | | | | | | | | |
| Intercept | 0.918*** | 0.091 | 1.283*** | 0.103 | 1.344*** | 0.076 | 1.476*** | 0.075 |
| Women | | | -0.825*** | 0.005 | -0.858*** | 0.006 | -1.065*** | 0.007 |
| Age centred | | | -0.08*** | 0 | -0.08*** | 0 | -0.114*** | 0 |
| Tertiary education | | | 0.816*** | 0.007 | 0.716*** | 0.01 | 0.741*** | 0.011 |
| Women*Tertiary | | | | | 0.167*** | 0.013 | 0.164*** | 0.014 |
| Women*Age centred | | | | | | | 0.053*** | 0.001 |
| Married | | | 0.095*** | 0.006 | 0.096*** | 0.006 | 0.132*** | 0.006 |
| **Random part** | | | | | | | | |
| Level-2 variance | 0.325*** | 0.076 | 0.412*** | 0.097 | 0.411*** | 0.097 | 0.405*** | 0.096 |
| Units: region | 41 | | 41 | | 41 | | 41 | |
| Units: id | 17967 | | 17967 | | 17967 | | 17967 | |
| Estimation: | MCMC | | MCMC | | MCMC | | MCMC | |
| DIC: | 838569.7 | | 690200.6 | | 690044.6 | | 681433.2 | |
| pD: | 41.223 | | 44.836 | | 45.726 | | 46.942 | |
| Burnin: | 500 | | 500 | | 500 | | 500 | |
| Chain Length: | 5000 | | 15000 | | 15000 | | 15000 | |
| Thinning: | 1 | | 1 | | 1 | | 1 | |

*p<0.10, **p<0.05, ***p<0.01; Source: EU-SILC 2009-2012

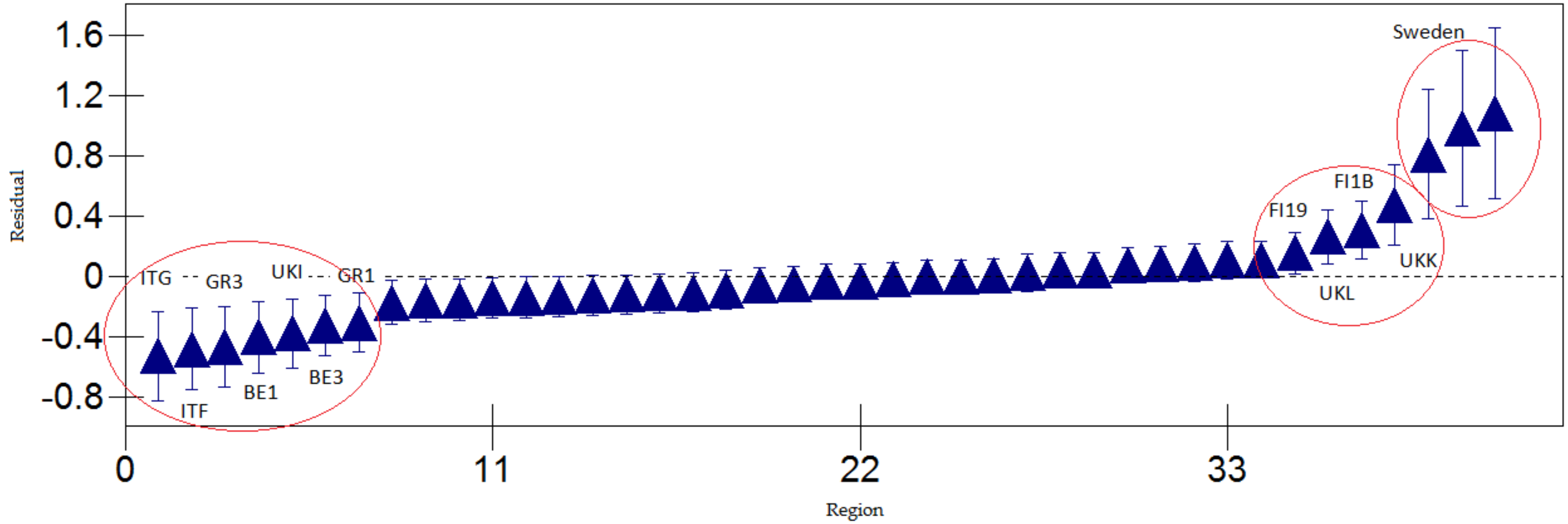
Interestingly, using a different modelling strategy and a different sample (fewer countries and only one period of analysis), Model III leads to similar results regarding the effects of gender, age, education and marital status on employment chances as sequence, cluster and regression analysis in Chapter 5. Indeed, it is confirmed that the strongest individual predictors of being employed during the European Great recession appear to be gender and education attainment, although also age, marital status and the two interaction terms (gender and high education; gender and age) have significant effects on the proportion of being employed. Overall, in 2009-2012 women are less likely to be in employment for the full duration of the panel compared to men. However, this negative effect is mitigated by the level of education and age (see Figures 3 and 4 in Appendix D). Highly educated women and older women are more likely to be employed than women with low levels of education and younger women. Nonetheless, women are always less likely to be employed than men irrespectively of their level of education or age.

For a detailed description of the effects of individual characteristics on employment outcomes during the crisis, see Appendix D.

*Which region offer higher chances of employment after controlling for age, gender, education and marital status?* Differences between regions regarding their employment outcomes are confirmed after controlling for individual characteristics. Plotting the residuals of Model III[121] in Figure 6.6, the group of regions with 95% confidence intervals below the horizontal line at zero, indicating that being employed for 48 months is significantly below the regional average ($b_{oj}$=1.476), is more populated compared to the VC MCMC model. Besides the Italian islands and south (ITG and ITF), it now includes three capital regions: Athens (GR3), Brussels (BE1) and London (UKI), confirming Caroleo and Coppola's (2005) finding that urban centres suffer from more severe labour market problems, together with North Greece (GR1) and Wallonia (BE3). In line with the VC MCMC findings, Sweden again registers by far the highest employment proportions, followed by Southwest England (UKK), Wales (UKL), the Helsinki region (FI1B) and Central Finland (FI19). Several regions have 95% confidence intervals crossing the horizontal line at zero, indicating that the proportion of months spent in employment in these regions equals to the average across all regions ($b_{oj}$=1.476).

[121] The regional residuals of Model III are very similar to the model without the interaction terms (Model II). The residuals, standard deviation of residuals and regional ranking of Modell III are presented in Table 3 in Appendix D.

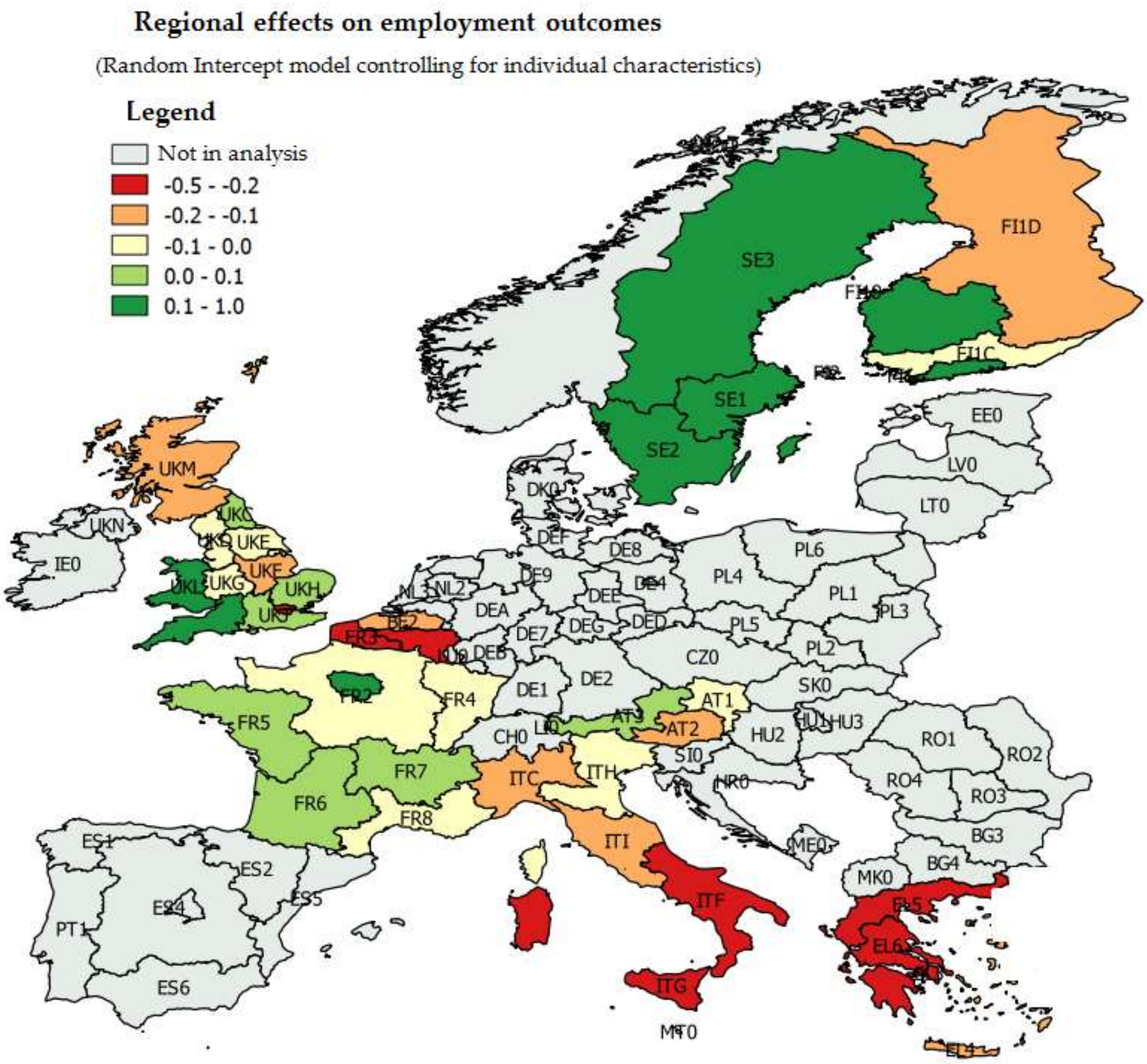
**Figure 6.6 - Caterpillar plot of region effects on proportions of months spent in employment from random intercept model (Model III)**




Source: EU-SILC 2009-2012

After controlling for individual characteristics, the regional residuals change, but the general patterns remain similar. Regional heterogeneity emerges from the map in Figure 6.7, confirming Hypothesis 3.1, but only partially. In fact, Sweden, which is one of the two countries analysed not using *euro* as their national currency, is the only homogeneous country, while the UK (the second country with a non-Euro currency) is very heterogeneous within its borders. A pattern of bipolarisation emerges from this map, in contrast with the map in Figure 6.5, with regions belonging to the two countries hardly hit by the economic shock - Greece and South Italy - forming one group of underperformers, in line with Bracalente and Perugini 2010. Indeed, in Chapter 4, I argue that Greece and Italy are the two countries with the lowest share of employment across time. Nonetheless, the rest of the European regions do not demonstrate any specific pattern of similarities, if not strong heterogeneity between and within countries. The regional bipolarisation is as evident within countries, as between countries.

**Figure 6.7 – Map of regional residual obtained from the random intercept model (Model III) of log-odds of proportions of months spent in employment**





Source: EU-SILC 2012 and Geographic data downloaded from Eurostat GISCO: http://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/administrative-units-statistical-units/nuts#nuts13.
File name: NUTS_2013_10M_SH.zip. Software used: QGIS version 2.18.2 Las Palmas.

### 6.4.2 The Effects of National Borders

By including country binary variables in the RI model, I study whether countries can explain part of the regional variation in employment outcomes. To this end, I run a binomial logit two-level model with individuals nested within regions controlling for individual characteristics and country dummies (the reference country is France); Model IV[122] presented in Table 6.7. The most important finding that emerged from Model IV is that the unexplained variation of the proportion of months spent in employment at regional level (level-2 variance) decreases sharply, from 0.405 (Model III) to 0.113 (Model IV), indicating that a large part of the employment variation between regions is explained by countries. Indeed countries explain three quarters of the variation among regions and thus countries matter when explain the employment outcomes at regional level. Nonetheless, still a 3% (VPC[123]) of the variation in employment outcomes is attributed to the regional variation. In addition, regions still matter when country binary variables are included in the model, since the level-2 variance of Model IV remains statistically significant at the 1% level. I would expect that Model IV - being a more complex and comprehensive model - to be a better fit than Model III, which controls for individual characteristics only. Nonetheless, based on the DIC diagnostic, Model IV is not better at explaining the regional employment outcomes than Model III which does not include country dummies (Table 6.7).

In Model IV, the coefficients of the country indicators record merely the difference of each country from France, which is used as the reference category. Not surprisingly, Sweden is the only country with positive log-odds (1.371), indicating that Swedish people are more likely to be in employment during the financial meltdown when compared to French people. A non-significant country effect here (e.g. Austria, Finland and the United Kingdom) does not imply that the specific

[122] The trajectories of Model IV are satisfying and the level-2 residuals satisfy the assumptions of normality, linearity and homoscedasticity (see Figure 5, Appendix D). Moreover, the Wald chi-square is significant.

[123] VPC (Model IV) = (0.113/(0.113+3.29))=0.033.

country has no effect, only that its effect is the same as the effect of France. The residuals of this model present similar results to caterpillar in Figure 6.6 in the previous section. Briefly, the three Swedish regions, together with Southwest England, Wales and Helsinki are the best performers regarding employment chances during the crisis compared to the country average[124] (and not the average across all regions as before). On the other hand, *Mezzogiorno*, Athens, Brussels, Wallonia, London and North Greece are amongst the worst performers.

**Table 6.7 – Binomial logit RI model controlling for individual characteristics and country of residence, log-odds of proportion of months spent in employment (MCMC estimations)**

| Model | Model III (Two-level, MCMC without countries) | | Model IV (Two-level, MCMC Model III+country binaries) | |
|---|---|---|---|---|
| | Coeff. | S.E. | Coeff. | S.E. |
| **Fixed Part** | | | | |
| Intercept | 1.476*** | -0.075 | 1.528*** | 0.13 |
| Women | -1.065*** | -0.007 | -1.065*** | 0.007 |
| Age centred | -0.114*** | 0 | -0.114*** | 0 |
| Tertiary education | 0.741*** | 0.011 | 0.742*** | 0.011 |
| Married | 0.132*** | 0.006 | 0.132*** | 0.006 |
| Women*Tertiary | 0.164*** | 0.014 | 0.163*** | -0.014 |
| Women*Age centred | 0.053*** | 0.001 | 0.053*** | -0.001 |
| Country (Ref.: France) | | | | |
| Austria | | | -0.053 | 0.249 |
| Belgium | | | -0.742*** | 0.255 |
| Greece | | | -0.67*** | 0.221 |
| Finland | | | -0.052 | 0.221 |
| Italy | | | -0.552*** | 0.209 |
| Sweden | | | 1.371*** | 0.273 |
| United Kingdom | | | -0.009 | 0.168 |
| **Random Part** | | | | |
| Level-2 variance | 0.405*** | 0.096 | 0.113*** | 0.029 |
| Units: region | 41 | | 41 | |
| Units: id | 17967 | | 17967 | |
| Estimation: | MCMC | | MCMC | |
| DIC: | 681433.2 | | 681433.3 | |
| pD: | 46.942 | | 46.907 | |
| Burnin: | 500 | | 500 | |
| Chain Length: | 15000 | | 150000[125] | |
| Thinning: | 1 | | 1 | |

*p<0.10, **p<0.05, ***p<0.01; Source: EU-SILC 2009-2012

[124] To compare regions of different countries, I need to add the country effects to the regional effects. Table 4 in Appendix D presents the residuals, standard deviation of the residuals and regional ranking for Model IV.

[125] I run the model for 150,000 iterations according to the Raftery-Lewis and Brooks-Draper measures.

### 6.4.3 Regional Contextual Features as Explanatory Variables

So far the influence of individual factors on labour market outcomes has been thoroughly discussed in this thesis. However, contextual factors (region-level variables) are also important and should not be ignored. As seen in Chapter 4, country-level characteristics, such as the nature of the labour market and the rigidity of the employment protection legislation, have a strong impact on European labour market performance. Similarly, I assume that contextual features might affect regional employment outcomes. In fact, numerous researchers studying regions from different perspectives have included contextual variables in their analysis (among others: Marelli and Signorelli 2010; Davies 2011; Diodato and Weterings 2015).

Marelli and Signorelli (2010) studied regional convergence and used as explanatory variables GDP per capita, productivity rate, employment and unemployment rates, employment sectors and a specialisation index. Esteban (2000) studied regional convergence in Europe with a special focus on industry and used as contextual explanatory variables the regional productivity rates, GDP per worker and GDP per capita, as well as country dummies. Davies (2011) studied regional resilience during the Great recession in Europe modelling the regional unemployment rates and used GDP per capita, regional unemployment rates, population density and employment sectors. Finally, Diodato and Weterings (2015) studied the determinants of regional resilience to the financial crisis in Europe and used employment sector, number of job vacancies and number of unemployed people.

I study some of the regional features based on the above literature (further discussed in section 2.4 in Chapter 2). I explore an indicator of regional economic capacity (GDP per capita and/or labour productivity), an indicator of regional agglomeration (population density), an indicator of accumulated learning (share of adults in education) and the sectoral composition of employment. These variables have been downloaded from the online Eurostat database referring to the first year of the panel (2009):

- Regional gross domestic product (GDP) per inhabitant[126], in thousand purchasing power standard (PPS)
- Regional labour productivity rate (gross value added in million euros/number of employed people)
- Regional population density (hundred people per square kilometre)
- Regional share of adults (25-64 years old) in education and training.
- Regional employment sectors based on the NACE[127] classification (share in gross value added of employment in Agriculture, Industry, Construction, Market Services and Public Administration).

[126] The value for each region is expressed as a percentage of the EU-28 average (EU-28 average=100). For more details, see Eurostat 2015, p. 123.

[127] In detail, I measure the share of agriculture, forestry and fishing (NACE Section A) in total gross value added; the share of industry (NACE Sections B-E) in total gross value added; the share of construction (NACE Section F) in total gross value added; the share of market services (NACE Sections G-N) in total gross value added and the share of public administration and public services, arts, entertainment and recreation, repair of household goods and other services (NACE Sections O-U) in total gross value added in 2009 (Eurostat 2015, p. 129).

**Table 6.8 – Regional macro-indicators provided by Eurostat, 2009**

| Region | GDP | Labour productivity | Density | Adult education | Agri culture | Industry | Constru ction | Services | Public admini stration |
|---|---|---|---|---|---|---|---|---|---|
| AT1 | 131 | 63.45 | 155 | 14.80 | 0.01 | 0.17 | 0.06 | 0.54 | 0.22 |
| AT2 | 109 | 53.10 | 69 | 13.00 | 0.02 | 0.26 | 0.08 | 0.42 | 0.23 |
| AT3 | 131 | 58.85 | 89 | 13.50 | 0.01 | 0.27 | 0.07 | 0.47 | 0.18 |
| BE1 | 220 | 86.19 | 6702 | 10.80 | 0.00 | 0.07 | 0.03 | 0.64 | 0.27 |
| BE2 | 118 | 69.91 | 466 | 7.60 | 0.01 | 0.20 | 0.07 | 0.52 | 0.21 |
| BE3 | 87 | 62.18 | 208 | 4.90 | 0.01 | 0.18 | 0.06 | 0.45 | 0.30 |
| GR1 | 72 | 36.33 | 62 | 3.40 | 0.05 | 0.16 | 0.06 | 0.43 | 0.30 |
| GR2 | 75 | 36.36 | 48 | 2.10 | 0.07 | 0.17 | 0.06 | 0.43 | 0.27 |
| GR3 | 128 | 55.03 | 1051 | 4.80 | 0.00 | 0.10 | 0.04 | 0.61 | 0.25 |
| GR4 | 86 | 39.63 | 66 | 1.90 | 0.04 | 0.07 | 0.07 | 0.56 | 0.26 |
| FI19 | 105 | 58.58 | 23 | 20.60 | 0.04 | 0.29 | 0.07 | 0.36 | 0.24 |
| FI1B | 161 | 75.10 | 165 | 26.30 | 0.00 | 0.18 | 0.06 | 0.53 | 0.22 |
| FI1C | 103 | 58.40 | 36 | 20.20 | 0.03 | 0.26 | 0.08 | 0.39 | 0.25 |
| FI1D | 92 | 55.87 | 6 | 20.10 | 0.05 | 0.22 | 0.08 | 0.36 | 0.29 |
| FR1 | 176 | 86.93 | 979 | 5.80 | 0.00 | 0.09 | 0.05 | 0.67 | 0.20 |
| FR2 | 90 | 58.58 | 74 | 5.40 | 0.03 | 0.19 | 0.07 | 0.44 | 0.27 |
| FR3 | 88 | 59.19 | 325 | 5.50 | 0.01 | 0.17 | 0.06 | 0.45 | 0.30 |
| FR4 | 91 | 59.83 | 112 | 6.10 | 0.01 | 0.20 | 0.06 | 0.44 | 0.28 |
| FR5 | 92 | 57.11 | 100 | 6.20 | 0.03 | 0.16 | 0.07 | 0.47 | 0.26 |
| FR6 | 95 | 58.73 | 66 | 5.60 | 0.02 | 0.13 | 0.07 | 0.48 | 0.29 |
| FR7 | 104 | 62.37 | 108 | 6.00 | 0.01 | 0.18 | 0.07 | 0.49 | 0.25 |
| FR8 | 95 | 61.30 | 116 | 4.60 | 0.01 | 0.10 | 0.07 | 0.52 | 0.30 |
| ITC | 128 | 62.25 | 278 | 5.80 | 0.01 | 0.21 | 0.06 | 0.56 | 0.16 |
| ITF | 72 | 47.69 | 194 | 5.30 | 0.03 | 0.14 | 0.06 | 0.48 | 0.29 |
| ITG | 73 | 49.30 | 135 | 5.30 | 0.04 | 0.10 | 0.07 | 0.47 | 0.32 |
| ITH | 122 | 58.91 | 182 | 6.80 | 0.02 | 0.23 | 0.06 | 0.50 | 0.19 |
| ITI | 121 | 59.51 | 198 | 6.80 | 0.01 | 0.15 | 0.05 | 0.55 | 0.23 |
| SE1 | 146 | 68.15 | 79 | 23.10 | 0.01 | 0.18 | 0.05 | 0.53 | 0.23 |
| SE2 | 111 | 56.04 | 53 | 23.10 | 0.02 | 0.23 | 0.06 | 0.44 | 0.25 |
| SE3 | 105 | 56.48 | 6 | 19.60 | 0.04 | 0.25 | 0.06 | 0.36 | 0.29 |
| UKC | 79 | 42.92 | 301 | 18.50 | 0.01 | 0.19 | 0.07 | 0.44 | 0.29 |
| UKD | 93 | 48.70 | 495 | 19.90 | 0.00 | 0.18 | 0.06 | 0.52 | 0.25 |
| UKE | 89 | 46.46 | 339 | 19.80 | 0.01 | 0.18 | 0.05 | 0.49 | 0.26 |
| UKF | 86 | 42.66 | 287 | 20.30 | 0.01 | 0.18 | 0.06 | 0.49 | 0.25 |
| UKG | 85 | 45.16 | 425 | 19.10 | 0.01 | 0.16 | 0.06 | 0.52 | 0.26 |
| UKH | 100 | 49.01 | 301 | 19.60 | 0.01 | 0.13 | 0.07 | 0.55 | 0.23 |
| UKI | 175 | 86.89 | 5051 | 24.90 | 0.00 | 0.04 | 0.04 | 0.73 | 0.19 |
| UKJ | 114 | 54.56 | 446 | 22.30 | 0.00 | 0.11 | 0.06 | 0.60 | 0.23 |
| UKK | 98 | 47.80 | 219 | 21.60 | 0.01 | 0.13 | 0.06 | 0.53 | 0.26 |
| UKL | 75 | 40.92 | 147 | 19.60 | 0.00 | 0.19 | 0.06 | 0.44 | 0.31 |
| UKM | 102 | 49.93 | 67 | 20.40 | 0.01 | 0.18 | 0.06 | 0.48 | 0.27 |
| **Mean** | **107.84** | **58.81** | **301** | **8.75** | **0.02** | **0.17** | **0.06** | **0.5** | **0.25** |

Source: Data downloaded from Eurostat online dataset, codes: nama_10r_2gdp, demo_r_d3dens, nama_10r_3gva, nama_10r_3empers, trng_lfse_04 and nama_10r_3gva. Extracted on 05.04.17

Interesting insights emerge by studying the indicators broken down by regions (Table 6.8). The regions with the highest levels of GDP per inhabitant are the capital regions of Brussels (BE1 220), Helsinki (FI1B 161), Paris (FR1 176) and London (UKI 175). On the contrary, the regions with the lowest GDP (below 70%) in 2009 belong to Greece (North GR1 and Central Greece GR2) and Italy (south ITF and islands ITG). The variables GDP per capita and labour productivity at regional level are highly correlated between them (Pearson's correlation r=0.83). The difference between the GDP indicator and the labour productivity lies in the calculation: GDP per capita is estimated by dividing the goods and services produced regionally by the residents of the region, while labour productivity by dividing GVA by the employed population of the region.

According to Eurostat (2009), labour productivity is a more accurate measure of the regional economic capacity because "it is not distorted by potential regional demographic differences, including different dependency ratios. Nor is it distorted by cross-regional commuting that causes disparities between the number of people who live in a region and the number who work there" (Eurostat 2009). Moreover, the regional labour market indicators are not always in line with the regional GDP, for instance some regions may have low unemployment rates and, at the same time, a weak economy (Davies 2011, p. 380). Although, GDP is often used as a measure of economic capacity because it is a good indicator of the regional eligibility for Structural Funds, it has been criticised because of the commuters' issue (Eurostat 2006, p. 67). In fact, in regions with many commuters from neighbour regions, such as London, the GDP is overestimated, while in the regions where the commuters live the GDP is underestimated. The labour productivity indicator tackles the commuters' bias and takes into account the employed population instead of just the residents. This is very important to capture a phenomenon spread mostly in Greek regions and South Italy where each employee might need to economically sustain their whole household (Eurostat 2006, p. 67). Table 6.8 shows that the regions of

Brussels, Helsinki and London register by far the highest productivity rates, while the Greek regions (except for the region of Athens) have by far the lowest rates, in line with Bracalente and Perugini (2010).

As expected, the most densely populated regions are the capital regions of Brussels (BE1 6702), London (UKI 5051), Athens (GR3 1051) and Paris (FR2 979). The less densely populated regions (less than 70 hundred people per square kilometre) belong to Sweden (South SE2 and North SE3) and Finland (Central FI19, Northeast FI1D and South FI1C), followed by Scotland (UKM 67), Southwest France (FR6 66), the three remaining Greek regions and Southern Austria (AT2 69). Because of the regional differences in the population density (the capital regions behave as outliers), I recode the variable in three categories and include it as categorical in the model: Thinly populated regions (6-155 hundred people); Intermediate regions (165-495 hundred people); Densely populated regions (979-6702).

The share of adults (25-64 years old) participating in education or training accounts on average for 8.8%. Most of the countries do not present any significant differences within their regions. Finnish regions present rates above 20%, with a prevalence of the Helsinki area (FI1B 26%) and Swedish regions are between 20-23%. Austria ranges between 13 and 15%, while Greece, France and Italy are between 2-5%.

Overall, it is clear that market services[128] account on average for half of the economic activity (50%), followed by public administration and public services (25%), industry (17%), construction (6%) and finally agriculture (2%) (Table 6.8). According to Marelli (2004, p. 41), agriculture is not a dominant sector, representing only a very limited share of the GVA, while industry and construction are declining as a result of the tertiarisation process. The highest shares of agriculture are in Greece

[128] The market services sector includes transportation and storage, accommodation and food services, information and communication, financial and insurance activities, real estate services, etc.

(except for Attica), followed by Northeast and Central Finland, North Sweden and the Italian islands. The highest share of industry (above 25%) is in Southern and Western Austria, South and Central Finland and North Sweden, while the lowest (below 10%) in the Brussels, Paris and London regions. Southern Austria, as well as South and Northeast Finland are above the average added value of construction (at 8%), while London and Athens are below (4%). The highest share of market services is in Brussels, Athens, Paris and London areas (almost 65%), while the lowest in Finland (FI19, FI1C, FI1D) and North Sweden. Finally, the public administration accounts for more than 30% in Wales, North Greece, Italian islands, Nord-Pas-de-Calais, and the Wallonia region. In essence, the differences in the sectoral structure are more evident within countries rather than between countries (Marelli 2004, p. 37).

*Are there differences between the regions of analysis regarding the employment outcomes after controlling for the above contextual effects? Which of these indicators influence the employment outcomes at regional level?* To answer these questions, I explore in a preliminary analysis the relationship of the regional variables described above and the regional effects on employment, provided by Model III (controlling for gender, age, education and marital status) and then I fit a binomial logit model to predict the regional employment proportions controlling for explanatory variables at individual and regional-level.

Table 6.9 shows that the correlation between only two of the above contextual characteristics and predicted employment at regional level is statistically significant, adult education (at the 1% level) and industry (at 5%), which are both positively correlated with regional employment. In fact, based on the R-squared statistic emerged from the scatterplots (Figures 6.8 and 6.9), the share of adults in education and training explains 26% of the employment variation, followed by the industry sector (11%), population density (4%) and GDP per capita (4%). Figure 6.8 displays a positive relationship between adult education and employment, indicating that the highest the adult education the highest the regional effects on employment outcomes. Manufacturing appears to have a positive relationship with the employment outcomes at regional level, while market services, public administration and population density a negative correlation. Finally, the scatterplots show some highly influential points that might lead to false conclusions: the three Swedish regions. Sweden appears to drive some of the patterns analysed. In fact, excluding the Swedish regions from the scatterplots results in flatter lines and weaker correlations[129].

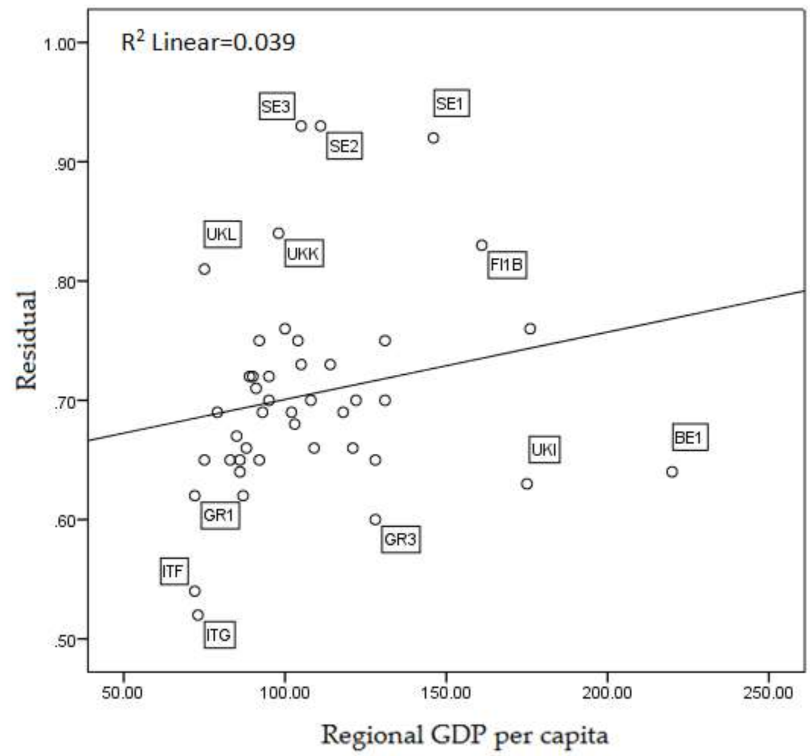
**Table 6.9 – Correlations between predicted employment (Model III regional residuals) and regional macro-indicators**

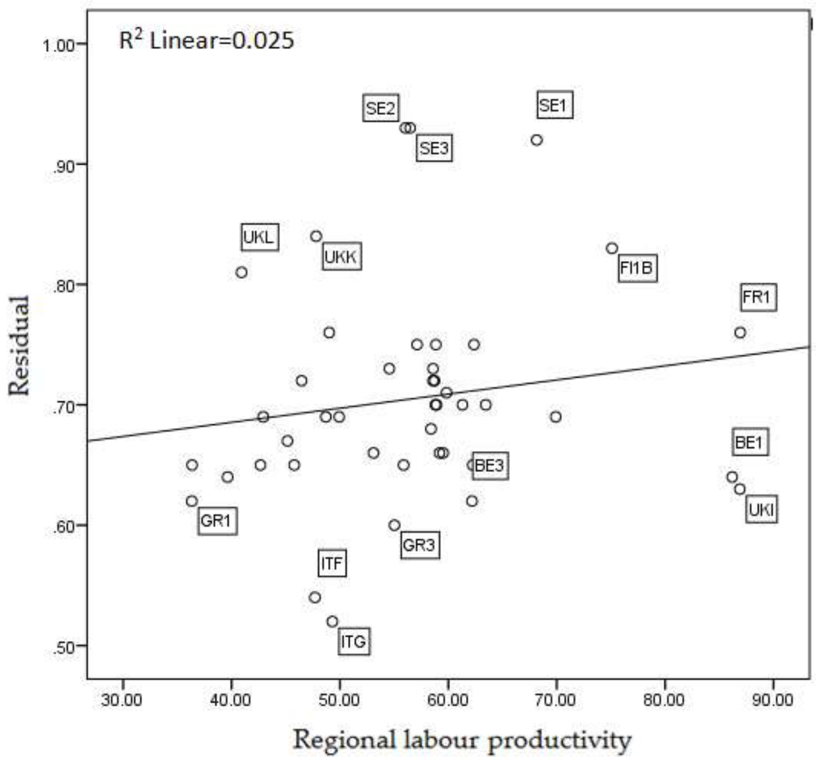
| Correlations | Predicted employment (Model III level-2 residuals) | |
|---|---|---|
| | **Pearson Correlation** | **Sig. (2-tailed)** |
| Employment | 1 | |
| GDP | 0.197 | 0.205 |
| Labour productivity | 0.159 | 0.309 |
| Density | -0.198 | 0.203 |
| Adult education | 0.510** | 0.001 |
| Agriculture | -0.167 | 0.284 |
| Industry | 0.327* | 0.032 |
| Construction | 0.007 | 0.966 |
| Market services | -0.123 | 0.431 |
| Public Administration | -0.184 | 0.236 |

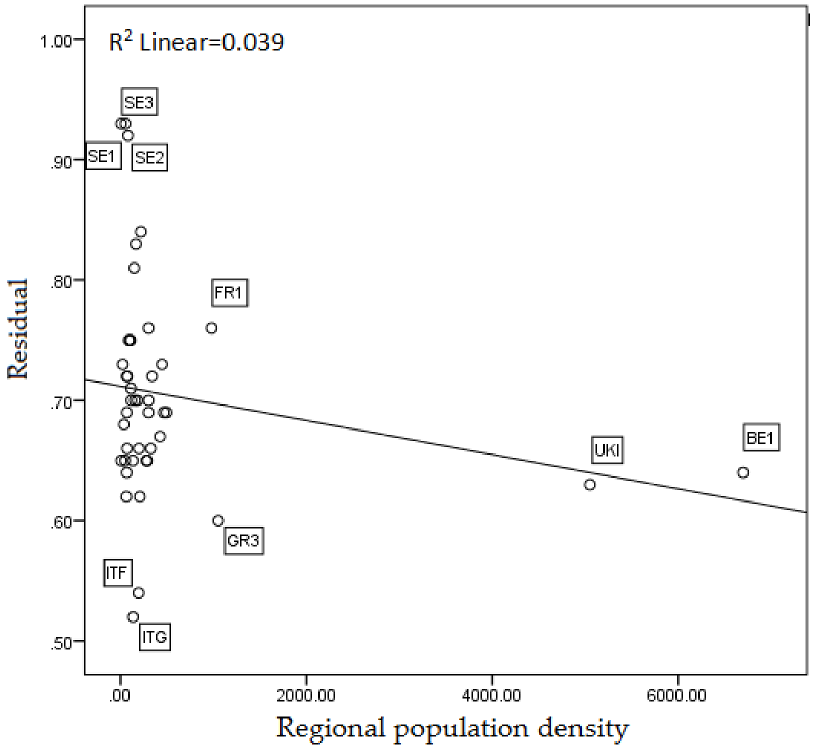
**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).
Source: Eurostat (online data codes: nama_10r_2gdp, demo_r_d3dens, nama_10r_3gva, nama_10r_3empers, trng_lfse_04 and nama_10r_3gva)

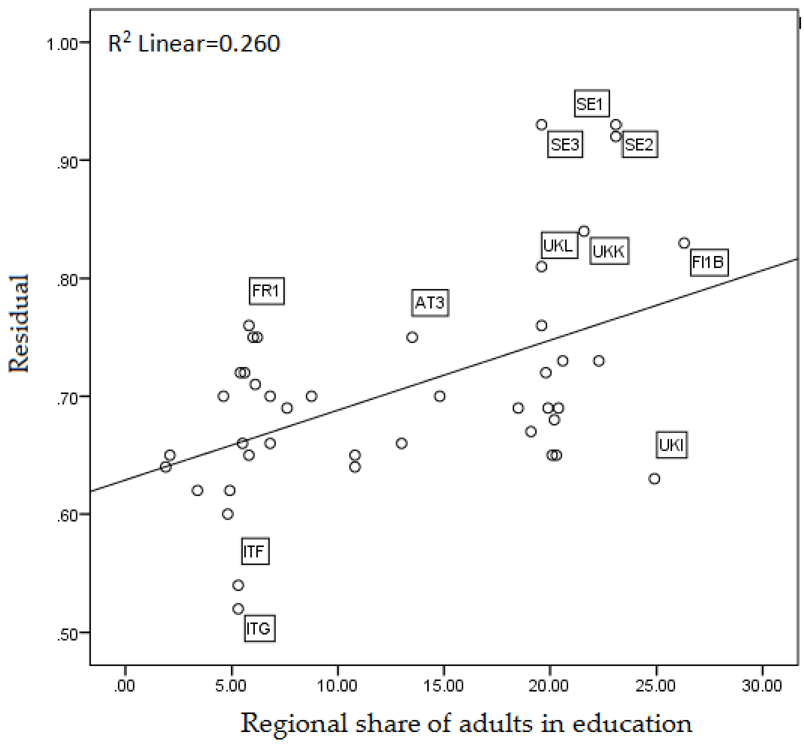
[129] I run the same analysis without the three Swedish regions, but do not present the plots here, since they do not provide any additional information.

**Figure 6.8 – Scatterplots of regional GDP per capita, regional labour productivity, regional population density and regional share of adults (25-64 years old) against regional residuals from Model III**



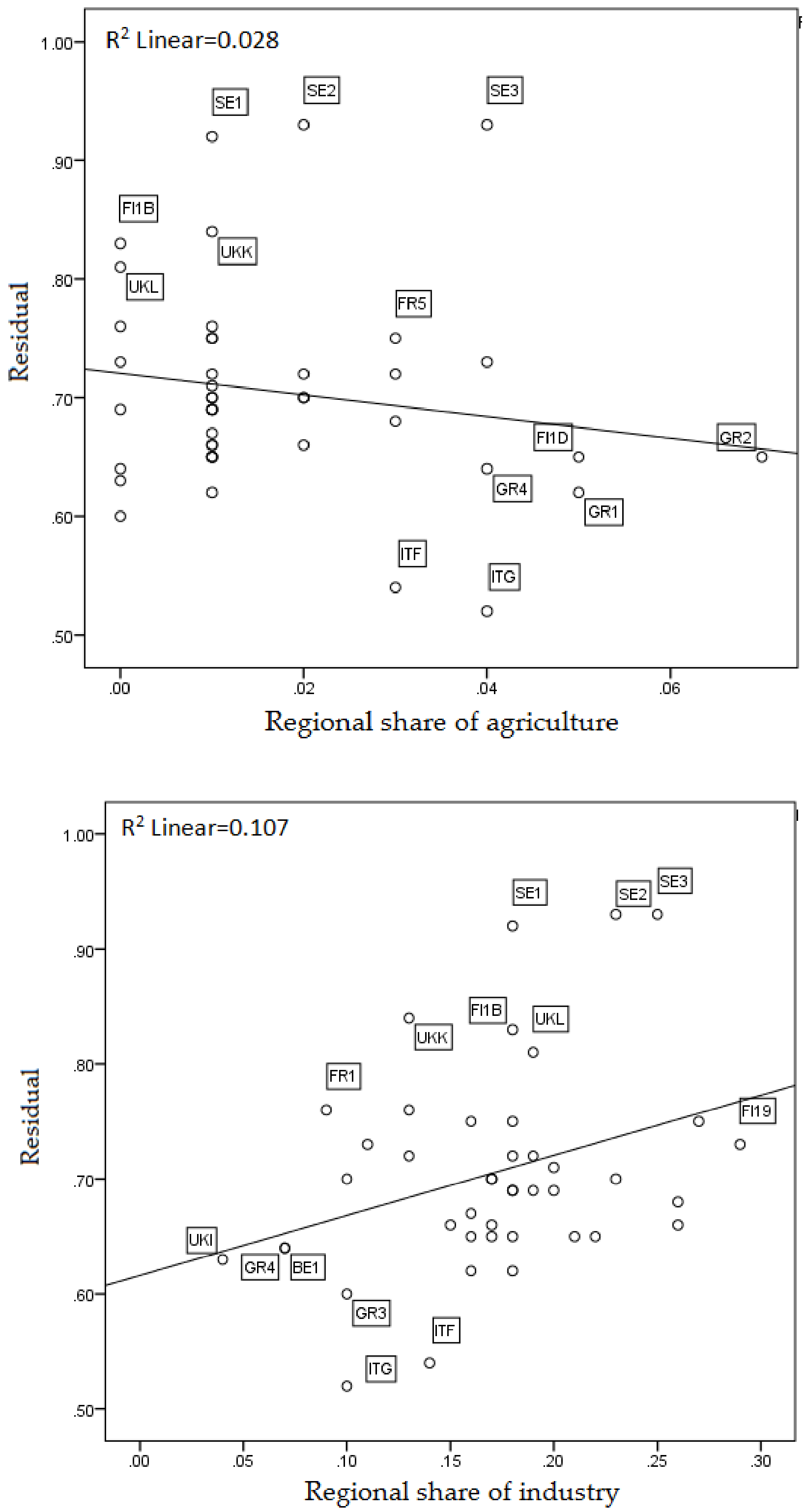



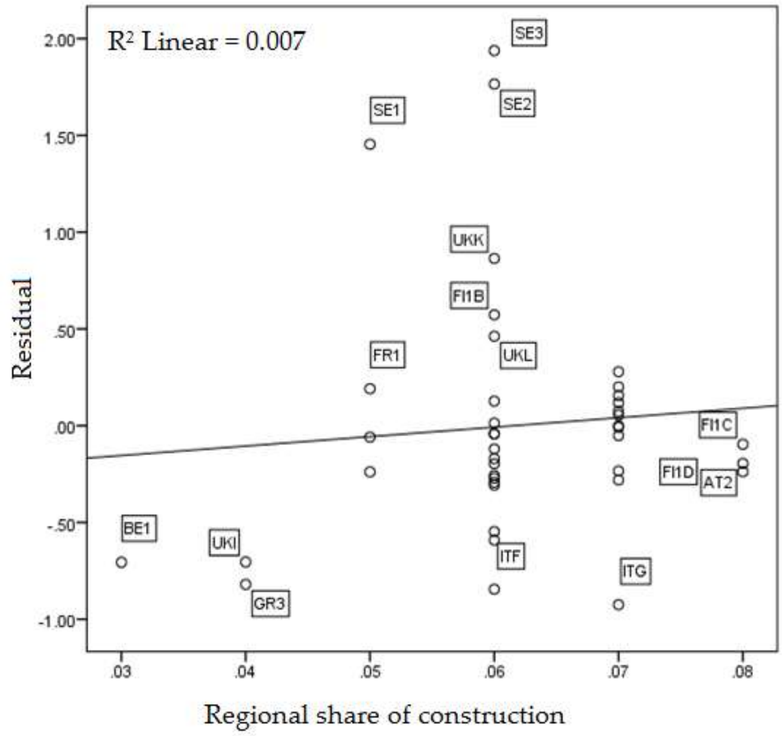


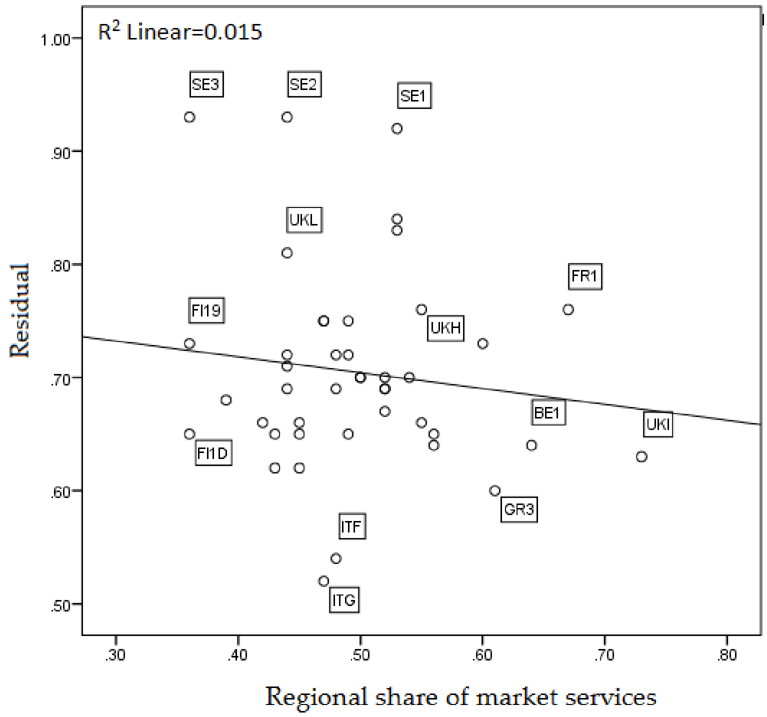



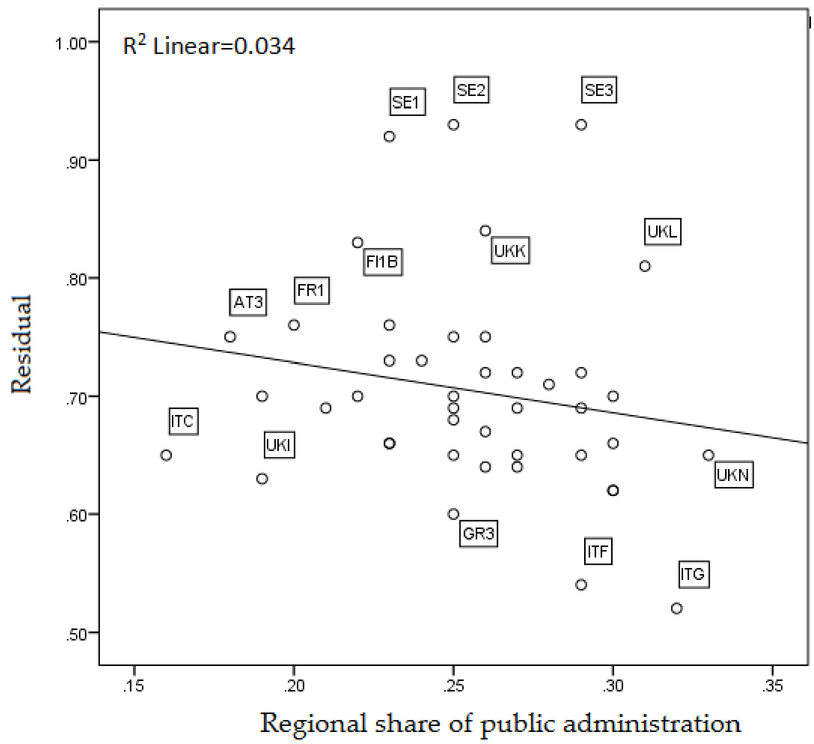

Note: The regional residuals are obtained from an MCMC model controlling for individual characteristics (Model III). Graph produced with SPSS 22.
Source: Data downloaded from Eurostat online dataset, codes: nama_10r_2gdp, nama_10r_3gva, nama_10r_3empers, demo_r_d3dens, trng_lfse_04. Extracted on 05.04.17. EU-SILC 2009-2012

**Figure 6.9 – Scatterplots of regional share of agriculture, industry, construction, market services and public administration in total gross value added against regional residuals from Model III**




R² Linear = 0.007
Residual
Regional share of construction
SE3
SE2
SE1
UKK
FI1B
FR1
UKL
FI1C
FI1D
AT2
BE1
UKI
GR3
ITF
ITG


R² Linear=0.015
Residual
Regional share of market services
SE3
SE2
SE1
UKL
FR1
FI19
UKH
BE1
UKI
FI1D
GR3
ITF
ITG




Note: The regional residuals are obtained from an MCMC model controlling for individual characteristics (Model III). Graph produced with SPSS 22.
Source: Data downloaded from Eurostat online dataset, codes: nama_10r_3gva, nama_10_a10. Extracted on 05.04.17. EU-SILC 2009-2012

Here I estimate a two-level binomial logit model that controls for individual characteristics since I have shown in the previous models that these characteristics have significant effects on the regional employment proportions, and several contextual fixed effects. I first estimate a model that includes the regional share of adult education and industry, i.e. the variables significantly correlated with regional employment outcomes (Model V), and then I add more regional contextual effects, namely level of urbanisation, labour productivity and occupational sectors (Model VI).

According to the models presented in Table 6.10, when contextual factors are added to the models the individual-level predictors remain unaltered compared to Model III and IV and statistically significant at the 1% level. The random level-2 variance when controlling for contextual effects decreases from 0.405 (Model III) to 0.29 (Model V) and 0.27 (Model VI), indicating that controlling for regional contextual features decreases the unexplained variation of employment outcomes at regional level. In other words, the regional context can explain almost half of the regional variation in employment outcomes. However, compared to Model IV controlling for countries, the level-2 variance increases from 0.113 (Model IV) to 0.27-0.29 (Models V and VI), indicating that the contextual features added to the model explain part of the variation within regions, leaving more between-region variation to be explained compared to the model which controls for countries.

Models V and VI show that 7-8% of the variation in the employment outcomes can be attributed to regional features. However, based on the DIC diagnostic, the models that include contextual factors are not better than the model including only individual features (identical DIC measures). Moreover, the trajectories of Models V and VI are not satisfying, even if I allow for 200,000 iterations (suggested by the Raftery-Lewis measure). Because of the non-satisfying trajectories of the model[130], I cannot consider the results robust and thus I interpret them with caution and I only briefly discuss the model.

In the models controlling for contextual and individual-level factors, the effect of adult education is statistically significant at the 1% level. For every unit of increase in the regional share of adults participating in education, the residents of this region are more likely of being employed during the financial crisis (log-odds of 0.03; Model V). From Model VI, which controls for more contextual characteristics, it emerges that residents in thinly populated regions are more likely to be employed compared especially to densely populated regions (log-odds of -1.481, significant at

[130] The Wald statistic for Models V and VI is significantly above to the chi-squared distribution (3.841), confirming the significance of the level-2 variance. The level-2 residuals satisfy the assumptions of normality, linearity and homoscedasticity. For a complete list of the residuals and their standard deviation (Model VI) see Table 5 in Appendix D.

the 1% level), confirming studies which find that urban centres suffer from more severe labour market problems (Niebuhr 2003; Caroleo and Coppola 2005). Furthermore, for every increase in the regional share of manufacturing in GVA, Model V predicts an increase in the employment outcomes (log-offs of 3.1, significant at the 5% level). Regions with higher shares of construction appear to offer higher chances of employment when compared to region with high shares of market services (reference category – Model VI).

Overall, the study of the sectoral share of employment among regions implies that regions with more developed industry and construction sectors offer higher chances of employment. Nevertheless, from the study of the variables in a preliminary analysis, I do not see any relationship between the response variable and the sectors and thus I am not able to neither confirm nor reject Hypothesis 3.4. In fact, in the literature review presented in Chapter 2 (section 2.4.2), it is argued that the findings of previous regional studies on employment or unemployment reach mixed conclusions, indicating that probably there is not a clear relationship between sectoral structure of employment and employment outcomes at regional level. A possible explanation might lie in the level of regional disaggregation used in this analysis. I study regions at NUTS1 level of detail and thus I do not have "patterns at microscale" (Davies 2011, p. 374).

In order to run a robustness check, I run a model including individual and contextual factors at regional level and country binaries (see Table 6 in Appendix D). From this model, it is clear that the level-2 variance decreased confirming, what we already know from section 6.4.2, i.e. that countries explain a large part of the regional variation of employment outcomes during the financial crisis. Moreover, when controlling for countries, the regional contextual features become statistically insignificant and based on the DIC diagnostic the model does not become any better in explaining the regional variation. Finally, since in Figures 6.8 and 6.9 the Swedish regions acts as outliers, affecting the scatterplots, I run all the models in section 6.4 excluding Sweden and the coefficients (and the significance) are almost identical.

**Table 6.10 – Binomial logit multilevel models with explanatory variables at individual and regional level, log-odds of proportion of months spent in employment**

| Model | Model V | | Model VI | |
|---|---|---|---|---|
| | Coeff. | S.E. | Coeff. | S.E. |
| **Fixed Part** | | | | |
| Intercept | 0.477* | 0.261 | 2.484* | 1.4 |
| **Individual effects** | | | | |
| Women | -1.065*** | 0.007 | -1.065*** | 0.007 |
| Age centred | -0.114*** | 0 | -0.114*** | 0 |
| Tertiary education | 0.742*** | 0.011 | 0.742*** | 0.011 |
| Women*Tertiary | 0.164*** | 0.013 | 0.164*** | 0.013 |
| Women*Age centred | 0.053*** | 0.001 | 0.053*** | 0.001 |
| Married | 0.132*** | 0.006 | 0.132*** | 0.006 |
| **Contextual effects** | | | | |
| Adult education | 0.035*** | 0.012 | 0.033*** | 0.013 |
| Level of urbanisation | | | | |
| (Ref: thinly populated area) | | | | |
| Intermediate area | | | -0.479** | 0.206 |
| Densely populated area | | | -1.481*** | 0.468 |
| Labour productivity | | | 0.009 | 0.009 |
| Occupational sector | | | | |
| Agriculture | | | 0.829 | 6.525 |
| Industry | 3.107** | 1.463 | 1.421 | 2.209 |
| Construction | | | -25.39*** | 10.424 |
| Market services | | | omit category | |
| Public administration | | | -1.66 | 2.779 |
| **Random Part** | | | | |
| Level-2 variance | 0.287*** | 0.07 | 0.27*** | 0.073 |
| Units: region | 41 | | 41 | |
| Units: id | 17967 | | 17967 | |
| Estimation: | MCMC | | MCMC | |
| DIC: | 681432.7 | | 681433.1 | |
| pD: | 46.672 | | 46.891 | |
| Burnin: | 1000 | | 1000 | |
| Chain Length: | 200000 | | 150000 | |
| Thinning: | 1 | | 1 | |

*p<0.10, **p<0.05, ***p<0.01; Source: EU-SILC 2009-2012

## 6.5 Conclusions

The between-country heterogeneity in labour market outcomes is highlighted in Chapter 4, where I study and compare individual labour market trajectories across countries. In Chapter 6 I turn my focus on within-country differences, studying the employment outcomes across European regions. *Can the between-country heterogeneity be a result of uneven distribution of labour within countries, at regional level?* This chapter confirms that employment outcomes during the years of the financial crisis, 2009-2012, show a pronounced regional variation, partially consistent with Hypothesis 3.1, expecting strong within-country heterogeneity.

Strong prevalence of stability in full-time employment among the sample of analysis emerged from Chapter 4, and thus the average proportion of months spent in employment across all regions analysed is relatively high (71.5%). Nonetheless, the employment proportion reveals a noteworthy heterogeneity between regions of the same country. The best performers, based on Model III that controls for individual characteristics, are the three Swedish regions, which are homogeneous, followed by Southwest England with Bristol being the productive centre of the region, the Finnish capital, Helsinki and Central Finland. Not surprisingly, the worst performers are the Greek regions together with South Italy and the Italian islands, belonging to two countries strongly hit by the economic shock, with overall weak economies and underperforming labour markers, in line with Hypothesis 3.2. Moreover, three European capitals, with high population density, are among the underperformers regarding the employment outcomes during the crisis, namely Athens, Brussels and London.

The within-country differences are more evident in some countries than in others. Within-country convergence is evident in Sweden, the best performer among the countries and in Greece, the worst performer regarding the employment outcomes during the crisis, rejecting the second part of Hypothesis 3.1. The rest of the countries demonstrate strong differences within their borders. Italy is known for the gap between the poor south and the richer and more developed north, with the latter being closer to central European countries than the rest of Italy. In fact, Greek regions and the regions of Southern Italy form a group of underperformers, revealing a country bipolarisation in Europe, consistent with Hypothesis 3.3. However, the most evident bipolarisation is not among countries and does not divide Europe in clear groups, but appears rather strongly within countries, with good examples being the northern part of the UK against the rest of the country; Southern and Northern France; Southern and Northern Italy.

Countries, when added to the model, explain a large part of the employment variation among regions. Indeed, as anticipated in Chapter 4, several factors that affect the labour market outcomes are country-specific (and not region-specific), such as the employment legislation, the nature of the labour market and the institutional set up of employment policies. Nonetheless, regions still matter in individual employment chances during the financial crisis, explaining part of the employment variation even when countries are included in the model. Puga (2002) claims that countries are less important when studying regions regarding the labour markets. I would re-phrase their finding, arguing that both the national and regional context matters when studying individual employment outcomes. However, controlling for region-specific contextual features, such as labour productivity and occupational sectoral structure, does not lead to a more robust model. Although the model explains overall a larger part of the employment regional variation, its estimates are not robust. Overall, it emerges that regions with high shares of adults participating in education and training are more likely to offer higher chances of employment even during the financial crisis. Thinly populated regions perform better compared to the big urban centres, such as the capital regions (i.e. London, Athens and Brussels). Finally, the study of the sectoral share of employment among regions leads to mixed results, with regions with high shares of industry and construction seeming better off regarding the proportion of months individuals spent in employment during 2009-2012.

The effect of individual characteristics on employment outcomes is evident already from Chapter 5 at the national level and confirmed here at the regional level, using a different sampling strategy and a different statistical method. Women are less likely to be employed than men, an effect which is mitigated by the education and age. Highly educated and older women are more likely to be employed compared to the low educated and women under 40 years old. In essence, when controlling for individual characteristics, the regional variation on employment outcomes persists.

To sum up, the region of residence affects the probability of being employed during 2009-2012. It matters even after controlling for the country of residence of the EU-SILC respondents. For instance, a person living in Northern Italy has more chances of being employed than a person living in Southern Italy. In fact, Italian regions in the north of the country are more similar to Scotland, Southern Austria and Northeast Finland than to Southern Italy which is more similar to regions in Greece. If a person moves to Finland because of the overall good employment outcomes they should bear in mind that Central Finland and the Helsinki region perform better than the rest of the country. Similarly, Southern France appears to offer higher employment chances than the north of the country. The UK is heterogeneous as well, with the north underperforming in employment compared to the rest of the country. In essence, both the between and within-country heterogeneity concerning the labour market outcomes is evident from my analyses. I conclude this chapter with a suggestion for future research on regional labour markets. Studying the regions at a higher level of disaggregation, would potentially give more detailed insights of labour market performance and could provide more explanations to some of the micro-patterns observed.

# 7

## Chapter 7 Discussion and Conclusions

This research project has now come to an end. The purpose of this chapter is to pull together the main themes of the thesis and discuss them in the light of the empirical evidence that emerged in the previous chapters. At the end of each chapter, there is a dedicated conclusion section, which summarises its key findings. The aim here is not to repeat the same conclusions, but to connect the key messages of each chapter under a more complete prism and draw the reader's attention away from the research technical details towards more general ideas and future suggestions.

This project was inspired by the curiosity to explore whether the 2008 Great Recession has affected individual labour market trajectories and the way it has affected them based on the country and region of residence. Moreover, the project investigates how the 2008 recession has differently affected the employment outcomes of subgroups of the European population, based on gender, age and education. Recent studies have focused on the period prior to the crisis or on the first two years of the crisis and they usually study one country or up to two-three countries analysed as case studies. My goal was to provide a broader study, comparing the period prior to the crisis (2005-2008) to the years in crisis (2009-2012) across 11 European countries, 41 European regions and more than 20,000 individuals. The study of 11 countries and 41 regions allows me to draw conclusions on whether the employment patterns emerged are country-specific and/or region-specific.

## 7.1 Main Concepts and Themes of the Thesis

This study is built on some main themes and concepts (in bold below), critically evaluated across the whole thesis and enriched with statistical analysis and explanations. One of the main themes concerns the **Great European recession**. Already prior to the crisis Günther Schmid (1995, 2002, 2006) predicted the formation of new labour market dynamics driven by the use of new forms of employment and the need to maintain and guarantee employment for all. During the financial crisis, the economic and labour market conditions deteriorated in most of the European countries, with fewer job opportunities, more non-standard forms of employment, higher unemployment rates and an expansion in education, used by young people to insulate themselves against the high chances of non-employment (known as the discouraged worker effect) (Barakat et al. 2010; Tros 2012). The only way of studying the *real* effects of the crisis is by comparing the period prior to the recession with the period immediately after the start of it. As seen in Chapter 4, it is more accurate to talk about European crises, rather than one recession, due to its large heterogeneity across countries. Indeed, one of the key messages of this thesis that should be taken into account in future research is that the European crisis should be considered as the sum of national crises.

One of the main concepts of the thesis is **heterogeneity**. This concept acquires here a dual nature: between and within heterogeneity. Indeed, the thesis is built up gradually from a general European analysis to a more specific cross-national comparative analysis which shows the between-country heterogeneity in the effects and responses to the crisis, as well as in the structure and performance of the national labour markets and in the national institutional frameworks. From the national level, the study becomes even more specific narrowing down the level of analysis and focusing on the within-country heterogeneity. The within-country heterogeneity is broken down at individual and regional level, as well as the heterogeneity within the same country prior to and during the financial crisis (2005-

2012). The overall heterogeneity that emerged from this study is strongly pronounced. National labour markets differ so much between them that the effort to classify them in country groups becomes ineffective. Similarly, regional labour markets differ substantially, highlighting heterogeneity even within the national borders. From Chapter 6, it is clear that the effects of the crisis were uneven among regions even belonging to the same nation. Country heterogeneity regarding labour markets' functioning can be explained by the regional breakdown. Indeed, national variation is driven by regional disparities: the national crisis can be considered as the sum of regional crises. Finally, individuals have diverse employment pathways based on their characteristics such as gender, age and education.

The theoretical framework of this project is constructed around the concept of **transitional labour markets** (Schmid 1995; Schmid and Gazier 2002). Labour market theories moved over the years from the belief in a single labour market to dual labour markets (two segments) and then to even more segmented markets (variety of segments). Segmentation often results in labour markets with stronger employment inequalities, defining specific sub-groups, such as youth and women, as outsiders without providing them with the necessary opportunities and policies in order to move upwards towards the *inside* of the labour market (Doeringer and Piore 1971; Lindbeck and Snower 2001). The transitional labour markets approach, an institutional concept and empirical framework, suggests more flexible boundaries between the various labour market segments, i.e. a bigger variety of secure and more dynamic labour market transitions. These segments should aim at maintaining and ensuring employment and not at deteriorating working conditions and job security. Moreover, a transitional labour market promotes short-time working (Schmid 1998). During a period of economic downturn, reduced working time schemes can tackle the increase of unemployment. In fact, reducing the working hours for the *insiders* may open the gates to the labour market for the *outsiders*. For instance, part-time employment is used as a tool to avoid layoffs during the crisis (labour hoarding), especially in Italy, Belgium and Finland, but in material words, the use of non-standard forms of employment is not always and everywhere benign (Schmid 2006; Eichhorst et al. 2011).

There is a strong connection between the theory of transitional labour markets and the concept of *flexicurity*, which promotes and secures transitions within jobs and/or from employment to other social systems, such as education and retirement, and aims at reducing unemployment (Wilthagen 1998; Tros 2012). In fact, transitional labour markets can improve the condition of insiders by making the internal labour markets more flexible and at the same time more secure and by promoting training and mobility opportunities (Rubery 1994; Gazier 2002). Moreover, transitional labour markets can also help outsiders in many ways. Firstly, by increasing insiders' mobility and secondly by offering lifelong training and eligibility to unemployment benefits, especially to disadvantaged workers, with the purpose of easing their transitions in the internal labour market and increasing/ maintaining employability, as well as enhancing their human capital (Cappelli 1995). In countries with rigid employment protection legislation, that strongly protects the insiders (permanent workers with open-ended contracts) but, at the same time, leaves the outsiders (non-standard employees) unprotected, employers often use non-standard forms of employment at the expense of permanent workers and not in favour of the unemployed (Clark and Postel-Vinay 2009). In that way, employers are able to adjust faster and cheaper their labour force whenever it is demanded by the circumstances. In these countries, mainly southern European, the share of involuntary part-time employment is rather high and specific sub-groups are more affected by non-standard forms of employment, such as young workers and women. Often these working arrangements represent career dead-ends, leading to insecurity, working poverty and discouragement (Rueda 2006).

The new dynamics of the labour market should foster a variety of forms of employment as a tool against non-employment and at the same time should promote not only flexible but also secure labour market transitions. For instance, during the crisis **flexible labour markets**, such as the Danish and Dutch, promoted reduced working-time schemes and other *flexicure* policies in order to tackle persistent unemployment. Indeed, the empirical results point out that countries with flexible employment legislations reacted and recovered faster from the crisis and managed to maintain employment to adequate levels if not at the pre-crisis levels. On the contrary, countries with **rigid labour markets**, such as Greece and Italy, appear more vulnerable to economic shocks and sank deeper into the crisis during 2011-2012. These countries did not manage to avoid the rise in unemployment and to absorb quickly dismissed workers, creating a queue of non-employed who are at risk of becoming outsiders. Hence, in these countries the main tool used against the crisis was an increase in labour market segmentation, reinforcing in that way employment inequalities (Clasen et al. 2012). At this point, the pre-crisis economic and labour market conditions in each country should not be ignored. Indeed, Greece and Italy registered the lowest employment rates across the whole period of study (2005-2012), while Denmark and Sweden the highest employment rates, indicating that countries should be compared with themselves across time and when compared with other countries that should be done with caution and taking into account the overall economic and labour market conditions in each country.

Finally, a primary concept of this thesis is the labour market **sequence**. This project studies labour market transitions in a dynamic way, analysing transitions as a whole and not as a single and isolated event. In other words, labour market transitions are considered as part of a bigger and more complete pathway, called a labour market sequence or trajectory. In this way, I can explore the effects of the crisis across four years and not just between year t and t+1. Indeed, one of the main contributions of this thesis concerns the quantitative methods applied. I used four different methods, namely sequence analysis, cluster analysis, multinomial logistic regression and multilevel binomial logit models; and four different statistical packages (R, Stata, MLwiN and SPSS). Each method contributed in a different and necessary way to the study of the different levels of analysis (national, individual and regional). Interestingly, although I used a different modelling strategy and a different sample of analysis, the results of the multilevel models confirmed the results of sequence and cluster analysis regarding the effects of countries and individual characteristics on employment outcomes during the financial crisis.

## 7.2 Can we Talk about New Labour Market Dynamics during the Financial Crisis?

Considering that the research has clearly shown that stability in full-time dependent employment (stable across the 48 months of analysis) is dominant, I draw the conclusion that full-time employment remains the main pillar of employment, even during the crisis. Full-time employment is followed by part-time employment and full-time self-employment, consistent with the transitional labour markets theory, which argues that although full-time employment is still the main form of employment, non-standard forms of employment are widely used, especially in some countries and by specific sub-groups of workers (Schmid and Gazier 2002). The empirical findings suggest that during the 2008 financial crisis, the use of part-time dependent employment and part-time self-employment increased, while full-time employment decreased. Another central finding suggests that in 2009-2012 unemployment increased, while female inactivity decreased, in accordance with the added worker effect. Overall, the labour market sequences during the years in crisis appear more turbulent, by including more labour market states, especially in Greece and Italy.

The main aim of this study is to disaggregate the general patterns which emerged during the Great recession and study their national, regional and individual variation. In fact, the heterogeneity of these patterns across countries and sub-groups of the sample is noteworthy (the regional variation is discussed in the next section). E**mployment inequalities** based on gender, age and education are evident from the analysis and vary significantly across European countries. During the 2008 financial crisis, the use of part-time dependent employment and part-time self-employment increased, resulting in higher labour market segmentation. Indeed, as emerged from the empirical findings, each form of non-standard employment affects different sub-groups of the sample: part-time employment and part-time self-employment have a strong female connotation, while full-time self-employment is more frequent among men.

Firstly, full-time employment represents the main form of employment in all the countries of analysis, but to a different extent. Denmark and Sweden show the highest share of stable full-time employment for everyone, irrespectively of their gender, age and education. On the other hand, full-time employment is not the main form of employment for women and low educated people in Greece (high prevalence of inactivity), Dutch women (high prevalence of part-time employment) and older workers (often in retirement). Full-time self-employment is more common among middle-aged men in Greece, Finland, Portugal and Italy. Secondly, part-time dependent employment has a female connotation and is more frequently used in countries with dual working time regimes, namely the Netherlands, followed by Sweden and the United Kingdom. Part-time self-employment is not a frequently used form of employment in my sample and is more common among women in Greece, the Netherlands and the UK. Finally, unemployment is more frequent in Belgium, Greece and Portugal and inactivity among Greek and Italian women. During the financial crisis, persistent inactivity decreased, especially for older women in Greece, Italy and the Netherlands, who according to the **added worker**

**effect** needed to contribute to the household income, possibly affected by the increased male unemployment, and thus transited from inactivity to labour market activity (ECB 2012; Bettio and Verashchagina 2014). That is why women's' labour market sequences become more turbulent during the second phase of the crisis, when they transit from inactivity to searching for a job and most of the times ending up to part-time dependent employment or part-time self-employment.

A central feature of this research points out that the main gender employment inequalities are relevant to part-time employment and inactivity, both considerably more common among women. This gender gap can be mediated by education, which matters more for women, and age. Indeed, older women and women with high levels of education experience much better employment trajectories than younger and low educated women, while men face higher chances of full-time permanent employment irrespectively of their level of education. However, when comparing highly educated women and men, men still have a clear advantage, stressing the presence of in-market segmentation. According to several studies, labour markets are still not as meritocratic in order to ensure similar employment opportunities and working conditions to women and men with the same qualifications, even during an era when women are overall more educated than men (Müller and Wolbers 2003; Iannelli and Smyth 2008). Finally, education matters more in Greece, Portugal, Finland and the UK, while on the contrary Swedish, Danish and Dutch labour markets provide everyone with equal chances of employment.

Summing up, during the years of financial crisis some new patterns emerged from my research. Women, especially in countries with high shares of female inactivity, transit from inactivity to paid work. Overall, the use of part-time forms of employment increased, especially among women, youth and in flexible labour markets. Men appear more likely to experience exclusionary transitions towards unemployment compared to the period prior to the crisis. These new patterns however might be the immediate results of adjustment strategies to tackle the effects of the crisis (labour hoarding) and of the sectoral profile of the crisis, which affected more male-dominated sectors, pushing men towards unemployment and women towards paid work, even part-time (Engemann and Wall 2010). Overall, the labour market dynamics appear slightly different with labour market trajectories being more turbulent and fragmented, especially for the already disadvantaged sub-groups of the sample. Countries with weak economies and underperforming labour markets prior to the crisis unsurprisingly appear to be even weaker during the years in crisis, while countries with stronger economies and more inclusive labour markets manage to survive the crisis. To talk with certainty about new labour market dynamics, I would need to expand my research until the most recent years (by analysing the EU-SILC dataset released during the year of submission of this thesis) and explore the employment trajectories of people during a longer span of time. In this way, I would be able to assess whether the changes in the employment sequences are caused due to the temporary adjustment strategies of the labour markets or whether these changes appear to be permanent.

## 7.3 Answers to the Research Questions

The purpose of this section is to answer the research questions of this project. To this end, I discuss the research hypotheses and sum all the information from the empirical findings in order to formulate an answer. Parts of the answers are already discussed above. Each question refers to a different chapter of the thesis. However, when needed I will use findings from other chapters aiming at providing a complete answer based on the whole thesis. The hypotheses concerning country classifications and country similarities/dissimilarities are discussed separately in the next section, as they represent a central issue of this project.

**Question 1: How did individual labour market trajectories change during the Great recession across European countries?**

Studying Europe as a whole (considering the average of the 11 countries) the individual labour market trajectories before and during the crisis present some differences. During 2009-2012, the first four years of the Great recession, the data indicated a decrease in full-time dependent employment, full-time self-employment and inactivity, together with an increase in part-time forms of employment and unemployment. Even though labour market patterns did not change drastically, they remain very heterogeneous between individuals, countries and regions.

During the financial crisis, labour market sequences appear more turbulent and fragmented compared to the period prior to the crisis, consistent with Hypothesis 1.1. As aforementioned, countries with weaker economies and rigid underperforming labour markets were hit harder by the recession compared to countries with stronger economies and labour markets that are more functional and inclusive. Indeed, southern European countries sank deeper into the crisis registering an increased number of exclusionary transitions (from employment to non-employment), while countries with more flexible labour markets promoted maintenance transitions, i.e. transitions between different working-time regimes, which aimed at preserving employment, confirming Hypothesis 1.3. Stable full-time employment decreased especially in Belgium, Denmark and Portugal, while Austria and Sweden were the two countries that best maintained employment levels during the crisis. Self-employment on a full-time basis decreased in almost all the countries, and especially in Greece and Italy that had the highest share in this employment form before the crisis. The decrease in self-employment might be related to limitations in state subsidies to boost start-ups, restrictions in eligibility in bank loans and higher taxes. Stable part-time employment increased in the Netherlands, the United Kingdom and Austria, while Dutch and Danish respondents experience an increased number of sequences with transitions from full-time to part-time employment during the financial crisis. The increase in unemployment and decrease in inactivity are gender-specific and are discussed next.

In synthesis, the between-country heterogeneity is more pronounced than the within-country heterogeneity across time. In other words, European labour markets were diverse before the crisis and remained diverse during the crisis, with some of their characteristics being accentuated. Overall, employment sequences during the crisis appear more turbulent and fragmented including more transitions, especially between full and part-time jobs (in flexible labour markets) and between employment and non-employment (in rigid labour markets).

**Question 2: Are employment inequalities more pronounced after the start of the 2008 financial crisis in Europe and if yes in which countries?**

This thesis focuses on the employment inequalities based on gender, age and education. I analyse them separately and combined. Firstly, the gender gap appears more contained after the start of the crisis. Men register a decrease in full-time employment and an increase in unemployment (especially low educated men in Greece, Italy and Belgium) caused by the sectoral profile of the recession, which mostly affected the male-dominated sectors of industry and construction. Women's labour market activity increases during the financial downturn, confirming the added worker effect (Bettio and Verashchagina 2014). A crucial point highlighted in the thesis is that in order to measure the real effect of the crisis on gendered employment trajectories, we need to compare women's trajectories before and during the crisis and not only focus on the differences between women's and men's trajectories. Overall, women - especially younger and low educated women - have fewer chances of full-time dependent employment than men and are more affected by part-time employment and inactivity. Although during the crisis women's labour market sequences appear less frequently in persistent inactivity than prior to the crisis, they experience more turbulent and fragmented sequences, consistent with

Hypothesis 2.1. The most gender equal labour markers are in Denmark, Finland and Portugal that offer high chances of full-time dependent employment for both men and women.

Secondly, I present evidence consistent with Hypothesis 2.3, since I show that younger workers (25-34 years old) experience more turbulent and fragmented sequences during the crisis and are more often in dependent part-time employment. The highest share of the increase in unemployment during the recession belongs to young men. Overall young workers appear more penalised in Greece and Italy, indicating the lowest shares of full-time employment. On the other hand, the Danish, Swedish and Portuguese labour markets offer high chances of employment for all, irrespectively of their age. In Chapter 2, it is argued that older workers (55-64 years old) are less affected by the crisis than expected based on previous shocks (Borghi 2012; ECB 2012). Indeed, older workers in 2009-2012 are the only sub-group in the sample who showed an increase in full-time dependent employment, indicating there is a new labour market pattern. Nonetheless, older workers still face higher chances of inactivity and overall lower shares of employment than core workers (35-54 years old).

Thirdly, in accordance with the job competition theory (Thurow 1975), the transitional labour markets concept and Hypothesis 2.5, highly educated workers have a clear advantage, with higher frequencies of employment and lower of non-employment when compared to low educated workers. However, the phenomenon of 'educated unemployment' (O'Higgins 2012) emerged from the analysis in the form of educated non-standard employment. The financial shock slightly worsened the employment conditions of highly educated people, pushing them towards part-time forms of employment. Nevertheless, low educated people are always disadvantaged when compared to highly educated individuals, especially in Portugal, Greece, Italy, Finland, France and the UK, where education matters more for employment. The labour markets offering equal chances of employment to all, irrespectively of their level of education, are the Swedish, followed by the Danish and the Dutch.

A key message of this research is that in times of economic depression the already disadvantaged groups of workers remain in disadvantage. That does not however mean that the rest of the workers were not affected. Men, especially young men, showed an increase in unemployment and highly educated workers experienced numerous transitions towards part-time forms of employment. Women, younger and low educated workers during the years in crisis experienced even more turbulent and fragmented employment sequences. In detail, the gender gap appears more contained during 2009-2012, although men still have higher chances of full-time dependent employment, irrespectively of their skills. Older workers are less affected than it was expected, but are more frequently in inactivity and thus still worse off when compared to younger workers. However, younger workers are defined here to be between 25 and 34 years old and thus their employment sequences appear closer to the core workers' sequences. Finally, employment inequalities register a strong heterogeneity between countries, with the Danish, Swedish, Dutch and Portuguese labour markets among the most equal, registering the more contained employment inequalities.

**Question 3: Does the region of residence matter for individuals' chances of being employed during the crisis?**

Consistent with the first part of Hypothesis 3.1, regions of different countries, but also within the same national borders, show strong heterogeneity between them, while the most homogeneous countries are Sweden (a non-Eurozone member) and Greece, a result that rejects the second part of the hypothesis. Regions which offer the highest proportion of months spent in employment during the years of the economic shock after adjusting for individual characteristics are the three Swedish regions, Southwest England and the Finnish capital, while the regions offering the lowest employment proportions are the Greek regions and the Italian south and islands. In essence, the majority of regions belonging to countries with strong economies present a higher resilience to the crisis and manage to maintain employment, consistent with Hypothesis 3.2. However, some regions of strong, in an economic sense, countries show low proportions of employment. For instance, the Finnish and British regions show high heterogeneity between them.

A primary concern of the regional analysis was to explore regional bipolarisation. A European bipolarisation was expected splitting Europe in developed and less developed regions, or else in rich and poor regions. In fact, Greece and South Italy formed a group of underperforming regions as opposed to the rest of the regions, partially consistent with Hypothesis 3.3. A key finding of this thesis showed that the bipolarisation was more clearly observed within the national borders. For instance, there was a clear distinction between North and South Italy, North and South France, the British North and the rest of the UK. North-east Finland, the most underperforming Finnish region, has similar proportions of employment with Northern Italy, North UK and Southern Austria, while the rest of the Finnish regions perform significantly better in employment outcomes, at the Swedish levels. Therefore, if someone chooses to live and work in Finland because its labour market performs better than those of the southern European countries, one should keep in mind the regional disparities in the interior of the country. Finally, several capital regions (Athens, London and Brussels), especially when controlling for individual characteristics, are among the regions with the lowest employment proportions, stressing that the big urban centres are more problematic than other more peripheral regions.

The region of residence matters in employment outcomes, even when controlling for the country effects. Overall, countries matter more for explaining the performance of labour markets, although regions explain part of the regional variation in labour markets. The between-country heterogeneity can be considered a result of uneven distribution of labour within countries, at regional level. We would expect that strong countries include mainly strong regions and vice versa, but this is not necessarily true from the regional analysis presented in Chapter 6.

## 7.4 Discussing the Context of Analysis and Country Classifications

One of the most important contributions of this study concerns the context of analysis. As stated already, the analysis is built up from a more generic context, the European, to a more specific, the national context and finally the regional context. Although the analysis of Europe as a whole does not provide detailed patterns, it is still useful to reveal the general patterns and then break them down by country and region. The more detailed contextual analysis stresses the national and regional heterogeneity, which is masked if we only study Europe as one entity. A key feature of the analysis lies in the disaggregation of the level of analysis. Indeed, national patterns are disguised by the European analysis and regional patterns are masked by the national patterns. For instance, from the multilevel models strong regional variation within countries is shown, demonstrating that regional variation should be taken into account.

Another key contribution of the thesis is the discussion and use of country classifications. To date, numerous researchers study countries aggregated in country groups in order to reduce the complexity of their project. My research shows that the study of countries in pre-defined country groups - based on classifications using specific country features, results in a substantial loss of information regarding the national patterns. Firstly, country classifications, as discussed in Chapter 2, are based on limited country features (welfare state, labour market features, education system, etc.), always ignoring other features that might also be important. For instance, some country classifications are gender blind, some ignore education and /or inequalities and overall the effects and severity of the financial shock are not included. Secondly, from the analysis presented in the empirical chapters, it is clear that although countries belonging to the same country group present some similarities, there is strong within-group heterogeneity, rejecting Hypotheses 1.2, 2.2 and 2.4.

In more detail, the data indicate that Portugal shows similarities regarding the high frequency of full-time dependent employment with the Nordic countries. Moreover, the Portuguese labour market is among the most equal in Europe, offering high chances of employment for all workers irrespectively of their gender and age. Finland has a similar share of full-time self-employed workers as southern European countries. In fact, although from the study at national level Finland appears overall more similar to the Scandinavian countries Sweden and Denmark, at regional level there are clear commonalities between some Finnish regions and some southern European regions. Additionally, Belgium has a higher share of non-employment than the rest of the continental countries. Finally, the Netherlands, Sweden and the UK share an extended use of part-time employment. Nonetheless, Hypotheses 2.2 and 2.4 can be partially confirmed, since the data identify a Nordic (Sweden and Denmark) and a southern European model, with the former presenting more equal labour markets offering higher chances of employment to all, while the latter registers more turbulent trajectories. The evidence presented in this thesis suggests that caution should be exercised when studying countries in groups. Indeed many countries such as Finland, the Netherlands and Portugal, can be considered as hybrid cases and can be classified in different groups based on the main features of each classification.

## 7.5 Final Thoughts

Summarising this thesis, I would like to emphasise two key points. Firstly, the institutional and geographical context able to promote employment even during the years in crisis; and secondly, the use of the transitional labour markets concept during the Great recession. Clearly, the Nordic countries offer generous and equal labour markets even during economic hardship, although other countries too offer high chances of (full and part-time) employment, namely the Netherlands and the UK. Portugal is a similar case although mixed with some of the main problems of the southern European labour markets, such as the high share of female inactivity. The institutional context of these countries lies on the *flexicurity* of their labour markets. Indeed, flexible employment legislation can boost employment by promoting maintenance transitions between different working time regimes and by allowing higher job mobility (Sicherman and Galor 1990). However, we need to be cautious with flexibility without security or with partial deregulation of the markets, because they lead to further segmentation and thus increased employment inequalities. For instance, in the southern European countries flexibility has been mainly used for the outsiders, leaving the insiders always protected and the outsiders always more outside acting on the insecure and precarious segment of the market (Hipp et al. 2015). In fact, Greece and Italy moved towards a deregulation of their labour market during the years of the crisis and especially during the second phase of the crisis, which surely helped at maintaining some job positions and/or creating some job vacancies (ECB 2012). However, at the same time, countries - especially countries with rigid labour markets - should foster an institutional framework that promotes flexibility as well as job security and that protects workers against not only unemployment, but also against bad quality, dead-end, low-paid and precarious jobs.

The emphasis on the combination of flexibility and security suggests that the transitional labour markets approach can still be applied in employment studies during the Great European recession. Full-time dependent employment is still the main pillar of employment, followed though by non-standard forms of employment, used to a different extent and offering different job quality and security in each country. In an era when labour market trajectories are more turbulent and fragmented, especially among women, youth and low educated people, indicating high labour market segmentation, there is a need of a normative frame that promotes *flexicurity* and a wide range of transitions in order to avoid persistent non-employment and dead-end transitions. Of course, the transitional labour markets approach might increase even further the labour market segmentation by creating even more segments and treating insiders differently from outsiders. However, in the case of the deregulation of a rigid labour market, the first step is clearly the set-up of a normative frame that will secure workers and encourage them to make transitions that will pay them back.

## 7.6 Limitations of the Study and Future Research

To conclude this research project I would like to discuss some of the limitations of my research and make future research suggestions. Most of the research limitations are limitations of the EU-SILC longitudinal dataset, while others are due to limited time and resources. A key finding of this thesis highlights the gender gap in employment trajectories. As stated in Chapter 2, an important explanation lies in motherhood and the household composition of women. The EU-SILC longitudinal dataset does not provide a clear household grid and thus it is hard (if not impossible) to reconstruct the relationships between household members, such as partners/spouses, parents and children (up until the time of submission of this thesis) (Iacovou et al. 2012). In the future, I would repeat part of this analysis focusing on the differences between women with young children versus the rest of the sample to examine how motherhood affects employment trajectories during the Great recession and in which countries.

A second limitation linked to the EU-SILC dataset is the lack of monthly information on other non-standard forms of employment and especially fixed-term contracts. In a future project, I would like to study employment trajectories before and during the financial crisis disaggregated by type of contract to assess which forms of non-standard employment are used, in which countries and whether they affect mainly specific sub-groups, such as youth and women. Although the EU-SILC dataset is the main source for European cross-country comparative studies providing labour market information at monthly, national and regional level, it does not allow the users to link cross-sectional and longitudinal data in order to enrich the dataset with a wider range of variables. Finally, for most countries the longitudinal panel includes four consecutive years, which is not a long span of time when studying employment sequences.

In the future, I would like to repeat this study focusing on the crisis and studying its effects across countries, including in the analysis information on the occupational sectors. It is known and discussed in Chapter 2 that the crisis hit some sectors harder and at different time points. It is also known that some sectors are male dominated (e.g. industry and construction) while other have a higher incidence of women (services). Other sectors might have a higher prevalence of seasonal jobs, thus more workers with fixed-term contracts (e.g. sales). Therefore, this kind of study might provide us with interesting insights on the effect of the crisis on specific sub-groups of the sample. Moreover, although previous research investigations provide some insight into regional labour markets at higher level of detail (NUTS2 or NUTS3), there is a need for continued research on regional labour markets at a higher level of disaggregation to identify and study the micro-patterns.

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# Appendix A (Chapter 3)

### Applying for the EU-SILC Dataset

With the Regulation n.223 of 2009, Article 23 access to micro-data can be given to researchers for scientific purposes, after the agreement of the National Statistical Institute (NSI) and with the modalities fixed in the new Commission Regulation n. 557/2013. In order to access the data, the University of Edinburgh had to be included in the Eurostat list of recognised entities. The application procedure started on January 2014 and included a research proposal and confidentiality declarations signed by my two supervisors, the Data Librarian and myself.

### Data Decryption of the EU-SILC Longitudinal Data

The data were provided by Eurostat in CD-ROMs, one for each year, covering the period between 2004 and 2012. Every CD-ROM contained four files of data (D, H, R and P), documentation (description of the dataset, description of the variables, problems and modifications and quality reports), all the questionnaires used in a national basis (one for each country) and a decryption programme. To decrypt the data the Windows Privacy Tools (WinPT) is used, the graphical front-end for GnuPG (Gnu Privacy Guard) for the Windows platform (Version 1.2.1 GnuPG and version 0.7.96rc1 WinPT).

### Merging the EU-SILC Data Files

Firstly, I merge the two household files, D and H. The merge is one-to-one as every observation in the master file D matches exactly one observation in the using file H. Secondly, I merge the two personal datasets, R and P. The merge is one-to-one as every observation in the master file P matches exactly one observation in the using file R. The R file contains every person living in a household, while the P file contains only the reference population and only persons with complete interviews (personal/proxy/registers). I therefore drop the cases that appear only in the register file after the merging. Finally, I merge the two new datasets (R_P and D_H). This merge is between individuals and households and it is many-to-one as every observation in the using file D_H matches more than one observation in the master dataset R_P, in other words every household may have one or more members.

**Table 1 - Population excluded from the EU-SILC longitudinal dataset**

| Country | Territories that may be excluded |
|---|---|
| France | French overseas Departments and territories |
| Netherlands | The West Frisian Islands with the exception of Texel |
| Ireland | All offshore islands with the exception of Achill, Bull, Cruit, Gorumna, Inishnee, Lettermore, Lettermullan and Valentia |
| United Kingdom | Scotland north of the Caledonian Canal, the Scilly Islands |

Source: Eurostat 2010a

**Table 2 – Merging the EU-SILC longitudinal datasets, 2005-2008 & 2009-2012**

| Results | # of obs. | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2005-2008 | | | 2009-2012 | | | |
| | D 1:1 H | R 1:1 P | D_H 1:m R_P | D 1:1 H | R 1:1 P | D_H 1:m R_P | |
| Not matched | 134,712 | 251,228 | 1 | 163,705 | 248,849 | 0 | |
| From master (D, R) | 134,712 | 251,228 | 1 | 163,703 | 248,849 | 0 | (_merge==1) |
| From using (H, P) | 0 | 0 | 0 | 2 | 0 | 0 | (_merge==2) |
| Matched | 470,237 | 1,007,229 | 1,007,229 | 514,855 | 1,090,088 | 1,090,088 | (_merge==3) |
| **Total** | **604,949** | **1,258,457** | **1,007,230** | **678,560** | **1,338,937** | **1,090,088** | |

Source: EU-SILC 2005-2008 and 2009-2012

**Table 3 - Type of interview by country, EU-SILC longitudinal dataset 2009-2012**

| Country | PAPI | CAPI | CATI | Self-administered | Proxy | Total |
|---|---|---|---|---|---|---|
| AT | 0.0 | 56.2 | 31.9 | 0.0 | 11.9 | 100 |
| BE | 0.0 | 92.2 | 0.0 | 0.0 | 7.8 | 100 |
| BG | 78.8 | 0.0 | 0.0 | 0.0 | 21.2 | 100 |
| CY | 0.0 | 80.6 | 0.0 | 0.0 | 19.4 | 100 |
| CZ | 52.5 | 26.2 | 0.0 | 0.0 | 21.3 | 100 |
| DK | 0.0 | 0.0 | 38.7 | 11.9 | 49.4 | 100 |
| EE | 1.0 | 75.4 | 0.4 | 0.0 | 23.2 | 100 |
| EL | 83.0 | 3.9 | 5.6 | 0.1 | 7.5 | 100 |
| ES | 0.0 | 72.1 | 12.7 | 0.0 | 15.2 | 100 |
| FI | 0.0 | 1.9 | 54.5 | 0.0 | 43.7 | 100 |
| FR | 0.0 | 72.7 | 0.0 | 0.0 | 27.3 | 100 |
| HR | 0.0 | 59.7 | 0.0 | 0.0 | 40.3 | 100 |
| HU | 81.9 | 0.0 | 0.0 | 0.0 | 18.1 | 100 |
| IS | 0.0 | 0.0 | 100.0 | 0.0 | 0.0 | 100 |
| IT | 29.6 | 47.8 | 0.0 | 0.0 | 22.6 | 100 |
| LT | 54.1 | 3.7 | 27.6 | 0.3 | 14.4 | 100 |
| LU | 78.9 | 0.0 | 0.0 | 0.0 | 21.1 | 100 |
| LV | 3.8 | 58.3 | 18.5 | 0.0 | 19.4 | 100 |
| MT | 0.0 | 72.3 | 0.0 | 0.0 | 27.7 | 100 |
| NL | 0.0 | 0.0 | 98.3 | 0.0 | 1.8 | 100 |
| NO | 0.0 | 0.5 | 70.5 | 0.0 | 29.0 | 100 |
| PL | 80.2 | 0.0 | 0.0 | 0.0 | 19.8 | 100 |
| PT | 3.4 | 71.3 | 0.0 | 0.0 | 25.3 | 100 |
| RO | 85.0 | 0.0 | 0.0 | 0.0 | 15.0 | 100 |
| SE | 0.2 | 0.0 | 97.7 | 0.0 | 2.2 | 100 |
| SI | 0.0 | 42.1 | 36.8 | 0.0 | 21.2 | 100 |
| SK | 95.3 | 0.0 | 0.0 | 0.3 | 4.4 | 100 |
| UK | 0.0 | 87.6 | 2.4 | 0.0 | 10.0 | 100 |
| **Total** | **29.6** | **33.8** | **16.8** | **0.2** | **19.6** | **100** |

Source: EU-SILC 2009-2012

**Table 4 – Examples of National questionnaires: Question on labour market status in original language, EU-SILC longitudinal dataset**

| | | | |
|---|---|---|---|
| Greece (2012)<br>Δ3. Ποιά είναι η ασχολία σας; Είστε:<br>(Η ασχολία αυτοκαθορίζεται από τον ερευνώμενο και αφορά στο σήμερα) | France (2012)<br>Au ^DATDEBn, quelle était votre [l'] activité principale [de ^PRENOM] ?<br>Tendre la carte IN3 (Activité principale) | Sweden (2011)<br>MPL030A<br>Arbetar …(NN), är han/ hon arbetslös, (föräldraledig, studerande,)(pensionerad,) hemarbetande eller något annat?<br>LÅT UP AVGÖRA VAD SOM ÄR DEN HUVUDSAKLIGA SYSSELSÄTTNINGEN | UK (2011)<br>Individual Section<br>117. EcStatus I'm going to ask you about what you've been doing over the past 12 months, but first, can I just check which of these categories best describes you at present? |
| Μισθωτός με πλήρη απασχόληση | 1. Salarié(e) à temps complet<br>d'enfants | 1 ARBETAR | 1.Working full-time as an employee |
| Μισθωτός με μερική απασχόληση | 2. Salarié(e) à temps partiel | 2 ARBETSLÖS | 2.Working part-time as an employee |
| Αυτοαπασχολούμενος με πλήρη απασχόληση | 3. Indépendant(e) à temps complet | 3 STUDERANDE | 3.Working full-time self employed |
| Αυτοαπασχολούμενος με μερική απασχόληση | 4. Indépendant(e) à temps partiel | 4 PENSIONERAD/HAR SJUKBIDRAG/ AKTIVITETSERSÄTTNING (FÖRTIDSPENSION) | 4.Working part-time self employed |
| Άνεργος | 5. Aide familial non rémunéré à temps complet | 5 SJUKSKRIVEN | 5.Unemployed |
| Μαθητής, φοιτητής, μετεκπαιδευόμενος, εργαζόμενος χωρίς αμοιβή για απόκτηση εμπειρίας | 6. Aide familial non rémunéré à temps partiel | 6 HEMARBETANDE | 6.Student (incl. Pupil at school, those in training) |
| Συνταξιούχος σε κανονική ηλικία ή μη ή έχετε διακόψει τις εργασίες της επιχείρησής σας | 7. Chômeur(se) | 7 MILITÄRTJÄNST | 7.Looking after family home |
| Ακατάλληλος για εργασία ή έχετε μόνιμη αναπηρία | 8. Retraité(e) ou préretraité(e), retiré(e) des affaires | 8 FÖRÄLDRALEDIG | 8.Long-term sick or disabled |
| Στρατιώτης | 9. Etudiant(e), élève en formation, en stage non rémunéré | 9 ARBETSMARKNADSPOLITISK ÅTGÄRD | 9.Retired from paid work |
| Νοικοκυρά ή και φροντίδα παιδιών/ηλικιωμένων | 10. Au foyer, occupé(e) à des tâches d'entretien de la maison ou de garde | 10 ANNAT | 10.Not in paid work for some other reason |
| Άλλη περίπτωση μη οικονομικά ενεργού ατόμου. | 11. Au foyer, en incapacité permanente de travail | | |
| | 12. Autre inactif(ve) | | |

Source: Eurostat 2012

**Table 5 - Percentages of (a) households, and (b) individuals re-interviewed the following year in EU-SILC 2005-2008 longitudinal dataset**

| | % of eligible households in which at least one member was interviewed the next year | % of eligible individuals in the sample who were interviewed the next year |
|---|---|---|
| UK | 75.5 | 74.8 |
| Austria | 77.6 | 77.8 |
| Slovenia | 78.8 | 77.6 |
| Belgium | 80.7 | 79.8 |
| Netherlands | 80.8 | 81.0 |
| Latvia | 83.2 | 83.3 |
| Denmark | 83.4 | 80.6 |
| Bulgaria | 83.8 | 84.8 |
| Ireland | 84.3 | 82.4 |
| Luxembourg | 85.7 | 84.5 |
| Spain | 86.2 | 86.2 |
| Italy | 86.3 | 86.5 |
| Hungary | 87.4 | 87.4 |
| Norway | 88.1 | 84.1 |
| Greece | 88.1 | 88.5 |
| Lithuania | 88.7 | 87.2 |
| France | 88.9 | 88.5 |
| Sweden | 89.0 | 87.2 |
| Portugal | 89.4 | 89.3 |
| Estonia | 89.9 | 89.4 |
| Poland | 90.4 | 90.7 |
| Iceland | 90.8 | 85.5 |
| Finland | 92.0 | 90.3 |
| Czech Republic | 92.4 | 92.1 |
| Cyprus | 93.0 | 92.7 |
| Slovakia | 94.8 | 94.6 |
| Romania | 97.5 | 98.1 |
| Source: EU-SILC longitudinal files, release 2008-4, unweighted | | |

Source: Table reproduced from Iacovou et al. 2012, p. 10

**Table 6 – Structure of different groups by socio-demographic characteristics and panel-years of observations, 2005-2008**

| Characteristics | | 1 year | 2 years | 3 years | 4 years | Total |
|---|---|---|---|---|---|---|
| Sex | Male | 49.2 | 47.8 | 47.5 | 47.7 | 47.8 |
| | Female | 50.8 | 52.2 | 52.5 | 52.3 | 52.2 |
| | **Total** | **100** | **100** | **100** | **100** | **100** |
| Age | Mean | 42.0 | 46.7 | 47.8 | 49.0 | 47.4 |
| | Std. Dev. | 19.2 | 18.4 | 18.1 | 17.1 | 18.1 |
| | Min | 13 | 15 | 14 | 15 | 13 |
| | Max | 80 | 80 | 80 | 80 | 80 |
| Marital status (%) | Never married | 42.7 | 30.7 | 28.2 | 24.7 | 29.0 |
| | Married | 42.9 | 54.4 | 57.1 | 60.7 | 56.4 |
| | Separated | 1.8 | 1.1 | 1.0 | 1.3 | 1.2 |
| | Widowed | 7.0 | 8.6 | 8.5 | 7.8 | 8.2 |
| | Divorced | 5.6 | 5.2 | 5.3 | 5.5 | 5.4 |
| | **Total** | **100** | **100** | **100** | **100** | **100** |
| Highest ISCED level attained | Pre-primary education | 1.0 | 0.9 | 1.1 | 1.1 | 1.0 |
| | Primary education | 12.3 | 13.4 | 13.9 | 15.0 | 14.0 |
| | Lower secondary education | 26.1 | 22.5 | 20.7 | 17.6 | 20.6 |
| | (Upper) secondary education | 39.0 | 41.4 | 42.4 | 43.6 | 42.2 |
| | Post-secondary non tertiary education | 3.5 | 3.7 | 3.7 | 3.3 | 3.5 |
| | First stage of tertiary education (not | 18.0 | 18.1 | 18.3 | 19.5 | 18.6 |
| | **Total** | **100** | **100** | **100** | **100** | **100** |
| Self-defined current economic status | Employee working full-time | 43.6 | 44.0 | 43.8 | 44.7 | 44.2 |
| | Employee working part-time | 6.5 | 6.7 | 6.4 | 7.7 | 6.9 |
| | Unemployed | 5.9 | 4.8 | 5.1 | 4.5 | 4.9 |
| | Pupil, student, further training | 15.6 | 10.1 | 8.6 | 6.5 | 8.9 |
| | In retirement or in early retirement | 16.9 | 22.2 | 23.6 | 23.4 | 22.6 |
| | Permanently disabled or/and unfit | 2.8 | 3.0 | 3.4 | 3.8 | 3.4 |
| | In compulsory military community | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| | Fulfilling domestic tasks | 6.2 | 6.9 | 6.8 | 7.3 | 6.9 |
| | Other inactive person | 2.3 | 2.2 | 2.2 | 2.1 | 2.2 |
| | **Total** | **100** | **100** | **100** | **100** | **100** |

Source: EU-SILC 2005-2008

**Table 7 – Structure of different groups by socio-demographic characteristics and panel-years of observations, 2009-2012**

| Characteristics | | 1 year | 2 years | 3 years | 4 years | Total |
|---|---|---|---|---|---|---|
| Sex | Male | 49.1 | 47.8 | 47.6 | 47.2 | 47.6 |
| | Female | 50.9 | 52.2 | 52.4 | 52.8 | 52.4 |
| | **Total** | **100** | **100** | **100** | **100** | **100** |
| Age | Mean | 43.0 | 47.8 | 49.0 | 50.3 | 48.6 |
| | Std. Dev. | 19.4 | 18.6 | 18.1 | 17.3 | 18.2 |
| | Min | 12 | 12 | 12 | 15 | 12 |
| | Max | 81 | 82 | 83 | 84 | 84 |
| Marital status | Never married | 42.9 | 31.3 | 27.8 | 24.6 | 29.0 |
| | Married | 42.8 | 53.1 | 56.6 | 59.6 | 55.5 |
| | Separated | 1.4 | 1.1 | 1.0 | 1.0 | 1.1 |
| | Widowed | 7.3 | 8.6 | 8.6 | 8.6 | 8.6 |
| | Divorced | 5.7 | 6.0 | 6.0 | 6.2 | 6.2 |
| | **Total** | **100** | **100** | **100** | **100** | **100** |
| Highest ISCED level attained | Pre-primary education | 1.2 | 1.1 | 1.2 | 1.0 | 1.1 |
| | Primary education | 10.9 | 11.2 | 11.7 | 13.2 | 12.0 |
| | Lower secondary education | 26.5 | 22.0 | 20.3 | 18.5 | 20.7 |
| | (Upper) secondary education | 39.8 | 42.5 | 42.8 | 42.7 | 42.4 |
| | Post-secondary non tertiary | 2.4 | 2.8 | 3.1 | 3.0 | 3.0 |
| | First stage of tertiary education | 19.2 | 20.4 | 20.9 | 21.7 | 20.9 |
| | **Total** | **100** | **100** | **100** | **100** | **100** |
| Self-defined current economic status | Employee working full-time | 35.0 | 34.8 | 35.3 | 36.8 | 35.7 |
| | Employee working part-time | 5.7 | 5.3 | 5.3 | 6.0 | 5.6 |
| | Self-employed working full-time | 6.0 | 6.0 | 6.2 | 6.1 | 6.1 |
| | Self-employed working part-time | 0.9 | 1.0 | 1.1 | 1.2 | 1.1 |
| | Unemployed | 8.1 | 7.5 | 6.8 | 5.7 | 6.7 |
| | Pupil, student, further training | 15.5 | 10.2 | 8.8 | 6.2 | 8.9 |
| | In retirement | 18.0 | 24.0 | 25.3 | 26.6 | 24.8 |
| | Permanently disabled or/and unfit | 2.5 | 2.9 | 3.1 | 3.2 | 3.1 |
| | In compulsory military community | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| | Fulfilling domestic tasks | 6.3 | 6.5 | 6.3 | 6.6 | 6.4 |
| | Other inactive person | 2.0 | 1.7 | 1.7 | 1.5 | 1.7 |
| | **Total** | **100** | **100** | **100** | **100** | **100** |

Source: EU-SILC 2009-2012

**Table 8 – Distribution of observations with different panel-years by country, 2005-2008**

| Country | 1 year | 2 years | 3 years | 4 years | Total |
|---|---|---|---|---|---|
| AT | 4.07 | 2.97 | 3.16 | 2.34 | 2.91 |
| BE | 4.18 | 3.02 | 2.95 | 2.63 | 2.97 |
| BG | 2.25 | 2.03 | 3.54 | 0 | 1.82 |
| CY | 1.21 | 1.69 | 2.17 | 2.06 | 1.91 |
| CZ | 3.48 | 4.26 | 6.62 | 7.88 | 6.08 |
| DK | 2.95 | 2.36 | 2.26 | 1.98 | 2.25 |
| EE | 2.05 | 2.5 | 3.04 | 1.17 | 2.18 |
| ES | 7.67 | 7.07 | 6.72 | 6.27 | 6.75 |
| FI | 2.57 | 2.77 | 3.31 | 3.31 | 3.09 |
| FR | 4.32 | 3.78 | 5.22 | 9.99 | 6.3 |
| GR | 2.4 | 2.74 | 3.34 | 2.64 | 2.85 |
| HU | 4.26 | 4.15 | 4.74 | 3.73 | 4.19 |
| IE | 2.17 | 2.38 | 1.69 | 1.13 | 1.75 |
| IS | 1.45 | 1.27 | 1.25 | 1.19 | 1.25 |
| IT | 9.24 | 10.45 | 11.03 | 9.91 | 10.3 |
| LT | 2.06 | 2.57 | 3.1 | 1.82 | 2.43 |
| LU | 2.6 | 1.37 | 1.66 | 5.56 | 2.94 |
| LV | 3.03 | 2.53 | 2.31 | 1.84 | 2.28 |
| NL | 5.73 | 4.98 | 3.84 | 5.01 | 4.72 |
| NO | 3.4 | 1.12 | 1.11 | 5.44 | 2.73 |
| PL | 5.94 | 7.13 | 9.04 | 8 | 7.88 |
| PT | 1.77 | 2.35 | 2.27 | 2.22 | 2.24 |
| RO | 0.84 | 8.34 | 0 | 0 | 2.52 |
| SE | 3.19 | 2.93 | 2.73 | 2.72 | 2.82 |
| SI | 8.63 | 6.01 | 5.75 | 4.67 | 5.71 |
| SK | 0.73 | 2.87 | 3.18 | 3.04 | 2.84 |
| UK | 7.83 | 4.36 | 3.96 | 3.46 | 4.23 |
| **Total** | **100** | **100** | **100** | **100** | **100** |

Source: EU-SILC 2005-2008

**Table 9 – Distribution of observations with different panel-years by country, 2009-2012**

| Country | 1 year | 2 years | 3 years | 4 years | Total |
|---|---|---|---|---|---|
| AT | 2.93 | 2.31 | 2.81 | 2.52 | 2.58 |
| BE | 3.67 | 2.63 | 2.5 | 2.04 | 2.48 |
| BG | 1.31 | 2.6 | 3.41 | 3.72 | 3.11 |
| CY | 1.58 | 1.93 | 2.97 | 1.59 | 2.09 |
| CZ | 1.76 | 3.34 | 4.44 | 4.44 | 3.91 |
| DK | 0.64 | 1.57 | 1.8 | 1.76 | 1.63 |
| EE | 1.97 | 2.31 | 2.57 | 2.15 | 2.3 |
| EL | 2.91 | 2.81 | 2.75 | 2.88 | 2.82 |
| ES | 6.99 | 6.02 | 6.44 | 6 | 6.22 |
| FI | 4.23 | 4.66 | 4.76 | 2.5 | 3.93 |
| FR | 5.42 | 4.38 | 4.65 | 11 | 6.78 |
| HR | 4.65 | 6.41 | 2.58 | 0 | 2.98 |
| HU | 4.78 | 6.67 | 4.68 | 4.8 | 5.3 |
| IS | 1.55 | 1.23 | 1.31 | 1.14 | 1.25 |
| IT | 11.23 | 10.13 | 7.76 | 6.74 | 8.38 |
| LT | 0.86 | 2.1 | 2.96 | 2.58 | 2.42 |
| LU | 3.78 | 2.34 | 2.55 | 5.76 | 3.67 |
| LV | 3 | 2.84 | 3.14 | 2.65 | 2.88 |
| MT | 1.74 | 2.06 | 2.24 | 2.17 | 2.13 |
| NL | 5.22 | 4.74 | 4.51 | 3.36 | 4.25 |
| NO | 4.11 | 1.72 | 1.45 | 3.87 | 2.56 |
| PL | 4.23 | 5.93 | 7.03 | 6.56 | 6.33 |
| PT | 1.59 | 2.74 | 2.87 | 2.91 | 2.74 |
| RO | 0.55 | 2.68 | 3.87 | 4.07 | 3.33 |
| SE | 2.84 | 2.29 | 2.53 | 2.37 | 2.43 |
| SI | 8.43 | 5.45 | 5.12 | 4.75 | 5.36 |
| SK | 1.05 | 2.46 | 3.16 | 3.26 | 2.82 |
| UK | 6.99 | 3.66 | 3.11 | 2.4 | 3.34 |
| **Total** | 100 | 100 | 100 | 100 | 100 |

Source: EU-SILC 2009-2012

**Table 10 –Sequence object, 2005-2008 & 2009-2012**

| 2005-2008 | 2009-2012 |
|---|---|
| Sequence object created with TraMineR version 1.8-11.1<br>[>] 22456 sequences in the data set, 4614 unique<br>[>] sum of weights: 24814.69 - min/max: 0.5514/3.58342<br>[>] min/max sequence length: 48/48<br>[>] alphabet (state labels):<br>1=FT (Employee full time)<br>2=PT (Employee part time)<br>3=SFT (Self-employed full time)<br>4=SPT (Self-employed part time)<br>5=U (Unemployed)<br>6=R (Retired)<br>7=I (Inactive)<br>[>] dimensionality of the sequence space[131]: 288<br>[>] colors: 1=green 2=blue 3=orange 4=yellow 5=red 6=gray 7=purple[132] | Sequence object created with TraMineR version 1.8-11.1<br>[>] 21702 sequences in the data set, 4583 unique<br>[>] sum of weights: 30002.71 - min/max: 0.64403/5.83824<br>[>] min/max sequence length: 48/48<br>[>] alphabet (state labels):<br>1=FT (Employee full time)<br>2=PT (Employee part time)<br>3=SFT (Self-employed full time)<br>4=SPT (Self-employed part time)<br>5=U (Unemployed)<br>6=R (Retired)<br>7=I (Inactive)<br>[>] dimensionality of the sequence space: 288<br>[>] colors: 1=green 2=blue 3=orange 4=yellow 5=red 6=gray 7=purple |

Source: EU-SILC 2005-2008 and 2009-2012

[131] The dimensionality of the sequence space is the number of dimensions needed for constructing the sequence space Haubold and Wiehe and is calculated using the formula $d=(|A|-1)l$, where $|A|$ is the size of the alphabet and l is the (maximal) length of the sequences, i.e. d=(7-1)*48=288 (Gabadinho et al., 2011, p. 54).

[132] To define the colour palette for the sequence graphics we use the 'RColorBrewer' package, developed by Erich Neuwirth in 2007.

**Table 11 – Transition rates from t to t+1, 2005-2008 & 2009-2012**

| 2005-2008 | [-> FT] | [-> PT] | [-> SFT] | [-> SPT] | [-> U] | [-> R] | [-> I] |
|---|---|---|---|---|---|---|---|
| **[FT ->]** | 0.9881 | 0.0032 | 0.0024 | 0.0017 | 0.0008 | 0.0001 | 0.0037 |
| **[PT ->]** | 0.0121 | 0.9729 | 0.0066 | 0.0029 | 0.0004 | 0.0005 | 0.0045 |
| **[SFT ->]** | 0.0068 | 0.0067 | 0.9736 | 0.0058 | 0.0018 | 0.0012 | 0.0041 |
| **[SPT ->]** | 0.0023 | 0.0022 | 0.0052 | 0.9882 | 0.0008 | 0.0004 | 0.0008 |
| **[U ->]** | 0.0036 | 0.0005 | 0.0028 | 0.0016 | 0.9873 | 0.0026 | 0.0016 |
| **[R ->]** | 0.0026 | 0.0035 | 0.0093 | 0.0049 | 0.0174 | 0.9587 | 0.0037 |
| **[I ->]** | 0.0348 | 0.014 | 0.0129 | 0.0046 | 0.0041 | 0.0017 | 0.928 |
| **2009-2012** | **[-> FT]** | **[-> PT]** | **[-> SFT]** | **[-> SPT]** | **[-> U]** | **[-> R]** | **[-> I]** |
| **[FT ->]** | 0.9868 | 0.0035 | 0.0019 | 0.0022 | 0.001 | 0.0002 | 0.0044 |
| **[PT ->]** | 0.0121 | 0.9738 | 0.0028 | 0.0049 | 0.0004 | 0.0006 | 0.0053 |
| **[SFT ->]** | 0.0026 | 0.002 | 0.9907 | 0.0034 | 0.0004 | 0.0006 | 0.0004 |
| **[SPT ->]** | 0.0059 | 0.0059 | 0.0057 | 0.9755 | 0.0015 | 0.0013 | 0.0041 |
| **[U ->]** | 0.0044 | 0.0008 | 0.0014 | 0.0024 | 0.9848 | 0.004 | 0.0022 |
| **[R ->]** | 0.0034 | 0.0063 | 0.0047 | 0.0071 | 0.0175 | 0.9567 | 0.0043 |
| **[I ->]** | 0.0318 | 0.0135 | 0.0039 | 0.0097 | 0.0035 | 0.0017 | 0.9359 |

Source: EU-SILC 2005-2008 and 2009-2012

*FT=Full-time employment; PT=Part-time employment; SFT=Full-time self-employment; SPT= Part-time self-employment; U=Unemployment; I=Inactivity; R=Retirement.

**Table 12 – Substitution costs based on the observed transition rates, 2005-2008 & 2009-2012**

| 2005-2008 | FT -> | PT -> | SFT -> | SPT -> | U -> | R -> | I -> |
|---|---|---|---|---|---|---|---|
| **FT ->** | 0 | 1.985 | 1.996 | 1.997 | 1.962 | 1.996 | 1.991 |
| **PT ->** | 1.985 | 0 | 1.999 | 1.996 | 1.981 | 1.995 | 1.987 |
| **SFT ->** | 1.996 | 1.999 | 0 | 1.980 | 1.994 | 1.998 | 1.995 |
| **SPT ->** | 1.997 | 1.996 | 1.980 | 0 | 1.995 | 1.995 | 1.989 |
| **U ->** | 1.962 | 1.981 | 1.994 | 1.995 | 0 | 1.995 | 1.983 |
| **R ->** | 1.996 | 1.995 | 1.998 | 1.995 | 1.995 | 0 | 1.989 |
| **I ->** | 1.991 | 1.987 | 1.995 | 1.989 | 1.983 | 1.989 | 0 |
| **2009-2012** | **FT ->** | **PT ->** | **SFT ->** | **SPT ->** | **U ->** | **R ->** | **I ->** |
| **FT ->** | 0 | 1.984 | 1.995 | 1.996 | 1.964 | 1.995 | 1.992 |
| **PT ->** | 1.984 | 0 | 1.999 | 1.993 | 1.981 | 1.995 | 1.989 |
| **SFT ->** | 1.995 | 1.999 | 0 | 1.979 | 1.994 | 1.998 | 1.996 |
| **SPT ->** | 1.996 | 1.993 | 1.979 | 0 | 1.994 | 1.995 | 1.992 |
| **U ->** | 1.964 | 1.981 | 1.994 | 1.994 | 0 | 1.996 | 1.986 |
| **R ->** | 1.995 | 1.995 | 1.998 | 1.995 | 1.996 | 0 | 1.991 |
| **I ->** | 1.992 | 1.989 | 1.996 | 1.992 | 1.986 | 1.991 | 0 |

Source: EU-SILC 2005-2008 and 2009-2012

*FT=Full-time employment; PT=Part-time employment; SFT=Full-time self-employment; SPT= Part-time self-employment; U=Unemployment; I=Inactivity; R=Retirement.

## Appendix B (Chapter 4)

**Table 1 – Summary of longitudinal sequence measures, 2005-2008 & 2009-2012**

| Measures | Entropy | | Turbulence | | Number of transitions | |
|---|---|---|---|---|---|---|
| | 2005-2008 | 2009-2012 | 2005-2008 | 2009-2012 | 2005-2008 | 2009-2012 |
| Mean | 0.12 | 0.12 | 2.89 | 2.96 | 0.88 | 0.85 |
| Std. deviation | 0.18 | 0.18 | 2.96 | 2.99 | 1.65 | 1.53 |
| Variance | 0.03 | 0.03 | 8.76 | 8.92 | 2.72 | 2.35 |
| Skewness | 1.17 | 1.11 | 1.57 | 1.47 | 3.17 | 3.00 |
| Kurtosis | 3.15 | 3.01 | 4.79 | 4.35 | 17.73 | 16.87 |
| Min | 0 | 0 | 1 | 1 | 0 | 0 |
| Max | 0.82 | 0.88 | 19.21 | 23.81 | 20 | 21 |
| 1st Quart. | 0 | 0 | 1 | 1 | 0 | 0 |
| 3rd Quart. | 0.29 | 0.29 | 4.12 | 4.39 | 1 | 1 |
| 90% | 0.36 | 0.36 | 6.96 | 7.04 | 3 | 3 |

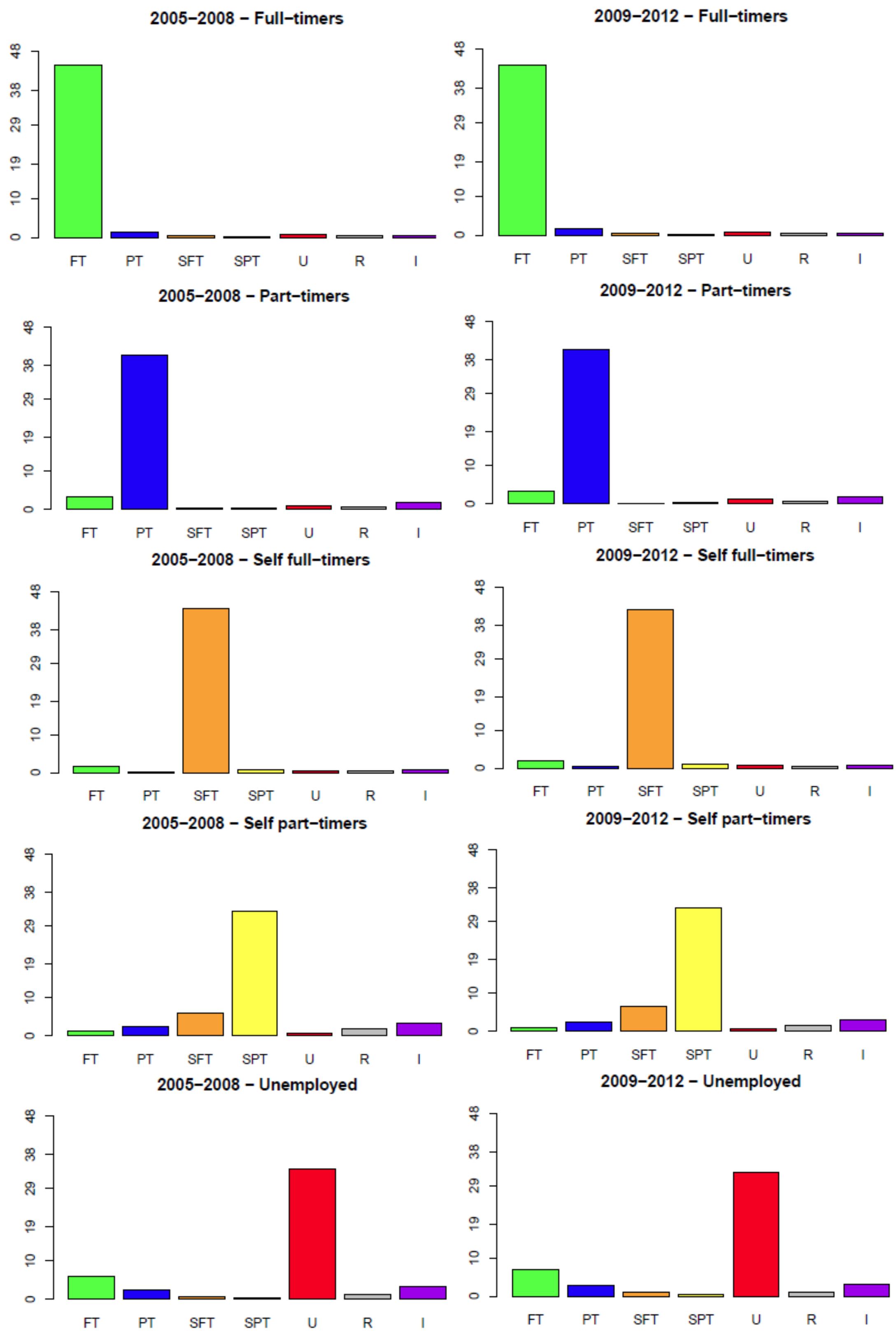
Source: EU-SILC 2005-2008 and 2009-2012

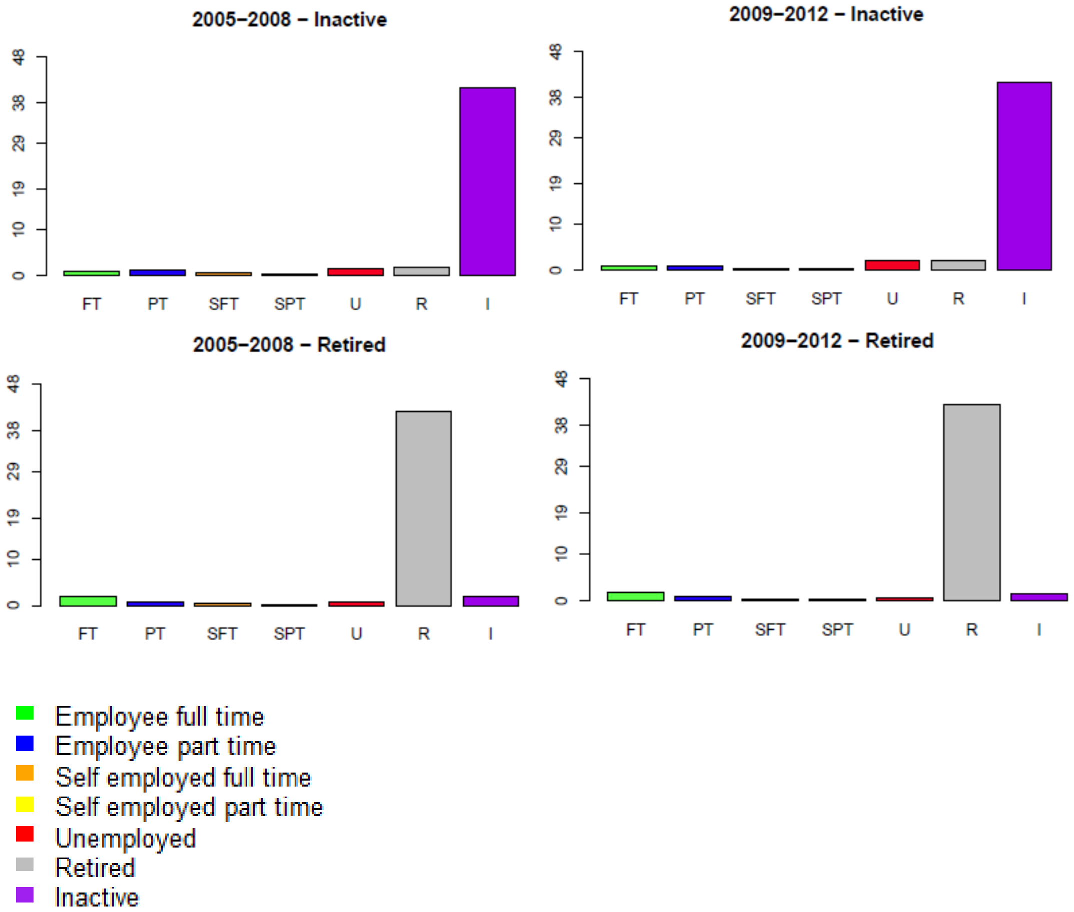
**Table 2 – Number of transitions, 2005-2008 & 2009-2012**

| Transitions | Absolute values | | Percent | |
|---|---|---|---|---|
| | 2005-2008 | 2009-2012 | 2005-2008 | 2009-2012 |
| 0 | 14,103 | 13,410 | 62.80 | 61.79 |
| 1 | 3,438 | 3,600 | 15.31 | 16.59 |
| 2 | 2,386 | 2,376 | 10.63 | 10.95 |
| 3 | 1,109 | 1,004 | 4.94 | 4.63 |
| 4 | 534 | 569 | 2.38 | 2.62 |
| 5 | 287 | 279 | 1.28 | 1.29 |
| 6 | 206 | 177 | 0.92 | 0.82 |
| 7 | 126 | 107 | 0.56 | 0.49 |
| 8 | 108 | 82 | 0.48 | 0.38 |
| 9 | 53 | 42 | 0.24 | 0.19 |
| 10 | 53 | 22 | 0.24 | 0.10 |
| 11 | 10 | 9 | 0.04 | 0.04 |
| 12 | 11 | 6 | 0.05 | 0.03 |
| 13 | 10 | 5 | 0.04 | 0.02 |
| 14 | 7 | 6 | 0.03 | 0.03 |
| 15 | 4 | 1 | 0.02 | 0.00 |
| 16 | 7 | 4 | 0.03 | 0.02 |
| 17 | 2 | 2 | 0.01 | 0.01 |
| 18 | 0 | 0 | 0.00 | 0.00 |
| 19 | 1 | 0 | 0.00 | 0.00 |
| 20 | 1 | 0 | 0.00 | 0.00 |
| 21 | 0 | 1 | 0.00 | 0.00 |
| **Total** | **22,456** | **21,702** | **100** | **100** |

Source: EU-SILC 2005-2008 and 2009-2012

**Figure 1 – Mean number of months spent in each status (not necessarily consecutive) by labour market clusters, 2005-2008 & 2009-2012**

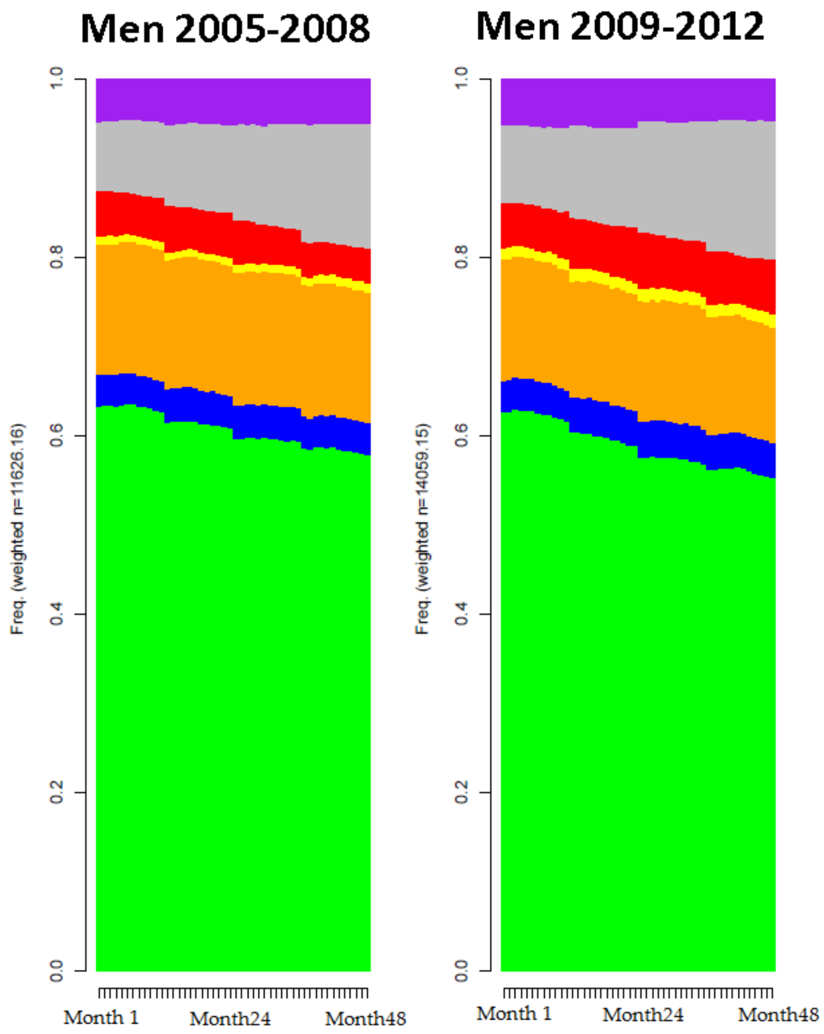


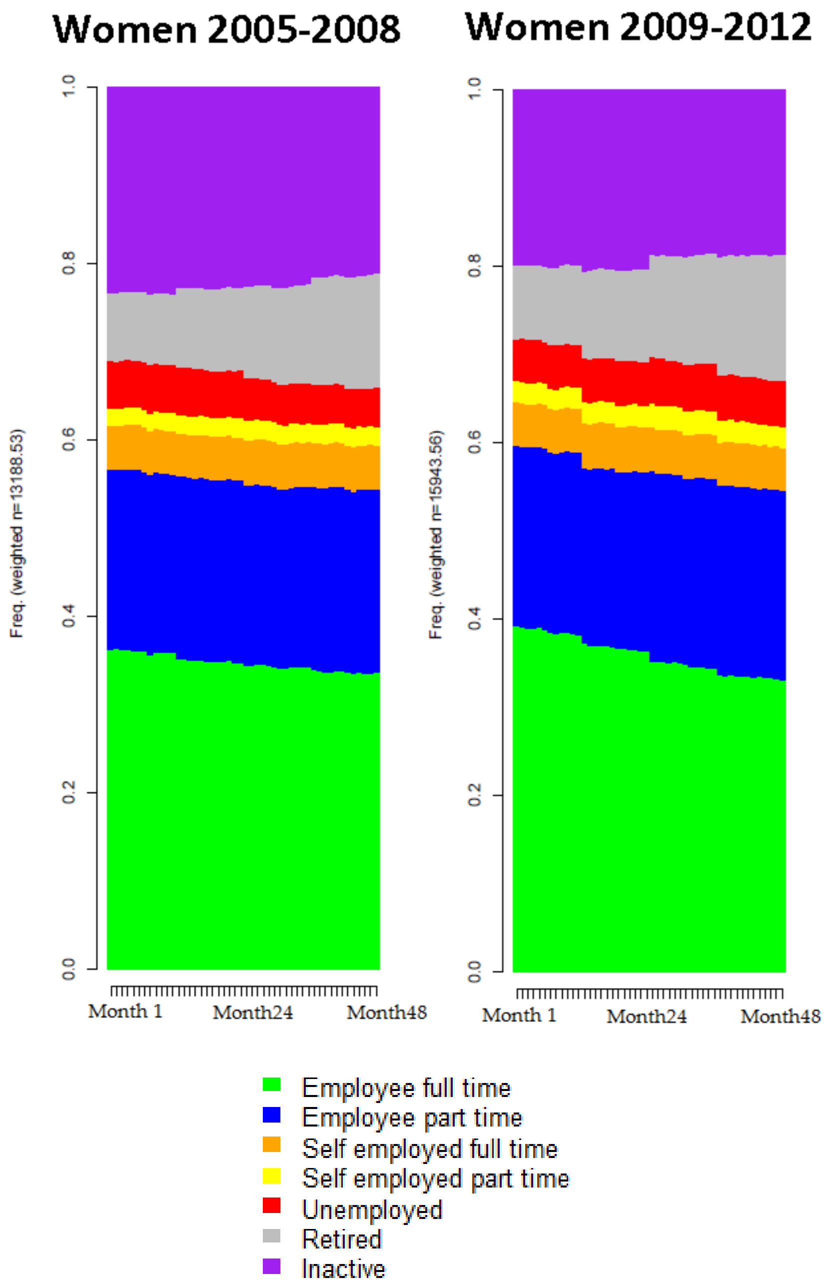



Source: EU-SILC 2005-2008 and 2009-2012
Note: FT=Full-time employment; PT=Part-time employment; SFT=Full-time self-employment; SPT=Part-time self-employment; U=Unemployment; R=Retirement; I=Inactivity.

## Appendix C (Chapter 5)

**Figure 1 – Monthly proportion labour market status plots by gender, 2005-2008 & 2009-2012**






Source: EU-SILC 2005-2008 and 2009-2012

**Table 1 – Composition of labour market clusters by socio-demographic characteristics, 2005-2008 & 2009-2012**

| Socio-demographic characteristics | Clusters 2005-2008 | | | | | | | | Clusters 2009-2012 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **FT** | **PT** | **SFT** | **SPT** | **U** | **I** | **R** | **Total** | **FT** | **PT** | **SFT** | **SPT** | **U** | **I** | **R** | **Total** |
| **Total** | **47.42** | **11.32** | **10.2** | **1.44** | **4.92** | **14.29** | **10.4** | **100** | **48.9** | **11.1** | **9.6** | **1.6** | **5.8** | **12.1** | **11.0** | **100** |
| Female | 38.5 | 87.6 | 28.2 | 74.1 | 56.0 | 86.0 | 47.4 | 52.1 | 41.2 | 88.4 | 29.9 | 75.9 | 50.2 | 84.7 | 49.1 | 52.6 |
| Male | 61.5 | 12.4 | 71.8 | 25.9 | 44.0 | 14.0 | 52.6 | 47.9 | 58.8 | 11.6 | 70.1 | 24.1 | 49.8 | 15.3 | 50.9 | 47.4 |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |
| 25-34 | 23.1 | 18.1 | 13.9 | 13.3 | 24.0 | 14.5 | 0.3 | 17.9 | 21.3 | 17.2 | 12.1 | 10.8 | 23.5 | 14.1 | 0.1 | 16.7 |
| 35-54 | 64.0 | 65.9 | 66.1 | 54.0 | 52.5 | 51.0 | 8.0 | 56.0 | 63.4 | 65.1 | 64.7 | 61.9 | 52.9 | 49.7 | 5.1 | 55.0 |
| 55-64 | 12.9 | 16.1 | 20.0 | 32.7 | 23.5 | 34.5 | 91.7 | 26.1 | 15.3 | 17.6 | 23.2 | 27.3 | 23.5 | 36.2 | 94.8 | 28.2 |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |
| Up to primary | 7.6 | 7.4 | 14.6 | 21.1 | 19.2 | 25.7 | 25.5 | 13.5 | 7.0 | 5.7 | 13.5 | 15.2 | 17.3 | 24.3 | 22.2 | 11.9 |
| Lower secondary | 14.0 | 15.5 | 17.7 | 13.9 | 25.9 | 28.5 | 18.5 | 17.7 | 13.3 | 14.9 | 16.6 | 14.0 | 25.9 | 27.3 | 19.2 | 16.8 |
| Upper/Post-secondary | 45.7 | 48.7 | 46.9 | 35.3 | 39.6 | 35.5 | 40.3 | 43.7 | 44.6 | 48.9 | 42.2 | 36.4 | 41.4 | 36.1 | 40.3 | 43.1 |
| Tertiary | 32.7 | 28.4 | 20.7 | 29.7 | 15.3 | 10.3 | 15.7 | 25.2 | 35.1 | 30.5 | 27.7 | 34.4 | 15.4 | 12.3 | 18.3 | 28.2 |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |

Source: EU-SILC 2005-2008 and 2009-2012

Note: FT= Full-time employment cluster; PT= Part-time employment cluster; SFT= Full-time self-employment cluster; SPT= Non-standard turbulent cluster with prevalence of part-time self-employment; U= Unemployment turbulent cluster; I=Inactivity cluster; R=Retirement cluster.

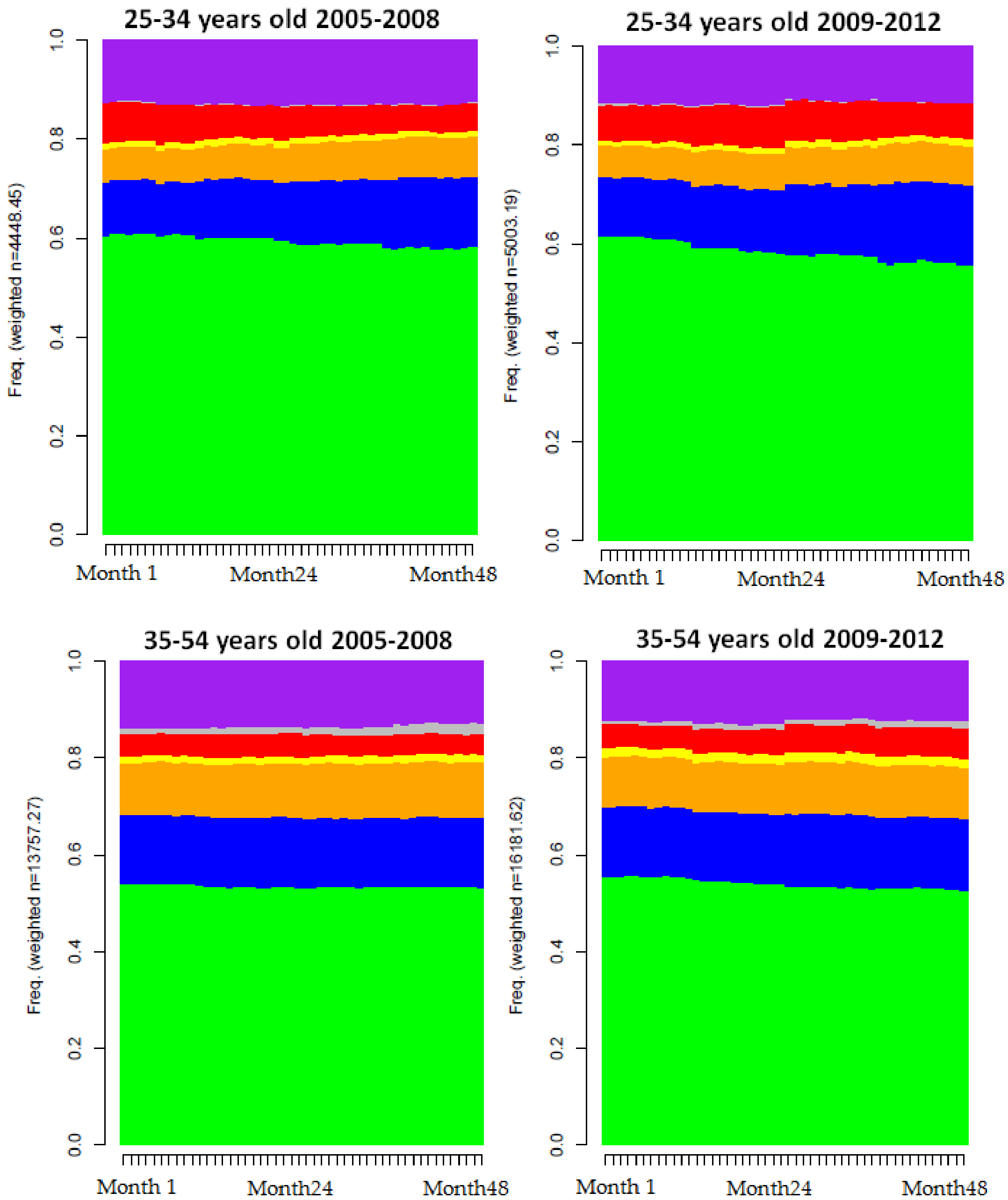
**Table 2 – Composition of labour market clusters by country of residence, 2009-2012 (Freq.)**

| Country | Clusters 2009-2012 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | FT | PT | SFT | SPT | U | I | R | Total |
| AT | 780 | 229 | 105 | 14 | 56 | 119 | 272 | 1,575 |
| BE | 555 | 198 | 91 | 11 | 124 | 205 | 89 | 1,273 |
| DK | 418 | 57 | 32 | 7 | 11 | 37 | 38 | 600 |
| GR | 552 | 45 | 378 | 66 | 147 | 298 | 162 | 1,648 |
| FI | 433 | 44 | 136 | 8 | 53 | 104 | 71 | 849 |
| FR | 3,732 | 840 | 456 | 55 | 352 | 642 | 880 | 6,957 |
| IT | 1,664 | 256 | 540 | 70 | 290 | 682 | 449 | 3,951 |
| NL | 547 | 384 | 66 | 53 | 45 | 140 | 92 | 1,327 |
| PT | 858 | 41 | 149 | 24 | 141 | 221 | 159 | 1,593 |
| SE | 475 | 124 | 45 | 5 | 17 | 12 | 5 | 683 |
| UK | 587 | 200 | 77 | 39 | 22 | 156 | 165 | 1,246 |
| **Total** | **10,601** | **2,418** | **2,075** | **352** | **1,258** | **2,616** | **2,382** | **21,702** |

Source: EU-SILC 2009-2012

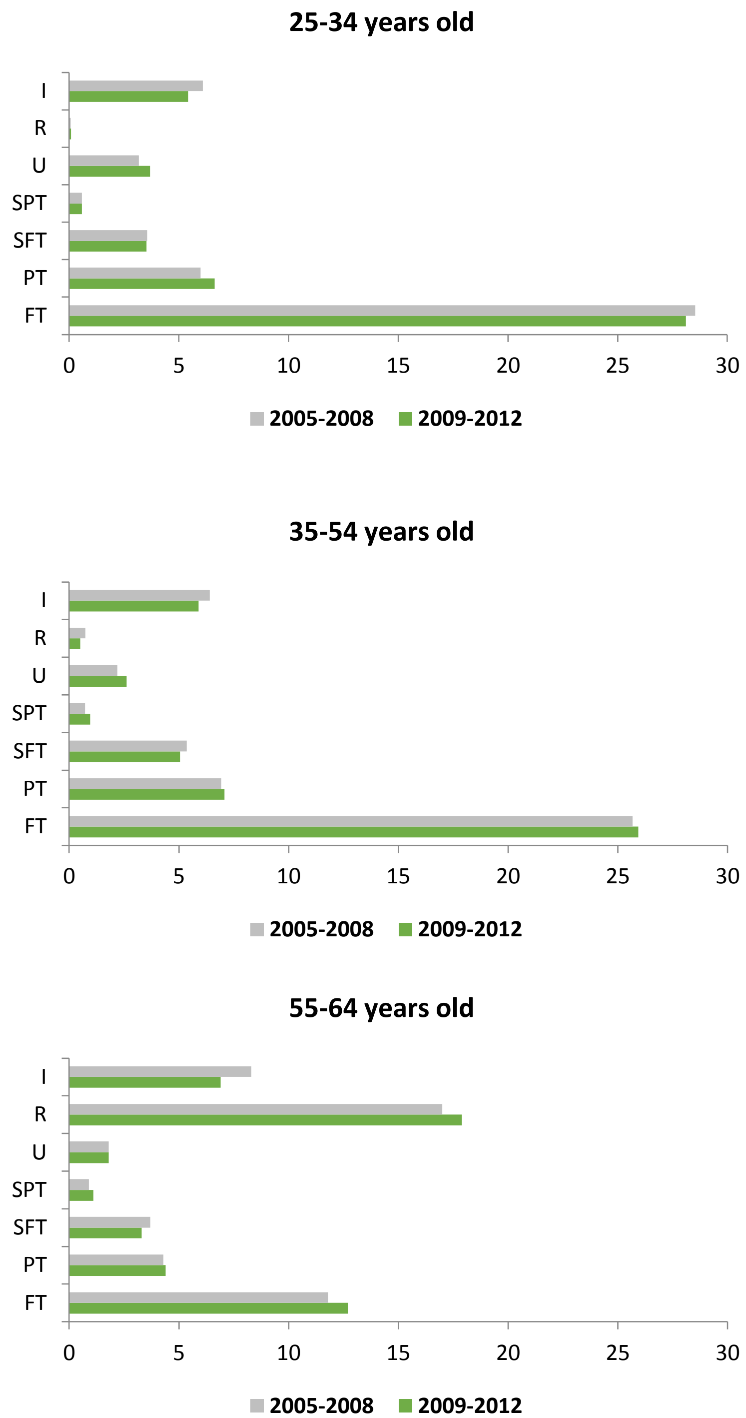
Note: FT= Full-time employment cluster; PT= Part-time employment cluster; SFT= Full-time self-employment cluster; SPT= Non-standard turbulent cluster with prevalence of part-time self-employment; U= Unemployment turbulent cluster; I=Inactivity cluster; R=Retirement cluster.

**Figure 2 - Monthly proportion labour market status plots by age groups, 2005-2008 & 2009-2012**



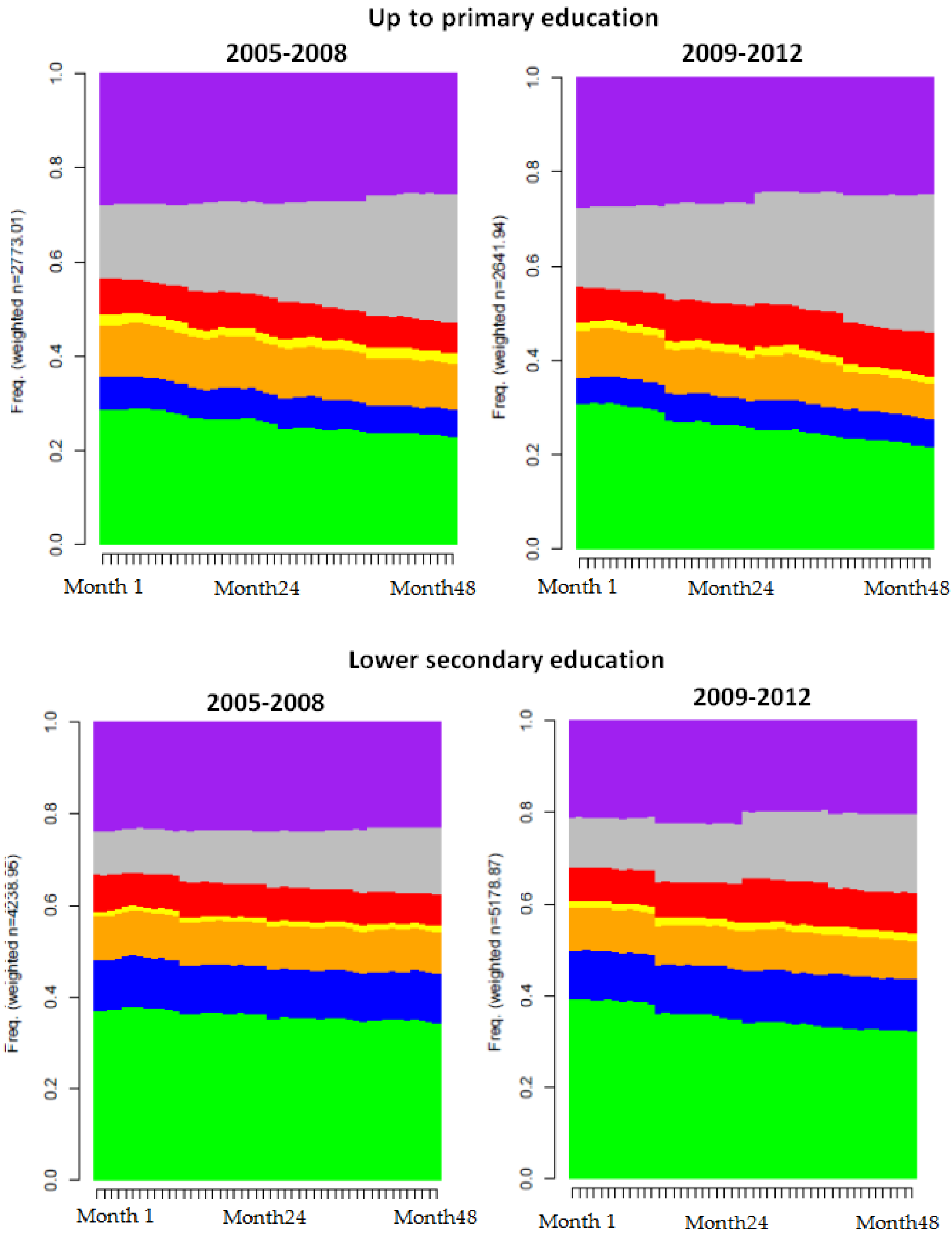

Source: EU-SILC 2005-2008 and 2009-2012

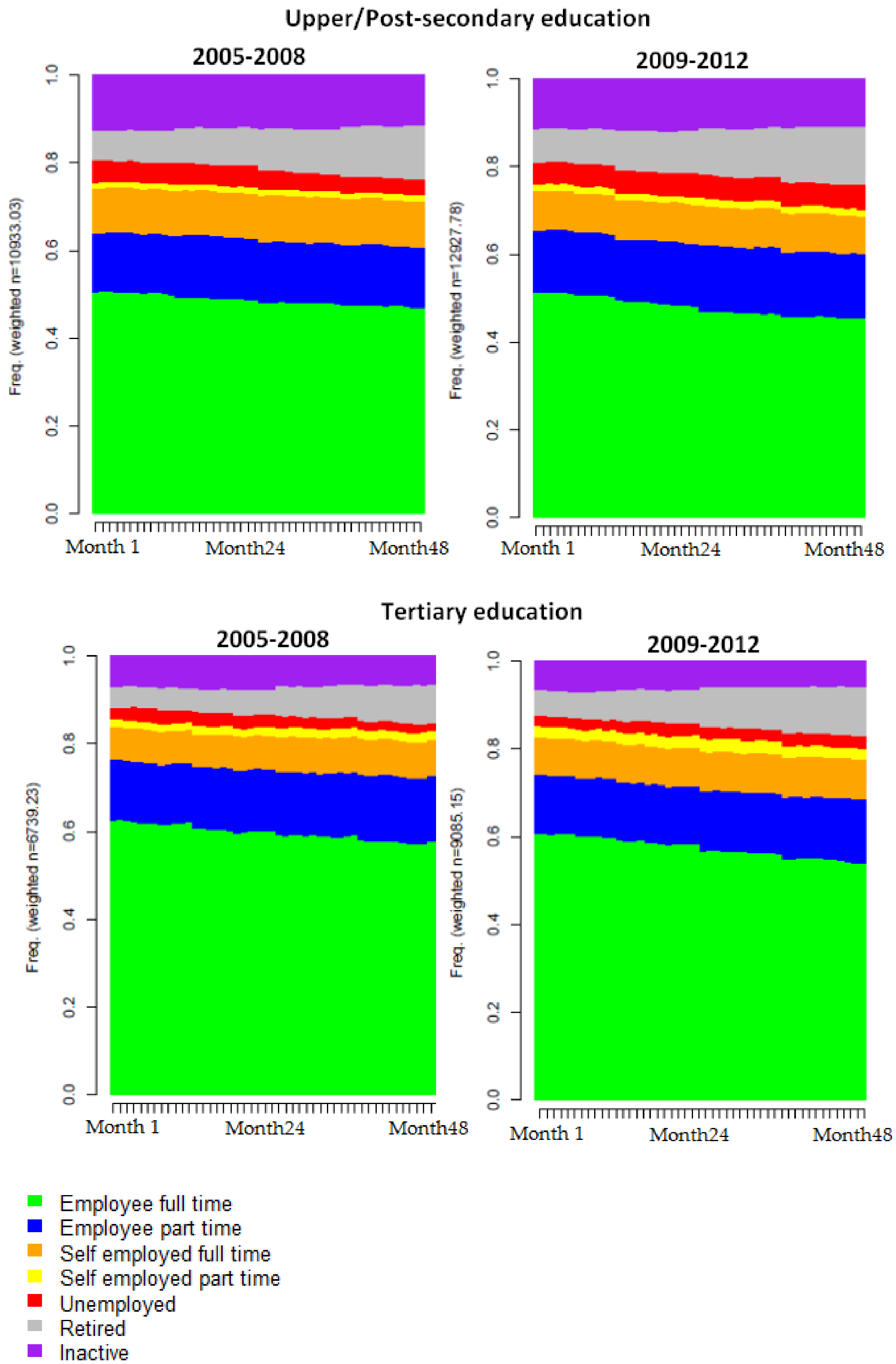
**Figure 3 - Mean number of months spent in each labour market status (not necessarily consecutive) by age group, 2005-2008 & 2009-2012**




Source: EU-SILC 2005-2008 and 2009-2012

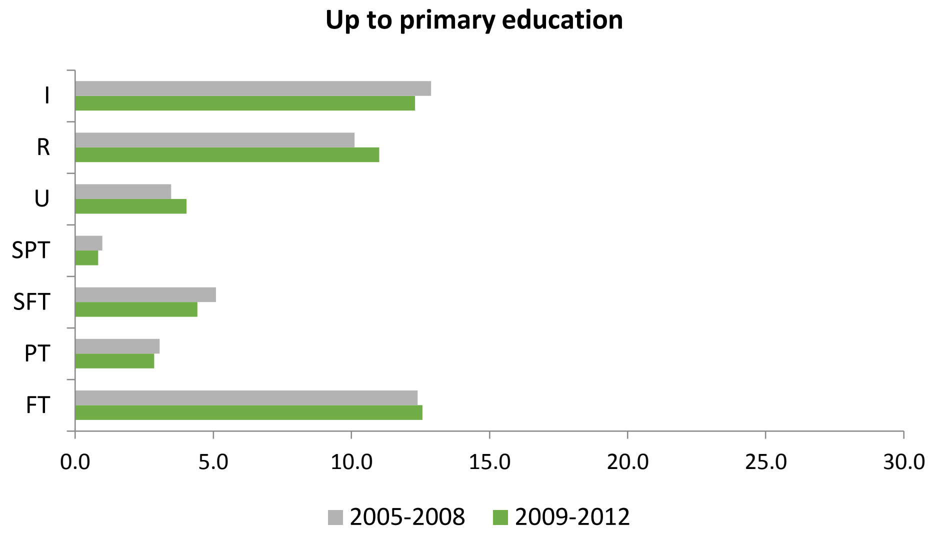
**Figure 4 – Monthly proportion labour market status plots by education level, 2005-2008 & 2009-2012**

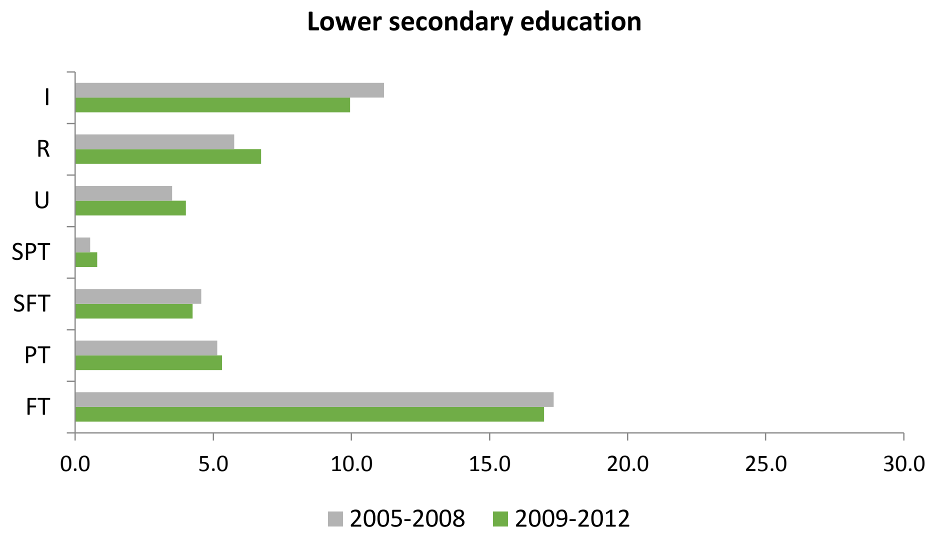





Source: EU-SILC 2005-2008 and 2009-2012

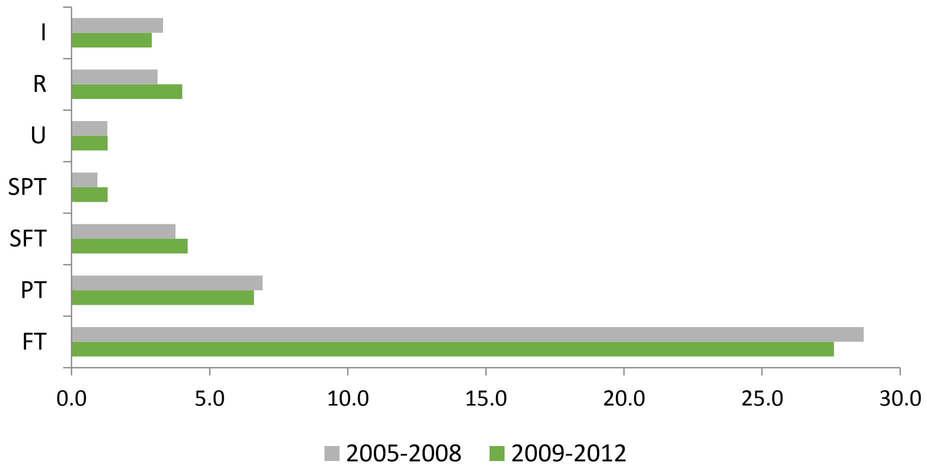
**Figure 5 – Mean number of months spent in each labour market status (not necessarily consecutive) by education level, 2005-2008 & 2009-2012**



## Upper/post secondary education

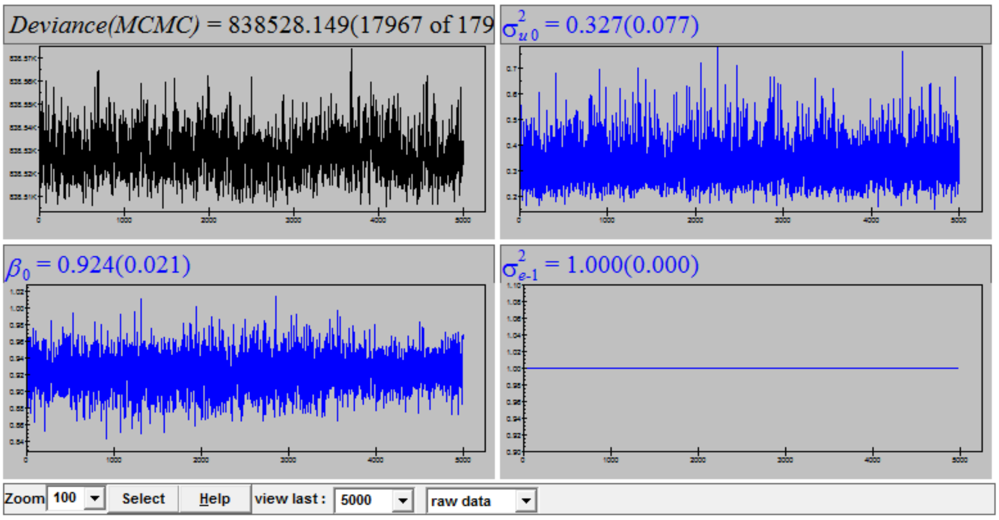

## Tertiary education




Source: EU-SILC 2005-2008 and 2009-2012

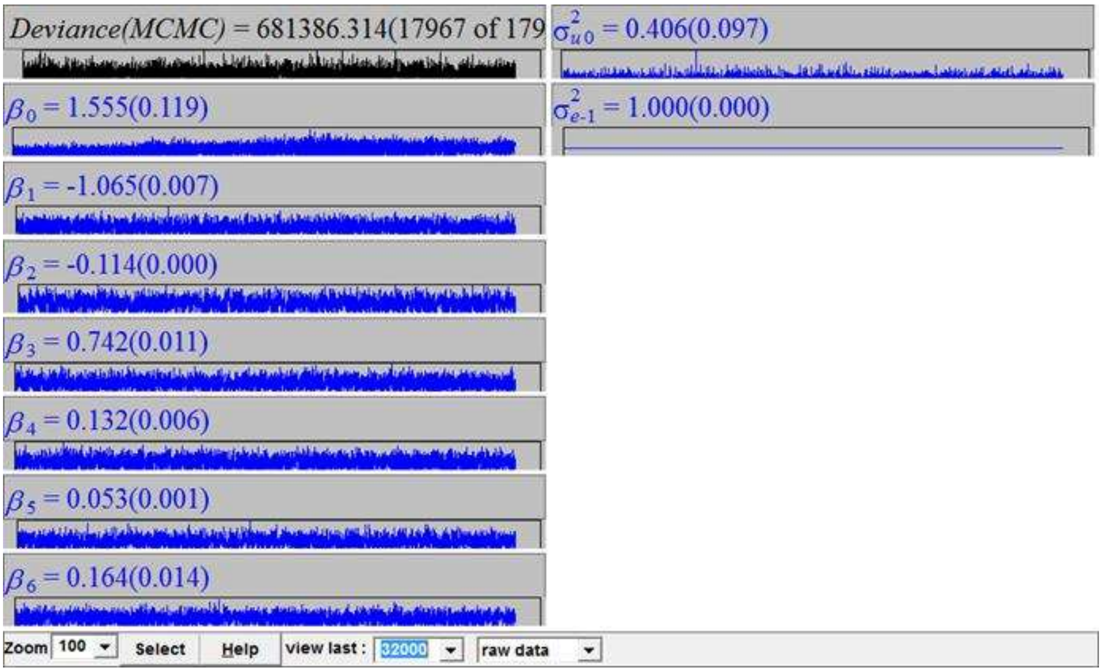
## Appendix D (Chapter 6)

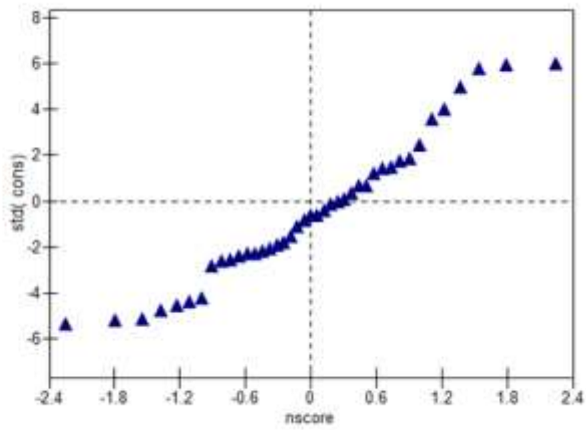
**Figure 1 – Trajectories of the variance component model using MCMC (presented in Table 6.4, section 6.3)**

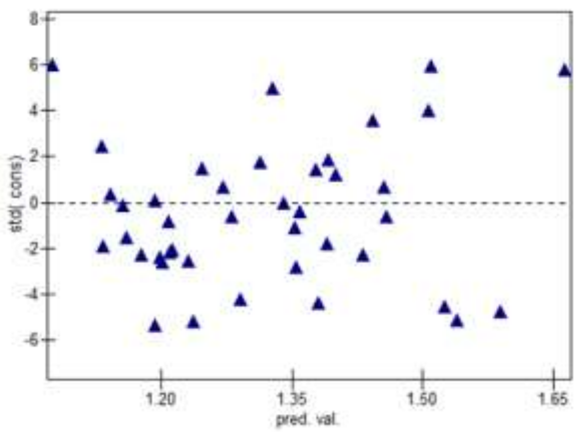



Source: EU-SILC 2009-2012

**Figure 2 – Diagnostics of Model III: Trajectories, Normality and Homoscedasticity of residuals - Random Intercept Model MCMC (presented in Table 6.6, section 6.4.1)**








Source: EU-SILC 2009-2012

**Table 1 – Residuals, Standard errors of residuals and Ranking of regions for variance component model (VC model)**

| Region | VC Model | | |
|---|---|---|---|
| | Residuals | Standard deviation of residuals | Region ranking |
| AT1 | -0.087 | 0.178 | 23 |
| AT2 | -0.271 | 0.186 | 15 |
| AT3 | 0.183 | 0.182 | 33 |
| BE1 | -0.373 | 0.194 | 7 |
| BE2 | -0.125 | 0.179 | 21 |
| BE3 | -0.443 | 0.196 | 5 |
| GR1 | -0.473 | 0.198 | 4 |
| GR2 | -0.326 | 0.188 | 10 |
| GR3 | -0.52 | 0.203 | 3 |
| GR4 | -0.347 | 0.193 | 8 |
| FI19 | 0.05 | 0.182 | 29 |
| FI1B | 0.617 | 0.218 | 37 |
| FI1C | -0.201 | 0.185 | 17 |
| FI1D | -0.312 | 0.19 | 11 |
| FR1 | 0.208 | 0.182 | 35 |
| FR2 | 0.001 | 0.177 | 26 |
| FR3 | -0.274 | 0.185 | 13 |
| FR4 | -0.024 | 0.178 | 25 |
| FR5 | 0.137 | 0.18 | 32 |
| FR6 | 0.014 | 0.178 | 27 |
| FR7 | 0.135 | 0.18 | 31 |
| FR8 | -0.101 | 0.179 | 22 |
| ITC | -0.306 | 0.186 | 12 |
| ITF | -0.772 | 0.228 | 2 |
| ITG | -0.88 | 0.242 | 1 |
| ITH | -0.071 | 0.177 | 24 |
| ITI | -0.273 | 0.184 | 14 |
| SE1 | 1.538 | 0.346 | 39 |

| | | | |
|---|---|---|---|
| SE2 | 1.703 | 0.373 | 41 |
| SE3 | 1.608 | 0.366 | 40 |
| UKC | -0.142 | 0.199 | 19 |
| UKD | -0.136 | 0.184 | 20 |
| UKE | 0.023 | 0.185 | 28 |
| UKF | -0.329 | 0.195 | 9 |
| UKG | -0.231 | 0.19 | 16 |
| UKH | 0.188 | 0.189 | 34 |
| UKI | -0.418 | 0.2 | 6 |
| UKJ | 0.055 | 0.184 | 30 |
| UKK | 0.695 | 0.233 | 38 |
| UKL | 0.483 | 0.211 | 36 |
| UKM | -0.148 | 0.187 | 18 |

Source: EU-SILC 2009-2012

**Table 2 – Random intercept model controlling for individual characteristics (IGLS estimation method) – Model III**

| Model | MQL1 | | PQL2 | |
|---|---|---|---|---|
| | Coeff. | S.E. | Coeff. | S.E. |
| **Fixed part** | | | | |
| Intercept | 1.214*** | -0.079 | 1.293*** | -0.097 |
| Women | -0.797*** | -0.005 | -0.824*** | -0.005 |
| Age centred | -0.077*** | 0 | -0.08*** | 0 |
| Tertiary education | 0.791*** | -0.007 | 0.815*** | -0.007 |
| Married | 0.09*** | -0.006 | 0.095*** | -0.006 |
| **Random part** | | | | |
| Level-2 variance | 0.256*** | -0.057 | 0.383*** | -0.084 |
| Units: region | 41 | | 41 | |
| Units: id | 17967 | | 17967 | |
| Estimation: | IGLS (MQL1) | | IGLS (PQL2) | |

Source: EU-SILC 2009-2012

**Interpretation of Individual Factors in Model III, presented in section 6.4.1 (Table 6.6)**

The log-odds of the proportion of months spent in employment equals to $b_o$=1.476 for average aged (46.3 years old) non-married men with low levels of education (when x=0), i.e. middle-aged low educated men have an 81% probability[133] of being employed during the financial breakdown. I expect age and education to have different effects in women and men. Therefore, I include in the model two interaction terms between gender and age, and gender and education. The

[133] I transform the log-odds into predicted probabilities to obtain this result.

coefficients for both interactions are positive and statistically significant (Table 6.6, section 6.4.1), indicating that age and education have a differing effect on women and men. The left hand plots of Figure 3 and 4 are plots without interaction terms between age, education and gender (lines are indeed parallel) and show that overall in 2009-2012 women are less likely to be in employment compared to men that with the increase of age, the proportion of employment decreases, while the opposite occurs with the increase of education.

The results of Model III show that women are overall less likely to be employed (log-odds of -1.065[134]) for the full duration of the panel when compared to men, in line with the findings of Chapter 5. However, this negative effect is mitigated by the level of education and age. More specifically, the positive coefficients of the two interaction terms (women*tertiary=0.164 and women*age=0.053) indicate that highly educated women and older women are more likely to be employed than women with low levels of education and younger women. Nonetheless, women are always less likely to be employed than men irrespectively of their level of education or age. Using the interaction terms we can calculate the age when the likelihood of full female employment becomes equal to men's employment (the likelihood turns from negative to zero[135]). Highly educated women have an equal chance of being employed for the full panel duration at age 63, while low educated women at age 66. Both these predictions are out of the working age, which implies that women do not reach the same levels of employment than men irrespectively of their level of education or age.

Focusing on the effect of age, for both women and men as age increases the log-odds of employment decreases (Figure 3). Age has an overall negative effect on the

[134] "Each logit coefficient represents the change in the logarithm of the odds ratio [of being employed] associated with a unit change in the value of the relevant explanatory variable" (Paterson & Raffe 1995, p. 10).

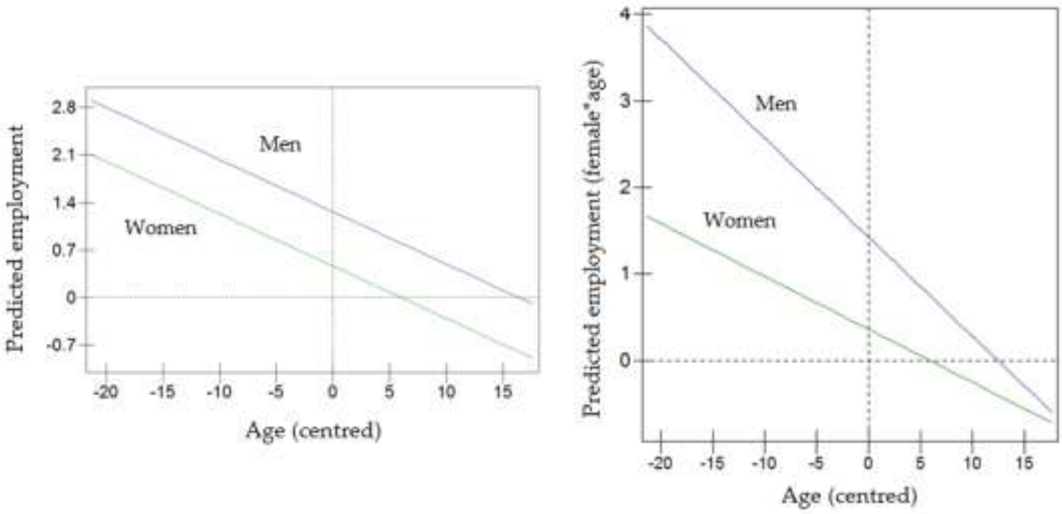
[135] This is calculated by differentiating in respect to female and setting the equation equal to zero and solving for age and education: dy/dfemale = -1.065 + 0.164tertiary +0.053agecentred.

probability of being fully employed, confirming the findings in Chapter 5. As seen in Table 6.6 (section 6.4.1), for every year of increase in age the log-odds of male and female employment decrease by -0.114 and -0.061 respectively (-0.114+0.053=-0.061). The negative effect of age on the probability of being employed is more pronounced for men when compared to women. In fact, the model predicts that older women are more likely to be employed than younger women. When one is young the probability of being employed increases for every year, however this effect turns negative as people grow older and move towards retirement[136].

In accordance with the findings of Chapter 5, education matters more for women (shown clearly in Figure 4). The coefficient in the log-odds scale is 0.905 (0.741+0.164) for women with tertiary education against women with low levels of education, while it is 0.741 for highly educated men against men with low levels of education. As anticipated, men are substantially more likely to spend a higher proportion of months in employment irrespectively of their level of education. On the other hand, the employment chances for women are strongly affected by their level of education: women with a tertiary education degree are more likely to be employed than their low educated peers. Indeed, Figure 4 shows that highly educated women reduce the gender gap when compared to low educated women (the slope for women is steeper that in the first plot of Figure 4). Finally, the probability of spending more months being employed increases by 53% for married individuals compared to non-married individuals (log-odds of 0.132).

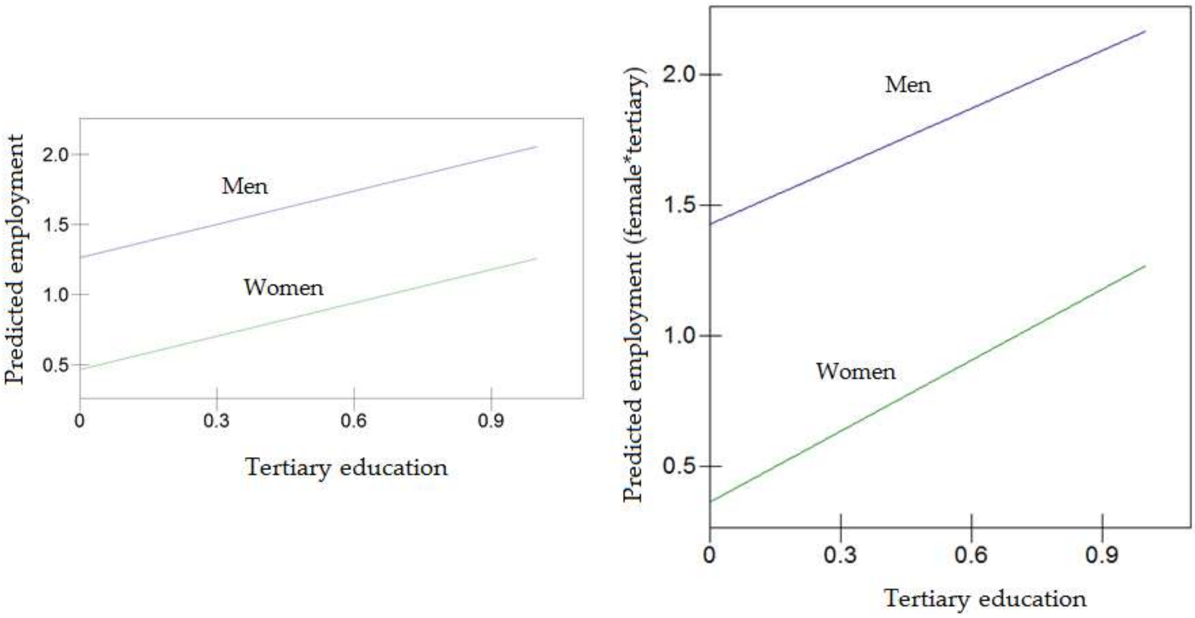
[136] When I run Model III adding a term for quadratic centred age, the effects of gender, marital status and education remain the same. The probability of being employed increases with age until it turns negative at age 40.6 years for women and 38 years for men.

**Figure 3 – Relationship between proportion of months spent in employment and age by gender, with and without an interaction between gender and age**




Source: EU-SILC 2009-2012

**Figure 4 – Relationship between proportion of months spent in employment and tertiary education by gender, with and without an interaction between gender and education**



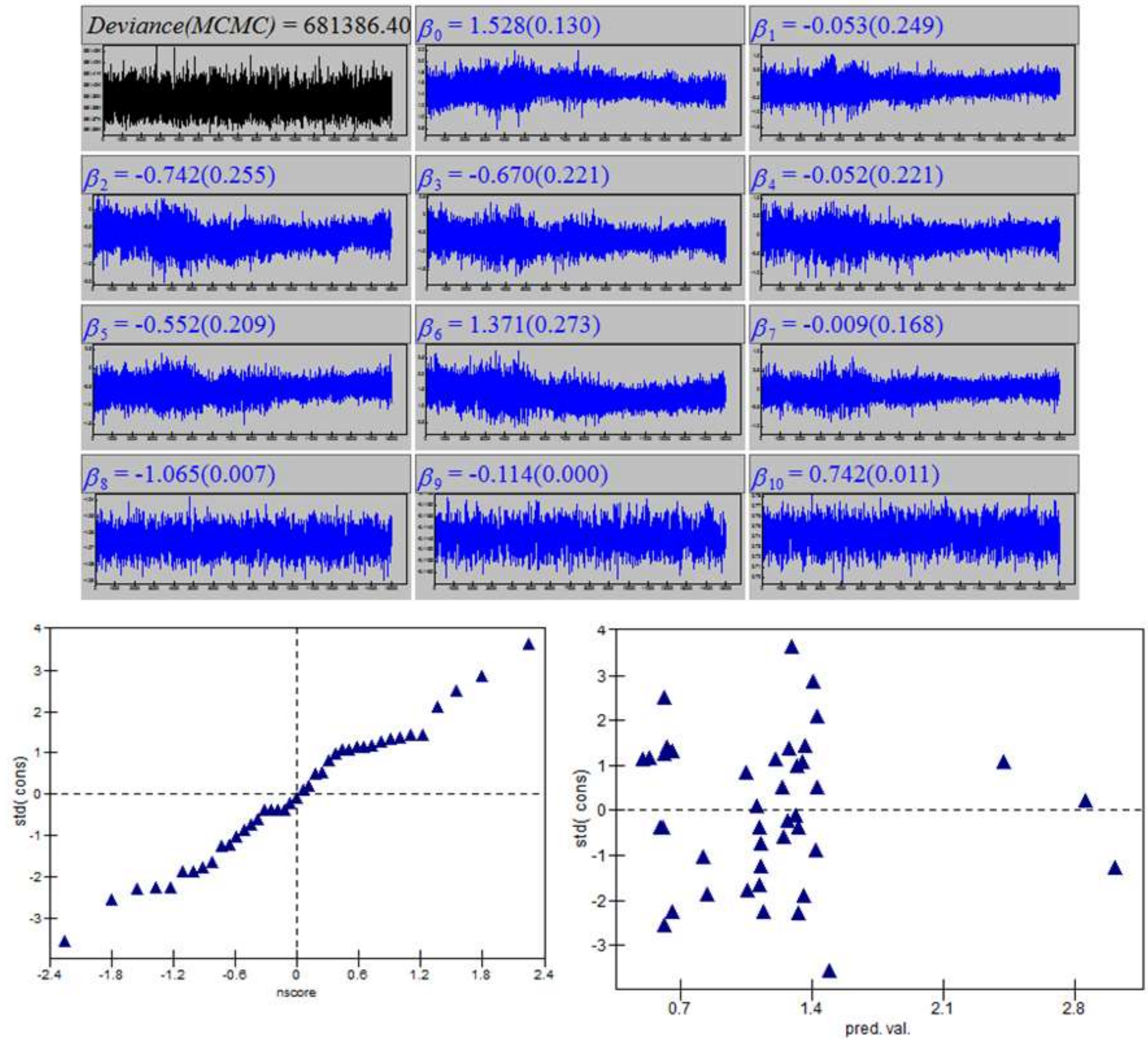

Source: EU-SILC 2009-2012

**Table 3 – Residuals, Standard deviation of residuals and Ranking of regions for random intercept model controlling for gender, age, education and interactions (RI Model III)**

| Region | RI Model III | | |
|---|---|---|---|
| | Residuals | Standard deviation of residuals | Region ranking |
| AT1 | -0.06 | 0.117 | 19 |
| AT2 | -0.115 | 0.129 | 15 |
| AT3 | 0.066 | 0.117 | 30 |
| BE1 | -0.381 | 0.236 | 4 |
| BE2 | -0.127 | 0.131 | 13 |
| BE3 | -0.31 | 0.203 | 6 |
| GR1 | -0.292 | 0.194 | 7 |
| GR2 | -0.152 | 0.14 | 9 |
| GR3 | -0.444 | 0.267 | 3 |
| GR4 | -0.148 | 0.141 | 10 |
| FI19 | 0.145 | 0.137 | 35 |
| FI1B | 0.287 | 0.193 | 37 |
| FI1C | -0.046 | 0.117 | 20 |
| FI1D | -0.107 | 0.128 | 16 |
| FR1 | 0.103 | 0.124 | 34 |
| FR2 | -0.002 | 0.111 | 25 |
| FR3 | -0.165 | 0.144 | 8 |
| FR4 | -0.019 | 0.113 | 23 |
| FR5 | 0.077 | 0.119 | 31 |
| FR6 | 0.038 | 0.113 | 28 |
| FR7 | 0.038 | 0.113 | 29 |
| FR8 | -0.033 | 0.113 | 22 |
| ITC | -0.135 | 0.134 | 11 |
| ITF | -0.454 | 0.272 | 2 |
| ITG | -0.499 | 0.294 | 1 |
| ITH | 0.006 | 0.111 | 26 |
| ITI | -0.121 | 0.13 | 14 |
| SE1 | 0.761 | 0.43 | 39 |
| SE2 | 0.924 | 0.514 | 40 |
| SE3 | 1.017 | 0.564 | 41 |
| UKC | 0.022 | 0.124 | 27 |
| UKD | -0.005 | 0.115 | 24 |
| UKE | -0.034 | 0.117 | 21 |
| UKF | -0.133 | 0.137 | 12 |
| UKG | -0.086 | 0.126 | 18 |
| UKH | 0.1 | 0.127 | 33 |
| UKI | -0.36 | 0.229 | 5 |
| UKJ | 0.083 | 0.123 | 32 |
| UKK | 0.443 | 0.268 | 38 |
| UKL | 0.246 | 0.178 | 36 |
| UKM | -0.103 | 0.13 | 17 |

Source: EU-SILC 2009-2012

**Figure 5 – Diagnostics of Model IV: Trajectories, Normality and Homoscedasticity of residuals - Random Intercept Model MCMC with country dummies and individual characteristics (Model III + country dummies presented in Table 6.7, section 6.4.2)**




Source: EU-SILC 2009-2012

**Table 4 – Residuals, Standard deviation of residuals and Ranking of regions for random intercept model controlling for gender, age, education, interactions and country dummies (RI model IV)**

| Region | RI Model IV | | | |
|---|---|---|---|---|
| | Residuals | Standard deviation of residuals | Regional Residual + Country coefficient | Region ranking |
| AT1 | -0.044 | 0.395 | -0.097 | 21 |
| AT2 | -0.152 | 0.402 | -0.205 | 18 |
| AT3 | 0.203 | 0.405 | 0.15 | 30 |
| BE1 | -0.215 | 0.412 | -0.957 | 4 |
| BE2 | 0.284 | 0.417 | -0.458 | 9 |
| BE3 | -0.074 | 0.4 | -0.816 | 5 |
| GR1 | -0.065 | 0.347 | -0.735 | 7 |
| GR2 | 0.21 | 0.36 | -0.46 | 8 |
| GR3 | -0.364 | 0.384 | -1.034 | 2 |
| GR4 | 0.217 | 0.363 | -0.453 | 10 |
| FI19 | 0.149 | 0.351 | 0.097 | 26 |
| FI1B | 0.428 | 0.398 | 0.376 | 35 |
| FI1C | -0.226 | 0.361 | -0.278 | 15 |
| FI1D | -0.346 | 0.381 | -0.398 | 11 |
| FR1 | 0.193 | 0.262 | 1.021 | 38 |
| FR2 | -0.013 | 0.244 | 0.099 | 27 |
| FR3 | -0.334 | 0.287 | 0.063 | 25 |
| FR4 | -0.048 | 0.245 | -0.198 | 19 |
| FR5 | 0.141 | 0.254 | 0.268 | 33 |
| FR6 | 0.064 | 0.246 | 0.31 | 34 |
| FR7 | 0.065 | 0.247 | 0.118 | 28 |
| FR8 | -0.074 | 0.246 | 0.264 | 32 |
| ITC | 0.206 | 0.32 | -0.346 | 12 |
| ITF | -0.421 | 0.365 | -0.973 | 3 |
| ITG | -0.508 | 0.39 | -1.06 | 1 |
| ITH | 0.485 | 0.378 | -0.067 | 22 |
| ITI | 0.235 | 0.324 | -0.317 | 13 |
| SE1 | -0.272 | 0.421 | 1.099 | 39 |
| SE2 | 0.044 | 0.4 | 1.415 | 40 |
| SE3 | 0.23 | 0.417 | 1.601 | 41 |
| UKC | 0.014 | 0.232 | 0.005 | 24 |
| UKD | -0.041 | 0.216 | -0.05 | 23 |
| UKE | -0.099 | 0.221 | -0.108 | 20 |
| UKF | -0.292 | 0.253 | -0.301 | 14 |
| UKG | -0.198 | 0.237 | -0.207 | 17 |
| UKH | 0.163 | 0.233 | 0.154 | 31 |
| UKI | -0.732 | 0.404 | -0.741 | 6 |
| UKJ | 0.131 | 0.225 | 0.122 | 29 |
| UKK | 0.829 | 0.447 | 0.82 | 37 |
| UKL | 0.446 | 0.305 | 0.437 | 36 |
| UKM | -0.232 | 0.242 | -0.241 | 16 |

Source: EU-SILC 2009-2012

**Table 5 – Residuals, Standard deviation of residuals and Ranking of regions for random intercept model controlling for gender, age, education, interactions and regional characteristics (RI Model VI)**

| Region | RI Model VI | | |
|---|---|---|---|
| | Residuals | Standard deviation of residuals | Region ranking |
| AT1 | -0.627 | 0.695 | 2 |
| AT2 | -0.232 | 0.487 | 14 |
| AT3 | -0.306 | 0.612 | 12 |
| BE1 | -0.365 | 0.657 | 5 |
| BE2 | 0.01 | 0.562 | 23 |
| BE3 | -0.232 | 0.667 | 15 |
| GR1 | -0.336 | 0.489 | 9 |
| GR2 | -0.12 | 0.563 | 20 |
| GR3 | 0.146 | 0.709 | 30 |
| GR4 | 0.287 | 0.768 | 33 |
| FI19 | -0.331 | 0.61 | 10 |
| FI1B | -0.03 | 0.553 | 22 |
| FI1C | -0.349 | 0.617 | 7 |
| FI1D | -0.315 | 0.734 | 11 |
| FR1 | 1.021 | 1.081 | 40 |
| FR2 | 0.099 | 0.356 | 27 |
| FR3 | 0.063 | 0.516 | 26 |
| FR4 | -0.198 | 0.46 | 18 |
| FR5 | 0.268 | 0.472 | 32 |
| FR6 | 0.31 | 0.578 | 34 |
| FR7 | 0.118 | 0.382 | 28 |
| FR8 | 0.264 | 0.629 | 31 |
| ITC | -0.23 | 0.841 | 17 |
| ITF | -0.345 | 0.564 | 8 |
| ITG | -0.506 | 0.508 | 4 |
| ITH | 0.042 | 0.625 | 25 |
| ITI | -0.231 | 0.642 | 16 |
| SE1 | 0.358 | 0.674 | 36 |
| SE2 | 0.956 | 1.041 | 39 |
| SE3 | 1.251 | 1.35 | 41 |
| UKC | 0.348 | 0.529 | 35 |
| UKD | -0.086 | 0.429 | 21 |
| UKE | -0.352 | 0.631 | 6 |
| UKF | -0.289 | 0.541 | 13 |
| UKG | -0.134 | 0.407 | 19 |
| UKH | 0.405 | 0.592 | 37 |
| UKI | -0.607 | 0.929 | 3 |
| UKJ | 0.037 | 0.494 | 24 |
| UKK | 0.798 | 0.877 | 38 |
| UKL | 0.126 | 0.608 | 29 |
| UKM | -0.686 | 0.655 | 1 |

Source: EU-SILC 2009-2012

**Table 6 - Binomial logit multilevel models with explanatory variables at individual and regional level, log-odds of proportion of months spent in employment**

| Model | Model V | | Model VI | | Model VII | |
|---|---|---|---|---|---|---|
| | Coeff. | S.E. | Coeff. | S.E. | Coeff. | S.E. |
| **Fixed Part** | | | | | | |
| Intercept | 0.477* | 0.261 | 2.484* | 1.4 | 2.954 | 3.426 |
| **Individual effects** | | | | | | |
| Women | -1.065*** | 0.007 | -1.065*** | 0.007 | -1.065*** | 0.007 |
| Age centred | -0.114*** | 0 | -0.114*** | 0 | -0.114*** | 0 |
| Tertiary education | 0.742*** | 0.011 | 0.742*** | 0.011 | 0.742*** | 0.011 |
| Married | 0.132*** | 0.006 | 0.132*** | 0.006 | 0.132*** | 0.006 |
| Women*Tertiary | 0.164*** | 0.013 | 0.164*** | 0.013 | 0.164*** | 0.013 |
| Women*Age centred | 0.053*** | 0.001 | 0.053*** | 0.001 | 0.053*** | 0.001 |
| **Contextual effects** | | | | | | |
| Adult education | 0.035*** | 0.012 | 0.033*** | 0.013 | 0.019 | 0.06 |
| Level of urbanisation | | | | | | |
| (Ref: thinly populated area) | | | | | | |
| Intermediate area | | | -0.479** | 0.206 | 0.017 | 0.221 |
| Densely populated area | | | -1.481*** | 0.468 | -0.308 | 0.603 |
| Labour productivity | | | 0.009 | 0.009 | -0.008 | 0.024 |
| Occupational sector | | | | | | |
| Agriculture | | | 0.829 | 6.525 | -3.574 | 6.87 |
| Industry | 3.107** | 1.463 | 1.421 | 2.209 | 0.365 | 2.718 |
| Construction | | | -25.39*** | 10.424 | 1.862 | 14.352 |
| Market services | | | omit category | | omit category | |
| Public administration | | | -1.66 | 2.779 | -3.758 | 3.809 |
| **Country (Ref.: France)** | | | | | | |
| Austria | | | | | -0.581 | 0.603 |
| Belgium | | | | | -0.38 | 0.314 |
| Greece | | | | | -0.449 | 0.667 |
| Finland | | | | | -0.273 | 1.06 |
| Italy | | | | | -0.678* | 0.368 |
| Sweden | | | | | 1.354 | 1.023 |
| United Kingdom | | | | | -0.432 | 0.997 |
| **Random Part** | | | | | | |
| Level-2 variance | 0.287*** | 0.07 | 0.27*** | 0.073 | 0.117* | 0.067 |
| Units: region | 41 | | 41 | | 41 | |
| Units: id | 17967 | | 17967 | | 17967 | |
| Estimation: | MCMC | | MCMC | | MCMC | |
| DIC: | 681432.7 | | 681433.1 | | 681433.1 | |
| pD: | 46.672 | | 46.891 | | 46.836 | |
| Burnin: | 1000 | | 1000 | | 1000 | |
| Chain Length: | 200000 | | 150000 | | 150000 | |
| Thinning: | 1 | | 1 | | 1 | |

*p<0.10, **p<0.05, ***p<0.01

Source: EU-SILC 2009-2012