



LUND UNIVERSITY
School of Economics and Management

Lund University

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Bachelor's Thesis (NEKK01)

EUROPEAN PATTERNS OF UNEMPLOYMENT

- A Spatial Analysis of Regional Unemployment in Europe -

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ABSTRACT

The aim of this thesis is to investigate the structural evolution and spatial pattern of regional unemployment rates in the EU for the period 1999-2009. Several previous studies have found large disparities across Europe's regions, contrary to what neoclassic theory predict would be the effect of regional integration. Moreover, some literature finds that these differences seem to increase over time – polarizing into high- and low-unemployment clusters. We employ entropy indices to measure the dispersion of unemployment across a panel of EU-regions over the period 1999-2009, a period so far unexplored in this respect. Results indicate that disparities are mainly persistent for this period. However, results differ if we look at specific groups of EU Member States. The older members show much more persistence than the newer members, who seem to have in some cases lessen both regional unemployment and unemployment disparities over the period. We discuss the implication of regional integration and the emergence of regional unemployment, contrasting more traditional theoretical approaches with that of New Economic Geography, and try to give some tentative answers to why, in some cases, disparities persist and why not in other cases.

Keywords: New Economic Geography, Entropy Indices, Regional Unemployment, Economic Integration

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LIST OF ABBREVIATIONS

COUNTRY CODES, EU MEMBER STATES:

Austria - AT
Belgium – BE
Bulgaria – BG
Cyprus – CY
Czech Republic – CZ
Denmark – DK
Estonia – EE
Finland- FI
France - FR
Germany – DE
Greece – EL
Hungary - HU
Ireland - IE
Italy – IT
Latvia – LV
Lithuania – LT
Luxembourg – LU
Malta – MT
The Netherlands – NL
Poland – PL
Portugal – PT
Romania – RO
Slovakia – SK
Slovenia – SI
Spain - ES
Sweden – SE
United Kingdoms – UK

Country Groups:

EU27 – all Member States

EU15 - BE, DK, DE, IE, EL, ES, FR, IT, LU, NL, AT, PT, FI, SE and UK

EU12 - CZ, EE, CY, LV, LT, HU, MT, PL, SI, SK, BG and RO

1. INTRODUCTION

1.1 PREAMBLE

The purpose of this thesis is to investigate the spatial spread of unemployment in the European Union (EU). Neoclassical theory predicts that increased economic integration and the removal of impediments to the free flow of production factors will lead to a convergence in factor returns and, subsequently, in living standards (PUGA, 2002). This is also true for employment which should converge across the union and, conversely, unemployment should converge.

However, causal observation of the economic landscape of Europe reveals that differences in employment between countries and, even, between regions within the same country can be great. This is also confirmed by empirical work in the field, which has found persistent and sometimes increasing disparities in regional unemployment rates. Seemingly, in Europe regions with practically full employment and regions with mass-unemployment coexist, sometimes within the same country. That is to say, by looking at regional data it is possible to reveal much larger and persistent disparities in unemployment rates than if only the national aggregation level was considered. Many such differences are well-documented. For example, the persistent unemployment of many South-Italian and Spanish regions has long garnered attention. But other countries also show large differences in regional unemployment. In 1999, for example, the region Languedoc-Roussillon, in France, had an unemployment rate over two times that of the Bretagne, which had the lowest rate in the country. At the same time, Brussels, Belgium, had an unemployment rate amounting to over 3.5 times that of West-Vlaanderen, which had the lowest rate in Belgium. Indeed, most European countries exhibit large variety in regional unemployment. The region in Europe, in 2009, with the lowest unemployment rate was Zeeland in the Netherlands, with 2.1%, and the region with the highest rate was Andalucía in Spain, with 25.4%. Thus, large differences seem to exist, hidden if one only were to look at the aggregate national unemployment rate.

Hence, something is missing from the traditional analysis, as integration has progressed but differences seem to persist. One influential approach to remedy this has been through the *New Economic Geography* theoretical formation. In this approach firms tend to produce more efficiently and workers enjoy higher welfare when clustered together near a large market (IBID, P374). The large markets, in turn, are where firms and workers locate. This circularity described by the New Economic Geography can give rise to persistent and, even, increasing geographical differences. Hence, such recent location theories can be helpful in understanding how regional inequalities emerge and persist.

Several studies on regional unemployment have found that rates seemed to polarize in the 1990s, concentrating into high- and low-unemployment groups. That is to say, Europe's regions seemed to concentrate into polarizing clusters with high-unemployment regional neighborhoods and

low-unemployment regional neighborhoods. So, historical low-unemployment regions saw unemployment steadily fall, while historical high-unemployment regions saw unemployment steadily rise over time, or so the story goes. Moreover, these clusters were found to have a transnational character, i.e. they stretch across national borders. This seemingly implies that this occurrence is not simply explained by differences in national institutional reform, but rather could be connected to deepened European economic integration process. However, more recent studies have, disagreeing with the polarization-story, revealed that state-specific reforms might after all matter more than neighborhood.

1.2 THE PURPOSE OF THE THESIS

This thesis is a first tentative look at regional unemployment in Europe for the period 1999-2009. A period that should prove interesting since it includes two enlargements (2004 and 2007), going from fifteen members to twenty-seven, making it the largest single enlargement in the history of the EU. In addition, many of the new Member States from the Central and Eastern Europe have an income-level well below that of the pre-2004 members. Much of the previous literature on regional unemployment is mainly focused on the period from around the 1980s to the late 1990s and early 2000s making this a first foray in this particular field, to the author's knowledge, into the period after the latest EU-enlargements. This thesis will try and answer how regional unemployment in the new EU-countries and in the old has evolved during this period. We will specifically investigate the pattern of the geographical distribution of unemployment in the EU. To analysis the spatial pattern of unemployment we will employ specific measures of concentration – or of entropy – to see if it has become more or less concentrated. Less concentration would imply a more even spread of unemployed across Europe's regions, while more concentration would imply a more uneven distribution.

Why, then, is it important to study these differences in regional unemployment? BADDELEY ET AL. (1998) argues that this overall persistence in regional unemployment disparities is of real concern, partly on account of the implied differences in economic and social inclusion. And partly, on account of the loss of economic output and the increased public expenditure such differences implies through a redistribution of wealth by regional policies. Thus, to study regional differences in unemployment is of importance if we want to understand the impact further European integration might have on regional unemployment. Not least on account of the redistribution of wealth channeled through national and supranational European regional policy measures. Moreover, understanding regional unemployment will help in reducing aggregate national unemployment and, following BADDELEY ET AL. (1998) reasoning, this will increase the total welfare of EUs inhabitants.

1.3 DISPOSITION

The thesis is structured as follows. Chapter 2 gives the findings of a number of previous empirical studies. Chapter 3 will set up the theoretical background, contrasting traditional neoclassical theory on

the impact of regional economic integration to that of New Economic Geography. Moreover, chapter 3 will give a theoretical discussion on the emergence of regional unemployment from both traditional and a New Economic Geography view. Following this, chapter 4 will present the main analysis, looking into the evolution of regional unemployment and concentration patterns. Lastly, in chapter 5 we will summarize our findings; give some tentative explanations and policy implications; and, briefly state some areas where we find that further research is needed.

2. PREVIOUS RESEARCH

2.1 EMPIRICAL FINDINGS ON REGIONAL UNEMPLOYMENT DISPARITIES

In an influential contribution to the research field of regional unemployment, OVERMAN & PUGA (2002) attempts an investigation on the effect of European integration on regional unemployment. The authors find evidence of not only persistence in disparities of regional unemployment rates but also increasing spatial inequality over time. What is more, regions seem to cluster into high- and low-unemployment groups more dependent on neighbors' unemployment than the national level. Looking at a panel running from 1986 to 1996 of EU-regions (excluding those regions lacking EU neighbors, thus entirely excluding for example Greece), the authors first conclude that the distribution of regional unemployment relative to the average of Europe have become more uneven. That is, more regions in 1996 were found to have much lower or higher unemployment relative to the EU average compared to 1986. The authors find that the spatial distribution of unemployment across Europe's regions is not only persistent but is seemingly becoming more polarized.

Before OVERMAN & PUGA (2002) there had been some work on regional unemployment in Europe. For example, BADDELEY ET AL. (1998) finds persistence unemployment rate disparities, looking at a panel of European regional data on unemployment rates for the period 1983 to 1995. The authors note that disparities increased the more disaggregated regional data that were used, even when differences at the national level decreased. Similarly, MARTIN & TYLER (2000) finds, measuring the cumulative relative employment growth¹ in a panel of regional data for 16 European countries (EU15 plus Norway) from 1976 to 1998, that regional employment growth has been strongly divergent. The authors argue that the regions that demonstrate low new employment growth (indicating low labor demand, according to the authors) are likely to be the same regions that also demonstrate high unemployment. Correspondingly to BADDELEY ET AL. (1998), MARTIN & TYLER (2000) find that many countries that exhibited national employment growth included regions with divergent employment growth. Confirming divergence in regional unemployment rates, BOLDRIN & CANOVA (2001), looking at a panel of regional data for EU15 stretching from 1980 to 1996, find no sign of convergence in unemployment rates, neither between nor within countries.

Thus, the early literature on regional unemployment agrees on the large persistent or increasing disparities in regional unemployment rates, sometimes decoupled from the evolution of the national aggregate rate. Moreover, BADDELEY ET AL. (1998) tests the persistence of regional unemployment, drawing the conclusion that the disparities in unemployment rates in the EU reflect region-specific fixed effects. That is, an inter-area equilibrium stemming from varying supply-side, demand-side or institutional characteristics of different regions and not prolonged disequilibrium brought on by

¹ This is defined as the cumulative annual change in the log of regional employment minus the cumulative annual change in the log of Europe 16 employment.

temporary shocks. This seems to be the general consensus in the literature on unemployment disparities in Europe – the disparities persist because of structural failures and not temporary shocks.

However, opinions differ on why unemployment disparities appear. MARTIN & TYLER (2000) note that divergence in employment growth was most rapid during the 1980s, but began to diminish and stabilize somewhat in the beginning of the 1990s. The authors agree that the why of this “*slacking off of divergence*” (IBID, P.605) is unclear, but speculate on industrial restructuring in Europe, during the 1980s and early 1990s, as a possible influencing factor on the divergence. Conversely, BOLDRIN & CANOVA (2001), taking regional labor productivity into account and finding some weak tendencies for convergence, argues that this convergence in productivity is taking place the “*usual hard way*” (IBID, P.241). That is, increased competitions might have forced firms in low-productivity regions to lay off labor to increase productivity and decrease unit labor costs, with wages set at national levels, this behavior leads to increased unemployment.

Regardless of specific cause, the proceeding discussion reveals that the early literature on unemployment disparities in Europe viewed the problem as mainly being region- and/or state-specific. What OVERMAN & PUGA (2002) add to the discussion is to investigate if regional unemployment polarization mainly is a national or a neighborhood phenomenon. That is, if there are more similarities across geographical neighbors, regardless national borders. The authors find that regional unemployment tends to be independent from the national level and more often have a higher likelihood of following the distribution of its neighbors. The findings suggest that neighborhood matters, if a region has high-unemployment neighbors it runs a high probability of being a high-unemployment region itself, even if these high-unemployment regions runs across a national-border, argues the authors. Thus, the spatial structure of regional unemployment in Europe according to OVERMAN & PUGA (2002) is organized in persistent transnational clusters that seem to polarize over time.

Proceeding, OVERMAN & PUGA (2002) discusses the possible cause of these seemingly polarizing transnational unemployment clusters, finding polarization of labor demand in the EU as an explanatory factor. This comes from the authors’ finding that low unemployment regions had a high probability of also having high employment growth, while high unemployment regions had high probability of having low employment growth. Thus, according to OVERMAN & PUGA (2002), employment growth and, thus argue the authors, labor demand has an effect on unemployment polarization. That is, leading regions are concentrating into high-demand clusters with high employment, leaving peripheral regions with low demand and high unemployment. This in turn, would imply that strong agglomeration brought on by economic integration in Europe, rather than country-specific effects, as the main culprit for regional unemployment disparities.

Confirming OVERMAN & PUGA's (2002) findings, GARCILAZO & SPEIZIA (2007) and NIEBUHR (2003) finds similar evidence of polarizing regional unemployment clusters.

GARCILAZO & SPEIZIA (2007) uses similar methods as OVERMAN & PUGA (2002) when investigating the European unemployment distribution, but in a panel of 706 European regions from 1998 to 2004. The authors find a larger neighborhood-effect than state-effect in determining regional unemployment. NIEBUHR (2003) looks at a panel ranging from 1986 to 2000 covering 359 European regions². Using spatial econometric methods, the author is able to show that regions marked by high unemployment often is close to other high-unemployment regions, clustering together in areas characterized by less favorable labor market conditions. This concentration has increased over the sample length. However, contrary to OVERMAN & PUGA (2002) and GARCILAZO & SPEIZIA (2007) findings, NIEBUHR (2003) results indicate these effects are somewhat stronger among within-country neighboring regions than among the across national-borders neighbors. Thus, the author argues that country-specific effects might, nevertheless, be a large explanatory factor in explaining the differences.

Furthermore, more recent studies, often taking regional income and productivity differences into account, find contrary evidence to those of the earlier studies reported above. Many times, these studies, confirm the importance of regional- and country-specific effects in determining unemployment differentials. Thus, being more in line NIEBUHR (2003) findings. For example, MELICIANI (2006) and COSCI & SABATO (2007) are able to show that country-specific effects and the behavior of EU's low-income regions explain more of the polarization of regional unemployment than clustering across national borders.

MELICIANI (2006) measures the spatial dependence between regions by spatial econometric methods in the same vein as NIEBUHR (2003). Using a panel of 99 regions³ from twelve EU-countries between 1988 and 1996, MELICIANI (2006) finds that regional unemployment diverged. However, there are exceptions; those countries that actually increased cohesion in the distribution of unemployment (the UK and the Netherlands in the sample) seem to have done so on account of country-specific reforms. Moreover, looking at productivity and incomes in addition to employment, MELICIANI (2006) finds that low-income regions seem to have experienced an above average productivity increase. However, this was often accompanied with a below average employment growth. The low-income regions, the author argues, has achieved this above average productivity growth at the expense of employment, thus echoing the assertions of the above mentioned BOLDRIN & CANOVA (2000). The author takes this as indicating that the polarization of employment (and

² The chosen regions consist of several different regional-units. The regions used in this study were chosen in accordance with comparability in size and labor market functionality.

³ Regions, in the study, were chosen from different aggregation levels in accordance with size-compatibility.

unemployment, argues the author) stems, mainly, from country-specific effects and the behavior of low-income regions.

Additionally, to further confirm the evidence, MELICIANI (2006) is able to show that spatial clustering is taking place, but mostly within countries and not very much across borders. However, MELICIANI (2006) concedes that OVERMAN & PUGA (2002) in many instances used smaller spatial-units in their study and admits that transnational clustering might be taking place at a lower level of aggregation. Moreover, when accounting for the behavior of low-income regions and country-effects MELICIANI (2006) finds that the distribution of unemployment are more in line with the EU-average. The author takes this as further confirmation that the polarization of employment (and unemployment) stems, mainly, from country-specific effects and the behavior of low-income regions.

As MELICIANI (2006), COSCI & SABATO (2007) finds stronger support for country-specific effects, using a panel consisting of 99 European regions belonging to 12 countries over the period 1989-1996, investigating the dynamics of income and unemployment. First, removing all low-income regions from the panel, the authors find that there have been considerably less persistence in unemployment disparities and much more mobility in the sample, while incomes were quite stagnant. Contrary to previous research the authors find that high-unemployment regions in the restricted (without low-income regions) sample converged to the EU average. The authors argue that much of the previous reported polarization might stem from the behavior of low-income regions.

To sum the empirical findings on unemployment disparities in Europe from the studies included in this chapter, most found persistence differences in regional unemployment rates (however, MELICIANI (2006) and COSCI & SABATO (2007) would argue that this persistence are not strong if low-income regions are excluded). These differences also seem to increase over time, low-unemployment regions seem to cluster in space with other low-unemployment regions and high-unemployment regions cluster with other high-unemployment regions. This divergence between different poles seems to persist (if not increase) over time. The main battleground seems to be whether this effect is mainly driven by agglomeration across national borders or by common region- or country-specific characteristic. In addition, many recent studies find that the behavior of low-income regions explains much of the divergence in regional unemployment rates and when excluding these more convergence appears. The subsequent chapter will try to give the theoretical background to the emergence of regional unemployment.

3. THEORY

3.1 REGIONAL INTEGRATION: TRADITIONAL VIEWS VS. NEW ECONOMIC GEOGRAPHY

The free mobility of production factors that is implied by a deepening economic integration should ideally lead to an improved resource allocation and higher productivity in the integrated area, with greater consumption possibilities as a consequence. Neoclassical theory teaches that this will allow countries, as well as regions, to converge, as the returns on labor and capital converges. Two mechanisms describing this occurrence are of particular interest to our analysis. First, deepened integration works as increased openness to trade and allows countries and regions to specialize according to their comparative advantages, which in turn allows trade and consumption possibilities to increase. This process will, according to the standard trade model of Heckscher-Ohlin as well as the Stolper-Samuelson theorem, lead to a convergence in income levels⁴. Second, the free mobility of labor and capital will allow factor price equalization, when factors move to the location where they have highest return⁵. That is, high income regions will attract labor from low income regions and low income regions will attract capital from high income regions until the price of labor, wages, and capital costs are equalized across regions.

Classic theory of comparative advantage and specialization has much to say about the impact of closer economic integration on the distribution of factors of production, and thus the location of certain production. The models, in all their simplicity, give a fairly good prediction on how certain production will distribute *between* trading countries, based on the return to different factors of production. However, the models lacks when it comes to explaining how this production will distribute *within* said countries which is of particular interest when considering the spatial spread of an economic variable. This might be better done in a New Economic Geography (NEG)-framework.

According to FUJITA ET AL (1999), the NEG model described by KRUGMAN (1991), the *Core-Periphery model* (CP-model), is characterized by a multi-region economy with two sectors, manufacturing and agricultural. The manufacturing sector employs workers and the agricultural sector employs farmers. Agricultural production is assumed to be under perfect competition with constant returns production technology. Manufacturing, on the other hand, is under monopolistic competition with associated increasing returns technology. Shipping manufacturing goods between the regions involves transport or trade costs⁶, shipping agricultural goods is assumed to be costless⁷. The model

⁴ Or rather a relative factor price equalization, where the relative price on labor and capital equalize between trading regions.

⁵ Factors move as long as it is less expensive to move factors compared to goods.

⁶ Think of these costs in a broad sense, they represent all kind of tariff and non-tariff costs associated with shipping a good from one location to another.

describes how industry can center into an industrial core-area served by a surrounding agricultural periphery and, thus, industry minimizes transport costs and realizes scale economies when trade costs fall. The industrial core will exhibit higher real wages and higher welfare for its inhabitants than the more backwards periphery. Thus, the CP-model describes how the reduction of trade barriers implied by economic integration can lead to increasing geographical differences.

The CP-model first presented by KRUGMAN (1991) simply tries to answer: *“Why and when does manufacturing become concentrated in a few regions, leaving others relatively undeveloped”* (P.484). Basically, this is determined by the strength of concentration forces, in turn determined by an *“interaction of economics of scale with transport costs”* (IBID). This, however, is no surprise, instead the more interesting implication found in the model is *“...that this concentration of manufacturing in one location need not always happen and whether it does depends in an interesting way on a few key parameters”* (IBID). That is, it gives a compelling answer to why sometimes spatial concentration forces –agglomeration forces (centripetal forces) - dominate dispersion forces (centrifugal forces) and concentration of industry appears, and why sometimes it does not.

Centrifugal forces are forces that work toward the geographical dispersion of economic activity. Any costs (both pecuniary costs and negative externalities) that can be associated with living or running a business in an economic center - such as housing prices, congestion or local competition - are centrifugal forces. In the original CP-model the only centrifugal force considered is local competition. That is, given higher competition in the core, some firms will find the competition too harsh and instead wish to set up business in the periphery, where they will find fewer locally-based competitors.

Centripetal forces, on the other hand, work towards the spatial agglomeration of economic activity. Two important centripetal forces described in the model are demand and cost linkages, or forwards and backward linkages.

First consider the demand linkages, manufacturing firms wish to locate in regions with good access to large markets.⁸ Therefore, since shipping is associated with transport costs, firms will locate in the larger market region, so they can sell goods to as many as possible without incurring transport costs. Subsequently, they will also attract workers, who in turn will spend their income in the region further increasing market size (demand) and attracting even more firms. This is what is referred to as *forward linkages* (FUJITA ET AL 1999, P63).

⁷ It is possible to include transport costs on agricultural goods. The model will yield core-periphery equilibrium as long as it is cheaper to ship agricultural goods compared to manufactures. However, in the original model transport costs in agriculture are removed to not overcomplicate the analysis.

⁸ Remember, the agricultural sector is under perfect competition, characterized by constant returns to scale and intensively uses land, which is immobile. The distribution of agricultural production will then follow the exogenous given land-endowment of a region.

Now consider the cost linkages, since manufacturing is assumed to be under imperfect competition, implying the more firms in the large regions, the higher the competition and the lower the price (firms mark-up decreases as more firms enter the market in a monopolistic competitive-model). This in turn implies that the real wage of workers are lower in the large region (remember that the real wage is the nominal wage deflated by the price level). Thus, *ceteris paribus*, the cost of living is lower in the large region, attracting more workers, increasing demand and, consequently, attracting more firms. This is what is referred to as *backwards linkages* (IBID, P64). Forward and backwards linkages are mutually strengthening and are the reason for agglomeration of manufacturing into one core area in the CP- model.

That is, in the CP-model the first of the *key parameters* determining agglomeration forces are the forward and backwards linkages described above. Moreover, other *key parameters* determining the strength of agglomeration forces are the workers propensity to migrate between regions (labor mobility) and between sectors. How much mobility it is between sectors is determined by the elasticity of labor supply, which in turn determines the level of competition in a region. If high competition, some firms' mark-up is diminishes, meaning that some firms will be out-competed and prefer to move to the smaller region.

But, under what circumstances does the CP-model yield equilibrium with agglomeration and when does it not?⁹ Workers are assumed to move in accordance with real wage differentials to the region offering the highest wage. FUJITA ET AL (1999, P65FF) presents the outcomes under low, high and intermediate trade costs. The authors find that under high transport costs the model yields a symmetric equilibrium, with manufacturing equally divided between the two regions and equal real wages. The high transport cost example, thus, is the no agglomeration case. Naturally the opposite holds with low transport cost, manufacturing will completely concentrates into one region, which will exhibit a higher real wage. Which region this is, depends on what region began with a slightly larger manufacturing sector. With intermediate transport costs the outcome is less certain; the model yields a stable symmetric equilibrium as well as two unstable ones, where manufactures concentrate to some extent but not fully to one region. In this case, which equilibrium we end up at depends on the initial share of the manufacturing sector. Hence, history must be considered in order to explain the outcome. Thus, with centrifugal and centripetal forces as a given agglomeration is decided by the level of transport (trade) costs. *Ceteris paribus*, which region that ends up with the manufacturing center is determined by history, the regions that began with a somewhat larger population will, as trade cost fall, see manufacturing agglomerate and concentrate to it.

It is important to note that, even though increased economic integration allows agglomeration forces to work and leave the peripheral region dominated by agricultural sector, agglomeration

⁹ Note that the original CP-model is not analytically solvable but must be solved numerically to give a equilibrium.

economies actually increases aggregate welfare in the model. This is because firms better utilizes scale economies and minimizes transports costs when clustered in a core-area. This in turn will improve competition (in the imperfect market model), which in turn increases the consumption possibilities – thus, increasing the aggregate welfare for all denizens of the model. In addition, it is important to note that for the model not to give rise to situation where all economic activity is centered in the core-area, an upper-bound must be introduced – often called “*the ‘No-Black-Hole’ condition*” (IBID, P58-9). The no-black hole condition is often an assumption on the centrifugal forces. Regularly this takes the form of restrictions on labor mobility, some share of the labor force will always remain in the peripheral region. With this assumption an extreme equilibrium where all manufacturing is *sucked* into the core-area is avoided.

3.2 REGIONAL UNEMPLOYMENT DISPARITIES: A THEORETICAL DISCUSSION

BALDWIN & WYPLOSZ (2009, P403) summarizes the main insights on why unemployment emerges; unemployment arises because wages do not instantaneously clear markets, i.e. labor supply do not match demand because the price of labor exceeds its equilibrium level. The consequence of this being that workers will offer more labor, at the going price, than firms are prepared to hire - hence the emergence of unemployment. If wages were to clear instantaneously across space and time unemployment would be nonexistent. However, there exist several impediments in the economy, obstructing full employment. We will proceed and discuss the theoretical background for such impediments.

In addition, for wages not to equilibrate some impediments to labor migration must be present. This impediment could be associated with a simple factor such as that people want to stay in their home region and are many times are reluctant to move long distances – they display a, so called, home bias. The home bias could stem from a preference for one’s own home region’s goods or more cultural and/or language differences between regions making the individual reluctant to move too long distances. Nearness to family is also a very possible influencing factor. Such impediments, will act as a rigidity hindering people from moving and segmenting the national labor market into smaller regional labor markets. These regional labor markets might differ markedly with significantly different labor market conditions. Thus, different regional labor markets can have very different labor demand or supply characteristics. If wages are set at the national level, without considering these differences in regional characteristics, regional unemployment might very well emerge.

According to GARCILAZO & SPIEZIA (2007) unemployment at the regional level has been studied from three theoretical approaches: the neoclassical approach, Keynesian approach, which we chose to group under traditional views on regional unemployment in this thesis, and from a New Economic Geography (NEG) approach.

3.2.1 TRADITIONAL VIEWS ON REGIONAL UNEMPLOYMENT

In this chapter we will take brief look at how neoclassical and Keynesian theories – dubbed traditional views¹⁰ for this thesis – view the emergence of regional unemployment.

In the neoclassical view, employment is decided negatively by real wage and positively by the marginal productivity of labor. Thus, low-productivity regions will have a lower employment and lower real wages than high productivity regions. Regional unemployment emerges when regional wages do not clear markets. Productivity differs among regional labor markets but due to the national labor market's institutional setup (e.g., collective bargaining, taxation, minimum wages or welfare benefits) the national set wage may differ from the regional equilibrium wage, conditioned on the region's productivity, creating unemployment in low-productivity regions and labor-market pressure in high-productivity regions. The implications given from this perspective is that changes to labor market institutions that reduce wage inflexibility will decrease regional unemployment (GARCILAZO & SPIEZIA 2007, P286).

The Keynesian approach, on the other hand, view unemployment as mainly a problem of too low aggregate demand for the products produced in the regions to generate full employment. That is, regions specialized in old industries for which products demand is low will have lower employment than regions specializing in new industries for which product demand is high. Thus, the Keynesian approach in GARCILAZO & SPIEZIA (2007) is associated with some regions inability restructure their industries to meet changes in demand, as a result lagging behind and suffering higher unemployment.

Even though both the neoclassical and Keynesian approach has relevance in explaining the emergence of regional unemployment neither approach explains the spatial pattern of unemployment in Europe, which is of main interest to this thesis. That, however, is better done if we turn our attention the NEG approach again. In this approach it is possible to provide an endogenous explanation to the geographical pattern of employment. We will therefore give some extra attention to the NEG model and the emergence of regional unemployment in this framework next. However, it is important to note that one view not necessarily excludes the other two.

3.2.2 UNEMPLOYMENT IN A NEG-FRAMEWORK

The original CP-model assumes full employment and to not concern itself with agglomeration dynamics possible effect on the labor market. Several recent theoretical approaches have incorporated labor market imperfection into the CP-model, thus explaining the spatial distribution side of unemployment. As in the traditional case, unemployment in the NEG-framework emerges when wages do not equilibrate, below follows a discussion on why this might be the case.

FAINI (1999) explores a CP-model with a labor market characterized by collective bargaining, presenting a model that incorporates trade union behavior into the usual two-region economy and

¹⁰ To distinguish them from the more recent NEG-approaches.

deals with regional growth prospects. Nonetheless, even though this model deals with regional growth it could conversely show unemployment polarization, since, as we noted above, raising wages above equilibrium will, *ceteris paribus*, create unemployment. As FAINI (1999) notes: “By setting a uniform national wage irrespective of local productivity conditions, trade unions is often alleged to depress labour demand particularly in backward regions and exuberate unemployment differentials” (P458).

FRANCIS (2003) investigates unemployment in a NEG-framework with international trade, finding that with decreasing trade costs unemployment falls in the core and rises in periphery. However, as trade costs continue to fall, unemployment in the core and periphery tend to converge as agglomeration effects increase. Moreover, FRANCIS (2007) presents a CP-model incorporating efficiency wages¹¹ and again finds that unemployment is decreasing in the level of agglomeration.

SUEDEKUM (2004) presents a CP-model with efficiency wages, similar to FRANCIS (2007), but marries it to wage setting curve¹², representing the long-run labor market equilibrium. SUEDEKUM (2004) is able to show that increased agglomeration in this model does not reduce unemployment disparities. Rather the migration of workers from the periphery to the core exuberate unemployment disparities. The model predicts that the larger core area will exhibit more agglomeration economies and lower unemployment than the more backwards periphery. The backwards periphery will because of the out-migration of workers always have lower demand relative to the core; this will have a general adverse effect on the economy of the periphery’s economy making it lag further behind.

EPIFANI & GANICIA (2005) presents a CP-model that incorporates job-search frictions¹³ on the labor market. In concordance with SUEDEKUM (2004), the authors note that out-migration from the periphery generates regional unemployment disparities, while in-migration to the periphery speeds-up convergence. The authors proceeds and gives the suggestion that when agglomeration effects is taken into account in-migration to the core actually lowers unemployment and raises real wages and out-migration from the periphery might very well raise unemployment and lower real wages (under certain parameter-values). Moreover, the authors come to the conclusion that geographical variables matter for unemployment and that unemployment inversely should follow the geographical concentration of production. Thus, variables that also determine the spatial location of production, such as trade costs, also determine the location of unemployment.

¹¹ That is, firms set wages above equilibrium level to discourage workers from shirking, from their job and thus being less productive than their non-shirking co-workers. To discourage this behavior firms give workers a wage over the market-clearing level – an efficiency wage – and fires anyone found shirking. The wage will be set as a premium over the “outside option”, i.e. the income a worker would earn when not being employed – e.g., unemployment benefit.

¹² The wage curve represents the negative relationship between real wages and unemployment. That is to say, worse labor market conditions, i.e. higher unemployment, are associated with a lower real wage.

¹³ Unemployment will also emerge on account of matching problems on the labor market; it will take some time for the right firms and the right worker to find each other.

One conclusion stemming from the theoretical approaches discussed in this chapter is that for persistent unemployment disparities to emerge imperfect labor mobility must be introduced as a centrifugal force. That is, workers must receive some intrinsic compensation from staying in the more backwards peripheral region, accepting lower real wages and higher unemployment. This could be experienced negative externalities such as disutility from congestion in the larger core region; the price of nontradables, such as housing costs in the core (increasing the cost of living here); or a more general home bias making workers unwilling to leave their home region.

The outcome of introducing imperfect labor mobility is that the peripheral-workers will demand an additional wage premium for migrating to the core to compensate this home bias. Thus, migrants will not fully follow the real wage differential between the core and the periphery. This will limit agglomeration economies and increase the aggregate unemployment in the periphery if labor market imperfections are present. As PUGA (2002, P390) notes, *“If agglomeration does not get reflected in wage differences, it may get reflected instead in the differences in unemployment rates.”*

Thus, taking agglomeration and imperfect labor markets into account one can explain the emergence of regional unemployment disparities and the persistence of such differences. Drawing from results of the above mentioned theoretical models, there seem to be a divide between two strands of theoretical NEG-models incorporating labor market imperfections. In the first strand of models stronger agglomeration can reduce aggregate unemployment, both in the core and the periphery, and thus lessening overall disparities (as in FRANCIS (2003) and FRANCIS (2007)). In the other strand, however, agglomeration can increase disparities of unemployment (as in SUEDEKUM (2004) and EPIFANI & GANICIA (2005)). So increased integration could very well increase unemployment disparities if labor is insufficiently mobile and wages do not equilibrate. Thus, drawing from these two strands, unemployment disparities persists because trade costs between EU members are still too high and agglomeration is still too low for the union to achieve convergence in regional unemployment rates. Or, they persist because labor market and labor migration impediments present the agglomeration forces brought on by the integration process leads to larger differences.

In addition, it is important to note that firms can leave regions much faster than workers. This mismatch of migration speeds may give rise to a polarization of economic activity and, concordantly, concentration of unemployment. Teamed with wage inflexibility, this give rise to agglomeration forces, where a small shift of industry from a region raises this region's unemployment and lowers that of the expanding region (BALDWIN & WYPLOSZ 2009, P404). Since workers view high unemployment as a heighten risk of themselves being unemployed they are more likely to move to the expanding regions, thus, further strengthening the centrifugal effects and the polarization of employment.

4. ANALYSIS

4.1 DATA

For the analysis we use regional data from the Eurostat REGIO-database. The data is at a NUTS 2¹⁴ level of aggregation, The NUTS-system is a hierarchal classification with three regional levels (NUTS 1 being the least disaggregate data level, below that of Member State) established by Eurostat to provide comparable regional breakdowns of the Member States of the EU (PUGA 2002, P373). The NUTS regional classification system is basically set up after three principles: (1) within a specific population thresholds (minimum 800 000 and maximum 2 million inhabitants for the NUTS 2 classification); (2) for practical reasons the NUTS regulations tries to follow member state's national administrative units to as large extent as possible (referred to as the normative criteria); and, (3) the NUTS regulation follows suitable geographical units (EUROSTAT 2007 P9-10). We use a panel of 271 NUTS 2 regions, from all 27 Member States, between the years 1999 and 2009. The period is of particular interest since it covers two enlargement of the EU¹⁵ and the REGIO-database contains data for all these countries from 1999. Following the classifications used in the Commission's Fifth Report on Economic, Social and Territorial Cohesion (2010, P.X) we group countries into three groups after enlargement: EU27 (all members), EU15 (all countries that joined prior to 2004)¹⁶ and EU12 (all countries that joined after 2004)¹⁷.

Some EU Member States are not large enough to constitute more than one NUTS 2-region (Estonia, Latvia, Lithuania, Luxembourg, Malta and Cypress), for these instances we use national level data. Since the main interest for this thesis is possible agglomeration forces in Europe, and the effect such forces might have on the distribution of unemployment, we exclude overseas regions (Guadeloupe (FR), Martinique (FR), Guyane (FR), Réunion (FR), Açores (PT), Madeira (PT) and Canarias (ES)). These regions are with all probability not affected by any agglomeration forces from other European countries. In addition, the overseas regions constitute extreme outliers, relative to the European regions, and might therefore give us biased results.

Note that even though NUTS 2 level data is chosen by Eurostat to be comparable, regions may still differ in population and economic size making comparison not always suitable (as some previous studies reviewed for this thesis notes, see for example: GARCILAZO & SPEIZIA (2007), NIEBUHR (2003), MELICIANI (2006) and COSCI & SABATO (2007)). However, since the NUTS 2 level data is the main regional level used in the implementation of European regional policy and, also, a majority of previous studies it is still relevant and comparable to these and therefore used in this thesis. In

¹⁴ Nomenclature of Territorial Units for Statistics level 2 (NUTS 2).

¹⁵ In 2004 the Czech Republic, Estonia, Cypress, Latvia, Lithuania, Hungary, Malta, Slovenia and Slovakia joined and in 2007 Bulgaria and Romania joined.

¹⁶ BE, DK, DE, IE, EL, ES, FR, IT, LU, NL, AT, PT, FI, SE and UK

¹⁷ CZ, EE, CY, LV, LT, HU, MT, PL, SI, SK, BG and RO

addition, no other geographical classification that could be matched with the necessary information on unemployment was available for this thesis.

For some countries and regions observations are missing for certain years¹⁸. Thus, to still be able to use a balanced panel and not have to exclude any data points we extrapolate and interpolate the data with the help of a trend. For missing data on such variables as unemployment and employment rates, that we suspect might oscillate around an equilibrium level, we estimate the trend using least square estimation on the available data. Thus, we can capture the randomness associated with such variables through the error term. When such variables as population is missing, where we might suspect a constant long-term growth rate and not variation around a trend, we instead use the following formula to calculate the long-term average growth rate,

$$g = \left(\frac{y_{t+T}}{y_t} \right)^{\frac{1}{T}} - 1.$$

Where y is the variable of interest, g is the growth rate, t is a particular year and T is the total number of years in our sample. With this approach we will not be able to account for large in- or out-fluxes of population to or from regions. But large changes to population are uncommon, therefore this is not deemed too large of a problem. Missing observations is mainly a problem in the beginning of the data period, so we still have reliable data for later years.

4.2 EMPIRICAL RESULTS

As noted in chapter 2, previous studies have found large persistent disparities in unemployment across Europe's regions. The aim here is to investigate the period 1999 to 2009, a period so far, to the author's knowledge, not subjected to very much research concerning this particular field.

In 1999 the average unemployment rate in the EU27 was 9 % and in 2009 the rate was 8.8 % (however, we should note that the rate very well could be exuberated by a business cycle trough following the 2008 financial crisis, the rate for 2008 was 6.3%). At the same time, however, regional unemployment rates differed markedly. Figure 4.1., below, shows a map over all EU NUTS 2 regions' unemployment rates comparing the 1999 distribution to that of 2009. The darker the green, the higher the unemployment, while beige and yellow means lower unemployment. We should be careful in drawing to far reaching conclusions from comparing the values of two data points in themselves, since we have not accounted for business cycles, however, we can still say something about the distribution from simple ocular inspection of the maps.

¹⁸ Data is missing for the following observations: Bulgaria 1999-2002, Denmark 1999-2006, Cyprus 1999, Malta 1999, Slovenia 1999-2000. Germany is missing data for the regions: Brandenburg Nordost and Brandenburg Südwest 1999-2003; Koblenz, Trier and Rheinhessen-Pfalz 2000-2001; Chemnitz, Dresden Leipzig 1999; and Sachsen-Anhalt 1999-2006. The UK is missing data for the regions North Eastern Scotland and Highlands and Islands between 1999 and 2000.

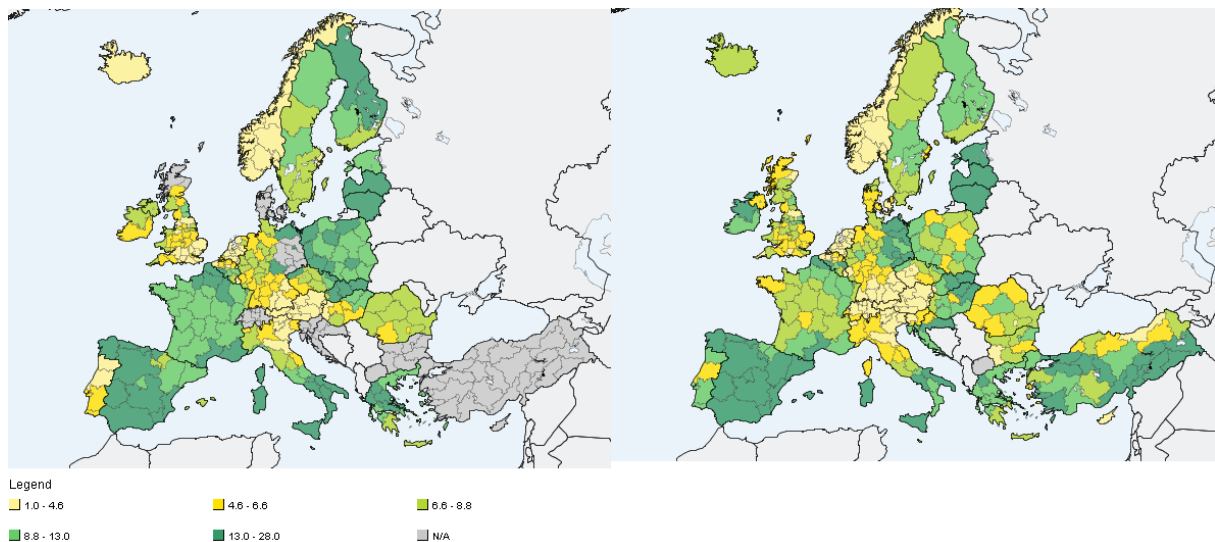


Fig. 4.1. Unemployment rates EU NUTS 2-regions 1999 (left) and 2009 (right).
Source: Eurostat.

Overall, unemployment seems to have been alleviated somewhat in many regions when comparing 1999 rates with 2009, see for example France, Poland, northern Finland and Greece. However, some regions seem troubled by more persistence unemployment, Spain and southern Italy are two notable examples (data is missing for many regions in eastern Germany; however, it is plausible to assume relatively high unemployment in these regions, persisting up till 2009). It is hard to find any general evidence of the transnational unemployment clusters of OVERMAN & PUGA (2002) and GARCILAZO & SPEIZIA (2007). Besides a low-unemployment cluster in central Europe (centering on northern Italy, Austria, southern Germany and western Czech Republic) and a high unemployment cluster across the Baltic States there is little evidence for cross-border clustering. Within-state clusters seems more persistent, than transnational clustering, and many regions that exhibited relatively higher (lower) unemployment in 1999 to other within-state neighboring regions do also exhibit relatively high (low) unemployment in 2009.

To further stress the differences in unemployment rates across Europe's region, we create a boxplot of regional unemployment rates. The result are presented in figure 4.2, below, and shows the unemployment differentials in Europe's NUTS 2-regions in 2009, showing an index of their unemployment rate compared to the average of EU27. The whiskers show regional outliers (also marked with name of region and their index-value), a compact box means a more compact distribution of unemployment (less within-nation disparities). Countries are ordered from highest national average unemployment rate (Spain; 16.5%) and descends down to the lowest (the Netherlands; 3.5%), showing that even low (high) national unemployment rate can hide regional outliers with above (below) average unemployment. As is evident from looking at figure 4.2 large disparities do exists in almost all EU countries.

However, even though figure 4.2 shows large disparities it says very little on the evolution of regional unemployment differences over time. To investigate this will be our next objective.

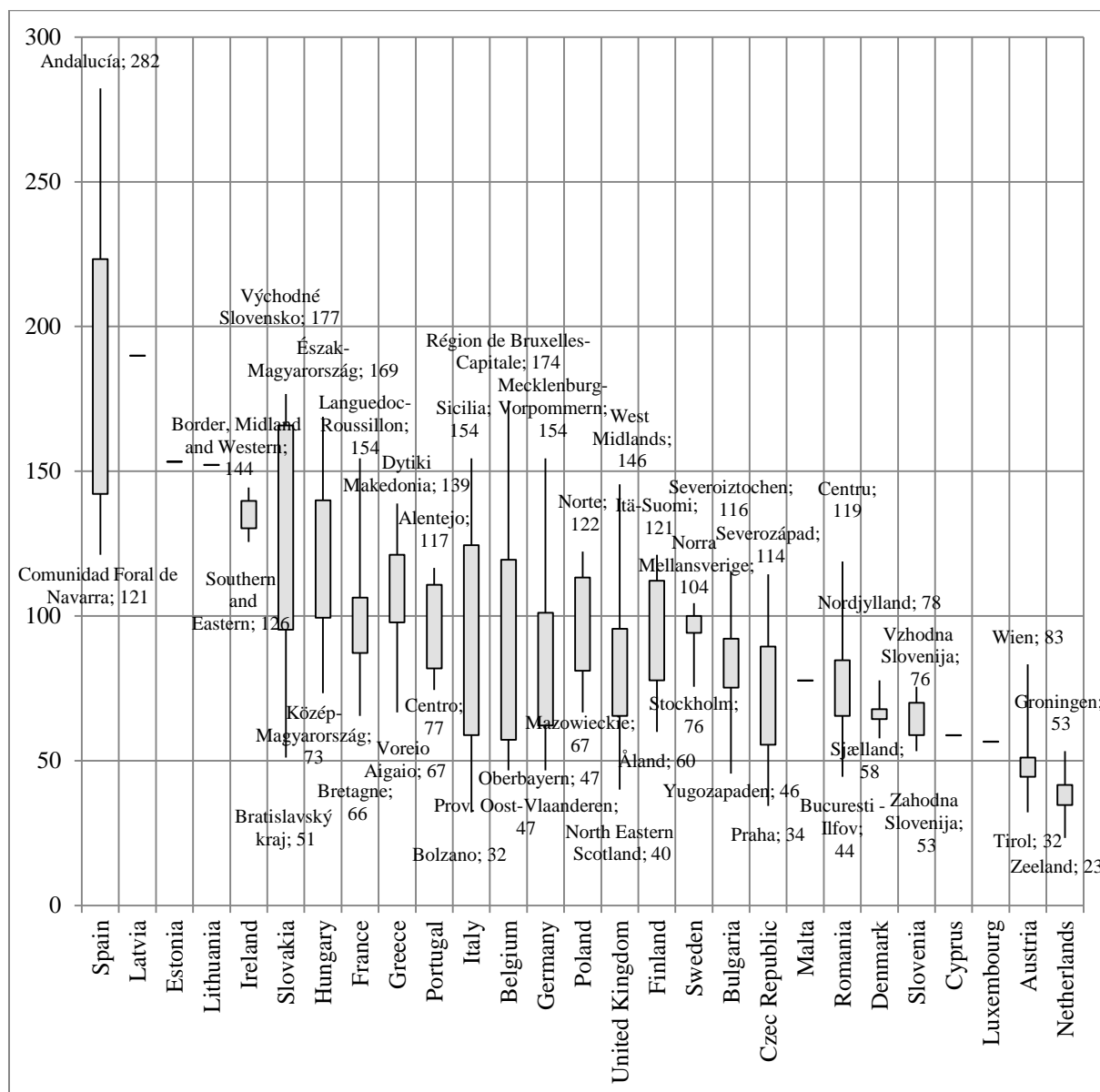


Fig. 4.2 Unemployment rates EU NUTS 2-regions 2009, with regional outliers (index 100=EU-average). Source: Author's calculations on Eurostat

4.2.1 STRUCTURAL EVOLUTION OF REGIONAL UNEMPLOYMENT

In the proceeding discussion we described large differences in regional unemployment rate across Europe's regions. But, are these differences part of a structural evolution of regional unemployment or merely the result of random ups and downs of regional fortune? And, if they are part of a structural evolution, does this give rise to persistent, increasing or decreasing regional unemployment rates over time? To answer these questions we will use a technique called transition matrices (or transition table), used in several previous studies (e.g., OVERMAN & PUGA (2002), GARCILAZO & SPIEZIA (2007), COSCI & SABATO (2007) and PUGA (2002)) and track the evolution of all our 271 regions and be able to summarize their behavior in a handful numbers.

Following the description given in OVERMAN & PUGA (2002, p.124), a transition matrix categorizes unemployment rate realizations in a number of ranges (we choose the same ranges as in OVERMAN & PUGA (2002): 0.0-0.6; 0.6-0.75; 0.75-1.0; 1.0-1.3; and, 1.3-highest) these ranges corresponds to the regional unemployment rate relative to the EU average (i.e. a number over one implies that the region has a higher employment rate than the average EU rate). Ranges are chosen arbitrary, but groups should not differ too much in size and categories should remain unchanged over time. The number of region in each range in 1999 is listed in the column *n*. The ranges are listed both across the row and column of the table, so that any cell corresponds to any pair of ranges. The number in the cell is the probability of any region starting in the column range in 1999, ends up in the row range in 2009 and since every region ends up somewhere each row sums up to a 100%. For example in 1999, 73 regions had a unemployment rate in the range 0.0-0.6 and it is a 57% probability that that these regions had a unemployment rates within the same range in 2009. Thus, cells on the diagonal (marked with bold text) are those regions that ended up in same range of unemployment rates as they began with, any cells to the right of the diagonal represent regions that increased their unemployment and cells to the left regions that decreased their unemployment rate.

Table 4.1 shows the transition matrix for the EU27 group, linking the 1999 with the 2009 distribution of European relative unemployment rate. There seem to be some persistence in the lowest and highest ranges, indicating polarization. However, we should note that the mid-range (0.75-1.0) exhibit more persistence, 50% of the regions that started out in the range also ended up in it. The most persistent group of regions (and the group with most regions belonging to it) is those in the low unemployment group (57%).

However, there is some movement evident in table 4.1. Looking at the mid-ranges mobility is far more common than in the extreme ranges. Indeed, in the mid-ranges movements seem to be toward the EU average, indicating that some convergence is taking place. Note the substantial number of high-unemployment regions, 40%, in 1999 that have improved their position, somewhat, in 2009. When looking at the data it is evident that many of these regions are from the newer Member States in Central and Eastern Europe (CEE). This could imply that the unemployment situation of many these newer Member States has improved. At the same time, much of the persistence of unemployment differences can be attributed to the behavior of regions in the old EU15-countries.

Table 4.1 Transition matrix for unemployment rate distribution: EU27, 1999-2009

		2009 ranges of relative unemployment rates (%)				
1999 ranges:	n	0.0-0.6	0.6-0.75	0.75-1.0	1.0-1.3	1.3-highest
0.0-0.6	73	0.57	0.21	0.16	0.05	-
0.6-0.75	39	0.24	0.35	0.27	0.14	-
0.75-1.0	52	0.06	0.17	0.50	0.19	0.08
1.0-1.3	35	-	0.16	0.37	0.29	0.18
1.3-highest	65	0.01	0.03	0.12	0.40	0.44

Source: Author's calculations on Eurostat

Table 4.2 Transition matrix for unemployment rate distribution: EU15, 1999-2009

		2009 ranges of relative unemployment rates (%)				
1999 ranges:	n	0.0-0.6	0.6-0.75	0.75-1.0	1.0-1.3	1.3-highest
0.0-0.6	60	0.62	0.22	0.14	0.02	-
0.6-0.75	30	0.16	0.42	0.32	0.10	-
0.75-1.0	39	0.05	0.13	0.51	0.21	0.10
1.0-1.3	29	-	0.14	0.34	0.38	0.14
1.3-highest	50	-	-	0.08	0.35	0.57

Source: Author's calculations on Eurostat

Table 4.3 Transition matrix for unemployment rate distribution: EU12, 1999-2009

		2009 ranges of relative unemployment rates (%)				
1999 ranges:	n	0.0-0.6	0.6-0.75	0.75-1.0	1.0-1.3	1.3-highest
0.0-0.6	5	0.40	0.20	0.40	-	-
0.6-0.75	5	0.60	-	-	0.40	-
0.75-1.0	13	0.17	0.25	0.42	0.17	-
1.0-1.3	10	-	0.27	0.36	0.09	0.27
1.3-highest	23	0.04	0.04	0.26	0.48	0.17

Source: Author's calculations on Eurostat

To further explore these differences in the evolution regional unemployment rates in different parts of Europe, we divide our data into a EU15- and a EU12-group (capturing all CEE-regions); the restricted groups are presented in table 4.2 and 4.3, respectively.

Looking at table 4.2, above, the persistence becomes more pronounced when only considering EU15-regions. The low unemployment group is still the largest group with both most regions belonging to it and the highest single probability to remain in it. However, we still have some movement, mostly downwards from the two high-unemployment ranges, but this is smaller than when

we considered the unrestricted EU27 group. But, as with the EU27 group, most of the movement is among the mid-ranges around the EU average. Thus, indicating that the movement, that nonetheless exists within this group, in many cases might be convergence.

The EU12 group, on the other hand, shows much more mobility, looking at table 4.3, only the mid-range shows a majority of regions staying in the same range as they began (the lowest ranges in the top row is evenly split with 40% staying in the range and 40% moving to the 0.75-1.0-range). We now, more clearly, see that the vast majority (48% and 26%) of high unemployment regions in this group actually improved their position comparing 1999 with 2009. Overall, the majority of regions in the EU12-group is to the left of the diagonal in 2009 and, thus, seems to have lessened the impact of unemployment.

Our findings from the transition matrices are not in line with those found by OVERMAN & PUGA (2002). They find that regions that started out with low relative unemployment in 1986 also had a high likelihood of remaining in the same group by 1996. In 1996, 81% of low-unemployment regions remained in the below-60% group, and none had a relative unemployment rate higher than 75% of EU-average. A similar persistence was found in high-unemployment regions; 62% of high-unemployment regions remained in this group in 1996. However, as in our sample, OVERMAN & PUGA (2002) results for mid-groups are less clear cut and the regions in these groups seem to have experienced much more mobility. Even though the evidence among the mid-range groups are less clear, OVERMAN & PUGA (2002) takes these results as confirmation that the spatial distribution of unemployment across Europe's regions are becoming more polarized during the period 1986-1996. Our findings suggest that less polarization and more persistence and, perhaps, some convergence among mid-range groups and the EU12 have prevailed during the 1999-2009 period.

To sum up the evidence from transition matrices, there seems to have been some convergence toward the EU average mostly among mid-ranges of unemployment. However, much persistence prevails during the sample period, mostly stemming from the behavior of EU15-regions. EU12-regions, on the other hand, show much more mobility and a majority EU12-regions starting out with high unemployment lessened unemployment during the sample period. Having looked at the evolution of unemployment distribution, we now continue by looking at specific measures of inequality.

4.2.2 ENTROPY INDICES

We now will proceed and apply so called generalized entropy indices to measure the geographical concentration of unemployment. According to BRÜLHART & TRAEGER (2005) these measure have an advantage in that they easily can be decomposed to a within-country and a between-country component. Thus, the measure allows us to investigate from which of these components inequality stems from.

The generalized entropy (GE) classes of inequality indices are defined by the following equation (IBID. P601),

$$GE(\alpha) = \frac{1}{\alpha^2 - \alpha} [1/N \sum_{i=1}^N \left(\frac{y_i}{y}\right)^\alpha - 1] \quad (i)$$

where,

$$y = \frac{1}{N} \sum_{i=1}^N y_i = \frac{Y}{N}.$$

In eq. (i) y_i is a measure associated with some economic activity, unemployment in our case, spread out over a set of spatial basic units, $i \in (1, 2, \dots, N)$, e.g. a square kilometer of land area. The basic units are divided into non-overlapping subgroups, $k \in (1, 2, \dots, K)$, by regional or country boundaries. The parameter α is a measure of the weight given to the distance between the variable y_i . If we choose $\alpha=2$ in eq. (i) we can end up with the coefficient of variation (CV) (IBID),

$$CV \equiv GE(2) = 1/y [1/N \sum_{i=1}^N (y_i - y)^2]^{1/2} = \sigma/\mu$$

That is, simply the standard deviation divided by the mean. This implies that the lower the value taken by the CV, the less variation from the mean in the sample and, consequently, less disparity. If we instead choose $\alpha=1$ in eq. (i) we will end up with the Theil index of inequality¹⁹,

$$GE(1) = 1/N \sum_{i=1}^N \frac{y_i}{y} \log \frac{y_i}{y}.$$

If the basic unit of the Theil index is a unit of land area it is called a topographic entropy index (GET) and if the basic unit is based on the number of working people it is called relative entropy index (GER). Thus, the topographic measure gives the unweighted spread of unemployed per square kilometer and a low value means an even spread over physical space. The relative measure, on the other hand, weights, in our case, each unemployed with the number of working people in each region and a higher value means a more uneven allocation of unemployed. If we consider each set of basic unit, i , as a region, $r \in (1, 2, \dots, R)$, such that $\sum_r n_r = N$, the Theil index becomes,

$$GE(1) = \sum_{r=1}^R \frac{n_r \bar{y}_r}{N \bar{y}} \log \frac{\bar{y}_r}{\bar{y}} \quad (ii)$$

where for topographic concentration,

$$\bar{y}_r = \frac{\sum_i y_{ir}}{n_r}, \quad \bar{y} = \frac{\sum_r \sum_i y_{ir}}{N}$$

and for relative concentration,

¹⁹ Using L'Hopital's rule

$$\bar{y}_r = \frac{\sum_i \frac{y_{ir}}{\sum_r y_{ir}}}{n_r}, \bar{y} = \frac{\sum_i \frac{y_{ir}}{\sum_r y_{ir}}}{N}.$$

As mentioned above, what makes the entropy indices attractive as a measure of inequality is its decomposability into a within- and between-component. The Theil index described above can additively be decomposed as follows,

$$GE(1) = GEw(1) + GEb(1),$$

where w and b indicate within and between, respectively. To get the within component (GEw(1)) we use the mean for our sub-groups K in (ii), instead for the entire population N. To then get the between component we simply use the additively of the measure and subtract GEw(1) from GE(1).

We will now proceed and apply both the CV and the Theil index on our data to investigate if unemployment is becoming more or less dispersed.

4.2.3 CONCENTRATION PATTERNS: INCREASING OR DECREASING SPATIAL INEQUALITY?

To investigate the spatial concentration patterns of regional unemployment we start by looking at the CV, results are presented in figure 4.3 below. The dispersion for the entire EU27-group seems to have decreased over the data period, indicating overall smaller deviations from the mean unemployment rate of the EU.

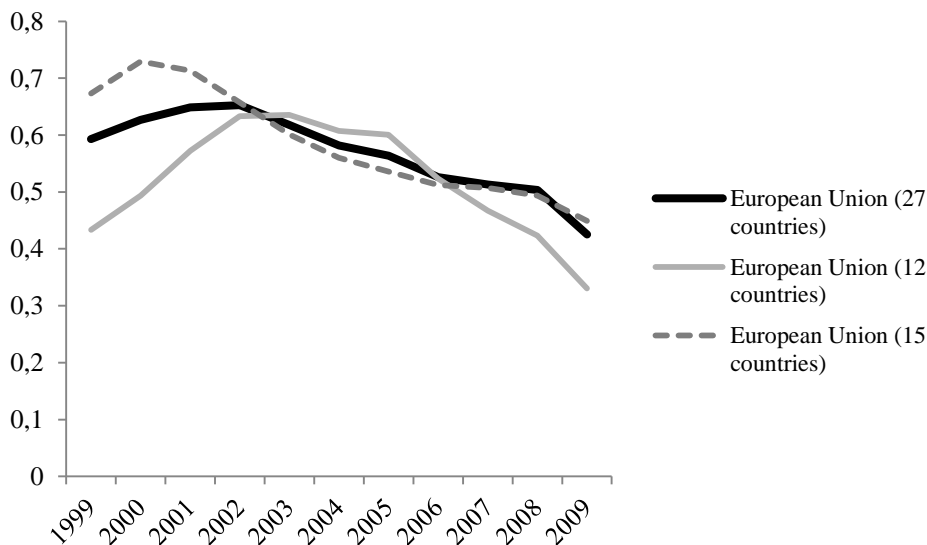


Fig. 4.3 Coefficient of variation of unemployment after enlargement groups, 1999-2009
Source: Author's calculations on Eurostat

In chapter 4.2.1 we found differences in the structural evolution of unemployment across Europe's regions. In particular, we found a different evolution in the old EU15-countries and the new EU12-countries. For that reason, it might be interesting to look at the concentration pattern for these two groups. If we consider the EU12 group first, it is evident from fig. 4.3, above, that unemployment disparities first increased, to around 2002 when they began to shrink, coming up to 2005 when

disparities began shrinking at an even faster pace. The EU15, on the other hand, saw disparities increase over the period 1999-2000, but has, according to the CV, seen the disparities shrink at a steady pace since.

However, even though the CV gives some indication general movement of disparities, a more detailed picture emerges if we consider the Theil index.

Fig. 4.4, below, shows the topographic entropy indices for EU12 and EU15 and indicates a quite marked differences in the distribution of unemployed over physical space between the two groups. EU12 have a more even spread of unemployed, as indicated by the low value of the index, and disparities seem to lessen over the sample period. At the same time the situation for the EU15 regions appear to be the opposite, with much higher value of the index, which also increased over the period. These results are markedly different from the ones obtained by looking at the CV. However, this is possible, the CV only calculates deviation from the mean while the topographic entropy indices compares actual spatial spread of unemployment to the case of perfectly even spread over physical space, so the measures might deviate.

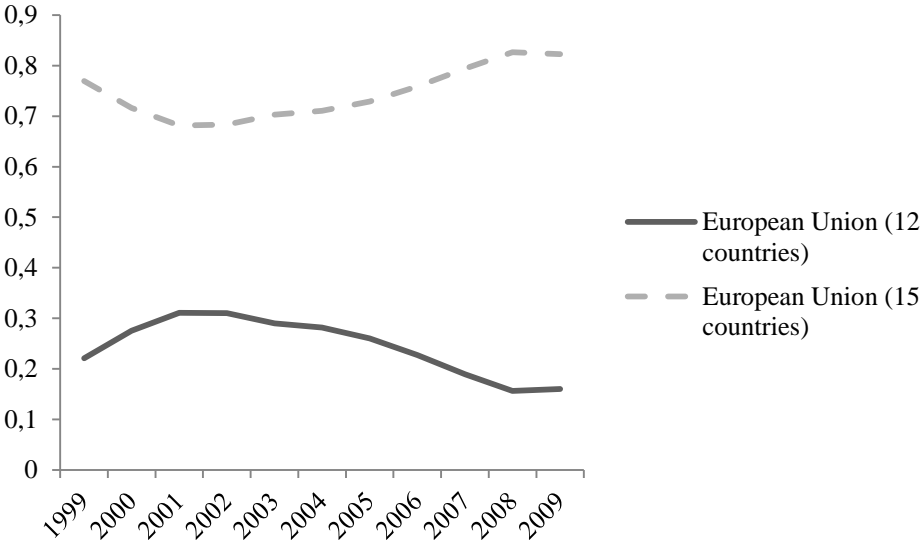


Fig. 4.4 Topographic concentration of unemployment (Theil index) after enlargement groups, 1999-2009
 Source: Author’s calculations on Eurostat

Below, in fig. 4.5, we plot the relative entropy indices, weighted with the labor market size of each region, for EU12 and EU15. The results are similar to those found when plotting the topographic indices in fig. 4.4; EU15 is still more concentrated than EU12.

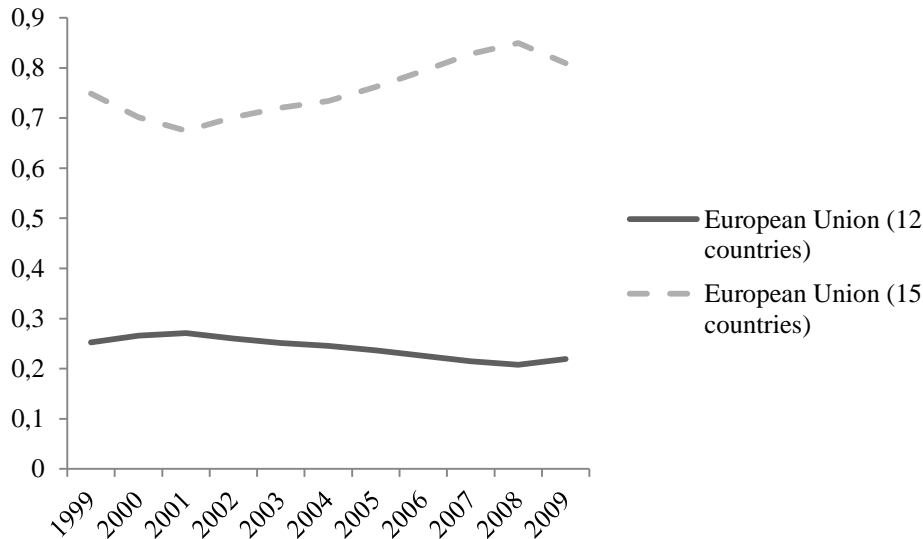


Fig. 4.5 Relative concentration of unemployment (Theil index) after enlargement groups, 1999-2009
 Source: Author's calculations on Eurostat

The why, of the large differences of the unemployment distribution between EU12 and EU15, are of course hard to speculate on. A tentative answer might be found in structural evolution of the EU12 states in improving their regional unemployment found in chapter 4.2.1. This evolution might be stemming from nation-specific factors; from the possible success of supranational EU-regional policies in increasing regional cohesion within these countries; or, simply from these countries catching-up with the rest of Europe, accepting market economy, improving their institutional setup and opening-up for trade.

Thus, when taking labor market size into account, as in fig. 4.5, the results are not that different. But to further investigate the contributions to the differences in disparities of unemployment we will turn to the within and between component of both the EU12's and EU15's topographic and relative measures.

Below in fig. 4.6 and fig. 4.7 we show the within and between component of the topographic measure of EU12 and EU15, respectively. What is evident when looking at the two figures are that main part of the lessening of disparities in the EU12 seems to be stemming from a decrease in the between-country contribution to disparities. This would indicate that the majority of the decrease of inequality in unemployment rates in the EU12-group is explained by a more even distribution of the unemployed between EU12-countries. This is supported by the findings concerning the structural evolution of unemployment, where a majority of EU12-regions moved towards the EU-mean. Furthermore, it is interesting to note that the situation seem to be the opposite in EU15. Looking at fig. 4.7, the main contributor to the overall differences in unemployment in EU15 is the within-state contribution. The EU15-indices are also much more persistent than the EU12-indices. These two

observations could indicate that the persistent dispersion of unemployment in the EU15 is due to the failure to achieve within-state cohesion and convergence among regional unemployment rates.

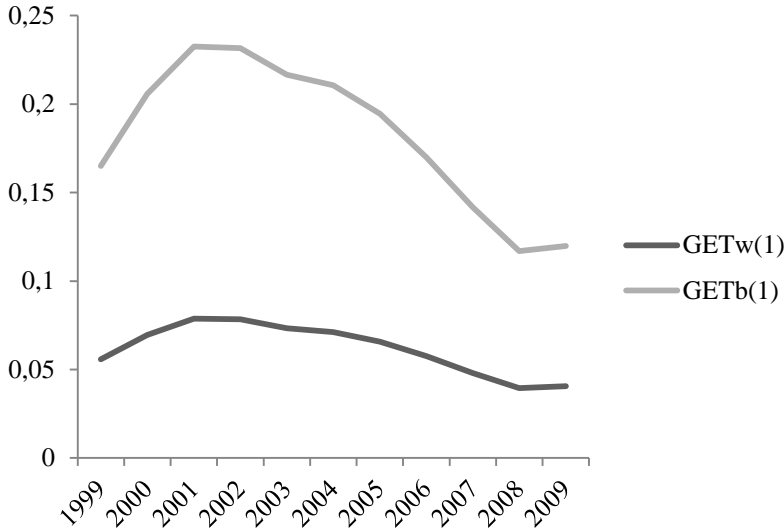


Fig. 4.6 Within- and between-country contribution of topographic concentration of unemployment in EU12, 1999-2009
Source: Author’s calculations on Eurostat

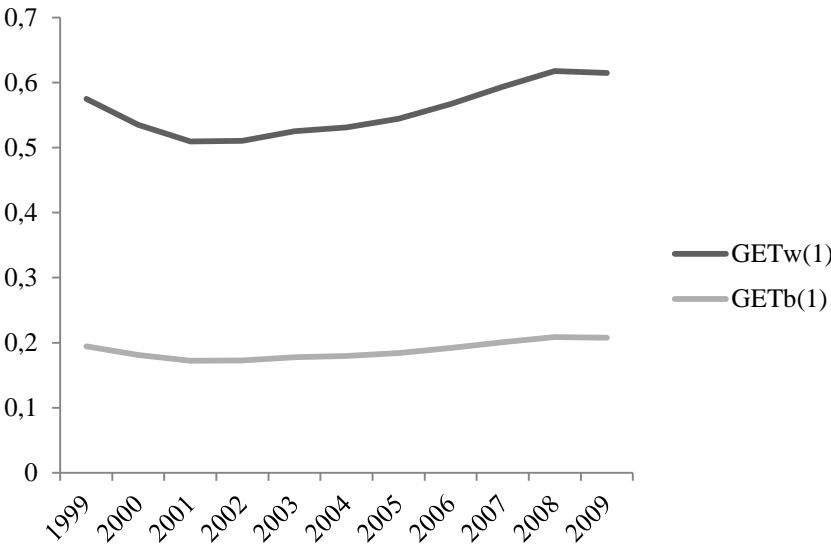


Fig. 4.7 Within- and between-country contribution of topographic concentration of unemployment in EU15, 1999-2009
Source: Author’s calculations on Eurostat

Proceeding, we investigate the within- and between-nation contribution to relative unemployment disparities. Fig. 4.8-9 below plots these contributions. The development of the between-nation contribution is now less dramatic for the EU12. However, it is still the main contributor to disparities in the EU12 group. Moreover, the within-nation contribution is still the main contributor to the concentrated pattern of the EU15 group. The direction of the within and between

contributions of the relative measure is also in alignment with that of the topographic measure; decreasing for EU12 and increasing or stagnant for EU15.

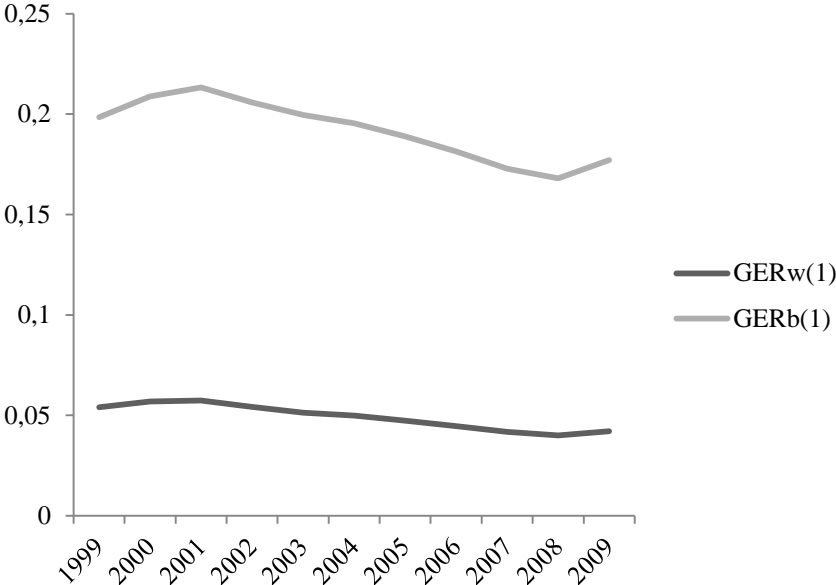


Fig. 4.8 Within- and between-country contribution of relative concentration of unemployment in EU12, 1999-2009
Source: Author’s calculations on Eurostat

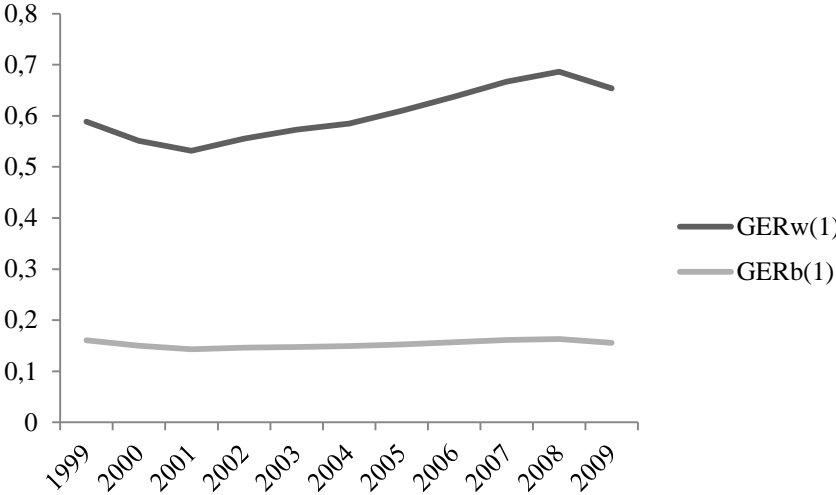


Fig. 4.9 Within- and between-country contribution of relative concentration of unemployment in EU15, 1999-2009
Source: Author’s calculations on Eurostat

Thus, so far our analysis has shown us that there do exist different spatial concentration patterns of unemployment across Europe and that the evolution of these seem to differ between the old EU15-countries and the new EU12-countries. While EU12 seem to have decreased disparities, mainly by lessening between-country differences, regional unemployment differences in EU15 have at best persisted or increased, mainly to do with persistent within-nation disparities. The larger differences

could stem from the EU15-group containing more diverse countries, both low unemployment countries (such as the Netherlands) and high unemployment countries (such as Spain), while the countries in the EU12-group generally are more alike. However, as we noted in our investigation of the structural evolution of unemployment in chapter 4.2.1, many EU12 regions have moved towards the EU-average, while many EU15 regions shows more persistence, both among the high- and the low-unemployment regions. This inability for some EU15-countries to lessen unemployment in lagging regions²⁰ can be one of the main reasons for the large disparities of this group; much of this is also evident in the large within-nation contribution to concentration of unemployment. As we noted above, much of the persistent high-unemployment regions can be found among the southern European Member State (especially, southern Italy and large parts of Spain). However, there are persistent high-unemployment regions in many northern members as well (parts of the United Kingdom and Eastern Germany are two notable examples). In the next chapter we will try and conclude and try to give some tentative explanation to these differences.

²⁰ Increasing unemployment in low-unemployment regions hardly seems as a sensible suggestion to decrease disparities.

5. CONCLUSION

5.1 PUTTING IT ALL TOGETHER: CONCLUDING DISCUSSION

At the outset of this thesis our aim was investigate the spatial spread of unemployment in the EU, trying to answer the question of whether unemployment is becoming more or less dispersed. In the analysis we have been able to show persistent regional unemployment disparities between Europe's regions. Previous empirical literature in this field have mainly been concerned with the 1980s and 1990s, this thesis looked at the spatial evolution of unemployment for the decade 1999 to 2009. In addition, some earlier studies have found evidence of increasing polarization between high- and low-unemployment clusters during the 1990s. These clusters seem to stretch across national borders making many authors name agglomeration, brought on by deepened European economic integration, as a possible cause. However, more recent studies have often attributed this polarization to the behavior of low-income regions and find that when accounting for these regional unemployment shows more convergence. This would indicate state- and region-specific behavior as a cause and not, mainly at least, economic integration. We find that regional unemployment differentials persist, but find no evidence of polarizing rates. Rather, we see some evidence of convergence among some of the new Member States in EU12.

Discussing the theoretical background we find that regional unemployment might emerge when labor market and labor mobility impediments are present. Unemployment arises when wages do not equilibrate. In a traditional view, such situations might emerge when the national wage-level (on account of labor market institutions) is disconnected from regional productivity. Moreover, when a region has an old industrial structure for which product demand is low, persistent unemployment might appear on account of that region's inability to restructure industry to meet demand. In a NEG perspective increased integration should decrease trade cost making industries cluster in space to realize scale economies and minimize transport costs, creating a world with an industrialized core with high income and an agrarian periphery with lower incomes. However, by introducing labor market imperfections and limit labor mobility to the extent that agglomeration economies are not fully realized we end up with unemployment. It is possible to find a theoretical rationale for unemployment disparities lessening if trade cost were to fall more, letting agglomeration economies take full effect. Yet, it is also possible to find support for that increased agglomeration might increase disparities in employment. Since agglomeration will be strong in the in-migration core, this region will usually have lower unemployment than the out-migration periphery. This might very well create a landscape with concentrations of low-unemployment regional clusters and high-unemployment regional clusters, where out-migration from the high-unemployment regional clusters further increase differences.

To investigate if regional unemployment is becoming more or less concentrated in the EU, we first look at the structural evolution of regional unemployment. By looking at transition matrices we

conclude that there seem to have been some convergence toward the EU average, mostly among regions in the mid-ranges of unemployment. However, for high and low unemployment regions persistence is much more prevalent. Though, much of the persistence during the sample period can be attributed to the behavior of EU15-regions. EU12-regions, on the other hand, show much more mobility. A majority of EU12-regions actually reduced unemployment during the sample period. We are unable to detect any specific polarization of unemployment rates, thus our result contradicts some of the previous literature in the field.

Proceeding, by calculating entropy indices we further explore the spatial concentration pattern of unemployment in the EU. As we might have suspected from the results of the transition matrices, the entropy indices show that the concentration of unemployment is higher in EU15 than EU12. Thus, indicating a more uneven spread of unemployment across EU15-regions, while unemployment in EU12 is more evenly distributed. By decomposing the indices we discover that the majority of the decrease in unemployment disparities in EU12 can be attributed to a reduction in between-nation differences. Moreover, much of the high concentration of EU15 unemployment is revealed to be mainly based on persistent within-nation disparities.

We can speculate on the differences in the evolution of regional unemployment in EU15 and EU12. The reduction of disparities in regional unemployment in EU12 seem, if we look at the results from the transition matrices, be based on several of the newer EU-member reducing their unemployment. We can view the reduction of between-nation component as further confirmation on this. Thus, some of the success of the EU12 in increasing regional unemployment cohesion can be attributed to the reduction of unemployment in many regions. The transition from planned to market economy, the opening-up to the European economic integration and the effects this in turn probably have had on these economies should not be underestimated in explaining this. That is, the EU12-countries might in this respect be on way to catch-up with the rest of Europe.

What is more, in our theoretical discussion we found that too low labor migration and wage rigidities as two main contributors to the persistence in regional unemployment. CROZET (2004) finds that migrants in the EU do follow market potential. However, the author comes to the conclusion that centripetal forces are too limited and mobility costs still are too high, for the union to really divide into a core-periphery structure and reap the benefits from agglomeration. Moreover, BUETTNER (2007) is able to show that wage flexibility for EU12 countries is significantly higher compared to the EU15. Accordingly, the author is able to show that unemployment disparities are much less persistent in the then-accession countries. Also, labor mobility is not particular higher in EU12 compared to EU15. This would indicate much of the reduction in regional disparities in EU12 also could be attributed to higher wage flexibility.

Thus, both state-specific institutional labor market setup (more flexible wages) and the effect of integration can be ascribed to the lower and decreasing disparities in regional unemployment rates in EU12.

Concerning the persistence found in EU15-unemployment, all previous studies reviewed for this thesis only concerned themselves with periods prior to 2004 and do not include the new EU12-members, hence only looking at what we refer to as EU15. Thus, based on the conclusions reached in these studies we can speculate that the persistence is based in either states/regions behavior (as in BOLDRIN & CANOVA (2001), MELICIANI (2006) and COSCI & SABATO (2007)) or the polarization of demand (as suggested by OVERMAN & PUGA (2002)). We did not find any evidence on increased polarization in the EU15 (rather more persistence); making state- and regional-specific effects seem likely. However, this is only a very tentative discussion; more research into the matter is needed before we fully can commit to any assertion. Moreover, the findings of BUETTNER (2007) indicate more wage inflexibility in the EU15, which also should act as a contributing factor to the persistent unemployment disparities.

To summarize, a tentative discussion on our finding suggest that the success of EU12 in reducing regional unemployment differentials could be attributed to more flexible wages and, possibly, to the effect of opening-up and integrating with the rest of Europe. Furthermore, the more persistent regional unemployment disparities of EU15 could conversely be attributed to inflexible wage-setting or country-/regions-specific effects and the polarization of demand as suggested by previous studies.

We have yet to turn to EU regional policies' possible role in all of this. Resources are transferred every year in the EU, through the Structural Funds, to increase national and regional cohesion and should have some effect on regional unemployment. However, the persistence in unemployment disparities should indicate that policies do not work optimally²¹. PUGA (2002) states a couple of policy improvements, two of which can be considered to be of particular importance for our analysis. First, policies should aim at encouraging regional wage-setting. By not setting wages at a national level wages might be set more in accordance with local productivity conditions, thus regional unemployment differentials should decrease. This might prove politically difficult to achieve, since wage-setting very much is in the Member States domain. Second, promote short distance mobility. This way, agglomeration economies can be realized. However, nations seem very reluctant to accept large population shifts, so this might also prove difficult to achieve.

²¹ Of course one could always assert how much worse the situation might have been without the redistribution of resources by EU regional policy.

5.2 FURTHER RESEARCH

There are a number of areas concerning the geography of unemployment in Europe that still need to be addressed.

First, testing the significance of our findings and of different variables suspected to explain regional unemployment differences, such as productivity and income differences seems to be a natural step. This could be done with panel data methods. However, recent advances in spatial econometrics should be used to account to specific problems of analyzing spatial data.

Second, more investigations into the possibility of transnational clustering is needed for the period 1999-2009. Recent studies have mainly done this by spatial econometric methods testing the significance of spatial autocorrelation in unemployment between neighboring regions within the same nation and across borders. This is of main importance since the importance of state/regional-effects versus transnational effects is fundamental in understanding the emergence of unemployment disparities.

Third, recent studies often looked at the evolution of income, productivity and employment. This is something that also should be done for the 1999-2009-period. The interlinked behavior of these three variables should be further explored to fully understand the effects of economic integration in Europe.

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