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Polarization or convergence? An analysis of regional unemployment disparities in Europe over time☆

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ABSTRACT

We analyse the distribution of regional unemployment rates in Europe and its dynamics. Using the standard deviation, non-parametric kernel densities, and stochastic kernels we identify and study two distinct periods: a convergence from 1996 to 2007 and a polarization from 2007 to 2013. We further estimate a multi-level factor model to identify the contributions of continental, country and region-specific fluctuations. We show that the convergence prior to the recent crisis is solely accounted for by country factors, whereas the strong polarization afterwards can be attributed to both country and region-specific fluctuations. In addition, we provide evidence for European unemployment cycles and discuss interesting regional patterns.

1. Introduction

With the economic turmoil that followed the financial crisis of 2008 unemployment rates in Europe rose sharply and have remained elevated in many countries since then. The unemployment rate in the Euro Area, the weighted average of the unemployment rates in the member countries, increased from 7.5% in 2007 to 11.9% in 2013. The measure hides substantial heterogeneity: in 2013 the unemployment rate was close to 5% in Germany but was above 25% in Spain. Even within countries unemployment rates can differ strongly: in Bruxelles-Capitale, for example, it is almost five times higher than in Oost-Vlaanderen, even though both regions belong to Belgium. While unemployment rates have been persistently higher than the average in some countries and regions, the recent economic turmoil has aggravated heterogeneity in European labour markets. Unemployment undermines social cohesion and is a burden for public finance, both because of increased spending on unemployment benefits and decreased tax earnings. High levels of unemployment therefore have always been a worry of policy makers and researchers alike. Reducing unemployment and heterogeneity in Europe – both at the national and regional level – is a prevailing challenge. The analysis of regional unemployment has therefore regained importance.

It started with the seminal paper of Blanchard and Katz (1992), which finds permanent differences between the unemployment rates in US states. In a related study, Decressin and Fatás (1995) provide evidence for a relatively higher heterogeneity among European regions and show that regional year-on-year changes are less correlated than in the US. Obstfeld et al. (1998) look in more detail at regional unemployment trends in existing currency unions and find similar results. Overman and Puga (2002) focus on the spatial distribution of 150 European regional unemployment rates and detect an increasing polarization between 1986 and 1996. Beyer and Smets (2015), in a recent paper, report a fast convergence of European regional unemployment rates after the introduction of the Euro but increasing standard deviations since 2008.[1]

We contribute to the understanding of recent unemployment dynamics by studying the distribution of European regional unemployment over time. First, we update the analysis of Overman and Puga (2002). This is important, as regional unemployment rates have evolved considerably in recent years; first, due to the establishment of a

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[1] Estrada et al. (2013) show that prior to 2008 regions in other developed countries converged as well, though less than in Europe.

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common currency and, second, due to the global financial crisis and the European sovereign debt crisis. We start by documenting changes of the spatial inequality of unemployment rates using different non-parametric methods.

Updating Overman and Puga (2002), however, is just one concern. In addition, we address the question whether unemployment is a country or regional phenomenon. Overman and Puga (2002) rely on stochastic kernel mappings to judge whether the regional or country dimension is dominant in determining unemployment. We extent this analysis and propose to employ a multi-level factor model, which decomposes regional and country fluctuations, to then study the contributions of country and regional factors in the distributional dynamics.

Our study is closely related to Iacus and Porro (2015), who study Gompartz stochastic unemployment processes for European regions and conduct a cluster analysis based on steady state values. Since we address different questions and use another methodology, we consider our study complementary to theirs.[2]

The remaining paper proceeds as follows. The next section introduces the data and provides descriptive statistics. The distributional analysis follows in Section 3. We then estimate a multi-level factor model of regional unemployment rates to study the role of country and regional factors in the distributional dynamics in Section 4. The last two sections summarize and discuss the findings.

2. Data and descriptive statistics

We update the dataset from Overman and Puga (2002) using Eurostat's regional NUTS2 database on unemployment rates. They covered the period from 1986 to 1996, which we extend to 2013.[3] Due to data availability we can include only 131 of the 150 regions included in the original dataset.[4] The regions span eleven countries, namely Belgium, Denmark, France, Germany, Great Britain, Italy, Ireland, Luxembourg, the Netherlands, Portugal, and Spain. The average regional population in 2013 was 2.3 Million. A list of all regions included in the sample as well as a map can be found in Appendix A.

The average unemployment rate over all years and for all regions in our sample is 8.7%. It was lowest in 2007 with 6.5% and highest in 1994 with 10.9%. In 2013 a similar height was reached with a rate again above 10%. The minimum rate overall was experienced by Utrecht (NLD) with 1.2% in 2001 and the maximum with 36.6% by Andalucía (SPA) in 2013. Before the outbreak of the financial crisis the highest unemployment was 17.1% in Bruxelles-Capitale (BEL) in 2007.

Minimum values remained relatively stable over time and fluctuated around 3%. Maximum values, on the other hand, exhibited high heterogeneity over time and pronounced movements. They show a decreasing trend during the period from the mid-1990s until the eve of the financial crisis, falling from 34.7% to 17.1%. Even though the gradual decline already started in 1994, it was after the introduction of the Euro that in the early 2000s this trend intensified. The mean increased between 2001 and 2005, even though maximum rates dropped strongly. The 95th percentile follows the same pattern as the maximum values and this pre-crisis development is mirrored in slightly falling interquartile ranges, including generally lower median values and means.

With the financial crisis developments reversed and previous gains in closing the gap between very high and very low regional unemployment rates were lost. Maximum rates started to surge again in 2009 and have since then experienced a continuous increase peaking with 36.6% at nearly twice the size of 2008. Again we find a similar trend for the 95th percentile and for the other distributional characteristics with mean and median unemployment rates creeping upwards and interquartile ranges widening.

3. Distributional analysis

Regional variables are often measured relative to aggregate ones (Blanchard and Katz, 1992; Obstfeld et al., 1998; Overman and Puga, 2002). We initially follow this convention and define *EU relative unemployment rate*, u^1_{it}, in the following way:

$$u^1_{i,t} = U_{i,t} - U_{EU,t}, \tag{1}$$

where U_{it} is the regional unemployment rate of region i at year t and $U_{EU,t}$ is the European unemployment rate in year t, which is defined here as the average of all regions in the sample.

3.1. Standard deviation

In Fig. 1 we plot the standard deviation of EU relative regional unemployment rates as well as a segmented linear trend. Between 1986 and 1996 the standard deviation increased slightly. With the introduction of the Euro, regional differences decreased considerably and the standard deviation dropped from 5.8% in 1996 to 2.7% in 2007. The convergence reversed promptly after the outbreak of the financial crisis. The standard deviation increased strongly and in 2013 was with 6.8% higher than in any year before.[5]

In the following, we focus on the distributional changes between two periods: with the first, from 1996 to 2007, we analyse the initial Euro convergence and with the second, from 2007 to 2013, we study the Great Recession divergence.[6] With these terms we refer to the concurrence of these events with clear trend changes in the dispersion of unemployment rates.[7]

3.2. Non-parametric analysis

Following Overman and Puga (2002), we tackle the spatial analysis of European regional unemployment with two non-parametric methods: (1) a standard density distribution analysis for the aforementioned selected year pairs and (2) estimations of so-called stochastic kernels, initially proposed in the economic growth literature by Quah (1993, 1996, 1997). Our analysis thus inspects the evolution of the cross-sectional distribution of European regional unemployment rates by exposing both changes in external shape and intra-distributional dynamics. In contrast to more traditional measures, like σ- and β-convergence, this approach allows the identification of polarization and stratification (Magrini, 2009). While density functions are widely known, stochastic kernels are used less.[8] They can be interpreted as the graphical equivalent of a transition matrix with infinitely small

[2] Iacus and Porro (2015) do not include developments since 2008 and need to make many assumptions, for example, that regional unemployment rates have a stochastic steady state and a log-normal limit distribution. We consider our approach – to use non-parametric methods for a distributional analysis of filtered actual unemployment – more suitable for our study.

[3] Unemployment is defined by Eurostat as a person aged between 15 and 75 and without work during the reference week, who is able to start work within the next two weeks and who has actively sought employment at some time during the last four weeks. For 1997 and 1998 data is not available for any region.

[4] The regions are based on Eurostat's regional classification of territorial units in 1996. A land reform in the UK in the mid-90s has in particular diminished our sample. However, other national administrative reclassifications or minor data availability issues affect nearly all our countries.

[5] Note that the average regional unemployment rate follows a similar trend, i.e. it remained mostly stable until 1996, decreased until 2007 and is increasing again since then. When we normalize the EU relative standard deviation by the mean, we still find the same pattern as just discussed.

[6] The first period from 1986 to 1996 has been analysed by Overman and Puga (2002).

[7] We are not, however, claiming causality. While certain consequences from these events, like decreasing interest rates in Southern Europe after 1999 or the recessions in some countries during the financial and sovereign debt crises, most likely affected regional unemployment, we leave formal establishment of causality for future work.

[8] They are used less, but are by no means rare. For example, Magrini (1999); Ioannides and Overman (2003); Pittau and Zelli (2006); Maza et al. (2012); El-Gamal and Ryu (2013), as well as Kamihigashi and Stachurski (2014) also employ stochastic kernels. Other examples are numerous.