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EXTENDED ABSTRACT

Title: Exploring the recent upsurge of regional inequality in Europe

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Abstract: In the last decades, and more especially since the financial crisis, some European countries have shown an upsurge of regional income per capita inequalities. This fact has revived a traditional debate in regional economic policy: the potential trade-off between a geographically balanced economic growth via regional policies or, by contrary, an uneven geographical development that enhances higher rates of national economic growth. This debate is gaining momentum in the agenda of policymakers in the European Union. Our aim in this research is to explore this issue by examining the imbalances that have risen between a set of 121 European regions (NUTS-2) over the period 1995-2014. The regions belong to Germany, Austria, Belgium, Spain, France, Netherlands, Italy, Portugal and Sweden. The databases used are the BD.EURS (NACE Rev1), and EUROSTAT. We seek to determine, first how far has evolved regional inequality in Europe, both within countries and between countries, and second, following the theories of uneven regional growth, to analyse the contribution of the structural change and region-specific factors to the evolution of the gap between European regions.

Keywords: Inequality, unbalanced economic growth, spatial imbalance.
JEL codes: R10, R11, R12

1. Introduction

In the last decade, the upsurge of regional income inequality has become a central issue in Economic Geography and Economic History research. The reasons have to deal with the recent rise in regional disparities in both, emerging countries[1] and developed economies[2]. The importance of spatial inequality for economic policy requires a better understanding of both, its magnitude and main determinants. Hence, this paper focus on the measurement and determinants of regional inequality in Western Europe since 1995 to 2014 and poses one interesting question: Can we talk about an upsurge of regional inequality in Western Europe? Is it transitory or respond to a new technological shock representing the start of a new inverted-U process? In analysing some of its main determinants we will try to shed some light on this invigorating issue.

The remainder of the paper is organized as follows. Section 2 briefly reviews the literature on the relationship between economic development and spatial inequality. Section 3 presents the data gathered to run this research and draws some figures to describe the evolution of income inequality in European regions since the mid-nineties up to 2014. We use different descriptive statistics to measure regional inequality and to get attention in the potential effect of agglomeration to stretch it. In the concluding remarks our main findings are summarized jointly with a brief discussion of their policy implications.

2. Theory and evidence: The link between spatial inequality and development

The literature on the evolution and determinants of regional disparities rests on the seminal work of Williamson (1965). This author based in the famous *Kuznets curve* (Kuznets, 1955) to postulate an inverted-U shape relationship between economic

[1] For instance, in China the increase of regional inequality became part of its outstanding per capita income growth since the start of the reforms in 1978 (Kanbur and Zhang, 2005). Although, more recent researches have revealed that it is plateauing from the mid-2000s onwards (Alvaredo et al, 2017; Lee, 2013; Zhang, 2015; Kanbur, Wang and Zhang, 2017). India…..

[2] Rodríguez-Pose (2018). The widening income gap between regions and across states observed in Europe since 1980 (Rosés and Wolf, 2018).

development and regional income per capita inequality. In the early stages of industrialization, as a country develops and becomes more economically integrated and industrialized, the distribution of economic activity across regions becomes more unequal. The manufacturing and the high value activities concentrate in a handful of advanced regions while the rest of the country remains linked to agriculture or more traditional manufacturing. As productivity in the modern industries increases more quickly fuelled by technological change and economies of scale, income per capita will tend to grow faster in these regions than in the traditional ones. Hence, in these early stages of modern economic growth regional income per capita inequality will increase.

This tendency will be reinforced by the attraction of capital and labour from the less developed regions in search for higher returns to capital and higher wages. In more advanced phases of development, this trend will stop and convergence between backward and industrialized regions will arise. Structural change and the subsequent reallocation of factors (capital and labor) between industries and across regions, technological diffusion across regions, and the compensating effect of economic policy, will mitigate the unbalancing forces and will push converge between regions.

In his seminal study Williamson (1965) presented a first piece of evidence in favour of an inverted-U curve for a sample of 24 developed and developing countries. Since then and until the last decade, very few evidence was added. It was around the 1990's when studies based in the U.S. regions (Amos, 1988; Kim 1995, 1998) resumed the question of the effect of development on regional per capita income disparities. Using historical regional data since 1860, Kim (1995, 1998) found evidence in favour of the inverted-U curve for this country whose reversal could be dated around 1930.

In Europe, the first studies were based on cross-section or panel data. These official databases use to start in 1975 or 1980. These studies use to compensate the lack of historical series with the evidence coming from European countries with different per capita income levels. In this strand of the literature is interesting to mention the pioneer cross-country studies of Ezcurra and Rapun (2006) or Barrios and Strobl (2009).[3] More recently Lessman (2014 and 2017) using a semi-parametric approach, widen the sample

[3] There is a big amount of literature refereed to the analysis of European regional inequality. For example, Ezcurra (2005), Esteban (2000).

to include less developed and emerging economies across the world to test the existence of the inverted-U curve. Notwithstanding the big amount of researches that have proliferated since the publication of the official datasets, their main drawback is their short time span. Hence, it is difficult to detect the "structural change" effect that has been considered by the literature as one of the main drivers of the regional divergence/convergence process.[4] The European and U.S. regions included in these samples belong to high income countries where the "structural change effect" exhausted during the Golden Age or even before.

In the last decade, and especially since the publication by Geary and Stark (2002) of a new method to allocate GDP across regions, the number of countries with historical regional data has soared. There is new evidence published for Great Britain, Spain, Portugal, Italy, France, Sweden, Belgium and Canada.[5] Additionally, Roses and Wolf (*forthcoming*) have compiled new historical estimates for 16 European countries and 173 NUTS-2 regions for 11 benchmark years since 1900 to 2010. This new historical empirical evidence reveals that, at least since mid 19th century, the Williamson' curve is hold in some countries (United States, Great Britain, Spain or Portugal). Belgium, Sweden and France exhibit a persistent decline in regional income inequalities since the last decades of the 19th century and results are even less concluding for Italy and Canada.

Nowadays, both kind of analysis, those based in country analysis and historical data[6] and those based on parametric and semiparametric econometric analysis and cross-country data[7], reveal that at least in the most developed countries, the inverted-U curve has been completed and a new upsurge of regional income inequality is visible in most of them. Furthermore, most of them offer evidence of a new upward trend in regional inequalities at high levels of economic development. The start of a new N-

[4] Caselli and Coleman (2001); Caselli and Teneyro (2006). For a long run view of the structural change process see Rosés and Enflo (2015), Martínez-Galarraga et al. (2015) and Rosés and Minns (2018).
[5] For Great Britain see Crafts (2005) and Geary and Stark (2016). Spanish data have been compiled by Martínez-Galarraga et al. (2010, 2015); Italy by Felice (2011); Portugal by Badia-Miró et al (2012); Belgium by Buyst (2010 and 2011) and Sweden by Enflo and Roses (2015). Additionally, there have been published new estimates for Canada (Minns and Rosés, 2018). For France there are alternative estimates Combes et al. (2011), Caruana-Galitzia (2013), Bazot (2014) and Diez and Sanchis (2018).
[6] Diez and Sanchis (2018); Rosés and Enflo (2015); Geary and Stark (2016); Diez, Martinez-Galarraga, Tirado and Sanchis (2018); Diez, Martinez-Galarraga, Tirado and Sanchis (2018) and Rosés and Wolf (2018).
[7] For instance, Lessman (2014), Lessman and Seidel (2017), Castells-Quintana et al (2015).

shaped curve has been identified in several country studies[8] and also in studies based in cross-section data[9]

3. Data and some descriptive statistics

3.1. Data

The data set used come from the BD.EURS (NACE Rev2) and EU-KLEMS. It contains information for 9 countries (Germany, Austria, Belgium, Spain, France, Netherlands, Italy, Portugal and Sweden) and sum up 121 NUTS-2 regions. The variables included are nominal and real Gross Value Added, employment, Gross Fixed Capital Formation, Capital Stock at country and a NUTS-2 level. The time span is 1995 to 2014. All variables are additionally disaggregated at 6 level sector: Agriculture; forestry and fishing; Manufacturing; Construction; Wholesale and retail commerce, transport, accommodation and food services, information and communication; financial and business services; non-market services. The main advantage of our dataset is to estimate the stock of capital by sector at a regional NUTS-2 level. In the explanation of the evolution of regional inequality in the European regions we will try to split down the evolution of differences in per capita income among regions in terms of differences in the participation in the labour market, differences in labour productivity, endowments of capital and multifactor productivity.

3.2. Descriptive analysis

In this section we present some basic statistics to describe the evolution of regional dynamics in the 173 European regions included in the sample. First we measure inequality using different indicators. Table 1 gathers up the coefficient of variation (CV); the population weighted coefficient of variation (WCV), the Gini Coefficient and the Theil Index for three sets of variables: the per capita Value Added (VA/POB), the Value Added by worker (VA/EMP) and the capital per worker (K/EMP) calculated for the 173 regions and for the 1995-2014 period.

[8] Duro and Esteban (1998), Amos (1988), Henning et al. (2011), among others.
[9] Lessman (2014), Lessman and Seidel (2017).

Table 1. Inequality in the European regions: several inequality index

	VA/POB				VA/EMP				K/EMP			
	CV	WCV (pop)	Gini	Theil	CV	WCV (pop)	Gini	Theil	CV	WCV (pop)	Gini	Theil
1995	0,296	0,302	0,124	0,032	0,198	0,195	0,106	0,020	0,252	0,208	0,124	0,032
1996	0,300	0,302			0,195	0,191			0,235	0,203		
1997	0,304	0,303			0,197	0,193			0,227	0,201		
1998	0,300	0,302			0,193	0,193			0,223	0,199		
1999	0,301	0,305			0,192	0,193			0,217	0,196		
2000	0,298	0,299	0,110	0,025	0,193	0,192	0,106	0,019	0,216	0,196	0,110	0,025
2001	0,289	0,293			0,187	0,187			0,212	0,194		
2002	0,287	0,290			0,190	0,188			0,212	0,196		
2003	0,283	0,285			0,192	0,189			0,211	0,198		
2004	0,283	0,282			0,198	0,192			0,210	0,199		
2005	0,284	0,282	0,109	0,023	0,201	0,194	0,110	0,021	0,209	0,198	0,109	0,023
2006	0,284	0,279			0,203	0,193			0,206	0,198		
2007	0,284	0,283			0,200	0,194			0,202	0,195		
2008	0,293	0,297			0,206	0,202			0,195	0,192		
2009	0,281	0,286			0,185	0,183			0,184	0,184		
2010	0,296	0,302	0,092	0,017	0,198	0,195	0,105	0,019	0,180	0,182	0,092	0,017
2011	0,302	0,309			0,196	0,193			0,177	0,179		
2012	0,310	0,317			0,198	0,194			0,173	0,175		
2013	0,315	0,322			0,198	0,192			0,172	0,175		
2014	0,312	0,320	0,088	0,015	0,195	0,190	0,104	0,019	0,174	0,179	0,088	0,015

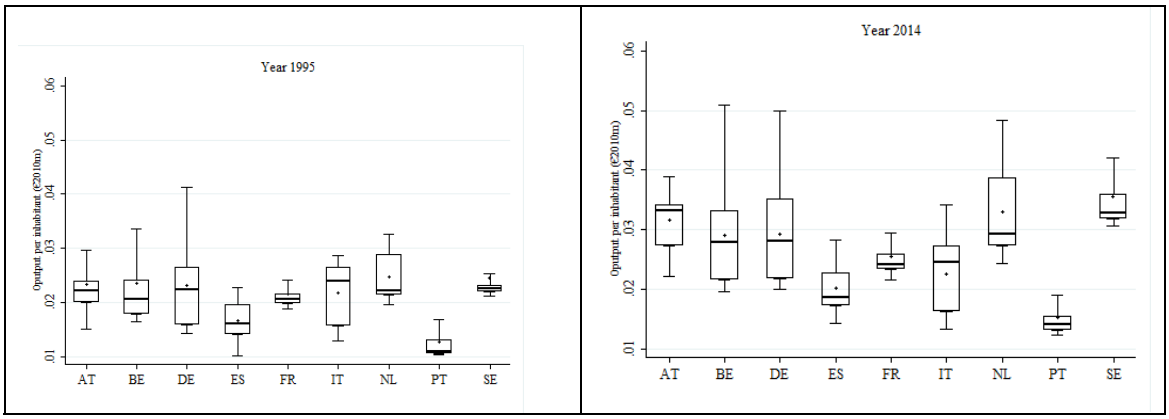
Source: Own elaboration. See the text for details on the dataset.

Table 1 compares all the European regions between them, without taking into account what happens within the country. For example, the average used to calculated the CV and the WCV is a populated weighted mean of the per capita income of all the European regions. The Gini coefficient compares each pair of countries within Europe.

In the aggregate comparison, only the per capita Value Added exhibits an increase in regional inequality between the start and the end of the period. And only the CV and the WCV show this upward trend. Inequality seems to decrease when the Gini or the Theil coefficients are considered. Simultaneously, regional dispersion in terms of labour productivity remains stationary for the whole period and capital per worker converge for the four coefficients analysed.

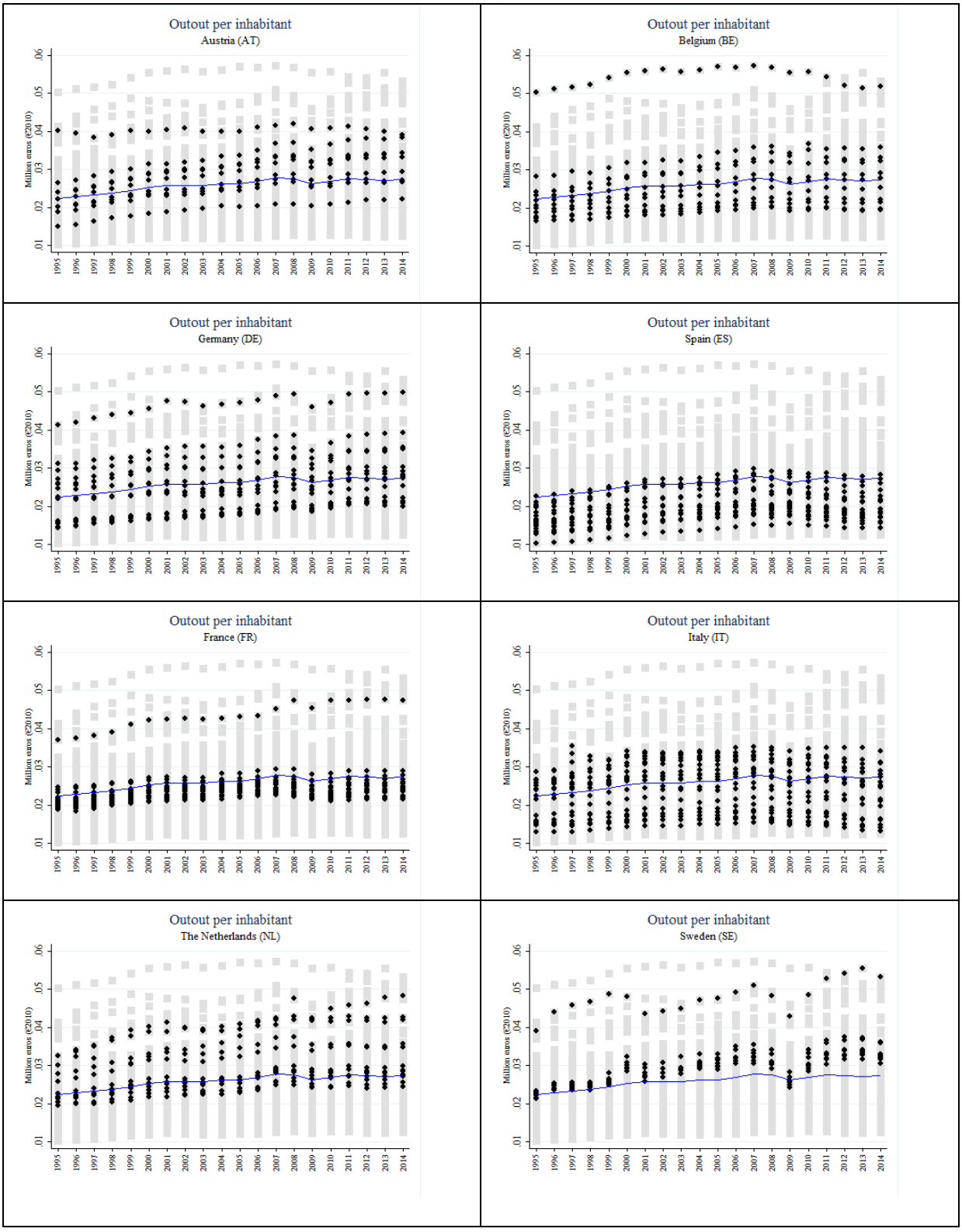
If instead of comparing the evolution of regional inequality for the whole sample, taking Europe as a unique area, one takes into account what has happened within each country the evolution of regional inequality presents a more defined picture. The box-plot diagram shows that per capita Value Added inequality, whose interquartile index is represented by the size of the boxes, has increased in most of the countries with the exception of Spain, Italy and Portugal.

Figure 1. Within country regional inequality in 1995 and 2004



Source: Own elaboration. See the text for details on the dataset.

Figure 2.


Outout per inhabitant
Austria (AT)
Outout per inhabitant
Belgium (BE)
Outout per inhabitant
Germany (DE)
Outout per inhabitant
Spain (ES)
Outout per inhabitant
France (FR)
Outout per inhabitant
Italy (IT)
Outout per inhabitant
The Netherlands (NL)
Outout per inhabitant
Sweden (SE)
Million euros (€2010)
.01
.02
.03
.04
.05
.06
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
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2008
2009
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2012
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2014

Figure 2 shows the regional per-capita VA in each country (dark-colored dots) compared to the average per-capita VA for Europe as a whole (solid line) for 1995-2014. The grey bars represent all the regions of the nine countries taken as a whole. It is possible to observe big differences between countries. Regions in each country could be compared with the average of the whole sample. In general, regions of the poorest countries used to be located below the European average. In Portugal all the regions are below the European average and in Spain only few regions used to be over the solid line (Madrid, Barcelona or the Basque Country). There is another set of countries with higher levels of inequality that have increased it throughout the period: Austria, the Netherlands, Sweden, France, Italy and Belgium. But perhaps the most outstanding fact represented in this figure is the presence of leader or outlier regions in the most developed countries: Île de France, Brussels in Belgium, Stockholm in Sweden and Hamburg in Germany. All these regions have increased their distance with regard to the average region of their respective countries and also with regard to the European average.

4. The model

Regional convergence can be attributed to changes in the size and structure of populations and productivity catch-up. Heterogeneities in the composition of populations could be relevant in our analysis. For example, if a given region *A* has more people working relative to its population than region *B* and labour productivities do not differ, then the former would be richer in per-capita terms. Therefore, following Duro & Esteban (1998) we decompose regional income inequality into factors: participation rates *PR* and labour productivity *LP*.

Therefore, to shed further light we will decompose the variation in labour productivity across regions following a methodology similar to that developed by Caselli and Tenreyro (2006). This method split down the variation in per capita income between two pairs of regions in terms of differences in labour productivity and changes in the

productive structure. In our study we will incorporate also relative changes in the stock of capital between regions. Furthermore, our benchmark for the comparison will not be the average income per capita of the entire sample, as Caselli and Teneyro (2006) do, but the richest regions following Enflo and Roses (2015).

This kind of shift-share analysis decomposes differences in labour productivity across regions in three or four major components. First, the *within-industry* component encapsulates the labour-productivity catch-up of each sector *j* with its equivalent in the leading regions. Second, the *labour reallocation term* measures the convergence resulting from labour flows across sectors. Third, the *capital reallocation term* measures the convergence resulting from capital flows. Fourth, the *between-industry*, which captures convergence between sectors within a region.

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