**The European Union’s centre-periphery problem revisited**

The present work sheds new light and offers evidence on the formation and sustaining of strong core-periphery imbalances at the EU, prior to the Covid-19 and the war crisis. After analysing several elements from the theory on core-periphery imbalances, it critically refers to several studies and EU policy documents that have been discussing some of the most significant causes forming regional inequalities and core-periphery patterns at the EU. A map depicting regional GDP per capita in PPPs for 2018 illustrates their presence and a Eurostat dataset with GDP per capita for 242 EU NUTS-2 measured in pps, is used to analyse their ranking, and calculate several regional inequality indexes. Two types of centres and peripheries appear to be formed: i) an EU centre extending from northern Italian to southern Swedish and Finnish regions, with two peripheries at eastern EU and southern Eurozone regions, and ii) centres in the regions of capitals in most EU states having a great GDP per head gap with their national peripheral regions, especially at the eastern EU and southern Eurozone periphery. This dual core-periphery pattern both at the national and EU scale reminds of a certain hierarchy of regions and a spatial pyramidic structure. Conclusions are reached with respect to the EU Cohesion Policy that fails to resolve these core-periphery imbalances.

1. **Centre-periphery imbalances: an affirmative conclusion from theory**

Regional economics, economic geography and planning studies have historically provided evidence and attempted to explain the formation and sustaining of centre-periphery relations and imbalances in space.

Location theory had extensively emphasized the causal factors of firm location that form towns, industrial spaces and various economic centres. Central place theory had suggested the formation of a hierarchy of towns, which were acting as centres for their surrounding space and were associated to each other by hierarchical relations (Christaller, 1933; Losch, 1954). Growth pole theory, initially proposed in France to highlight the over-concentration of development in Paris, had remarked that growth concentrates in poles that act as development centres to the detriment of their peripheries (Perroux, 1955; Boudeville, 1966). Myrdal (1957) had analysed the mechanism of cumulative and circular causation forming centres and peripheries, and discussed spread effects from centres and backwash effects in peripheries. Cumulative causation was analysed also for metropolitan regions in advanced countries (Pred, 1977) and acknowledged in the work of Hirschman (1958), who had emphasized spatially unbalanced growth, its significance, its problems and the side-effects and trickle-down effects of growth. Friedmann (1966) had suggested a four-stage core-periphery model of regional development, emphasizing that the core is a metropolitan area, while lagging peripheries are economically and socially subordinate. Similarly, Wallerstein (1974) had highlighted the formation of a center-periphery hierarchy.

The centre-periphery debate was also used to hold a proliferate critic against capitalism at a time when the lines between capitalism, communism and socialism were clearer. This critic was advanced by Prebisch (1950) (followed by Frank (1967)) who had underlined the formation of interstate relationships of dependency between centres and peripheries, by first overcoming the classic dichotomy between rich and poor. Harvey’s analysis on spatial accumulation of capital took also a structural and Marxist perspective against capitalism, while Boeke (1976) has suggested the formation of a certain dualism in economies and their societies in terms of internal organization, production and consumption patterns and social and political values.

All aspects of planning studies and the broader planning framework are affected by the development and sustaining of core-periphery relationships. The more intense is the development of centres, the more planning studies are required to provide solutions to protect towns and cities from intensive market forces harming their urban structure, zones and periphery. The organised development and expansion of cities and towns has been historically considered necessary and proposed to take place through zoning, coherent suburb or new town development and the appropriate land uses. It was realized that central spaces should form livable communities, with mixed land uses, where people could live and work, equipped with green spaces and sustainable environment of low noise and air pollution, without facing the dangers of flooding, pollution or other environmental and natural disasters and threats. Equally important has been considered the appropriate use of agricultural land in peripheral regions, along with the preservation of natural and physical resources.

Resource availability and use by states and regions had been stressed to affect different periods of their development (Perloff et al., 1960; Perloff and Wingo, 1975). Exporting resources, manufactured and other goods was suggested to progressively strengthen regional economies (North, 1955).

Spatial agglomeration and the factors contributing to regional imbalances were extensively examined in studies for Marshalian industrial districts, clusters, networks, at the Californian school of thought and the spatial specification of Williamson’s markets and hierarchies. The causes of spatial clustering were also highlighted in Porter’s theory on cluster competitiveness, national and regional. Developments from endogenous and new growth theory have emphasized that endogenous growth factors contribute to spatial agglomeration, such as human capital, technology, research, knowledge, learning and innovation. After the 1990s, the form of economic organization and especially monopolistic competition (grasped in endogenous growth models) had been considered to play a significant role in agglomeration, along with internal returns to scale, economies of localization and economies of urbanisation (see McCann, 2013).

Spatial concentration and the formation of centre-periphery patterns was re-emphasized through New Economic Geography and numerous models explored by Krugman (1991, 1998), and associated to ongoing economic integration in Europe and elsewhere. Krugman viewed the formation of a centre-periphery relationship as an outcome of monopolistic competition, increasing goods diversity and the interplay among centrifugal and centripetal forces. The latter are market size effects, labour market thickness and pure external economies, acting against centrifugal forces, such as immobile factors, land rents and pure external diseconomies.

1. **From theory to evidence: EU centres, peripheries and regional disparities**

Despite expectations from neoclassical theory and policies for the development of less advanced regions, *beta convergence* between less and more advanced regions was not confirmedand *sigma convergence (*that refers to the reduction of spread of income differences between the rich and poor) not traced in many analyses across EU nations or regions. Failure to predict national or regional convergence through endogenous growth models has brought an acknowledgment (first by Baumol, 1986) that multiple equilibria may exist and that states (or regions respectively) may cluster together in certain distinct clusters or clubs. Club convergence fails to grasp if poorer states (or regions) will manage to grow at a faster pace from richer. There may be little, no convergence or even divergence among clubs of regions, leading to core-periphery patterns among clubs and among their constituent regions or nations. As Galor (1996) has explained, club convergence is associated to polarization, persistent poverty and clustering and it takes place when states (or regions) with identical structural characteristics and similar initial conditions converge in per capita income in the long-run. In absolute convergence states (or regions) converge in per capita incomes in the long-run irrespective of their initial conditions and in conditional convergence states (or regions) with identical structural characteristics -not just in technology or preferences but also in population growth, savings and applied government policies- converge in per capital income, irrespective of their initial conditions (see Galor, 1996).

Significant evidence has now been accumulated on the formation or sustaining of clubs of EU regions with dissimilar and discernible features (Cutrini, 2019; Corrado et al., 2005; Siano and D’ Uva, 2006; Bartwkowska and Riedl, 2012; Simionescu, 2015; Fiaschi et al., 2018; Iammarrino et al., 2017). Similar findings emphasise club convergence at EU state or Eurozone level (e.g. Borsi and Metiu, 2013; Cavallaro and Villani, 2021).

Different methodological approaches have been used in club convergence studies to trace regional clubs. Most of them emphasize the use of econometrics, with a preference for the Phillips and Sul (2007) log t test. In most cases, GDP per capita was used to identify clusters, measured either in purchasing power parities or not, and the geographical scale selected was the NUTS-2 regional, for the various time periods studied. Several explanatory factors for club formation have also been tested. Most of them use maps to illustrate their findings but Iammarino et al. (2017) in particular have used maps as a tool to differentiate among the four clubs they have identified. Their study uses pc GDP data for NUTS 2 regions, for the 2001-2014 period and suggests the presence of four clubs: those very high income regions or capital city-regions, and several additional regions highly urbanized, specialized in the production of high-quality goods and services; those high-income regions that are less metropolitan or city-centred and less dynamic demographically; those medium-income club regions that comprise most regions in northern Europe that do not belong in the former two clubs; and finally those low-income regions that represent a large part of the eastern and southern EU periphery.

Another method to distinguish EU regions is by using pc GDP measured in purchasing power parities, which has now the case for official EU Cohesion Policy. The 7th Economic and Social Report has distinguished in less developed regions as those falling below 75% of EU-27 average pc GDP measured in pps, regions in transition between 75% and 90%, and developed regions above 90%. According to the Report, a distinct club of regions in the latter category are developed capital city-regions, mostly composed of functional areas of national capitals. The most developed regions contained a major city, capital or not of a nation-state, and their development was due to agglomeration economies, bigger labour markets that matched better the skills needed, specialized services and suppliers, higher returns from infrastructure and ICT technology, and more innovation and knowledge diffusion because of firm proximity (EC, 2017b). Regions with GDP per head close to EU average are found at a “middle-trap”. They have a manufacturing tissue smaller and weaker against other regions, high costs against their competitors and regional innovation systems incapable to compete against the most advanced (EC, 2017b).

Growing evidence is provided on EU core-periphery imbalances (EC, 2017a; Pascariu and Duarte, 2017; Gӧrmar et al., 2019; Caraveli, 2017). An EU core has been extensively discussed to be present and to take the shape of a “blue banana” or a “Pentagon” (before Brexit), for the area delimitated by London, Paris, Hamburg, Munich and Milan.Almost twenty years ago, the ESPON project had recommended the development of zones of economic global integration beyond this “Pentagon”, built upon their functional specialization (Nordregio, 2005).

On the other hand, two large peripheries appear to have been formed at the EU space. A southern periphery, comprising at minimum the whole of Greece, regions of southern Italy, and significant regional parts of Portugal and Spain (EC, 2017a; Pascariu and Duarte, 2017); and an eastern EU periphery, composed of the vast majority of regions from most eastern EU member-states joining the EU through the major 2004 eastern enlargement or after.

Produced almost a decade after the first Eurozone crisis, the “Lagging Regions Report” underlined that EU lagging regions (i.e. those where pc GDP fell significantly below EU average) were located at the southern and eastern EU periphery. The former comprised low-growth regions and the latter low-income regions. These were home to one sixth of EU citizens[[1]](#footnote-1) (EC, 2017a).

The causes of regional inequalities have increased in Eurozone’s regions after the launch of Euro. The EU states have shared their currency without having created in advance all other preconditions needed for the appropriate operation of the monetary union, the transmission mechanism of monetary decisions and without avoiding their side-effects. Macroeconomic coordination in Eurozone was advanced only after the great crisis in 2009, despite early claims for its significance in pursuing common development paths and stability. Neither Eurozone member-states have placed in action stability mechanisms that would have protected national and regional economies from lagging behind. Setting in place automatic stabilizers at the Eurozone was necessary to guarantee, due to the loss of the national currency exchange mechanism as a principal way to automatically stabilize national and regional economies. The implementation of a Banking Union, a Capital Markets Union and Common Fiscal Policy arrived after the crisis, with the latter is still debated. The carefully and progressively built unification edifice that was based on economic theory left unattended significant components (see Ikonomou, 2020).

Euro’s exchange and interest rates have acted to the detriment of specific peripheral Euroarea regions, as opposed to other Eurozone or EU regions benefiting from free trade opportunities. Since in the early implementation phase of the Eurozone, regional production structures differed, exposure to asymmetric shocks and the external currency fluctuation would have had dissimilar impact across regions in different states, with dissimilarly felt job losses, to the expense of more vulnerable regions (Fingleton, 2005; Martin, 2001).

Dissimilar inflation rates at the same currency zone would naturally affect regional disparities. Despite the early highlighting of this problem (see Fingleton, 2005; Martin, 2001), the EU authorities assumed they are the same, for example in their decisions for EU Cohesion funding allocation. Taking prices into account remains a difficult task until today, since regional prices and inflation rates remain unpublished for most states. Inflation is bound to differ for numerous reasons, related to social, institutional and structural differences exercising cost-push pressures, especially after abrupt demand changes or shocks, such as energy shocks, financial crises or a war. The strengthening of peripheries and other vulnerable regions through strong compensating mechanisms, and their manufacturing growth were discussed to bring long-term spillover effects in centres (Fingleton, 2005).

The significant institutional and policy development at the currency zone after the 2009 crisis evidences that a monetary union formed on Mundell’s optimum currency area theory only has weakened some of its part and regions. Besides, two homogeneity conditions were missing early from the start: economic openness among constituent member-states and the similar degrees of structural diversification (emphasized by McKinnon (1963) and Kenen (1969)), both suggested to reduce the strength of regional imbalances (see Martin, 2001).

Despite these missing, significant operational and functional EMU components, official EU authorities have welcomed the grouping of all cases of lagging regions at the “Lagging Regions Report” in homogenous groups in terms of their features and problems encountered (EC, 2017a). Regions were considered as lagging, irrespective of their development origin and efforts taken over the decades, the integration period they have been following, their prior communist background or the extent of their engagement in the learning processes of operating regional development programs. Lagging regions were all considered as influenced by their macroeconomic environment, despite their dissimilar macroeconomic problems. They were considered to have lower productivity, educational attainment and employment rates in comparison to national average (EC, 2017a). Their underdeveloped regional innovation systems, significant problems in transferring innovation to production, a skills gap and poor institutional quality undermined their growth potential; their citizens had to spend more time to deal with judiciary systems and local and regional administration authorities. The main distinction made in the Lagging Regions Report was between low-growth and low-income regions (up to 90% and 50% of pc GDP in pps, respectively), located at the southern and eastern periphery respectively (EC, 2017a). In low-growth regions, stagnating productivity and rising labour costs were considered to bring reduced export shares. Higher public and private debt levels in their countries were combined with limited size and availability of bank loans and, as a result, restricted regional investments and growth rates. The real estate sector, along with EU Cohesion policy, have played a leading role in driving regional investment. Growth potential was limited in low-income regions by significant population losses, and out-migration of the young and more educated (EC, 2017a). This Report seems to ignore historical phases of development in southern EU states.

As Simonazzi and Ginzburg (2015) have highlighted, the southern EU periphery has been deindustrialised since the 1970s and throughout its progressive EU integration. Its falling use of protective instruments and policies has had an impact upon its regional development, hitherto protected in closed national borders. The state was also prevented from investing in industrial growth (Simonazzi and Ginzburg, 2015). The industrial base of Euroarea member-states was weakened after the launch of Euro, when successful industrial policies during the 1990 were replaced by strategies, based on broadly conceived, if not contestable, competitiveness theory (see Kitson et al., 2004).

Iammarino et al. (2017) distinguished their identified club of lower-income regions in “slow-growing” and “ageing and declining”. They argued that the former come from southern Europe, the Italian Mezzogiorno, and less developed regions in Greece, Spain and Portugal, all considered to have poor quality government, corruption, lack of trust and assets shortage. The latter come from northern Italy, northern Spain and French declining areas, characterized by good-quality government, skills mismatch, degraded amenity and residential conditions, deepening social problems and despair for their long-term declining (Iammarino et al., 2017).

The EU lagging regions have not reached their status by following the same or similar processes. Greece for instance, and her regions, underwent through a severe crisis, even worse than the 1929 crisis in USA in terms of duration and real GDP contraction, which lasted at least up to 2016 and brought prolonged unemployment levels exceeding 25%(Ikonomou, 2018). Exercised policies of severe austerity by her Eurozone and IMF partners, aiming to adjust her macroeconomic accounts, external imbalance and unsustainable debt, have managed to resolve her long-term macroeconomic problems and unbalancing (IMF, 2018) but had not strengthened her economy nor advanced regional growth and development. Furthermore, measuring per capital GDP does not grasp Greece’s significant losses of labour through her historically extended outflow of immigrants and brain drain (see Lambrianidis and Pratsinakis, 2017). This crisis is still prolonged by the pandemic and the war in Ukraine. All these particular conditions place Greece as an exceptional case of EU peripheries. Being located at the intersection between the two peripheries, Greece and her regions can be viewed as forming an ultra-periphery.

An important policy lesson from the Greek case is that state-level policies for macroeconomic adjustment and the macroeconomic framework proposed and largely imposed by Eurozone over the last decade has superseded any other growth influence exercised by EU Cohesion Policies upon Greek regions. Given the time lag in the planning horizon of EU Cohesion Policy, Eurozone’s macroeconomic framework emerged as the most significant factor influencing Greek lagging regions. In this respect, the Greek case highlights two separate points: a) lagging Euroarea regions are likely to be those failing to benefit from common monetary policies and other macroeconomic conditions imposed, despite national economic policies, and b) the geographical scale of application of macroeconomic policies at state and Eurozone level turns to be more significant and to influence the subnational local or regional scale, where EU Cohesion Policy is conducted, operationalized and funded. These important conclusions may similarly hold for non-lagging regions, including over-performing regions that belong to those Eurozone member-states benefiting mostly from common monetary and macroeconomic policies.

In the eastern EU periphery, another picture emerges. Regional development is spatially unbalanced and polarised, with metropolitan regions and few dynamic centres benefiting mostly from national and EU Cohesion policies, while most regions remain structurally weak, declining or stagnating, especially in rural areas and eastern borders (Smetkowski, 2013; Lukomska, 2018). Highly educated professionals and successful entrepreneurs are located in metropolitan regions, while peripheries suffer from structural unemployment, rural depopulation, brain drain, persistent poverty, social exclusion and below average social well-being (Smetkowski, 2013). In Poland, deindustrialization of a single-industry economic structure has brought the decline of several cities and changes at the hierarchy of Polish cities (Lukomska, 2018). During economic integration at the EU, eastern capitals such as Warsaw, Prague, Bratislava, Budapest and Bucharest, have emerged as EU-wide centres and growth poles. Given that the guidance of the 2001 Sapir Report to improve EMU macroeconomic framework and restrict EU Cohesion Policy to low-income countries -mostly eastern- was neglected, the convergence and restructuring of eastern EU regions has been decisive for the rise of EU regional inequalities and core-periphery patterns (Sapir, 2014).

In contradiction to the weakening of Eurozone peripheries, the post-crisis strengthening of German economy, where a great part of the EU economic centre is found, can be explained by both domestic and external to Germany factors and their association to Eurozone policies. As Simonazzi and Ginzburg (2013) explain, on the one hand lie the virtuous savings behaviour of Germany, wage containment across German regions, specific labour market amendments in the 2000s, the relocation of production plants away from German regions, along with an intermediate-inputs intensive economy targeting low-cost competitiveness. On the other hand lie the rise of borrowing in peripheries due to reductions in borrowing costs after the Euro was launched, debt accumulation and various booms formed in their markets. The German economic recovery, national and regional, was achieved not only through stagnant wages, weak internal demand and falling external demand for German products to the EU South but also through strengthening her exports to eastern EU markets and forming supply chains with them (Simonazzi and Ginzburg, 2013).The Italian industrial districts had also benefited from eastern EU markets after the 2009 crisis, without having “tightly organised value-added chains” nor a “country system” support (Simonazzi and Ginzburg, 2013; p. 672). As pertained in export-base theory, advanced growth and development opportunities emerged in regions managing to export in markets offering external demand for their goods and services. These are the markets receiving abundant EU Cohesion funds.

The rest of EU central regions had benefited from their interregional linkages with German regions and spread effects exercised on them. The analysis by Simonazzi and Ginzburg (2013), considered as structural by Grabner and Jakob (2020), reminds a typical, regional macroeconomic-keynesian analysis: when regional savings are higher than regional investments, regional exports will be higher than regional imports. A surplus in regional imports requires an excess of regional investment over regional savings (see Richardson, 1969; p. 263). From this viewpoint, the German economy and her regions combined a policy of sufficiently high regional savings without public spending, by exporting in import-oriented EU southern, and more recently, EU eastern regional economies, where abundant EU Cohesion fund investments are directed. Taken from a standard balance of payments analysis perspective, while the German economy has improved price competitiveness by containing wages, southern EU peripheries were forced to lower their salaries and wages rather unsuccessfully (Simonazzi and Ginsburg, 2013).

Peripheral economies become dependent on global production networks (Grabner and Hafele, 2020). In Eurozone peripheries, development was hampered by internal demand restrictions through the early Stability Pact and the fiscal policy held after the 2009 crisis, which was not assigned the role to actively promote investments nor to expand their limited productive base (Simonazzi and Ginsburg, 2013). Peripheral countries and regions were found unprepared for intra-European competition due to their lower productivity, smaller firm sizes, difficulties to exploit economies of scale, lower innovativeness and less linkages with other industries and related services (Simonazzi and Ginsburg, 2013). Somehow, an unequal exchange took place in the EU periphery, which exchanged agricultural with industrial goods from EU centres. Import substitution of goods also took place for German -and other EU central- regions, from EU southern to low-cost EU eastern products (Grabner and Hafele, 2020). What is more, the EU Cohesion Policy has become conditional on macroeconomic, structural and fiscal reforms imposing the loss of national policy autonomy for designing and implementing growth agendas.

Hence, the EU Cohesion Policy has played an energetic role in dividing the EU space in centres and peripheries. It helped to redistribute growth opportunities in favour of regions systematically benefiting from exports in EU Cohesion places with abundant funds, while other regions had failed to advance exports and were primarily based on imports and internal demand. A hopeful sign though is that Italian regions too have benefited along with the German, giving rise to a non-national, EU interregional model of growth, transmitted mostly inside the currency zone (if not more generally at the EU).

The unification process has expanded the tendency of German and other EU central regions to grow through human capital attraction and immigration from southern and eastern EU or even outside EU borders. This trend was enhanced by high unemployment in southern Eurozone, contagion of the financial crisis, removal of barriers in EU labour markets, transportation and other infrastructure improvements that increased labour mobility, and regional endogenous growth policies applied through EU Cohesion Policy, aiming to strengthen human capital in less advanced regions. In metropolitan and bigger regions, higher wages attract workers but divergence processes may take place among them. Urban wage premium is higher in bigger cities, where human force is more productive and better educated, and the concentration of knowledge intensive services and high technology manufacturing increases (Ehrlich and Overman, 2020). 64% of the EU-15 population in 2015 were living in 226 metro regions (at NUTS 3 level), where only 32 had regional GDP per head below 75% of the EU average (ibid, 2020). Evidence for rising disparities between metropolitan regions was also found (ibid, 2020).

The development of an EU metropolitan area and centre cannot take place without effects. Urban sprawl takes places in large EU parts, gradually declining from central to peripheral countries (EEA, 2016; 57). Metropolitan development, the resulting urban sprawl and the strengthening of core-periphery relationships naturally affect all planning aspects, bringing previously unidentified planning consequences and needs.

The list of factors causing EU regional inequalities and core-periphery patterns is quite extended. It comprises deindustrialisation, globalization, over-financialization, eastern EU enlargement and the legacy of former systems of economic organization, geographical remoteness, the availability of human, financial and other resources and intra-European competition (EPRS, 2019; p.4; Grabner and Hafele, 2020). Southern EU regional economies were hit by deindustrialisation after the 1980s, and rising global and EU competition after the opening of EU borders towards their northern partners. The latter had benefited faster and better from enhanced accessibility to EU southern markets during earlier integration stages (Grabner and Hafele, 2020; Simonazzi and Ginzburg 2013). Following the financial crisis, German and other EU manufacturing plants took advantage of cheaper human capital available at the eastern periphery that either migrated in Germany and other central areas or worked remotely. A relationship, described as “reverse maquiladores”, has been formed between German (and Austrian) firms and firms in eastern European peripheral regions; the former have created plants producing goods and services in the latter, benefiting from cheaper labour and high-skilled IT and other innovation services, low production and transport costs, and access to EU markets (Marin, 2010)[[2]](#footnote-2). This outsourcing was mutually beneficial but brought job losses for Germany and further containment of German salaries (Marin, 2010). It has left unnoticed and sustained the gap between skilled and unskilled workforce in German economy, where further job creation in transportation and imports of goods sector has brought a significant new job surplus (ibid, 2010). The growth of services and their clustering in eastern EU economic and financial centres may be due not only to their more equipment with human capital and other endogenous resources but also to the attraction of national human resources from their own peripheries, which narrows down regional development paths and strategies in the latter.

Eastern EU countries have managed also to penetrate in global value chains formed by exporting high and medium-high tech fabrication products, such as in machinery, transport and electrical equipment (Pellenyi, 2020). Ιnterlinking production and supply chains between German and other eastern EU regions, to satisfy demand in the former was mutually beneficial for regions involved and hard to bypass, as it serves the aim of economic integration, even if it impedes balanced spatial development and postpones alternative development priorities in less advanced regions. Regional demand creates its own supply but regional supply creates its own demand too.

The EU centre formation and sustaining relates to German economic transformation since the 1990s. The German unification added new regions of lower income and poorer life conditions, part of a command economy for decades that were facing backwardness, lower productivity and economic adjustment problems. Their integration and sharing of German currency have enhanced German interregional competition. Salaries in eastern German regions have risen along with unemployment, causing economic and social tensions (see Britannica, 2022). These tensions and problems culminated at significant labour market reforms, similar to those in Anglo-saxon states and USA, which enhanced labour market flexibility and targeted at the lower-end wage scale (Simonazzi and Ginsburg, 2013)[[3]](#footnote-3). As a result, German industry propelled across regions, the German market expanded but the divide between wealthy and poor has widened. Improved cost competitiveness through wage restraints helped German products to penetrate in international markets and emerging economies, such as China, India or eastern EU, where her export shares, especially for capital goods, expanded (Simonazzi and Ginsburg, 2013). The German industry invested in offshore companies producing products and parts by using intermediate goods first imported to Germany and then exported as intermediate or finished goods, substantially rising its trade and surpluses, national and regional (see Simonazzi and Ginsburg, 2013). Cluster competitiveness policies emphasized nationally and regionally since the mid-2000s have helped post-crisis economic recovery and the organization of its selling and market networks. Export-led growth spillovers were formed or enhanced with central and eastern European countries, central EU regional economies and fewer southern Eurozone partners, mostly viewed as holiday destinations (ibid, 2013). On the contrary, growth in southern EU countries was impeded by their labour market rigidities, the continuous imports from Germany and the lack of new avenues for their exports that led them to deficits (ibid, 2013).

In conclusion, the domestic spatial divide after the German unification resulted at the adjustment of German economy, whose regions benefited much more than most other EU regions, better envisaging low-cost competition from the East. The existing divide is however twofold. It is a spatial, interregional and one separating the wealthy from the poor, being further aggravated by immigration after the eastern EU enlargement. Unavoidably, this twofold divide should play a role in forming political views at the German society that has been historically skeptical in most decisions concerning wealth distribution and other decisions benefiting Eurozone’s periphery. By remembering Hirschman’s analysis for states, it is expected that, located either in less advanced or in advanced regions, German low-incomers would espouse the German model of economic restructuring and recommend its replication across Eurozone peripheries, believing that lagging regions were left behind due to their inferiority and values shared by their citizens. A socio-spatial conflict was raised in economic integration process (or even its mental construction) between German local low-incomers (and possibly in other EU central regions) and EU citizens in most lagging regions. One could describe it as an internal German spatial and social versus external spatial conflict of integration.

Taking all the above into account, we expectat least two types of peripheries and two types of centres at the EU: two large peripheries at the southern and eastern EU, an EU centre extending from northern Italian regions to southern Swedish and Finnish regions, and several centres in most nation-states that oppose to their national peripheries. An ultra-periphery may be formed in the Greek or transatlantic regions.

1. **Evidence**

Taking into account prices is important in comparisons of regional pc GDP among EU regions, even if this has not happened in other works explaining the formation of clubs or regional inequalities (e.g. in Iammarino et al. (2017)). Prices influence the perception and understanding of citizens on their own per capita income. When prices and the cost of life are higher, per capita income becomes less significant. It is no coincidence that the EU has started to use purchasing power parities for the allocation of EU Cohesion funds[[4]](#footnote-4).

In **Map 1**, regional pc GDP, measured in PPPs (EU=100) was used to distinguish regions in five clubs at an official newsletter released by Eurostat. This map shows that an EU-wide centre exists that comprises NUTS-2 regions from northern Italy, Germany, Austria, Belgium, Luxembourg, Netherlands, Denmark and southern Sweden. In these states, NUTS-2 regions represent the greatest proportion of all NUTS 2 regions above 100% of EU average. One could add to this group the western Slovenia region. Another type of region belonging at the group with the highest pc GDP in PPPs (i.e. above 128% of EU) also appears at the map. These are the capitals of Ireland, France, Finland, Poland, Hungary, Slovakia, Romania and Czech Republic. Such core-periphery patterns in favour of the region of the capital city exist also in Spain, Slovenia, Lithuania, Romania, Hungary, Bulgaria and Greece, even if the levels of pc GDP fall below the group of regions with highest pc GDP.

**Map 1:** pc GDP in EU regions, 2018, in PPS (EU=100)

**Source:** Eurostat (2018)

**Table** **1** provides pc GDP for 242 EU NUTS-2 regions, measured in pps. 31 regions had pc GDP levels above 40,000 in 2018 (depicted in **Table 2**). Most of them had pc GDP above or close to 30,000 a decade ago, in 2009. Some regions had significantly expanded their pc GDP, for example the Romanian capital of Bucuresti-Ilfov where it changed from 28,000 to 45,300 and similarly the German region of Tubigen, from 28,900 to 40,600. Among these 31 top performers lie nine German regions (ten, if Koln is included that reaches 39,900), four Austrian, Luxembourg, two out the three Irish regions, two Belgian and the EU capitals of the Czech Republic (Praha), France (Ile de France), Belgium (Bruxelles), Netherlands (Noord Holland), Denmark (Hovedstaden), Slovakia (Bratislavsky kraj), Sweden (Stockholm), Poland (Warszawski stoleczny), Austria (Wien), Romania (Bucuresti-Ilvof), Finland (Helsinki – Uusimaa) and Hungary (Budapest).

**Table 1:** Regional pc GDP for 242 EU NUTS-2 regions, measured in pps

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NUTS 2** | **2018** | **2009** | **NUTS 2** | **2018** | **2009** | **NUTS 2** | **2018** | **2009** |
| **Luxembourg (LU)** | 79,200 | 65,500 | **Groningen (NL)** | 36,800 | 37,700 | **Koblenz (DE)** | 31,000\* | 23,100 |
| **Southern (IR)** | 70,900 | 29,700 | **Niederbayern (DE)** | 36,300\* | 26,600 | **Münster (DE)** | 30,900\* | 24,300 |
| **Praha (CZ)** | 62,300 | 46,400 | **Grad Zagreb (HR)** | 36,200\* | 27,000 | **Área Metropolitana**  **de Lisboa (PT)** | 30,800 | 28,600 |
| **Région de Bruxelles-Capitale (BE)** | 61,600 | 54,200 | **Emilia-Romagna (IT)** | 36,000 | 30,500 | **Malta (MT)** | 30,800 | 20,100 |
| **Eastern and Midland (IR)** | 60,700 | 36,600 | **Freiburg (DE)** | 35,700\* | 26,700 | **Schleswig-Holstein (DE)** | 30,300\* | 23,700 |
| **Hamburg (DE)** | 59,700\* | 49,900 | **Sostines regionas (LT)** | 35,700 | 20,200 | **Leipzig (DE)** | 30,200\* | 22,100 |
| **Oberbayern (DE)** | 54,200\* | 40,400 | **Hannover (DE)** | 35,600\* | 27,800 | **Aragón (ES)** | 30,100 | 26,200 |
| **Île de France (FR)** | 53,300 | 42,500 | **País Vasco (ES)** | 35,500 | 30,800 | **Illes Balears (ES)** | 29,900 | 25,800 |
| **Noord-Holland (NL)** | 51,900 | 41,700 | **Oberfranken (DE)** | 35,500\* | 25,500 | **Etelä-Suomi (FIN)** | 29,900 | 25,100 |
| **Hovedstaden (DK)** | 50,600 | 37,400 | **Midtjylland (DK)** | 35,400 | 28,300 | **Länsi-Suomi (FIN)** | 29,700 | 25,600 |
| **Bratislavský kraj (SK)** | 50,300 | 43,500 | **Västsverige (SE)** | 35,300 | 29,000 | **La Rioja (ES)** | 29,500 | 25,900 |
| **Stockholm (SE)** | 49,900 | 44,100 | **Detmold (DE)** | 35,300\* | 26,500 | **Provence-Alpes-Côte d'Azur (ES)** | 29,300 | 24,500 |
| **Stuttgart (DE)** | 49,500\* | 34,500 | **Åland (FI)** | 34,900 | 35,200 | **Norra Mellansverige (SE)** | 29,300 | 24,100 |
| **Utrecht (NL)** | 48,300 | 43,000 | **Steiermark (AT)** | 34,800 | 27,200 | **Flevoland (NL)** | 29,200 | 25,300 |
| **Darmstadt (DE)** | 47,600\* | 39,500 | **Övre Norrland (SE)** | 34,700 | 26,800 | **Alsace (FR)** | 29,200 | 25,000 |
| **Provincia Autonoma di Bolzano/Bozen (IT)** | 47,100 | 38,000 | **Limburg (NL)** | 34,600 | 27,500 | **Prov. Limburg (BE)** | 29,100 | 22,700 |
| **Warszawski stoleczny (PL)** | 46,900 | 31,200 | **Rheinhessen-Pfalz (DE)** | 34,600\* | 26,600 | **Dresden (DE)** | 28,900\* | 21,100 |
| **Salzburg (AT)** | 45,900 | 35,400 | **Syddanmark (DK)** | 34,500 | 27,400 | **Midi-Pyrénées (FR)** | 28,700 | 23,300 |
| **Wien (AT)** | 45,500 | 40,500 | **Prov. West-Vlaanderen (BE)** | 34,500 | 26,800 | **Trier (DE)** | 28,100\* | 21,600 |
| **Bucuresti – Ilfov (RO)** | 45,300 | 28,000\*\* | **Lazio (IT)** | 34,400 | 33,100 | **Pohjois- ja Itä-Suomi (FIN)** | 28,000 | 22,500 |
| **Braunschweig (DE)** | 45,100\* | 29,900 | **Kassel (DE)** | 33,700\* | 26,000 | **Pays-de-la-Loire (FR)** | 27,700 | 23,300 |
| **Bremen (DE)** | 44,500\* | 35,500 | **Comunidad Foral de Navarra (ES)** | 33,300 | 29,800 | **Marche (IT)** | 27,600 | 24,900 |
| **Prov. Brabant wallon (BE)** | 44,200 | 30,500 | **Saarland (DE)** | 33,300\* | 26,200 | **Aquitaine (FR)** | 27,600 | 23,300 |
| **Helsinki-Uusimaa (FI)** | 43,800 | 39,300 | **Veneto (IT)** | 33,200 | 28,300 | **Kypros (CY)** | 27,500 | 25,600 |
| **Budapest (HU)** | 43,800 | 35,500 | **Gelderland (NL)** | 33,000 | 28,300 | **Attiki (EL)** | 27,400 | 31,100 |
| **Vorarlberg (AT)** | 43,600 | 31,900 | **Kärnten (AT)** | 33,000 | 25,900 | **Burgenland (AT)** | 27,100 | 20,400 |
| **Mittelfranken (DE)** | 42,000\* | 31,000 | **Overijssel (NL)** | 32,900 | 27,900 | **Friesland (NL)** | 27,000 | 23,800 |
| **Prov. Antwerpen (BE)** | 41,900 | 33,200 | **Cataluña (ES)** | 32,700 | 28,200 | **Drenthe (NL)** | 26,900 | 24,500 |
| **Karlsruhe (DE)** | 41,200\* | 32,100 | **Nordjylland (DK)** | 32,600 | 26,500 | **Sjælland (DK)** | 26,800 | 20,800 |
| **Tirol (AT)** | 41,000 | 32,000 | **Prov. Oost-Vlaanderen (BE)** | 32,600 | 25,700 | **Brandenburg (DE)** | 26,800\* | 20,100 |
| **Tübingen (DE)** | 40,600\* | 28,900 | **Weser-Ems (DE)** | 32,500\* | 24,400 | **Thüringen (DE)** | 26,700\* | 18,900 |
| **Köln (DE)** | 39,900\* | 31,200 | **Arnsberg (DE)** | 32,400\* | 24,900 | **Champagne-Ardenne (FR)** | 26,500 | 22,900 |
| **Noord-Brabant (NL)** | 39,800 | 32,300 | **Niederösterreich (AT)** | 32,000 | 25,200 | **Bretagne (FR)** | 26,400 | 21,900 |
| **Oberösterreich (AT)** | 39,700 | 30,500 | **Liguria (IT)** | 31,900 | 28,500 | **Chemnitz (DE)** | 26,400\* | 19,100 |
| **Oberpfalz (DE)** | 39,300\* | 27,900 | **Gießen (DE)** | 31,900\* | 24,700 | **Haute-Normandie (FR)** | 26,300 | 23,200 |
| **Lombardia (IT)** | 39,200 | 33,900 | **Friuli-Venezia Giulia (IT)** | 31,700 | 26,900 | **Algarve (PT)** | 26,300 | 20,400 |
| **Prov. Vlaams-Brabant (BE)** | 38,700 | 30,700 | **Zahodna Slovenija (SI)** | 31,700 | 25,200 | **Umbria (ES)** | 26,100 | 24,200 |
| **Düsseldorf (DE)** | 38,600\* | 31,800 | **Rhône-Alpes (FR)** | 31,600 | 26,300 | **Castilla y León (ES)** | 26,100 | 22,600 |
| **Zuid-Holland (NL)** | 38,300 | 35,300 | **Toscana (IT)** | 31,500 | 27,600 | **Bourgogne (FR)** | 26,000 | 22,500 |
| **Provincia Autonoma di Trento (IT)** | 38,300 | 33,800 | **Piemonte (IT)** | 31,500 | 26,700 | **Sachsen-Anhalt (DE)** | 25,900\* | 19,300 |
| **Valle d'Aosta/Vallée d'Aoste (IT)** | 38,100 | 35,000 | **Zeeland (NL)** | 31,400 | 25,300 | **Lüneburg (DE)** | 25,900\* | 19,200 |
| **Berlin (DE)** | 38,100\* | 28,200 | **Östra Mellansverige (SE)** | 31,300 | 25,900 | **Centre - Val de Loire (FR)** | 25,800 | 22,300 |
| **Unterfranken (DE)** | 37,700\* | 27,700 | **Småland med öarna (SE)** | 31,200 | 25,400 | **Nord-Pas-de-Calais (FR)** | 25,500 | 21,500 |
| **Comunidad de Madrid (ES)** | 37,600 | 32,800 | **Mellersta Norrland (SE)** | 31,100 | 27,500 | **Cantabria (ES)** | 25,400 | 22,900 |
| **Schwaben (DE)** | 37,000\* | 27,400 | **Sydsverige (SE)** | 31,100 | 26,200 | **Mecklenburg-Vorpommern (DE)** | 25,400\* | 19,200 |
| **Prov. Liège (BE)** | 25,300 | 20,900 | **Centro (PT)** | 20,500 | 16,800 | **Dytiki Ellada (EL)** | 14,500 | 16,900 |
| **Abruzzo (IT)** | 25,200 | 22,100 | **Guadeloupe (FR)** | 20,400 | 17,400 | **Lubelskie (PL)** | 14,500 | 9,900 |
| **Poitou-Charentes (FR)** | 25,200 | 21,000 | **Vest (RO)** | 20,400 | 13,200\*\* | **Ipeiros (EL)** | 14,100 | 15,600 |
| **Yugozapaden (BG)** | 25,200 | 17,700 | **Extremadura (ES)** | 20,200 | 17,100 | **Guyane (FR)** | 13,900 | 12,500 |
| **Jihovýchod (CZ)** | 25,100 | 18,700 | **Norte (ES)** | 20,200 | 16,000 | **Észak-Alföld (HU)** | 13,900 | 9,900 |
| **Auvergne (FR)** | 24,900 | 20,700 | **Vidurio ir vakaru Lietuvos regionas (LT)** | 20,200 | 11,400 | **Anatoliki Makedonia, Thraki (EL)** | 13,800 | 16,400 |
| **Galicia (ES)** | 24,800 | 21,400 | **Közép-Dunántúl (HU)** | 20,100 | 13,200 | **Voreio Aigaio (EL)** | 13,700 | 18,200 |
| **Corse (FR)** | 24,700 | 21,300 | **Ciudad de Melilla (ES)** | 20,000 | 19,700 | **Yugoiztochen (BG)** | 12,800 | 8,800 |
| **Strední Cechy (CZ)** | 24,700 | 19,000 | **Lódzkie (PL)** | 19,900 | 13,200 | **Severoiztochen (BG)** | 12,500 | 8,700 |
| **Eesti (EE)** | 24,600 | 15,400 | **La Réunion (FR)** | 19,800 | 16,300 | **Nord-Est (RO)** | 12,500 | 7,400\*\* |
| **Basse-Normandie (FR)** | 24,400 | 21,400 | **Malopolskie (PL)** | 19,700 | 12,800 | **Panonska Hrvatska (HR)** | 12,200\* | 10,700 |
| **Principado de Asturias (ES)** | 24,300 | 22,000 | **Jadranska Hrvatska (HR)** | 19,200\* | 14,700 | **Yuzhen tsentralen (BG)** | 11,000 | 7,400 |
| **Comunitat Valenciana (ES)** | 24,200 | 21,400 | **Puglia (IT)** | 19,100 | 16,500 | **Severen tsentralen (BG)** | 10,700 | 7,100 |
| **Prov. Namur (BE)** | 24,100 | 19,900 | **Západné Slovensko (SK)** | 19,100 | 15,900 | **Severozapaden (BG)** | 10,300 | 6,600 |
| **Jihozápad (CZ)** | 23,700 | 18,100 | **Severozápad (CZ)** | 19,000 | 16,300 | **Mayotte (FR)** | 8,400 | 5,900 |
| **Dolnoslaskie (PL)** | 23,500 | 15,800 | **Centru (RO)** | 19,000 | 11,400\*\* |  |  |  |
| **Franche-Comté (FR)** | 23,400 | 21,200 | **Campania (IT)** | 18,900 | 17,500 |  |  |  |
| **Languedoc-Roussillon (FR)** | 23,300 | 20,600 | **Dytiki Makedonia (EL)** | 18,600 | 18,800 |  |  |  |
| **Limousin (FR)** | 23,200 | 20,300 | **Ionia Nisia (EL)** | 18,500 | 21,600 |  |  |  |
| **Basilicata (IT)** | 23,200 | 19,000 | **Nord-Vest (RO)** | 18,300 | 10,900\*\* |  |  |  |
| **Northern and Western (IR)** | 23,100 | 20,300 | **Sterea Ellada (EL)** | 18,200 | 20,000 |  |  |  |
| **Picardie (FR)** | 23,100 | 20,200 | **Mazowiecki regionalny (PL)** | 18,100 | 11,800 |  |  |  |
| **Região Autónoma da Madeira (PT)** | 23,100 | 19,700 | **Sicilia (IT)** | 17,900 | 17,100 |  |  |  |
| **Wielkopolskie (PL)** | 23,100 | 15,500 | **Zachodniopomorskie (PL)** | 17,800 | 12,600 |  |  |  |
| **Lorraine (FR)** | 22,800 | 20,500 | **Lubuskie (PL)** | 17,600 | 12,300 |  |  |  |
| **Severovýchod (CZ)** | 22,800 | 16,700 | **Kujawsko-Pomorskie (PL)** | 17,400 | 12,100 |  |  |  |
| **Moravskoslezsko (CZ)** | 22,800 | 16,600 | **Calabria (IT)** | 17,300 | 16,400 |  |  |  |
| **Región de Murcia (ES)** | 22,600 | 20,100 | **Kriti (EL)** | 17,100 | 19,900 |  |  |  |
| **Canarias (ES)** | 22,500 | 20,800 | **Pest (HU)** | 17,100 | 13,500 |  |  |  |
| **Prov. Hainaut (BE)** | 22,500 | 18,200 | **Opolskie (PL)** | 17,000 | 11,800 |  |  |  |
| **Strední Morava (CZ)** | 22,400 | 16,300 | **Stredné Slovensko (SK)** | 16,900 | 13,800 |  |  |  |
| **Slaskie (PL)** | 22,300 | 15,300 | **Peloponnisos (EL)** | 16,800 | 18,100 |  |  |  |
| **Nyugat-Dunántúl (HU)** | 22,100 | 15,000 | **Sud-Est (RO)** | 16,500 | 9,700\*\* |  |  |  |
| **Castilla-la Mancha (ES)** | 21,900 | 19,500 | **Kentriki Makedonia (EL)** | 15,800 | 18,100 |  |  |  |
| **Prov. Luxembourg (BE)** | 21,900 | 18,800 | **Dél-Alföld (HU)** | 15,800 | 10,500 |  |  |  |
| **Alentejo (PT)** | 21,900 | 17,900 | **Swietokrzyskie (PL)** | 15,500 | 11,400 |  |  |  |
| **Ciudad de Ceuta (ES)** | 21,800 | 21,000 | **Sud – Muntenia (RO)** | 15,500 | 10,300\*\* |  |  |  |
| **Vzhodna Slovenija (SI)** | 21,800 | 16,900 | **Sjeverna Hrvatska (HR)** | 15,400\* | 11,800 |  |  |  |
| **Martinique (FR)** | 21,700 | 16,900 | **Podlaskie (PL)** | 15,400 | 10,600 |  |  |  |
| **Notio Aigaio (GR)** | 21,500 | 24,500 | **Sud-Vest Oltenia (RO)** | 15,400 | 9,100\*\* |  |  |  |
| **Sardegna (IT)** | 21,200 | 19,300 | **Východné Slovensko (SK)** | 15,300 | 11,700 |  |  |  |
| **Molise (IT)** | 21,000 | 20,800 | **Thessalia (EL)** | 15,100 | 17,000 |  |  |  |
| **Região Autónoma dos Açores (PT)** | 20,900 | 18,100 | **Podkarpackie (PL)** | 15,100 | 10,200 |  |  |  |
| **Latvija (LV)** | 20,900 | 12,800 | **Dél-Dunántúl (HR)** | 15,000 | 10,700 |  |  |  |
| **Pomorskie (PL)** | 20,800 | 14,200 | **Észak-Magyarország (HR)** | 14,900 | 9,200 |  |  |  |
| **Andalucía (ES)** | 20,500 | 18,500 | **Warminsko-Mazurskie (PL)** | 14,800 | 10,600 |  |  |  |

**Source:** Eurostat, Regional Gross Domestic Product (PPS per inhabitant) by NUTS-2 regions, TGS 000005, Purchasing Power parities (PPS, EU27 from 2020) per inhabitant, data extracted 22/02/2022, current prices

**Note:** \* estimated, \*\*break in time series

All these regions form two types of centres. An extended centre expanding from Bolzano in Northern Italy to many regions in Austria, Germany, Benelux and Denmark, reaching the southern Swedish and Finnish regions; and a collection of centres formed by many central regions of the capitals in most EU countries, especially at eastern EU.

By descending even further down in **Table 1**, most regions of capitals are above the rest of regions in their own country. This is the case in Spain (the capital region of Communidad de Madrid, 44th), Lithuania (Sostines regionas, 51st), Portugal (Area metropolitan de Lisboa, 99th), Greece (Attiki, 115th) and Croatia (Jadranska Hrvatska, 194th). It is noted that five states have a single NUTS-2 region (Luxembourg, Malta, Cyprus, Estonia and Latvia).

For the most advanced Irish regions, ranked second and fifth in 2018, pc GDP has significantly changed due to the country’s correction of GDP. The Irish Northern and Western region lies at the 157th position in 2018, with 25,400 pc GDP, much below the other two. Hence, a great gap exists between this and the other Irish regions, in particular the Southern, whose pc GDP was 70,900. Given that in 2009, the Southern had 29,700 and the Northern and Western 20,300, a substantial rise of core-periphery imbalances took place in Ireland during the last decade, with its Northern region facing a more severe slow-growth process.

The following indexes are calculated from 2009 to 2020 using pc GDP (in pps) and recalculated**,** after removing the top 31 outliers whose GDP, measured in PPS units, are above 40,000 (**Table 2**).

The average (i1) has risen each year. Being affected by outliers, its recalculation without top 31 outliers gives a significant change from 20,919 in 2009 to 25,582 in 2018. The median (i5) has risen from 22,200 to 26,750 but after removing top 31 outliers the change is even greater, from 18,900 to 25,100. The difference between highest and lowest regional pc GDP (i2) has risen from 58,900 to 68,900. After removing outliers, both values and their change are much more limited. The change is limited from 10,000 to 5,000. Divided by the average, the difference between the highest and lowest regional pc GDP (i3) remains at similar levels throughout the period and is halved after removing outliers. The ratio of highest to lowest (i4) has fallen from 9.9 in 2009 to 7.7 in 2018 and after removing outliers is also halved, changing from 4.7 to 3.9.

**Table 2:** Regional inequality indexes and their recalculation without top 31 outliers

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Index** | **i1** | | **i2** | | **i3** | | **i4** | | **i5** | |
| **Name of index** | **Average** | | **Highest minus lowest** | | **Highest minus lowest, divided by average** | | **Ratio highest to lowest** | | **Median of highest minus lowest** | |
| **No of regions** | **241** | **minus top**  **31 outliers** | **241** | **minus top 31 outliers** | **241** | **minus top 31 outliers** | **241** | **minus top 31 outliers** | **241** | **minus top 31 outliers** |
| **2018** | 26,698 | 25,582 | 68,900 | 29,600 | 2.4 | 1.2 | 7.7 | 3.9 | 26,750 | 25,100 |
| **2009** | 23,107 | 20,919 | 58,900 | 24,600 | 2.5 | 1.2 | 9.9 | 4.7 | 22,200 | 18,900 |
| **2010** | 23,882 | 21,523 | 61,500 | 25,400 | 2.6 | 1.2 | 10 | 4.7 | 22,700 | 19,500 |
| **2011** | 24,512 | 22,066 | 63,000 | 26,000 | 2.6 | 1.2 | 9.6 | 4.5 | 23,650 | 20,400 |
| **2012** | 24,677 | 22,159 | 63,800 | 26,100 | 2.6 | 1.2 | 9.5 | 4.5 | 23,500 | 20,550 |
| **2013** | 24,921 | 22,352 | 65,000 | 26,800 | 2.6 | 1.2 | 9.7 | 4.6 | 23,650 | 20,900 |
| **2014** | 25,249 | 22,791 | 67,100 | 27,400 | 2.6 | 1.2 | 9.3 | 4.4 | 24,150 | 21,800 |
| **2015** | 26,284 | 23,429 | 69,500 | 28,500 | 2.6 | 1.2 | 9.6 | 4.5 | 24,600 | 22,350 |
| **2016** | 26,784 | 23,898 | 69,900 | 28,600 | 2.6 | 1.2 | 9.2 | 4.4 | 24,550 | 22,800 |
| **2017** | 27,812 | 24,833 | 69,700 | 29,300 | 2.5 | 1.2 | 8.6 | 4.2 | 25,950 | 23,850 |
| **2019\*** | 29,585 | 26,382 | 69,400 | 29,800 | 2.3 | 1.1 | 7.8 | 3.9 | 27,700 | 25,100 |
| **2020\*** | 28,320 | 25,154 | 71,200 | 28,400 | 2.5 | 1.1 | 7.7 | 3.7 | 26,400 | 24,900 |

**Note:** Data in the original dataset were provisional for a large number of NUTS-2 regions for the years 2020 and 2019. This is designated with an asterisk. Data were also estimates for German regions in the years 2017, 2018, 2019 and 2020. Mayotte is excluded because of its significant influence upon the indexes

From the 60 EU most lagging regions (**Table 1)**, five are Bulgarian (out of six Bulgarian), eleven Greek (out of eleven), three Croatian (out of four), six Romanians (out of eight), six Hungarian (8), nine Polish (17), three Slovakian (4), four southern Italian (21), two Spanish (19), one Czech (8), one Lithuanian (2), and four are transcontinental French. In the first five countries and Lithuania, the problem of lagging regions is more intense.

Out of the thirteen EU most lagging regions, whose pc GDP fell below 14,500, 4 came from Bulgaria, 3 from Greece, 2 from France and 1 from Hungary, Romania and Croatia. Without the two transcontinental French regions, all other regions are from the Balkan area, indicating integration problems and weaknesses in regional economies in the Balkans.

The Greek regions, whose majority is between the top 60 lagging, fell substantially in their ranking since 2009 (**Table 1**). The most extreme cases are two regions from the Greek islands, the Ionian and northern Aegean that have fallen by 77 and 63 positions respectively. Two of the four French transantlactic regions have pc GDP above many southern and eastern EU regions and the Greek islands. Southern Spanish and Italian regions also fell in their ranking, in the cases of Cuidad de Mellila, Sicilia and Calabria by 33, 23 and 18 positions. As opposed to southern, most eastern lagging regions out of this group of sixty regions improved their rankings, especially the Romanian, and most of the rest by few places. Even after excluding France, the average fall of ranking positions for southern Eurozone states is 32, while the average increase for eastern EU lagging regions is 8.3[[5]](#footnote-5). The divergence pattern of the Greek regions after the 2009 crisis is a reverse pattern against all other lagging regions, even against the French transcontinental. The Romanian lagging regions are among those improving more their position.

Variation is wide across German regions for 2009 and 2018 (**Table 3**). A great gap exists between regions from former Eastern Germany that lie above the 100th ranking position and the most advanced[[6]](#footnote-6). The 38 German regions represent 15.7% of the total number of 242 EU regions examined, influencing the ranking of other EU regions. In the first quarter of 242 EU regions, twenty out of sixty-one highly ranked regions are German, representing a third of top performing EU regions in pc GDP in pps (**Table 1**). Only two of them are included in the first ten regions and four in the first twenty regions. Thirteen out of them are comprised from the 30th to the 61st observation.

If one excludes German regions, nine out of ten top performing regions are capital-city regions, including Luxembourg (the exception being the Southern region of Ireland), while overall 14 among the first twenty regions are capital-city regions. Starting from the top, these are the regions of Luxembourg, Praha (CZ), Bruxelles-Capital (BE), Eastern and Midland Ireland (IR), Ile de France (FR), Noord-Holland (NL), Hovedstaden (DK), Bratislavsky kraj (SL), Stockholm (SE), Warszawski stoleczny (PL), Wien (AT), Bucuresti-Ilfov (RO), Helsinki-Uusimaa (FI), Budapest (HU), and Comunidad de Madrid (ES), Grad Zagreb (HR) and Sostines regionas (LT). Czech Republic, Slovenia, Poland, Romania, Hungary, Croatia and Lithuania are included in the list, representing a significant part (7 out of 10) of CEE countries. Furthermore, the capital-regions of Denmark, Belgium, Netherlands, Sweden, Finland are Austria are included, which belong to the EU centre, along with the capitals of France, Ireland, Spain and Germany.

**Table 3:** Ranking order of German regions among all EU NUTS-2 regions, 2009 and 2018

**Source: Table 1**

Hence, after taking into account the vast majority of German regions and the regions of Italian North, a conclusion is reached that two type of EU centres are formed: one extending from northern Italy to southern Scandinavian regions, and one referring to regional centres inside their nation-states, most notably at the Eastern periphery but also in the rest of the EU. Adding the better placement of the Greek and Portuguese capital-regions against the rest of their national regions, the significance of capitals across the whole EU space and the formation of a dual pattern of national and EU level core-periphery relationship is unveiled, in pc GDP terms. A hierarchy of regions appears to be formed, at the top of which lie regions of capital cities and those of the EU centre. It is worth-noting that the number of German regions (20) belonging in top 61 performers is higher than the capital-city regions across the rest of the EU (15) and their proportion, almost 32,3%, is almost twice the proportion of German regions to total EU NUTS-2 regions (15,7%). This reflects the dominance of the EU centre and that of the German regions over the rest of capital city regions and another hierarchical pattern between these two types of centres. Even if other EU top performing regions have higher levels than German, we can consider the German top performing regions to be at the top of the hierarchy, due to their extended presence.

After removing German regions from top performing in 2018, most regions out of the top performing remaining 41 are part of the EU centre. Since five out of the top 25 regions come from Austria, representing the majority of 11 Austrian regions, they can be considered too to be part at the top of the hierarchy, along with the German. The regions in the industrial districts of northern Italy (Bolzano, Lombardia, Trento, Aoste, Emilia-Romagna) are part of the top hierarchy of regions. From the rest of southern EU regions only two Spanish regions are included.

Earlier findings concerning the bottom 44 lagging EU peripheral regions, where a large number of CEE regions were found, makes clear the very strong core-periphery patterns in Romania, Hungary, Poland, Slovenia, Croatia and Bulgaria. This is also found in Italy, where four regions belong to the list of lagging 44 and five in the list of top 61, in Spain, where two Spanish regions are among the lagging 44 and one at the top 61, and France, with her four transatlantic regions compared against Ile de France. Since almost all Greek territory belonged in the list of 44 lagging EU regions, one could suggest evidence for the strong formation of a twofold core-periphery pattern between the pre-described EU centre, the southern and eastern EU, as well as inside the states forming the southern and eastern periphery.

**Conclusions**

Theory on core-periphery imbalances has sufficiently and extensively acknowledged and explained their formation, creating concerns for their appearance and sustaining inside the EU during its ongoing integration and enlargement. Despite the intensity and uniqueness of EU Cohesion policy exercised over the decades that has been praised in many occasions as successful -as in the last Economic and Social Report- and created expectations for their redressal, the present work has provided evidence for their presence and intensification inside the EU by the use of pc GDP, in pps.

As opposed to other analyses emphasizing club convergence and the formation of EU clubs of regions, the present study has highlighted that core-periphery patterns are present, persistent and strengthened at two different levels: the EU-international and the national level. It also highlighted the presence of a hierarchy between these two levels, if based on pc GDP measured in pps. The pattern of centres diverging from peripheries is evident both nationally and at the EU level. This finding has strong implications for the development of the EU territory, its spatial planning and the rescheduling and appropriate assessment of EU Cohesion Policy.

Different explanations have been discussed for the divergence of the EU centre from its two main peripheries, at southern Eurozone and eastern EU. Greece in particular stands as a type of ultra-periphery inside the EU, with her pc GDP levels comparable to those of transcontinental French regions. This is not the case for the majority of lagging Bulgarian regions because they have been benefiting much less from EU Cohesion Policy and are not part of Eurozone. The overperformance of most capital-regions, as opposed to their national peripheries, unveils a new type of regional centre at the EU. In France, the gap of Ile de France in GDP per head against other French regions brings in mind the reason why growth pole theory was proposed almost seventy years ago. Similar with the French case is the picture across almost all EU states that do not belong at the main EU centre.

The discussion before evidence has offered principal causes for EU core-periphery patterns. Since the EU Cohesion Policy has been assisting a significant part of EU regions in their development, it follows that it has also been sustaining or expanding, instead of redressing, such core-periphery imbalances at the EU and the national level. Most certainly it has done so in the case of core-periphery patterns inside states at the EU eastern periphery, most of which use their own currencies; this is also the case with the EU-wide centre, where German, Austrian, northern Italian and other regions have substantially benefited from the EU eastern enlargement. For the southern EU periphery in particular, not only the first Eurozone financial crisis but also common monetary and macroeconomic policies have significantly contributed in her divergence. This is also the case for French regions, most of which no longer belong to the most advanced EU regions when pps are considered. In these cases, the EU Cohesion Policy can be considered that it did not adequately prioritise the presence and significance of common monetary and macroeconomic policies as causal for divergence, failing to diagnose their value on time. Significant detrimental forces also operate in peripheral EU eastern regions; while a worth-noting repositioning of the EU eastern capital regions takes place at the top of the list of regional pc GDP, the greatest part of EU eastern regions are lagging behind. The evident strong core-periphery patterns should now become the main focus on the possible future restructuring of EU Cohesion Policy. It is worth-noting that EU core-periphery imbalances are likely to be even worse, if the aforementioned lack of regional prices and problem encountered in measuring GDP are considered.

By way of conclusion, few implications are worth highlighting. The EU Cohesion Policy should change to better target core-periphery imbalances nationally and at the EU, by acknowledging the reasons why particular regions benefit more from EU enlargements and their dissimilar gains from EU demand and supply chains formed. Peripheral EU regions should also gain more out of the pie of such value chains formed and the supply-demand interlinking between regions could become a matter of common concern for the benefit of a more balanced spatial development across the EU space. The role of EU Cohesion Policy in sustaining externally the demand of products from German regions should be considered also from the side of its restraining effect upon necessary German redistribution mechanisms that would have acted to the benefit of lower German incomers. The formation of an EU ultra-periphery in Greece, where the eastern and southern peripheries intersect, is a problem requiring a permanent solution, by combining macroeconomic and monetary policies with EU Cohesion policy. Given the positioning of Bulgarian and of certain Romanian regions, further integration at the Balkan peninsula is a matter to consider in EU Cohesion Policy and its pre-integration mechanisms and instruments placed in operation.

Expectations from theory that core-periphery imbalances will be formed at the EU space were proved accurate in two different levels, the EU-wide and the national (but for single-region states and those belonging at the EU centre, which however confirm the rule), despite the application of EU Cohesion Policy for decades. The evidence provided raises a question whether some form of pyramidic structure and a certain hierarchy or regions is progressively formed at the EU, if some other causes than those already provided in theory explain the formation of these core-periphery imbalances, and how exactly core-periphery imbalances could be redressed. Undoubtedly, another mix of policies is needed, at least at the common level of EU Cohesion Policy. A reference to the basics of regional theory might be a useful guide.

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1. The Report has used data for the 2000-2013 period and on certain occasions from 2014 and 2015. [↑](#footnote-ref-1)
2. The “maquiladores” are the factories in northern Mexico by the borders with USA, controlled by management and producing products made in USA. A reverse of “maquiladores” in the case of Germany was suggested by Ellingstad (1997), since human capital working in eastern EU regions provides the necessary IT skills and other services for the production of products inside Germany or in other German factories around the world. [↑](#footnote-ref-2)
3. A similar policy was proposed for Greece following the 2009 crisis. [↑](#footnote-ref-3)
4. *According to information provided by the official site of Eurostat, regional purchasing power parities (PPPs) are not available for EU regions. Hence, the use of state-level PPPs to calculate regional pc GDP in PPPs unavoidably affects the fraction of regional pc GDP divided by PPPs. Since state-level PPPs should normally derive from regional PPPs, some regions should have higher prices than other. Capital and central regions have usually higher prices because wages, real estate prices and the cost of life is higher in them. Hence, regional PPPs in capital and central regions are rather expected to be higher, raising the national average of PPPs. Since prices in non-central and non-capital regions are lower than the state average, it is rather expected that using state-level PPPs (instead of regional PPPs) influences pc GDP divided by PPPs, which ultimately takes a value lower than expected. If, as described, prices differ between capital regions and their peripheries, then conclusions on the formation of centres and peripheries based on regional pc GDP are even stronger and the gap between regional centres and peripheries even wider, when measured by the use of state-level PPPs.*

   *The manual on regional account methods reminds that, in calculations of regional population used to calculate pc GDP, students are counted at their host region if their residence is at the same country (and similarly this takes place for long term patients) (Eurostat, 2013, par. 13.52). Therefore, regions with higher proportions of domestic students, which mostly are capital regions, will tend to have a larger number of residents and larger regional populations, even if these students do not necessarily contribute in the rise of regional GDP. It follows that regional pc GDP may be in practice underestimated in capital regions than the opposite.* [↑](#footnote-ref-4)
5. This is calculated by adding the fall or increase in rankings and dividing by the number of regions included (in the Southern Eurozone states, France is not including because her regions are the transatlantic) [↑](#footnote-ref-5)
6. The German regions selected for state-aid support in the periods 2000-2006, 2007-2013 and 2014-2020 represented 34,9%, 29,6% and 25,85% of total German population respectively (see Ridder (2008) and EC (2013)), which is a significant proportion. During the 2014-2020 programming period for EU Cohesion Policy, the regions of Brandenburg, Mecklenburg-Vorpommern, Dresden, Chemnitz, Sachsen-Anhalt and Thüringen, all belonging to Eastern Germany, benefited from a status of Article 87(3) (c) of the Treaty at the time, which offered rates of state aid from 10 to 20% (EC, 2013). [↑](#footnote-ref-6)