REGIONAL INEQUALITIES, POLITICAL DISCONTENT AND THE ANATOMY OF INTEGRATION AND DISINTEGRATION IN EUROPE

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The impact of integration on regional growth and cohesion

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Introduction

The economic globalization processes and the EU integration dynamics are undoubtedly significant drivers of aggregate economic growth at the global and national level. Expanded trade relations, cross-border investment and free mobility of capital and labor have been at the heart of the subsequent rounds of deepening and widening of the EU integration process. However, the distributional effects from trade integration at the sub-national level are highly debatable in both the academic and public arena as the integration process does not always allocate costs and benefits evenly among advanced and less advanced regions and countries. Although overall trade and intra-EU trade follow an upward trend, there are major differences in the trade balances and deficits across member states that hide even higher imbalances across regions, producing an unequal regional growth footprint that affects their prospects for convergence. In fact, eliminating borders and all sorts of barriers to trade releases forces of creation, but also forces of destruction, as inferior production structures in weaker regions may not be able to maintain traditional and less competitive tradable activities that are typically replaced by imports from the more advanced regional trade partners. These destruction forces are not always easy to counterbalance with the introduction of other more dynamic activities. The lack of quick adjustment mechanisms that will replace the declining tradable sectors or activities with new ones is one of the factors that keep inequalities high. The current analysis is nested within the debate of the distributional dynamics of the EU integration process and is extended to empirically investigate the role of geography in explaining the unevenness in trade integration patterns and the resulting growth asymmetries at the regional level.

Major research findings

The analysis of the regional data over the period 2010-2018 reveals the following patterns:

- Spatial inequalities have increased over time, as the distance between the top 10% and top 20% regions with respect to GDP per capita from the EU average, the bottom 50% and the bottom 20% and 10% has been increasing significantly.

- The analysis reveals that the impact of trade integration on regional growth is highly conditional on geography and the development level of the trade partners, or put simply

who trades with *whom* determines whether the trade effect is destructive or conducive to growth. Specifically, trade integration is positive when all regions are considered but is negative when peripheral regions trade with core countries due to import substitution and competition effects. Interestingly, the trade effect becomes positive for peripheral regions only when they trade with peripheral regions (which are of similar income level and productive/industrial structures). These different types of integration are associated with different benefits and costs that overall leave a positive regional footprint. However, trade integration has a negative impact on growth in weaker regions, as it is dominated by inter-industry trade relations that are responsible for imported structural pressures and destruction in labor markets in the non-traditional tradable sectors. On the other hand, trade integration among peripheral regions has a positive impact, as trade relations among similar partners is dominated by intra-industry trade mostly in low- to medium-technology sectors. These findings reveal the diverse footprint of different types of integration and the importance of the mix of trade partners.

- When integration is services is considered, the relationship with regional growth is positive, even for peripheral regions. The typical pattern of trade may include exports of peripheral regions based on tourism and imports related to high-tech service sectors, like software development, artificial intelligence services, or perhaps advisory in the financial, legal, real estate or other sectors. These services are typically absent in peripheral regions and as a result, trade does not have an immediate substitution effect. Moreover, these advanced services tend to support the modernization, restructuring and upgrade of the other sectors of the economy, including manufacturing, in the peripheral regions.

- Rising dissatisfaction and discontent, measured as the percentage of citizens not trusting the EU at the regional level, has a negative relationship with regional growth, indicating that this challenge to the institutional and political arrangements of the existing economic and social model may have an adverse effect on the economy.

Econometric analysis

The empirical analysis is based on a conditional β-convergence panel econometric model, employing data for the period 2010-2018 at the regional (NUTSII) level, augmented by a set of control variables and growth determinants. The *all EU regions* model provides evidence that:

- A process of spatial divergence is taking place at the EU level, as more advanced regions have on average a better growth performance than the lagging regions.

- When all EU regions are concerned, EU trade integration contributes to regional growth, by expanding markets and transferring knowledge and technology in the production process.

- Skilled labor contributes to higher growth, reflecting the role of human capital endowments at the regional level.

- The impact of regional market size is positive and significant, indicating that large home-markets are associated with scale effects and efficiency gains in production.

- High levels of discontent appear to have a negative and significant effect on regional growth.

- The impact of being part of the Eurozone is negative, indicating that, at the regional level, the net effect of the common currency may have been associated with an unfavorable balance of creative and destructive effects and contractionary austerity policies during the financial crisis period that left a negative footprint compared to regions outside Eurozone.

In order to examine the hypothesis regarding the heterogeneous effects of integration we estimate the model for core and peripheral regions separately. The model is estimated for the subgroup of peripheral regions, defined as regions in countries with GDP per capita below the EU average. The underlying assumption is that economic integration between regions with similar levels of development (peripheral with peripheral) may pose "milder" competition effects than integration between regions with very unequal income levels (i.e., peripheral regions with EU core trade partners) as it reflects the nature of the trade integration (intra-industry trade versus inter-industry trade). The results confirm the hypothesis that *the typology of trade between 'equal' and 'unequal' partners* is critical for growth:

- When peripheral regions trade with EU core partners, the integration effect is negative, statistically significant and robust, due to the prevailing effect of import penetration and substitution effects for their productive base.

- The *peripheral regions* models still generate a process of regional divergence, possibly indicating the presence of a group of persistently underperforming regions at the low end of the income distribution.
- The human capital variable is again positive, significant and robust, highlighting the importance of human capital for peripheral regions.
- The market size variable appears with a positive and significant coefficient in two models, the discontent variable negative and significant and the *EUROZONE* dummy again with a negative and significant coefficient in two models. It is interesting that the coefficient of the variable *EUROZONE membership* is greater, indicating that the adverse effects of the Eurozone are more intense in peripheral regions.
- In contrast with the weak or unclear effect in *all EU* models, trade in services with core regions has a clear positive and significant effect on the growth performance in peripheral regions, indicating the importance of this type of trade as a transmission mechanism for high-tech knowledge and innovation in their productive base.
- Also, the impact of public investment on regional growth is positive, significant and robust, indicating that peripheral regions may depend more on public investment in order to reach certain infrastructure and organizational thresholds and embark on a positive and sustainable growth trajectory.
- Finally, the impact of financialization is negative and significant in one model raising the issue that peripheral regions may have a more adverse experience with the operation of the financial sector related to austerity programs and a massive redistribution of private wealth that were used in order to refinance the banking sector during the debt crisis that affected aggregate demand.

Conclusions

The European landscape is characterized by persistent inequality and divergence trends verified in all models and groups. Divergence takes place at the EU scale among the advanced and less advanced regions, driven by initial conditions and major structural, technological and social drivers.

The impact of trade integration is positive at the EU level, where the regions of modest or advanced levels of development and intra-industry trade relations prevail. However, trade integration may have a negative impact on growth in weaker regions, as it is dominated by inter-industry trade relations that are responsible for structural pressures and destruction in

the non-traditional tradable sectors. On the other hand, trade integration among peripheral regions has a positive impact, as trade relations among similar partners is dominated by intra-industry trade mostly in low- to medium-technology sectors.

These findings reveal the diverse footprint of different types of integration and the importance of the mix of trade partners. On the one hand, inter-industry trade, which dominates North-South and West-East trade relations, contributes to the formation of fixed capital and is the main avenue for technology transfer, but at the same time it is associated with competitive pressures and contraction in the non-traditional sectors of the weaker regions, that are necessary for long-term development. On the other hand, intra-industry trade, which dominates relations of countries and regions with similar levels of development and similar tastes, provides opportunities for expansion without significantly affecting their structural characteristics. The challenge arising for the lagging regions is that they are engaged in a dominant type of integration that is at the same time both necessary, as it contributes to 'technological learning' and capital formation, and destructive, as it pressures the exposed and less competitive capital-intensive sectors.

It is interesting that trade in services has consistently a positive impact on growth, implying that the rapid development and internationalization of the service industries (digital platforms, finance, tourism, producer and consumer services) does not pose yet any competitive pressures on the production base of lagging regions, perhaps because potential benefits are stronger than potential losses. The footloose character of many of these services may provide an opportunity for the peripheral regions and a promising avenue for the design of future regional policies that may focus on the attraction of digital nomads or highly skilled labor.

Public dissatisfaction with EU policies and discontent, after some point seem to affect growth prospects through a variety of channels related to uncertainty and pessimistic expectations about the future of the EU. This is especially true in weaker regions, where expectations are more fragile.

Our findings indicate that public investment is critical for peripheral regions, as it maintains an important role for the formation of fixed capital and the catching up of these regions in terms of skills, investment, social and productive infrastructure.

The results show that the single market and the single currency, the basic pillars of the European model, do not lead to an inclusive economy, neither to reasonably satisfied

constituencies. On the contrary, unbalanced patterns of (unfinished) integration, divergence from the advanced core, worrying levels of discontent, as well as chronic gaps in human, physical and financial capital shape a geography of opportunities and challenges that seems to be highly unfavorable for peripheral regions.

Keywords: EU integration, regional growth, convergence, economic geography

JEL: F15, R11, R12, C33

1. Introduction

The notions of trade and peripherality have been widely explored and have produced insightful, but often contradicting, evidence. The distributional effects from trade at the sub-national level are highly debatable in both the academic and public arena as the geography of trade has evidently followed a spatially selective pattern which opens up new avenues for research. The key issue which constitutes the departing point of our analysis is that the acceleration of the integration process does not always allocate costs and benefits evenly among advanced and less advanced regions and countries. Weaker regions with structural deficiencies in their productive base face severe difficulties to compete with the advanced regions in a more integrated market and experience pressures in their labor markets, public finances and income levels (Rodríguez-Pose, 2012).

Integrating in a larger market of more than 500 million consumers is a fast-paced structural change which creates opportunities but also threats to domestic industries. Although the stylized facts on trade, emphasize that the hallmark regularity is that firms serving foreign markets are more productive than their domestic competitors (Ottaviano et al., 2007), there are still competitiveness gaps across firms within the same industries and across regions within EU member states that hamper the growth process and may lead to severe de-industrialization, induced by import competition pressures of more technologically advanced imports or from countries with more proactive industrial or export promoting policies.

Considering that, more than a quarter of the EU population lived in a NUTS II region with a GDP p.c. below the 75% of the EU average (in 2019) and where real GDP had still not returned to pre-crisis levels showcases how the integration benefits require careful examination. While in the last decade a catching-up process in Eastern Europe is observed, mainly attributed to the performance of metropolitan regions, many less developed regions in Southern Europe have experienced “sluggish or negative growth and their GDP per head is driving away from the EU average” (European Commission [EC], 2022, p.25). In terms of trade, although overall trade (as a percentage of GDP) and intra-EU trade follow an upward trend, there are major disparities in the trade balances and deficits across member states that hide even higher imbalances across regions. The huge disparities in the trade balances range from *surpluses* of over 170 billion EUR for Germany (the majority of which is with the EU-27) to trade *deficits* of 2.26 billion EUR in Greece (German Federal Ministry of Economic Affairs, 2022). We expect these national trends to produce an unequal regional growth footprint that drives disparities and affects convergence.

The widening and deepening of EU integration provided on the one hand, increased opportunities for trade and investment but also raised concerns regarding the equal distribution of trade benefits within countries (Brülhart and Traeger, 2005; Kallioras and Pinna, 2015; Midelfart-Knarvik and Overman, 2002; Monastiriotis et al., 2017; Petrakos et al., 2012). Empirical evidence suggests that the growth impact is highly conditional on the development level of the region, the origin of the trade partners and the composition of trade (Kallioras et al., 2021; Rodríguez-Pose, 2012; Rodríguez-Pose and Sotiriou, 2021). Relevant studies highlight the fact that the growth effect may be highly "conditioned by the level of development, as weak economies, which do not have a similar structure with their more advanced trade counterparts, may face intense competition and therefore, experience inferior growth performance" (Petrakos et al., 2011, p. 385).

This paper aims to enrich our understanding of the EU integration process in producing growth and closing divergence gaps and to highlight the conditions under which the trade-growth effect may prevail and most importantly in which cases trade in fact impedes growth. The central hypothesis is that geography determines the growth effect of trade. In order to assess the heterogeneity of the trade integration growth impact across different regions we employ a unique dataset on trade (imports and exports) at the regional NUTS II level in the period 2010-2018 (ESPON, 2018) to empirically explore the critical role played by geography and the type of integration (integration with core countries versus integration with peripheral) in determining growth effects. We use regional growth models and trade integration indices combined with a rich set of growth determinants and interaction effects to assess the role played by the productive and skill structure of the region, the intensity of public policies and critical economic geography determinants.

The report is organized as follows: Section 2 presents a critical discussion of the existing literature, sections 3 and 4 present descriptive statistics, data and modelling, while sections 5 and 6 present the results and the conclusions of the analysis.

2. Literature review

At the EU level, there is scarce evidence into how trade integration temporally affects regional growth and in turn the regional convergence process. Theoretical and empirical evidence find distance decay costs from the EU core that challenge the balanced diffusion of trade benefits across regions especially those located in the periphery. More specifically the recent EU Cohesion Report (EC, 2022) states that regional economic convergence has stopped in the EU due to the fact that benefits from globalization and integration are not evenly transmitted to all regions. Since integration is not a level playing field, the heterogeneity of the impact across space may undermine the EU convergence process and the growth prospects of regions in development traps and in the periphery. To this end, this report aims to provide scientific evidence in order to inform countervailing policies that will prevent this from becoming destructive.

Integration in the EU has been regarded as one of the main sources of growth and prosperity through enlarged market access, increased variety and factor mobility that optimizes resources allocation and production efficiency. One of the key features of the EU integration process is the enormous opportunity presented for deeper trade integration across member states (European Economy, 2007). The latter is expected to unravel a multitude of benefits in terms of growth-inducing factors such as larger market access, improved variety, productivity and knowledge transfer gains. However, it may also pose a serious of threats such as substitution effects for the domestic competing industries and the regions which are more exposed to the trade integration dynamics (Autor et al., 2013; Petrakos et al., 2012). These phenomena give rise to a rigorous debate on the growth returns from trade. More specifically, trade is found to induce substitution effects for domestic producers (Edwards and Jenkins, 2015) leading, in some cases, to the de-industrialization of regions due to the high exposure to economically more advanced or competitive trade partners (Autor et al., 2013; Edwards and Jenkins, 2015). Despite the anticipated large macro-economic benefits of the internal market and the increased competition it entails (European Commission, 2007, 2015a), the sub-national distribution of the benefits and the connection to certain political outcomes has been largely overlooked by the bulk of the related research which constitutes a conceptual and empirical gap.

Within the European Union (EU) disparities in GDP per capita across member states declined from the 1990s until the financial crisis of 2008, where the EU South diverged again for a period of time. At the same time, regional disparities within member states (measured by the

standard deviation of GDP per capita) continued to increase (Farole et al., 2011). The aggregate trends at the national level, especially for the New Member States, seem to align with the dispersion forces of the neoclassical theories of convergence while the subnational regional outcomes seem to conform to the New Economic Geography (NEG) framework of core – periphery type of divergence patterns. The debate concerning the distribution of the "overall welfare gains from the economic integration process finds fertile ground since the size, the direction and the composition of trade (and factor) flows determine, to a large extent, the prospects (and the limitations) for development" (Kallioras et al., 2021, p.6).

Further, the evidence that integration may have amplified existing intra-national inequalities in the EU (Petrakos et al., 2005) reveals the importance of studying the regional-adjustment dynamics in the new and more recent waves of integration for the validation of previous findings. The existing empirical evidence confirms that trade may lead to uneven growth patterns at the subnational level and intensify spatial inequalities (Autor et al., 2013; Rodríguez-Pose, 2012; Rodríguez-Pose and Gill, 2006). Ezcurra and Rodríguez-Pose (2014) find a positive link between trade and spatial inequality in 22 developing countries over the period 1990–2006. They conclude that a greater degree of trade openness reduces the GDP per capita of poorer regions and increases that of richer regions, thereby creating winners and losers that coincide with rich and poor regions respectively.

Expanding upon this body of literature at the regional level, empirical evidence focusing specifically on the pre-accession phase on EU NMS regions, stress that regions that were initially more exposed to trade competition, suffered the most in terms of destruction in industrial employment leading to de-industrialisation (Kallioras and Petrakos, 2010). The latter demonstrates that peripheral regions with weak industrial structures will suffer significant employment losses related to the opening of their markets and integration with the EU, with implications on growth. In line with these findings, country level studies at the sub-national level, provide empirical evidence on Greece's EU integration experience. The results revealed the inability of Greek regions to compete (successfully) with their more advanced counterparts in capital-intensive manufacturing and knowledge-intensive economic activities (Petrakos et al., 2012). With respect to the crisis period, Petrakos and Psycharis (2016) empirically showcase that while regions with higher initial levels of overall trade openness perform better when openness increases further, higher prior levels of EU trade integration do not seem to have a similar effect, suggesting that the EU market seems too competitive for the internationalization efforts of the Greek regions.

In the same line of arguments, Farole (2013, p.20) synthesizes that, "regions further outside the core (that is, the periphery), are not only less able to take advantage of spillovers, but also more likely to be far removed from key infrastructural, institutional, and interpersonal links to regional and international markets". Therefore, the geographical pattern of core and peripheral regions is manifest in an economic pattern of "leading" and "lagging" regions (Farole, 2013). In an EU wide context more peripheral regions in the South or Central East of the EU are expected to face considerable challenges pertaining to geography, scale and competitiveness as a result of strengthened trade relations with relatively more advanced economic partners of the EU core (Petrakos et al., 2012).

The current analysis examines the specificities stemming from the type of trade integration which is affected by the geography of the trade block (*who* trades with *whom*) and in turn affects how regional inequalities evolve. To what extent the growth impact is spatially balanced or geographically uneven across and within countries is conditioned on a broad set of conditionalities that require in depth examination.

The geography of trade relation patterns produces a diverse set of growth-inducing versus import substitution effects (Rodríguez-Pose, 2012). The central concern when assessing the geography of trade is to what extent the characteristics of the trade partners matter for spatially balanced growth and how the type of trade integration (combinations of core with non-core or peripheral EU countries) affects the nature and direction of the growth effect.

Evidence of deeper integration between advanced EU counterparts, and European Neighborhood countries (ENP) produced unbalanced growth effects due to unsustainable competition pressures. Specifically, the less advanced ENP countries faced "severe difficulties in restructuring and diversifying their productive bases in order to successfully reap the benefits of EU trade thus threatening the process of "neighbourhood Europeanization"" (Kallioras et al., 2021, p.14). The analysis goes a step further to conclude that the division between North and South countries can be decisive when it comes to trade. More specifically, "North-South" trade relations due to their unbalanced nature need to be counter-balanced and complemented by "South-South" trade relations (i.e., trade among "equal" or "close" partners) for the successful integration of the ENP countries which was not always as prevalent.

There is wide consensus in the literature that intra-industry trade is more conducive to economic growth than inter-industry trade, and that the former tends to take place between countries with similar factor endowments, to stimulate innovation and to exploit economies

of scale (Helpman, 1987). Given the fact that there is a positive correlation between GDP growth and intensity of intra-industry trade (IIT), new EU members hoped to achieve higher growth rates and sustainable development as a result of an increase in IIT with other EU member states. This was the case between the more industrially advanced regions of the EU core, while for the North-South EU relations, the increases in IIT were expected to be associated with higher competition pressures, due to differences in economies of scale of the domestic industries and in the regional levels of technological development.

Trade integration between North and South would "inescapably lead less developed countries (or the South) to specialize in labor- or raw material-intensive products, and to import most of the products that embody technology and high quality physical and human capital" (Petrakos, 2003, p.4). Such a division of labor (which is considered optimal by the dominant school of economic thought with respect to trade) does nothing more than condemn these countries to intransigent and long-lasting underdevelopment, which blocks the industrialization of their production system and insures that the gap between them and the developed countries will not be closed (Petrakos, 2003). Thus, the most important problems in North-South relations are these intense inter-industry characteristics which largely impose a geographical division that does not favor convergence in the productive sectors nor in the levels of development.

Empirical evidence has found that similar trends were reported in the Balkan region with large increases in their trade deficits from 1990 onwards. The transition from central planning to a market economy and the subsequent "association[1] agreements" resulted in an increased deficit (and a trade surplus for the EU in the same period), owing, to a large degree, to the opening of these economies, their lower competitiveness compared to EU firms and to the collapse of a significant part of their production system. The North-South divide is also manifested in the case of Greece that reported a contraction of manufacturing and a sharp increase of trade deficit as a result of import pressures from EU trade (Petrakos and Tsiapa, 2009). During the entire decade of the 80's and at least half the decade of the 90's it experienced an abrupt increase in its trade deficit with the EU, and simultaneously a significant contraction of its industrial base, a decline in manufacturing which took the form of a

[1] These agreements included regulations on free trade that excluded a series of sectors and industries which are 'sensitive' for the EU (e.g., agricultural products, textiles, iron and steel, etc.), but in which the transition economies had traditionally a strong presence and a comparative advantage.

deindustrialization of those regions whose production system was more exposed to international competition (Petrakos and Saratsis, 2000; Rodríguez-Pose and Sotiriou, 2021).

To this end, geography and more precisely the development level of the trade partner was found to play a decisive role regarding the regional growth effect of trade in the case of Greece during the post-EMU period. Empirical evidence showed that increases in trade with the more advanced EU counterparts was negatively associated with economic growth due to dynamics associated with substitution effects, while trade with the rest of the world contributed to regional growth (Rodríguez-Pose and Sotiriou, 2021). The study reveals that apart from the trade partner, a large part of the impact depends on the income level of the *integrating* regions (i.e., the typology of regions) showcasing the importance of both the trade partner and the participating region's role. More specifically, evidence showed that the deepening and widening of the integration process specifically in the case of Greece was detrimental for the growth of the more advanced regions due to stronger substitution effects from the EU attributed to more similar sectoral structures that intensified the import competition effect. On the contrary less advanced Greek regions (i.e., more "sheltered" regions) that do not have large tradable sectors were not negatively affected by EU trade.

The examples of Central Europe, the Balkans, and more peripheral Southern countries such as Greece indicate that the EU trade integration process can be highly conditioned upon the geography, the timing of when the integration intensifies and the "composition" of the trade block, or in other words "who trades with whom and when".

In the related literature, the effects of trade are analyzed both in terms of the overall growth impact but also and equally importantly on regional inequality trends. Research is rapidly showing that trade leads to uneven growth patterns at the subnational level, suggesting heterogeneous responses to increases in trade exposure (Autor et al. 2013; Petrakos and Psycharis 2016; Rodríguez-Pose 2012). In line with the above, Ezcurra and Rodríguez-Pose (2014) find that increased trade led to spatial inequality in 22 developing countries over the period 1990–2006. Overall, the findings point to the direction that the type and geography of the regions participating in the trade integration process as well as the development level of the trade partner is decisive.

To this end, although specialization is considered a sectoral shock threat for regional economies, specialization in high-technology sectors specifically, is regarded as a structural factor that is able to offset the effect of an economic recession (Filippetti and Archibugi, 2011). The national and regional specialization patterns and the export competitiveness of regions

are critical growth components that have attracted the attention of academics and policy makers. Peripheral EU regions' competitiveness has been based on inferior technological levels, quality and value added compared to that of more developed regions that are based on innovation high-tech production and product differentiation (branding) and this may create an (un)level playing field when it comes to intensified trade. Export patterns are found to determine the resilience of regions and are conducive to growth in the broader regional economy via a set of channels, precisely: *i.)* the expansion of export demand in fast growing countries, *ii*.) the improvement of the quality of the exported products combined with increases in the related variety of comparative advantage sectors or in other words changers in the extensive margin of the export patterns (Tsiapa, 2019).

Our analysis goes a step further to provide concrete evidence on how geography determines and "turns" the signs of the trade impact depending on *who trades with whom* by employing data at a fine geographical level for two critical blocks of regions in the EU, the core and the -periphery.

3. Descriptive analysis

Inequalities, and especially regional inequalities, are receiving new attention by the EU and international organizations. Empirical evidence suggests that regional performance is mostly characterized by a long-lasting, unequal, and spatially uneven distribution of income across EU regions. In fact, the EU is experiencing the formation of regional income clubs, with the regions belonging to the top income group having a stronger performance in terms of GDP, employment, and population growth, while the regions belonging to the lower income group experiencing a net decline (Iammarino et al., 2019). Overall, serious EU core – periphery gaps remain, indicating that regional performance in Europe is characterized by increasing or high and persistent inequalities.

Figure 1. presents a snapshot map of the spatial distribution of the economic development of EU NUTS II regions (in terms of GDP per cap.) Darker colors correspond to higher levels of economic development. The EU core countries, Eastern European countries and interestingly countries which are not members of the Eurozone (Figure 2) record positive growth rates. This is not the case for regions in the central-south EU i.e., in Italy, parts of France and all Greek regions which are characterized by a severe contraction of the entire economy.

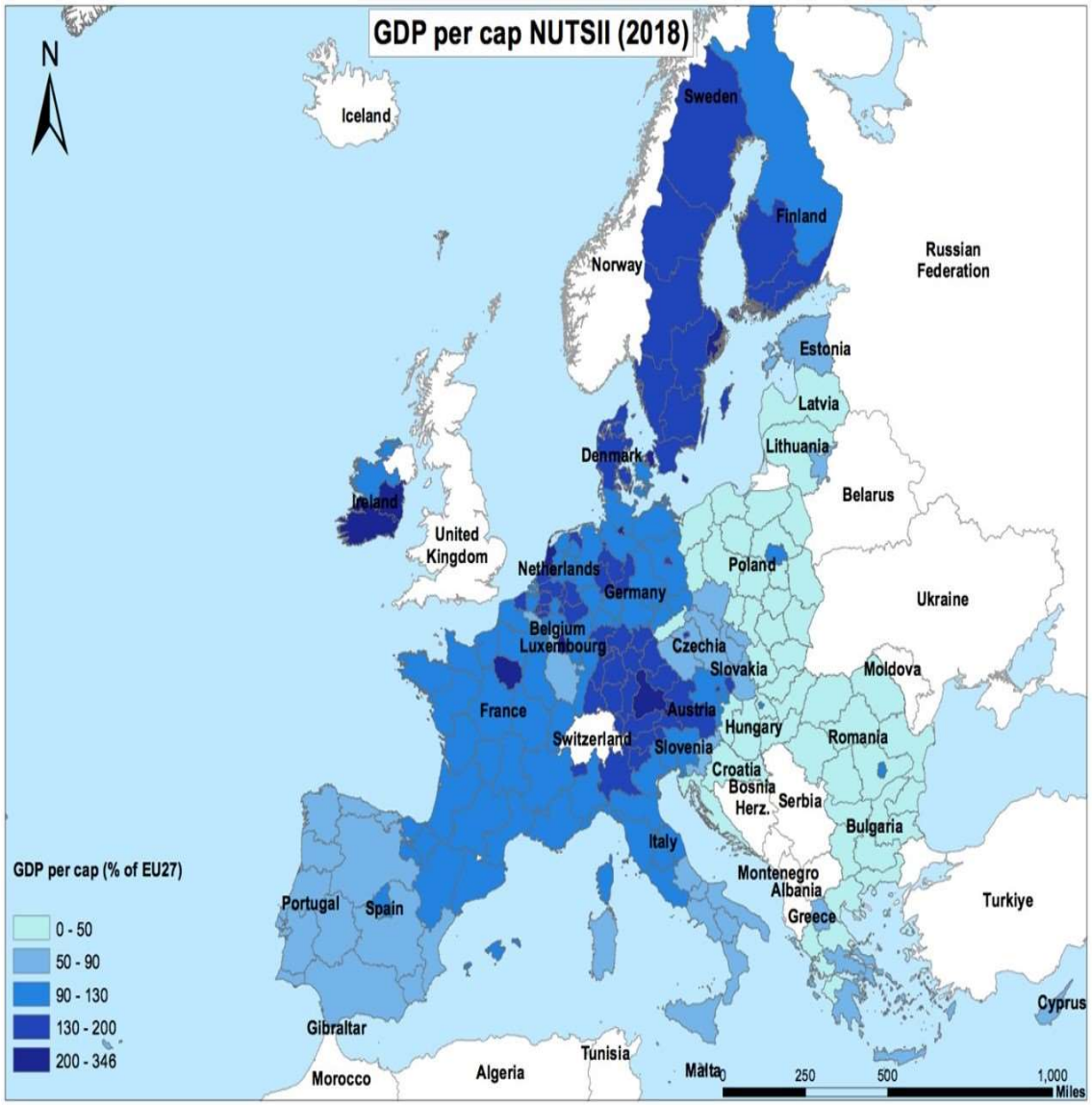


Figure 1. Map of GDP per cap (% of EU) at NUTS II in 2018

Source: own elaboration using data from ARDECO

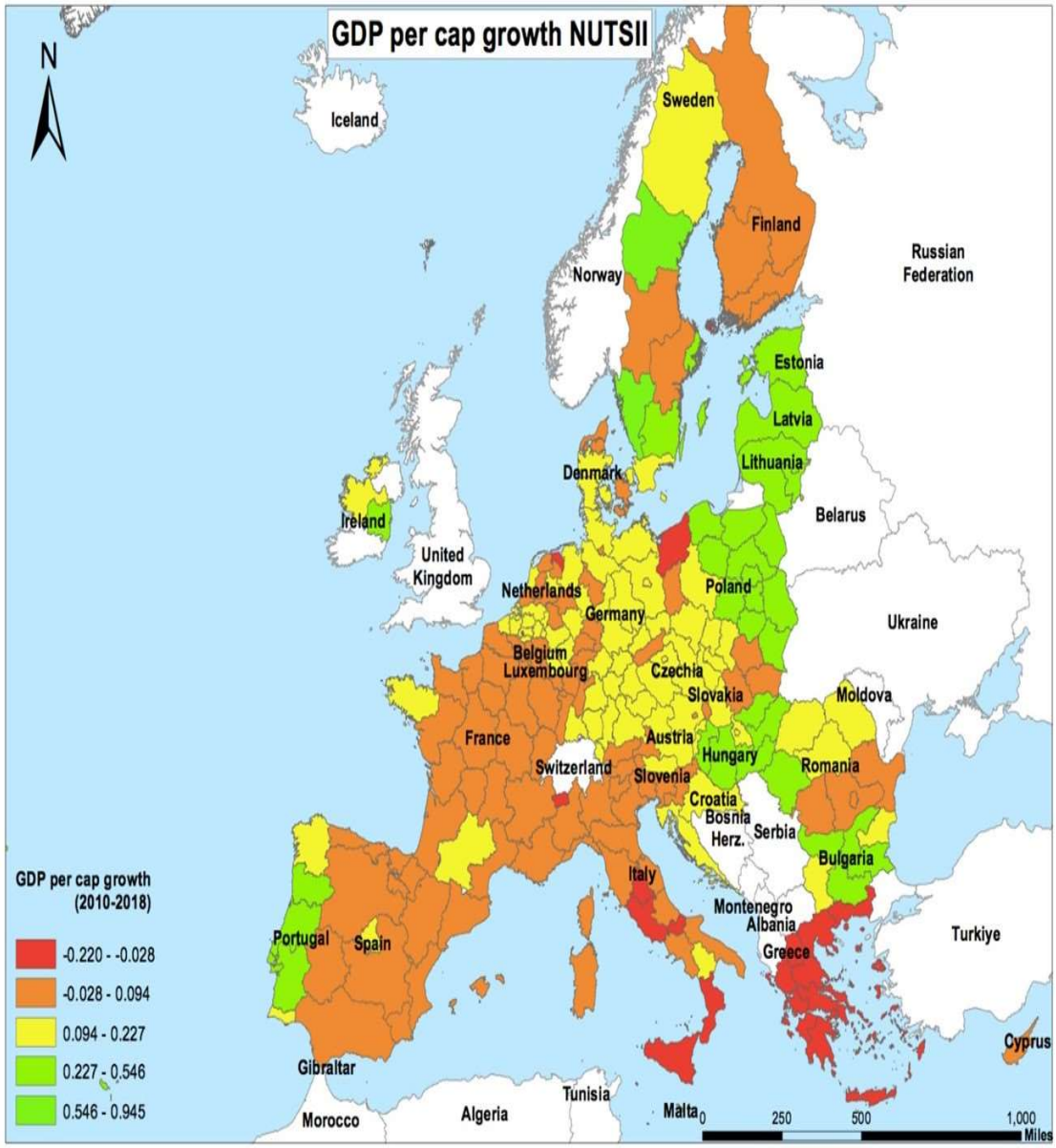


Figure 2. GDP growth NUTS II (2010-2018)

Source: own elaboration using data from ARDECO

Figure 3 presents the average GDP per capita growth of the following geographical blocks of regions[2], specifically for core and peripheral EU regions as well as the EU average trend. The trendlines follow a similar pattern with the peripheral regions exhibiting a higher growth rate than both the average and the core EU regions. This trend of the peripheral block is partly driven by the high growth rates of the Eastern European countries.

[2] Core regions belong to: AT, BE, DE, DK, FI, FR, IE, IT, LU, NL, SE and peripheral regions belong to: BG, CY, CZ, EE, EL, ES, HR, HU, LT, LV, MT, PL, PT, RO, SI, SK

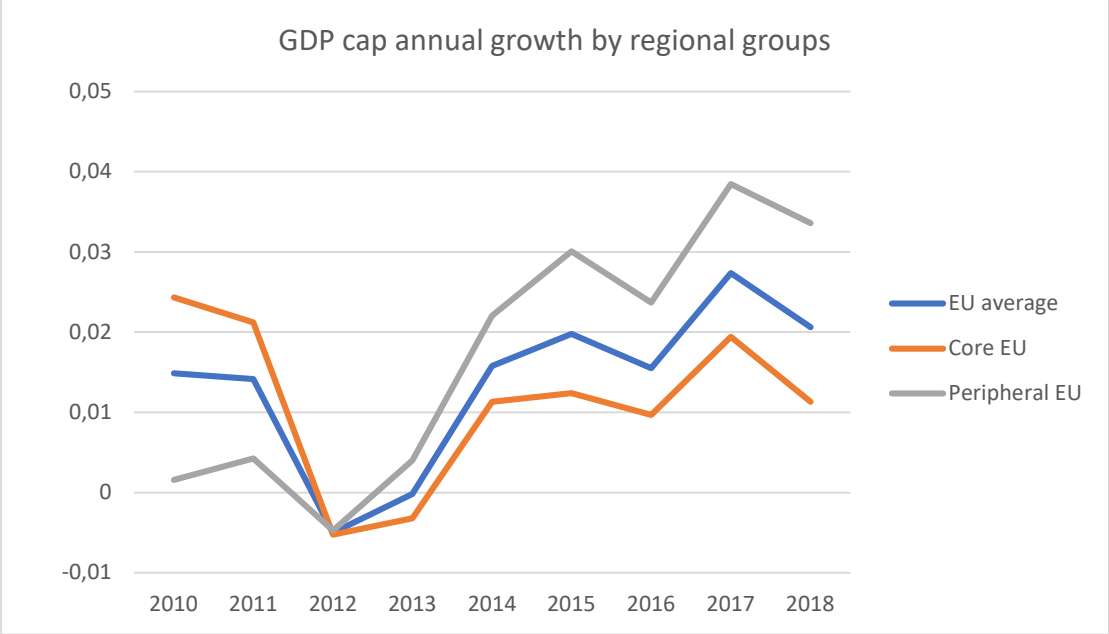


Figure 3. Evolution of annual growth by regional groups (NUTS II), 2010-2018

Source: own elaboration using data from ARDECO database

Figure 4 presents the temporal evolution of GDP per capita for the two geographical blocks and for the EU average from 2010 - 2018. Although there is a similar slightly positive trend for both core and peripheral regions, the large gap between the core and the peripheral is maintained within the study period and is increasing.

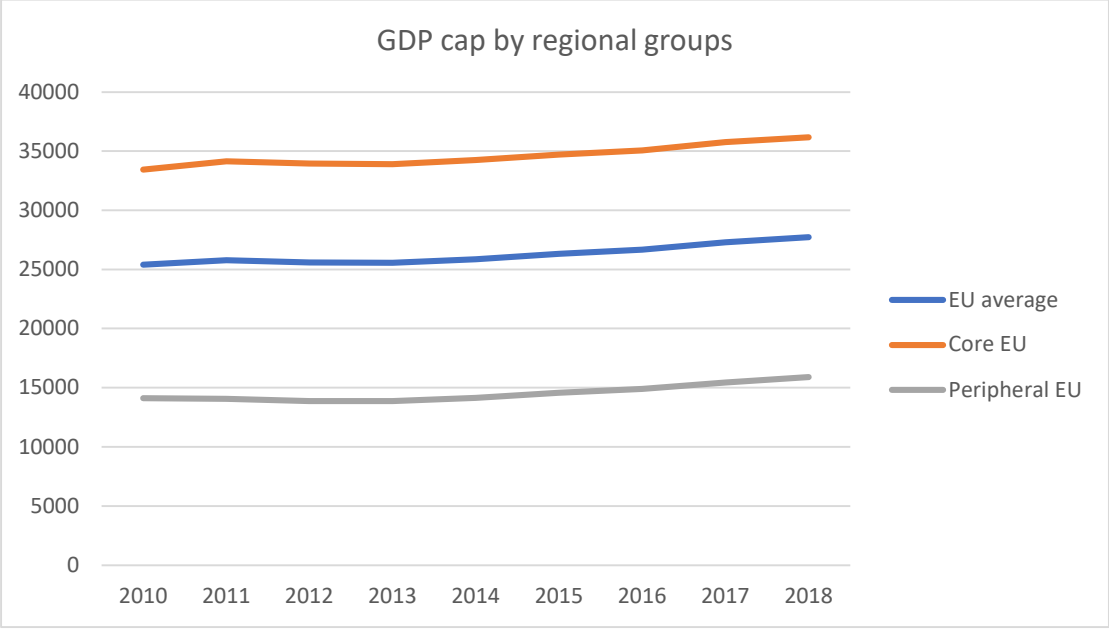


Figure 4. Evolution GDP per capita by regional groups

Source: own elaboration using data from ARDECO database

Table 1 depicts the GDP per capita levels change and growth between 2010 and 2018 for the: core, peripheral regions and the EU average. We also calculate the differences/gaps between core, peripheral with the EU average as well as the evolution of the GDP per capita gap between the core and the periphery as well as their ratios. We observe a high change of GDP in absolute numbers for the core regions and a higher growth rate for the peripheral block. The difference/gap of the peripheral regions from the EU average reports a larger increase than the increase of the core-EU average gap showcasing that the core regions have a better economic performance than the peripheral temporally. Moreover, the difference between core and periphery reports a high change both in levels and in terms of the growth rate.

Table 1. Average Regional GDP per capita by regional group, 2010 and 2018

		GDP per capita by regional groups			
	NUTS II group	2010	2018	Change	Growth
1	EU average	25.401,05	27.734,61	2.333,56	9,19%
2	Core EU	33.456,93	36.182,48	2.725,56	8,15%
3	Peripheral EU	14.122,83	15.907,59	1.784,76	12,64%
4	Difference core/EU average	8.055,88	8.447,87	392,00	4,87%
5	Difference EU average/peripheral	11.278,23	11.827,02	548,80	4,87%
6	Difference core/peripheral	19.334,10	20.274,89	940,79	4,87%

Source: own elaboration using data from ARDECO database

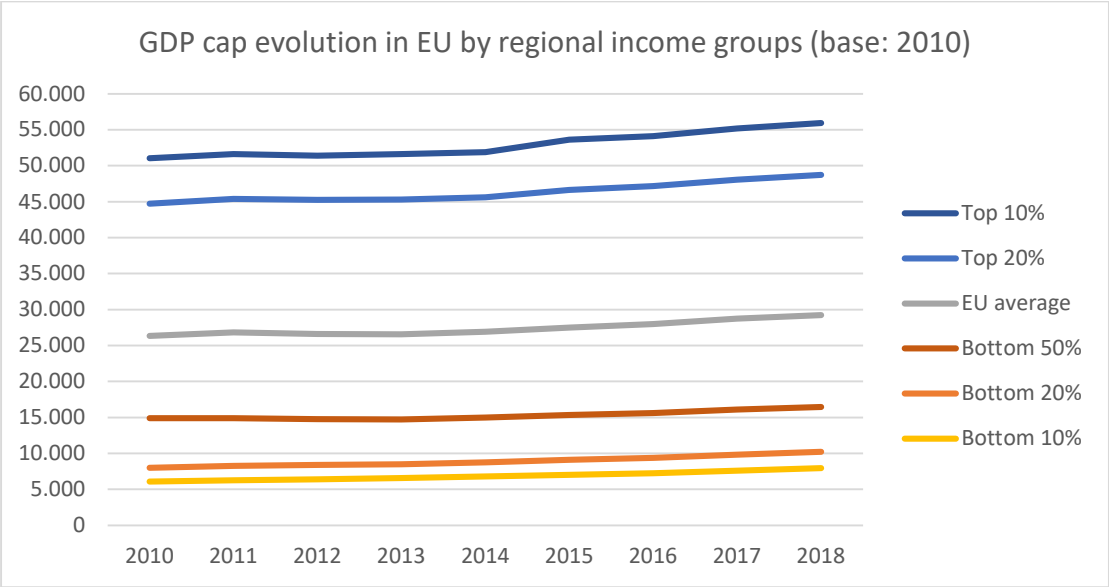


Figure 5. Evolution of GDP per capita by regional income groups (ranking based on 2010), 2010-2018

Source: own elaboration using data from ARDECO database

Figure 5 depicts the evolution of GDP per capital for 5 income groups and the EU average. The large gaps between the top 10% of the EU and the bottom 10% reflect alarmingly high and increasing regional inequalities. In order to illustrate the severity of the regional inequalities in the EU, Table 2 presents the levels and change of GDP per capita for 5 regional income groups. The difference between the *top* 10% and *bottom* 10% of EU regions is 47.984,66 and exhibits a rising trend. The magnitude of the gaps between the rest of the remaining groups, which range from 45.722 to 39.476 (in 2018), is also extremely high. Calculating the ratios between the regional groups we observe a slight decrease between the two end tails of the period and a decrease of their growth rate however, the size of the ratios between the extreme ends of the regional income spectrum are very high (i.e. 7,03).

Table 2. Average Regional GDP per capita by income group (ranking based on 2010), 2010 and 2018.

	GDP per capita NUTS II income groups			
NUTSII group	**2010**	**2018**	**Change**	**Growth**
Top 10%	51.049,73	55.942,87	4.893,14	9,59%
Top 20%	44.759,99	48.761,38	4.001,38	8,94%
EU average	26.360,19	29.265,02	2.904,83	11,02%
Bottom 50%	14.879,79	16.466,16	1.586,37	10,66%
Bottom 20%	8.034,06	10.220,72	2.186,66	27,22%
Bottom 10%	6.112,86	7.958,22	1.845,36	30,19%
Difference top10%/bottom10%	44.936,87	47.984,66	3.047,78	6,78%
Difference top10%/bottom20%	43.015,67	45.722,15	2.706,48	6,29%
Difference top10%/bottom50%	36.169,94	39.476,71	3.306,77	9,14%
Difference top10%/EU average	24.689,54	26.677,85	1.988,31	8,05%
Difference EU average/bottom20%	18.326,13	19.044,30	718,17	3,92%
Difference EU average/bottom10%	20.247,33	21.306,80	1.059,47	5,23%
Ratio top10%/bottom10%	8,35	7,03	-1,32	-15,83%
Ratio top10%/bottom20%	6,35	5,47	-0,88	-13,86%
Ratio top10%/bottom50%	3,43	3,40	-0,03	-0,97%
Ratio top10%/ EU average	1,94	1,91	-0,03	-1,29%
Ratio EU average/bottom20%	3,28	2,86	-0,42	-12,73%
Ratio EU average/bottom10%	4,31	3,68	-0,63	-14,72%

Source: own elaboration using data from ARDECO database

Figure 6 presents the association between regional growth and the development level (GDP per capita), the negative slope of the fitted line indicates that richer regions have a lower growth rate which reflects a convergence process. The validity of this association will be further investigated in the full econometric convergence model where all other growth explanatory variables / determinants are considered.

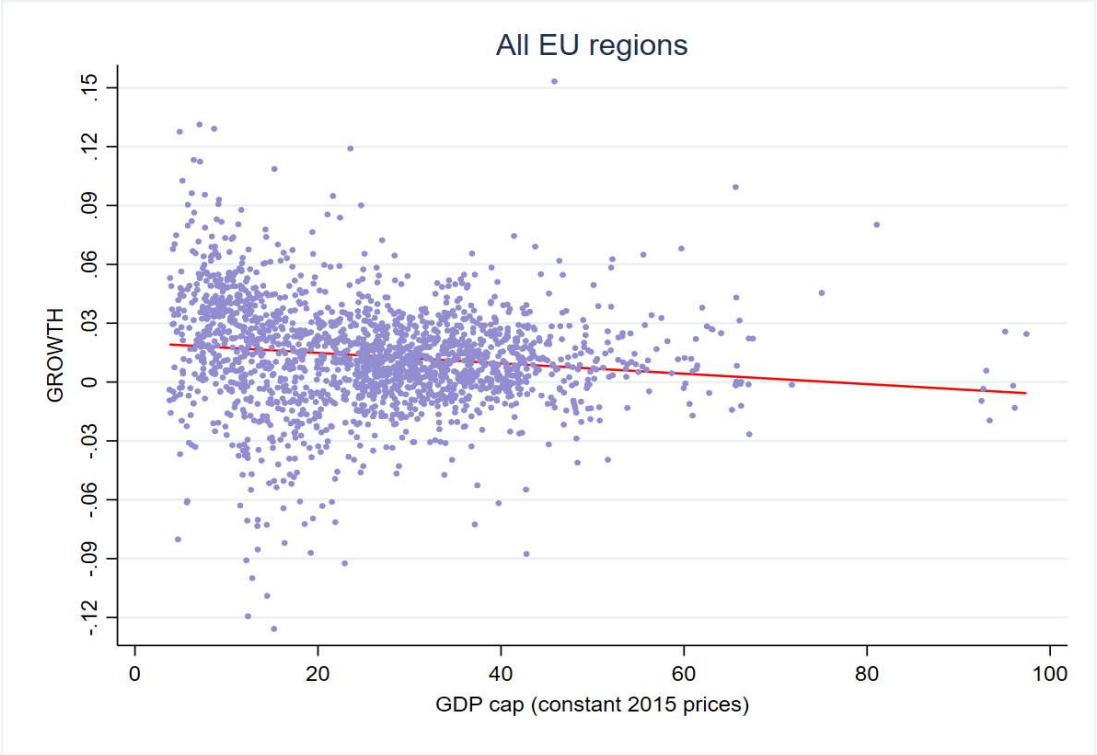


Figure 6. Growth and development level in the EU NUTSII regions, 2010-2018

Source: own elaboration using data from ARDECO database

Figure 7 presents the association between growth and the GDP per cap level only for the peripheral EU NUTSII in order to detect differences in the convergence-divergence trends across regional income groups. The negative slope provides evidence of convergence within the EU periphery.

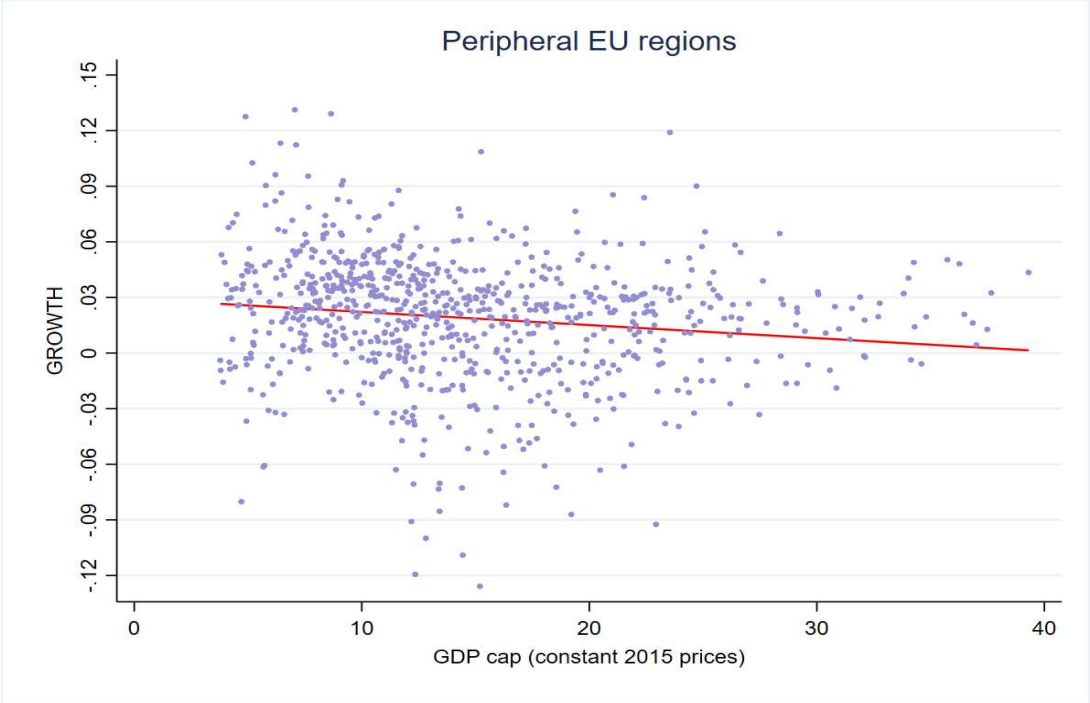


Figure 7. Growth and development level of peripheral EU NUTSII regions, 2010-2018

Source: own elaboration using data from ARDECO database

The central research question of this study is the assessment of how trade integration affects regional growth and more specifically how the geographical breakdown of the trade relations - trading with core versus peripheral partners[3] – plays a decisive role in determining regional trajectories. More specifically the key variable of integration, which captures the share of regional trade, is assessed separately for the entire EU and for peripheral regions. The underlying research hypothesis is that the exposure and in turn the effects of trade, will depend on the type of trade integration with trade among similar income partners having a milder/or positive impact on growth while trade among distant or countries of different economic development levels to have a negative or destructive effect due to competition pressures.

The central hypothesis is that the impact of trade on growth depends on the geographical and development gap among partners. Core-periphery trade among distant partners and partners with serious gaps in their development levels tends to take an inter-industry character, putting pressure on the more advanced and capital intensive or technology-intensive sectors of the domestic industrial bases in peripheral countries and regions. This type of trade leads to a

[3] Country level trade partners

division of labor where the core countries and regions mainly specialize in knowledge-intensive, high technology sectors, while the less advanced periphery in labor-intensive and low-skill products in less advanced peripheral countries. This type of specialization imposed by unbalanced trade relation releases forces of creation and destruction with a spatial footprint that affects regional growth and the evolution of regional inequalities (Petrakos, 1997; Petrakos et al., 2005; Petrakos et al., 2016).

The evolution of EU integration for core and peripheral regions and the association with regional growth provides important insight that informs our key research hypotheses. Following Petrakos and Psycharis (2016) and Petrakos et al. (2016), the level of integration is proxied by the share of trade (exports and imports) with the EU over total trade[4].

Figure 8 provides the spatial depiction of the EU integration index across EU NUTSII regions in 2018. Darker colors correspond to higher levels of EU trade integration. It is evident from the map that there is a high variation across countries and regions and both core and peripheral countries have high degrees of integration with high variations of the index within countries. The high values of trade integration in both core and periphery are expected to have very divergent effects on their growth, in other words the sub-national variation is what matters the most when assessing trade relations.

[4] Provided by the formula:

$$TRADE\ INT_{r,t} = (imports^{j}_{r,t} + exports^{j}_{r,t})/(imports^{T}_{r,t} + exports^{T}_{r,t})$$

where r: NUTS II region, j: trade partners, T: total trade, t: year

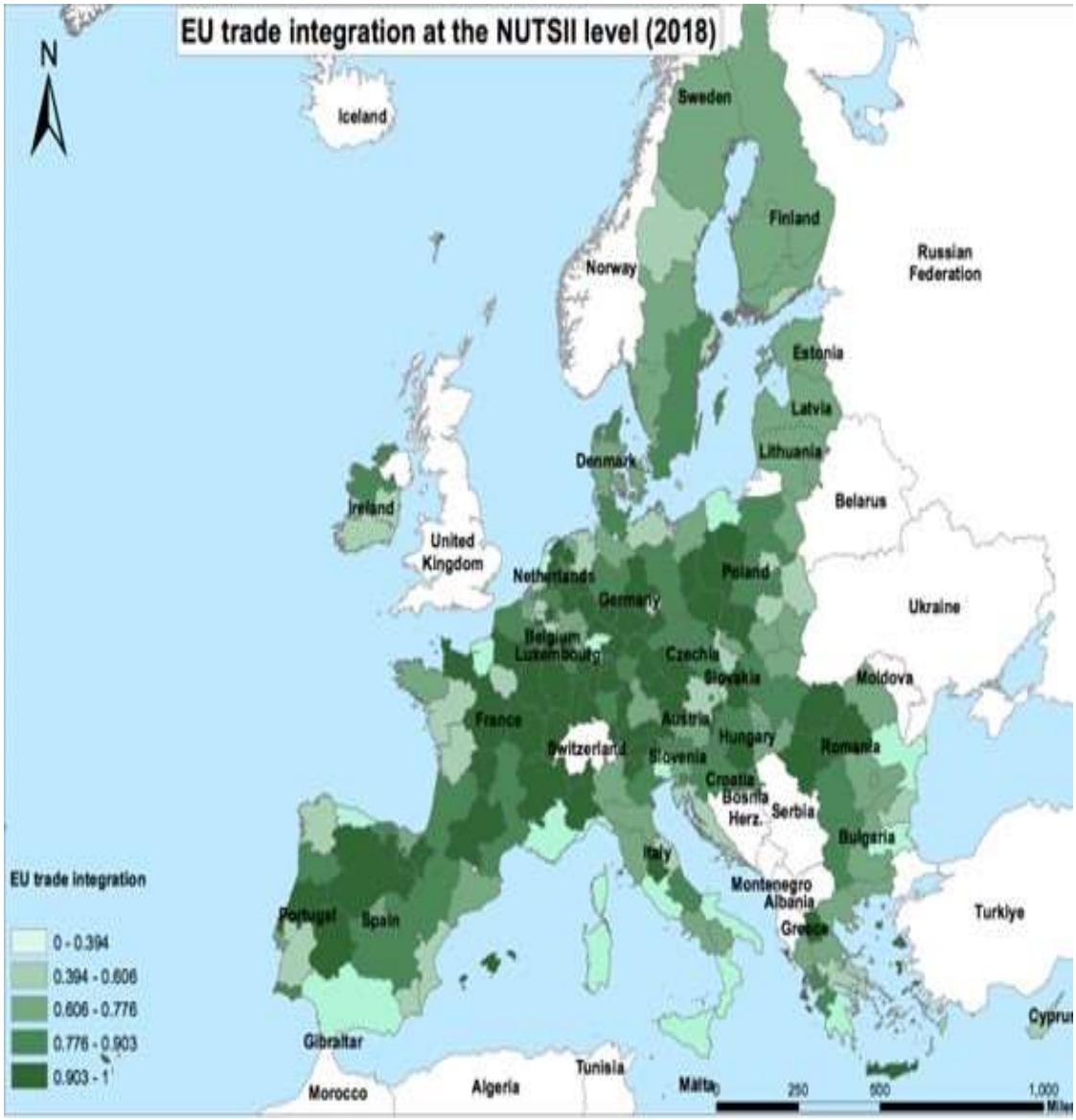
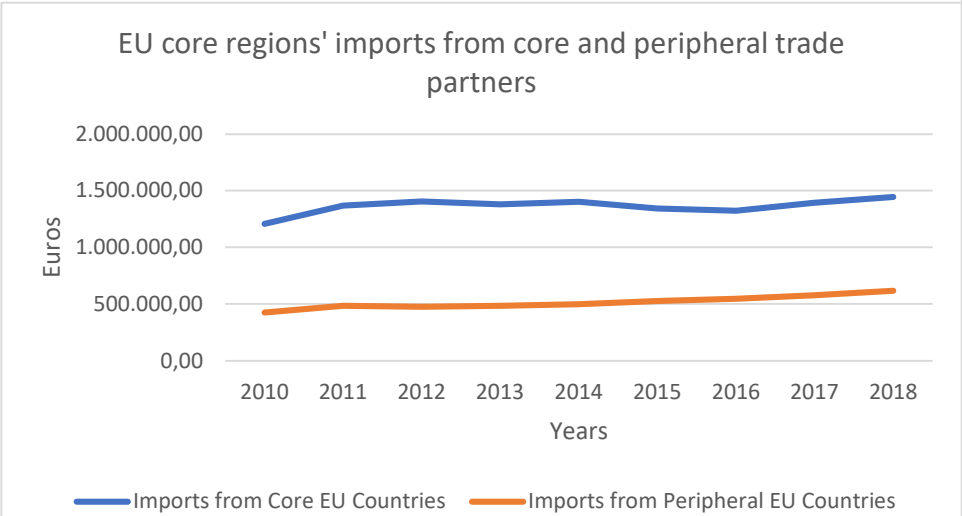
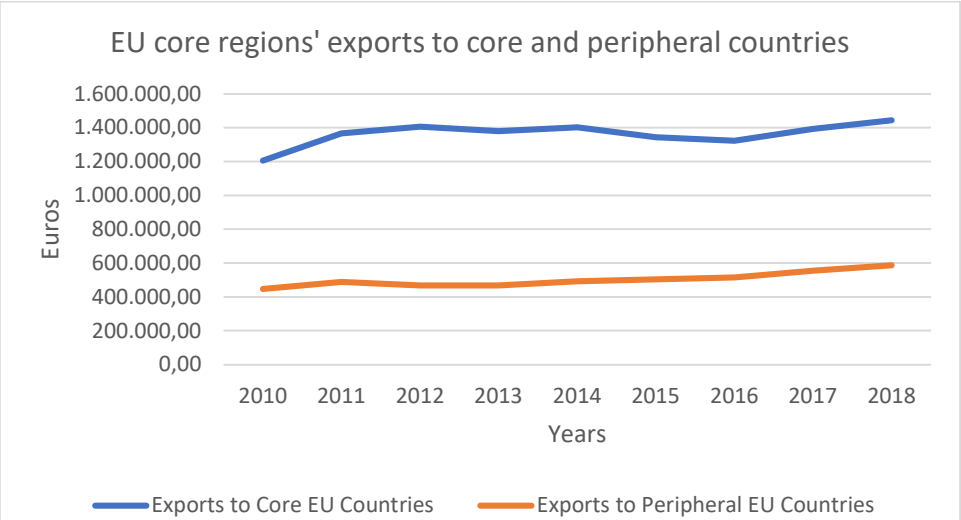


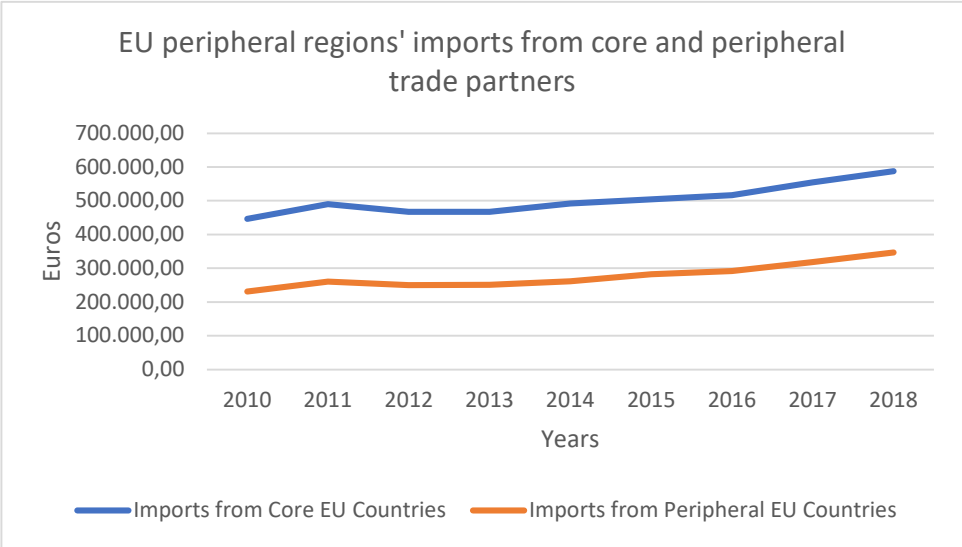
Figure 8. EU trade index at the NUTSII level - 2018

Source: own elaboration using data from ESPON

Figure 9 presents the geographical breakdown of import and export flows for core and peripheral EU regions. Interestingly core regions import and export mostly with core countries while in contrast the periphery imports from core countries (reflecting potentially higher import penetration rates and higher import substitution threats from core trade partners) and export to core countries (possibly mostly inter-industry type of trade). Therefore, the high core-core and core-periphery trade integration is expected to have differential growth impact effects for regions. In order to assess the geography of the trade-growth relationship we examine the relation between EU trade integration and growth for three regional income groups.







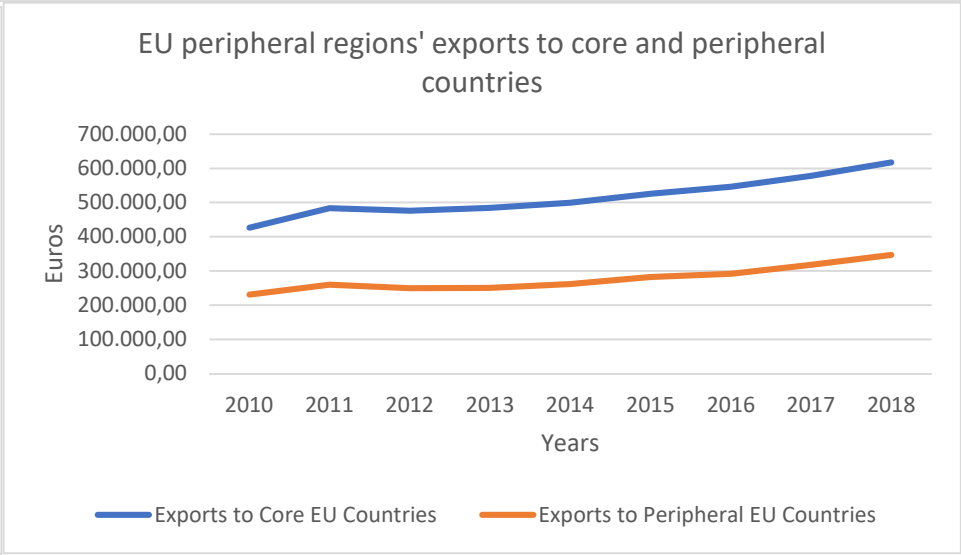


Figure 9. Trade activity between EU regions and EU countries (absolute figures), period 2010-2018

Source: own elaboration from ESPON (2018)

Figure 10 depicts the relation between integration and growth for all EU regions. The fitted line is slightly positive, with variation increasing in higher levels of integration. This indicates that in an EU wide context where all regions are considered, the level of integration may have on average a positive impact on growth, although this impact varies widely, especially in high levels of integration[5]. The association suggests that the integration experience of the EU regions may include both net winners, experiencing a positive impact on growth, and net losers, experiencing a negative impact.

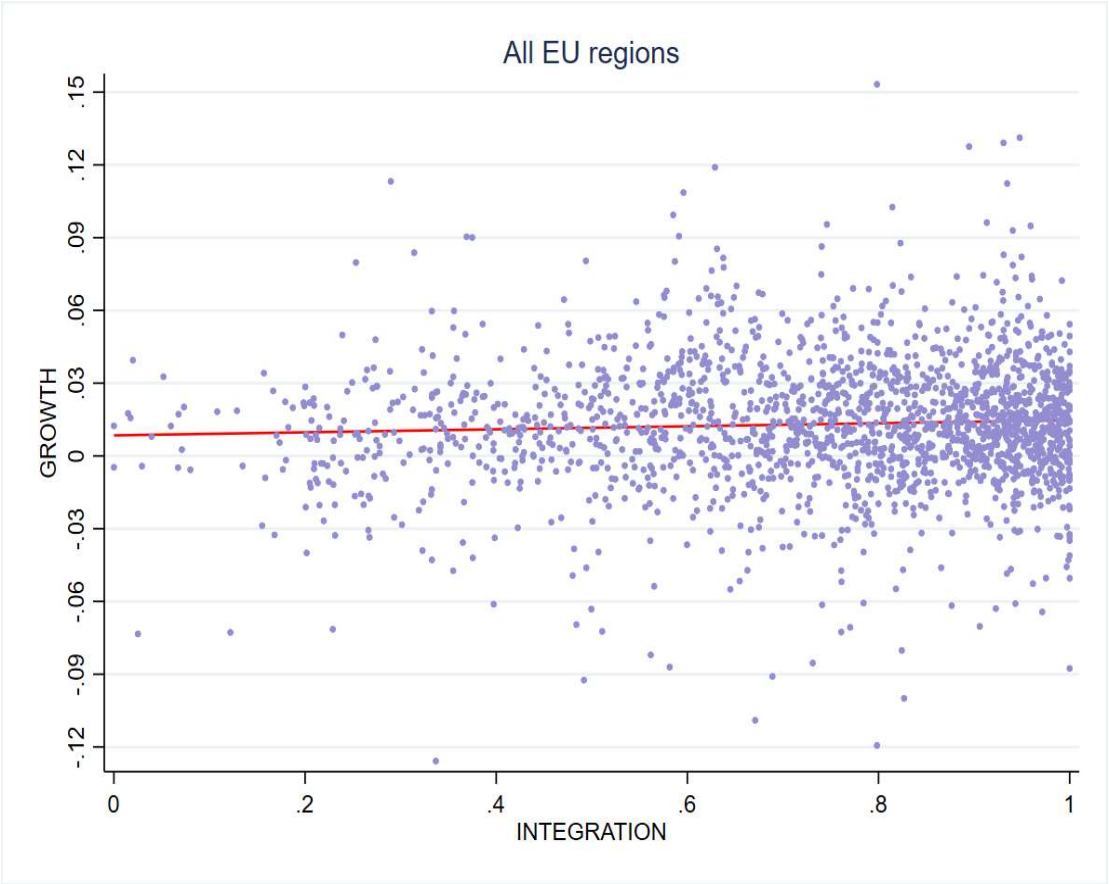


Figure 10. Growth and trade integration in the EU NUTSII regions, 2010-2018

Source: own elaboration using data from ESPON's trade database

[5] Regions with integration index close or equal to 1 are those with no trade relations outside the EU.

Figure 11 presents the same relation for peripheral regions[6] trading with core trade partners[7]. This time the slope is negative, with again significant variation taking place in relatively high levels of integration. The Figure shows that peripheral regions have a variety of experiences in trading with more advanced counterparts. However, on average, integrating into more competitive markets, is typically associated with significant pressures on their productive base that may have a destructive character and hamper their growth.

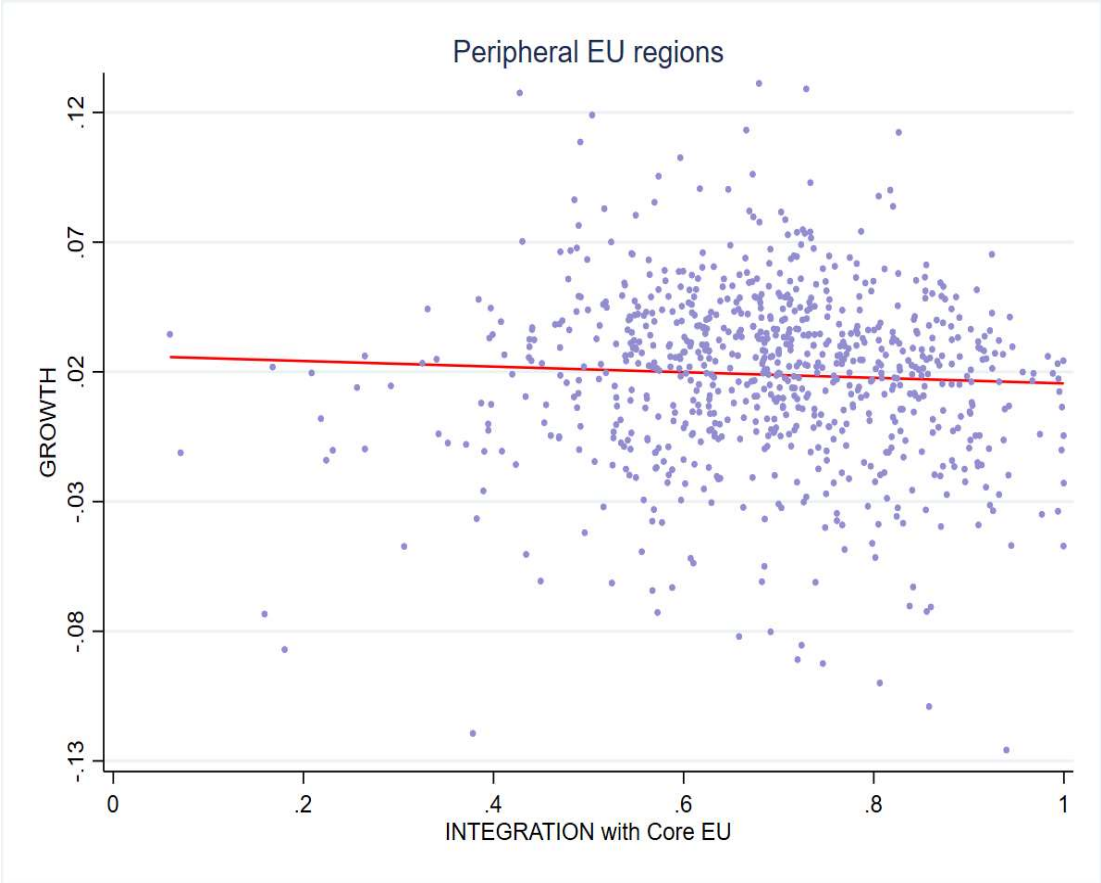


Figure 11. Growth and trade integration of peripheral EU NUTSII regions trading with core EU partners, 2010-2018

Source: own elaboration using data from ESPON's trade database

[6] Peripheral regions: Regions in countries with (national) GDP cap (in constant 2015 prices) lower than the EU national average (NMS, Greece, Portugal, and Spain).

[7] Core EU trade partners: Countries with (national) GDP cap (in constant 2015 prices) higher than the EU national average (Austria, Belgium, Denmark, Germany, Ireland, Finland, France, Italy, Luxembourg, Netherlands, Sweden, UK, Norway, Iceland, Lichtenstein, and Switzerland).

The relation between trade integration and growth seems to be positive (Figure 12) when peripheral regions trade with peripheral EU countries[8]. This indicates that trade among partners with similar development level and sectoral structures may be mutually beneficial and less destructive for the productive base of trading partners.

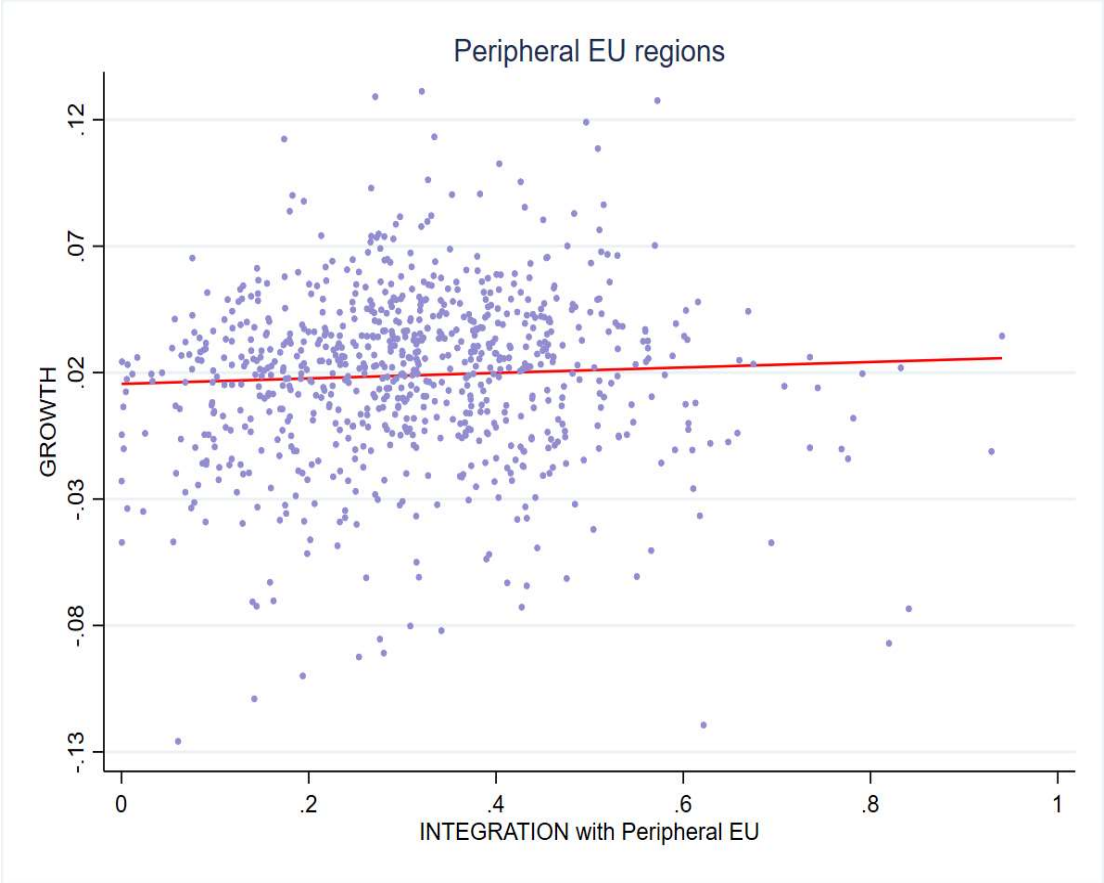


Figure 12. Growth and trade integration of *peripheral* EU NUTSII regions trading with *peripheral* EU partners, 2010-2018

Source: own elaboration using data from ESPON's trade database

Besides the role of integration based on merchandise trade, we also examine the role that trade in services may play in shaping regional performances. Following the tertiarization of national and regional economies, trade in services expands significantly as a share of GDP (Figure 13), but this expansion is unevenly allocated among core and peripheral areas, with the former taking the lion's share of the total trade. Trade in services may include traditional sectors like hospitality and tourism, but also trade in the new tertiary sector that includes the knowledge intensive and high-tech sectors, including software and artificial intelligence. In

[8] Peripheral EU trade partners: countries with (national) GDP cap (in constant 2015 prices) lower than the EU national average (Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovenia, Slovakia, and Spain).

that perspective, they play an important role in both maintaining and changing the productive bases of regions in all sectors of the economy through a process of improvement on the one hand and creative destruction on the other that may have a geographical footprint.

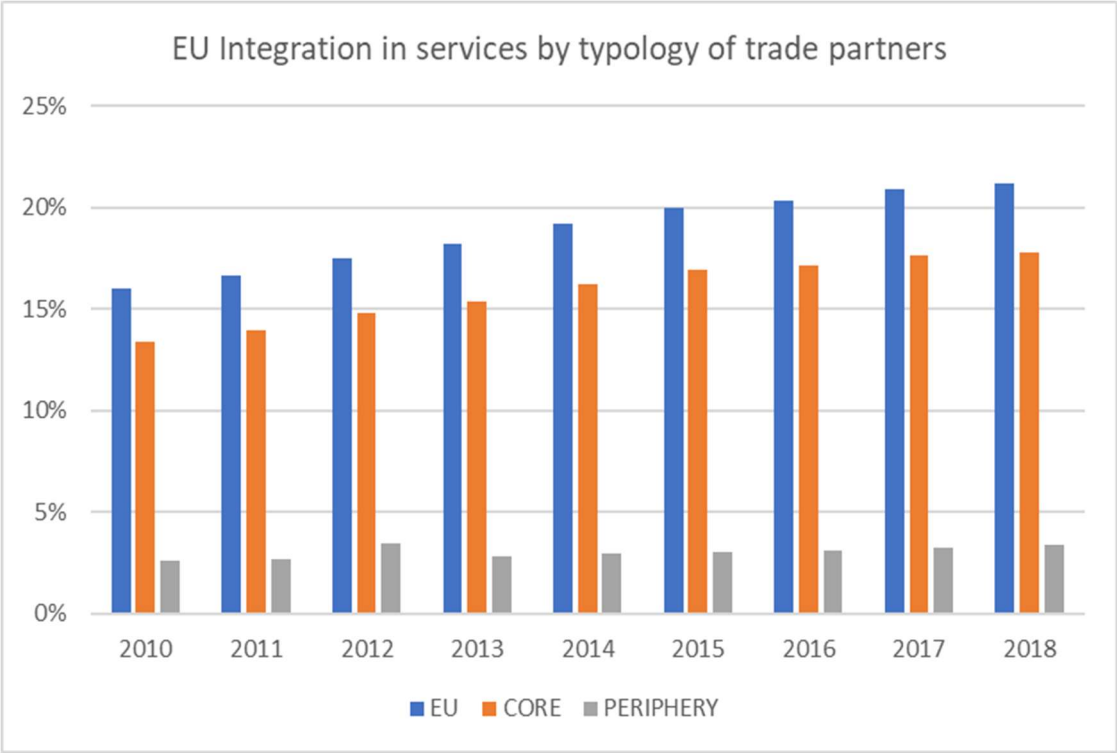


Figure 13. EU Integration in services by type of trade partners

Source: own elaboration using data from ESPON's trade database and EUROSTAT

On average, we expect that this new wave of regional integration would have a positive impact on regional growth, by expanding markets, creating higher value-added jobs and acting as a source of innovation. It remains an open question, however, if this impact will be equally beneficial for growth in both core and peripheral regions.

The Figures below present the relation between regional growth and integration in services for all regions (Figure 14), for peripheral regions trading in services with core partners (Figure 15) and peripheral regions trading with peripheral partners (Figure 16). We observe that most regions have a relatively low level of trade integration in services (less than 30% of GDP) and only a small number has very high levels (that exceed 100% of GDP). We also observe that, when all regions are taken into consideration, there is no clear pattern in the relation of integration in services and regional growth. This may simply mirror the variety of experiences of regions with different characteristics and different specializations in the tertiary sector from their exposure to the competitive forces of the single market.

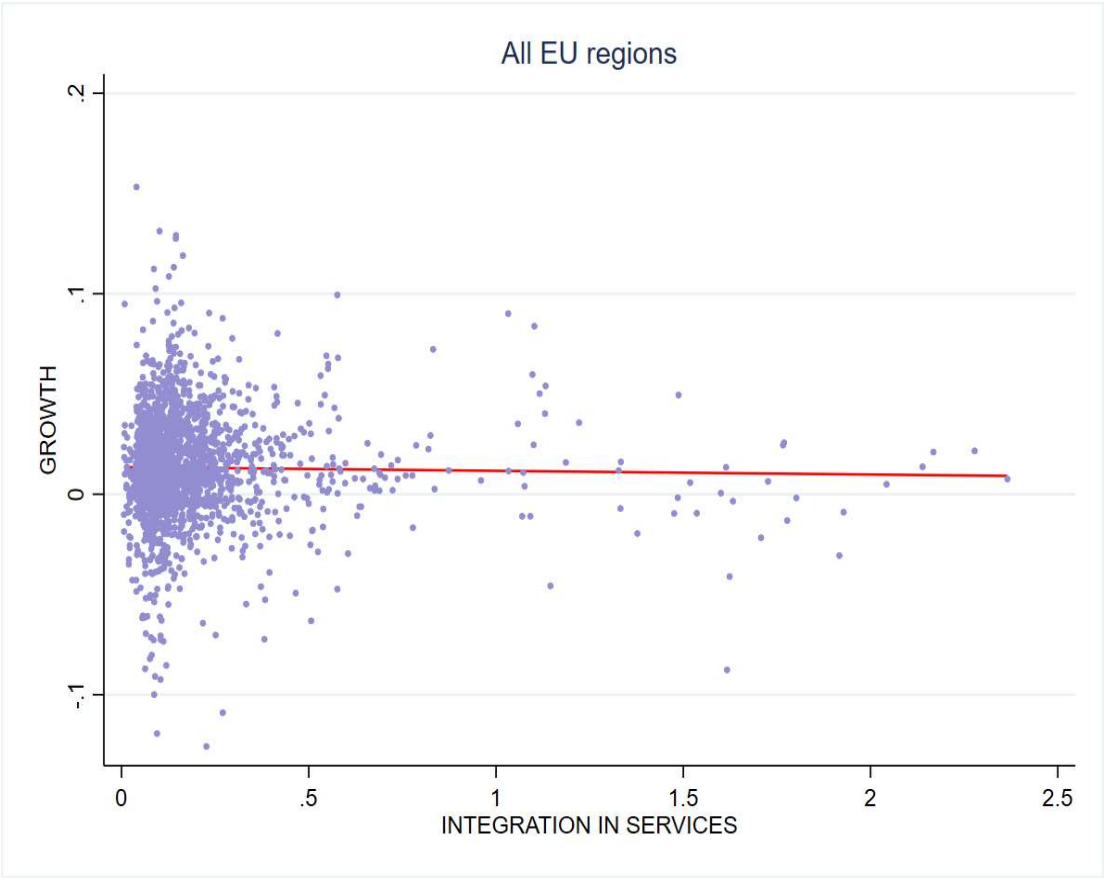


Figure 14. Growth and integration in services in the EU NUTSII regions, 2010-2018

Source: own elaboration using data from ESPON's trade database and EUROSTAT

When we look, however, at the experience of the peripheral regions with trade integration in services, the picture is different. Although the level of integration in services of the peripheral regions is clearly lower, Figures 15 and 16 indicate that the relation between integration in services and regional growth on average may be positive. Although this is similar with the pattern found in periphery-to-periphery trade also in products, there is a clear difference between the core-periphery pattern in services and the one for products presented in Figure 11. How can we explain this difference in the two patterns of core-periphery trade?

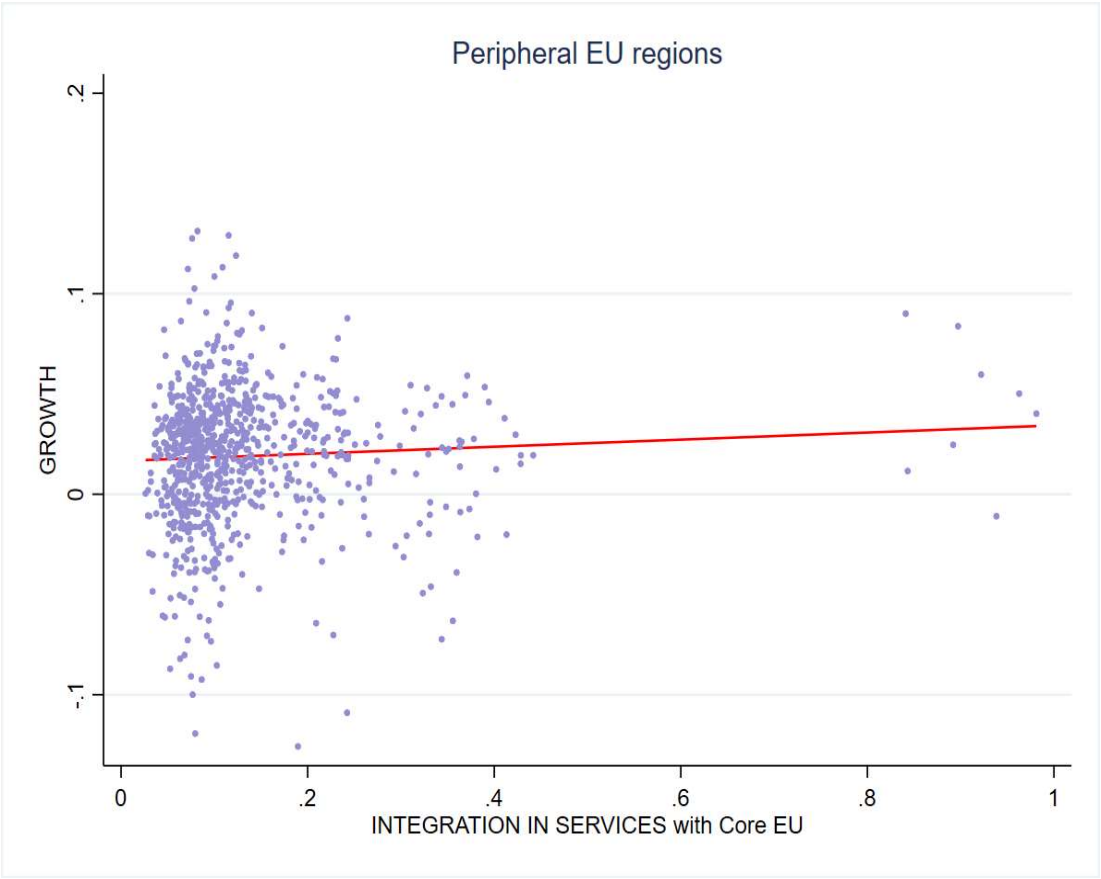


Figure 15. Growth and integration in services of peripheral EU NUTSII regions trading with core EU partners, 2010-2018

Source: own elaboration using data from ESPON's trade database and EUROSTAT

The most likely explanation is that core-periphery trade in services is more compatible to the production bases of the peripheral regions and is less of a threat for existing service and product sectors in weaker regions. The typical pattern of trade may include exports of peripheral regions mainly based on tourism related services and imports related to high-tech service sectors, like software development, artificial intelligence services, or perhaps advisory in the financial, legal, real estate or other sectors. These services are typically absent in the production base of the peripheral regions and as a result, trade does not have an immediate substitution effect, as it may be the case between advanced economies. Moreover, these advanced services tend to support the modernization, restructuring and upgrade of the other sectors of the economy, including manufacturing, in the peripheral regions.

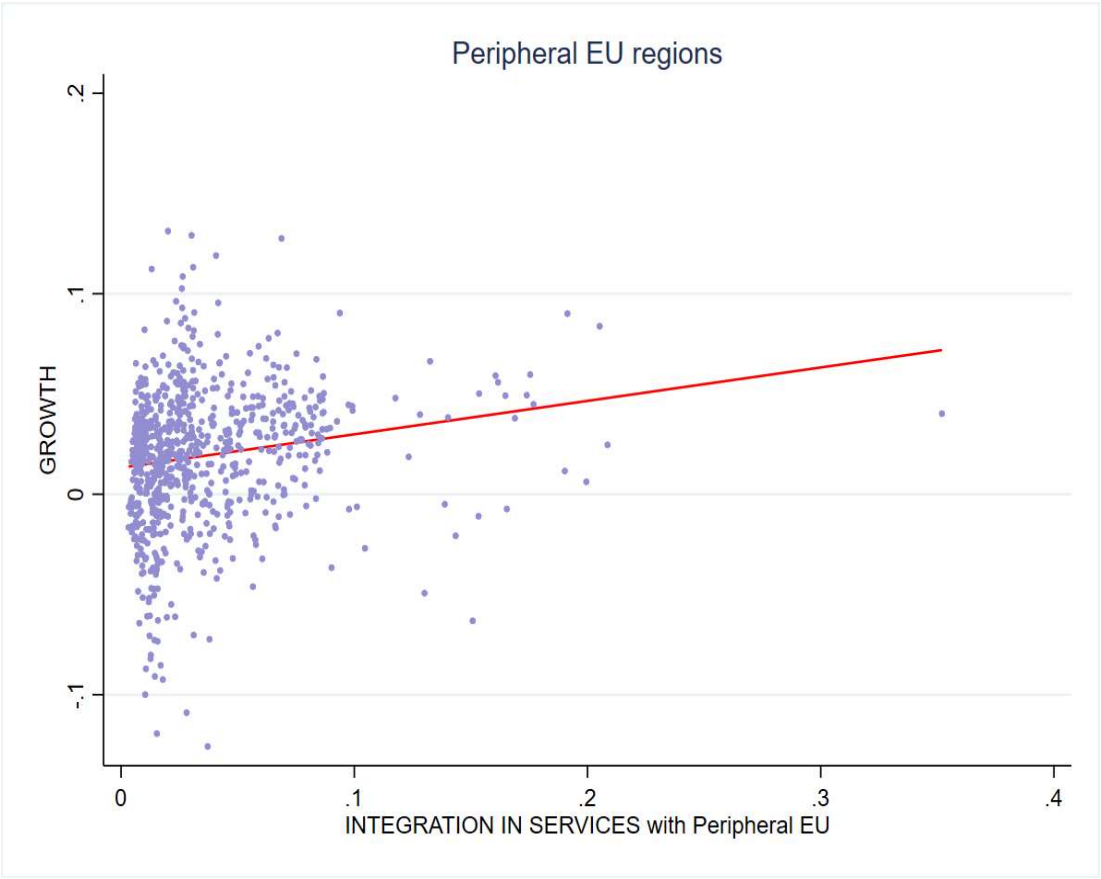


Figure 16. Growth and integration in services of peripheral EU NUTSII regions trading with peripheral EU partners, 2010-2018.

Source: own elaboration using data from ESPON's trade database and EUROSTAT

Of course, some creative destruction will take place locally, as new technologies will displace old ones along with some unskilled labor. Unlike the case of trade in products, however, where the place of displaced local technologies and products is captured by imports, in the case of trade in services there is no immediate substitution effect and the peripheral regions have the chance to adapt local resources to the new state-of-the-art in technology.

During the last one or two decades, unbalanced growth and the distributional dynamics of the European architecture have been related to widespread dissatisfaction of EU citizens with national and EU institutions and an alarming political discontent. Rising dissatisfaction and Euroscepticism (expressed both in the ballot and in Eurobarometer reports) is evident even in traditional pro EU countries. For large segments of population, the EU is not anymore, the promised land of the earlier decades. The architecture of the European economy does not seem to be able to generate enough growth and jobs in the places that need them the most. As a result, places left behind in the EU growth race, or places that feel threatened by wider

processes, have been voting populist, anti-systemic or anti-EU governments and politicians, challenging their overall prospects in the EU market (Petrakos & Sotiriou, 2021). Figure 17 depicts the spatial pattern of EU trust in EU NUTSII regions. Lighter colors depict low levels of EU trust which are found mainly in peripheral regions, in the EU South and in large parts of the UK (during the Brexit year).

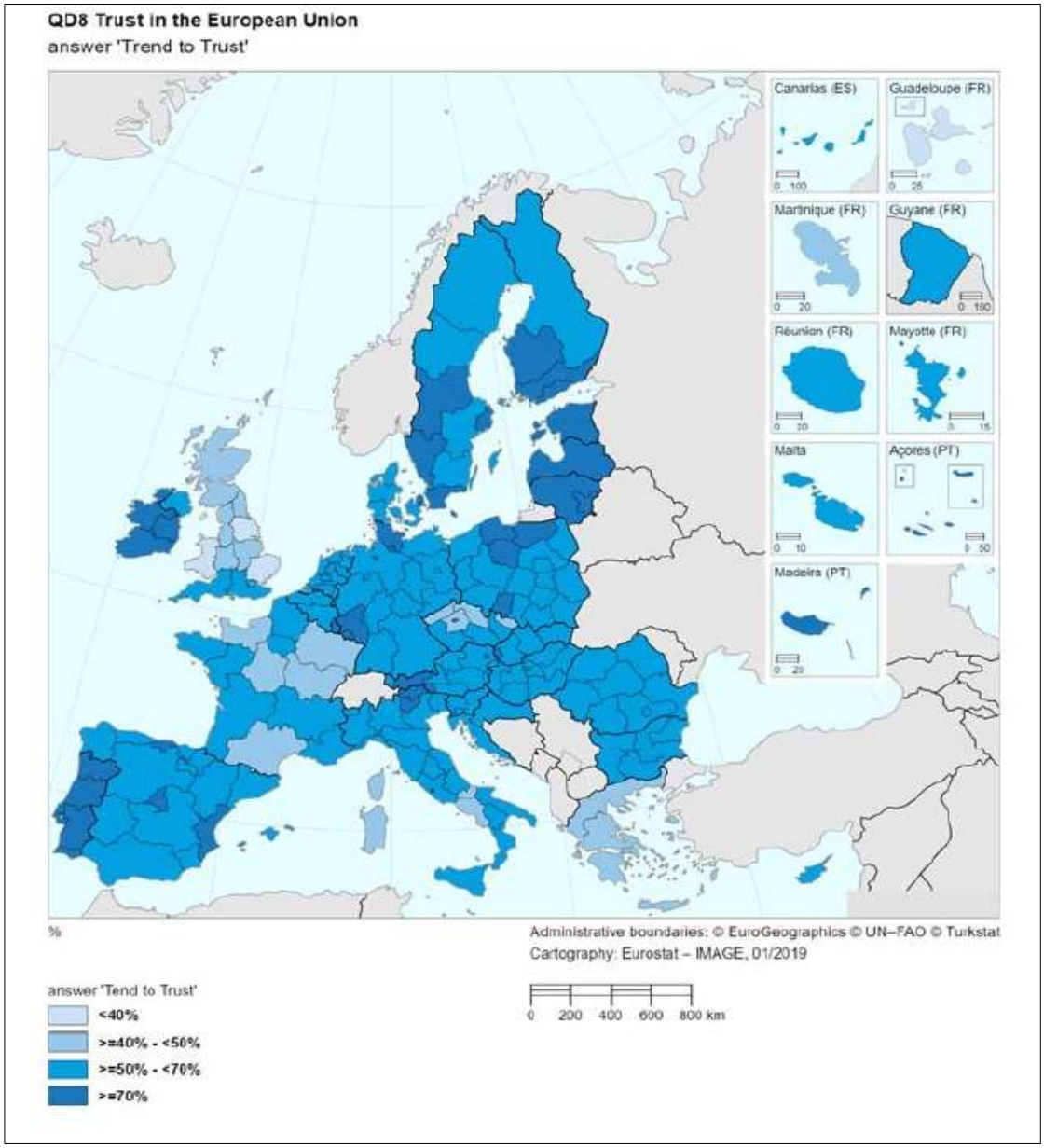


Figure 17. Map of Trust in EU by NUTS II (2018)

Source: EC (2018)

Figure 18 presents the temporal evolution of potential discontent as proxied by the following EU citizens perceptions from the Eurobarometer: tend to not trust and tend to trust. The strikingly high gap between the percentages of *no trust* up to 2015 reflect rising discontent

also expressed in the ballot box and the hard felt depth of the crisis, although there is some convergence in 2018 the no trust is still over the trust in the EU responses.

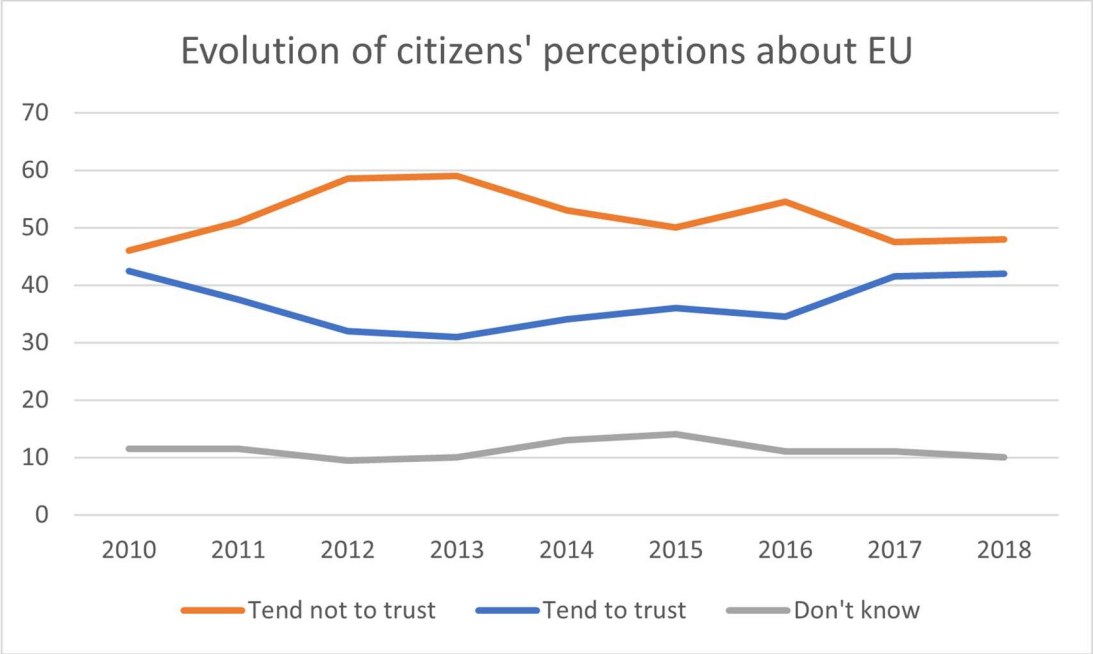


Figure 18. Evolution of discontent (2010 – 2018)

Source: EC (2018)

We expect that discontent has an independent adverse effect on regional growth, as it challenges the institutional and political arrangements underlying the existing economic and social model at the regional, national and EU level. If we express discontent as the percentage of citizens not trusting the EU at the regional level, Figure 19 suggests, there is a clear negative association between growth and discontent.

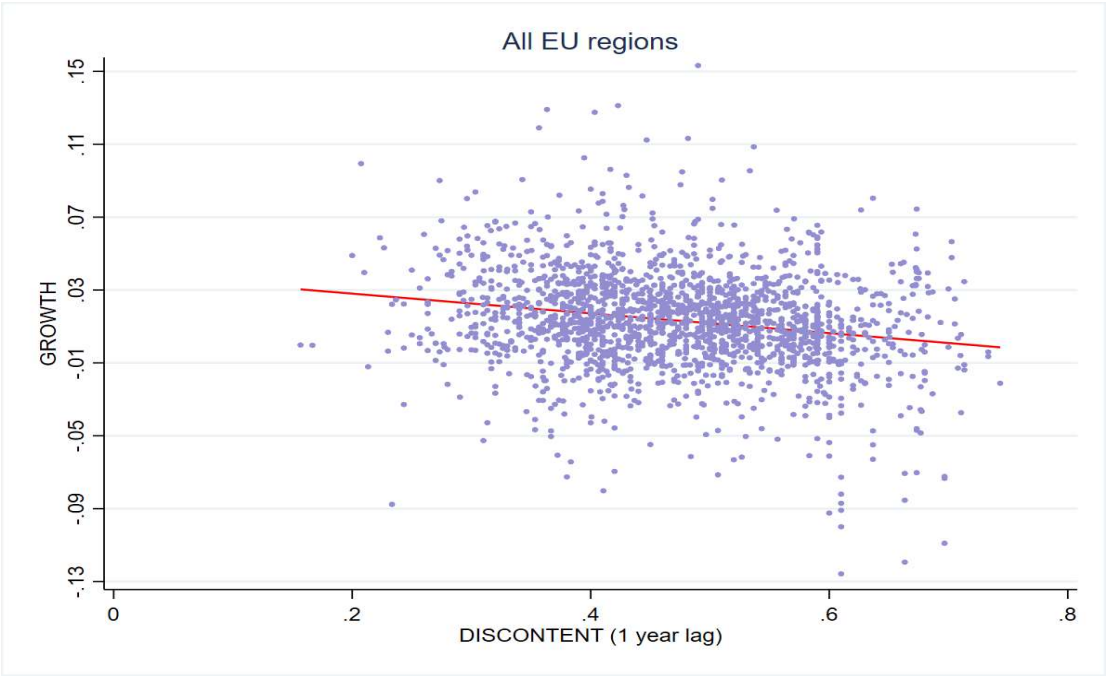


Figure 19. Discontent and growth across EU NUTSII regions, 2010-2018

Source: own elaboration using data from ARDECO and EUROBAROMETER

The following graphs present the evolution and scatterplots between our controls variables (core development determinants such as high skilled employment, the role of public sector, geography, policies and institutions) and regional growth. In Figure 20 we observe an overall increase of the share of high skilled employment in EU region within out study period reflecting the rise in production automation and the digitalization the economy which is positive associated to regional growth as the fitted line suggest in Figure 21.

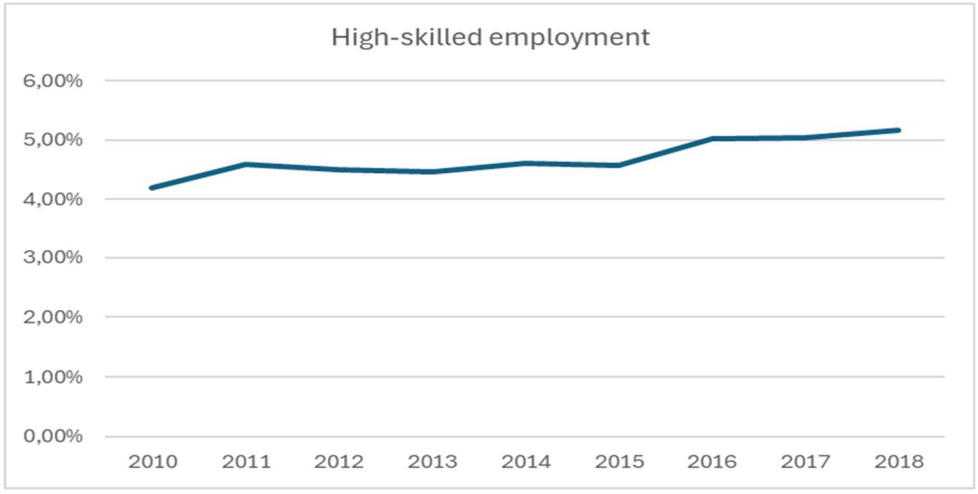


Figure 20. High-skilled employment evolution, 2010-2018

Source: own elaboration using data from EUROSTAT

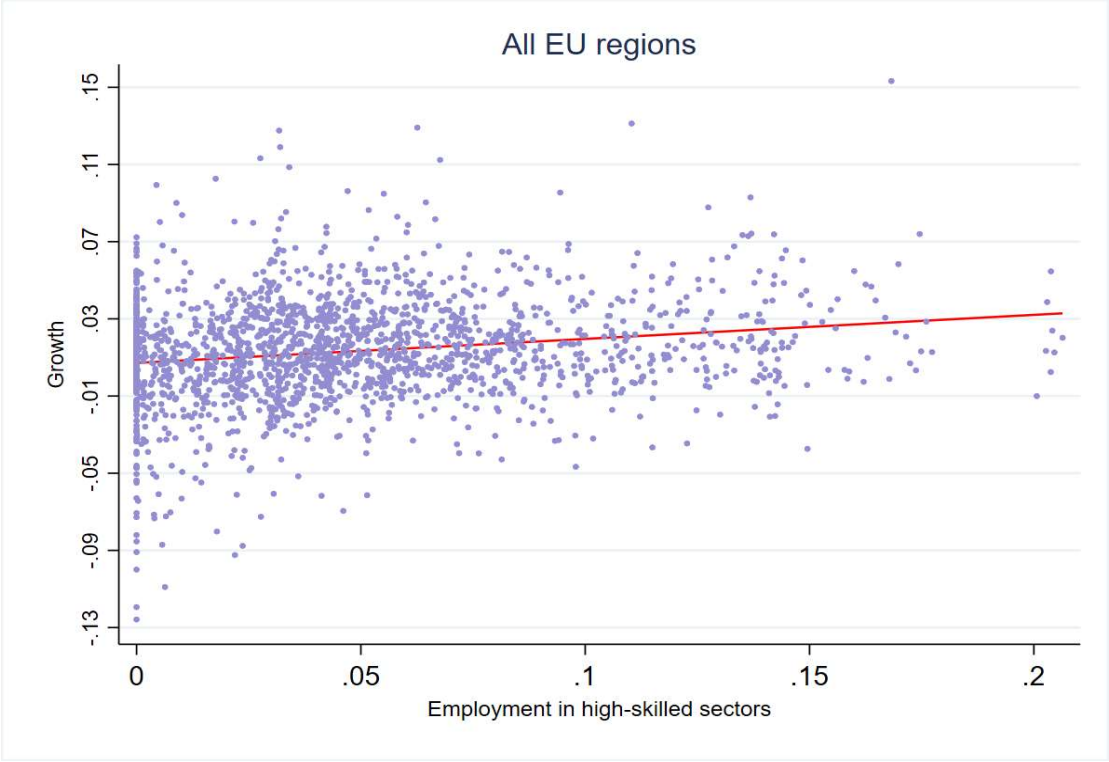


Figure 21. Employment in high-skilled sectors and growth across EU NUTSII regions, 2010-2018

Source: own elaboration using data from EUROSTAT

The role of the public sector in generating growth appears negative suggesting perhaps crowding out effects or lower productivity in certain regions with very large shares (Figure 22 and 23).

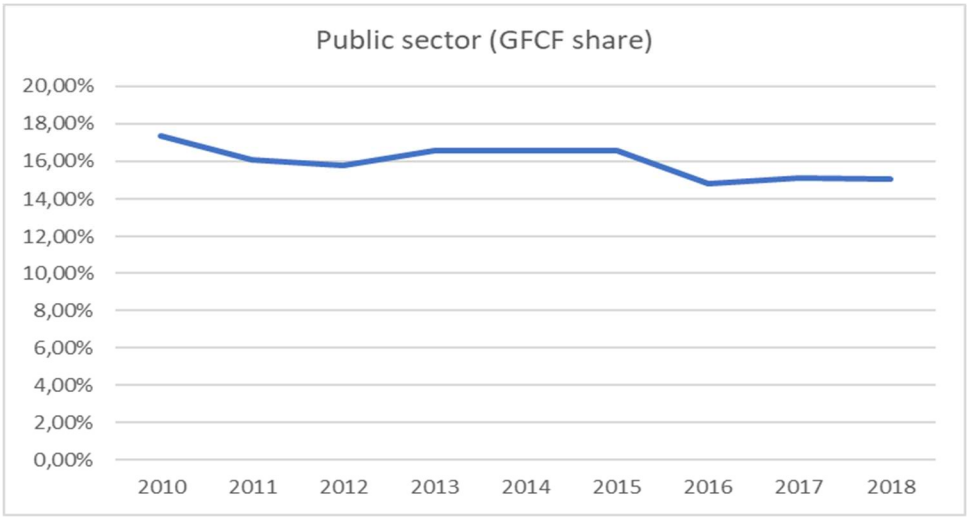


Figure 22. Public sector evolution, 2010-2018

Source: own elaboration using data from EUROSTAT

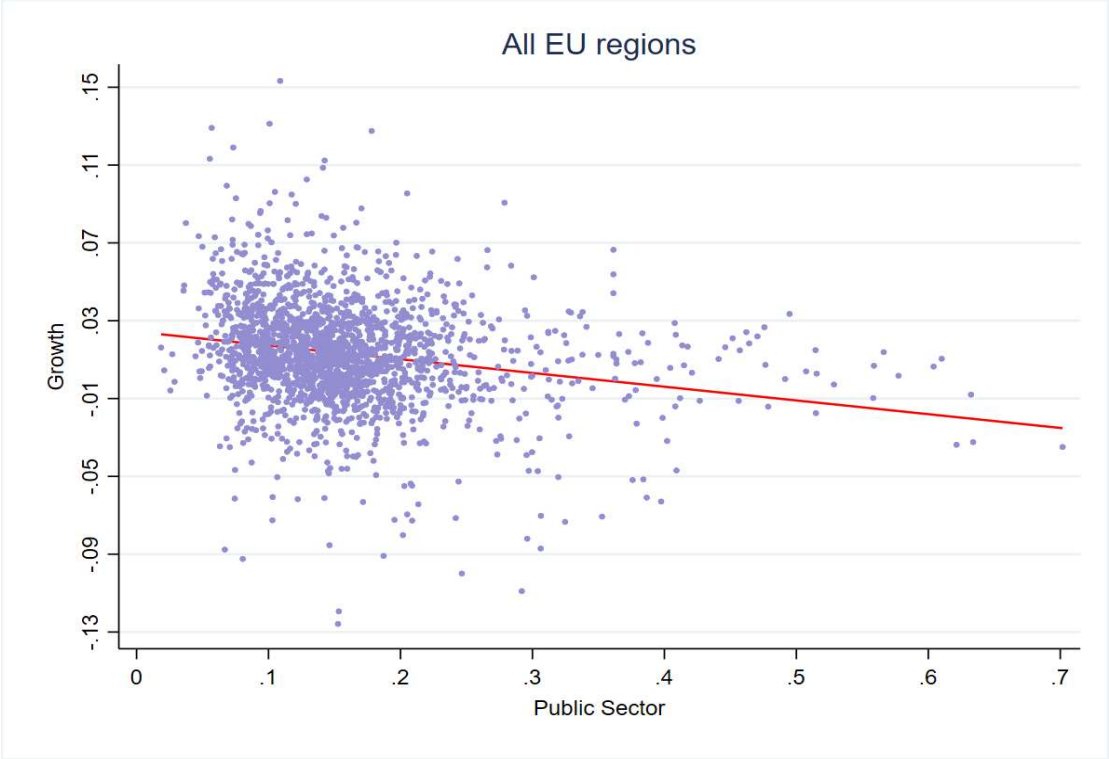


Figure 23. Public sector and growth across EU NUTSII regions, 2010-2018

Source: own elaboration using data from EUROSTAT

Population density and growth seem to be positively associated but not with a significant and pronounced slope (Figure 24).

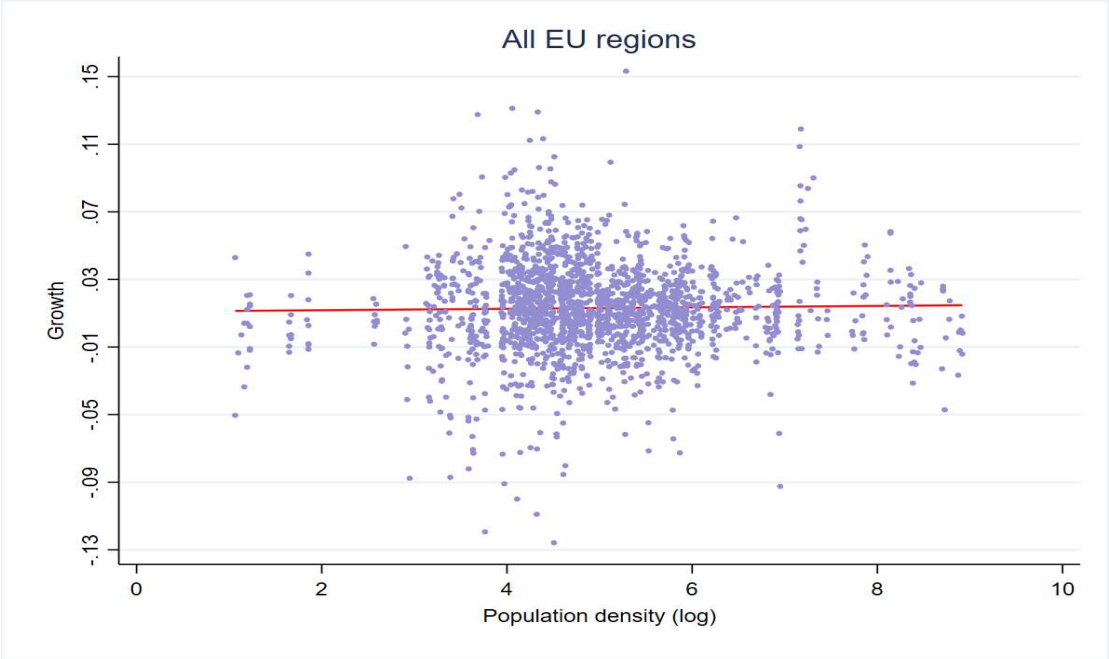


Figure 24. Population density and growth across EU NUTSII regions, 2010-2018

Source: own elaboration using data from EUROSTAT

Regional market size measured by the GDP PPS follows an upward trend temporally and a positive association with regional growth (Figures 25 and 26). These trends reflect the higher purchasing power of the regional population that increases demand consumption and is growth generating.

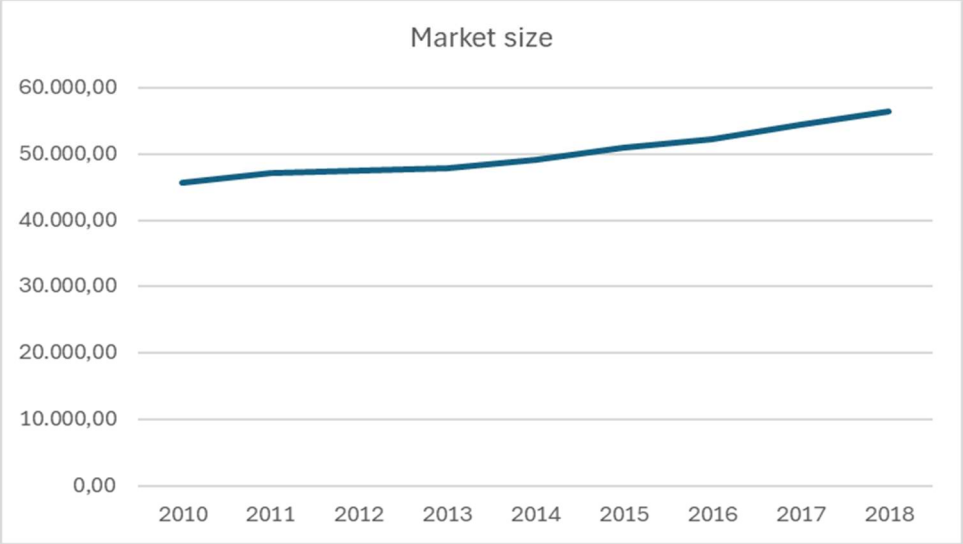


Figure 25. Market size evolution (GDP PPS), 2010-2018

Source: own elaboration using data from EUROSTAT

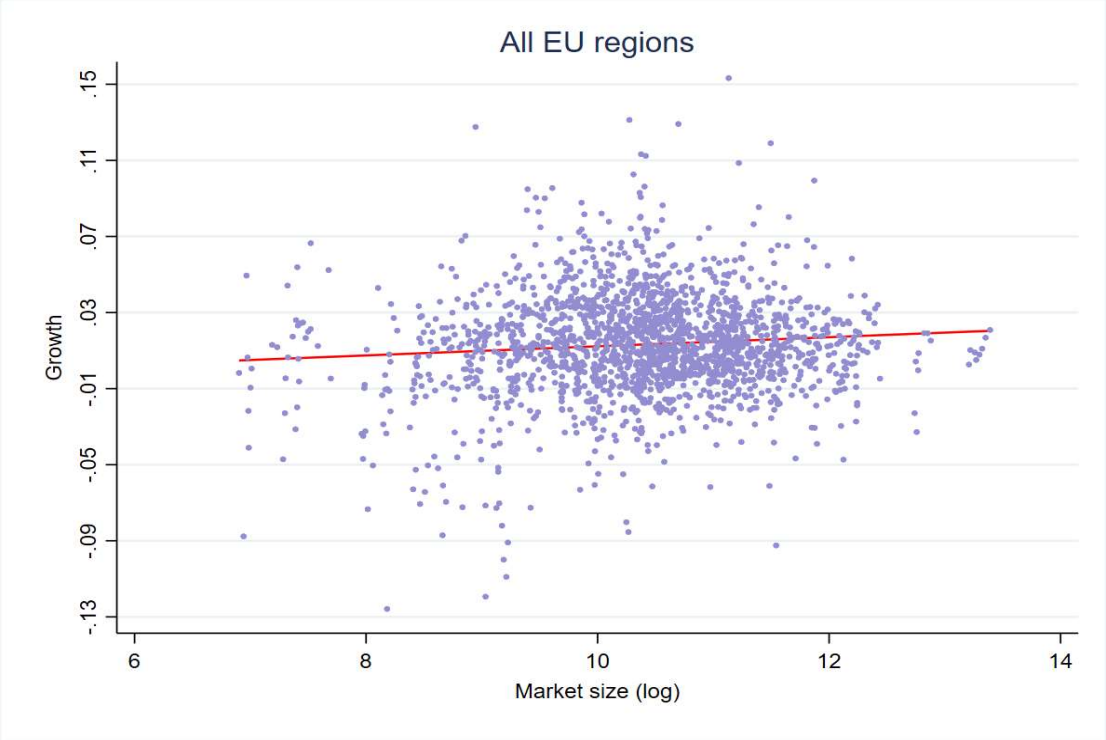


Figure 26. Market size and growth across EU NUTSII regions, 2010-2018

Source: own elaboration using data from EUROSTAT

Lastly, the regional GVA share of the financial sector follows a stable but slightly declining temporal trend (Figure 27) and the association with growth is negative (Figure 28).

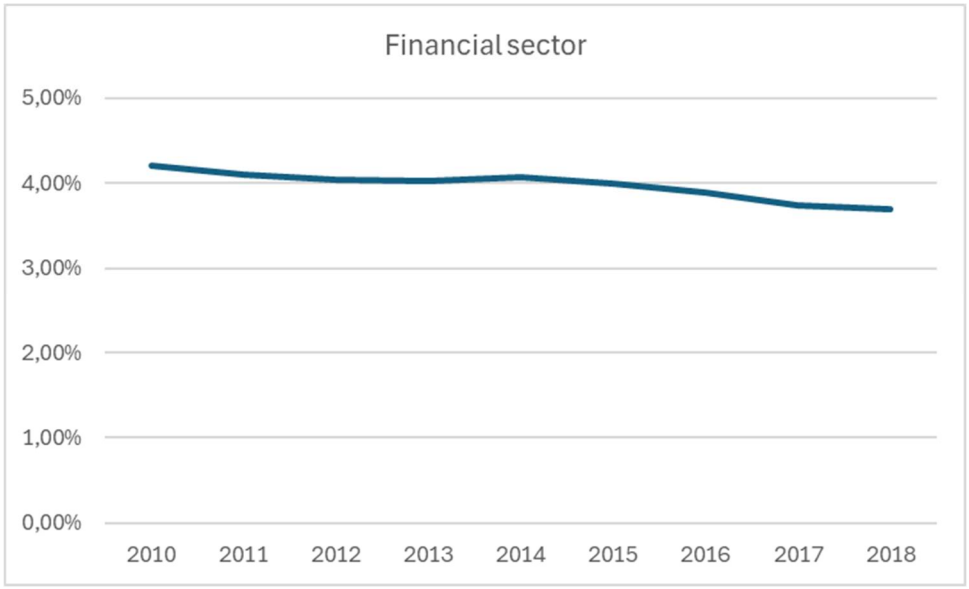


Figure 27. Financial sector evolution, 2010-2018

Source: own elaboration using data from EUROSTAT

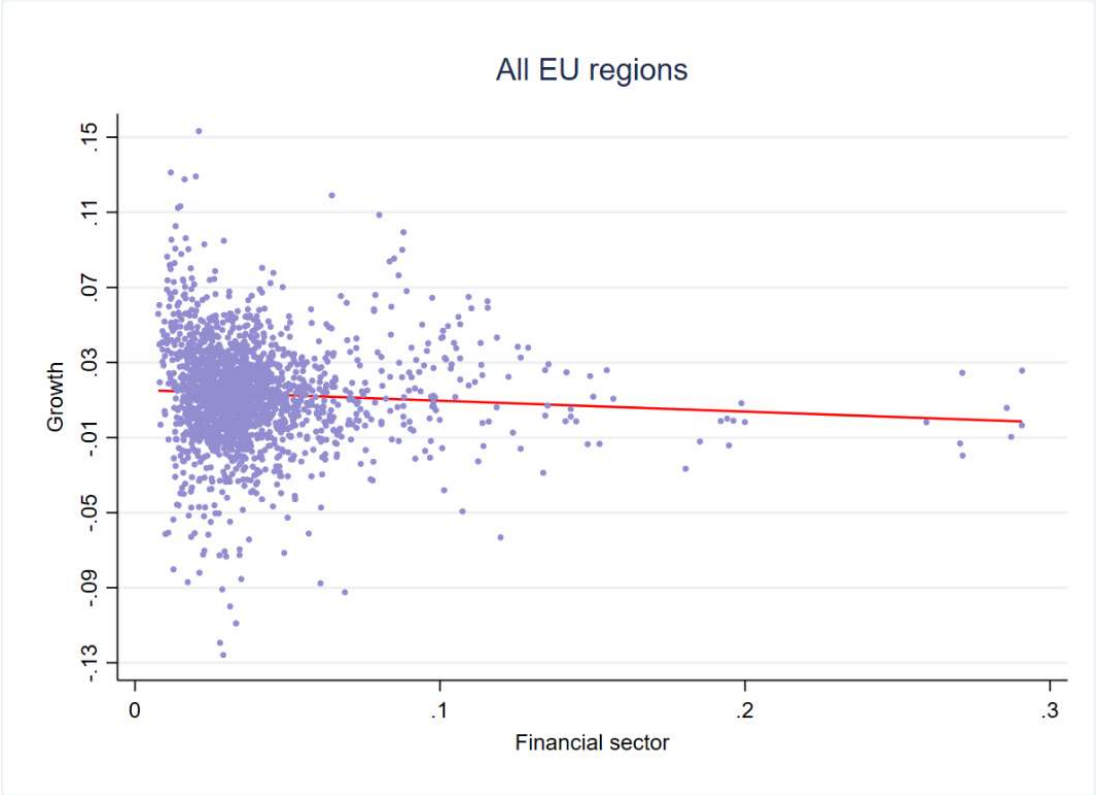


Figure 28. Financial sector as a GVA share and growth across EU NUTSII regions, 2010-2018

Source: own elaboration using data from EUROSTAT

4. Data and methodology

The empirical analysis is based on a conditional β-convergence regional growth model in which the dependent variable is the real GDP per capita growth, and the key variable of interest is the EU trade integration index (*T-INT*). The index represents the ratio of imports and exports from/to the EU in region *r* and year *t* over the total imports and exports of region *r* in year *t*. This is an indicator of EU trade intensity. The key regressor takes the form of two different types of trade integration: a) with trade partners belonging to the EU core ($T\text{-}INT_{CORE}$) and b) with those belonging to the EU periphery ($T\text{-}INT_{PERIPHERY}$).

Region fixed effects are used in all models and standard errors are clustered at the regional level. The period of analysis is confined in the period 2010-2018, which is determined by the availability of regional trade data at the NUTS II level (ESPON, 2018). As there is no consistent trade dataset at this detailed geographical scale, our study contributes with a novelty to the existing empirical literature, as trade at the EU NUTSII level is a unique database and has not been studied, to the best of our knowledge.

The empirical analysis is based on panel econometric models using a balanced dataset employing data at the regional (NUTSII) level augmented by a set of control variables and growth determinants. The estimated equation takes the following form:

$$g_{r,t} = \beta_0 + \beta_1 Y_{r,t} + \sum_{i=1}^{k} \gamma_i Z_{i,r,t} + e_{r,t} \quad (1)$$

where ***g*** is the real GDP per capita growth and **Y** is the real GDP per capita level in thousand euros (at constant 2015 prices). The parameter β_1 detects convergence ($\beta_1 < 0$) or divergence processes ($\beta_1 > 0$) according to the estimated sign.

r = 1,..., 240 EU regions

i = 1,..., k control variables

t = 1, ..., 9 periods (2010 – 2018)

The model examines the impact of trade integration in both products and services, as the latter accounts for an increasing share of trade and is becoming a key element in growth strategies by creating higher value-added jobs and acting as a source of innovation (WTO, 2023). Our expectation is that trade in services (*S-INT*) has a positive effect on growth, as it allows net exporting regions to expand their market and net importing regions to benefit from the embedded technological progress and increase productivity.

We also include the share of employment in high skill sectors (*SKILL*) at the regional level in order to capture the structural characteristics of production. We expect regions with higher shares of high skill labor to perform better in terms of productivity gains, FDI attraction and higher returns to R&D investments (Castellani et al., 2008; Elia et al., 2009; Gagliardi et al., 2015).

The share of the Public Sector (PUB) in the regional Gross Fixed Capital Formation (GFCF) is factored in to capture the importance of public policies in supporting regional growth. We use public investment and not public employment or public GVA, as we put an emphasis on interventions that improve growth related infrastructure in sectors like transportation, energy, telecommunications, education and health, as well as state aid and business support services that are expected to have a positive footprint on regional growth (Petrakos & Psycharis, 2016).

A key issue in the latest years is the increased levels of discontent (DISC) which is associated with the uneven distribution of costs and benefits of the European model and is expected to negatively affect growth potentials (Hendrickson et al., 2018; Rodríguez-Pose, 2018). *DISC* is measured by the one-year lagged share of citizens not trusting the EU, using the data of the Eurobarometer surveys (EC, 2012, 2015b, 2018a) at the regional level[9].

We add in our model a control variable related to the Financialization of the economies (FIN), measured as the share the financial sector in regional GVA. The research question is whether the increasing importance of the financial sector leaves a real footprint in the economy and contributes to growth. The expected impact is positive, as a growing financial sector is expected to increase liquidity and the financial capital required for investment activity (Petrakou et al., 2023).

The regional market size (MARKET) is included using logs of GDP in Purchasing Power Standards (PPS, EU27) to account for size-related effects on growth, under the NEG-type assumption that larger economies have more opportunities to develop larger firms and more efficient regional value chains (Iammarino et al., 2019; Petrakos et al., 2011).

The logarithm of population density (DENS) is also included as a proxy of agglomeration economies with a positive expected impact on regional growth accruing from positive externalities arising in denser and more diverse economies (Campbell & Hopenhayn, 2005; Kallioras et al., 2018; Petrakos, 1992; Petrakos et al., 2011; Rodríguez-Pose & Sotiriou, 2021).

[9] We use the data for the years 2012, 2015 and 2018 and interpolation and extrapolation techniques to estimate the data for the rest of the years in the period 2010-18.

Finally, we include a dummy variable that accounts for Eurozone membership, which varies across regions and time periods. The variable intends to capture the different macroeconomic environment of the Eurozone regions that improves market access and removes obstacles or currency related uncertainty, but at the same time deprives regions from the monetary policy option that can be used in favor of weaker regions and their productive base that may be faced with fiercer competition in the single market (IMF, 2005; Petrakos, et al., 2012). This variable is expected to capture the net effect of the additional creative and destructive forces released by the one currency benefits and limitations at the regional level. All variables and their measurements are presented in detail in Table A1 in Appendix. Tables A2 and A3 present the summary statistics and the pairwise correlations.

The empirical analysis takes into account both the geography and typology of regions by estimating the effects of different types of trade integration at different levels of aggregation. The model in equation (1) is first estimated for all the EU regions and then for the peripheral regions separately, testing for heterogeneous effects from different types of trade integration. The hypothesis is that the growth effects of integration in peripheral regions may be different in their trade with core regions than in their trade with peripheral regions.

5. Empirical analysis

Table 1 presents the results of the baseline model including *all* EU regions trading with all EU trade partners. In order to account for the geographical heterogeneity of the EU trade impact, the models are re-estimated in Tables 2 and 3 for the subset of peripheral regions trading with core trade partners and peripheral trade partners respectively.

Coefficient β_1 is positive and statistically significant, indicating that a process of spatial divergence is taking place at the EU level, as more advanced regions have on average a better growth performance than the lagging regions.

In all fixed effects models in Table 1 the EU trade integration index (*T-INT*) returns a positive and significant sign, which remains robust across all specifications. This finding indicates that overall, at the level of the entire EU market, trade contributes to regional growth, acting as a neoclassical catalyst of expanding markets, knowledge and technology transfer as well as efficiency enhancing imports in the production process.

Our results show that higher shares of skilled labor (*SKILL*) also contribute to higher growth, reflecting the role of human capital endowments at the regional level.

Trade in services (*S-INT*), appears with a positive coefficient in models (3) to (6), which however is significant only in model (3). The results do not provide very robust evidence at the '*all regions'* level, one explanation being related to the possibility of partially offsetting import substitution effects in the high-tech sectors in advanced regions, where competition is more intense.

The effect of the discontent variable (*DISC*) on regional growth, which captures the impact of anti-EU sentiments, is tested with both a linear and a quadratic form of the variable. The linear models provide evidence that there is a negative impact of discontent on regional growth that is statistically significant (in models 5 and 6). The quadratic models indicate that at low to modest levels (measured by the percentages of no trust in the EU), discontent appears to be positively associated with growth. However, at higher levels, discontent appears with a negative and significant impact on growth, which is in line with the recent empirical evidence (McCann, 2020; Rodríguez-Pose et al., 2023). A possible explanation of this finding is that low or modest levels of dissatisfaction may be associated with reasonable concerns or a sincere criticism of EU policies from the point of view of improving them. After some point, however, estimated around 46% of the respondents having a negative opinion for the EU, discontent

becomes widespread, and it is associated with perceptions and actions that may have a destructive effect on the operation of markets and on economic policy.

Table 3. All EU regions to all EU trade partners

DEP.V.: g	(1)	(2)	(3)	(4)	(5)	(6)
Y	**0.006*** **	**0.005*** **	**0.006*** **	**0.004*** **	-0.0001	-0.0001
	(0.0005)	*(0.0004)*	*(0.0004)*	*(0.001)*	*(0.0002)*	*(0.0002)*
T-INT	**0.030*** **	**0.030*** **	**0.026*** **	**0.023*** **	0.002	0.004
	(0.009)	*(0.009)*	*(0.008)*	*(0.008)*	*(0.003)*	*(0.004)*
SKILL	**0.229*** **	**0.226** **	**0.226*** **	0.150	**0.115*** **	**0.089** **
	(0.087)	*(0.088)*	*(0.082)*	*(0.095)*	*(0.034)*	*(0.039)*
DISC		-0.011	**0.311*** **	**0.284*** **	**-0.048*** **	**-0.048*** **
		(0.011)	*(0.057)*	*(0.057)*	*(0.009)*	*(0.009)*
$DISC^2$			**-0.339*** **	**-0.296*** **		
			(0.063)	*(0.061)*		
S-INT			**0.032***	0.015	0.003	0.009
			(0.019)	*(0.027)*	*(0.005)*	*(0.006)*
PUB			**0.081*** **	**0.102*** **	**-0.025***	-0.005
			(0.028)	*(0.026)*	*(0.013)*	*(0.015)*
DENS				**-0.216*** **		0.0004
				(0.046)		*(0.001)*
MARKET				**0.080*** **		**0.004*** **
				(0.026)		*(0.001)*
FIN				0.101		-0.096
				(0. 127)		*(0.072)*
EUROZONE					**-0.013*** **	**-0.015*** **
					(0.003)	*(0.003)*
Constant	-0.167***	-0.158***	-0.257***	0.028	0.045***	0.001
	(0.015)	(0.016)	(0.019)	(0.266)	(0.005)	(0.014)
Observations	1,902	1,902	1,902	1,884	1,902	1,884
R-squared	0.128	0.129	0.158	0.190	0.119	0.125
Number of regions	240	240	240	240	240	240
F	49.49	46.24	42.63	64.94	.	.
FE	YES	YES	YES	YES	NO	NO
Thresholds						
DISC			0.46	0.46		
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

The impact of the public sector (*PUB*) on regional growth is inconsistent. It appears with both positive and negative, significant and insignificant coefficients at the '*all regions*' level. This may be related to possible crowding out effects in regions where the public sector is already sufficiently large, or to the fact that an often-large part of public investment (security, defense, bureaucracy) is not contributing to growth.

The impact of density (*DENS*) is not the expected one, as it appears to be negative and significant in one model. Although this is not a robust finding, a possible explanation is that

the NEG-type agglomeration economies in major metropolitan areas have been offset by diseconomies of concentration related to congestion and pollution or rising land cost. Another possible explanation is that the digitalization of the economy has reduced the importance of physical proximity and has increased the importance of digital proximity, which, however, can be secured with lower densities and remote work based on global digital networks.

The impact of regional market size (*MARKET*) is positive and significant, indicating that large home-markets are associated with scale effects and efficiency gains in production.

On the other hand, the Financialization of the economy (*FIN*), associated with the rise of the importance of the banking sector, the financial institutions and the financial services does not seem to contribute to regional growth at the level of '*all regions'*. This may be related to the oligopolistic structure of this sector, its lending practices and the management of the accumulated debt of the business sector that may lead to an unfavorable mix of business creation and destruction.

Finally, the impact of being part of the Eurozone is negative, indicating that, at the regional level, the net effect of the common currency may have been associated with an unfavorable balance of creative and destructive effects. In addition, during the prolonged recession period, regional growth was in fact impeded by contractionary and austerity policies applied in the Eurozone, leaving a negative footprint compared to regions outside Eurozone.

Given the uneven geography of development in the EU, especially at the regional level, an interesting research and policy question is whether we should expect the same or a differentiated impact of key drivers of growth when the focus is on peripheral regions. Especially for the process of integration, it is important to know if the expansion of trade of peripheral regions with the advanced core regions continues to have the positive footprint in their economy found in Table 1. The alternative hypothesis is that the geographically uneven distribution of the benefits and costs of integration exert significant pressures on the growth prospects of these regions.

In order to examine the hypothesis for heterogeneous effects of integration among different geographical and development groups, we estimate again our model only for the subgroup of peripheral regions. The underlying assumption is that economic integration between regions with similar levels of development may pose "milder" competition effects than integration between regions with very unequal income levels as it reflects the nature of the trade integration (intra-industry trade versus inter-industry trade).

Table 2 presents the results of the same set of models in the case of peripheral regions trading with core trade partners, while Table 3 presents the results of peripheral regions trading with peripheral trade partners. The results confirm the hypothesis that *the mix of trade with equal and unequal partners* is critical for growth. When peripheral regions trade with EU core partners, the integration effect is negative, statistically significant and robust, due to the prevailing effect of import penetration on their productive base.

Table 4. Peripheral EU regions to core EU trade partners

DEP.V.: g	(1)	(2)	(3)	(4)	(5)	(6)
Y	**0.008*** **	**0.005*** **	**0.007*** **	-0.0002	**0.001** **	0.0004
	(0.001)	*(0.002)*	*(0.001)*	*(0.003)*	*(0.0003)*	*(0.0003)*
$T\text{-}INT_{core}$	**-0.028***	**-0.026** **	**-0.018** **	**-0.021** **	**-0.021*** **	**-0.027*** **
	(0.014)	*(0.013)*	*(0.009)*	*(0.010)*	*(0.008)*	*(0.008)*
SKILL	**0.358*** **	**0.343*** **	**0.238*** **	**0.147***	**0.252*** **	**0.214*** **
	(0.109)	*(0.098)*	*(0.085)*	*(0.078)*	*(0.041)*	*(0.043)*
DISC		**-0.100*** **	**-0.077*** **	**-0.059*** **	**-0.121*** **	**-0.116*** **
		(0.019)	*(0.018)*	*(0.019)*	*(0.012)*	*(0.012)*
$S\text{-}INT_{core}$			**0.202*** **	0.073	**0.039*** **	**0.068*** **
			(0.071)	*(0.077)*	*(0.010)*	*(0.014)*
PUB			**0.128*** **	**0.136*** **	0.016	**0.052*** **
			(0.027)	*(0.025)*	*(0.018)*	*(0.019)*
DENS				**-0.198** **	-0.001	-0.001
				(0.085)	*(0.002)*	*(0.001)*
MARKET				**0.126*** **		**0.009*** **
				(0.031)		*(0.002)*
FIN				-0.118		**-0.213*** **
				(0.224)		(0.081)
EUROZONE					**-0.018*** **	**-0.019*** **
					(0.004)	*(0.005)*
Constant	-0.097***	-0.004	-0.087***	-0.304	0.078***	-0.014
	(0.022)	(0.030)	(0.030)	(0.560)	(0.007)	(0.021)
Observations	788	788	788	776	776	776
R-squared	0.133	0.174	0.229	0.287	0.314	0.333
Number of regions	100	100	100	100	100	100
F	32.97	45.07	33.69	37.28	.	
FE	YES	YES	YES	YES	NO	NO
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

The models in Table 2 still generate the same results for the *Y, SKILL, DENS, MARKET* and *EUROZONE* variables. Even among peripheral regions, the coefficient of *Y* and the prevailing trend is still divergence, possibly indicating the presence of a group of persistently underperforming regions at the low end of the income distribution. Similarly, the coefficient of the *SKILL* variable is positive, significant and robust, highlighting the importance of human capital for peripheral regions.

The *DENS* variable appears again with a negative and significant coefficient in one of the models, the *MARKET* variable with a positive and significant coefficient in two models and the *EUROZONE* dummy again with a negative and significant coefficient in two models. It is interesting that the coefficient of *EUROZONE* is greater in Table 2 (and 3), indicating that the adverse effects of the Eurozone are more intense in peripheral regions.

The impact of the other variables in Table 2 is different from that in Table 1 in a number of ways. First, *DISC* appears with a negative, significant, universal (for all levels of discontent and not only after a threshold) and robust effect on growth. Second, in contrast with the weak of unclear effect in Table 1, trade in services ($S\text{-}INT_{core}$) with core regions has a clear positive and significant effect on growth performance in peripheral regions, indicating the importance of this type of trade as a transmission mechanism for high-tech knowledge and innovation in their productive base. Third, the impact of public investment (*PUB*) on regional growth is positive, significant and robust, indicating that peripheral regions may depend more on public investment (and in fact EU Structural Funds that make up a significant part of PUB) in order to reach certain infrastructure thresholds and embark on a positive and sustainable growth trajectory.

Finally, the impact of *FIN* is negative and significant in one model raising the issue that peripheral regions may have a more adverse experience with the operation of the financial sector. This may be related to austerity policies used in exposed weaker economies to protect the banks during the debt crisis that led to a massive redistribution of private wealth and affected aggregate demand (Petrakos, 2014).

Table 3 presents the results of the models when peripheral regions trade with each other. Interestingly, the results show a positive, significant and robust effect of integration on growth. This result is in line with our assumption that integration can be mutually beneficial and growth inducing when regions with similar income and development levels trade with each other. This type of integration probably has a higher intra-industry component and does not pose any of the threats that inter-industry trade with the core partners may imply. The down side of this type of integration, of course, is that it does not support the structural transformations of the productive base for the real convergence of weaker regions with their more advanced counterparts. The remaining growth determinants provide similar results with Table 2.

Table 5. Peripheral EU regions to Peripheral EU trade partners

DEP.V.: g	(1)	(2)	(3)	(4)	(5)	(6)
Y	**0.008*** **	**0.005*** **	**0.007*** **	-0.0005	**0.001** **	**0.001** **
	(0.001)	*(0.002)*	*(0.002)*	*(0.003)*	*(0.0002)*	*(0.0003)*
$T\text{-}INT_{periphery}$	**0.028***	**0.026** **	**0.020** **	**0.022** **	0.009	0.010
	(0.014)	*(0.013)*	*(0.009)*	*(0.009)*	*(0.009)*	*(0.009)*
SKILL	**0.358*** **	**0.343*** **	**0.276*** **	**0.152***	**0.225*** **	**0.161*** **
	(0.109)	*(0.098)*	*(0.087)*	*(0.078)*	*(0.038)*	*(0.042)*
DISC		**-0.100*** **	**-0.087*** **	**-0.061*** **	**-0.121*** **	**-0.118*** **
		(0.019)	*(0.018)*	*(0.018)*	*(0.012)*	*(0.012)*
$S\text{-}INT_{periphery}$			0.116	0.043	**0.130*** **	**0.217*** **
			(0.119)	*(0.111)*	*(0.030)*	*(0.045)*
PUB			**0.124*** **	**0.135*** **	0.015	**0.047** **
			(0.028)	*(0.025)*	*(0.018)*	*(0.020)*
DENS				**-0.206** **	-0.001	0.00002
				(0.086)	*(0.001)*	*(0.002)*
MARKET				**0.134*** **		**0.008*** **
				(0.031)		*(0.002)*
FIN				-0.113		**-0.274*** **
				(0.231)		*(0.094)*
EUROZONE					**-0.018*** **	**-0.020*** **
					(0.004)	*(0.005)*
Constant	-0.125***	-0.030	-0.086***	-0.346	0.062***	-0.020
	(0.018)	(0.027)	(0.027)	(0.561)	(0.009)	(0.023)
Observations	788	788	788	776	776	776
R-squared	0.133	0.174	0.215	0.286	0.319	0.339
Number of regions	100	100	100	100	100	100
F	32.97	45.07	30.69	37.51	.	.
FE	YES	YES	YES	YES	NO	NO
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

6. Conclusion

The results of our analysis suggest that the European landscape is characterized by persistent inequality and divergence trends verified in all models and groups. Divergence takes place at the EU scale among the advanced and less advanced regions, driven by initial conditions and major structural, technological, and social drivers. It also takes place among the lagging regions, as a number of them, perhaps those affected more severely from the crisis are diverging from their trend.

The impact of trade integration is positive at the EU level, where the regions of modest or advanced levels of development prevail and the mix of inter-industry and intra-industry trade is in favor of the latter. These different types of integration are associated with different benefits and costs that overall leave a positive regional footprint. However, trade integration has a negative impact on growth in weaker regions, as it is dominated by inter-industry trade relations that are responsible for imported structural pressures and destruction in labor markets in the non-traditional tradable sectors. On the other hand, trade integration among peripheral regions has a positive impact, as trade relations among similar partners is dominated by intra-industry trade mostly in low- to medium-technology sectors. These findings reveal the diverse footprint of different types of integration and the importance of the mix of trade partners. On the one hand, inter-industry trade, which dominates North-South and West-East trade relations, contributes to the formation of fixed capital and is the main avenue for technology transfer, but at the same time it is associated with competitive pressures and contraction in the non-traditional sectors of the weaker regions, that are necessary for long-term development. On the other hand, intra-industry trade, which dominates relations of countries and regions with similar levels of development and similar tastes, provides opportunities for expansion without significantly affecting their structural characteristics. The challenge arising for the lagging regions is that they are engaged in a dominant type of integration that is at the same time both necessary, as it contributes to 'technological learning' and capital formation, and destructive, as it pressures the exposed and less competitive capital-intensive sectors.

It is interesting that trade in services has consistently a positive impact on growth, implying that the rapid development and internationalization of the service industries (digital platforms, finance, tourism, producer and consumer services) does not pose yet any competitive pressures on the production base of lagging regions, perhaps because potential benefits are stronger than potential losses. The footloose character of many of these services

may provide an opportunity for the peripheral regions and a promising avenue for the design of future regional policies that may focus on the attraction of digital nomads or highly skilled labor.

Public dissatisfaction with EU policies and discontent, after some point seem to affect growth prospects through a variety of channels related to uncertainty and pessimistic expectations about the future of the EU. This is especially true in weaker regions, where expectations are more fragile.

Our findings indicate that public investment is critical for peripheral regions, as it maintains an important role for the formation of fixed capital and the catching up of these regions in terms of skills, investment, social and productive infrastructure. Given that Structural Funds support a large part of public investment in these regions, our findings provide an important message for Cohesion Policy that needs to maintain a critical scale and improve its delivery mechanisms.

Overall, the existing European architecture seems to expose to the same market forces regions having diverse structures and endowments and as a result, diverse responses to the prevailing mix of integration dynamics. The results show that the single market and the single currency, the basic pillars of the European model, do not lead to an inclusive economy, driven by a clearly visible process of convergence, neither to reasonably satisfied constituencies. On the contrary, unbalanced patterns of (unfinished) integration, divergence from the advanced core, worrying levels of discontent, as well as chronic gaps in human, physical and financial capital shape a geography of opportunities and challenges that seems to be highly unfavorable for peripheral regions. This needs to be one of the starting points for the discussions about the future of the European architecture.

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APPENDIX

Table A1. List of variables and data sources

VARIABLES			**Source**
g	Growth rate	Real GDP per capita annual change (%) (constant prices 2015)	ARDECO - EC
Y	Development level	Real GDP per capita in thousand euros (constant prices 2015)	ARDECO - EC
T-INT	Trade Integration index (GOODS)	Ratio of trade (imports and exports) with the EU over total (world) trade	ESPON Program "Interregional Relations in Europe"
T-INT core	Trade Integration index with core EU countries (GOODS)	Ratio of trade (imports and exports) with the EU core over total EU trade	ESPON Program "Interregional Relations in Europe"
T-INT periphery	Trade Integration index with peripheral EU countries (GOODS)	Ratio of trade (imports and exports) with the EU periphery over total EU trade	ESPON Program "Interregional Relations in Europe"
SKILL	High skilled employment as a share of total employment	Persons employed in high skilled sectors to total persons employed	EUROSTAT
DISC	Not trust EU	Percentage of citizens not trusting EU	Eurobarometer
S-INT	Integration in services as a share of GDP	Trade in services (imports and exports) with the EU over current GDP	ESPON Program "Interregional Relations in Europe" and EUROSTAT
S-INT core	Integration with CORE in services as a share of GDP	Trade in services (imports and exports) with the EU core over current GDP	ESPON Program "Interregional Relations in Europe" and EUROSTAT
S-INT periphery	Integration with PERIPHERY in services as a share of GDP	Trade in services (imports and exports) with the EU periphery over current GDP	ESPON Program "Interregional Relations in Europe" and EUROSTAT
PUB	Public Sector (GFCF share)	Gross fixed capital formation in Public administration, defense, education, human health and social work activities to Total GFCF	EUROSTAT
DENS	Logarithm of Population density	Persons per km^2 in logs	EUROSTAT
MARKET	Logarithm of Market size	GDP in Purchasing power standard (PPS, EU27) mil. € in logs	EUROSTAT
FIN	Financial Sector (GVA share)	Gross value Added in Financial and insurance activities to Total GVA	EUROSTAT
EUROZONE	Dummy	EURO=1, non-EURO = 0	

Table A2. Summary statistics

Variable	Obs	Mean	Std. Dev	Min	Max
g	1,920	0.013	0.030	-0.126	0.643
Y	2,160	26.241	13.958	3.643	97.416
T-INT	2,153	0.736	0.223	0	1
T-INT core	2,153	0.730	0.156	0	1
T-INT periphery	2,153	0.269	0.155	0	1
SKILL	2,142	0.046	0.041	0	0.206
DISC	2,160	0.456	0.111	0.14	0.743
SERV INT	2,160	0.189	0.236	0.007	2.365
SERV INT core	2,160	0.159	0.213	0.006	2.026
SERV INT periphery	2,160	0.030	0.036	0.001	0.356
PUB	2,160	0.160	0.078	0.19	0.702
DENS (log)	2,124	4.940	1.174	1.030	8.919
MARKET (log)	2,160	10.372	0.992	6.879	13.391
FIN	2,158	0.040	0.029	0.008	0.297

Table A3. Pairwise correlations

Variables	(g)	(Y)	(T-INT)	(T-INT$_{core}$)	(T-INT$_{periphery}$)	(SKILL)	(DISC)	(S-INT)	(S-INT$_{core}$)	(S-INT$_{periph}$
g	1.000									
Y	-0.086***	1.000								
T-INT	0.038*	0.031	1.000							
T-INT$_{core}$	-0.033	0.297***	0.047**	1.000						
T-INT$_{periphery}$	0.035	-0.293***	-0.028	-0.981***	1.000					
SKILL	0.156***	0.150***	0.297***	-0.008	0.015	1.000				
DISC	-0.222***	-0.100***	0.013	-0.034	0.042*	0.110***	1.000			
S-INT	-0.005	0.246***	-0.030	0.062***	-0.059***	-0.141***	-0.145***	1.000		
S-INT$_{core}$	-0.019	0.264***	-0.006	0.098***	-0.095***	-0.155***	-0.147***	0.994***	1.000	
S-INT$_{periphery}$	0.064***	0.057***	-0.153***	-0.161***	0.167***	-0.026	-0.084***	0.730***	0.656***	1.0
PUB	-0.198***	-0.149***	-0.008	-0.069***	0.055**	-0.287***	0.185***	-0.093***	-0.083***	-0.115
DENS	0.007	0.325***	-0.132***	0.132***	-0.142***	0.085***	-0.068***	0.057***	0.049**	0.089
MARKET	0.090***	0.399***	-0.068***	0.097***	-0.081***	0.281***	-0.039*	-0.113***	-0.130***	0.0
FIN	-0.060***	0.545***	-0.103***	0.103***	-0.100***	-0.099***	-0.137***	0.318***	0.314***	0.252

**** p<0.01, ** p<0.05, * p<0.1*