Working Paper

**Tullio Buccellato
Giancarlo Corò**

**Path dependence in regional
structural change:
implications for the EU
cohesion and innovation
policy**

Path dependence in regional structural change: implications for the EU cohesion and innovation policy

Tullio Buccellato

Economic Research Department, Confindustria

Giancarlo Corò

Ca' Foscari University of Venice

Abstract: The key purpose of this paper is to measure the strength of regional economic fabrics based on their structure. We propose a new mapping of European regions based on structural proximity; the representation takes the shape of a network, which is also useful to define clusters of regions according to the similarity of their economic structures and, hence, in the endowment of productive competences. We show that there is a high persistence in the relative positioning of regions according to their economic structure and that this is markedly associated with patterns of economic growth and convergence. The spectrum of regional performance range from virtuous urban agglomerates characterized by the presence of advanced services, with enhanced institutional quality, endowed with efficient transport infrastructures and highly educated and productive workforce, to regions characterised by scarce service or industrial activity, sometimes with a cumbersome role of tourism-related business, with poor institutions and transport infrastructure and low endowments of human capital and productive workforce. To richer pools of productive competences are associated faster paces of economic growth. The findings of this paper suggest that place-based policies should be implemented to support territorial development in the short/medium term, but these policies can be effective for the long run growth only when they are meant to leverage on the regional pool of competences to trace trajectories of structural change.

Keywords :Resilience, economic complexity, regional disparities

JEL Codes: O10, O25, P25, R10, L16

Address for correspondence:
Tullio Buccellato
Economic Research Department
Confindustria
Viale dell'Astronomia, 30
Roma, 00144 Lazio - Italy
E-mail: t.buccellato@confindustria.it

Path dependence in regional structural change: implications for the EU cohesion and innovation policy

Tullio Buccellato[a] and Giancarlo Corò[b]

Abstract

The key purpose of this paper is to measure the strength of regional economic fabrics based on their structure. We propose a new mapping of European regions based on structural proximity; the representation takes the shape of a network, which is also useful to define clusters of regions according to the similarity of their economic structures and, hence, in the endowment of productive competences. We show that there is a high persistence in the relative positioning of regions according to their economic structure and that this is markedly associated with patterns of economic growth and convergence. The spectrum of regional performance range from virtuous urban agglomerates characterized by the presence of advanced services, with enhanced institutional quality, endowed with efficient transport infrastructures and highly educated and productive workforce, to regions characterised by scarce service or industrial activity, sometimes with a cumbersome role of tourism-related business, with poor institutions and transport infrastructure and low endowments of human capital and productive workforce. To richer pools of productive competences are associated faster paces of economic growth. The findings of this paper suggest that place-based policies should be implemented to support territorial development in the short/medium term, but these policies can be effective for the long run growth only when they are meant to leverage on the regional pool of competences to trace trajectories of structural change.

Key words: resilience, economic complexity, regional disparities

JEL Codes: O10, O25, P25, R10, L16

(a) Economic Research Department, Confindustria. The opinions and views expressed in this paper by the author do not reflect in any way the opinions and views of Confindustria as an institution. Corresponding author: t.buccellato@confindustria.it

(b) Ca' Foscari University, Department of Economics

INTRODUCTION

Since early 2020 the focus of economists has been suddenly captured by the pandemic of Coronavirus. Initially the problems appeared to be limited to China, but immediately perceived as much wider in range for its impact worldwide, due to the central position of the Chinese economy in the global value chains. There has not been enough time to realize the vast international extent of the Covid-19 diffusion in China, that Italy suddenly realized to be severely infected by the virus and the sort of issues considered until that moment represented no term of comparison with respect to what it meant having the epidemy spreading on its own territory. Italy was only the first country that ended to be a victim of the Covid-19 diffusion out of China, and then one by one all the other Western countries were surprised to find themselves victim as well, as if everywhere there was a general overconfidence of the own capacities in managing the issues connected to the pandemic.

The pandemic of Covid-19 has proved to be relatively symmetric in the way it has spread in various countries worldwide, while instead the impact that it will produce across the territories in the medium term risk to be highly asymmetric due mainly to three factors: (i) the preparedness of regions in tackling the key problems connected to the contagion and the time of reaction to bring the situation again at least close to the business as usual environment; (ii) the specialization of territories might be crucial as resilience and recovery may vary substantially across different sectors, for instance the restoration of normality could be particularly slow for tourism related activities; (iii) the amount of economic resources that will be made available to local authorities in order to face the issues of resilience of the economic system. The current crisis is therefore likely to exacerbate the development gap across regions, even in the context of the integrated EU economy.

Market integration has undoubtedly had positive effects on economic growth as it has contributed to widen the scale and scope of production and consumption. However, it has also brought a worsening in levels of inequalities and disequilibria in patterns of economic development across different geographies. Marked imbalances are often at the roots of arbitrage opportunities. If such opportunities are artificially repressed for long periods through restrictions to the free movement of factors (goods, capital and people), when removed, generate sudden changes in the social and economic conditions of people living in territories previously "protected" (or "encaged", from the point of view of the poorer ones).

Some places in the EU have found themselves between a rock and a hard place, they faced an increasing gap with respect to richer locations and loss of ground with respect to previously worse-off regions. Economic policy has encountered difficulties first in anticipating and preparing the ground for such sea change and then in implementing appropriate policies to offset arising issues; the circumstances were rendered harsher by the fact that budget constraints have become more stringent, especially after 2008. It is precisely the consequences of the economic crisis that brought to a situation where people lost trust and spirit of belonging with respect to traditional parties and institutions and started either refraining from voting, or giving preference to parties with populist first and/or, more recently, sovereignist connotation. After more than ten years those regions that had suffered most the problems related to the crisis and not completely recovered from it, risk to be among those suffering most the negative impact of the Covid-19 pandemic.

Europe has been the perfect laboratory to understand what happened because, after the fall of the Berlin wall, many regions experienced a double displacement: globalization -mainly opening the Western markets to Chinese and Asian products- and the rapid enlargement of the EU. This resulted in a high-speed reallocation of resources both between and within European regions. The reallocation took various forms and the territorial dimension was mostly impacted. It should be nonetheless noticed that heterogeneous performance experienced at different geographies often mirrors different sector specializations. For example, regions with manufacturing specialization oriented towards traditional products have suffered more and earlier the competition of Asian markets, or regions that were specialized in the production of automotive components for German cars, have suffered more the enlargement towards East of the EU Single market due to tougher competition among sub-suppliers.

The trends of GDP per capita across EU regions suggest that integration has been accompanied by a process of convergence in the standards of living. However, when taking a closer look at the data, one realizes that, if any convergence took place, this happened mainly across regions occupying relatively weak positions in the overall ranking. Top performers with sophisticated technological stand were not much affected by the new entry of emerging manufactures from Eastern European countries. Mobility happened mainly at the bottom of the income distribution.

The purpose of this paper is to provide a new perspective to look at the changes in relative competitiveness across EU regions, to throw light on both, mobility at the bottom of the distribution and persistency of the gap between top performers and the remaining part of EU regions. More in particular, we assess how much did contribute the endowment of productive competences to the resilience or loss of competitiveness across EU territories with respect to the new changes in the competitive environment. The pool of competences of territories is captured through the study of the economic structure, that is the distribution of resources across productive branches.

Having a clear look at the positioning of territories in the competitive landscape is of particular relevance after the lessons learnt from the recent history of EU integration. Sudden changes in the benchmark of competitors and the internal restructuring induced in response have had strong impact on people's life and this should have been taken into account as central in orientating policy decisions, rather than being just considered as bearable collateral effects. In fact, if in principle opening markets tend to enhance general welfare, the way it is achieved is key in determining the final outcome. In cases where this is achieved in strongly *laissez-faire* manner, discontent generated may actually result in high instability of the electoral ballots, determining in the end the paradox of establishing economic systems based on sovereignism rather than openness (recent elections such as the Brexit referendum or Trump's victory confirm this). This puts into question the efficacy of policies implemented that aimed at enhancing integration, as somehow such policies opened up the way to parties and political movements with opposite objectives.

The idea of sovereignism and populism growing up as a reaction of the "places that do not matter" is broadly discussed in Rodriguez-Pose (2017), who insists on the failure of the people-based policies, i.e. the idea that migration flows would naturally bring to equilibria between 'lucky' places and those lagging behind. One of the consequences in this frame is that urban agglomerates keep on increasing their comparative advantages with respect to contexts characterized by poorer density of economic activity with an indefinite time pattern of people displacement. Such pattern is what brought to the point where we stand, with entire locations assigning preference to anti-globalization reforms, which often derail into populism. Place-based policies, aimed at leveraging on regional competitive advantages, are proposed as the way forward to counteract such tendencies.

The implementation of effective place-based policies requires a precise assessment of the initial positioning of territories in order to clearly assess possible ways forward in economic development. We propose a new mapping of European regions based on structural rather than geographical proximity; the representation takes the shape of a network, which is also useful to define clusters of regions according to the similarity of their comparative advantages and, hence, in the endowment of productive competences. The classification of regions into clusters has the twofold advantage to allow the analysis of economic growth performance as well as the evolution in the knowledge base according to the already available pool of competences. This recognising the fact that innovation tend to happen in the neighbourhood of the existing pool of productive competences, letting arise path dependency in the evolution of the knowhow.

Hence, even though the findings of this paper confirm that to support territorial development place-based policies should be implemented as opposed to people-based policies, we also suggest that such policies might not suffice in guaranteeing sustainable and more cohesive economic development in the longer term, as regions endowed with wider competences not only experience faster economic growth, but have also a substantial advantage in innovation patterns. Place-based policies should hence aim at leveraging on already present competences to diversify and strengthen the economic fabrics of

territories, choosing innovation paths that are compatible with the pool of competences initially available within territories. In cases of very poor productive systems, external intervention to prompt innovation path might be necessary in order to let penalised territories being projected on sustainable development paths.

Stated differently, the key complementary consideration to place-based approaches is that, if left to their own disposable capabilities, some territories are condemned to remain left apart with respect to others, at least in the absence of strong external shocks. Places with no productive capabilities, without any external intervention, might be condemned to rely on others for satisfying their needs and keep up consumption habits more in line with those in developed communities. Therefore place-based cannot be intended as just leveraging on the current local capacity for increasing economic growth and job creation, but rather considered as a way forward for speeding up innovation and structural change towards more sustainable development paths.

In the next section we briefly discuss the theoretical background on persistence of knowledge development path. The third section illustrates the stylized facts on convergence\divergence across EU regions. The fourth section introduces the methodology used to draw the network of European regions according to their structural similarity and the implied grouping of regions. In section five we characterize the clusters in terms of performance according to various indicators as well as implications for regional patterns of growth. Section six reports concluding remarks and policy implications.

VARIOUS WAYS OF GENERATING PATH DEPENDENCY IN THE ECONOMIC THEORY

A general point of consensus in the economic literature is that knowledge is central to economic development. Different theories, often moving from contrasting assumptions and approaches, recognize knowledge, with its different semantic nuances, as the key factor explaining prosperity and poverty of nations and regions. In particular, productive knowledge or, said differently, technology, evolves with self-strengthening (or endogenous) trajectories, implying path dependency in the patterns of long-run economic growth. In this brief literature review we reconcile different theoretical frameworks to show that apparently contrasting interpretations entail very similar economic policy insight and recommendations.

Arrow (1962a) was first in exploring the concept of knowledge, intended as the capability of acquiring key information and managing it to gain advantages on the market. In this sense knowledge can be considered as a commodity that is used in any situation of uncertainty, which is the common ground where entrepreneurs tend to operate. Arrow's contribution is also to explore the way knowledge expands, i.e. through a process of learning by doing: knowledge is the resultant of practice and research (Arrow 1962b). Productive experience in Arrow's theory has therefore a central role in determining competitiveness of countries and in characterizing knowledge as a by-product of output or investment (for an exhaustive review on the theory of knowledge of Arrow's theory of knowledge, please refer to Vahabi 1997).

Among the neoclassical economists, Romer (1986) was the first explicitly encompassing knowledge in economic growth model; in such theoretical framework knowledge is allowed to grow without bound, even though with decreasing marginal returns with respect to research input invested to obtain it. Lucas (1988) identifies in human capital, intended as "an unobservable magnitude or force," the engine of long-run economic growth. In Lucas' theoretical framework human capital has similar characteristics to the concept of productive knowledge of evolutionary economics, as it evolves with experience gained in the production process, thanks to its learning-by-doing component. In addition to this, Lucas recognizes the importance of creative forces as the resultant of the various individual professional efforts to emphasize "originality and uniqueness" of their products. The endogenous component of technological change is further expanded in Romer (1990), where technology is treated as "neither a conventional good nor a public good; it is a non-rival, partially excludable good." In this view economies endowed with larger stocks of human capital will attain faster growth.

Endogeneity in the patterns of technological change is central also in the evolutionary economic theory (Nelson and Winter,1982), which is in line with the new neoclassical framework of Romer and Lucas in that it recognizes the central role of knowledge to explain heterogeneous growth patterns across countries. However, the evolutionary economists take distance from the neoclassical production function as it does not capture changes in the evolution of knowledge, hence failing to account for the factor that at the same time is judged as the key of development within the neoclassical theory itself. Such dichotomy in economic theory has brought to a situation in which evolutionary economics seemed better placed to illustrate the mechanics of change in knowledge, whereas the new neoclassical theory enjoyed a more pragmatic way to assess the impact of knowledge on economic growth through modelling and empirical analysis (Mulder, De Groot and Hofkes 2001).

Advances in data collection have gradually open up the way to model in more sophisticated way technological change. Both research streams have in particular explored diversification (relevant to our discussion as diversification of products entails an enlargement of the pool of competences) as a key factor to enhance sophistication of products and economic growth. For instance, Koren and Tenreyro (2013) develop a model that reconciles the importance of having diversified economic fabrics with the idea of endogenous technological change of Romer (1990) by characterizing technological progress as an expansion in the number of input varieties. More in particular, by assuming that each product variety is prone to external shocks with a certain likelihood, the expansion in the number of varieties brings the direct benefit of stabilizing the economy. In this framework higher productivity resulting from deeper specialization in a given production, might have the undesirable outcome of excessively technological concentration and, hence, an exacerbated degree of volatility.

Boschma (2005) tackles the issue of interactive learning and innovation exploring five dimensions of proxitmity (cognitive, organizational, social, institutional and geographical). Such holistic approach has contributed to unravel the black box of endogeneity and explore further the determinants of growth and success of firms and regions. These streams of literature has widened the study of regional competitiveness from simply considering specialization (Marshallian externalities) to taking into account also regional diversification (Jacobs' externalities) as possible factors that affect patterns of economic growth (see also Frenken, Van Oort, Verburg, 2007 and Boshma and Iammarino 2007).

This approach has more recently developed into the study of economic complexity. The term complexity conveys a situation in which the change and impact of the single element is overcome by the simultaneous co-evolution of multiple elements adapting to the environment of which they are all inherent particles. Interaction may take place also across systems, as, when one of them evolves, it affects the landscape of the others (Kauffman 1993, 1995). The theory of economic complexity analyses the process of co- evolution in productive competences through the observation of changes in the bouquet of products made (or exported) in (by) a given territory. In this sense changes of sectors or products, reflecting the pool of competences within the economy, tend to take place simultaneously with continuous feedbacks across them. For instance, the electronics and digital devices has brought innovations in numerous products and, at the same time, it has continuously received new inputs for further advances.

A coherent approach to analyse economic complexity has been developed starting since 2007 (Hidalgo et al. 2007, Hidalgo and Hausmann 2009, Hausmann et al. 2011). This theoretical framework is based on the two key concepts of diversification and ubiquity, where the former is simply the number of products exported by a country and the latter the number of countries exporting a given product. The idea underlying this approach is that the pool of competences finds direct expression in the range of products made in a given territory and that these two elements considered jointly evolve together according to a mutual need of coexistence. Economic Complexity is also found to be a strong determinant of long-run growth. Countries exhibiting level of GDP per capita in excess with respect to the degree of diversification and sophistication of their bundle of exported products are destined to experience slowdowns in their growth path and vice-versa. Additional methods have been proposed to measure economic complexity and assess its impact on economic development (see for example Tacchella et al. 2012, Albeik et al. 2017, Cristelli et al. 2013 e 2014).

Buccellato 2016 shows that the degree of economic complexity of territories arises from the strategies of diversification of individual firms. This adds a further dimension to economic complexity which, beside the interactions across competences synthesized in products and sectors, also calls the aspects of complexity arising at the micro-level from the strategies implemented within the single firm. The idea of considering the firms as a pool of competences stems from Penrose (1959) who recognizes the importance of diversification as a strategy of the firm to grow beyond the limits of the market, even though within the constraint of existing resources. As for countries, the knowledge of the firm evolves in proximity to acquire new competences close to the core ones originally present within the firm. This generates persistent competitive gaps across firms, because the initial pool of competences within the firm tend inevitably to affect the acquisition of new ones and therefore the expansion of the firm itself (Dosi, Grazzi, Moschella, 2015).

The theory of economic complexity has had the merit of stressing the importance of the structure of the economy, which is a trustful image of the overall pool of competences of countries and regions. It emerges the key role of sophisticated manufacturing activities as an engine for persistent and sustainable development. In this sense the theory of economic complexity is more in favour of the so-called structuralist approach, which is in contrast with the neoclassical view that market efficiency is the optimal way to promote structural change (see Gala, Rocha and Magacho, 2016).

Various of these streams of economic theory have also developed tools that turned out to be useful for gaining better understanding of place-based policy and the related concepts (e.g. Hidalgo et al. 2007; Neffke et al. 2011; Balland, Boshma et al. 2017). Place-based theory has had the merit of putting forward the idea of contextualizing any policy promoting development on the bespoke local context where it applies (Barca 2009, Foray et al. 2009). As opposed to the spatially blind policy approach, place-based is intended to promote development leveraging directly on the pool of knowledge and productive capabilities available in a given local entity. *Per se* place-based is a relatively general and broad concept as it can be seen from several angles (e.g. institutional, geographical, historical, knowledge-based), which can be treated jointly or separately and that usually end up characterizing the specificity of the policy designed and implemented. One of the broad consequences of such an approach is that the emphasis is moved from territorial convergence towards social inclusion, and that any local development strategy should take into account economic, social, political and institutional diversity with the objective of maximizing local as well as general welfare (Barca, McCann and Rodriguez-Pose 2012).

Summarizing, there is a wide consensus in the economic literature on the centrality of knowledge as the key engine for economic development. More recent strands of research have insisted on the idea that knowledge evolves in the proximity of the existing competences and that this gives rise to path dependency in innovation processes, generating gaps and imbalances in long-run economic development across countries and regions. The degree of sophistication of existing productive competences is well captured by the current structure of the economies, under the assumption that firms make what they know how to make. Bearing this in mind we will propose a new alternative view on the processes of structural change and economic growth across the EU regions.

STYLIZED FACTS ON CONVERGENCE ACROSS THE EU REGIONS

EU integration has triggered a process of convergence in the standards of living across European regions, at least as it can be inferred from data on GDP per capita calculated at purchasing power parity. Figure 1 displays the trends of two indicators relating income disparities – the Gini index and

M2[1]. Before 2010 both the indicators suggest that there has been convergence across EU regions and such trend reverted afterwards.

[Figure 1]

Nonetheless, the catch-up of regions lagging behind has been taking place mainly at the bottom part of the distribution, with the new regions from Eastern Europe entering the single market and, starting from relatively poor income levels, grew faster with respect their established European peers. Figure 2 shows that there has been a general decrease of the distance between minimum, and maximum in the distribution of income, leaving the question open on whether this coincided with a general improvement or just a phenomenon relating regions at the bottom of the distribution. The minimum median ratio confirms indeed that in the lower part of the distribution poorer regions caught up with those lying around the median and that the convergence process took place only until the financial crisis of 2008, after which both curves flattened. In addition to this, above the median there was barely any change also before the crisis and, after 2008, the gap with the spearhead of best performers tended to intensify.

[Figure 2]

Convergence happened mainly in the bottom part of the distribution, mainly due to the rapid growth in GDP per capita across regions in Central and Eastern Europe (Cuaresma, Doppelhofer and Feldkircher, 2014). Among the regions which have contributed more to such result appear the region surrounding Bucarest in Romania, the Mazovia province and the lower Silesian province in Poland, where Warsaw is located, the Southwest Planning Region in Bulgaria, the region of Sophia, the East area of the Czech Republic (Buccellato and Corò, 2020).

The recent history relating EU regions suggest that convergence does not take place in "normal" periods. The trigger of fast catching up at the bottom of the distribution has been the European enlargement. Convergence in living standards across EU regions has mainly been driven by the transition of Eastern territories towards market economy, that has created vast arbitrage opportunities for international investors to refurbish already existing competences in the obsolescent industrial sectors inherited from the Soviet period. More precisely, arbitrage opportunites stemmed from the following elements characterizing the former soviet satellite countries in Europe: low labour costs and GDP per capita, obsolete industrial plants, relatively weak presence of unions and labour protection standards, lack of infrastructure, but relatively advanced competences and, last but not least, geographical proximity to the German industrial giant.

Access to the EU has not only open up the way to complete integration with the Single market, but also access to funds devolved to foster infrastructure and upgrade the obsolete industrial system; private entrepreneurs, based locally or abroad, have had a clear opportunity to align their investment strategies to such trends sublimating and accelerating the catch-up process with respect to other European regions, that suddenly found themselves in a new level playing field characterized by tougher competition, also affected by the new push from China and other emerging industries in South-East Asia.

The reshuffling at the bottom of the distribution, has induced changes for a number of the "incumbent" regions that where part of the EU since its inception phase. The redirection of public and private resources towards East countries, has induced a fast growth of such economies to which naturally corresponded a relative impoverishment in some "veteran" EU regions. However, this cannot be generalized to all the "incumbent" regions, as some of them took advantage of the enlargement and in some cases where the home-base of firms investing in the new regions. The backwards veterans then suffered a double effect of the enlargement, in addition to the exacerbated competitive environment at the bottom, they assisted to the departure of the top performer veterans. Similarly not all the newly

---

[1] M2 is an indicator calculated based on the transition matrix, the higher it is, the stronger is the mobility of observations within a given distribution. (M2= 1-detA5 where detA5 is the determinant of transition matrix of regions across quintiles).

accessed regions have experienced the same degree of success and hence experienced the departure of their national peers.

It is then important to characterize what factors might have contributed to decide the success of some regions in catching up with the veteran EU regions, as well as the success of the top performers in exploiting advantages from the enlargement, the resilience of some veteran EU regions, and the backlash of others.

PATH DEPENDENCE IN STRUCTURAL CHANGE

The way we proceed towards the study of regional advantages is through the analysis of their structure, as this mirrors the productive competences available on the territories and, hence, allow to assess whether some pools of competences proved to be key in explaining successful\unsuccessful regional growth patterns and also to keep track of structural change. The regional knowledge base can have triggered a double effect on the process of convergence across EU regions: (i) some competences pertaining to specific sectors can immediately represent a comparative advantage to experience faster economic growth, i.e. in GDP levels; (ii) richer pools of competences can innovate faster resulting also in more sophisticated production systems in the future.

We first propose a methodology to identify subgroups of European regions based on the similarity of their economy structures and then assess whether having different structures contribute to heterogeneous performance according to competitiveness indicators. We finally assess how structures change over time and whether there are recurrent patterns in structural change across regions.

The methodology identifies clusters based on the structures of regional economies

In this section we illustrate the procedure followed to obtain the definition of clusters based on the degree of similarity in the structures of regions. The first step is the mapping of EU regions according to their economic structure. We exploit information conveyed by Eurostat data, which is available for a panel of 276 regions in 2010 and 280 in 2016; the additional four regions in 2016 result from the split of some NUTS2 codes in multiple ones: inner London is for example subdivided in its West and East part. Data are available for 86 economic branches and the information used is the amount of wages paid in each region and branch, normalized with the total amount per region.

Based on this information we construct a symmetric matrix, in which each cell contains the pair-wise correlation between each region with all the others individually considered. In order to clean up country effects, we demean all the branch share found in each region according to the national ones. We are therefore able to construct a space in which the metric of distance is structural proximity of regions. As discussed in the literature review, the mix of outputs of each economy, is direct expression of its knowledge basis, we can hence consider the position of each region with respect to others as a measure of technological proximity.

The next step is the construction of the network space based on the correlation matrix. We consider two regions "close" if they exhibit a correlation equal or above the 95th percentile of the distribution of pair-wise correlations; in addition to this, in order to avoid that the network is populated by a relatively high number of islands, we assign to each regions at least five peers corresponding to the regions with which it exhibits the highest correlations. As a result, for the year 2010, we construct a network of 276 nodes and 1382 edges; in 2016 the figures are 280 and 1400, respectively.

In order to obtain the clusters of regions based on the similarity of their economic structure, we apply the Girvan-Newman clustering algorithm to detect communities in the networks. Such measures defines by progressively deleting nodes exhibiting the highest degree of betweeness, hence representing focal points in the network. Intuitively, after removing such crossing points, the ones remaining

isolated can be considered as the groups; the process stops when all the nodes with highest betweeness have been removed from the network.

Finally, the disposition of the regions in the network space is obtained through a the force atlas 2 algorithm as written in the software Gephii (Jacomy *et al.* 2014).

Persistence in the network shape

Thanks to this procedure 11 and 12 groups are identified for 2010 and 2016, respectively. Figure 3 shows the shape of the networks and the detected groups with different colours.

[Figure 3]

For each of the group we analyse what are the prevalent branches of specialization thanks both to the distribution of wages paid across branches and in terms of revealed comparative advantage computed based on the same indicator. The analysis highlights the presence of seven groups with a clear structural composition and sector specialization; in both years the remaining groups have not such a strong connotation and can be labelled as "No clear specialization". The seven groups are:

1) Metal manufacture: territories characterized by the presence of manufactures activities centered around metal working industry. This is for instance the case of Puglia, where is the location the industrial plant of Ilva. Other examples of regions in this group are the Moravian-Silesian territory, North Middle Sweden and the Principado de Asturias in Spain

2) Traditional manufacture: these are regions characterized by the presence of simple manufacture activities including mining of metal and ores, the manufacture of food products, beverages, textile products and furniture. This group includes regions from various European countries, among the most representative territories appear: Alentejo, Anatoliki Makedonia, Bretagne, Castilla-la Mancha, Northern Ireland, Pays de la Loire and Thessalia.

3) Diversified manufacture: these are areas with a relevant share of advanced manufacturing activities in addition to the traditional ones; a,pmg the sector of relative specialization appear computer and electronic equipments, machinery and motor vehicles. This is the group hosting the highest number of regions, among which appear for example: Emilia-Romagna, Freiburg, Oberfranken, Kujawsko Pomorskie and Thuringen and Veneto.

4) Automotive-driven manufacture: territories characterized by the presence of manufactures activities related to the car-making industry. It should be noticed that such territories are not necessarily the European regions where the automotive sector is more developed, but rather locations where car plants occupy a cumbersome part of the economy. This means that some of these territories might result relatively poor of other economic activities. In this group appear for instance regions such as Abruzzo, Basilicata and Molise, which are manufacture system scarcely diversified; similar to these cases are probably some of the regions located in Eastern Europe, such as Lubuskie, Severovychod, Stredni Cechy and Wielkopolskie. Beside these regions there appear some of the traditional key location of car production in Europe, such as Niederbayern, Oberbayern, Piemonte and Stuttgart.

5) Advanced services and creative sector: urban areas characterized by a prominent presence of activities connected to services, with an important component of creative branches (publishing activities; computer programming, consultancy and related activities; activities of head offices, management consultancy activities; architectural and engineering activities). The regions that turn out to be more representative are often capital cities such as Stockolm, London, Wien, Paris (Ile de France), Rome (Lazio) or other important urban contexts such as Utrecht, Koln and Barcelona.

6) Construction and urban activities: these are urban areas where the lack of a vibrant service sector together with the lack of a strong manufacturing vocation leaves room to construction-related activities as residual part that characterize any inhabited land; in this group appear for

example regions such as Brandenburg in Germany, Burgerland in Austria, Highlands and Islands in Scotland.

7) Tourism driven economy: regions with a cumbersome weight of tourism reception activities. These are mainly European regions, where the branches with prominent weights are accommodation and food and beverage services. Among the most representative examples within this group appear Algarve, Canarias, Corse, Bolzen and Tirol.

Looking at the two networks in figure 3, what strikes most is the persistence in the relative position of regions. Even if shifting from one group to another, the observations tend to maintain the same relative position with respect to the other and so does the positioning of their respective groups. For instance let us consider the regions of Luxembourg, Kypros, and Malta, which in 2010 are categorized together with the group of touristic regions, whereas in 2016 fell in the non-determined area but all close as in the previous graph and in a similar position with respect to the touristic ones. Such regions share the characteristic of fiscal shields with, hence attracting similar typology of business tourists and having a developed set of financial services close to the accommodation-related activities. Such characteristics put these territories in intermediate position between small tourism led economies and large urban centres with advanced service activities connected to finance.

There is then the set of regions occupying a blurred position without precise specialization in 2010 and then turning to become likened with territories where constructions occupy a central role. This is the case of Italian regions such as Calabria, Sardinia, Sicily and Valle d'Aosta. Such regions are also located close to the tourism-centered group as one would expect given that these are among the most touristic places in Italy.

The overall structure of the network remain also pretty much the same, with a the relative dense block of regions with different types of manufacture, with the spectrum ranging from traditional activities relating to the three Fs- Fashion, Food and Furniture (dark blue) to the ones more centered around the automotive (light blue), with the small group of regions focusing on steel industry (dark green) and the one with highly diversified manufactures (pink industry). Even though the groups appear to be rotated upside down with respect to the group of touristic regions (red), the proportion and positioning with respect to each other remain broadly the same.

The distribution of regions per cluster is relatively persistent over the five years considered. Table 1 shows the transition matrix of regions across groups. It is interesting to notice that there is relatively high mobility across all groups with the exception of those pertaining to manufacturing activities, which are not only relatively persistent when considered individually, but even more when considered jointly as the most of regions out of the diagonal shuffle across different manufactures.

Regions connected to tourism-related activities tend to be highly mobile, with the higher share going towards regions with no precise specialization (28,6%), a consistent part towards the category of regions with economies centred around the construction sector (9,5%) and traditional manufacture (5,8%). Construction appears to be the sector that project economies towards agglomeration, which can then take the shape of some type of manufacture or more advanced service activities. Once a manufacturing specialization is created, it tends to be persistent over time, this might also derive from the fact that industrial activities require investments that take time to be repaid.

[Table 1]

ECONOMIC SPECIALIZATION AND PERFORMANCE

The next step is to analyse the performance of regions according to their sector specialization. We first look at the statistics that feed into the regional competitiveness index (RCI) of the European Commission. The indicators are synthesized through simple averages of the values reported by regions in each group.

The first three indicators relate to institutional quality. Urban areas are those presenting improved institutional environment, agglomeration and institutional quality tend to move together for a mutual need of coexistence. Among the manufacturing systems, only the regions displaying diversified productive systems enjoy enhanced institutional quality. Territories displaying a cumbersome weight of tourism-related activities are characterized by relatively poor institutional quality.

The next three indicators relate to transport infrastructure. Most strikingly, regions with tourism-related activities, where one would expect to find an efficient and strong transport network, are instead the territories (together with those centred around metal and traditional industry) exhibiting weak infrastructures. Also, in this respect, urban contexts with advanced services activities is the group to which are associated the best results. Automotive-driven manufactures tend to be located in places with efficient railway network, suggesting that this characteristic might be central when choosing where investing in such sector.

No substantial difference is found across groups when it comes to life expectancy. This is somehow reassuring because, as one would expect in the EU28 context, fundamental health services appear to be homogeneous and not dependent on economic or other characteristics.

The next two variables relate to human capital formation and maintenance. Urban contexts with thriving services sector excel also in this respect. The next two groups with relatively strong positioning in this respect are diversified manufacture and the urban contexts with relatively strong construction activities. A similar pattern is found for the employment rate and labour productivity.

As regards the use of internet for purchasing goods and services, more agglomerated urban contexts outperform all the other groups, with the one relating traditional manufacture resulting the one with the narrowest use of internet.

The two variables relating the financial sector, employment and gross value added from finance, as expected are particularly relevant in regions with advanced services. Other urban contexts follow, and the remaining groups do not differ substantially.

Innovative SME are more present in urban contexts and in the remaining groups tend to be distributed quite similarly, with the exceptions of regions where there is a strong presence of the automotive sector.

[Table 2]

We then assess the influence of groups on the growth patterns across the EU regions and over the period 2010-2016. Table 3 shows the results of a generally least square regression with and without controlling for the categorical variable for group belonging. The omitted group is the one of regions without a precise specialization. The results are quite clear with three group of regions that have been growing at faster pace over the period considered: diversified manufactures, automotive-driven manufactures and urban contexts with advanced services.

[Table 3]

Concluding remarks and policy implications

Increased market integration has triggered virtuous circles in many contexts, those where productive capabilities and/or labour costs were more favourable: such places experienced larger revenues, faster growth, enhanced investments to promote innovation and, therefore, better future perspective to further enhance their relative position with respect to the competitors landscape. However, some territories were positioned initially worse-off and experienced a relative downgrade in the ranking of regions ordered by GDP per-capita: among the territories that were mostly exposed to such trends, were those in advanced economies neither exhibiting clear comparative advantages in industrial activities, nor benefiting of the agglomeration effects of large urban contexts: this were typically rural areas or less technologically advanced industrialized areas that suffered the "low cost" competition of emerging competitors located in new access European member states or in emerging Asian economies. Consistent parts of people living in European countries have started perceiving to a greater extent exclusion and, as a reaction, have expressed their miss-content mainly through the vote to anti-establishment parties, or, in a more open way through street protests (e.g. the movement of the gillets jaunes in France). The current crisis connected to the diffusion of Covid-19, if not counterbalanced by effective policy making, risk to exasperate the disparities across countries and regions, and to become the trigger of a new strong wave of consensus for sovereignism and populism.

A wide debate is spreading around the idea that place-based policies as opposed to spatially-blind policies, can represent an effective response to the growing populist movements against globalization. The rise of populist parties is indeed seen as the revenge of places that do not matter and the application of policies aiming at attaching value at the territorial productive fabric and its potential patterns of diversification might contribute to give back involvement and being part of the greater picture to territories which are currently suffering backwardness without a clear cut to get out of it. This paper, moving from the assumption that place-based policies are useful to promote development of any local production fabric, argue that they might not suffice in tackling the problem of disparities across territories, unless their implementation foresee since the inception phase an approach to structural change for sustainable development; without any redistributive mechanism (of financial resources, as well as of competences, human capital, access to infrastructure and technologies) to be applied, they might actually exacerbate the gap separating winners and losers of globalization and mask just another type of *laissez faire*.

Industrial policies should aim at closing gaps in the production capabilities network that, if left un-tackled, can result in severe dependency from external providers with the even worse risk of losing completely control on great chunks of value chains, especially those human capital intensive jobs and more likely to let future innovation flourishing.

The contribution of this paper is to assess how much policies could alleviate the disparities in economic development, also discussing which approaches to industrial development could be more suitable to attain sustainable and balanced development, while keeping the diffused benefits from market integration. We propose a new mapping of European regions based on structural rather than geographical proximity; the representation takes the shape of a network, which is also useful to define clusters of regions according to the similarity of their economic structures and, hence, in the endowment of productive competences; this is relevant for designing informed industrial policies aimed at fostering territorial development in a balanced and sustainable manner. The findings of this paper suggest that place-based policies should be implemented to support economic growth in the short/medium term; however, such policies might not suffice in guaranteeing sustainable and more cohesive economic development in the longer term as regions endowed with wider competences not only experience faster economic growth, but have also a substantial advantage in innovation patterns. Place-based policies should hence aim at leveraging on already present competences to diversify and strengthen the economic fabrics of territories, choosing innovation paths that are compatible with the pool of competences initially available within territories. In cases of very poor productive systems,

external intervention to prompt innovation path might be necessary in order to let penalised territories being projected on sustainable development paths.

The evidence presented in this paper calls for a strong coordination between cohesion policy and any policy aiming at promoting excellence in innovation processes. The two spheres of reducing disparities and promoting excellence appear to be in conflict if treated separately: it is intuitively impossible to have long run convergence by assigning financial resources to the "weak", when at the same time promoting innovative structural change only for the "Strong". Our results suggest that sustainable and balanced growth can be achieved only in places where it is present a pool of productive competences apt to trigger a virtuous evolutionary path in the knowledge base and, hence, productive fabric of each region.

BIBLIOGRAPHY

Arrow, K. (1962a), "Economic Welfare and the Allocation of Resources for Invention", in Arrow K. (ed.), The Rate and Direction of Inventive Activity : Economic and Social Factors, Princeton University Press, Princeton, pp. 609- 625, reprinted in Arrow, Collected Papers, Vol. 5, pp. 104-120.

Arrow, K. (1962b), "The Economic Implications of Learning by Doing", Review of Economic Studies, Vol. 29, pp. 155-173, reprinted in Arrow, Collected Papers, Vol. 5, pp.157-181.

Arrow K. (1965), "Knowledge, Productivity, and Practice", Bulletin SEDEIS, Etude no. 909, Suppl., reprinted in Arrow, Collected Papers, Vol. 5, pp. 191-200.

Balland, P.-A., Boshma, R., Crespo, J., Rigby, D.L. (2017), SMART Specialization policy in the EU: Relatedness,, Knowledge Complexity and Regional Diversification, Papers in Evolutionary Economic Geography, Utrecht University, Urban & Regional research centre Utrecht.

Barca, F. (2009), An agenda for a reformed cohesion policy: A place-based approach to meeting European Union challenges and expectations. In independent report prepared at the request of the European Commissioner for Regional Policy, Danuta Hübner. Brussels European Commission.

Barca, F., P. McCann, A. Rodriguez-Pose (2012), The case for regional developmentintervention: place-based versus place-neutral approaches, Journal of Regional Science, Vol. 52, NO. 1, 2012.

Barro, R. J., X. Sala-i-Martin, (1991); Convergence Across States and Regions, Brookings Papers on Economic Activity, Vol. No.1, 107-182.

Barro, R. J.; Sala-i-Martin, X. (1997); Technological diffusion, convergence and growth, Journal of Economic Growth, 2, 1-16.

Barro, R. j. and Sala-i-Martin, X. (2003); Economic Growth, Second Edition; The MIT Press, Cambridge, Massachussets.

Baumol W.J. (1986), Productivity Growth, Convergence and Welfare: What the Long Run Data Show, American Economic Review, 76, 1072-1085.

Beugelsdijk, S., J.K. Mariko, P. Milionis (2017), Regional economic development in Europe: the role of total factor productivity, Regional Studies, 52:4, pp.461-476.

Boltho A., W.Carlin, P.Scaramozzino (2017), Why East Germany did not become a new Mezzogiorno, Journal of Comparative Economics, 46(2018), 308-325.

Boschma, R.A. (2005), Proximity and innovation: A critical assessment. Regional Studies 39:61-74.

Boschma, R.A. and S. Iammarino (2009), Related variety, trade linkages, and regional growth in Italy, Economic Geography, Vol.85, No. 3(Jul., 2009), pp. 289-311.

Bosker, M., E. Buringh (2017), City seeds: Geography and the origins of the European city system, Journal of Urban Economics, vol. 98, issue C, pp. 139-157.

Brenner, T. (2006), Identification of Local Industrial Clusters in Germany, Regional Studies, Vol. 40.9, pp. 991-1004.

Brock, W. and Durlauf, S. (2001). Growth Empirics and Reality. World Bank Economic Review, 15:229-272.

Buccellato, T. (2016), The Competences of Firms Are the Backbone of Economic Complexity, SSRN Working Paper.

Buccellato, T. and G. Corò (2020), Relatedness, economic complexity and convergence across European regions, Forthcoming in Springer.

Christopherson, S., Michie, J and Tyler P. (2010), Regional resilience: theoretical and empirical perspectives, Cambridge Journal of Regions, Economy and Society, Vol. 3, pp.3-10.

Corrado, L., Martin, R., and Weeks, M. (2005). Identifying and Interpreting Regional Convergence Clusters across Europe. Economic Journal, 115:C133-C160.

Crespo Cuaresma, Jesus and Doppelhofer, Gernot and Feldkircher, Martin (2014) The determinants of economic growth in European regions. Regional Studies, 48 (1). pp. 44- 67. ISSN 1360-0591

Cristelli, M., A. Gabrielli , A. Tacchella, G. Caldarelli, and L. Pietronero(2013)., Measuring the intangibles: a metrics for the Economic Complexity of countries and products, PLoS ONE 8, e7072.

Cristelli, M., A. Tacchella, A. Zaccaria, and L. Pietronero (2014), Growth scenarios for sub-Saharan countries in the framework of Economic Complexity. https://mpra.ub.unimuenchen.de/71594/.

Cuaresma, C. J., G. Doppelhofer, and M. Feldkircher, Martin (2014) The determinants of economic growth in European regions. Regional Studies, 48 (1). pp. 44-67. ISSN 1360-0591.

Dosi, G., M. Grazzi, D. Moschella (2015) What do firms know? What do they produce? A new look at the relationship between patenting profiles of product diversification, Quaderni-Warking paper DSE N. 1004.

Foray, D. (2015), Smart specialization: opportunities and Challenges for Regional Innovation Policy, London/New York: Routledge/Regional Studies Association.

Foray, D., P.A. David and B.H. Hall (2009), Smart specialization. The concept, Knowledge Economists Policy Brief No. 9, European Coommission, Brussels, June.

Frenken, K., F. Van Oort, T. Verburg (2007), Related Variety, Unrelated Variety and Regional Economic Growth, Regional Studies, Vol. 41.5, pp. 685–697.

Frenken, K. (2016) A complexity-theoretic perspective on innovation policy, Papers in Evolutionary Economic Geography, no.16.19., Department of Economic Geography, Utrecht.

Fernihough, A., K. H. O'Rourke (2014), Coal and the European Industrial Revolution, University of Oxford, Discussion Papers in Economic and Social History, No. 124.

Gala, P., I. Rocha and G. Magacho, The Structuralist Revenge: economic complexity as an important dimension to evaluate growth and development, Working Paper 436, Sao Paulo School of Economics.

Hantsch, S., H. Kergel, T. Lämmer-Gamp, G. Meier zu Köcker, M. Nerger (2013), German clusters in comparison with European peers, European secretariat of Cluster Analysis and Institute for Innovation and Technology.

Harrison, B. (1992), Industrial districts: old wine in new bottles?, Regional studies, Vol. 26, n. 5, 1992.

Hausmann, R., Hidalgo.C.A. (2010), Country diversification, Product Ubiquity, and Economic Divergence, Faculty Research Working Paper Series, Harvard Kennedy School, November 2010.

Hidalgo C. A., B. Klinger, A.-L. Barabási, R. Hausmann (2007), The product space conditions the development of nations, Science 317, 482 (2007).

Hidalgo, C. A., R. Haussmann (2009), The building blocks of economic complexity, PNAS, Vol.106, n. 26, 10570-10575.

Hausmann, R., Hidalgo, C. A., Bustos, S., Coscia, M., Chung,. S,. Jimenez, J., Simoes, A., Yıldırım, M. A. (2011), The Atlas of economic complexity – mapping path to prosperity, Center for International Development at Harvard University, Harvard Kennedy School, Macro Connection- MIT Media Lab, MIT.

Jacomy M., T. Venturini, S. Heymann, M. Bastian (2014), ForceAtlas2, a Continuous Graph Layout Algorithm for Handy Network Visualization Designed for the Gephi Software, Published: June 10, 2014DOI: 10.1371/journal.pone.0098679.

Kaffman, S. (1993), The Origins of Order: Self-Organization and Selection in Evolution,, Oxford:Oxford University.

Kaffman, S. (1995), At Home in the Universe:The Search for Laws of Laws of Self- Organization and Complexity. London: Viking.

Kergel, H., G. Meier zu Köcker, M. Nerger, O. Ziegler (2018), Cluster management excellence in the Danube region: Pan-European Snapshot of the Current Status of Cluster Management Excellence in Europe, European secretariat of Cluster Analysis.

Koren, M. and S. Tenreyro (2013), Technological Diversification, The American Economic Review, Vol. 103, No. 1 (February 2013), pp.3278-414.

Lucas, R.E (1988), on the mechanichs of economic development, Journal of monetary Economics 22, pp.3-42.

Martin, R. (2012), Regional economic resilience, hysteresis and recessionary shocks, Journal of economic geography, Vol. 12, pp.1-32.

Mulder, P. H.L.F. De Groot, M.W. Hofkes (2001), Economic growth and technological change: A comparison of insights from a neo-classical and an evolutionary perspective, Technological Forecasting & Social Change, 68 (2001), pp. 151-171.

Nelson , R.R., S.Winter (1982), An Evolutionary Theory of Economic Development, Harvard University Press, Cambridge, MA.

O'Brien, P. (1982), The contribution of the periphery, The Economic History Review, New Series, Vol. 35, No. 1, pp. 1-18.

Pavlinek, P. (2015), Foreign direct investment and the development of the automotive industry in Central and Eastern Europe, in: Béla Galgóczi, Jan Drahokoupil and Magdalena Bernaciak (eds) (2015) Foreign investment in eastern and southern Europe after 2008: Still a lever of growth? ETUI, Brussels. ISBN: 978-2-87452-390-8.

Reinert, E.S. (2007), How Rich Countries Got Rich... and Why Poor Countries Stay Poor, Constable and Robinson Ltd, London.

Rodriguez-Pose, A. (2017), The revenge of the places that don't matter (and what to do about it), Cambridge Journal of Regions, Economy and Society, 11 (1), pp. 189-209.

Romer, P.M. (1986), The Journal of Political Economy, Vol.94, No.5., pp.1002-1037. Romer, P.M. (1990), The Journal of Political Economy, Vol.98, No.5., pp.s71-s102.

Solow, R.M. (1956), A Contribution to the Theory of Economic Growth, Quarterly Journal of Economics, 70(1), 65-94.

Swan, T.W. (1956), Economic Growth and Capital Accumulation, Economic Record, 32, 334-361.

Simmie, J. and R. Martin (2010), The economic resilience of regions: towards an evolutionary approach, Cambridge Journal of Regions, Economy and Society, Vol. 3, pp.27-43.

Tacchella, A., M. Cristelli, G. Caldarelli, A. Gabrielli, and L. Pietronero (2012), A new metrics for countries' Fitness and products' Complexity. Scientific Reports 2, 723.
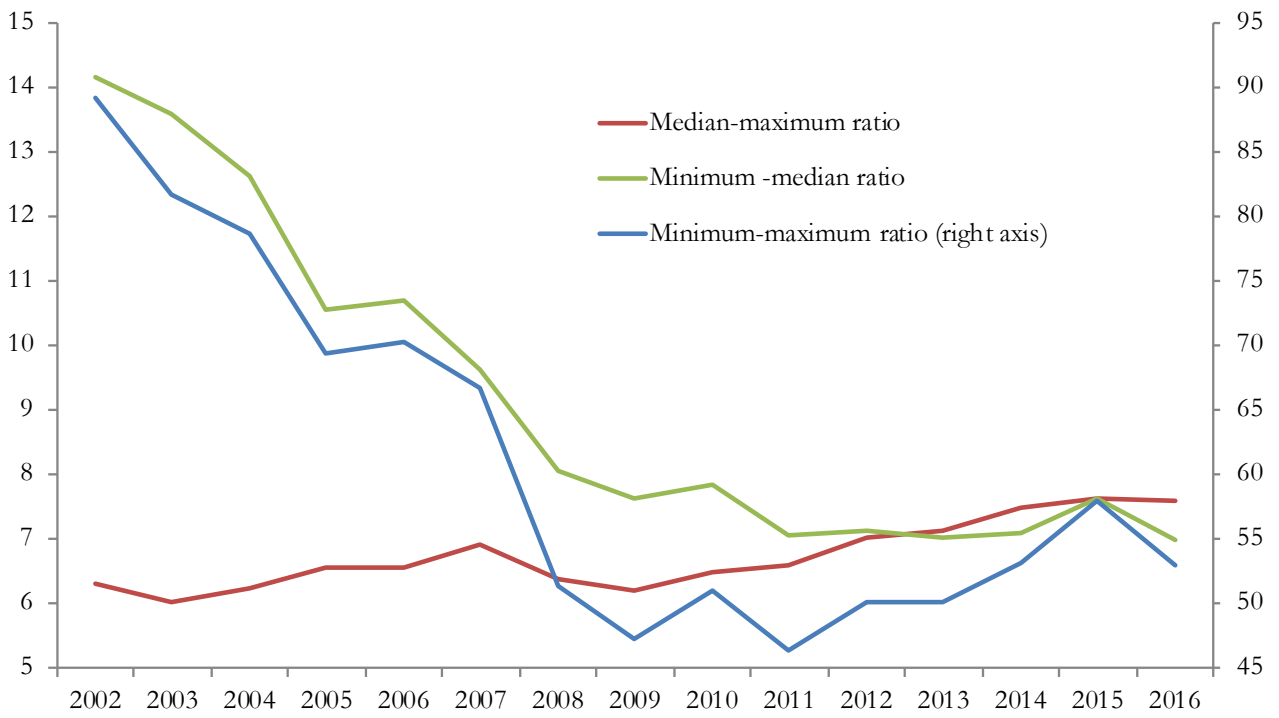
Tables and figures

Figure 1: trend of the Gini index and the mobility index (M2) of income across EU regions
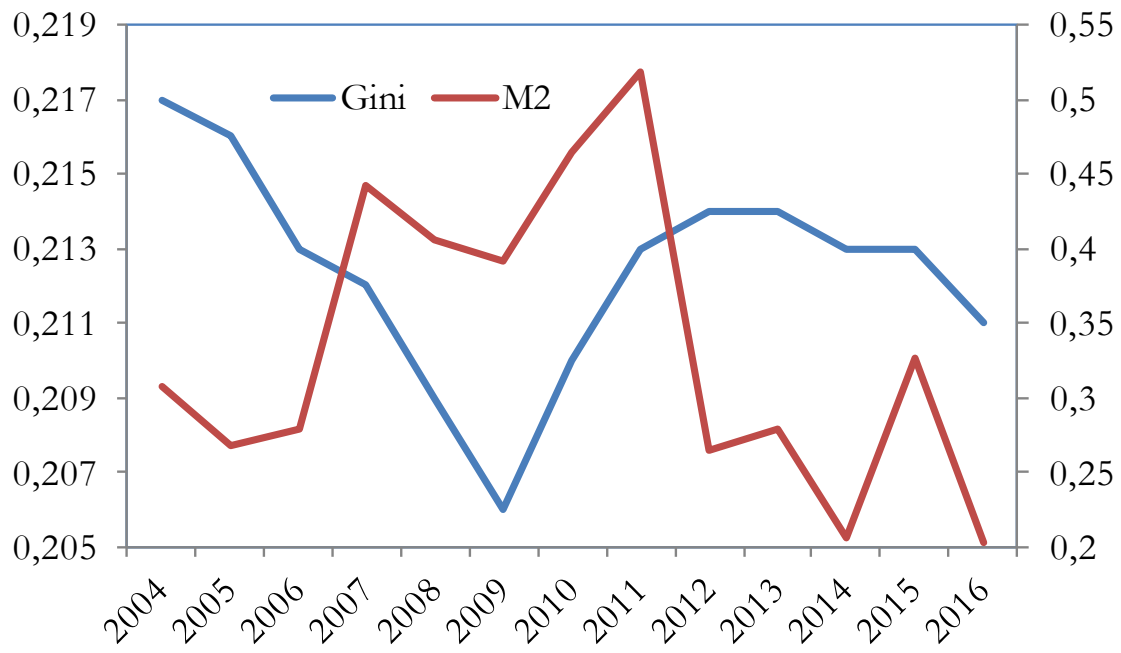
Source: authors' calculations based on Eurostat data.

Figure 2 – changes in the distribution.

Source: authors' calculations based on Eurostat data.

Figure 3 – The networks of regions based on their structural characteristics, closer regions share similar production systems.
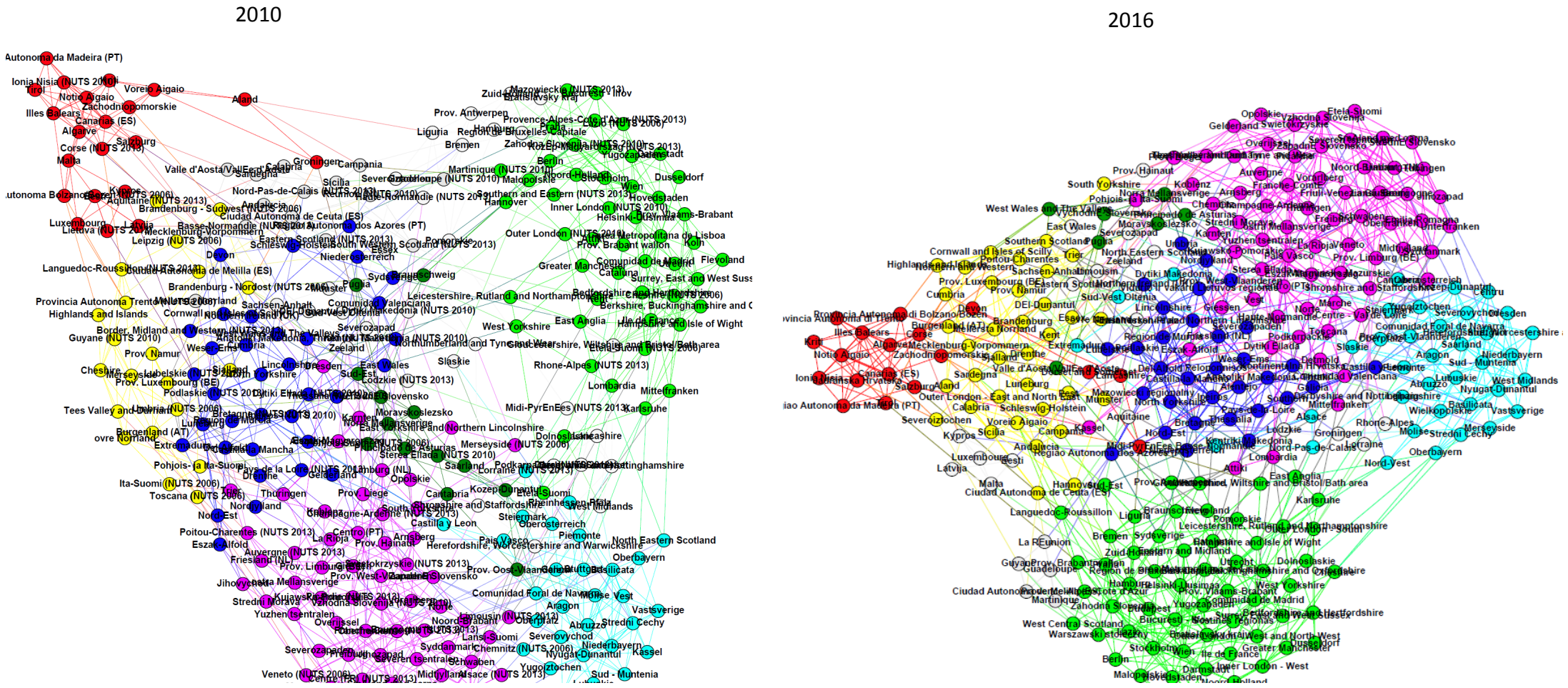
Table 1- the transition matrix of regions across groups

	Metal manufacture	Traditional manufacture	Diversified manufacture	Automotive-driven manufacture	Advanced services and creative	Construction and urban activities	Tou... dri... eco...
Metal manufacture	41.7	0.0	8.3	33.3	16.7	0.0	
Traditional manufacture	2.9	58.8	11.8	2.9	2.9	14.7	
Diversified manufacture	0.0	8.1	75.8	6.5	1.6	4.8	
Automotive-driven manufacture	0.0	6.9	17.2	65.5	0.0	0.0	
Advanced services and creative sector	0.0	0.0	8.9	0.0	82.2	4.4	
Construction and urban activities	0.0	5.3	15.8	10.5	10.5	36.8	
Tourism driven economy	0.0	4.8	0.0	0.0	0.0	9.5	
No clear specialization	2.3	0.0	9.1	15.9	20.5	29.6	
Total	2.6	10.9	25.6	13.9	19.6	12.0	

Source: authors calculations based on Eurostat database.

Table 2 – The characterization of clusters according to performance indicators

	Government quality	Corruption	Quality of public services	Road accessability	Raliway accessability	Passenger flight	Life expectancy	High education	Lifelong learning	Employment rate	Labour productivity	Purchase on the internet	Employment in finance	Gross value added from finance	Innovative SME
Metal manufacture	-0.12	-0.17	0.02	65.14	3.21	147.49	73.94	25.45	10.97	60.92	84.27	55.86	11.48	19.91	0.38
Traditional manufacture	-0.20	-0.20	-0.27	70.44	2.38	207.02	73.19	27.82	8.43	56.75	79.34	51.26	11.13	21.02	0.37
Diversified manufacture	0.36	0.29	0.24	76.01	4.12	491.62	74.18	27.32	11.13	64.87	94.44	58.99	12.77	21.58	0.37
Automotive-driven manufacture	-0.06	-0.13	-0.08	73.73	5.39	363.61	73.70	26.77	8.74	62.15	90.64	54.14	12.66	20.67	0.31
Advanced services and creative sector	0.28	0.34	0.28	88.03	11.40	881.03	74.34	37.75	12.65	69.27	108.13	66.29	19.14	27.47	0.42
Construction and urban activities	0.27	0.47	0.34	76.89	5.32	371.92	74.87	28.51	11.38	63.74	92.52	62.71	13.12	22.73	0.47
Tourism driven economy	-0.16	-0.16	-0.07	71.74	2.71	182.19	74.01	27.73	10.04	62.46	86.39	55.11	12.20	23.24	0.36
Other	0.14	0.32	0.19	82.30	3.59	343.36	74.47	31.77	12.76	62.62	102.26	60.42	15.69	24.22	0.55

Source: authors' calculation based on Eurostat and Revealed Competitiveness Index (RCI) Data

Table 3 – Regression results: economic growth and the structure of the economy.

	Average annual GDP per capita Growth 2010/2016	Average annual GDP per ca Growth 2010/2016
GDP per capita 2010	-0.013	-0.016
	(4.96)**	(6.03)**
Constant	0.149	0.17
	(5.67)**	(6.50)**
Metal manufacture		0
		-0.1
Traditional manufacture		0.003
		-1.01
Diversified manufacture		0.009
		(3.16)**
Automotive-driven manufacture		0.012
		(3.47)**
Advanced services and creative sector		0.012
		(3.77)**
Construction and urban activities		-0.001
		-0.16
Tourism driven economy		0.009
		-1.63
Constant		
R2	0.13	0.25
N	185	185

* p<0.05;** p<0.01
Source: Author's calculation based on Eurostat data