



Study on National Policies and Cohesion

Final Report

Contract No 2017CE16BAT125

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Study on National Policies and Cohesion

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ABSTRACT

Keywords: regional disparities, less developed regions, national policies, ESI Funds.

The economic disparities between Europe's Member States and regions is not a new phenomenon but remains a concern for the overall economic and social well-being of the continent. After a period of convergence economic disparities widened after Europe's economic crisis in the late 2000s. Within some countries the disparities between rapidly growing (capital city) regions, often the focus for investment and talent, and the rest of their country have also grown. These developments can be observed despite the significant investments from the EU's Cohesion Policy and national efforts over this period and before. Disparities can become deeply ingrained and difficult to reverse. A positive finding is that the national political measures, especially when coordinated and complementary with EU Cohesion Policy, can stimulate investments that help to address disparities. Investments in human capital, access to infrastructure, and improving governance, through supporting institutional capacity appear to be the most effective instruments in this respect.

The suggested policy approaches include: a national policy focus on assets for growth and transformation (including diffusion of innovation, skills and digital technologies); improving productivity in low output sectors or sectors that do not perform to their potential in some contexts, including agriculture; measures to balance the growth of major cities and ensure that other areas do not get left behind as well as a focus on policies that are additional to, and coordinated with EU Cohesion Policy.

ZUSAMMENFASSUNG

Schlagwörter: Regionale Disparitäten, weniger entwickelte Regionen, nationale Politiken, ESI Fonds.

Die wirtschaftlichen Unterschiede zwischen den Mitgliedstaaten und Regionen Europas sind kein neues Phänomen, sondern bleiben ein relevantes Thema für das wirtschaftliche und soziale Wohlergehen des gesamten Kontinents. Nach einer Phase der Konvergenz haben sich die wirtschaftlichen Ungleichgewichte nach der Wirtschaftskrise in Europa Ende der 2000er-Jahre verschärft. In einigen Ländern sind die Unterschiede zwischen den schnell wachsenden (Hauptstadt-)Regionen, die oft im Mittelpunkt von Investitionen und Talenten stehen, und dem Rest des Landes ebenfalls gewachsen. Diese Entwicklungen lassen sich trotz der erheblichen Investitionen aus der Kohäsionspolitik der EU und den nationalen Anstrengungen in diesem und früheren Zeiträumen beobachten. Disparitäten sind tief in den regionalen Strukturen verwurzelt und schwer umkehrbar. Ein positiver Befund der Studie ist, dass die politischen Maßnahmen der EU-Länder, insbesondere wenn sie mit der EU-Kohäsionspolitik koordiniert und ergänzt werden, Investitionen fördern können, die dazu beitragen, Ungleichgewichte zu reduzieren. Investitionen in Humankapital, in den Zugang zu Infrastrukturen und in die Verbesserung der Regierungsqualität durch Unterstützung der institutionellen Kapazitäten scheinen in dieser Hinsicht die wirksamsten Instrumente zu sein.

Zu den vorgeschlagenen politischen Ansätzen gehören: ein Förderschwerpunkt auf Wachstums- und Transformationsfaktoren (inkl. der Verbreitung von Innovationen, Fähigkeiten und digitalen Technologien); die Verbesserung der Produktivität in Sektoren mit geringer Produktivität (einschließlich der Landwirtschaft) oder Sektoren, die ihr Wachstumspotenzial nicht ausschöpfen; Maßnahmen zum Ausgleich des Wachstums von Großstädten und zur Gewährleistung, dass andere Regionen nicht zurückbleiben sowie ein Fokus auf nationale politische Prozesse und Aktivitäten, die die EU-Kohäsionspolitik ergänzen und mit ihr koordiniert werden.

RÉSUMÉ

Mots clés : disparités régionales, régions moins développées, politiques nationales, fonds ESI.

Les disparités économiques entre les États membres et les régions d'Europe ne constituent pas un phénomène nouveau, mais demeurent une préoccupation pour le bien-être économique général et social de ce continent. Après une période de convergence, les disparités économiques se sont aggravées après la crise économique européenne de la fin des années 2000. Dans certains pays, les disparités entre les régions à croissance rapide (capitales), qui sont souvent au premier plan des investissements et des talents, et le reste de leur pays se sont également accentuées. Ces tendances peuvent être observées malgré les investissements importants de la politique de cohésion de l'UE et des efforts nationaux au cours de cette période et avant. Les disparités peuvent devenir profondément enracinées et difficiles à inverser. Une conclusion positive est que les politiques nationales, en particulier lorsqu'elles sont coordonnées et complémentaires avec la politique de cohésion, peuvent stimuler les investissements qui aident à réduire les disparités. Les investissements dans le capital humain, l'accès à l'infrastructure et l'amélioration de la gouvernance, en soutenant la capacité institutionnelle, semblent être les instruments les plus efficaces à cet égard.

Les approches politiques suggérées comprennent: une politique nationale axée sur les atouts pour la croissance et la transformation (y compris la diffusion de l'innovation, les compétences et les technologies numériques); l'amélioration de la productivité dans les secteurs à faible production ou dans les secteurs qui n'exploitent pas pleinement leur potentiel dans certains contextes, notamment l'agriculture ; des mesures pour équilibrer la croissance des grandes villes et garantir que les autres régions ne soient pas délaissées; une concentration sur les politiques qui sont complémentaires à la politique de cohésion et en coordination avec celle-ci.

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GLOSSARY

CEE	Central and Eastern Europe Member States
CEF	Connecting Europe Facility
CF	Cohesion Fund
COSME	Competitiveness of Enterprises and Small and Medium-sized Enterprises
DG	Directorate-General
EARFD	European Agricultural Fund for Rural Development
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EIB	European Investment Bank
EMFF	European Maritime and Fisheries Fund
EP	European Parliament
ERDF	European Regional Development Fund
ESF	European Social Fund
ESIF	European Structural and Investment Funds
ESI Funds	European Structural and Investment Funds
EU	European Union
EEC6	Belgium, France, Italy, Luxembourg, the Netherlands and the Federal Republic of Germany (1957)
EEC9	EEC6 + Denmark, Ireland, the United Kingdom (1973)
EEC10	EEC9 + Greece (1981)
EEC12	EEC10 + Portugal, Spain (1986)
EU15	EEC12 + Austria, Finland and Sweden (1993)
EU25	EU15 + Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia (2004)
EU27	EU25 + Bulgaria and Romania (2007)
EU28	EU27 + Croatia (2013)
FEI	Financial Engineering Instrument

FDI	Foreign direct investment
FP	Framework Programme
GDP	Gross domestic product
GDP PPS	Gross domestic product, purchasing power standards
GDP per capita in PPS	Gross domestic product per capita, purchasing power standards
GFCF	Gross fixed capital formation (consists of resident producers' investments, deducting disposals, in fixed assets during a given period)
H2020	Horizon 2020
ICT	Information and communication technology
ITI	Integrated Territorial Investment
LDR	Less developed region
MA	Managing Authority
MDR	More developed regions
MS	Member States
NPS	National Programme for R&D&I (the Czech Republic)
NUTS	Nomenclature des unites territoriales statistiques (The NUTS 2021 classification, that will be valid for data transmissions to Eurostat from 1 January 2021, lists 104 regions at NUTS 1, 283 regions at NUTS 2 and 1345 regions at NUTS 3 level)
OP	Operational Programme
PA	Partnership Agreement
POC	Complementary Operational Programme (Italy)
R&D	Research & Development
R&I	Research & Innovation
SEA	Single European Act
SME	Small and medium-sized enterprises
TO	Thematic Objective

EXECUTIVE SUMMARY

Background and Objectives

This summary relates to the final report on the **Study on National Policies and Cohesion**, undertaken in 2019 by a team led by Prognos AG and experts from the Politecnico di Milano (POLIMI) and Technopolis Group.

The study seeks to better understand the underlying trends of national and regional disparities (economic, social, territorial; with a focus on economic cohesion) and the specific role of national policies in the context of regional policy, and policies designed to reduce disparities between regions. Based on extensive quantitative analysis and simulation modelling, stakeholder interviews and case studies in selected Member States¹ it is expected that the study will inform the EU ahead of its next **Report on Economic, Social and Territorial Cohesion**² which is due for publication by September 2021. The study specifically contributes to the following two overarching questions:

1. To what extent do disparities exist and persist, particularly in relation to the less developed regions (LDRs)?
2. To what extent do national policies directly or indirectly influence cohesion?

These overarching questions have been further specified in 14 research questions, as set out in the terms of reference.³

Key Study Findings

Below we present the central findings of the study, structured along the 14 research questions. While for some questions, very comprehensive answers could be provided, for some others the base of evidence is less clear and calls for further investigation in the future. The key findings are outlined below.

A. REGIONAL ANALYSIS

1. What has been the nature and extent of regional disparities in European Union (EU) Member States (particularly economic disparities)?

Regional disparities have been on the rise in many European countries and structural, economic disparities within the EU remain serious. Most Central and Eastern European (CEE) Member States have a GDP per capita of less than 75% of the EU-28⁴ average, and less than 50% in some regions. Similarly, regions in the Southern European Member States (including Spain and Italy) show significant gaps to leading regions in terms of growth, productivity, and employment. There has been a trend towards increasing disparities – including levels of productivity – since the economic crisis, whilst agglomeration forces, with an increasing spatial specialisation of European industries and services combined with the growth and convergence of capital regions, which has led in some cases to an increasing divide with surrounding and peripheral areas. In these cases, disparities have

¹ While for the quantitative analysis on regional disparities, all EU Member States were studied, the policy review focussed on 11 selected Member States where greater information needs were detected, including Bulgaria, Croatia, the Czech Republic, Hungary, Italy, Poland, Portugal, Romania, Slovakia, Slovenia and Spain. For eight of the 11 countries, additional evidence was gathered through case studies, i.e. in Bulgaria, the Czech Republic, Hungary, Italy, Poland, Romania, Slovenia and Spain.

² According to Article 175 TFEU, the European Commission (CF) must report to the European Parliament (EP), the European Council, the European Economic and Social Committee, and to the Committee of the Regions every three years on the progress being made with respect to the attainment of the goals of the Cohesion Policy.

³ https://ec.europa.eu/regional_policy/sources/tender/pdf/2017125/specifications.pdf

⁴ The 28 members of the European Union at the time of the study

been driven to an extent by slow growing/low-productivity industries and higher levels of unskilled labour.

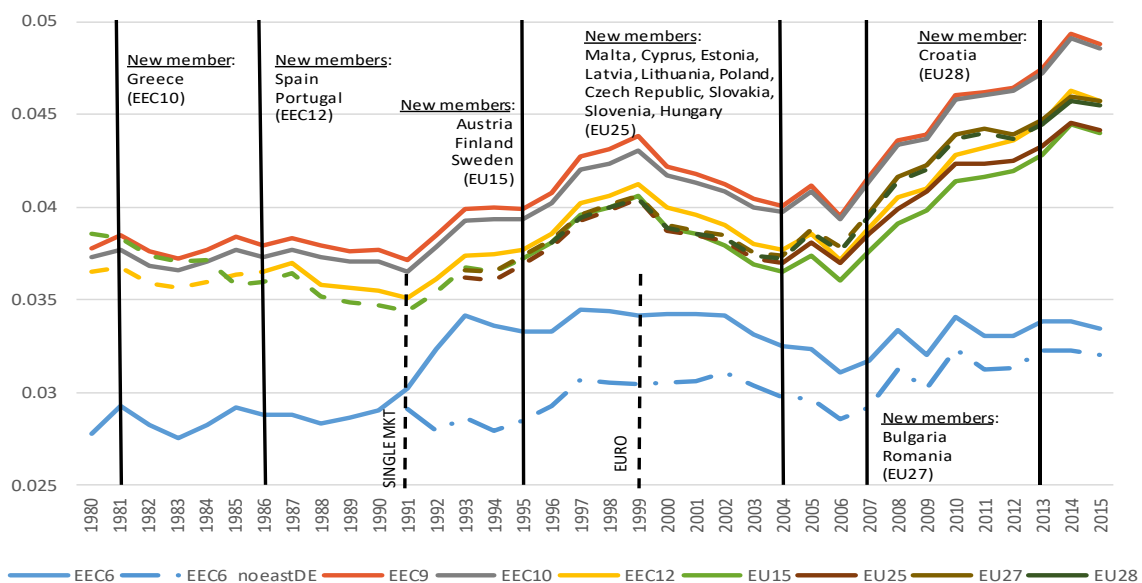
2. How have regional disparities changed over time?

Overall, **inter-regional disparities** show a persistent convergence since the 1980s and up to 2008, when the economic and financial crisis interrupted and reversed this positive trend. The picture changes when disparities between and within countries are analysed separately. *Disparities between countries* are consistent with the general trend, showing a permanent decrease up to the crisis. *Intra-national disparities (within countries)*, instead, are more volatile, changing from periods of stability and/or convergence to periods of divergence. For what concerns within-country disparities, we have identified four broad periods since 1980, the starting point for comparable data sets;

- 1980–1991, a period of relative stability;
- 1991–1999, a period of increasing disparities;
- 1999–2007, a period of decreasing disparities;
- 2007–onwards, a new period of growth in disparities.

The diagram below shows how **disparities within-countries** have changed over time, based on gross domestic product, purchasing power standards (GDP PPS). Disparities peaked at the turn of the century coinciding with the introduction of the euro and the expansion to 25 Member States but then reduced prior to the crisis. A sharp increase in disparities following the crisis can be clearly seen. The data suggests a more recent convergence since 2014, although data is limited, and the most recent data used in the study was from 2016. Under certain conditions the trend towards reduced disparities could be expected to continue and consolidate, but it also depends on the overall economic health of Europe (a new recession could have a negative effect as could new trade barriers) and demographic trends (e.g. ageing of the population leading to shortages of labour, outward migration in some regions).

Figure 1: Within-country disparities by groups of Member States 1980–2015, Theil index, within component (GDP per capita in PPS)



Note: The Theil index is a statistic mean used to measure economic inequality in terms of weighted distance of wealth (in this case GDP PPS per capita) in a region or country with respect to an overall mean (the EU value). Each line represents the level of disparities within a specific group of Member States, with the dashed part representing the time in which the last countries joining that particular group are not yet part of the EU, the continuous line displaying the period in which all countries belonging to the group are officially part of the EU.

Source: POLIMI (2019), based on data available on EU website <https://urban.jrc.ec.europa.eu/t-pedia/#/>.

3. What have been the main drivers behind these regional disparity trends?

Regional disparities occur for many reasons and have many causes. They are also deeply ingrained. Reversing disparities is a complex process. Italy and Spain are good examples, where disparities persist and sometimes increase, despite years of EU and national cohesion policies. However, the process of convergence can be helped by technological diffusion, by periods of positive economic cycles, and by major institutional changes.

The **enlargement of the EU** has favoured convergence *between* countries but has exacerbated *intra-national* disparities. This is especially true for the last two enlargements, where the intra-national disparities within CEE Member States drastically increased, highlighting the need for effective interventions to avoid within-country disparities in these Member States to remain permanently different from those in Western countries.

The constitution of the **Common Market** and the introduction of the **Single Currency** helped convergence *between-countries* but resulted in different effects on *intra-national disparities*. The long period of investment expansion which accompanied the Common Market contributed to divergence within countries, with large international investments directed mainly to the 'gateways' of countries, i.e. the largest cities and/or capital cities. The convergence effects of the establishment of the Single Currency is the result of the abolition of (price) competitiveness policies obtained through exchange rate variations, which were in the past helpful for the competitiveness of economically strong areas within countries (at least in the short term).

Regional disparities find their **sources** in either a different level of productivity among regions, or in the uneven distribution of growth assets. In the first case, productivity depends on the industrial structure. Once this is assumed to change, the effects on regional disparities are relevant. In the second case, the effects on disparities go through the speed of the catching up process. Once an equal distribution of assets is assumed, the effects on regional disparities exist, but are more limited since they take place through a higher speed in the catching up of lagging regions.

With a similar **industrial composition** across European regions or with a similar **productivity** in the different sectors across regions, disparities in fact would be much lower. This is true especially for the intra-industry productivity effect; the same intra-industry productivity across sectors in European regions could reduce regional disparities by approximately two-thirds. Furthermore, a decrease in regional disparities can be attributed to a favourable composition of dynamic industries, to local industries more dynamic than the European average and to reallocation of employees in higher value-added sectors. This is particularly true for the CEE Member States. If we take the example of agriculture regions: regions in the CEE countries with a strong presence of lower productivity agricultural activity tend to perform poorly compared to regions where agriculture in general is lower, or where agriculture has been modernised with resulting increases in productivity.

In the case of a **balance in interregional endowment of resources**, the catching up process of less developed regions would be affected, and disparities would decrease, although to a lesser extent with respect to the previous case, since they affect the speed of the catching up process. The results also suggest that effective policies would favour interventions on 'soft' elements, such as ethics, organisation, education and innovation, and less on 'hard' elements, such as infrastructure, which is a necessary but not sufficient condition for a catching up process.

Lastly, an important message comes out from what concerns the role of **agglomeration economies** on regional disparities. While agglomeration economies explain part of the efficiency in regional production, they have a relatively low relevance in regional disparities. This result suggests that even if, paradoxically, we could envisage large cities like Paris and London to be present in all European regions, the problem of spatial imbalances would not be solved. In fact, other assets, like human capital, accessibility and quality of government play a much more important role on disparities than the presence of cities.

4. How has public investment (in terms of gross fixed capital formation) evolved at national/regional level over time?

The global economic and financial crisis has had great effects upon the state of public finances in Europe and posed a major challenge to the institutional structure of several EU Member States.

Public investments in many EU countries as a share of GDP is still below the pre-crisis level. Low public investment in less-developed EU Member States and scarcity of sub-national investment in less developed regions can undermine convergence. With the recent revival of the European economies, the overall public debt of Member States has declined, but is still well above its pre-crisis level in 2007. Public investment in the EU fell from 3.4% of GDP in 2008 to 2.9% in 2018 and in some Member States, there have been substantial cuts in growth-enhancing spending. At the national level, post-crisis fiscal adjustments have led to a major reduction on the competency rights and autonomy of local governments and administrations. The new financial framework conditions have prompted many countries to rethink financial relations between levels of government in terms of taxes and spending powers and there has been a significant re-centralisation of decision-making on public resources and financial allocations.

Many **sub-national governments** suffered due to falling revenues between the years 2008 and 2009, originating, inter alia, from reduced transfers from central governments or stagnating revenues. In 2018 government investments, i.e. gross fixed capital formation, represented 2.9% of GDP compared to the pre-crisis 3.2% of GDP, a similar decline as observed for public investments overall. Member States most impacted by this trend were some of the most affected by the economic recession, i.e. Ireland, Portugal and Spain, where gross fixed capital formation remained below 2% in 2016 and only marginally increased since then. Other growth inducing expenditures have also declined during that period, such as total expenditures on transport, communication, energy or education. This is specifically the case for Member States with GDP per capita below the EU average, raising concerns over the likelihood of their convergence to the rest of the EU.

5. What has been the impact of public investment and changes in public investments on regional disparities (different funds and investments)?

Through data modelling, and supported by stakeholder consultations and case studies, we identified the types of investment that are more favourable to the reduction of disparities between regions.

Public investments for cohesion (both ESI Funds and national policies) play an important role in shaping growth trajectories of regions, with strong cumulative and self-reinforcing effects. However, this result holds a caveat. The effect of public investments on growth is strongly related to the presence of private investments. Moreover, the less developed regions (for the ESI Funds) register a higher return of investments on growth than the European average. In other words, less developed regions increase growth more than the others per euro invested. Investments, therefore, can stimulate convergence. ESI Funds stimulate growth rather indirectly by stimulating investments, but effects are normally visible after a time lag, following the investments.

However, both the baseline starting point (e.g. regarding a country's industrial mix) and the adoption of investment policies varies between Member States. We can observe the importance of public (and private) investment in growth assets in explaining regional disparities. From the analysis the most important assets for growth are human capital, quality of government, radical innovation (i.e. product innovation) and market innovation. The spatial distribution of these assets and investment in them varies although urban areas get advantage from the presence of high value functions – rather than the size of the urban area - and human capital.

Two important messages can be derived from this: on the one hand, it is possible that disparities would be worse without EU and national policies for cohesion. On the other hand, however, it is also true that the strength of exogenous drivers such as economic cycles and (global) institutional changes are so fundamental that cohesion policies will

struggle to make a significant impact on the scale of disparities, or the direction towards greater convergence or greater disparities.

B. POLICY MAPPING

6. Which EU Member States have national (or regional) funding policies in place that explicitly aim at reducing (regional) disparities and to what extent are they aligned with the objectives of the EU's Cohesion Policy?

All EU Member States analysed have several nationally mandated and purely nationally financed policies for economic cohesion: around **60 policy measures** were identified in 11 selected Member States, focusing on a broad spectrum of policy categories with sector development and targeted investments. The improvement of the business environment is the policy category that is utilised most frequently. In terms of investing in growth assets (see Question 4 above), the balance of spend (in € million) is broadly comparable across CEE and Southern European Member States, except that spend in Italy and Spain on cluster development and centres of excellence is almost three times that in Croatia, Hungary, Romania, Slovenia and Slovakia combined.

Overall, however, the **ESI Funds** remain the main source of financing of policies explicitly addressing economic and territorial cohesion challenges in the analysed Member States except for Italy. Nationally funded measures often support activities that cannot be financed by the ESI Funds, increase the flow of funding in areas where EU sources alone are not enough or support regions in transition and territories facing development challenges across all types of regions. The dividing line between EU and national policies supporting cohesion is often blurred. This is to be expected given that the ESI Funds work within the 'grain of national policies and priorities' with complementary objectives and targets (e.g. developing low carbon economies and renewable energy sources, fostering innovation in the business community, enhancing skills etc.). Wholly distinctive national policies, therefore, tend to be found in policy areas not covered by the ESI Funds.

Table 1: Overview of policy measures by the type of instrument in the selected EU Member States

Policies measures by...		Member States											Total
...type of category	...type of instrument	BG	HR	CR	HU	IT	PL	PT	RO	SK	SI	ES	
Business environment and Trade	Venture capital funds and other financial instruments		4	1		3	1	1		1	1		12
	Tax incentives	2	3		1	1	2	4			3		16
	Investment promotion	1	3		1	3	1	1			4	5	19
	Special economic zones	1	3	1		1	2					1	9
Innovation and Sector Development	Business development and innovation support to firms	1	8	1	3	3	2	1	3		4	6	32
	R&D programmes		5	1		2	1	1			1		11
	Research infrastructures		4	1	1	3	1						10
	Commercialisation of research and technology transfer		4		1	1	1						7
	Industrial parks and other businesses infrastructures	1	3		1	3	1	1			2		12
Urbanisation and Connectivity	Clusters, centres of excellence and technology centres		4		1	2	1	1					9
	Transport infrastructure		4	1	1	3	1	1	1	2	1		15
	Digital infrastructures		3			2	1	1		2	1		10
	Energy infrastructures		3			1	1			1			6
Skills and Mobility	Life-long learning	1	3			1	1	1			4		11
	New skills development (e.g. digital skills)	1	3			2	1	1		1	1		10
	Labour market training	2	4		1	1	1	1			1		11
	Educational infrastructures, Universities		3		1	1	1	1					7
	Mobility of researchers		3			2	1						6
Total		10	67	6	12	35	21	16	4	7	23	12	213

Note: The total number of policy measures identified is 60, including seven smaller measures in Croatia that have been grouped into one. These policies were analysed in terms of the type of policy instrument that they entail. In some cases, one policy measure can utilise several instruments, resulting in a higher number of policy instruments than policy measures (multiple designation, resulting in 213 type of instruments).

Source: Prognos/Technopolis (2019).

From the analysis of national policy measures, we can see that 37% favour specific regions based on eligibility (e.g. unemployment levels), 30% are directed towards specific regions (region-specific policies) and 23% can benefit all regions (the remaining 10% is

unspecified). Regionally focused policies (the first two categories) are generally favoured more in the Southern European Member States than the CEE countries. There are mixed experiences with regards Member State attitudes to regional disparities. Some actively support the more prosperous regions, including capital cities, with the view that doing so also benefits less developed regions. Some are more actively engaged in supporting less developed regions and reducing within country disparities including some exclusion of funding to capital cities and more prosperous regions (e.g. through funding eligibility criteria). On average, the first approach is more diffused among countries which had lower issues with growth and internal disparities. On the other hand, the patterns of growth and disparities seem to exert little influence on the typologies of policies implemented.

7. Which other (economic, financial, etc.) policies exist that have an indirect impact on cohesion?

In Table 1 above some policy instruments fall outside – but complement – ‘cohesion-type’ policies pursued by the Member States as part of their ESI Funds programmes. These include fiscal measures including tax incentives, and special economic zones, with favourable arrangements for occupiers. In addition, national policies that support the mobility of researchers would generally fall outside cohesion-type policies.

EU Cohesion Policy has changed over the years, moving away from large capital investments in infrastructure towards RTD and business innovation measures. Member States have used national policies to support what might be funded under previous EU programmes, including transport infrastructure. This is especially visible in the CEE countries, where up to 17% of policies are directed accordingly, although the scale varies with investments in urbanism and connectivity in Italy five times those of Romania, and fifty times the budget for the transport infrastructure programme in Hungary.

Some public policy measures to support the redistribution of assets have had inadvertent effects (e.g. reallocation of public sector functions and jobs in Italy to LDRs, when those jobs are lost due to a slowdown or reduction in public investment through austerity cuts and other policies). However, policies to invest in growth assets designed to improve productivity and to move the economic structure away from low productivity agriculture and industry to modern growth sectors and processes does appear to have an effect.

8. What is the duration of the respective policies?

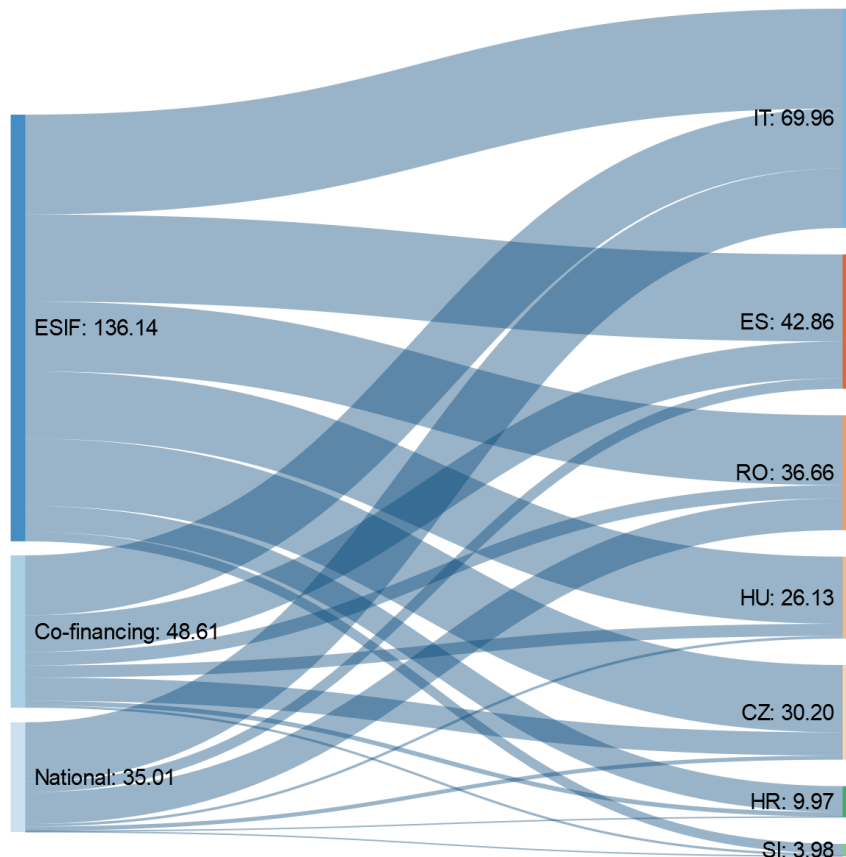
From the existing evidence from the Member States, the **duration of policies** is very variable. Some national policies – and funding cycles – mirror the EU policy and funding cycle, but some national policies are implemented over relatively short periods. In Italy there is a ‘Complementary Operational Programme’ that follows the timelines of the EU programmes.

Overall it can be observed, that the medium to long-term approach which is associated with the programme-cycles of the ESI Funds Operational Programmes is not a common standard in national policies but that in some cases, there has been a transfer of the policy architecture from the EU to the national level.

9. If measurable, what is the financial magnitude of the respective policies?

The budget of purely nationally funded policy measures targeting cohesion was found to be much lower than the ESI Funds. An exception is Italy, where the national funding is around 93% of the ESI funding (based on the available data). Other significant national contributions are in place in Romania and to a lesser extent in Spain, whereas the national funding of policies in countries such as Slovenia, Hungary, the Czech Republic and Croatia is much smaller. For Italy, the most significant share of national funding (69%) is directed to network infrastructures, mainly roads, to compensate for the low funding from the ESI Fund. In several cases, the absorption of national funding seems to be an issue, more so than the actual levels of funding, with implementation agencies lacking the capacity for effective and efficient delivery.

Figure 2: Comparison of budgets - ESI funded measures (without co-financing), co-financed measures, and nationally funded measures supporting the reduction of economic disparities (in € billion)



Note: The amounts for the different countries illustrate the total budget (ESI Funds, co-financing and National). ESI Funds and Co-financing include only Cohesion Fund (CF), European Regional Development Fund (ERDF) and the European Social Fund (ESF). Budgets for the national funding were only available for seven countries, Portugal, Slovakia, Bulgaria and Croatia are not shown in this figure.

Source: Prognos/Technopolis (2019).

10. At what level of governance are the policies designed and implemented (national, regional, local)?

The analysis of policy measures showed that the vast majority were designed (87%) and implemented (70%) at the national level with a further 3% and 13% respectively designed and implemented jointly between national and regional governments. There are variations based on governance structures so in Spain the autonomous communities decide how public money targeted on cohesion policies will be spent.

From the countries reviewed there are examples of nationally established programmes for regional and local development (such as the National Programme for Local Development in Romania). It is also common for specialist (thematic) public agencies to have a role in policy design, implementation and monitoring (e.g. the Invest Bulgaria Agency in relation to the country's Investment Promotion Act).

11. How do these policies contribute and align to the EU's objectives of economic, social and territorial cohesion?

Economic cohesion and the reduction of economic disparities between the respective country and the EU and is often understood more broadly by the Member States than it is described in the EU treaties. Thus, territorial cohesion is often an inseparable part of the broader efforts of the country to reduce the economic disparities with the EU. This is also supported by the fact that countries are often implementing policies in fields in which their less developed regions are weak, either in absolute or relative terms.

C. POLICY AND REGIONAL ANALYSIS

12. Are there specific patterns emerging across Member States and their regions regarding the utilisation of specific strategies / policy measures / approaches?

From the evidence, there are **mixed experiences** with regards Member State attitudes to regional disparities. Some actively support the more prosperous regions, including capital cities, with the view that doing so also benefits less developed regions. Some are more actively engaged in supporting less developed regions and reducing within-country disparities including some exclusion of funding to capital cities and more prosperous regions. Most CEE countries, i.e. Poland, Romania, Bulgaria, Slovakia, the Czech Republic and Hungary show the same pattern: the capital city has become a 'champion region', and in most cases its performance drives the national average, while other regions are falling behind.

The **policy responses from Member States** vary, and many national policies, especially those focused on sectoral growth, do not have explicit territorial or regional dimensions (but might have indirect impacts on economic cohesion). As noted above, there has been a tendency towards the centralised governance of policies.

Moreover, comparing the policies implemented with the endowments of growth factors, a demand-driven approach to policy implementation seems to prevail, in which countries implement more measures on aspects in which they are already highly endowed of related resources.

13. Which territorial factors are operating in which type of region? (agglomeration economies, centrifugal/centripetal forces, capital-city development, spatial spill-overs etc.)

In the CEE Member States the evidence suggests that **capital and larger cities** can exacerbate economic disparities, being the focus for investment and talent, and a 'magnet' for in-migration (with resultant depopulation in neighbouring regions). The pattern of depopulation and the migration of people from less developed regions is a major challenge for countries tackling regional imbalance.

14. What are appropriate policy responses under different regional circumstances and development potentials?

Given the factors involved in determining the economic performance at both country and regional level there are limitations in the role public policy and funding can play in addressing disparities.

However, the evidence from the quantitative analysis is that **EU and national funding** has helped to stimulate growth through investments. The evidence suggests that a mix of policies that help to promote diffusion of innovation (RTD) investments and talent (skills, improving the mobility of researchers), which encourage a more even spread of productivity and balanced economies (moving away from less productive and less innovate sectors often found in LDRs) can lead to a reduction of disparities, but especially if combined with high quality governance to lead and oversee the process of change and monitor the performance of policies. The flexibility and potential for responsiveness, afforded by many national policies was cited as a positive in the case study research, although tempered by uncertainties in funding continuity and the potential for changes in policy direction at the national level. A further potential constraint is the capacity to design and deliver policies, especially so at the regional and local levels, where the governance and delivery infrastructures can be constrained.

Overall, **it can be summarised from this study that**, despite the sixty years of integration, no group of countries resulting from subsequent EU enlargements in the EU registers a lower disparity with respect to another group, making the convergence process still incomplete. The long-term processes associated to greater convergence, leading to higher levels of development in the economies through information diffusion, integration of local cultures and know-how, strong imitation processes in economic activities and in in lifestyles still must show all their effects.

At the same time, we see, that public investments (ESI Funds and national policies) have and can play an important role in shaping growth trajectories of regions, with strong cumulative and self-reinforcing effects. ESI Funds stimulate growth rather indirectly by stimulating investments, a similar effect is likely for many of the analysed national policies. But this requires private investments to go alongside of public sector engagement and it requires the public sector to focus on growth-enhancing policy measures that promote the diffusion of innovation (RTD) investments and talent, which encourage a more even spread of productivity and ensure high quality governance to lead and oversee the process of change and monitor the performance of policies.

ZUSAMMENFASSUNG

Hintergrund und Ziele

Diese Zusammenfassung bezieht sich auf den Abschlussbericht der Studie über die **Nationale Politik und Kohäsion**, die 2019 von einem Team unter der Leitung der Prognos AG und Experten der Politecnico di Milano (POLIMI) und der Technopolis Group durchgeführt wurde.

Die Studie zielt darauf ab, die zugrunde liegenden Trends nationaler und regionaler Disparitäten (wirtschaftliche, soziale und territoriale Disparitäten; mit Schwerpunkt auf den wirtschaftlichen Disparitäten) sowie die spezifische Rolle nationaler Regionalpolitik und die der Politik zur Verringerung regionaler Disparitäten besser zu verstehen. Die Studie basiert auf umfangreichen quantitativen Analysen und Simulationsmodellen, Interviews mit Experten und Fallstudien in ausgewählten Mitgliedstaaten.⁵ Hierdurch soll die Studie vor dem nächsten **Bericht der EU-Kommission über den wirtschaftlichen, sozialen und territorialen Zusammenhalt (Kohäsionsbericht)** Evidenz liefern,⁶ der im September 2021 veröffentlicht werden soll. Die Studie trägt insbesondere zu den folgenden übergreifenden Fragen bei:

1. Inwieweit existieren und fortbestehen Disparitäten, insbesondere in Bezug auf die weniger entwickelten Regionen?
2. Inwieweit beeinflusst die nationale Politik direkt oder indirekt den Zusammenhalt?

Diese übergreifenden Fragen wurden in 14 Forschungsfragen näher spezifiziert.⁷

Zentrale Erkenntnisse

Im Folgenden werden die zentralen Ergebnisse der Studie vorgestellt, orientierend an den 14 Forschungsfragen. Während für einige Fragen sehr umfassende Antworten gegeben werden konnten, ist für einige andere die Evidenz weniger klar und erfordert weitere Untersuchungen in der Zukunft.

A. REGIONALANALYSE

1. Was sind die Natur und das Ausmaß der regionalen Disparitäten in den EU-Mitgliedstaaten (insbesondere der wirtschaftlichen Disparitäten)?

Die regionalen Disparitäten sind in vielen europäischen Ländern gestiegen und die strukturellen und wirtschaftlichen Ungleichgewichte innerhalb der EU nach wie vor problematisch. Die meisten mittel- und osteuropäischen Mitgliedstaaten weisen ein BIP pro Kopf von weniger als 75% des EU-28-Durchschnitts auf und in bestimmten Regionen weniger als 50%. Ebenso weisen Regionen in den südeuropäischen Mitgliedstaaten (einschließlich Spanien und Italien) erhebliche Disparitäten zu den führenden Regionen in Bezug auf Wachstum, Produktivität und Beschäftigung auf. Seit der Wirtschaftskrise gibt es einen Trend zu immer größeren Ungleichheiten zwischen Regionen – auch in Hinblick auf die Produktivität. Zudem führen Agglomerationskräfte, die sich durch eine zunehmende räumliche Spezialisierung der europäischen Industrien und Dienstleistungen sowie durch

⁵ Während für die quantitative Analyse der regionalen Disparitäten alle EU-Mitgliedstaaten untersucht wurden, konzentrierte sich die Überprüfung der Politik auf 11 ausgewählte Mitgliedstaaten, in denen ein größerer Informationsbedarf festgestellt wurde, darunter Bulgarien, Kroatien, die Tschechische Republik, Ungarn, Italien, Polen, Portugal, Rumänien, die Slowakei, Slowenien und Spanien. Für acht der elf Länder wurden zusätzliche Erkenntnisse durch Fallstudien gesammelt (in Bulgarien, der Tschechischen Republik, Ungarn, Italien, Polen, Rumänien, Slowenien und Spanien).

⁶ Gemäß Artikel 175 AEUV muss die Europäische Kommission (CF) dem Europäischen Parlament (EP), dem Europäischen Rat, dem Europäischen Wirtschafts- und Sozialausschuss und dem Ausschuss der Regionen alle drei Jahre über die Fortschritte bei der Verwirklichung der Ziele der Kohäsionspolitik berichten.

⁷ https://ec.europa.eu/regional_policy/sources/tender/pdf/2017125/specifications.pdf

das Wachstum und die Konvergenz der Hauptstadtregionen kennzeichnen, in einigen Fällen zu einer zunehmenden Kluft zu umliegenden und peripheren Gebieten. In diesen Fällen wurden die Disparitäten zum Teil durch die langsame Entwicklung und geringere Produktivität einzelner Branchen sowie durch ein höheres Maß an ungelerten Arbeitskräften verursacht.

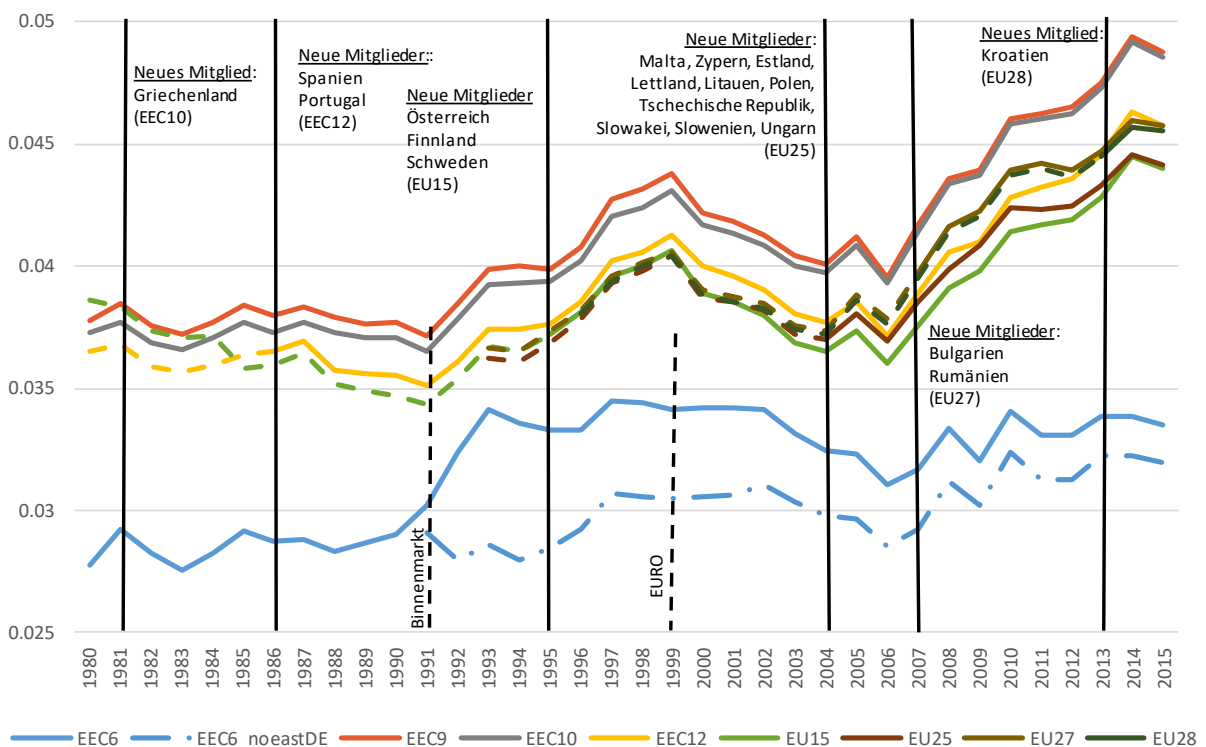
2. Wie haben sich die regionalen Disparitäten im Laufe der Zeit verändert?

Insgesamt zeigen die **interregionalen Disparitäten** eine anhaltende Konvergenz seit den 1980er Jahren bis ins Jahr 2008, als die Wirtschafts- und Finanzkrise diesen positiven Trend unterbrach und umkehrte. Das Bild ändert sich, wenn Disparitäten zwischen und innerhalb von Ländern separat analysiert werden. Die Disparitäten zwischen den Ländern sind im Einklang mit dem allgemeinen Trend und zeigen einen dauerhaften Rückgang bis zur Krise. Intranationale Disparitäten hingegen sind volatiler und wechseln von Perioden der Stabilität und/oder Konvergenz zu Perioden der Divergenz. Was die Disparitäten innerhalb der Länder betrifft, so werden im Rahmen der Studie zum Datenvergleich als Ausgangspunkt vier große Zeiträume seit 1980 herangezogen:

- 1980 – 1991, eine Periode der relativen Stabilität;
- 1991 – 1999, eine Periode zunehmender Disparitäten;
- 1999 – 2007, eine Periode abnehmender Disparitäten;
- seit 2007, eine neue Phase zunehmender Disparitäten.

Die folgende Abbildung zeigt, wie sich die **Disparitäten innerhalb der Länder** im Laufe der Zeit verändert haben, basierend auf dem Bruttoinlandsprodukt, gemessen in Kaufkraftstandards (BIP in KKS). Die Disparitäten erreichten ihren Höhepunkt um die Jahrtausendwende, ungefähr zeitgleich mit der Einführung des Euro und der Erweiterung der EU auf 25 Mitgliedsstaaten, schwächten sich aber vor der Krise leicht ab. Nach der Krise ist eine deutliche Zunahme der Disparitäten zu erkennen. Die Daten deuten auf eine Konvergenz seit 2014 hin, jedoch ist hier die Datenverfügbarkeit begrenzt; die letzten in der Studie verwendeten Daten stammen aus dem Jahr 2016. Unter bestimmten Bedingungen könnte davon ausgegangen werden, dass sich der Trend zur Verringerung der Disparitäten fortsetzen wird; dies hängt aber auch von der allgemeinen wirtschaftlichen Entwicklung Europas (eine neue Rezession könnte sich negativ auswirken, ebenso wie neue Handelshemmnisse) und den demografischen Trends (z. B. Überalterung der Bevölkerung, die zu Arbeitskräftemangel führt, Abwanderung in einigen Regionen) ab.

Figure 3: Disparitäten innerhalb der Länder nach Gruppen von Mitgliedstaaten 1980 – 2015, Teil-Index, innerhalb der Komponente (BIP pro Kopf in KKS)



Hinweis: Der Theil-Index ist ein statistisches Mittel zur Messung der wirtschaftlichen Ungleichheit in Bezug auf die gewichtete Entfernung des Reichtums (in diesem Fall BIP KKS pro Kopf) in einer Region oder einem Land in Bezug auf einen Gesamtmittelwert (den EU-Wert). Jede Linie stellt das Ausmaß der Disparitäten innerhalb einer bestimmten Gruppe von Mitgliedstaaten dar, wobei der gestrichelte Teil die Zeit darstellt, in der die letzten Länder, die dieser Gruppe beigetreten sind, noch nicht der Europäischen Union angehörten. Die kontinuierliche Linie zeigt den Zeitraum, in dem alle Länder, die dieser Gruppe angehören, offiziell der Europäischen Union angehören.

Quelle: POLIMI (2019), basierend auf den Daten von <https://urban.jrc.ec.europa.eu/t-pedia/#/>.

3. Was waren die Hauptgründe für diese regionalen Disparitätstendenzen?

Regionale Ungleichheiten haben sehr unterschiedliche Gründe und vielfältige Ursachen, was die Umkehrung zu einem komplexen Prozess macht. Italien und Spanien sind gute Beispiele dafür, dass die Disparitäten trotz jahrelanger Kohäsionspolitik der EU und der Mitgliedstaaten fortbestehen und sich zuweilen noch vergrößern. Der Konvergenzprozess kann jedoch durch technologische Diffusion, Perioden positiver Wirtschaftszyklen und durch bedeutende institutionelle Veränderungen unterstützt werden.

Die Erweiterung der EU hat die Konvergenz *zwischen den Ländern* begünstigt, aber die *innerstaatlichen Disparitäten* verschärft. Dies gilt insbesondere für die letzten beiden Erweiterungen, bei denen sich die innerstaatlichen Disparitäten innerhalb der MOE-Mitgliedstaaten drastisch vergrößerten, was die Notwendigkeit wirksamer Maßnahmen zur Verringerung von Disparitäten innerhalb dieser Mitgliedstaaten unterstreicht, die sich dauerhaft von denen in den westlichen Ländern unterscheiden.

Der Europäische Binnenmarkt und die Einführung einer **einheitlichen Währung** in einem Großteil der Mitgliedstaaten trugen zur Konvergenz zwischen den Ländern bei, führten aber zu unterschiedlichen Auswirkungen in Bezug auf innerstaatlichen Disparitäten. Die mit dem Binnenmarkt einhergehende Ausweitung von Investitionen trug zur Divergenz innerhalb der Länder bei, wobei große internationale Investitionen hauptsächlich in die „Gateways“ der Länder, d.h. die größten Städte und/oder Hauptstädte, flossen. Die Konvergenzeffekte der Einführung einer einheitlichen Währung sind das Ergebnis der Abschaffung der (Preis-)Wettbewerbspolitik, die durch Wechselkursschwankungen erzielt

wurde, die in der Vergangenheit für die Wettbewerbsfähigkeit wirtschaftlich starker Gebiete innerhalb der Länder (zumindest kurzfristig) hilfreich waren.

Regionale Disparitäten entstehen entweder durch ein unterschiedliches Produktivitätsniveau zwischen den Regionen oder durch eine ungleiche Verteilung von Wachstumskapital. Das Produktivitätsniveau hängt von der Industriestruktur ab. Sobald davon ausgegangen wird, dass sich dies ändert, sind die Auswirkungen auf die regionalen Disparitäten relevant. Bezogen auf das Wachstumskapital durchlaufen die Auswirkungen auf Disparitäten die Geschwindigkeit des Aufholprozesses. Bei gleichmäßiger Verteilung des Wachstumskapitals bleiben zwar die Auswirkungen auf die regionalen Disparitäten bestehen, sind aber schwächer, da sie durch eine höhere Geschwindigkeit beim Aufholen der rückständigen Regionen erfolgen.

Bei einer ähnlichen **Industriestruktur** in den europäischen Regionen oder einer ähnlichen **Produktivität in den verschiedenen Sektoren** in den Regionen wären die Disparitäten sogar viel geringer. Dies gilt insbesondere für den Effekt der intra-industriellen Produktivität; die gleiche intraindustrielle Produktivität in den Sektoren der europäischen Regionen könnte die regionalen Disparitäten um etwa zwei Drittel verringern. Darüber hinaus ist ein Rückgang der regionalen Disparitäten auf eine günstige Zusammensetzung der dynamischen Industrien und der lokalen Industrien, die dynamischer als der europäische Durchschnitt sind, sowie auf die Umschichtung der Arbeitnehmer in Sektoren mit höherer Wertschöpfung zurückzuführen. Dies gilt insbesondere für die MOE-Mitgliedstaaten. Am Beispiel der Agrarregionen wird deutlich, dass sich MOE-Mitgliedsstaaten mit stark vertretenen, weniger produktiven Agrarregionen tendenziell schlechter entwickeln im Vergleich zu Regionen, in denen der landwirtschaftliche Sektor im Allgemeinen schwächer ausgeprägt ist oder in denen die Landwirtschaft im Interesse einer höheren Produktivität modernisiert wurde.

Im Falle **eines Gleichgewichts bei der interregionalen Ausstattung der Ressourcen** wäre der Aufholprozess der weniger entwickelten Regionen betroffen, und die Disparitäten würden sich verringern, wenn auch in geringerem Maße als im vorherigen Fall, da sie die Geschwindigkeit des Aufholprozesses beeinträchtigen. Ebenfalls deuten die Ergebnisse darauf hin, dass Politikmaßnahmen hinsichtlich „weicher“ Elemente, insbesondere Ethik, Organisation, Bildung und Innovation, wirksamer im Vergleich zu „harten“ Elementen, wie beispielsweise Infrastrukturen, sind. Diese „harten“ Elemente sind eine notwendige, aber nicht ausreichende Voraussetzung für einen Aufholprozess.

Schließlich ergibt sich eine wichtige Botschaft aus der Frage, welche Rolle die **Agglomerationsökonomien** hinsichtlich regionaler Disparitäten spielen. Während Agglomerationsökonomien einen Teil der Effizienz in der regionalen Produktion erklären, haben sie eine relativ geringe Relevanz in Bezug auf regionale Disparitäten. Dieses Ergebnis deutet darauf hin, dass – selbst wenn es in allen europäischen Regionen Großstädte wie Paris und London gäbe – das Problem der räumlichen Ungleichgewichte nicht gelöst wäre. Tatsächlich haben andere Güter wie Humankapital, Zugänglichkeit und Regierungsqualität einen deutlich größeren Einfluss auf das Vorhandensein von regionalen Disparitäten als die Präsenz von Städten.

4. Wie haben sich die öffentlichen Investitionen (gemessen an der Bruttoanlageinvestitionen) auf nationaler/regionaler Ebene im Laufe der Zeit entwickelt?

Die globale Wirtschafts- und Finanzkrise hatte große Auswirkungen auf die öffentlichen Finanzen in Europa und stellte eine große Herausforderung für die institutionelle Struktur mehrerer EU-Mitgliedstaaten dar.

In vielen EU-Ländern liegen die **öffentlichen Investitionen** als Anteil am BIP immer noch unter dem Niveau von vor der Krise. Niedrige öffentliche Investitionen in weniger entwickelten EU-Mitgliedstaaten und die Knappheit regionaler Investitionen in weniger entwickelten Regionen können die Konvergenz negativ beeinträchtigen. Mit der jüngsten Belebung der europäischen Wirtschaft ist die Staatsverschuldung der Mitgliedstaaten zurückgegangen, sie liegt aber immer noch deutlich über dem Vorkrisenniveau von 2007.

Infolge des Drucks auf die öffentlichen Finanzen sind die öffentlichen Investitionen in der EU von 3,4% des BIP im Jahr 2008 auf 2,9% im Jahr 2018 gesunken. Im Zuge dessen sind die wachstumsfördernden Ausgaben in einigen Mitgliedstaaten erheblich zurückgegangen. Auf nationaler Ebene haben die fiskalischen Anpassungen nach der Krise zu einem erheblichen Rückgang der Kompetenzrechte und der Autonomie der lokalen Regierungen und Verwaltungen geführt. Die neuen finanziellen Rahmenbedingungen haben viele Länder veranlasst, die finanziellen Beziehungen zwischen den Regierungsebenen in Bezug auf Steuern und Ausgabenbefugnisse zu überdenken und es gab eine erhebliche Rezentralisierung der Entscheidungsfindung über öffentliche Mittel und Mittelzuweisungen.

Viele **regionale Regierungen** litten unter sinkenden Einnahmen zwischen den Jahren 2008 und 2009, die unter anderem durch geringere Transfers von Zentralregierungen oder stagnierende Einnahmen verursacht wurden. Im Jahr 2018 machten die Bruttoanlageinvestitionen 2,9% des BIP aus, verglichen mit 3,2% vor der Krise – ein ähnlicher Rückgang wie bei den öffentlichen Investitionen insgesamt. Am meisten von dieser Entwicklung betroffen waren die Mitgliedstaaten, die am stärksten von der wirtschaftlichen Rezession betroffen waren, nämlich Irland, Portugal und Spanien, wo die Bruttoanlageinvestitionen im Jahr 2016 unter 2% lagen und seitdem nur geringfügig zugenommen haben. Auch andere wachstumsinduzierende Ausgaben, wie die Gesamtausgaben für Verkehr, Kommunikation, Energie oder Bildung, sind in diesem Zeitraum zurückgegangen. Dies gilt insbesondere für Mitgliedstaaten mit einem Pro-Kopf-BIP unter dem EU-Durchschnitt, was Bedenken hinsichtlich der Wahrscheinlichkeit einer Konvergenz mit den übrigen Mitgliedsstaaten schürt.

5. Welche Auswirkungen haben öffentliche Investitionen und Veränderungen bei öffentlichen Investitionen auf die regionalen Disparitäten (unterschiedliche Fonds und Investitionen) gehabt?

Durch Datenmodellierung und unterstützt durch Stakeholder-Konsultationen wie auch Fallstudien wurden die Arten von Investitionen identifiziert, die besser zur Verringerung von Disparitäten zwischen den Regionen beitragen.

Öffentliche Investitionen für Kohäsion (sowohl durch die ESI-Fonds als auch nationale Programme) spielen eine wichtige Rolle bei der Unterstützung der Wachstumsentwicklung von Regionen, mit starken kumulativen und selbstverstärkenden Effekten. Dieses Ergebnis birgt jedoch einen Vorbehalt. Der Einfluss öffentlicher Investitionen auf das Wachstum hängt stark mit dem Vorhandensein privater Investitionen zusammen. Darüber hinaus verzeichnen die weniger entwickelten Regionen eine höhere Wachstumsrendite der Investitionen als der europäische Durchschnitt. Mit anderen Worten, jeder investierte Euro steigert das Wachstum in weniger entwickelte Regionen stärker als in höher entwickelten. Investitionen können daher die Konvergenz fördern. Die ESI-Fonds fördern das Wachstum also eher indirekt durch die Stimulierung von Investitionen, diese Auswirkungen sind normalerweise aber erst mit zeitlicher Verzögerung nach den Investitionen sichtbar.

Sowohl der Ausgangsstatus (z.B. im Hinblick auf die Industriestruktur eines Landes) als auch Investitionspolitiken variieren jedoch von Mitgliedstaat zu Mitgliedstaat. Wir können die Bedeutung öffentlicher (und privater) Investitionen auf hinsichtlich der für die regionalen Disparitäten bedeutende Ressourcenausstattung beobachten. Aus der Analyse geht hervor, dass Humankapital, Regierungsqualität, radikale Innovationen (d. h. Produktinnovationen) und Marktinnovationen die wichtigsten Faktoren für das Wachstum sind. Die räumliche Verteilung dieser Vermögenswerte und Investitionen ist unterschiedlich, obwohl städtische Gebiete von der Präsenz hochwertiger Geschäftsfunktionen – und nicht von der Größe des Stadtgebiets – und des Humankapitals profitieren.

Daraus lassen sich **zwei wichtige Botschaften** ableiten: Einerseits ist es möglich, dass die Disparitätsunterschiede ohne die Kohäsionspolitik der EU und der Mitgliedstaaten noch größer wären. Andererseits ist es aber auch richtig, dass der Einfluss exogener Faktoren wie Konjunkturzyklen und (globaler) institutioneller Veränderungen so grundlegend ist, dass es für die Kohäsionspolitik schwierig ist, signifikant spürbare Auswirkungen auf das Ausmaß von Disparitäten oder deren Entwicklung hinzu mehr Konvergenz oder mehr Divergenz zu erzielen.

B. POLICY MAPPING

6. Welche EU-Mitgliedstaaten haben nationale (oder regionale) Förderpolitiken, die ausdrücklich darauf abzielen, (regionale) Disparitäten zu verringern, und inwieweit sind sie mit den Zielen der EU-Kohäsionspolitik vereinbar?

Alle analysierten EU-Mitgliedstaaten verfügen über mehrere national entwickelte und rein national finanzierte Politiken für den wirtschaftlichen Zusammenhalt: In den 11 ausgewählten Mitgliedstaaten wurden aus einem breiten Spektrum von Kategorien rund **60 Politikmaßnahmen** ermittelt. Die Verbesserung der Unternehmensentwicklung ist die Politikategorie, die am häufigsten genutzt wird. In Bezug auf Investitionen in die Entwicklung von materielle und immaterielle Vermögenswerten (siehe Punkt 4 oben) sind die Ausgaben in den MOE- und Südeuropäischen Mitgliedstaaten in etwa vergleichbar, mit der Ausnahme der Clusterentwicklung und Kompetenzzentren, welche in Italien und Spanien ca. dreimal so hoch sind wie in Kroatien, Ungarn, Rumänien, Slowenien und der Slowakei zusammen.

Insgesamt bleiben die **ESI-Fonds** jedoch die wichtigste Finanzierungsquelle in den betrachteten Ländern, mit Ausnahme von Italien, für Politikmaßnahmen, die sich ausdrücklich mit den Herausforderungen des wirtschaftlichen und territorialen Zusammenhalts befassen. National finanzierte Maßnahmen unterstützen oft Aktivitäten, die nicht aus den ESI-Fonds finanziert werden können, erhöhen den Finanzierungsfluss in Bereichen, in denen EU-Fördermittel allein nicht ausreichen, oder unterstützen Regionen im Übergang und mit regionspezifischen Herausforderungen.

Die Trennlinie zwischen der EU- und der nationalen Politik zur Förderung der Kohäsion ist im Allgemeinen verschwommen. Dies ist zu erwarten, da die ESI-Fonds im Rahmen der nationalen Politiken und Prioritäten mit ergänzenden Zielen arbeiten (z. B. Entwicklung kohlenstoffarmer Volkswirtschaften und erneuerbarer Energiequellen, Förderung von Innovationen in der Wirtschaft, Verbesserung im Bereich Humankapital usw.). Völlig unterschiedliche nationale Politiken finden sich daher in der Regel in Politikbereichen, die nicht unter die ESI-Fonds fallen.

Aus der Analyse der nationalen Politikinstrumente geht hervor, dass 37% der identifizierten politischen Maßnahmen auf Basis von Förderfähigkeit (z. B. Arbeitslosenquote) bestimmte Regionen bevorzugen, 30% auf bestimmte Regionen zugeschnitten sind (regionalspezifische Politik) und von 23% aller politischen Maßnahmen alle Regionen profitieren können (die restlichen 10% sind nicht spezifiziert). Politikmaßnahmen mit einer regionalen Komponente (die ersten beiden Kategorien) werden in den betrachteten südeuropäischen Mitgliedstaaten im Allgemeinen stärker bevorzugt als in den MOE-Ländern. Hinsichtlich des Verhaltens der Mitgliedsstaaten in Bezug auf regionale Disparitäten gibt es unterschiedliche Befunde. Einige unterstützen aktiv wohlhabendere Regionen einschließlich der Hauptstädte – diesem Handeln liegt die Ansicht zugrunde, dass dies auch weniger entwickelten Regionen zugutekommt. Andere engagieren sich aktiver für die Unterstützung weniger entwickelter Regionen und den Abbau von Ungleichheiten innerhalb der Länder, beispielsweise durch den Ausschluss von Hauptstädten und wohlhabenderen Regionen (z. B. durch Förderkriterien). Im Durchschnitt ist der erste Ansatz stärker in Ländern verbreitet, die weniger Probleme mit Wachstum und internen Disparitäten hatten. Andererseits scheinen die Wachstumsmuster und Disparitäten in begrenztem Zusammenhang mit thematischen oder regionspezifischen Politikmaßnahmen zu stehen.

Table 2: Überblick über die Politikmaßnahmen nach Art der Instrumente in den ausgewählten EU-Mitgliedstaaten

Politische Maßnahmen		Mitgliedsstaaten											Gesamt
...Art der Kategorie	...Art des Instruments	BG	HR	CR	HU	IT	PL	PT	RO	SK	SI	ES	
Geschäftsumfeld und Handel	Risikokapitalfonds und andere Finanzinstrumente		4	1		3	1	1		1	1		12
	Steuerliche Anreize	2	3		1	1	2	4			3		16
	Investitionsförderung	1	3		1	3	1	1			4	5	19
	Sonderwirtschaftszonen	1	3	1		1	2					1	9
Innovation und Branchenentwicklung	Unternehmensentwicklung und Innovationsförderung	1	8	1	3	3	2	1	3		4	6	32
	F&E-Programme		5	1		2	1	1			1		11
	Forschungsinfrastrukturen		4	1	1	3	1						10
	Kommerzialisierung von Forschung und Technologietransfer		4		1	1	1						7
	Industrieparks und andere Unternehmensinfrastrukturen	1	3		1	3	1	1			2		12
	Cluster, Kompetenzzentren und Technologiezentren	4		1	2	1	1						9
Urbanisierung und Konnektivität	Verkehrsinfrastruktur		4	1	1	3	1	1	1	2	1		15
	Digitale Infrastrukturen		3			2	1	1		2	1		10
	Energieinfrastrukturen		3			1	1			1			6
Qualifikationen und soziale Mobilität	Lebenslanges Lernen	1	3			1	1	1			4		11
	Entwicklung neuer Kompetenzen (z.B. digitale Kompetenzen)	1	3			2	1	1		1	1		10
	Arbeitsmarkttraining	2	4		1	1	1	1			1		11
	Bildungsinfrastrukturen, Universitäten, Universitäten		3		1	1	1	1					7
	Mobilität von Forschern		3			2	1						6
Gesamt		10	67	6	12	35	21	16	4	7	23	12	213

Anmerkung: Die Gesamtzahl der ermittelten Politikmaßnahmen beträgt 60, darunter sieben kleinere Maßnahmen in Kroatien, die zusammengefasst wurden. Diese Maßnahmen wurden im Hinblick auf die Art des damit verbundenen politischen Instruments analysiert. In einigen Fällen kann eine Politikmaßnahme mehrere Instrumente beinhalten, was zu einer höheren Anzahl von politischen Instrumenten führt als Politikmaßnahmen (Mehrfachnennung, dies führt zu 213 Instrumententypen).

Source: Prognos/Technopolis (2019).

7. Welche anderen Politiken (Wirtschaft, Finanzen usw.) gibt es, die sich indirekt auf den Zusammenhalt auswirken?

In Tabelle 2 oben fallen einige politische Instrumente nicht unter die Kohäsionspolitik der Mitgliedstaaten im Rahmen ihrer ESI-Fonds Programme, ergänzen sie aber. Dazu gehören steuerliche Maßnahmen einschließlich steuerlicher Anreize und Sonderwirtschaftszonen mit günstigen Regelungen für Ansässige. Darüber hinaus würden nationale Politiken, die die Mobilität von Forschern unterstützen, in der Regel nicht unter die Kohäsionspolitik fallen.

Die EU-Kohäsionspolitik hat sich im Laufe der Jahre verändert und sich weg von großen Investitionen in die Infrastruktur hin zu F&E- und Innovationsmaßnahmen entwickelt. Die Mitgliedstaaten haben mit ihrer nationalen Politik das unterstützt, was im Rahmen früherer EU-Programme, einschließlich der Verkehrsinfrastruktur, finanziert werden konnte. Dies zeigt sich insbesondere in den MOE-Ländern, wo bis zu 17% der Politikmaßnahmen dementsprechend ausgerichtet sind, obwohl der Umfang – je nach Höhe der Investitionen in Städtebau und Konnektivität – in Italien fünfmal so hoch ist wie in Rumänien und fünfzigmal so hoch wie der Haushalt für das Verkehrsinfrastrukturprogramm in Ungarn.

Einige Politikmaßnahmen zur Unterstützung der Umverteilung von Vermögenswerten hatten unbeabsichtigte Auswirkungen (z. B. die Umverteilung von Funktionen des öffentlichen Sektors und von Arbeitsplätzen in Italien in weniger entwickelte Regionen, wenn diese Arbeitsplätze aufgrund einer Verlangsamung oder Verringerung der öffentlichen Investitionen durch Austerität und andere Maßnahmen verloren gehen). Die Politikmaßnahmen, die Investitionen in Wachstumsgüter fördern – mit dem Ziel, die Produktivität zu verbessern und die Wirtschaftsstruktur von der Landwirtschaft und Industrie mit niedriger Produktivität wegzubewegen, hin zu modernen Wachstumssektoren und -prozessen – scheinen jedoch Wirkung zu zeigen.

8. Wie sind die Laufzeiten der jeweiligen Politikmaßnahmen?

Aus den vorliegenden Erkenntnissen der Mitgliedstaaten geht hervor, dass die **Laufzeit der Maßnahmen** sehr unterschiedlich ist. Einige nationale politische Maßnahmen und Finanzierungszyklen spiegeln die Politik und den Finanzierungszyklus der EU wider, einige andere werden über relativ kurze Zeiträume umgesetzt. In Italien gibt es ein „ergänzendes

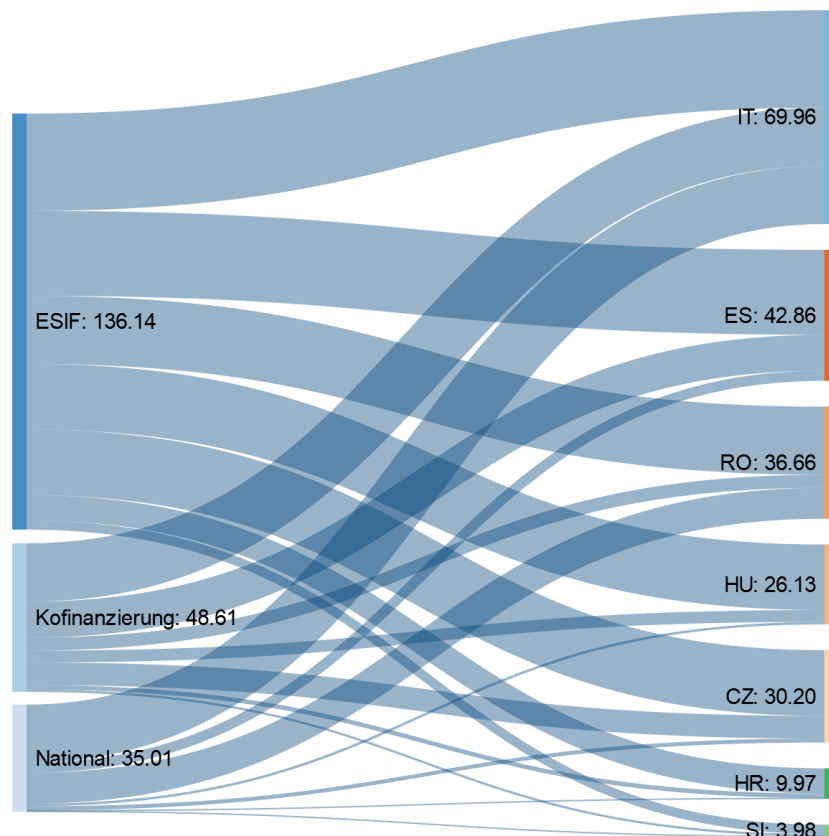
operationelles Programm“, das – wie der Titel besagt – den Zeitrahmen der EU-Programme spiegelt.

Insgesamt lässt sich feststellen, dass der mittel- bis langfristige Ansatz, der mit den Programmzyklen der operationellen Programme der ESI-Fonds verbunden ist, nicht unbedingt gemeinsamer Standard in der nationalen Politik ist. Jedoch ist in einigen Fällen bemerkbar, dass ein Transfer der politischen Architektur von der EU auf die nationale Ebene stattgefunden hat.

9. Wenn messbar, wie hoch ist die finanzielle Größe der jeweiligen Verträge?

Wie nachstehend dargestellt, ist das Budget der national finanzierten Maßnahmen im Rahmen der Kohäsionspolitik im Allgemeinen geringer als das der ESI-Fonds, mit Ausnahme Italiens, wo die nationalen Mittel rund 93% der ESI-Mittel ausmachen (basierend auf den verfügbaren Daten). Weitere bedeutende nationale Beiträge gibt es in Rumänien und in geringerem Maße in Spanien, während die nationale Finanzierung von Politikmaßnahmen in Ländern wie Slowenien, Ungarn, der Tschechischen Republik und Kroatien viel geringer ist. Für Italien entfällt der größte Teil der nationalen Mittel (69%) auf Netzinfrastrukturen, hauptsächlich Straßen, um die geringen Mittel aus dem ESI-Fonds auszugleichen. In mehreren Fällen scheint die Absorption nationaler Mittel ein Problem darzustellen – mehr als die tatsächliche Höhe der Mittel, wobei den Durchführungseinrichtungen die Fähigkeit zu einer effektiveren und effizienteren Umsetzung fehlt.

Figure 4: Vergleich der Budgets – ESI-finanzierte Maßnahmen (ohne Kofinanzierung), kofinanzierte Maßnahmen, und national finanzierte Maßnahmen zur Verringerung der wirtschaftlichen Disparitäten (in Mrd. €)



Hinweis: Die Beträge für die verschiedenen Länder veranschaulichen das Gesamtbudget (ESI-Fonds, Kofinanzierung und National). Die ESI-Fonds und die Kofinanzierung umfassen nur den Kohäsionsfonds (CF), den Europäischen Fonds für regionale Entwicklung (EFRE) und den Europäischen Sozialfonds (ESF). Die Budgets für die nationale Finanzierung waren nur für sieben Länder verfügbar, Portugal, die Slowakei, Bulgarien und Kroatien sind in dieser Abbildung nicht dargestellt.

Quelle: Prognos/Technopolis (2019).

10. Auf welcher Ebene der Governance werden die Politiken konzipiert und umgesetzt (national, regional, lokal)?

Die Analyse der Politikmaßnahmen ergab, dass die **überwiegende Mehrheit auf nationaler Ebene konzipiert (87%) und umgesetzt (70%)** wurde, weitere 3% bzw. 13% wurden gemeinsam von nationalen und regionalen Regierungen konzipiert und umgesetzt. Hinsichtlich der Governance-Strukturen gibt es Disparitäten. So entscheiden beispielsweise in Spanien die autonomen Gemeinschaften, wie die öffentlichen Mittel, die für Kohäsionspolitiken bestimmt sind, ausgegeben werden.

Weiterhin gibt es in den untersuchten Ländern Beispiele für national etablierte Programme zur regionalen und lokalen Entwicklung (z. B. das Nationale Programm für lokale Entwicklung in Rumänien). Es ist auch üblich, dass spezialisierte (thematische) öffentliche Stellen eine Rolle bei der Gestaltung, Umsetzung und Überwachung der Politik spielen (z. B. die Invest Bulgaria Agency in Bezug auf das Investitionsförderungsgesetz des Landes).

11. Wie tragen diese politischen Maßnahmen zu den Zielen der EU für den wirtschaftlichen, sozialen und territorialen Zusammenhalt bei und inwieweit stimmen sie mit diesen überein?

Die wirtschaftliche Kohäsion und die Verringerung der wirtschaftlichen Disparitäten zwischen dem jeweiligen Land und der EU werden von den Mitgliedstaaten oft weiter ausgelegt als in den EU-Verträgen beschrieben. So ist der territoriale Zusammenhalt oft untrennbarer Bestandteil der umfassenderen Bemühungen des Landes, die wirtschaftlichen Ungleichgewichte mit der EU zu verringern. Dieser Faktor wird dadurch gestützt, dass die Länder oft Politiken in Politikmaßnahmen umsetzen, in denen ihre weniger entwickelten Regionen absolut oder relativ gesehen schwach sind.

C. POLITIKMAßNAHMEN UND REGIONALANALYSE

12. Sind in den Mitgliedstaaten und ihren Regionen spezifische Muster für die Nutzung spezifischer Strategien / Instrumente / Ansätze zu erkennen?

Aus den verfügbaren Daten geht hervor, dass es **gemischte Befunde** mit der Einstellung der Mitgliedstaaten zu regionalen Disparitäten gibt. Einige unterstützen aktiv die wohlhabenderen Regionen, einschließlich der Hauptstädte, mit der Ansicht, dass dies auch weniger entwickelten Regionen zugutekommt. Einige engagieren sich aktiver für die Unterstützung weniger entwickelter Regionen und den Abbau von Ungleichgewichten innerhalb der Länder, einschließlich einiger Ausnahmen von der Finanzierung von Hauptstädten und wohlhabenderen Regionen. In den meisten MOE-Ländern, d. h. in Polen, Rumänien, Bulgarien, der Slowakei, der Tschechischen Republik und Ungarn, zeigt sich das gleiche Muster: Die Hauptstadt ist zu einer „Champion-Region“ geworden; und in den meisten Fällen treibt ihre Leistung den nationalen Durchschnitt voran, während andere Regionen zurückfallen.

Die **politischen Reaktionen der Mitgliedstaaten** sind unterschiedlich, und viele nationalen Politikmaßnahmen, insbesondere solche, die sich auf das sektorale Wachstum konzentrieren, haben keine explizite territoriale oder regionale Dimension (könnten aber indirekte Auswirkungen auf den wirtschaftlichen Zusammenhalt haben). Wie bereits dargestellt gab es eine Tendenz zur zentralisierten Steuerung der Programme.

Vergleicht man die umgesetzten Politiken mit den Ausstattungen der Wachstumsfaktoren, so scheint sich ein nachfrageorientierter Ansatz für die Umsetzung der Politik durchzusetzen, bei dem die Länder mehr Maßnahmen zu Aspekten ergreifen, in denen sie bereits über eine hohe Ausstattung mit entsprechenden Ressourcen verfügen.

13. Welche territorialen Faktoren wirken in welcher Art von Region? (Agglomerationsökonomien, Zentrifugal- und Zentripetalkräfte, Hauptstadtentwicklung, räumliche Spillover usw.)

In den mittel- und osteuropäischen Mitgliedstaaten deutet alles darauf hin, dass die **Hauptstadt und größere Städte** die wirtschaftlichen Ungleichheiten verschärfen können, da sie der Mittelpunkt für Investitionen und Talente und ein „Magnet“ für die Zuwanderung sind (mit der daraus resultierenden Entvölkerung der Nachbarregionen). Das Muster der Entvölkerung und der Migration von Menschen aus weniger entwickelten Regionen ist eine große Herausforderung für Länder, die versuchen, regionale Disparitäten zu überwinden.

14. Welche politischen Maßnahmen sind unter den verschiedenen regionalen Gegebenheiten und Entwicklungspotenzialen angemessen?

Angesichts der Faktoren, die bei der Bestimmung der Wirtschaftsleistung sowohl auf Länder- als auch auf regionaler Ebene eine Rolle spielen, gibt es Einschränkungen in der Bedeutung der Politikmaßnahmen und der Finanzierung zur Reduzierung von Disparitäten. Aus der quantitativen Analyse geht jedoch hervor, dass die **EU- und nationalen Mittel** dazu beigetragen haben, das Wachstum durch Investitionen zu stimulieren. Die Ergebnisse deuten darauf hin, dass eine Kombination von Maßnahmen, die zur Förderung der Verbreitung von Investitionen und Talenten im Bereich der Innovation (F&E) beitragen (Humankapital, Verbesserung der Mobilität von Forschern) und solchen, die eine gleichmäßigere Verteilung der Produktivität und eine ausgewogenere Volkswirtschaft fördern (weg von weniger produktiven und weniger innovativen Sektoren, die häufig in weniger entwickelten Regionen präsent sind), zu einer Verringerung der Disparitäten führen kann. Dies gilt insbesondere in Kombination mit einer hochwertigen Regierungsqualität, um den Prozess des Wandels zu steuern und zu überwachen. Die Flexibilität und das Reaktionspotenzial, die viele nationale Politiken bieten, wurden in den Fallstudien als positiv bezeichnet, wenn auch gemildert durch Unsicherheiten bei der Finanzierungskontinuität und das Risiko für Veränderungen der politischen Prioritäten auf nationaler Ebene. Ein weiteres mögliches Hindernis ist die Fähigkeit, Politikmaßnahmen zu entwickeln und umzusetzen, insbesondere auf regionaler und lokaler Ebene, wo die Governance-Strukturen und weitere Grundstrukturen eingeschränkt sein können.

Insgesamt lässt sich aus dieser Studie zusammenfassen, dass trotz 60 Jahren Integration keine Gruppe von Ländern, die sich aus späteren EU-Erweiterungen in der EU ergeben, eine geringere Ungleichheit gegenüber einer anderen Gruppe aufweist. Dies macht den Konvergenzprozess noch unvollständig. Die langfristigen Prozesse, die mit einer größeren Konvergenz verbunden sind und zu einem höheren Entwicklungsstand der Volkswirtschaften durch Informationsverbreitung, Integration lokaler Kulturen und Know-how, starke Nachahmungsprozesse in der Wirtschaft und im Lebensstil führen sollen, müssen noch all ihre Auswirkungen zeigen.

Gleichzeitig sehen wir, dass öffentliche Investitionen (ESI-Fonds und nationale Politiken) eine wichtige Rolle bei der Gestaltung der Wachstumskurven der Regionen spielen und spielen können, mit starken kumulativen und selbstverstärkenden Wirkungen. Die ESI-Fonds stimulieren das Wachstum eher indirekt durch Investitionsförderung, ein ähnlicher Effekt ist bei vielen der analysierten nationalen Politiken wahrscheinlich. Dazu sind jedoch neben dem Engagement des öffentlichen Sektors auch private Investitionen erforderlich, und der öffentliche Sektor muss sich auf wachstumsfördernde politische Instrumente konzentrieren, die die Verbreitung von Investitionen und Talenten für Innovationen (F&E) fördern, die eine gleichmäßigere Verteilung der Produktivität fördern und eine hochwertige Regierungsqualität gewährleisten, um den Prozess des Wandels zu steuern und zu überwachen sowie die Leistung der Programme zu evaluieren.

SYNTHÈSE

Contexte et objectifs

Le présent résumé se rapporte au rapport final de « **l'étude sur les politiques nationales et la cohésion** », menée en 2019 par un consortium dirigé par Prognos AG et des experts de Politecnico di Milano (POLIMI) et du Groupe Technopolis.

L'étude cherche à mieux comprendre les tendances sous-jacentes des disparités nationales et régionales (économiques, sociales, territoriales, avec un intérêt particulier pour la cohésion économique) et le rôle spécifique des politiques nationales dans le contexte de la politique régionale et des politiques destinées à réduire les disparités entre régions. Basée sur une analyse quantitative approfondie et des modèles de simulation, des entretiens avec des parties prenantes et des études de cas réalisés dans une sélection d'États membres⁸, cette étude a pour objectif de contribuer au prochain **rapport sur la cohésion économique, sociale et territoriale**⁹ dont la publication est prévue pour septembre 2021. L'étude contribue spécifiquement aux deux questions globales suivantes:

3. Dans quelle mesure des disparités existent-elles et persistent-elles, en particulier par rapport aux régions moins développées?
4. Dans quelle mesure les politiques nationales ont-elles un impact direct ou indirect sur la cohésion?

Ces questions globales ont été précisées au travers de 14 questions de recherche, comme indiqué dans les termes de référence.

Conclusions principales

Nous présentons ci-dessous les principales conclusions de l'étude, structurées d'après les 14 questions de recherche. Alors que pour certaines questions, des réponses très complètes pouvaient être apportées, pour d'autres, les données empiriques sont moins claires et nécessitent des recherches complémentaires dans le futur. Les conclusions principales sont présentées ci-dessous.

A. ANALYSE RÉGIONALE

1. Quelle était la forme et l'ampleur des disparités régionales dans les États membres de l'UE (en particulier les disparités économiques)?

Les disparités régionales ont augmenté dans un grand nombre de pays européens et les disparités structurelles et économiques au sein de l'UE restent importantes. La plupart des États membres d'Europe centrale et orientale (PECO) ont un PIB par habitant inférieur à 75% de la moyenne de l'UE-28 et dans certaines régions, ce taux est inférieur à 50%. De même, des régions des États membres du sud de l'Europe (y compris l'Espagne et l'Italie) présentent des écarts importants en termes de croissance, de productivité et d'emploi par rapport aux régions principales. Depuis la crise économique, il y a une tendance à l'accroissement des disparités - y compris les niveaux de productivité -, alors que les forces agglomérations, combinant à la fois une spécialisation spatiale croissante des industries et services européens et une croissance et convergence des régions capitales, ont conduit dans certains cas à une divergence croissante entre les régions

⁸ En ce qui concerne l'analyse quantitative des disparités régionales, tous les États membres de l'UE ont fait l'objet de cette étude. Cependant, l'analyse des politiques menées a porté sur une sélection de 11 États membres où les besoins en termes d'informations étaient les plus importants : Bulgarie, Croatie, Hongrie, Italie, Pologne, Portugal, Roumanie, République tchèque, Slovaquie, Slovénie, Espagne. Pour huit de ces 11 pays, les études de cas ont permis de recueillir des données supplémentaires, à savoir la Bulgarie, la République tchèque, la Hongrie, l'Italie, la Pologne, la Roumanie, la Slovénie et l'Espagne.

⁹ Conformément à l'article 175 du TFUE, la Commission européenne doit informer tous les trois ans le Parlement européen, le Conseil européen, le Comité économique et social européen et le Comité des régions du progrès réalisé en ce qui concerne la mise en œuvre des objectifs de la politique de cohésion.

capitales et les zones périphériques. Dans ces cas-là, les disparités sont en partie liées à des industries à faible croissance et productivité et à un niveau plus élevé de main-d'œuvre non qualifiée dans les zones périphériques.

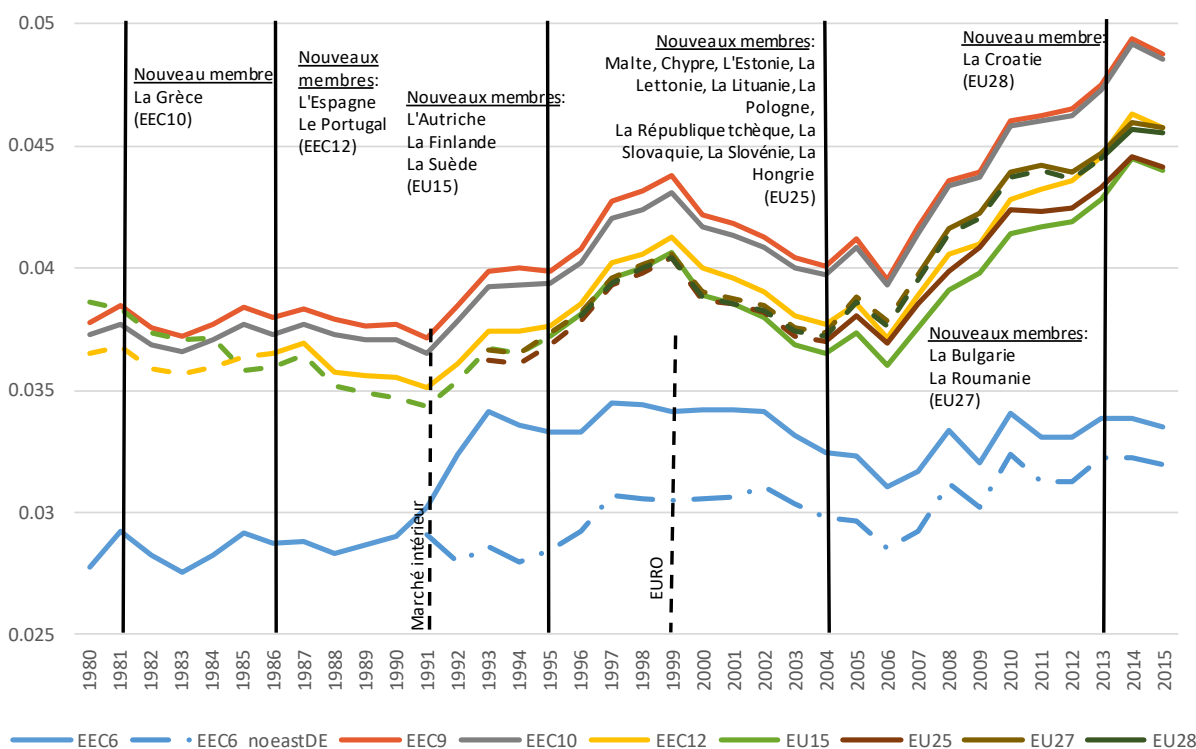
2. Comment les disparités régionales ont-elles évolué au fil du temps?

Globalement, **les disparités interrégionales** montrent une convergence persistante entre les années 1980 et 2008, jusqu'au moment où la crise économique et financière a interrompu et inversé cette tendance positive. La situation change lorsque les disparités entre les pays et à l'intérieur d'un même pays sont analysées séparément. Les disparités entre les pays sont consistantes avec la tendance générale, montrant une diminution permanente jusqu'à la crise. Les disparités intra-nationales, au contraire, sont plus volatiles, passant des périodes de stabilité et/ou de convergence à des périodes de divergence. En ce qui concerne les disparités à l'intérieur des pays, nous avons identifié quatre grandes périodes depuis 1980 qui en même temps représentent le point de départ pour avoir des ensembles de données comparables:

- 1980–1991, une période de relative stabilité;
- 1991–1999, une période de disparités croissantes ;
- 1999–2007, une période de réduction des disparités ;
- À partir de 2007, une nouvelle période de croissance des disparités.

Le diagramme ci-dessous montre comment **les disparités à l'intérieur des pays** ont évolué au fil du temps en fonction du produit intérieur brut (en standard de pouvoir d'achat - SPA du PIB). Les disparités ont culminé au début du siècle, coïncidant avec l'introduction de l'euro et l'élargissement à 25 États membres, mais elles ont diminué ensuite avant la crise. Une forte augmentation des disparités à la suite de la crise est évidente. Les données suggèrent une convergence plus récente depuis 2014, bien que les données soient limitées. Les données les plus récentes utilisées dans l'étude datent de 2016. Dans certaines conditions, on peut s'attendre à ce que la tendance à la réduction des disparités se poursuive et se consolide, mais elle dépend également de la santé économique globale de l'Europe (une nouvelle récession pourrait avoir un effet négatif tout comme des nouvelles barrières commerciales) et des tendances démographiques (par exemple, le vieillissement de la population entraînant une pénurie de main d'œuvre ou l'émigration dans certaines régions).

Figure 5: Disparités à l'intérieur des pays par groupes d'États membres 1980 - 2015, indice Theil, par composante (PIB par habitant en SPA)



Note : L'indice de Theil est un indice statistique utilisé pour mesurer l'inégalité économique en terme de distance pondérée de la richesse (en l'occurrence le PIB en SPA par habitant) dans une région ou un pays par rapport à une moyenne globale (la valeur UE). Chaque ligne représente le niveau de disparités à l'intérieur d'un groupe spécifique d'États membres, avec la partie en pointillés représentant le moment où les derniers pays rejoignant ce groupe particulier ne font pas encore partie de l'Union européenne et la ligne continue indiquant la période pendant laquelle tous les pays appartenant au groupe sont officiellement membres de l'Union européenne.

Source : POLIMI (2019), sur la base des données disponibles sur le site web de l'UE <https://urban.irc.ec.europa.eu/t-pedia/#/>.

3. Quels ont été les principaux facteurs à l'origine de ces disparités régionales?

Les disparités régionales existent pour de nombreuses raisons et ont de nombreuses origines. Elles sont aussi profondément enracinées. L'inversion des disparités est un processus complexe. L'Italie et l'Espagne en sont de bons exemples, où les disparités persistent et parfois s'accroissent, malgré des années de politique de cohésion de leurs gouvernements et de l'UE. Toutefois, le processus de convergence peut être soutenu par la diffusion technologique, par des périodes de cycles économiques positifs et par des changements institutionnels majeurs.

L'élargissement de l'UE a stimulé la convergence entre les pays, mais a exacerbé les disparités intra-nationales. C'est particulièrement vrai pour les deux derniers élargissements, pour lesquels les disparités intra-nationales au sein des PECO ont considérablement augmenté, soulignant la nécessité d'interventions efficaces pour éviter que les disparités à l'intérieur de ces pays restent en permanence différentes de celles des pays occidentaux.

La constitution du marché commun et l'introduction de **la monnaie unique** ont contribué à la convergence entre les pays, mais ont eu des effets différents sur les disparités intra-nationales. La longue période d'expansion des investissements qui a accompagné le marché commun a contribué aux divergences à l'intérieur des pays, comme les investissements internationaux importants étaient principalement dirigés vers les "portes d'entrée" des pays, c'est-à-dire les grandes villes et/ou les capitales. Les effets de

convergence de l'introduction de la monnaie unique résultent de l'abolition des politiques de compétitivité (par les prix) par le biais des variations des taux de change, qui dans le passé étaient bénéfiques pour la compétitivité des régions économiquement fortes au sein des pays (au moins à court terme).

Les disparités régionales trouvent **leur origine** soit dans un niveau de productivité différent d'une région à l'autre, soit dans la répartition inégale des actifs de croissance. Dans le premier cas, la productivité dépend de la structure industrielle. Lorsqu'on suppose que cela change, les effets sur les disparités régionales sont pertinents. Dans le second cas, les effets sur les disparités passent par la rapidité du processus de rattrapage. Une fois que l'on suppose une répartition égale des actifs, les effets sur les disparités régionales existent, mais ils sont plus limités puisqu'ils se manifestent par un rattrapage plus rapide dans les régions en retard de développement.

Avec une **composition industrielle** similaire dans toutes les régions européennes ou avec une **productivité** similaire dans les différents secteurs d'une région à l'autre, les disparités seraient en fait beaucoup plus faibles. C'est particulièrement vrai pour l'effet de productivité intra-industrie: la même productivité intra-industrie dans tous les secteurs des régions européennes pourrait réduire les disparités régionales d'environ deux tiers. En outre, une diminution des disparités régionales peut être attribuée à une composition favorable des industries dynamiques, à des industries locales plus dynamiques que la moyenne européenne et à une redistribution des travailleurs dans des secteurs à plus forte valeur ajoutée. C'est particulièrement vrai pour les PECO. Si l'on prend l'exemple des régions agricoles : les régions des PECO, où la productivité de l'activité agricole est plus faible, ont tendance à être moins performantes que les régions où l'agriculture en général est moins importantes ou que l'agriculture a été modernisée dans l'intérêt d'une productivité accrue.

Dans le cas **d'un équilibre dans la dotation interrégionale des ressources**, le processus de rattrapage des régions moins développées serait affecté et les disparités diminueraient, bien que dans une moindre mesure par rapport au cas précédent, car elles affectent la rapidité du processus de rattrapage. Les résultats suggèrent également que des politiques efficaces devraient favoriser des interventions avec des composantes "soft", en particulier sur l'éthique, l'organisation, l'éducation et l'innovation, et moins des composantes "dures", comme les infrastructures, qui sont une condition nécessaire mais non suffisante pour un processus de rattrapage.

Enfin, un message important ressort de ce qui concerne le rôle des **économies d'agglomération** sur les disparités régionales. Tandis que les économies d'agglomération expliquent en partie l'efficacité de la production régionale, elles ont une pertinence relativement faible en ce qui concerne les disparités régionales. Ce résultat suggère que même si, paradoxalement, on pouvait envisager la présence de grandes villes comme Paris et Londres dans toutes les régions européennes, le problème des déséquilibres spatiaux ne serait pas résolu. En fait, d'autres atouts, comme le capital humain, l'accessibilité et la qualité du gouvernement jouent un rôle beaucoup plus important sur les disparités que la présence des villes.

4. Comment l'investissement public (en termes de formation brute de capital fixe) a-t-il évolué au niveau national/régional au fil du temps?

La crise économique et financière mondiale a eu de graves répercussions sur l'état des finances publiques en Europe et a constitué un défi majeur pour la structure institutionnelle de plusieurs États membres de l'UE.

Dans de nombreux pays de l'UE, la part des **investissements publics** dans le PIB reste inférieure au niveau d'avant la crise. La faiblesse des investissements publics dans les États membres moins développés de l'UE et la rareté des investissements sub-nationaux dans les régions moins développées peuvent compromettre la convergence. Avec la récente reprise des économies européennes, la dette publique des États membres a diminué, mais elle est encore nettement supérieure à son niveau d'avant la crise, en 2007. En raison de

la pression exercée sur les finances publiques, l'investissement public dans l'UE est passé de 3,4% du PIB en 2008 à 2,9% en 2018 et, dans certains États membres, les dépenses visant à stimuler la croissance ont été fortement réduites. Au niveau national, les ajustements fiscaux d'après-crise ont conduit à une réduction importante des droits de compétence et de l'autonomie des gouvernements et administrations locales. Les nouvelles conditions-cadres financières ont incité de nombreux pays à repenser les relations financières entre les différents niveaux de gouvernement. En ce qui concerne les impôts et le pouvoir de dépenses, il y a eu une recentralisation importante du processus décisionnel en matière de ressources publiques et d'allocations financières.

De nombreuses entités **sub-nationales** ont souffert de la baisse des revenus entre les années 2008 et 2009, liée, entre autres, à la diminution des transferts des administrations centrales ou à la stagnation des revenus. En 2018, les investissements publics, c'est-à-dire la formation brute de capital fixe, ont représenté 2.9% du PIB contre 3.2% du PIB avant la crise, soit une baisse similaire à celle observée pour l'ensemble des investissements publics. Les États membres les plus frappés par cette tendance ont été parmi les plus affectés par la récession économique, à savoir l'Irlande, le Portugal et l'Espagne. Dans ces pays, la formation brute de capital fixe est restée inférieure à 2% en 2016 et a peu augmenté depuis lors. Des autres dépenses entraînant une croissance ont également diminué au cours de cette période, telles que les dépenses totales consacrées aux transports, aux communications, à l'énergie ou à l'éducation. C'est particulièrement le cas pour les États membres dont le PIB par habitant est inférieur à la moyenne de l'UE, ce qui suscite des inquiétudes quant à la probabilité de leur convergence vers le reste de l'UE.

5. Quel a été l'impact de l'investissement public et de l'évolution des investissements publics sur les disparités régionales (différents fonds et investissements)?

Grâce à la modélisation des données, et à l'aide de consultations auprès des parties prenantes et des études de cas, nous avons identifié les types d'investissement les plus favorables à la réduction des disparités entre régions.

Les investissements publics en faveur de la cohésion (les fonds ESI et les politiques nationales) jouent un rôle important dans la définition des trajectoires de croissance des régions, avec des forts effets cumulatifs et auto-renforçant. Toutefois, ce résultat est assorti d'une mise en garde. L'effet des investissements publics sur la croissance est fortement lié à la présence des investissements privés. En outre, les régions les moins développées (pour les fonds ESI) affichent un rendement des investissements sur la croissance plus élevée que la moyenne européenne. En d'autres termes, les régions moins développées augmentent la croissance plus que les autres par euro investi. Les investissements peuvent donc stimuler la convergence. Les fonds ESI stimulent la croissance plutôt indirectement en incitant des investissements, mais les effets sont normalement visibles après un certain délai, une fois que ceux-ci sont réalisés.

Cependant, tant le point de départ de base (par exemple en ce qui concerne le mix industriel d'un pays) que l'adoption des politiques d'investissement varient selon les États membres. Nous pouvons observer l'importance des investissements publics (et privés) dans les actifs de croissance pour expliquer les disparités régionales. D'après l'analyse, les atouts les plus importants pour la croissance sont le capital humain, la qualité du gouvernement, les innovations radicales (c'est-à-dire les innovations de produit) et les innovations de marché. La répartition spatiale de ces actifs et les investissements dans ces actifs varient. A cet égard, les zones urbaines profitent surtout de la présence des fonctions à forte valeur ajoutée et du capital humain, plutôt que de leur taille.

Deux messages importants peuvent en être tirés : d'une part, il est possible que les disparités pourraient s'aggraver sans les politiques européennes et nationales de cohésion. D'autre part, il est également vrai que la force des facteurs exogènes comme les cycles économiques et les changements institutionnels (mondiaux) sont si fondamentaux que les politiques de cohésion auront du mal à avoir un impact significatif sur l'ampleur des

disparités ou sur la direction vers une convergence plus importante ou des disparités plus importantes.

B. CARTOGRAPHIE DES POLITIQUES

6. Quels États membres de l'UE ont mis en place des politiques de financement nationales (ou régionales) qui visent explicitement à réduire les disparités (régionales) et dans quelle mesure sont-elles conformes aux objectifs de la politique de cohésion de l'UE?

Tous les États membres de l'UE analysés ont plusieurs politiques de cohésion économique mandatées et purement financées au niveau national: environ **60 mesures politiques** ont été identifiées dans les 11 États membres sélectionnés. Ces politiques se focalisent sur un large éventail de catégories de politique dont le développement sectoriel et les investissements ciblés. L'amélioration de l'environnement des affaires est la catégorie de politique la plus fréquemment mise en œuvre. En termes d'investissement dans des actifs de croissance (voir point 4 ci-dessus), le solde des dépenses (en millions d'euros) est globalement comparable entre les PECO et les États membres du sud de l'Europe. Cependant, les dépenses en Italie et en Espagne pour le développement de clusters et de centres d'excellence sont presque trois fois supérieures à celles de Croatie, Hongrie, Roumanie, Slovaquie et Slovaquie ensemble. Toutefois, dans l'ensemble (exception faite de l'Italie), **les fonds ESI** restent la principale source de financement des politiques visant explicitement à relever les défis de la cohésion économique et territoriale dans les États membres analysés. Les mesures financées au niveau national soutiennent souvent des activités qui soit ne peuvent être financées par les fonds ESI, soit augmentent le flux de financement dans des domaines où les sources nationales ou de l'UE seules ne suffisent pas, soit des activités qui soutiennent les régions en transition et/ou des territoires confrontés à des défis de développement quel que soit leur type de région.

La ligne qui sépare les politiques de l'UE et les politiques nationales visant à renforcer la cohésion est souvent floue. Cela est attendu dans la mesure où les fonds ESI travaillent dans le cadre des politiques et priorités nationales tout en poursuivant des objectifs et des cibles complémentaires (par exemple, le développement des économies à faible émission de carbone et des énergies renouvelables, la stimulation de l'innovation dans les entreprises, l'amélioration des compétences et qualifications, etc.). Par conséquent, les politiques nationales tout à fait distinctes de ceux de l'UE tendent à se trouver dans des domaines politiques non couverts par les fonds ESI.

Tableau 1: Vue d'ensemble des mesures politiques par type d'instrument dans les États membres de l'UE sélectionnés

...type de catégorie	Mesures politiques par... ...type d'instrument	États membres											Total
		BG	HR	CR	HU	IT	PL	PT	RO	SK	SI	ES	
Environnement des affaires et commerce extérieur	Fonds de capital-risque et autres instruments financiers		4	1		3	1	1		1	1		12
	Incitations fiscales	2	3		1	1	2	4			3		16
	Promotion des investissements	1	3		1	3	1	1			4	5	19
	Zones économiques spéciales	1	3	1		1	2					1	9
Innovation et développement sectoriel	Développement des affaires et soutien à l'innovation dans les entreprises	1	8	1	3	3	2	1	3		4	6	32
	Programmes de R&D		5	1		2	1	1			1		11
	Infrastructures de recherche		4	1	1	3	1						10
	Commercialisation de la recherche et transfert de technologie		4		1	1	1						7
	Infrastructures des parcs industriels et autres infrastructures d'entreprises	1	3		1	3	1	1			2		12
	Clusters, centres d'excellence et centres de technologie		4		1	2	1	1					9
Urbanisation et connectivité	Infrastructures de transport		4	1	1	3	1	1	1	2	1		15
	Infrastructure digitale		3			2	1	1		2	1		10
	Infrastructures énergétiques		3			1	1			1			6
Qualifications et mobilité	Formation continue	1	3			1	1	1			4		11
	Développement de nouvelles compétences (p. ex. compétences numériques)	1	3			2	1	1		1	1		10
	Formation sur le marché du travail	2	4		1	1	1	1			1		11
	Infrastructures éducatives, Universités		3		1	1	1	1					7
	Mobilité des chercheurs		3			2	1						6
	Total		10	67	6	12	35	21	16	4	7	23	12

Note : Le nombre total de mesures politiques identifiées est 60, dont sept mesures plus petites en Croatie qui ont été regroupées en une seule. Ces politiques ont été analysées en fonction du type d'instrument politique qu'elles impliquent. Dans certains cas, une mesure politique peut utiliser plusieurs instruments, ce qui se traduit par un nombre plus élevé d'instruments politiques que de mesures politiques (désignation multiple, ce qui donne 213 types d'instruments).

Source: Prognos/Technopolis (2019).

En analysant les instruments politiques nationaux, on constate que 37% d'entre eux sont en faveur des régions spécifiques en se basant sur des critères d'éligibilité (par exemple le taux de chômage), 30% visent des régions spécifiques (politiques régionales spécifiques) et 23% des instruments bénéficient à toutes les régions (les 10% restants sont non précisés). Les politiques axées sur les régions (les deux premières catégories) sont généralement plus répandues dans les États membres d'Europe du Sud que dans ceux des PECO. Les expériences sont mitigées en ce qui concerne l'attitude des États membres à l'égard des disparités régionales. Certains soutiennent activement les régions les plus prospères, y compris les capitales, estimant que cela profite également aux régions moins développées. Certains s'emploient plus activement à soutenir les régions moins développées et à réduire les disparités à l'intérieur des pays, notamment en excluant dans une certaine mesure le financement des capitales et des régions plus prospères (par exemple, par le biais de critères d'admissibilité au financement). En moyenne, la première approche est plus souvent utilisée dans les pays où les problèmes de croissance et de disparités internes étaient moins importants. D'autre part, les modèles de croissance et les disparités semblent avoir peu d'influence sur les typologies des politiques mises en œuvre.

7. Quelles sont les autres politiques (économiques, financières, etc.) qui ont un impact indirect sur la cohésion?

Dans le tableau 1 ci-dessus, certains instruments politiques ne relèvent pas des politiques de type "cohésion" menées par les États membres dans le cadre de leurs programmes des fonds ESI, mais les complètent. Il s'agit notamment des mesures fiscales, y compris des incitations fiscales, et des zones économiques spéciales, avec des dispositions favorables pour les occupants. En outre, les politiques nationales qui soutiennent la mobilité des chercheurs ne relèvent généralement pas des politiques de cohésion.

La politique de cohésion de l'UE a évolué au cours des années, passant d'importants investissements en capitaux dans les infrastructures à des mesures de RDT (recherche, développement et technologie) et d'innovation dans les entreprises. Les États membres ont eu recours à des politiques nationales pour soutenir ce qui ultérieurement pouvait être financé dans le cadre de programmes de l'UE, y compris les infrastructures de transport. Cela est particulièrement visible dans les PECO, où jusqu'à 17% des politiques y sont orientées en conséquence. Cependant, l'échelle varie en fonction des investissements dans l'urbanisme et la connectivité. En Italie, les investissements dans l'urbanisme et la

connectivité sont cinq fois supérieurs à ceux de la Roumanie et cinquante fois supérieurs au budget du programme d'infrastructure de transport en Hongrie.

Certaines mesures de politique publique visant à soutenir la redistribution des actifs ont eu des effets involontaires (par exemple, la réallocation des fonctions et des emplois du secteur public vers les régions moins développées en Italie, et une perte de ceux-ci en raison d'un ralentissement ou de la diminution des investissements publics due aux mesures d'austérité et autres politiques). Toutefois, les politiques d'investissement dans des actifs de croissance destinés à améliorer la productivité et à faire passer la structure économique de l'agriculture et des industries à faible productivité à des secteurs et des processus de croissance modernes semblent avoir un effet.

8. Quelle est la durée des politiques respectives?

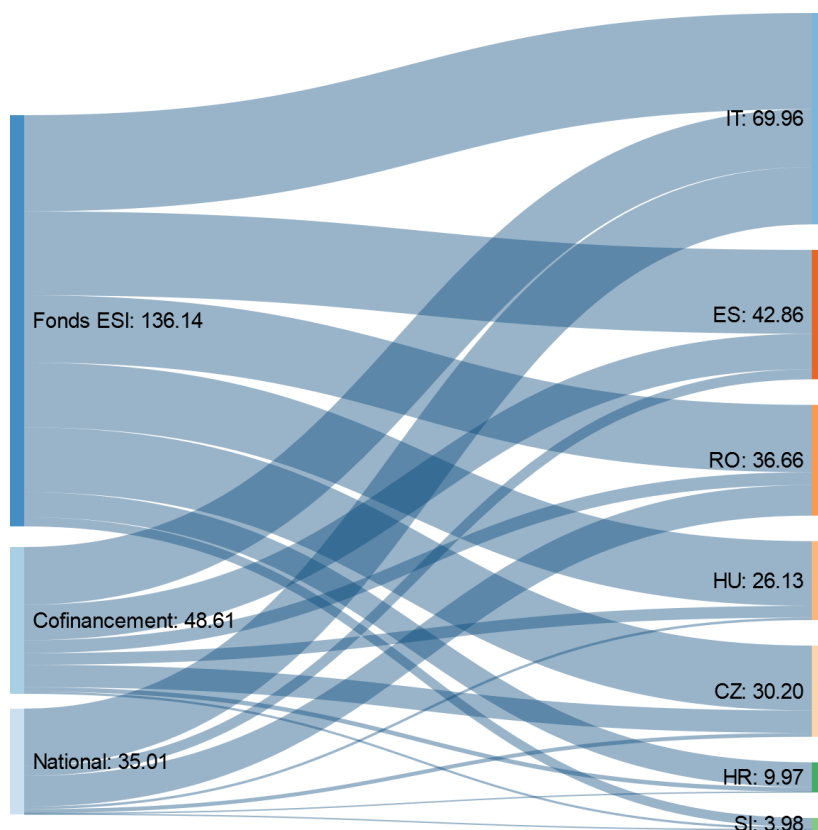
D'après les données disponibles dans les États membres, **la durée des politiques** est très variable. Certaines politiques nationales - et cycles de financement - reflètent la politique et le cycle de financement de l'UE, mais certaines politiques nationales sont mises en œuvre sur des périodes relativement courtes. En Italie, il existe un "programme opérationnel complémentaire" qui, comme son titre l'indique, respecte les délais des programmes communautaires.

Dans l'ensemble, on peut observer que l'approche à moyen et long terme qui est associée aux cycles de programmation des programmes opérationnels des fonds ESI n'est pas une norme commune dans les politiques nationales mais que, dans certains cas, l'architecture politique a été transférée de l'UE au niveau national.

9. Si elle est mesurable, quelle est l'ampleur financière des politiques respectives?

Il a été constaté que le budget des mesures de politique de cohésion purement financées au niveau national était nettement inférieur à celui des fonds ESI. Une exception concerne l'Italie, où le financement national représente environ 93% du financement de l'ESI (sur la base des données disponibles). D'autres contributions nationales importantes sont en place en Roumanie et, dans une moindre mesure, en Espagne, tandis que le financement national des politiques dans des pays comme la Slovaquie, la Hongrie, la République tchèque et la Croatie est beaucoup moins important. Pour l'Italie, la part la plus importante du financement national (69%) est consacrée aux infrastructures de réseau, principalement les routes, afin de compenser le faible financement du Fonds ESI. Dans plusieurs cas, l'absorption du financement national semble être un problème, plus que les niveaux réels de financement, les organismes de mise en œuvre n'ayant pas la capacité d'assurer une exécution efficace et efficiente.

Figure 6: Comparaison des budgets - mesures financées par l'ESI (sans cofinancement), mesures cofinancées et mesures financées au niveau national soutenant à réduire les disparités économiques (en milliards €)



Note: Les montants pour les différents pays illustrent le budget total (fonds ESI, cofinancement et national). Les fonds et cofinancements de l'IES ne comprennent que le Fonds de cohésion (FC), le Fonds européen de développement régional (FEDER) et le Fonds social européen (FSE). Les budgets pour le financement national n'étaient disponibles que pour 7 pays, le Portugal, la Slovaquie, la Bulgarie et la Croatie ne figurent pas dans cette figure.

Source: Prognos/Technopolis (2019).

10. A quel niveau de gouvernance les politiques sont-elles conçues et mises en œuvre (national, régional, local)?

L'analyse des instruments politiques a montré que la grande majorité d'entre eux ont été conçus (87%) et mis en œuvre (70%) au niveau national, avec respectivement 3% et 13% supplémentaires conçus et mis en œuvre conjointement par les gouvernements nationaux et régionaux. Il existe des variations en fonction des structures de gouvernance, de sorte qu'en Espagne, ce sont les communautés autonomes qui décident de la manière dont les fonds publics destinés aux politiques de cohésion sont dépensés.

Parmi les pays étudiés, il existe des exemples de programmes de développement régional et local établis au niveau national (tels que le « Programme national de développement local » en Roumanie). Il est également courant que des organismes publics spécialisés (thématiques) jouent un rôle dans la conception, la mise en œuvre et le suivi des politiques (par exemple, l'Agence bulgare pour les investissements dans le cadre de la loi sur la promotion des investissements du pays).

11. Comment ces politiques contribuent-elles et s'alignent-elles sur les objectifs de cohésion économique, sociale et territoriale de l'UE?

La cohésion économique et la réduction des disparités économiques entre les pays respectifs et l'UE sont souvent comprises par les États membres de manière plus large que ce qui est décrit dans les traités de l'UE. Ainsi, la cohésion territoriale est souvent un

élément indissociable des efforts plus larges déployés par le pays pour réduire les disparités économiques avec l'UE. Cela est également confirmé par le fait que les pays mettent souvent en œuvre des politiques dans des domaines où leurs régions moins développées sont faibles, en termes absolus ou relatifs.

C. L'ANALYSE DES POLITIQUES ET DES RÉGIONS

12. Existent-t-ils des tendances spécifiques qui se dessinent dans les États membres et leurs régions en ce qui concerne l'utilisation de stratégies, d'instruments ou d'approches spécifiques?

D'après les données disponibles, **les expériences sont hétérogènes** en ce qui concerne l'attitude des États membres vis-à-vis des disparités régionales. Certains soutiennent activement les régions les plus prospères, y compris les capitales, estimant que cela profite également aux régions moins développées. Certains s'emploient plus activement à soutenir les régions moins développées et à réduire les disparités à l'intérieur des pays, notamment en excluant dans une certaine mesure le financement des capitales et des régions plus prospères. La plupart des PECO, à savoir la Pologne, la Roumanie, la Bulgarie, la Slovaquie, la République tchèque et la Hongrie, présentent le même schéma : la capitale est devenue une « région championne » et, dans la plupart des cas, ses performances font progresser la moyenne nationale, tandis que les autres régions prennent du retard.

Les réponses politiques des États membres varient d'un État membre à l'autre et de nombreuses politiques nationales, en particulier celles qui visent la croissance sectorielle, n'ont pas de dimension territoriale ou régionale explicite (mais peuvent avoir un impact indirect sur la cohésion économique). Comme indiqué précédemment, il y a eu une tendance à la gouvernance centralisée des politiques. En outre, si l'on compare les politiques mises en œuvre avec les dotations en facteurs de croissance, une approche de la mise en œuvre des politiques axée sur la demande semble prévaloir, dans laquelle les pays appliquent davantage de mesures dans des domaines où ils sont déjà très bien dotés en ressources pertinentes.

13. Quels sont les facteurs territoriaux qui interviennent dans quel type de région? (Économies d'agglomération, forces centrifuges/centripètes, développement des capitales, retombées spatiales, etc.)

Pour les PECO, les données suggèrent que les **capitales et les grandes villes** peuvent accroître les disparités économiques en attirant les investissements et les talents et en incitant à la migration intérieure (avec pour conséquence un dépeuplement dans les régions voisines). La tendance au dépeuplement et à la migration des populations des régions moins développées est un défi majeur pour les pays qui s'attaquent au déséquilibre régional.

14. Quelles sont les réponses politiques appropriées aux différentes situations régionales et aux différents potentiels de développement?

Compte tenu des facteurs qui interviennent dans la détermination de la performance économique aux niveaux national et régional, le rôle que peuvent jouer les politiques publiques et le financement dans la lutte contre les disparités est limité.

Toutefois, l'analyse quantitative montre que **les financements communautaires et nationaux** ont contribué à stimuler la croissance par des investissements. Les faits suggèrent qu'un ensemble de politiques qui contribuent à promouvoir la diffusion des investissements en matière d'innovation (RDT) et des talents (compétences, amélioration de la mobilité des chercheurs), encourageant une répartition plus équilibrée de la productivité et une économie équilibrée (s'éloignant des secteurs moins productifs et moins innovants souvent présents dans les RMD) peut entraîner une réduction des disparités, surtout si elles sont associées à une bonne gouvernance qui dirige et supervise le

changement et suit le processus d'élaboration de politiques. La souplesse et le potentiel de réactivité qu'offrent de nombreuses politiques nationales ont été jugés positifs dans les études de cas, bien qu'atténués par les incertitudes quant à la continuité du financement et la possibilité de changements dans l'orientation des politiques à l'échelle nationale. Une autre contrainte potentielle est la capacité à concevoir et à mettre en œuvre des politiques, en particulier aux niveaux régional et local, où les infrastructures de gouvernance et d'exécution peuvent être limitées.

Globalement, **on peut résumer à partir de cette étude** que, malgré les soixante années d'intégration, aucun groupe de pays résultant des élargissements successifs de l'UE n'enregistre une disparité moindre par rapport à un autre groupe, rendant le processus de convergence encore incomplet. Les processus à long terme associés à une plus grande convergence, conduisant à des niveaux de développement plus élevés dans les économies par la diffusion de l'information, l'intégration des cultures et du savoir-faire local, les imitations des activités économiques et modes de vie doivent encore montrer tous leurs effets.

Dans le même temps, nous constatons que les investissements publics (fonds ESI et politiques nationales) ont et peuvent jouer un rôle important dans la formation des trajectoires de croissance des régions, avec de forts effets cumulatifs et auto-renforçables. Les fonds ESI stimulent la croissance plutôt indirectement en stimulant les investissements. Un effet similaire est probable pour bon nombre des politiques nationales analysées. Mais cela exige que les investissements privés soient associés à l'engagement du secteur public et que le secteur public se concentre sur des instruments politiques favorisant la croissance qui favorisent la diffusion des investissements et des talents en matière d'innovation (RDT), qui favorisent une répartition plus équitable de la productivité et garantissent une gouvernance de haute qualité pour diriger et superviser le processus du changement et suivre les performances des politiques. Mais cela exige que les investissements privés soient associés à l'engagement du secteur public et que le secteur public se concentre sur des instruments politiques de croissance favorisant la diffusion des investissements en innovation (RDT) et des talents, une répartition plus équilibrée de la productivité et garantissant une gouvernance de qualité pour diriger et surveiller le processus du changement et suivre les performances des politiques.

1 INTRODUCTION

1.1 Background and scope of the study

Background

The **issue of regional inequalities** in the EU¹⁰ has gained increasing importance on public and political agendas in the aftermath of the global financial and economic crisis, and in the context of political movements gaining support in the so-called “places left behind”.¹¹ Earlier studies have shown that regional disparities have been on the rise in many European countries and structural economic disparities within the EU remain serious. Most CEE Member States have a GDP per capita of less than 75% of the EU-28 average. GDP per capita in all Romanian and Bulgarian regions, except for the capital city regions, is below 50% of EU average.¹² Similarly, regions in the Southern European Member States (for instance Spain and Italy) show off significant gaps to leading regions in terms of growth, productivity, and employment.¹³ Regional disparity in productivity levels have been increasing in the EU since the mid-1990s, due to more rapid growth in leading regions and limited diffusion of structural change and innovation.¹⁴ There is a convergence of capital city regions across the EU (metropolitan convergence), which can, however, come at the expense of surrounding areas. Leading regions at the productivity frontier (often capital city regions) are catching-up while rural areas are falling behind.¹⁵ Agglomeration forces have driven the spatial localisation of European industries and agglomeration has had a positive effect on growth pathways. Sectoral differences materialised with capital-intensive and skill-intensive activities concentrating in the core of the EU while slow growing industries characterised by unskilled labour tend to agglomerate in peripheral areas.¹⁶

The **overarching focus of the study** is the role of national policies in the context of the EU’s cohesion policy. In this context, the study aims to describe and analyse the nature and extent of regional disparities of all kinds (economic, social, territorial; with a focus on economic disparities), within the EU’s Member States, and outline the drivers behind economic divergence. Furthermore, the analysis reviews nationally (or regionally) funded policies that explicitly target the disparities between regions and assesses whether they contribute to the EU’s objectives regarding economic, social and territorial cohesion. Understanding the development of regional disparities as well as the functioning of national policies in this regard has become a relevant topic for the EU.

In the light of these developments and on the basis of data analysis, case studies, and stakeholder interviews this study will inform the EC ahead of its next **Report on Economic, Social and Territorial Cohesion**, which is due for publication by September 2021. Here, it will specifically contribute to the following two questions:

1. To what extent do disparities exist and persist, particularly in relation to the less developed regions (LDRs)?
2. To what extent do national policies directly or indirectly influence cohesion?

¹⁰ Although the official denomination of European Union (EU) came into force with the Maastricht Treaty in 1993, given the continuity between the European Communities and the EU, this report will use EU throughout for simplicity.

¹¹ European Parliament (2019), BRIEFING - Regional inequality in the EU, EPRS | European Parliamentary Research Service: Brussels.

¹² European Commission, Directorate-General for Regional and Urban Policy (2017): My Region, My Europe, Our Future. Seventh report on economic, social and territorial cohesion, EU COM Publication: Brussels.

¹³ Crescenzi, R., Giua, M. (2019), One of many Cohesion Policies of the European Union? On the differential economic impacts of Cohesion Policy across member states. *Regional Studies*, DOI: 10.1080/00343404.2019.1665174.

¹⁴ Beugelsdijk, S., Mariko, J. K., Milionis, P. (2018), Regional economic development in Europe: the role of total factor productivity. *Regional Studies*, 52 (4), pp. 461-476 and Ridao-Cano, C., Bodewig, C. (2019): How can Europe upgrade its „Convergence Machine“? *Intereconomics – Review of European Economic Policy*, No. 1 pp.11-18.

¹⁵ OECD (2016), OECD Regional Outlook. Productive Regions for Inclusive Societies. OECD Publishing: Paris.

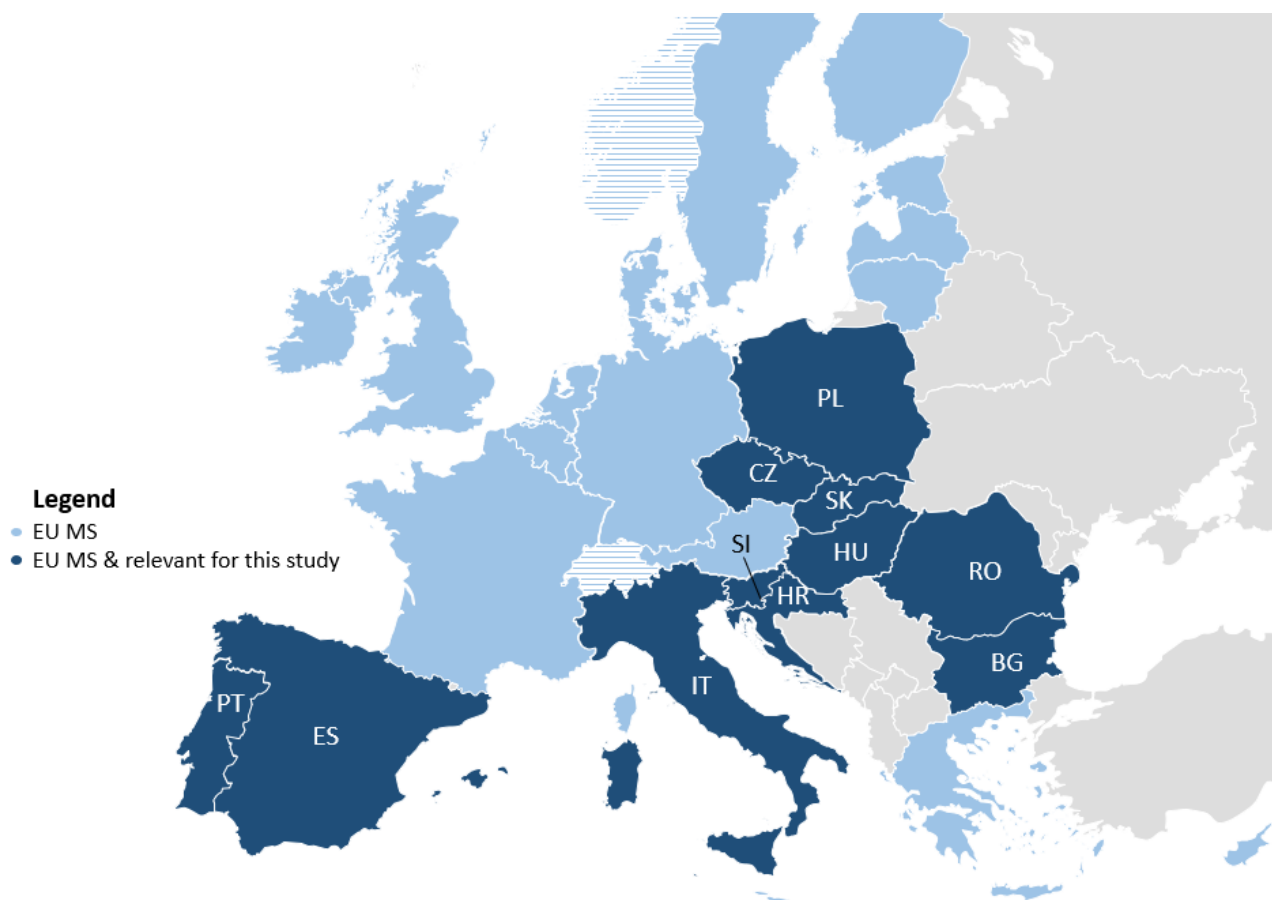
¹⁶ Iammarino, S., Rodriguez-Pose, A., Storper, M. (2018), Regional Inequality in Europe: evidence, theory and policy implications. *Journal of Economic Geography*, Vol. 19, No. 2 and De Dominicis, L. (2014): Inequality and growth in European regions: Towards a place-based approach. *Spatial Economic Analysis*, 9 (2), pp. 120-141.

Scope of the study

To answer these questions, the relatively 'new' Member States from Central and Eastern Europe (CEEs)¹⁷ as well as older Member States from Southern Europe, i.e. Italy, Portugal and Spain, are the focus of the study.

The **quantitative analysis on regional disparities** (Chapter 2) covers all EU Member States with at least two NUTS 2 regions but provides a more detailed and focused analysis for those Member States with less developed regions. In this context, it is analysed which of the relevant Member States converge to, or grow above, the EU average and which diverge or fall behind the EU average. While the EU's cohesion policy consists of three pillars, namely economic, social and territorial cohesion, for reasons such as its scope and the availability of robust data, this study centres on the economic aspects of cohesion.

Map 1: Overview of analysed Member States in the policy mapping



Source: Prognos (2019).

Chapter 3 looks at **nationally mandated policies**, including those delivered at a regional level yet excluding finance that purely augments EU cohesion policy. Here, one central question is whether EU funding is used to replace national support and/or whether national policies are favouring more developed regions (MDRs) – and especially the capital city regions – at the expense of LDRs. To get a coherent picture of how national policies are implemented in different contexts, 11 Member States are considered in detail, namely Bulgaria, Croatia, the Czech Republic, Hungary, Italy, Poland, Portugal, Romania, Slovakia, Slovenia, Spain. A focus on fewer Member States allows this study to gain in-depth knowledge of the specific cases while the

¹⁷ Bulgaria, the Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia.

selection of countries ensures the investigation of both Southern European as well as the CEE Member States.

1.2 Research questions of the study

As discussed in the existing literature, regional disparities are a difficult theme that does not allow for a simple answer. Similarly, national policies differ from country to country and are thus not easy to map. Recognising the complexity of the subsequent analysis of disparities and policies, the above-mentioned research questions are subdivided in the following Table 3, which allows the study to have a clear structure.

Table 3: Overall study objectives

Objectives regarding	Key research questions
Regional Analysis (A)	<ol style="list-style-type: none"> 1. What has been the nature and extent of regional disparities within EU Member States (particularly economic disparities)? 2. How have regional disparities changed over time? 3. What have been the main drivers behind these trends in regional disparities? 4. How has public investment (in terms of gross fixed capital formation) evolved at national/regional level over time? 5. What has been the impact of public investment and changes in public investments on regional disparities (different funds and investments)?
Policy mapping (B)	<ol style="list-style-type: none"> 6. Which EU Member States have national (or regional) funding policies in place that explicitly aim at reducing (regional) disparities and to what extent are they aligned with the objectives of the EU's Cohesion Policy? 7. Which other (economic, financial, etc.) policies exist that have an indirect impact on cohesion? 8. What is the duration of the respective policies? 9. If measurable, what is the financial magnitude of the respective policies? 10. At what level of governance are the policies designed and implemented (national, regional, local)? 11. How do these policies contribute and align to the EU's objectives of economic, social and territorial cohesion?
Policy and regional analysis (C)	<ol style="list-style-type: none"> 12. Are there specific patterns emerging across Member States and their regions regarding the utilisation of specific strategies/instruments/approaches? 13. Which territorial factors are operating in which type of region? (agglomeration economies, centrifugal/centripetal forces, capital-city development, spatial spill-overs etc.) 14. What are appropriate policy responses under different regional circumstances and development potentials?

Source: Prognos/POLIMI/Technopolis Group (2019). Adapted from Section 2.2 of the terms of reference 2017CE16BAT125, A, B and C, pp.7.

1.3 Methodological design and research limitations

Methodological design

This study required a highly integrated conceptual and methodological approach, in which the different tasks interlink and build upon each other. Based on this understanding, we present an overview of the approach in Table 4. The table briefly summarises the key working steps in each of the tasks and outlines the underlying methodological approaches.

Table 4: Overview of tasks, outputs and methods

	Tasks	Outputs	Methods
1	T1: Inception and Literature analysis	Inception Report with detailed elaboration of the study approach and agreements on the study focus; review of the relevant literature with summary of the main determinants and patterns of regional disparities in Europe; first overview of relevant national policies for cohesion based on the existing literature	Desk research, methodological scoping, literature review (theory & empirics of regional disparities)
2	T2: Quantitative analysis of regional disparities	Comprehensive analysis of regional disparities; inventory of the drivers behind regional disparities in Europe for different regions and different time-periods; evidence on the role played by different policy models & the role of public investment as a stimulus to private investment and regional growth	Database preparation, descriptive statistical analysis, econometric analysis
3	T3: Policy mapping (policies on cohesion)	Stock-taking and classification of relevant policies, both explicitly and implicitly supporting cohesion within the Member States, as an input to the interim and final reports	Desk research, key-informant interviews in all (selected) Member States
4	T4: Analysis of cross-regional patterns (comparative assessment)	Comprehensive repository of regional policy approaches coupled with key regional development parameters; descriptive analysis of regional policy approaches; empirically-grounded typology of regional policy approaches for cohesion; case studies on the types identified which deliver strengths and weaknesses of policies as well as best practices	Comparative policy analysis, Delineation of typology Country case studies
5	T5: Final Report with Summary and Conclusions	Results-driven synthesis of study findings & conclusions; main patterns and typologies of regional disparities and national policies for cohesion	Triangulation, criteria-based synthesis

Source: Prognos/POLIMI/Technopolis Group (2019).

Challenges in the research process

A complex empirical analysis as performed in this project needs to cope with various challenges in the research process. Moreover, there might be methodological limitations, which cannot fully be overcome. Below, we describe the key challenges observed in the research process which need to be considered when assessing and interpreting the results presented in Chapter 2 and Chapter 3.

Chapter 2 included a large-scale longitudinal database on which to base the analysis on disparities, in particular:

- As for data on real GDP provided by Cambridge Econometrics, the **time span varies** depending on individual countries, e.g. data for the CEE Member States and Eastern Germany are available only since the beginning of the 1990s. Of course, this has influenced the possibility of covering a relevant historical series for all the countries.
- In addition, for some regions in a few countries (e.g. Alentejo in Portugal and Stockholm in Sweden) – although data is in principle available since 1980 – the **first years present some anomalies**. Therefore, the option to remove those years from the time series has

been taken into consideration for national country analyses, while they have been kept in the long-run disparity analysis since their weight does not significantly affect the final European aggregate result.

- The **Cambridge Econometrics/EC time series** does not always match the Eurostat data. The two series have different time spans (1980-2015 and 2000-2017, respectively) and different spatial classifications. Given this last difference, it was not possible to take 2016 into consideration. Moreover, when the two series overlap, they are not totally consistent. Therefore, as it was agreed, the Cambridge Econometrics database was used for the long-term time series and instead the most recent data from Eurostat were used for the econometric analysis.
- Finally, as far as **gross fixed capital formation (GFCF)** is concerned, comparable and comprehensive data for explicit national regional policies should have been ideally available. Unfortunately, this will not be the case, as explained below.
- For the **GFCF database**, the source is Cambridge Econometrics/Eurostat. Investments are categorised in sectors according to the origin of the investments and not the destination.¹⁸ Moreover, interregional investments flows are not available.¹⁹ Both aspects, especially the second, limit the interpretative power of the phenomenon.

Chapter 3 includes a large-scale mapping of national policies for cohesion in the eleven Member States, based on extensive desk research and interviews. Apart from operational challenges regarding the interview process (identification and in particular availability of interviewees), there were some specific technical challenges which we summarise below:

- In several cases, measures with a territorial focus are composed by **integrated plans** with a mix of economic, social and territorial cohesion objectives. In such cases:
- Clear differentiation between **economic** (within our scope) and **social** (out of our scope) **cohesion** objectives was challenging to be made. (*was difficult to discern*)
 - The categorisation of the measures under the different policy categories and types of policy instruments according to our typology was difficult.
 - (*According to our typology, classifying the measures among the different policy categories and types of policy instruments proved challenging.*)
- **Budget information** was either not always available or it was available for a broad mix of activities, of which not all fell within the scope of the study. Therefore, in some cases, the provided budgets could be overestimated.
- Nationally funded policies are defined at an annual base following the **annual cycle of national budgets**. Therefore, when a budget was available, it was only for specific years until 2019.
- In some cases, programmes with a very large number of **different types of smaller activities or sub programmes** could combine both the ESI Funds and national funding (in addition to the co-financing). In those cases, it was not possible to identify and distinguish the measures financed by the ESI Funds. Therefore, we include the programme in the analysis with the necessary clarification regarding the dual source of funding.
- **Budget transfers** to regions which have been used for cohesion objectives could be traced and captured only in case the cohesion objective was clearly defined in the specific budget lines. General budgetary transfers that might have been used by the regions for cohesion purposes were not possible to be identified.

¹⁸ Investments in the CE database are investments by sector. However, the unit of analysis for regional data is the local unit, so that an investment made by a multi-plant firm of a certain sector is recorded in the region of the plant and not the one of the headquarter. For this reason, we can assume there is a very good correspondence between the sector which invests and the sector in which investments arrive.

¹⁹ Notice that cohesion policy transfers are not recorded in the investment database as they are recorded as capital transfers.

- It was challenging to identify **ad-hoc interventions** and therefore it should be expected that full coverage was not always feasible. This is also the case with the investments in transport and digital infrastructures.
- Several of the **identified measures were horizontal** in character, targeting both advanced and less advanced regions. In cases where the selection criteria were giving an advantage to less developed regions over the more advanced, the programmes have been included in our analysis.

The second part of Chapter 3 consists of the integration of Task 2 and 3. Consequently, the challenges that are described for Chapter 2 and the first part of Chapter 3 continue to be relevant. Additionally, the following challenges occurred:

- Some Member States have a **large number of small (in terms of funding) policies** in place (particularly Croatia), while others use large policies (for instance Italy), which makes the comparison of policy instruments between Member States or groups of Member States rather difficult. To circumvent this issue, some (similar) policies in Croatia are merged to reduce the overall number of instruments.
- One of the most useful ways to compare policies is through its magnitude (money spent per capita or per annum). However, the sparse information in some countries makes the **comparison of the financial magnitude** difficult and only allows for an indication.
- When grouping the Member States (for instance Southern and CEE Member States or by the year of accession), the only possibility to make the policies comparable is to illustrate them as a share of total number of policies in a specific category. The trade-off in this case is that the **shares are in some cases based on very small numbers of policies**, thus the chance of coincidence increases and cannot be ruled out.

Despite the outlined challenges, the study was able to establish a profound basis to draw on with rich empirical evidence, of both quantitative and qualitative nature. Through the innovative research approaches that were used, new answers to the complex research and policy questions raised by the terms of reference were found.

2 REGIONAL DISPARITIES IN THE EU MEMBER STATES – 1980 UNTIL TODAY

One main objective of this study is to analyse the extent to which disparities exist and persist in relation to the less developed regions. Disparities are here defined as disparities in GDP per capita levels (and not rate of growth). It is therefore an economic aggregate measure of disparity and not interpersonal disparities at the individual level.

To give an answer to this question, the following account is structured according to some key questions, namely what the nature and extent of regional disparities has been within EU Member States, how regional disparities have changed over time, what the main drivers have been behind this divergence, how public investment has evolved at the national and regional level and how the investment has impacted regional disparities? (see research Questions 1-5 and 13 in Section 1.2).

Overview of key findings from the analysis of regional disparities

1. **Regional disparities occur for many reasons and have many causes. Reversing disparities is therefore a complex process**, necessitating an analysis of historical trends of inter-regional homogenisation of economic, social and structural conditions. This process is helped by technological diffusion, by periods of positive economic cycles, and by major institutional changes.
2. **Overall, inter-regional disparities show a persistent convergence since the 1980s and up to 2008, when the crisis interrupted and reversed this positive trend.** The picture changes when disparities between and within countries are analysed separately. Disparities *between* countries are consistent with the general trend, showing a permanent decrease up to the crisis. *Intra-national* disparities, however, are more volatile, changing from periods of stability and/or convergence to periods of divergence.
3. **The enlargement of the EU has favoured convergence *between* countries but has exacerbated *intra-national* disparities.** This is especially true for the last two enlargements, where the intra-national disparities within the CEE Member States drastically increased, highlighting the need for effective interventions to avoid within country disparities in these Member States to remain permanently different from those in Western countries.
4. **The constitution of the Common Market and the introduction of the Single Currency helped convergence between countries** but resulted in different effects on intra-national disparities. The long period of investment expansion that accompanied the Common Market contributed to divergence within countries, with large international investments directed mainly to the 'gateways' of countries, i.e. the largest cities and/or capital cities. The convergence effects of the establishment of the Single Currency is the result of the abolition of price competitiveness policies obtained through exchange rate variations, which were in the past extremely helpful for the competitiveness of economically strong areas within countries.
5. **Disparity evolutions within countries can be characterised by different trends at different spatial scale.** Disparities can be analysed between NUTS 2 of the same country (inter-regional) and between NUTS 3 within a NUTS 2 (intra-regional disparities). Despite differences within each country in the way the two trends are associated, similarities can be identified across the EU. Increases (decreases) in disparities among NUTS 3 of the same NUTS 2 are associated with increases (decreases) among NUTS 2 of the same country, leading to absolute concentration (absolute diffusion).
6. **An explanation of regional disparities are differences in employment.** If all regions had the same levels of employment, regional disparities would be significantly lower, less than half of the present level. Furthermore, with a similar industrial composition across

European regions or with a similar productivity in the different sectors across regions, disparities would be much lower. The same intra-industry productivity across sectors in European regions could reduce regional disparities by approximately two-thirds. In the specific case of agriculture, what weights the most on disparities is the composition effect. If all regions had the same share of agriculture, regional disparities would be about 15% lower than the actual situation. Productivity levels are the result over the previous time of a favourable composition of dynamic industries (MIX), to local industries more dynamic than the European average (DIFF) and to reallocation of employees in higher value-added sectors. This is particularly true for the CEE Member States.

7. **Regional disparities originate also from the speed of the catching up process among countries and regions, stemming from the regional distribution of growth assets.** With a higher balance of spatial distribution of resources, disparities would decrease. If all less-developed regions would achieve the European average resource endowment, disparities could decrease by around 5% in case of quality of government, by around 1.5% in the case of marketing or radical innovation, by around 3% in the case of human capital, and by around 1% in the case of accessibility. The effect on disparities is more contained than in the case of the sectoral composition, since the growth assets affect the speed of the catching up process and not assume to change the entire industrial structure. The results suggest that for a catching up process, effective policies are those that favour interventions on 'soft' elements, such as on ethics, organisation, education and innovation, and less on 'hard' elements, such as infrastructure.
8. **Agglomeration economies have a lower relevance with respect to the other input factors,** suggesting that policies aiming at redistributing assets such as human capital and accessibility have a more pronounced impact on disparities than the presence of cities.
9. **Investments play an important role in shaping growth trajectories of regions, with strong cumulative and self-reinforcing effects.** However, this result holds a caveat. The effect of public investments on growth is strongly related to the presence of private investments. Moreover, less developed regions (for the ESI Funds) register a higher return of investments on growth than the European average. In other words, per euro invested, less developed regions increase growth more than more developed ones. Investments therefore stimulate convergence.
10. **European funds mostly stimulate growth indirectly by stimulating investments.** This relationship holds in the case of both the private and public sectors.

After laying out the main processes behind regional disparities (Section 2.1), the following two subsections show the evolution of regional disparities in the 28 EU Member States (Section 2.2) as well as the evolution of within-country disparities (Section 2.3). The key determinants of regional disparities are presented in Section 2.4. The chapter ends with some emerging findings on the role of public investment (national, sub-national;(Section 2.5)) in reducing disparities and the role of European policies in stimulating national investment (Section 2.6).

2.1 Main processes behind regional disparities

As can be seen above, regional disparity is a multifaceted and complex phenomenon, which calls for some ex-ante expectations about the trends to avoid an inductive, data driven, and casual interpretation of the situation.

The evolution of regional disparities is the result of many processes of different nature that manifest their effects along different timespans:

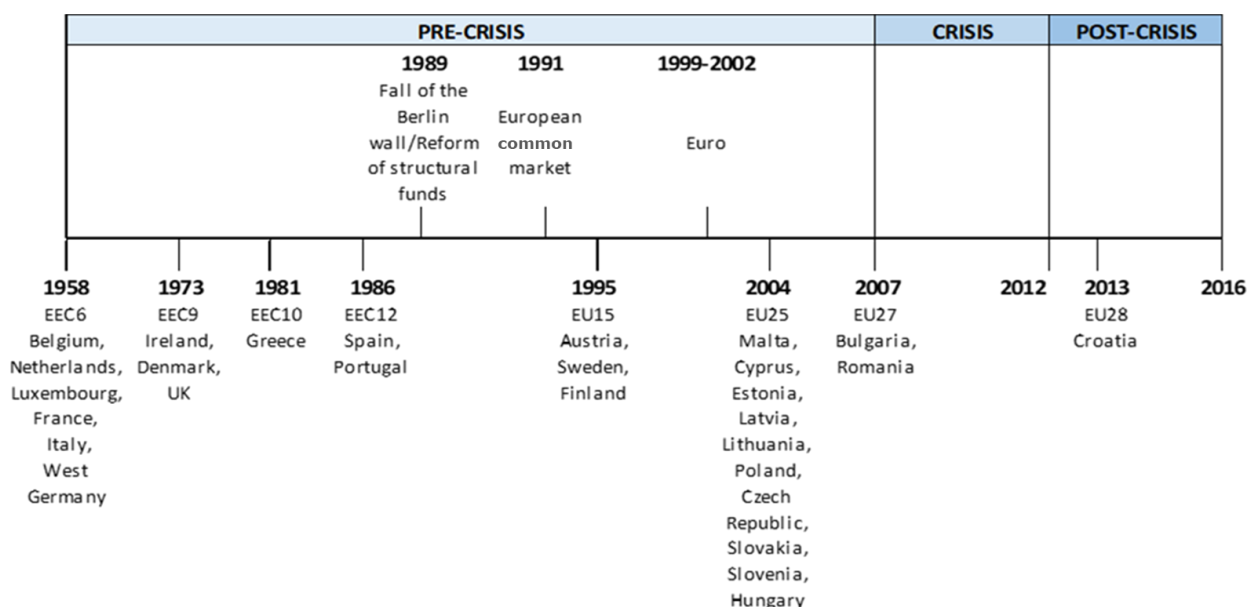
- **Long-term processes** (taking decades to develop), tied to a historical trend of interregional homogenisation of economic, social and structural conditions throughout an integrated territory – in this case the European Union. Through “stages of development”, less developed economies achieve levels of welfare that are typical of advanced economies. This homogenisation trend depends on a natural “entropic” tendency towards information diffusion, integration of local cultures and know-how, mobility of production factors – including labour and capital through foreign direct investment (FDI) -, strong imitation processes in economic organisation (technological and managerial practices, organisational and marketing models) as well as in life-styles (consumption models and consumers’ behaviour), inter-national (and inter-regional) movements of labour and capital, of basic infrastructures and social overhead capital, social services provision and quality.
- **Medium-term processes**, tied to waves of technological transformation, as they are emphasised by the theory of spatial diffusion of innovation. The tendencies of such transformations are typically in favour of more advanced regions, which are the natural loci for the seeds of invention, thanks to the richness and variety of know-how, information, human capital and high-level functions. For this reason, rich areas and countries adopt radical innovation in shorter time, leaving lagging countries and regions to adopt once the innovation process is less risky, and when the organisational changes to adopt effectively the new technologies are identified.
- **Short-term processes**, tied to cyclical, rapid sequence of upturns and downturns of the economic processes, both linked to exogenous shifts, originating at the global level outside Europe, and to endogenous (national) processes, mostly linked to the macroeconomic conditions of each country. In periods of crisis, recent evidence has shown that weak countries, with high public debt and deficit over gross domestic product (GDP), suffer the most from a slowdown of the world economy, increasing between-country disparities. By the same token, within-country disparities might register a rise when stronger regions are more capable of enduring crisis conditions - e.g. through flexible industrial structures - and weaker regions are disadvantaged by a possible slowdown in demand, by fiercer competition from external firms on their local, previously captive markets, and by their weaker production and marketing industrial structures.

A fourth important process superimposes itself on the already intricate and complex interaction of the above-mentioned processes, making the result of disparities trends difficult to foresee in its outcome. In particular,

- **Far-reaching institutional decisions about the process of international integration in Europe**, which in different moments in time took place, enlarging the European Union from the six founding members in 1957 to 28 by 2013; the early establishment of the Rome Treaty (1957-58), the enlargement of the European Community in the early '70s to UK, Ireland and Denmark, to Greece at the beginning of the '80s, to Austria, Finland and Sweden in the mid '90s, and to the CEE Member States since the mid-2000s (Figure 7). On top of these enlargement processes, two major institutional changes took place, deepening the integration of EU Member States, namely the adoption of the European Common Market in 1991, and the establishment of the Single Currency in 1999. Both theory and empirical evidence have shown that the level of disparities between countries increased after any enlargement as a statistical effect since the entrance of less developed countries (excepting the 1995 enlargement to

Austria, Finland and Sweden). However, in the short term, the within-country disparity trends tend to show an increase due to the capacity of more advanced regions to take advantage of the benefits of a wider market, while less advanced regions risk instead to suffer from the loss of their captive market. The trend in international disparities, instead, decreases, thanks to the benefits of a wider market penetrating newly entered country economies. By the same token, agreements on a single European monetary policy and the consequent reduction of viability of competitiveness policies managed through exchange rate variations imply a convergence of interregional growth rates of productivity and competitiveness, placing an extra burden upon the shoulders of least favoured countries and regions. In these latter regions, in fact, the process of industrial modernisation that accompanies an integration is more likely to take place through the shut-down of least efficient firms rather than through the virtuous path of product and process innovation.

Figure 7: Timeframe of EU enlargement including the main institutional changes and the crisis



Source: POLIMI (2019).

The illustrations provided on the **expected impacts of different processes on the evolution of regional disparities** highlight an important warning: the driving processes of regional disparities differ between international (between-country) disparities and within-country disparities. The two types of disparities, in fact, react differently to specific exogenous shock, being macroeconomic or institutional in nature, with a different time span, and with different intensity. This message suggests that an analysis of a comprehensive, summative, index of total disparities is only illustrative of the evolution, but difficult to be interpreted. Instead, an explanation calls for a separation of the two components – between- and within-country disparities – that provides insight on the evolution of such disparities and thereby offers the right information for identifying the causes behind these trends.

If advantages exist in using the decomposition of between- and within-country disparities, a word of caution is important regarding the messages associated to the two indicators. While it is clear that the within-country disparity indicator relates its evolution to regional performances, the source of evolution of the between-country disparity indicator is more ambiguous. Its evolution is generally attributed to national performances. However, it may also be the result of the aggregate effects of regional policies, which can have a significant influence on national economic trends through an increase in the regional performance, especially in those countries, like the CEE Member States, where Cohesion Policy represents a significant share of GDP. This aspect needs to be considered when analysing the results.

Finally, an important general remark is that while (disruptive) macroeconomic and technological changes can hit economies unexpectedly and in an unprepared state, and long-term social development usually takes place smoothly, with no evident shocks, institutional changes are prepared, discussed at length, and decided upon with clear timetables about the different strategic moments. In the latter case, economic systems can prepare for such changes. All this makes us search for ex-ante expectations on advantages that can clearly emerge.

2.2 Evolution of regional disparities in the EU Member States from 1980 until today

2.2.1 Evolution of overall regional disparities in Europe

Regional economic disparities have always represented a **risk to harmonious economic progress**. Figure 8 shows the long-term evolution of regional disparities across EU regions, measured for the fifteen EU Member States with the Theil index²⁰, for which per capita GDP data is available between 1980 and 2015, and for the 28 Member States, whose data availability restricts the analysis to the period 1995-2015.²¹ The Theil index is in fact able to measure the distance in per capita wealth between each region and the reference area, in this case the EU. Details on the Theil index and the data upon which it is measured are available in Annex 6.2.1 to this report.

i

Infobox 1: The Theil Index

The Theil index is a statistical mean used to measure economic inequality. Due to its structure, the Theil index can be decomposed into two parts: a between-country index and a within-country index, which add up to a total value. The index measures the weighted distance of wealth (in this study: GDP PPS per capita) between a region or country and a reference area. A higher number indicates greater degrees of disparity. The main advantage of the Theil index, compared to other measures of territorial disparities, is that it can be decomposed into different sectors and units.

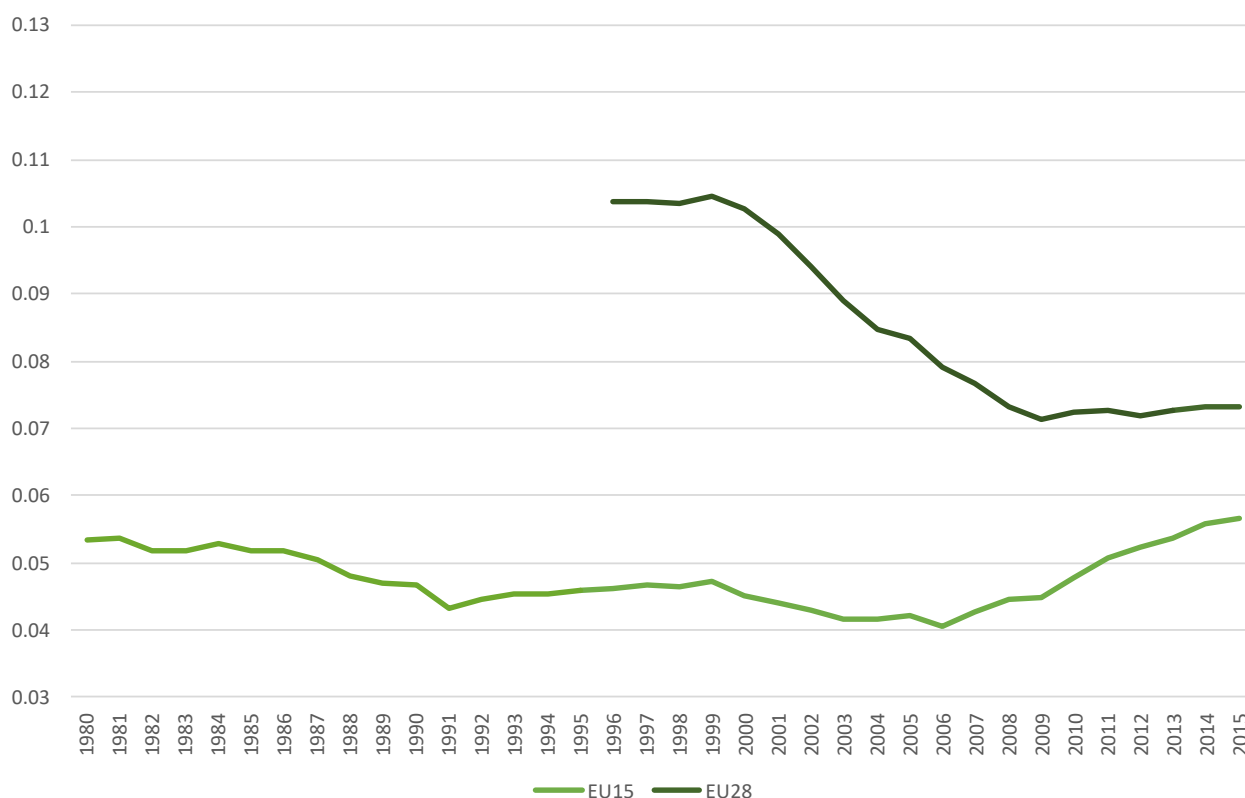
The **trend in regional disparities** in the (then) 15 Member States shows an evolution (at constant rates) between 1980 and 1986, followed by a period of convergence after the enlargement to 12 Member States in 1986. In 1992, with the introduction of the Common Market, competition increased at the expense of less favoured regions in Europe, and disparities reversed their trend up to 1995, when they stabilised again. This stability is mainly driven by the preparation of the EU enlargement to Central and Eastern countries. Assessing the disparity trends of the 28 EU countries, it is evident that the identified convergence trend since 2000 is due to the growth of per capita GDP in the CEE Member States. This occurred for two main reasons. First, the institutional reforms that took place within these countries helped usher in market economies and second, the availability of pre-accession EU funds attracted investment, thereby supporting the transition phase.

A **long period of convergence** took place from 1995 to 2007, at which point the process was interrupted due to the disruptive economic crisis. In 2009, the regional disparities among the 28 EU countries increased for the first time. As Figure 8 shows, the result is a slight divergent trend across regions which lasts until 2014, when signs of stability show up.

²⁰ Annex 6.2.1 shows that the same results are obtained if regional disparities are measured with another index, in particular with the coefficient of variation.

²¹ Data at the NUTS 2 level is provided by Cambridge Econometrics and retrieved from DG REGIO T-board.

Figure 8: Evolution of regional disparities in Europe - Theil index – (GDP per capita in PPS)



Note: The **Theil index** is a statistic used to measure economic inequality. It is able to measure the distance in per capita wealth between each region and the reference area, in this case the EU. A higher number indicates greater disparities.

Source: POLIMI (2019).²²

The **increasing trend since 2009** is the result of a slowdown of GDP per capita in the CEE Member States accompanied by a drastic increase of disparities among the 15 older Member States, the economies in Southern Europe being much more strongly hit from the crisis than the North of Europe. In fact, while the Theil index for the 28 Member States only slightly increased between 2009 and 2014, the one measuring disparities across the fifteen Member States increased more rapidly, even if at a slower pace in the most recent year.

As mentioned above, the **evolution of total disparities** is difficult to interpret, as it is the result of both how countries and regions grow. Sources behind international disparities differ from those behind within-country disparities. The two types of disparities react differently to specific exogenous shocks, dependent on whether such shocks are macroeconomic or institutional in nature, of different lengths, and of different intensity. It is worth distinguishing them to be able to highlight associations between institutional (EU enlargement; Common Market, Single Currency), macroeconomic (crisis), political (e.g. reducing government spending to control public-sector debt), technological (new 4.0 technological paradigm²³) and regional disparities. The long-term trends are first presented, relating both to between-country (Section 2.2.2) and within-country (Section 2.3.1, Section 2.3.2, Section 2.3.3 and Section 2.3.3) disparities in response to the different institutional changes that have taken place. An analysis of short-term disparity trends follows, with the aim of highlighting new “regional laggards” and “regional leaders” that were generated by the crisis (Section 2.3.4).

²² Data available on EU Website: <https://urban.jrc.ec.europa.eu/t-pedia/#/>.

²³ The new 4.0 technological paradigm is based on the evolution of automation, digitalisation and artificial intelligence technologies that evolve and mutually complement each other producing a constellation of new technologies labelled in the literature as 4.0 technologies.

2.2.2 Evolution of between-country disparities and the role of EU enlargement

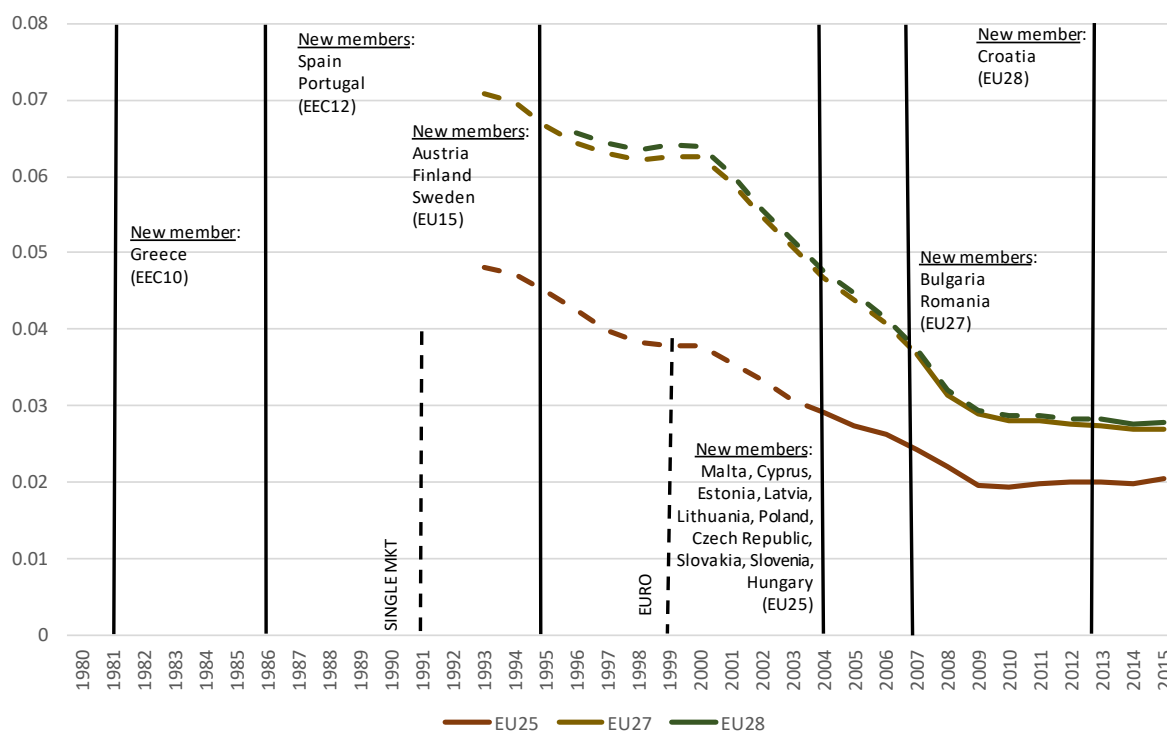
Figure 9 presents the evolution of between-country regional disparities over the period 1980 – 2015, measured by the *between* component of the Theil index. Each line represents the level of disparity within a specific group of Member States. The dashed part of the line signifies the time in which the last countries to join that particular group were not yet part of the European Union. The continuous line displays the period in which all countries belonging to the group are officially part of the European Union. For instance, the EU-27²⁴ line depicts the disparity trend of the EU-27 before (dashed) and after (continuous) Bulgaria and Romania officially acceded, allowing us to effectively assess the impact of accession on disparity within that country group. A careful reading of the figure leads to the following interesting messages:

- A general first result reported by Figure 9a is that **between-country disparities show a constant decreasing trend**, as signalled by the negative slope of the Theil index curve. In the short-term, the advantages of scale in a larger market and in the long-run, the processes of information diffusion, the inter-regional movement of production factors, the homogenisation of infrastructure and the social overhead capital show their positive effects.
- **Since 2004, between-country disparity among all 28 countries decreased** at a slower pace than during the previous period (Figure 9a). Between the old members, disparities increase due to the different capacities to react to the crisis between Southern and Northern European countries. Italy, Portugal, Spain and especially Greece were strongly hit by the crisis, increasing the gap to more resilient Northern European countries.
- **During the crisis, the analysis shows that between-country disparities increased** in Europe and suggests that measures to reduce government spending in order to control public-sector debt might have influenced the situation. This can be highlighted by the Greek case since the evolution of the disparities among the old European Member States registers a drastic increase when Greece is considered. The evolution of regional disparities between the EEC10 since 2009 is much steeper than in the case of the EEC9 group, the difference lying in the weak performance of Greece (Figure 9b).
- **Each enlargement registered a deepening of between-country disparity.** In fact, in each integration phase a statistical effect is registered, making the Theil index jump upward as a result of the participation of less developed countries in the European Union. An exception exists in this trend, represented by the 1995 enlargement, when more developed countries, like Austria, Finland and Sweden, entered the European Union with a slightly positive effect on between-country disparity. In fact, the statistical effect records a lower Theil index for the EU15 group with respect to the EEC12 group (Figure 9b).

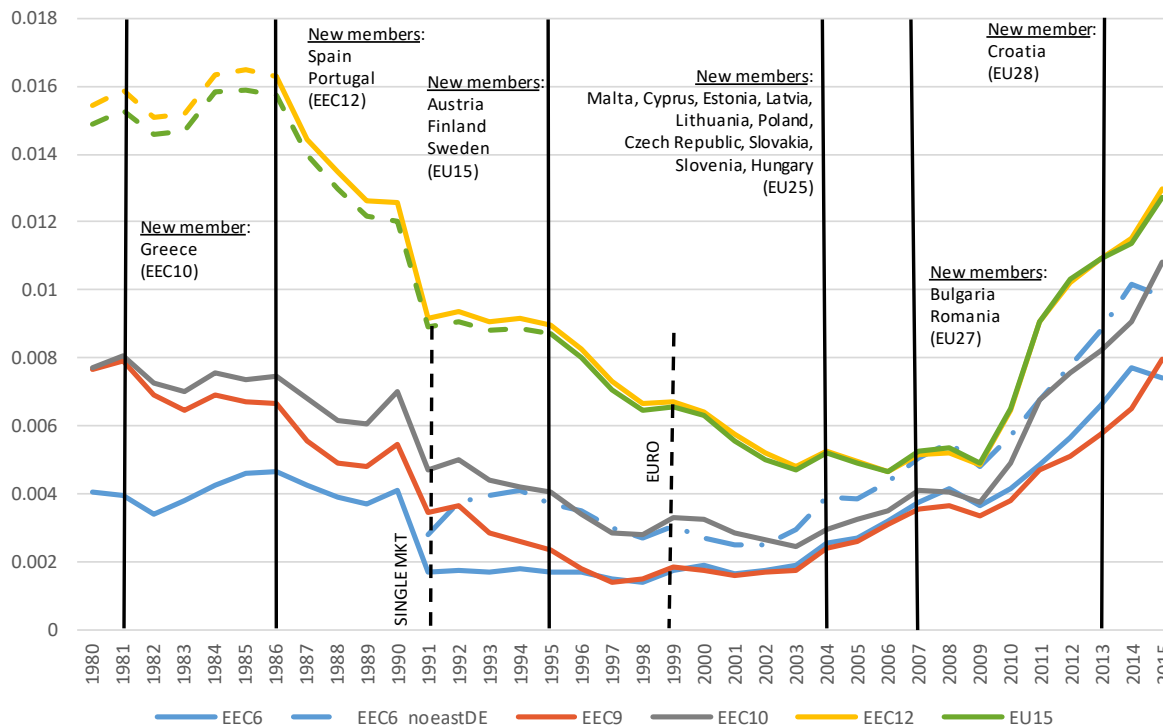
²⁴ Excluding Croatia.

Figure 9: Evolution of between-country disparities by groups of Member States 1980 – 2015, Theil index, between component (GDP per capita in PPS)

a) Evolution of groups of countries in the last three enlargements



b) Evolution of groups of countries the first four enlargements



Source: POLIMI (2019).²⁵

²⁵ Polimi calculations based on data available on EU website <https://urban.jrc.ec.europa.eu/t-pedia/#/>.

The **advantages of integration** are in some instances captured in advance. Anticipatory effects are registered in Spain and Portugal, where disparities stop to increase in 1984, two years before the enlargement takes place. Most of these anticipatory effects are expected to take place through investments, as forward-looking economic agents frequently act to be ready for an enlargement from the very beginning. Once members of the European Union, Spain and Portugal played an important role in decreasing the between-country disparities of that time up until 1991. The same decrease, in fact, is not registered between the other European Member States over this time period, signalling that the flourishing of the Spanish and Portuguese economies is the primary reason for said trend to occur.

The same ex-ante effects on disparities are not registered for the **1995 enlargement**, when Austria, Finland and Sweden acceded. These countries were already converging to the other European countries since 1986. In the period just before the enlargement this convergence stops starting again in a decisive way just after their accession and lasting until the crisis.

With the **reunification between Eastern and Western Germany**, disparities among European Member States decrease. This is particularly evident when analysing the evolution of disparity within the group of the six founding members of the EU in Figure 9b. Following the reunification (continuous blue line in Figure 9b), disparities between the six countries decrease in 1991, and remain constant for some years. The reasons for such a "positive" evolution in disparities is explained, however, by the fact that Germany becomes overall 'poorer', moving towards the average of the other countries. The dotted blue curve in Figure 9b represents instead how disparities would have evolved without German reunification. The relative wealth of Western Germany with respect to the reunified Germany would have made disparities among the six countries larger.

The European enlargement does not represent the only institutional effect impacting disparities. Two more important institutional changes, as described in Section 2.2, took place: the creation of the Common Market in 1991 and the Single Currency in 1999.

The **constitution of the Common Market**, as an important institutional change, can be associated in the evolution of disparities with both an anticipatory effect and an ex-post positive effect. In 1990, between-country disparities decrease as a probable result of investments being made in less developed countries, which sought to prepare their economies to take advantage of economies of scale in a larger market, and to lower administrative and organisational costs required to participate in an international market. These costs had always represented a financial burden, especially for small firms and less efficient economies. After 1991, the period of relative decrease continues, especially in the UK, Ireland, Denmark and Greece, while the other countries seem to remain stable. As we shall see, the decrease in between-country disparities are not always accompanied with an intra-national disparity trend.

The possible positive effect of the Common Market on convergence is not registered in Spain, Portugal and the six founding countries. For the first two countries, problems of development are clearly registered, probably due to difficulties in continuing the industrial modernisation processes and the productivity increase necessary to cope with competition in a larger market.

A different story can be linked to the **Single Currency and its effects on between-country disparities**. No anticipatory effects on disparities can be linked to this institutional change, which influences investment decisions to a very limited extent with respect to the enlargement of the Common Market. With the advent of the Single Currency, some factors promoted a convergence process. New trade opportunities (lower transaction costs especially in less developed countries), 'internal devaluation' through labour cost decrease in less developed countries, and lower interests on debt paid by countries with high public debt. However, certain factors with the opposite effect, such as the halting of policies based on a devaluation of the exchange rate (a common yet possibly harmful policy in the long run, pursued by countries like Italy and - to a lesser extent - France), led to an increase in the between-country disparities after 2003. Such devaluation policies have, in fact, momentarily helped these countries to regain competitiveness in the past. For instance, during the oil crises of the 1970s and in September 1992, when the lira (Italy) and the pound (UK) were devalued to the point of destroying the European Exchange Rate agreement.

The situation regarding between-country disparities shows convergence trends. When disparities are measured among all 28 European Member States, the decrease in its evolution emerges clearly, with a slow-down due to the crisis that hit the Southern Member States more than the strongest Northern European ones, and decelerated the positive growth rate of the CEE Member States (Figure 9a).

If the **impact of the crisis** on disparities among European countries is only a confirmation of something which is known, what emerges from Figure 9a is another interesting message: no curve measuring disparities within different groups of countries crosses each other. This means that, despite the sixty years of integration, no group of countries registers a lower disparity with respect to another group, leaving the convergence process incomplete. The long-term processes mentioned in the introductory chapter, leading to higher levels of development through information diffusion, integration of local cultures and know-how, strong imitation processes in economic activities and in lifestyles, still have to show all their effects. The long-term decrease in regional disparities can also be regarded as a matter of bridging cultural, social and economic differences, leading towards the homogenisation of quality of life and well-being.

2.3 Evolution of within-country disparities in the EU

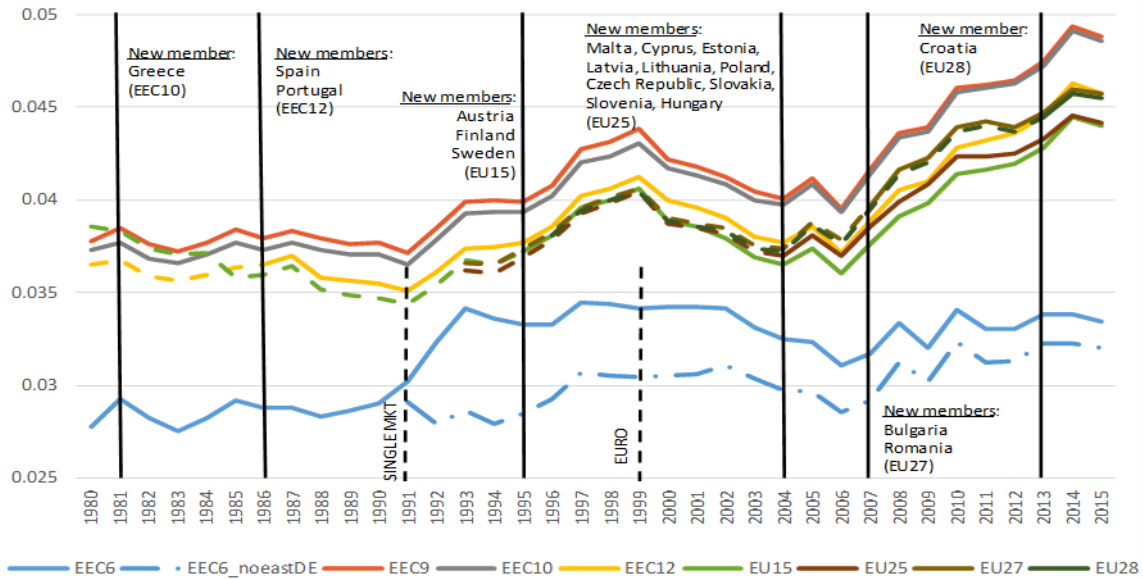
2.3.1 Evolution of within-country disparities and the role of EU enlargements

A completely different picture is presented by the **within-country disparity evolution** in Figure 10, which shows that within-country disparities are the result of different causes, reacting to the same shocks differently with respect to the between-country disparities.

The picture shows **four distinct periods of the evolution of within-country disparities** (Figure 10):

- 1980–1991, a period of relative stability;
- 1991–1999, a period of increasing disparities;
- 1999–2007, a period of decreasing disparities;
- 2007–onwards, a new period of growth in disparities.

Figure 10: Within-country disparities by groups of Member States 1980–2015, Theil index, within component (GDP per capita in PPS)



Source: POLIMI (2019).²⁶

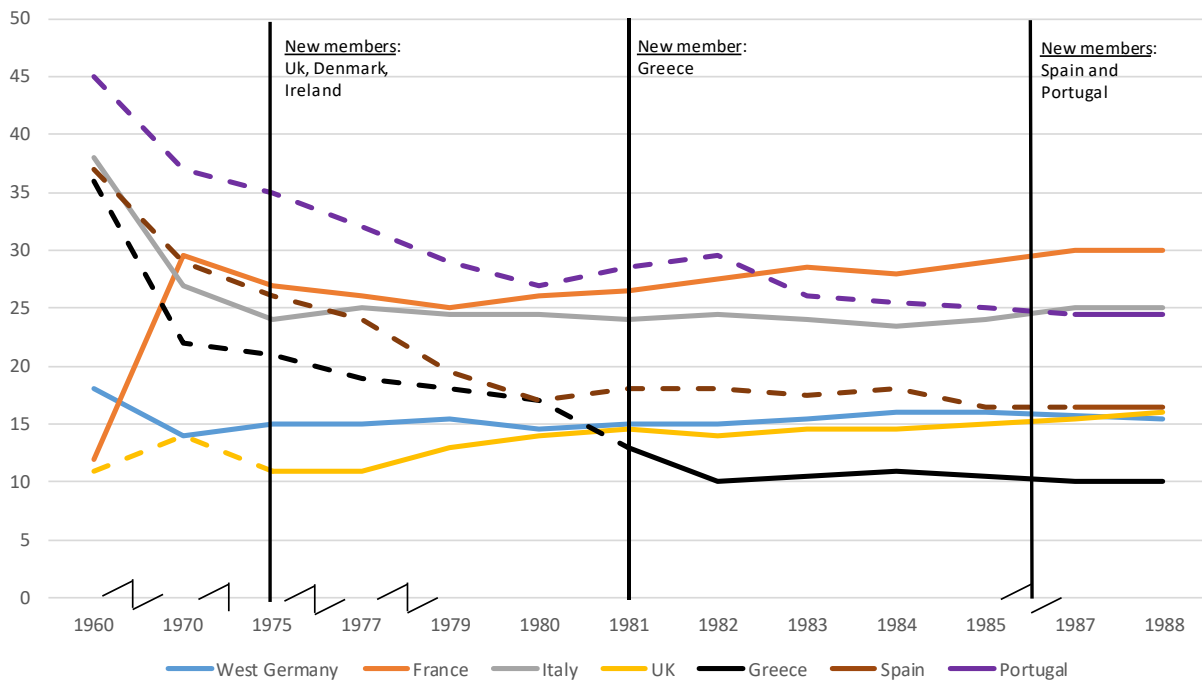
1980–1991, a period of relative stability:

In 1980, a **phase of increasing within-country disparities** interrupts the decreasing trend that characterised intra-country disparities since the 1960s. No data is available for this period, but a previous study showed that convergence in intra-national disparities was predominant since the 1960s, when the enlargement was producing its positive effects also in the lagging regions of the Member States. The Mezzogiorno of Italy as well as lagging regions in France benefited from the enlargement process in the 1960s and 1970s (Figure 11).

The first period, starting from the 1980s, shows a relative stability in intra-country disparities in all different groups of Member States in which they are analysed. A relatively flourishing economic period, less limits to public expenditure, and, at the end of the 1980s, ex-ante effects of the constitution of a large market, helped less developed areas of less developed countries to grow rapidly, through private and, especially, public investments.

²⁶ Polimi calculations based on data available on EU website <https://urban.jrc.ec.europa.eu/t-pedia/#/>

Figure 11: Intra-national disparities by selected Member States. 1960–1988 - coefficient of variation



Source: GREMI (1991), based on data of the Netherlands Economic Institute.

1991–1999, a period of increasing disparities:

The year in which the **Common Market was launched (1991)** represents a year of change in intra-national disparities, as they start to increase. The launching of the international integration phases can in fact be associated with increases in intra-national regional disparities, due to the ability of more advanced (especially urban/metropolitan) regions to take rapid advantage of a wider market.

The 1990s (1991–1999 period) are characterised by an **increase in intra-national disparities**. As mentioned before, the decision to join the Common Market can be related to a phase of “economic boom” in stronger regions and probably contributed to a rise in intra-national disparities. Yet there were additional forces likely to be at play. In the 1990s, the broad diffusion of information and communication technology (ICT) displays all its centripetal forces. As many empirical analyses demonstrate, the first adoption phases of the new ICTs favoured stronger areas. Cities are *loci* of larger endowments of higher- quality ICT networks, of services and of higher-level human capital, which gain strategic advantages from such advanced technologies.

The advantages stemming from these new technologies are not merely dependent on technological adoption. Even if, in principle, advanced communication technologies are present everywhere in the era of the Internet, skills and relational capital required for their innovative use are not available ubiquitously.²⁷ The likely result is the **cumulative strengthening of the centripetal forces of growth** (all sorts of increasing returns) and the centrifugal forces of territorial weakening, as signalled by the rise in intra-country disparities.

Over the 1991-1995 period, the **rise in intra-national disparities** is, on average, less pronounced in the six founding Member States than in the other countries. Once the increase caused by the German reunification is over (1991-1993), intra-national disparities stabilise

²⁷ Camagni, R. (2002), On the Concept of Territorial Competitiveness: Sound or Misleading?, *Urban Studies*, vol.39(13), pp. 2395-2411 ; Graham, S. (1999) Global grids of glass: on global cities, telecommunications and planetary urban networks, *Urban Studies*, 5-6, pp. 929-949.

(1993 and 1995). The longer period of integration and the spatially widespread adoption of the new technological paradigm generated a higher spatial balance of productive activities, industrial knowledge, human capital and other positive effects.

In 1991, the re-unification of Germany generated an increase in intra-national disparities amongst the EEC six between 1990 and 1991 through a simple statistical effect. What is instead a "real" effect is the **decisive increase between 1991 and 1993**, which resulted from the closure of some of the industrial activities of the former socialist economy. This result is shown by the dotted blue line, which represents the evolution of regional disparities that would have taken place without the German reunification. Following that line, a decreasing trend in intraregional disparities would have taken place precisely in the years when amongst the six founding members a steep increase is registered. However, in the original six Member States, the increase in intra-national disparities lasts only a few years. In 1994, a decrease took place lasting until the beginning of the crisis period, showing the capacity of Germany to absorb internal disparities at an impressive speed.

1999–2007, a period of decreasing disparities:

In 1999, a **turnaround in the evolution of intra-regional disparities** takes place, registering an important decrease. The major event of those years is the establishment of the Single Currency for 11 of the 15 Member States, with Greece joining the group two years later.

The decrease in intra-national disparities is the result of **two concomitant effects**. On the one side, the Single Currency abolishes the possibility of price competition policies obtained through exchange rate variations, which used to be extremely helpful in gaining price competitiveness in the strong, industrialised areas of weak countries. The advantages of the drastic devaluation of the Italian lira, which broke the monetary system agreements in 1992, were most notably registered in the strong export-oriented ("made in Italy") and industrialised areas in the North-Eastern and Central part of the country. As a result, the strong areas in less developed countries grew relatively less. On the other side, lagging areas started to take advantage of the ICT inspired technological revolution, finally displaying its effects in these areas. This occurred because local labour markets gained the capacities and knowledge required to adopt and use these technologies in strategic ways to generate processes of local development.

2007–onward, a new period of growth in disparities:

The **increase of intra-national disparities**, a trend that manifested itself in 2006, is accelerated by the **global financial and economic crisis**, and continues until 2014, when the crisis was already over in many countries. The original six Member States register an increase which is less pronounced than for all other countries, yet still relevant.

The **interruption of intra-national catching up** is the result of two major processes. On the one hand, large cities and strong industrialised regions show a higher capacity to cope with the slowdown of the economy, losing relatively less than lagging areas. On the other hand, impoverishment of less developed regions of less developed countries takes place due to a more fragile production system and the inability of managerial strategies to redirect industrial activities towards new market niches, new products and new marketing solutions. Particularly in the CEE Member States, activities are concentrated in the strongest parts of the countries, similar to Spain and Portugal in the 1990s.

Figure 10 shows that **since 2014 an opposite trend seems to emerge**. If some conditions are met, this reversal is expected to hold. Such conditions include the recovery process in most European economies producing additional resources in a cumulative self-reinforcing mechanism, the European Union regaining a strong consensus among European citizens through flexible agreements on different political topics, and CEE Member States moving towards a second-rank city development model.

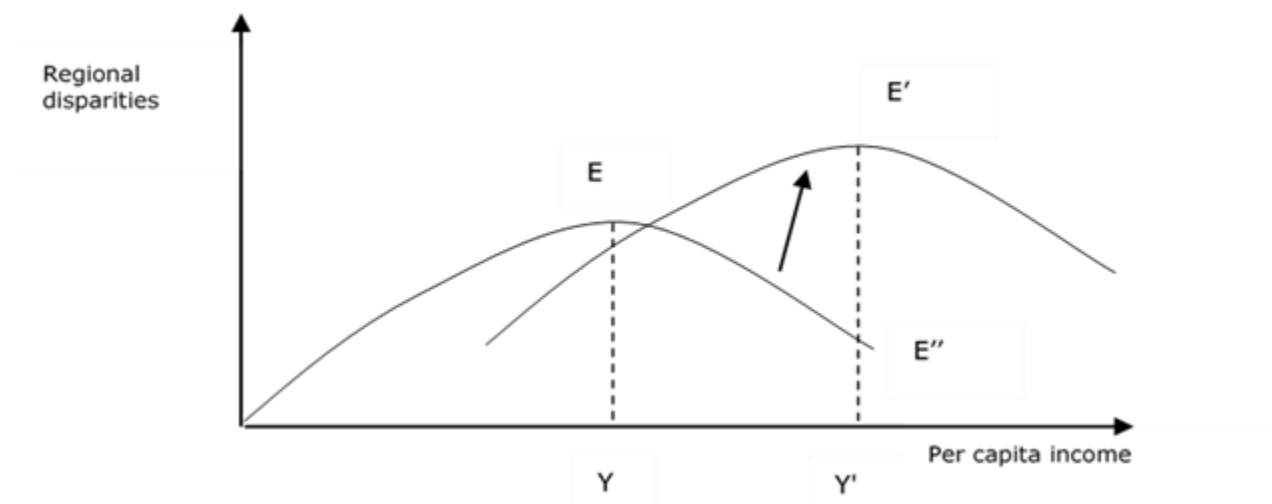
2.3.2 Evolution of income per head and regional disparities: Williamson curve

As mentioned above, the long-term decrease in regional disparities can also be interpreted as a matter of bridging cultural, social and economic differences and leading towards homogeneous levels in the quality of life and well-being. Less developed national economies catch up with more developed and modern economies, who through technological progress, social changes, and the evolution of knowledge, achieve the expected frontier of decreasing returns to investments at higher levels of income, as suggested by Williamson's theory (Williamson, 1965).²⁸

According to Williamson, **development proceeds through stages**. In its early stages, development is concentrated and polarised in the country's stronger areas. Only subsequently does it spread to less developed areas and sectors. The consequence of this 'two-speed' development is that the regional gap widens in the early phases of a country's economic development and then narrows when the national income reaches a certain level. Therefore, it follows an inverted U-shaped trajectory (Figure 12).

However, **technological progress, social changes, and the evolution of knowledge** are all factors which may give advanced regions a greater capacity to attract capital and labour from the less developed weaker regions, and to obtain public investments in modern social capital and advanced infrastructures (e.g. hub airports, high-speed trains). Consequently, in the more developed regions, the frontier of decreasing returns on investments is reached at higher levels of income. In graphic terms, this means that the U-curve of regional disparities moves rightwards and upwards, as in Figure 12, where given a level of income Y' , the country may find itself with a higher level of regional disparity: E' rather than E'' .²⁹

Figure 12: Williamson's curve of regional disparities



Source: POLIMI (2019).

Our Figure 13a-c present the Williamson's curve for groups of countries: CEE Member States in Figure 13a, Southern Member States in Figure 13b, and Northern European Countries in Figure 13c.

The empirical evidence confirms that regional disparities increase during the early phases of a country's development and decrease after a certain level of income is reached in the **CEE Member States** (Figure 13a). Two aspects emerge clearly from the empirical evidence: i) disparities tend to increase in relatively low-income countries, independently from the initial

²⁸ Williamson, J.G. (1965), "Regional Inequality and the Process of National Development: a Description of the Patterns", *Economic Development and Cultural Change*, 13(4), 3-45.

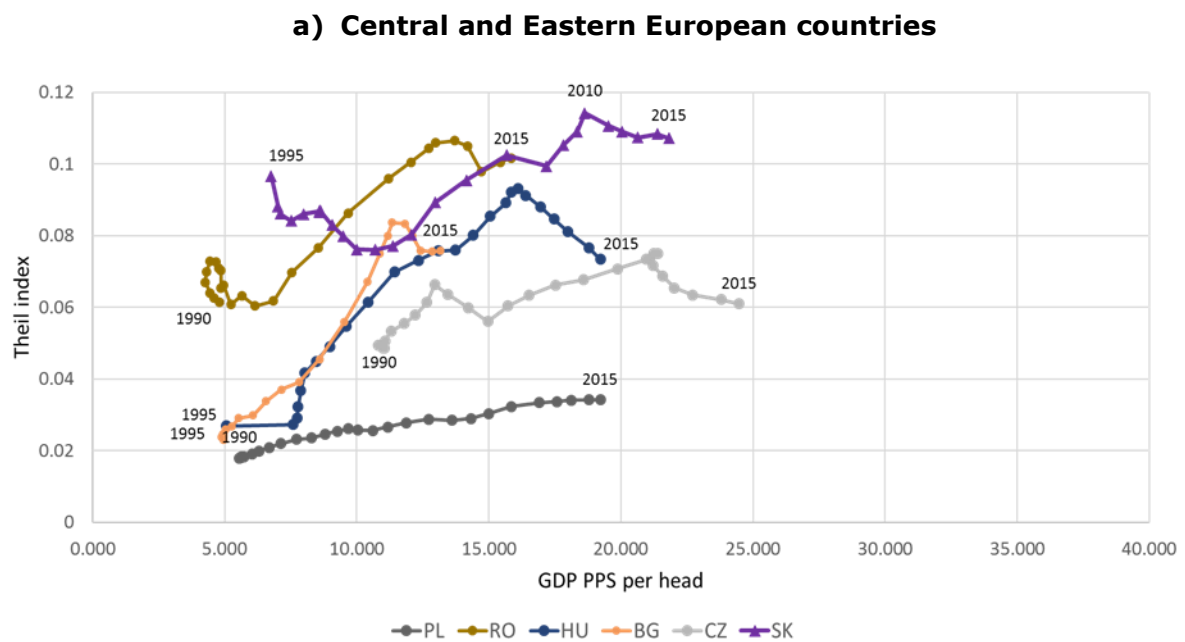
²⁹ Capello, R. (2016), *Regional Economics*, Routledge, London.

level of country disparities; ii) the turning point is reached at different levels of per capita income. For some of them, this takes place at around 14.000 Euro per head, while others require a higher income, around 16.000 euro per head. Only one CEE Member State, namely the Czech Republic, shows a curve with already two peaks that, as we shall see, is typical of more developed countries.

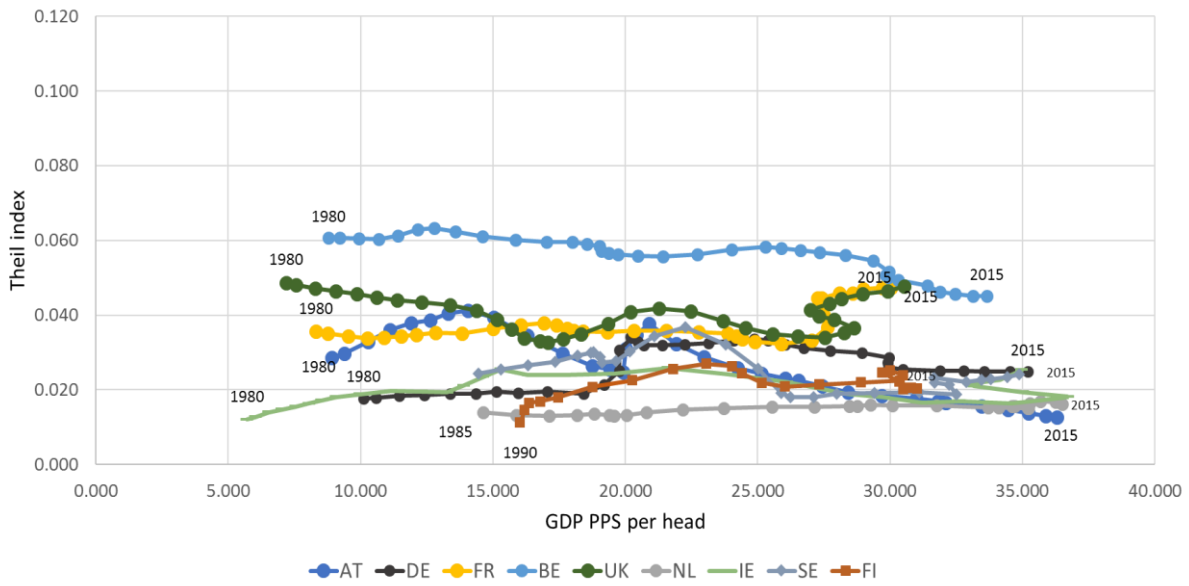
Northern European countries, instead, show two inverted U-shaped curves, some more pronounced, like UK, Sweden, Austria, while others less so, like France, Finland and Germany. The two curves underline that the country has already gone through two cycles. After regional disparities decrease, they increase again in the presence of technological progress and social changes. Southern Member States show the same kind of double U-shaped evolution as the Northern European countries do (Figure 13c), even if the turning point is achieved at lower levels of disparities.

The moment in time at which disparities start a new cycle takes place in different years in the different countries. An interpretation of this is that the new technological paradigm does not take place everywhere at the same moment in time. Countries and regions grasp the advantages of the new paradigm at different moments in time, according to the time span with which they learn how to exploit the new technologies. Even within a conceptual consistency like the one presented by the Williamson curve, specificities emerge.

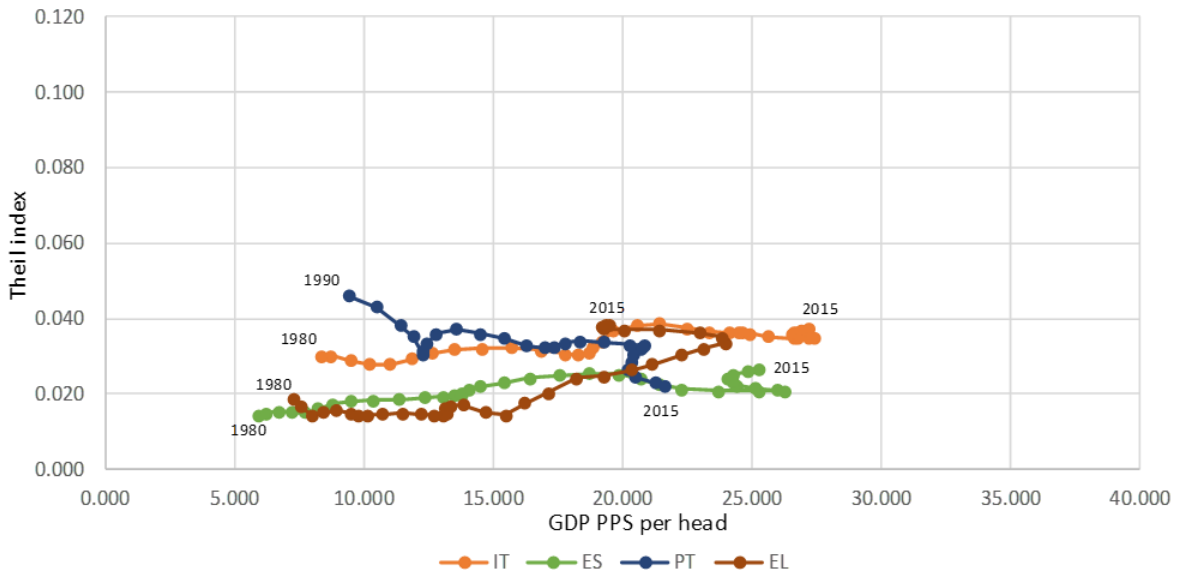
Figure 13: Relationship between regional disparities and income per head: Williamson’s curve



b) Northern European countries³⁰



c) Southern Member States



Source: POLIMI (2019).³¹

Equally interesting is the **influence of entering the EU** on the relationship between income growth and regional disparities. Figure 14 is constructed for this purpose.

It represents the evolution of within-country disparities and income per head in EU Member States in three moments in time: at their EU entry year, four years before and four years after the entry. Four years has been chosen as a reasonable amount of time to grasp the short-term effects of entering the EU. It is short enough so that data is available for those Member States

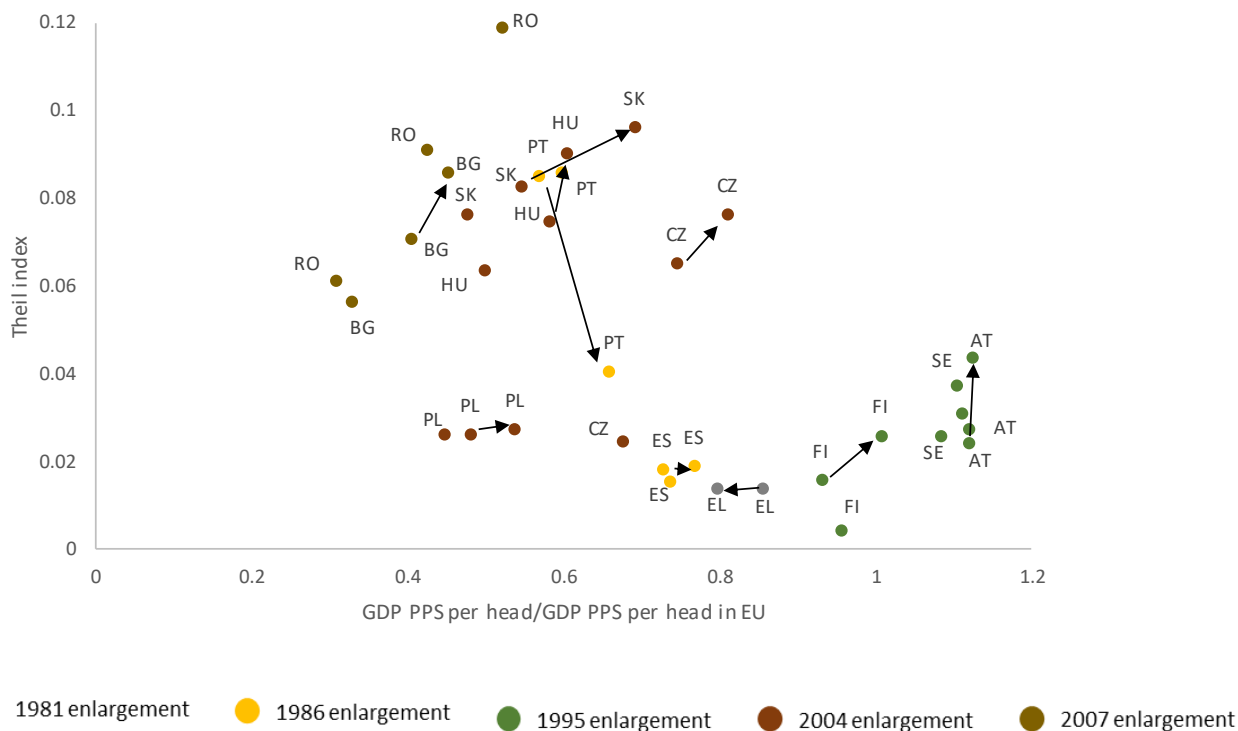
³⁰ To produce a consistent picture of internal disparities, disparities in the UK have been computed after aggregating the various NUTS 2 regions which compose the London region. The disparities detected in this way are smaller but the time path is qualitatively similar than if all London NUTS 2 were taken separately.

³¹ Polimi calculations based on data available on EU website <https://urban.jrc.ec.europa.eu/t-pedia/#/>.

that entered very recently and long enough to capture some tendencies. Figure 14 shows that the **enlargement** has had a mostly **unfavourable effect on regional disparities**, which increase in most countries. This is especially true for CEE countries, who already joined the EU with very high levels of disparities, which were thereupon exacerbated due to several reasons. First, development opportunities and inward Foreign Direct Investments (FDIs) were mainly caught by large cities, where human capital and advanced services were concentrated, rather than rural or small city regions. Second, the industrial restructuring process taking place since the fall of the former Soviet Union, in which soviet economic activities, spread all over the country, were closed. Third, the further concentration of the modernisation of industrial and service activities in more developed areas. To a lesser extent, this trend is also common to Western countries, which also register an increase in disparities after joining the EU. Some exceptions exist in this regularity, represented by Austria, which reduced internal disparities in a constant trend before and after joining the EU, and Portugal, which decreased disparities by increasing its income per head. The reinforcement of regional disparities represents a continuous trend registered four years before the enlargement takes place, witnessing the presence of some anticipatory effects. In some countries, like Hungary, it reinforces after the country joins the EU while in others (most cases) it is instead a constant trend.

A very important message is reflected in Figure 14. Disparities in the CEE Member States are much higher than in all other countries and also increase at a greater rate, which suggests that the CEE Member States may need strong policy interventions to avoid a level of internal disparity that is permanently higher than in Western countries.

Figure 14: Regional disparities and relative income per head by country at the EU entry year and four years before and after



Source: POLIMI (2019).³²

³² Polimi calculations based on data available on EU website <https://urban.irc.ec.europa.eu/t-pedia/#/>.

2.3.3 Concentration vs. diffused growth: geographical evolution of within- country disparities

When a convergence trend is registered, it can either be the result of less developed regions relaunching their economies, or of wealthier regions registering a slowdown. To understand which of these is indeed the case, Figure 15 shows the annual national average GDP per capita growth rate compared to the annual average GDP per capita growth rate in the richest areas, defined as those belonging to the highest 25% of the national GDP per capita, both in the crisis (2007-2012) and in the post-crisis (2012-2016) period. The **bi-sector line divides Figure 15 into two:**

- those countries that are above the bi-sector line are **countries whose richest areas grow more (or decline less) than the national average**, registering a geographical concentration of economic growth (or slowdown);
- while those below the bi-sector line have their **richest areas growing less than the national average**, indicating diffusion of growth (or stagnation).

Figure 15 is built for two periods of time, the crisis period (2007-2012, Figure 15a) and the post-crisis period (2012-2016, Figure 15b).

During the crisis, no regular pattern exists in the geographical trend of economic growth and decline. Neither stagnation nor growth can be linked to spatial concentration or diffusion trends, with countries in the different situations similar in number (Figure 15a). This means that growth is not always associated to the dynamics of the developed areas of the country, nor is stagnation necessarily associated to the less developed ones. The first case is typical of Italy, Ireland, Spain, UK and the Netherlands, where the richest areas show a higher resilience to the crisis than the rest of the country, while in Portugal, Slovenia and Finland the stagnation is linked to the catching up of less developed areas of the country.

This suggests that the **capacity to react to the economic crisis** does not merely depend on the presence of activities *tout court* in the central area, but on the types of activities and industrial sectors present. In some countries, namely Spain, Ireland, Italy, UK and the Netherlands, the most developed regions perform relatively better than less developed ones, showing a trend of concentration of activities, while in others, namely in Belgium, Austria, Germany and Hungary, diffused growth can be observed, where their most developed regions grew less than the country average.

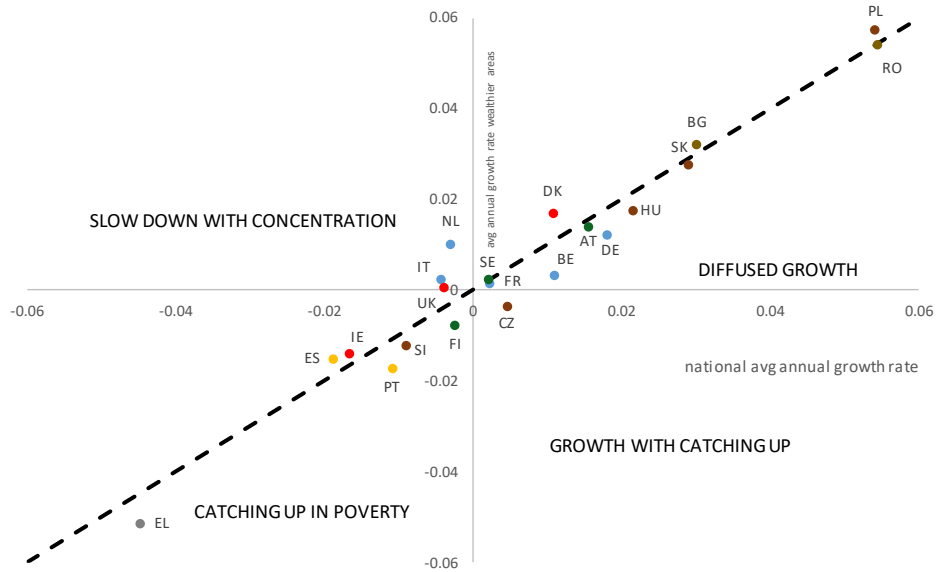
The **post-crisis** period registers a slightly higher number of countries whose pattern is that of diffused growth (Figure 15b), a trend that is common to most CEE Member States. Just a few countries invert their geographical trend of growth, with some specific patterns emerging:

- **Italy moves from a concentration with slowdown to diffused growth;** the relaunch of the economy does not only take place in the richest areas, but spreads around, including in the Southern part of the country, resulting in a decrease in intra-country disparities;
- **The Netherlands moves from a concentration with slowdown to catching up with growth,** meaning that not only does growth take place in less developed regions, but that more developed regions grow less than average;
- **Greece registers a concentrated growth;** the relaunch of the country starts from the large cities, the richest part of the country, at the expense of convergence.

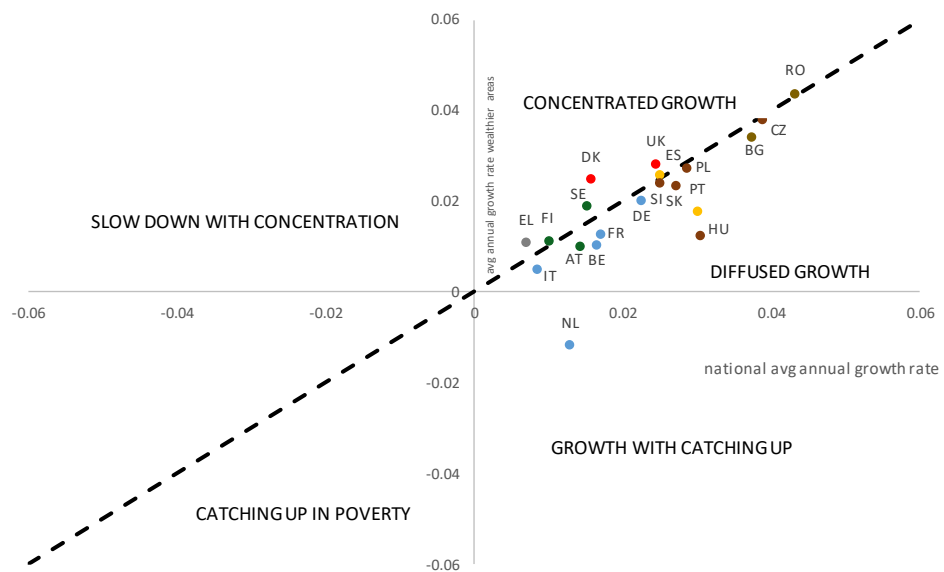
This latter point leads to the conclusion that there is not a unique way in which countries have come out of the crisis. Some national economies have been driven by their large and rich cities (Greece), while others have benefited from the capacity of small and medium ranked cities to, due to the penetration of Industry 4.0 technologies, host new activities, such as long distance (remote) ones. As such, specificities occur, preventing common distinct geographical trends from being predicted.

Figure 15: National average annual GDP per capita in PPS growth vs. average annual GDP per capita in PPS growth in the wealthiest areas in each country: spatial concentration / diffusion of growth

a) 2007-2012



b) 2012-2016



- 1973 enlargement
- 1981 enlargement
- 1986 enlargement
- 1995 enlargement
- 2004 enlargement
- 2007 enlargement

Source: POLIMI (2019).³³

³³ Polimi calculations based on Eurostat data.

2.3.4 Interregional vs. intraregional disparities within countries: geographical patterns of growth and the role of large cities

In the previous section, concentration vs. diffusion patterns of growth were presented at the country level. What is not yet clear at this level of analysis is whether **concentration or diffusion of growth** at the regional level is associated to a concentration of growth in large cities, or to a diffusion of growth along the urban hierarchy, in medium and small towns. Large cities are expected to be the drivers of growth for regions, but when a concentration of economic activity exceeds some limits, it leads to decreasing returns and a deceleration of growth. Important reflections accompany such trends, especially in terms of urban policies and their focus on first vs. second and third rank cities.

To proceed along this line of reasoning and depict geographical patterns of growth at both regional and urban levels, regional disparities are calculated both between NUTS 2 and between NUTS 3 within each NUTS 2 of each country. For NUTS 3, a methodology is applied to guarantee that each metropolitan area belongs to a single NUTS 3 region.³⁴ The results are summarised in Table 6, while in Annex 6.2.3 the results for each country are presented.

i

Infobox 2: Identification of metropolitan areas

In this analysis, some NUTS 3 areas have been readjusted in order to be consistent with the Eurostat definition of metropolitan areas. In particular, some NUTS 3 have been re-aggregated when:

1. within a large NUTS 2 region, two or more NUTS 3 regions belong to the same metropolitan area;
2. the metropolitan area covers all NUTS 3 inside the NUTS 2 region. This is the case of Ile de France;
3. the metropolitan NUTS 3 regions span over more than one NUTS 2 region. This implies the aggregation of the different NUTS 2 containing the metropolitan NUTS 3 areas in object. This is the case, for example, of London.

The possible patterns are schematically represented in Table 5, where inter-regional processes of concentration or diffusion at regional (NUTS 2) level are analysed together with processes of concentration and diffusion within regions (NUTS 3 level), giving rise to **four possible situations**:

- **absolute concentration**: where development takes place in stronger areas of leading regions;
- **diffused interregional concentration**: where development occurs in both stronger and weaker areas of leading regions;
- **concentrated interregional diffusion**: where development takes place in stronger areas of all regions;
- **absolute diffusion**: where development follows a widespread diffusion in both stronger and weaker areas of stronger and weaker regions.

³⁴ See the Infobox for an overview of the methodology applied. Further technical details are reported in Annex 6.2.2.

Table 5: Spatially diffused or cumulative processes within countries

		Intra-regional disparities (NUTS3 level)	
		Decrease	Increase
Inter-regional disparities (NUTS2 level)	Increase	Diffused interregional concentration	Absolute concentration
	Decrease	Absolute diffusion	Concentrated interregional diffusion

Source: POLIMI (2019).

Table 6 contains the names of the different countries that pertain to a specific category in each sub-period. The four periods correspond to the **four periods in which European within-country disparities show clear tendencies**, namely:

- i) a period of stability (1980-1991);
- ii) a period of increase (1991-1999);
- iii) a period of decrease (1999-2007);
- iv) a new period of increase (2007- onward).

Table 6: Intra- vs. inter-regional disparities in four periods of time in EU Member States

	1980-1991*	1991-1999	1999-2007	2007-2015
ABSOLUTE CONCENTRATION	Denmark France Ireland (3)	Austria Belgium Greece Finland Poland Czech Republic Hungary Denmark Ireland Italy Sweden UK Germany (13)	Bulgaria Poland Romania Slovakia Hungary (5)	Bulgaria Poland Romania Denmark France Ireland Italy Sweden UK (9)
DIFFUSED INTERREGIONAL CONCENTRATION	Belgium Spain Germany (3)	Spain Netherlands Bulgaria (3)	Belgium Greece (2)	Austria Belgium Greece Spain Netherlands Slovakia (6)
CONCENTRATED INTERREGIONAL DIFFUSION	Sweden (1)	Slovakia (1)	Netherlands Czech Republic France Italy UK (5)	Czech Republic Hungary (2)
ABSOLUTE DIFFUSION	Austria Greece Finland Netherlands Italy UK Portugal (7)	Romania France Portugal (3)	Austria Spain Finland Denmark Ireland Sweden Germany Portugal (8)	Finland Germany Portugal (3)

Note: * CEECs are not included within the first period due to lack of data

Source: POLIMI (2019).³⁵

If one looks at the results depicted in Table 6, some **important messages emerge**:

³⁵ Polimi calculations based on data available on EU website <https://urban.jrc.ec.europa.eu/t-pedia/#/>.

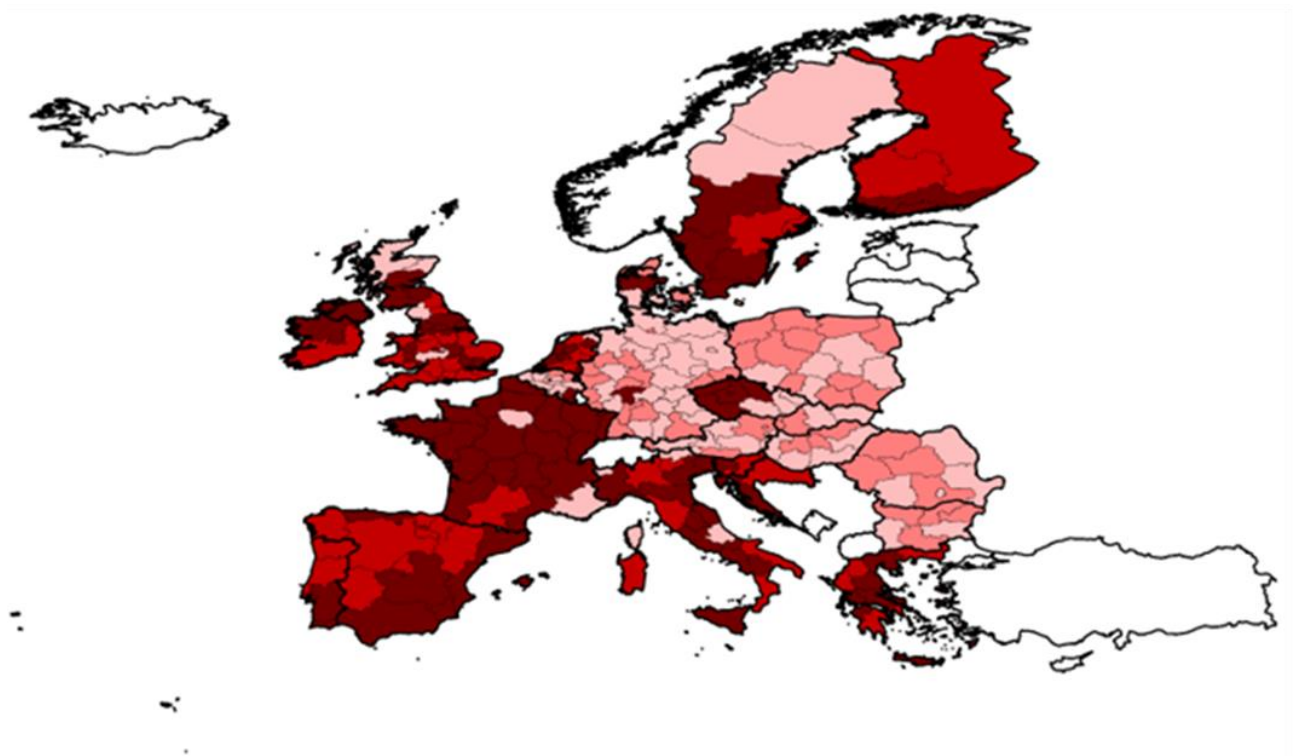
- the two extreme cases of absolute concentration and absolute diffusion are the most frequent ones, showing that **geographical processes of growth are rather pervasive at both the interregional and spatial level**;
- the situation of **absolute concentration is the most frequent one**. Summing up all periods, the number of countries showing this kind of trend is the highest;
- **absolute concentration characterises Central and Eastern European countries**, except for Bulgaria and Romania when they were not yet market economies;
- **Western countries**, instead, **alternate between the two extreme cases**: if interregional disparities increase, this is associated to a concentration of activities in urban areas. Instead, if regional growth also takes place in weaker regions of the country, this takes place everywhere in the region. Portugal is an exception to this rule of alternative situations, consistently in the category of absolute diffusion. Looking at the data, one understands that this result is due to Lisbon and its NUTS 2 region declining rather than peripheral areas growing.

2.3.5 Identifying 'laggards' and 'leaders' among EU regions: the crisis effects

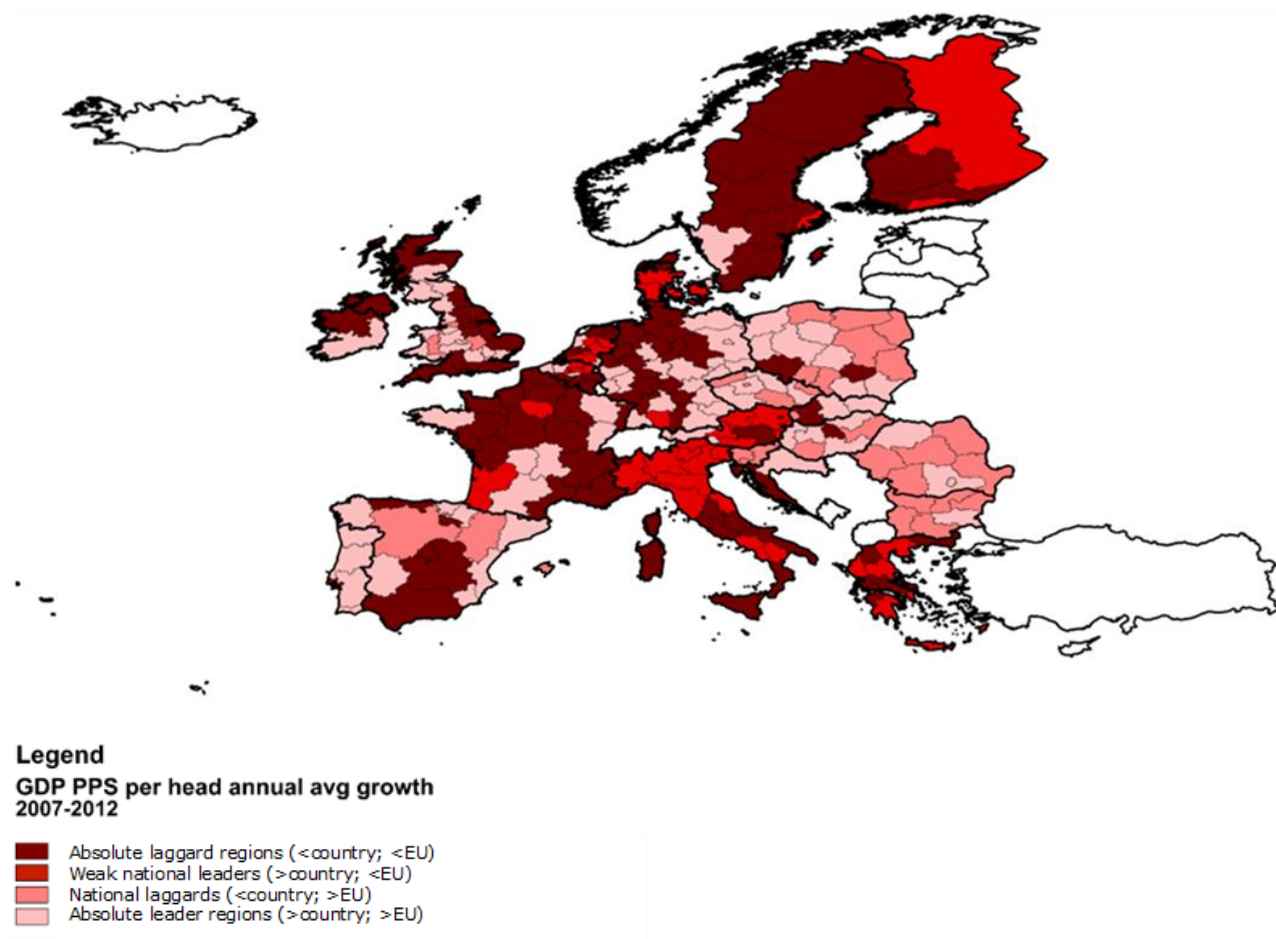
As we mentioned above, the crisis period has exacerbated regional disparities, being highly disruptive in many regions. However, signs have been registered that the long-run process of regional convergence has resumed. An interesting question then comes about: what is the **geography of the "new growing Europe"**? Are the regions that recover those that lost more in the crisis?

Map 2: GDP per capita in PPS annual average growth rate

a) Crisis period (2007-2012)



b) Post-crisis period (2012-2016)



Source: POLIMI (2019).³⁶

Map 2 presents the **annual average growth of GDP per capita in PPS for the post-crisis period (2012-2016) and for the crisis (2007-2012)**.³⁷ The maps represent regions that are both above and below the EU average and above and below national average. More intense colours are associated to lower GDP per capita growth rates with respect to the EU average while lighter colours, instead, represent a higher GDP per capita growth rate with respect to the EU average.

The **picture of growth in Europe has changed**. Absolute laggard regions, defined as regions growing less than the EU and their national average, represented nearly all Western countries during the crisis, except for Germany, yet now are more scattered. Absolute leaders, which are defined as those regions growing more than the EU average and national average, are now present everywhere, apart from Greece, Italy and Finland.

The following **trends can be discerned**:

- **absolute laggard regions** have reduced in number all over Europe. Rather, they have increased in more developed areas, like Scandinavia, UK and Germany, and have decreased in lagging regions;

³⁶ Polimi calculations based on Eurostat data.

³⁷ Using PPS makes these maps consistent with a map representing the relative changes of regional positions.

- **absolute leaders** emerge particularly in France, Portugal, Spain and the UK;
- in France, Germany and the UK, extreme situations of either **absolute leader or absolute laggard regions emerge**, increasing within-country disparities;
- **laggards, either national or absolute**, are present in two non-dynamic countries, Greece and Italy, highlighting the dramatic economic situation of the two countries, and in rich countries, like Austria, Denmark, Finland and Sweden, the last one with an exception of Gothenburg as a leading region.

2.4 Key determinants of regional disparities in the EU

The level of regional disparities observed nowadays can have different types of sources, stemming from **two complementary approaches**:

- **an industrial-based approach**, where regional disparities are interpreted as the result of either a different MIX of sectors or a different efficiency of sectors in the different regions. There may be regions endowed with a mix of high value-added sectors compared to other regions (MIX effect), or it may be the case that the same industry has a higher productivity in a region with respect to other regions, thanks to a more favourable environment;
- **a resource-based approach**, where the sources of regional disparities are dependent on different endowments of production inputs, and, in general, of growth assets among regions.

While the latter finds its roots in neoclassical approaches to regional growth, interpreting growth as a matter of an efficient spatial allocation of production factors, the former has its origin in the theory of stages of development, elaborated in the 1940s. According to this theory, the sectoral composition of a region explains its rate of growth. Given their low levels of factor productivity and small capital/labour ratios, mainly agricultural regions experience low GDP levels and GDP growth, whilst industrialised regions, by contrast, record high factor productivities and therefore high GDP levels and rates of development. At the end of the 1950s, these considerations were enlarged by a group of economists who developed a composite analysis of the relation between production structure and regional growth. This gave rise to the well-known statistical method for determining a region's relative growth rate known as 'shift-share analysis'.³⁸

2.4.1 Sources of regional disparity levels: the role of employment, industrial composition and productivity

The regional level of GDP per capita depends on how many jobs are present in a region and on how productive they are. Therefore, the first reason for a region to have higher or lower income levels is due to whether:

- i) it has a **high or a low employment rate**, i.e. how many among the inhabitants are involved in work activities (labelled as the *employment effect*);

The number of jobs, however, is only a part of the explanation, since the productivity of these jobs can be very different and, consequently, the effect on regional GDP per capita can vary. Applying the shift-share analysis to productivity levels allows us to understand whether a region has a high (low) level of productivity (and GDP) because:

- ii) it is either characterised by a **high share of employment in sectors with higher (lower) productivity levels** (defined as an *industrial composition effect*);

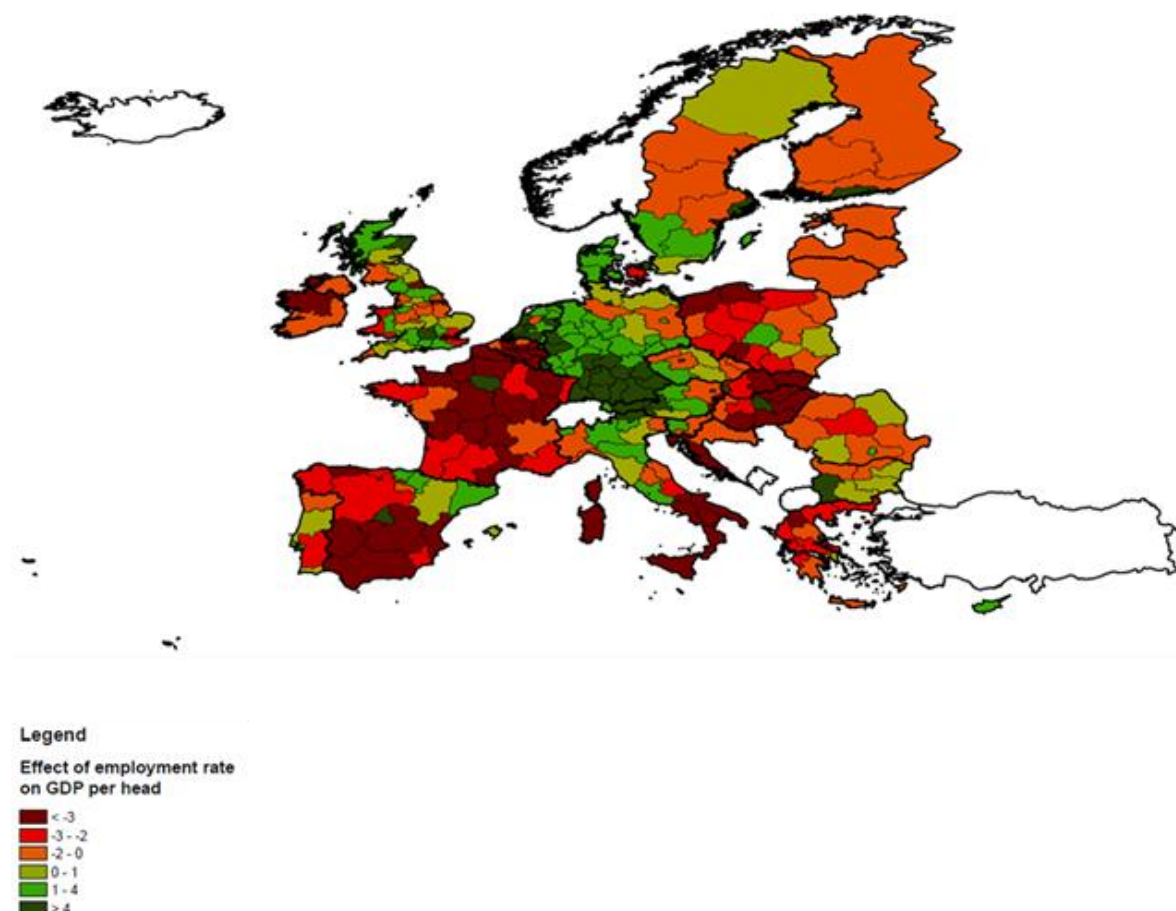
³⁸ Perloff, H., Dunn, E., Lampard, E., Muth, R., (1960) Regions, Resources, and Economic Growth, Johns Hopkins Press.

- iii) or the region's sectors register a **higher productivity level than elsewhere** (labelled an *intra-industry productivity effect*).

According to the analysis above, the **differences in employment** are the first very important determinant of disparities. If all regions had the same levels of employment, the patterns of GDP per capita in the EU would be significantly different, with lower disparities. Map 3 shows the effect of the different employment rates on regional GDP per capita in PPS: the map plots the difference between the actual GDP per capita and the GDP per capita obtained by assuming an equal employment rate across Europe. Regions with positive values (green) are regions that register an advantage in GDP per capita due to their high employment rate, while those characterised by a negative value (red) are penalised by their lack of employment.

Both **country and regional forces** are active at the same time. At the country level, it is evident that employment rates are lower in Eastern and Southern countries, in addition to France and Ireland. At the regional level, there is a sizeable divide between NUTS 2 regions with large cities and the others. Where large cities are present, employment rates are higher and GDP per capita is also higher as a consequence. This is partly, but not predominantly, due to commuting, since this effect is highly accentuated where NUTS 2 are small and do not contain the whole labour market (e.g. Prague, Vienna, London). Yet this effect is also present for larger NUTS 2 with important cities (e.g. Paris, Barcelona, Milan, Rome, Sofia). The differences in GDP per capita between regions, a common reality in many countries, also tends to exist, albeit not as distinctly, in terms of employment, for example between Eastern and Western Germany, Northern and Southern Italy, Northern and Southern Spain, Paris and the rest of France, etc.

Map 3: Losses/gains in GDP per capita assuming an equal spatial distribution of employment rates



Source: POLIMI (2019).

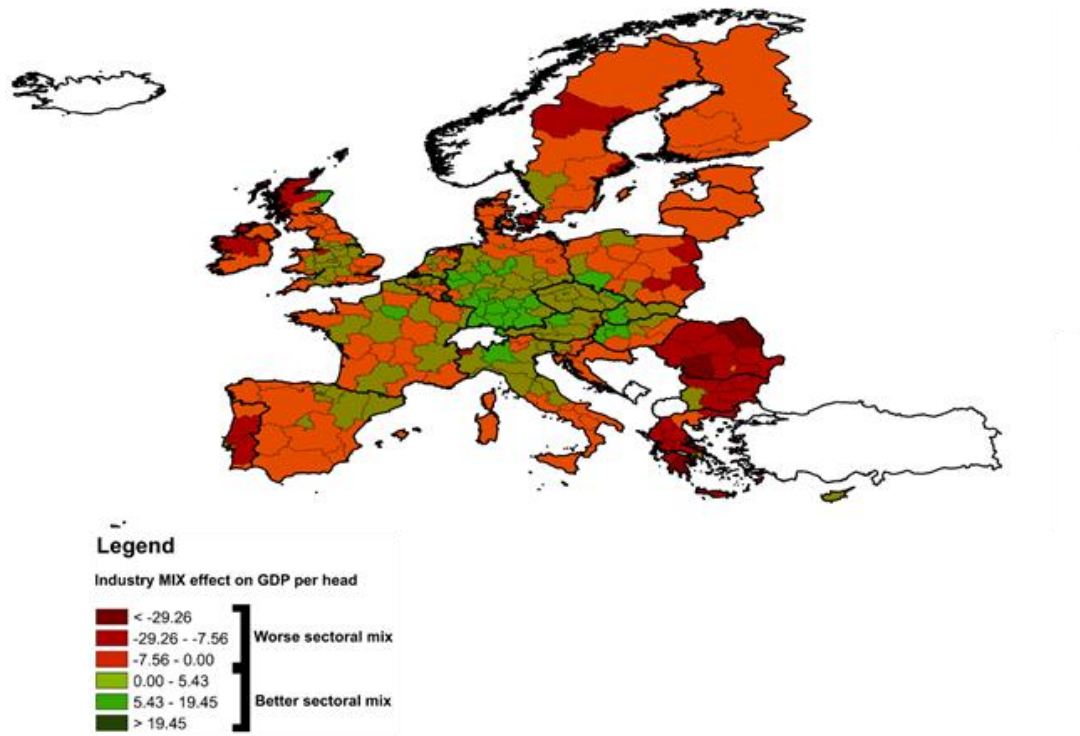
Beyond employment, the **differences in GDP are due to productivity**. In this regard, the effect of the industrial composition and the effect of intra-industry productivity on EU NUTS 2 productivity levels have been calculated.³⁹ Through simulations that assume either a similar industrial MIX or a similar level of intra-sectoral productivity in European regions, the GDP per capita can be calculated under the two different assumptions. The difference between the actual GDP per capita and the simulated GDP per capita represents the gain (loss) of productivity due to a composition of higher (lower) value added sectors or of sectors that are more (less) competitive.⁴⁰

Map 4 reports the loss (in red) or gain (in green) in productivity due to, respectively, a difference in a mix of higher (lower) productivity sectors (Map 4a) or in higher (lower) productivity levels of each sector across regions (Map 4b). Looking at the two maps, it is important to highlight that:

- the **industrial composition (MIX) effect** is primarily present in Eastern and Southern countries. Productivity in Eastern countries, Spain, Portugal, Southern Italy, and Greece depends on the unfavourable MIX of their industrial activities. However, an unfavourable sectoral MIX is also present in Southern France, Ireland, Scotland, Denmark, Nordic and Baltic countries. The central part of Europe, instead, registers a better industrial MIX;
- the **intra-industry productivity effect** is concentrated in Central and Eastern European countries and in some Southern European countries. Sector inefficiency is registered in Eastern countries, Portugal, Greece and the South of Italy. In Southern European countries the exception is represented by Spain and some Southern Italian regions. Sectoral inefficiency is also registered in the East of Germany and Great Britain, except for London and other Southern regions in the UK.

Map 4: Losses/gains in GDP per capita due to industrial composition and intra-industry productivity effects

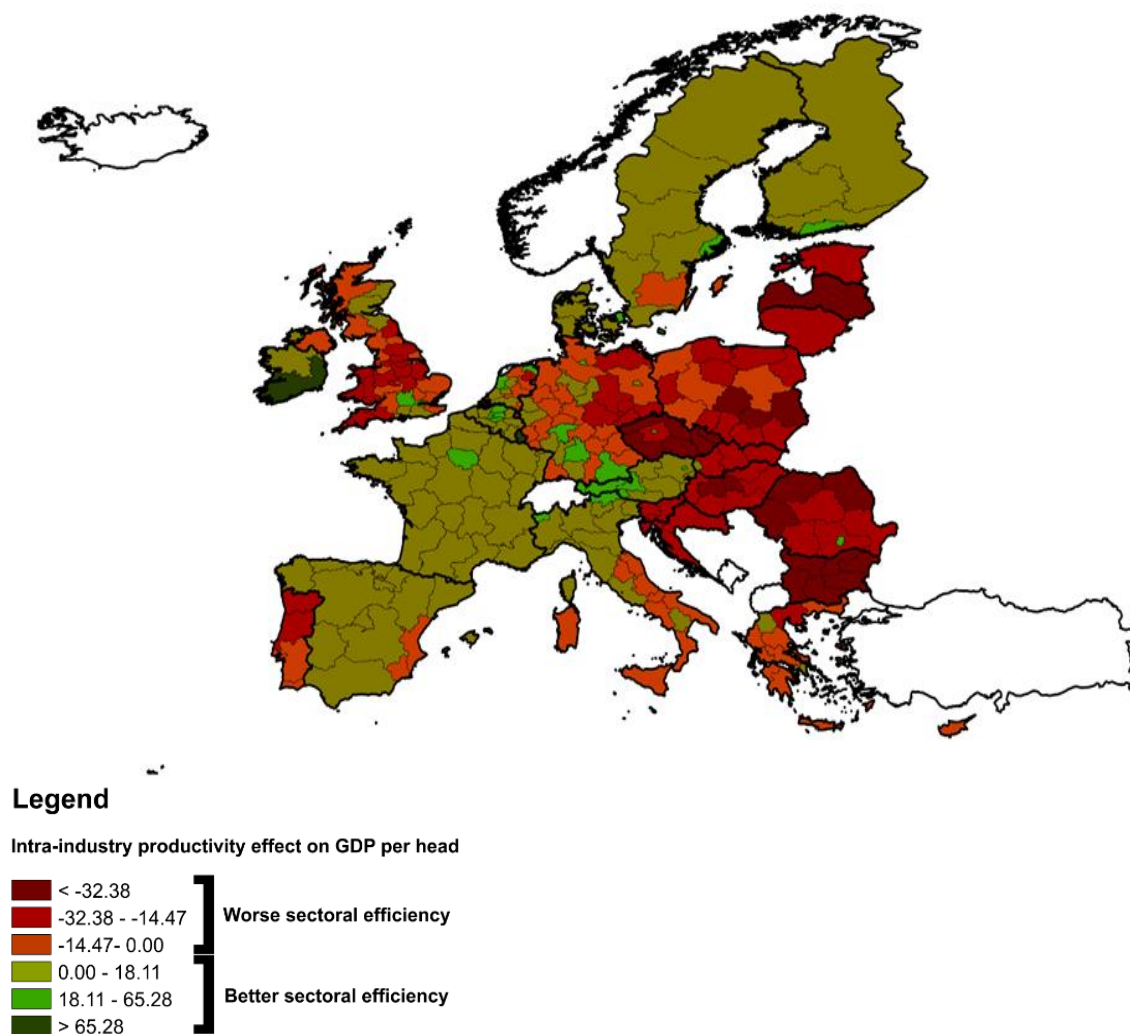
a) Industrial MIX effect



³⁹ The methodology for the calculation of the two components is presented in Annex 6.2.4.

⁴⁰ The methodology for the simulations is presented in Annex 6.2.4 and 6.2.5.

b) Intra-industry productivity effect

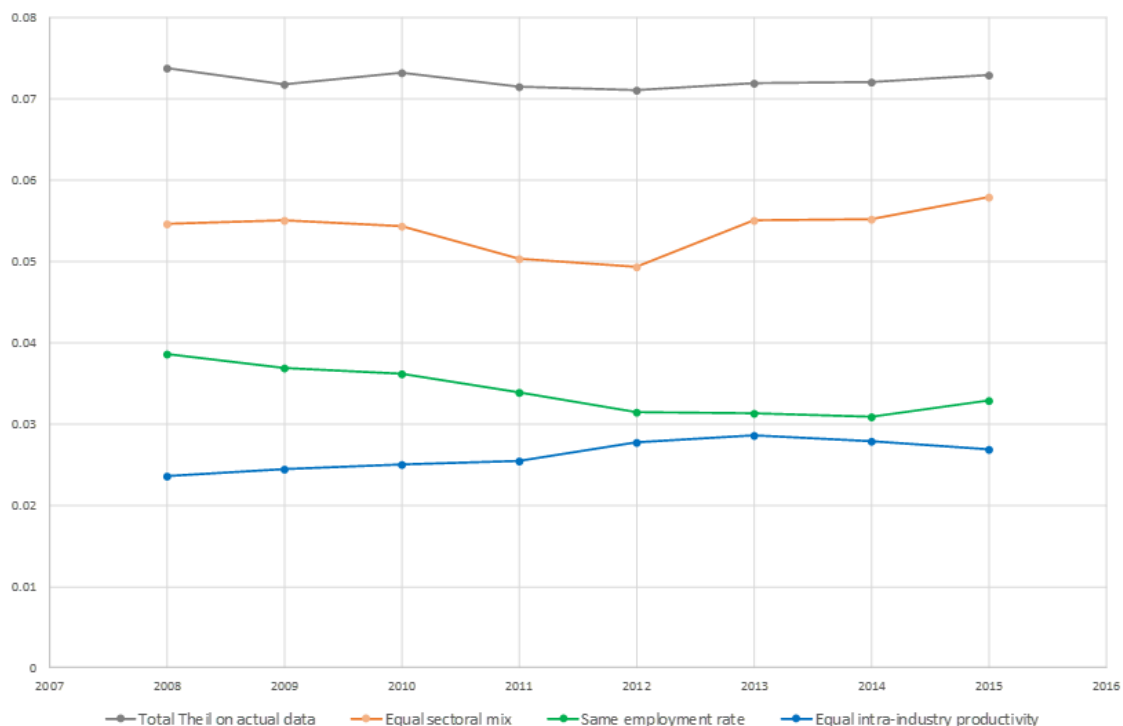


Source: POLIMI (2019).⁴¹

All this has an impact on regional disparities. Figure 16 reports the **actual evolution of disparities**, compared with the level of disparities if regions all had the same productivity (in blue), the same sectoral composition (in orange) or the same employment rate (in green). The three effects can be compared in terms of magnitude and, although they are not additive, the total disparities in the EU would be zero if the three conditions would apply simultaneously.

⁴¹ Polimi calculations based on data available on EU website <https://urban.jrc.ec.europa.eu/t-pedia/#/>.

Figure 16: Evolution in actual disparities and in disparities under equal sectoral MIX or equal intra-industry productivity (total Theil indices)



Source: POLIMI (2019).⁴²

Similar industrial composition across European regions, similar productivity levels in the different sectors across regions, or similar levels of employment in all regions would clearly reduce disparities. This is especially true for the intra-industry productivity effect. The same intra-industry productivity across sectors in European regions would reduce regional disparities by more than 60%. However, it is not only a matter of productivity. A similar composition of sectors across European regions would decisively reduce regional disparities, as was the case in the 1960s and up to the mid-1970s, when the presence of low value-added sectors (e.g. textile, mining) explained much of the disparities. Finally, the effect of the differences in employment are also of paramount importance: they are larger than the industry mix and only slightly lower than the intra-industry productivity ones, with the difference of the latter effect reducing in the years following the crisis.

It has to be remembered that the three effects are not to be considered economically and conceptually independent, since more employment is normally created in sectors that are more productive and the sectoral composition of regions is expected to evolve towards those sectors that are more productive and, hence, profitable.

In these aggregate results, it is interesting to note the role of the agricultural sector, which characterises lagging regions. Results are presented in Map 3a and Map 5b, which display, respectively, the loss of GDP per capita due to the regional share of employment in agriculture (Map 5a) and the difference in agricultural productivity levels across regions (Map 5b). The two maps have different scales as the two effects have different magnitudes.

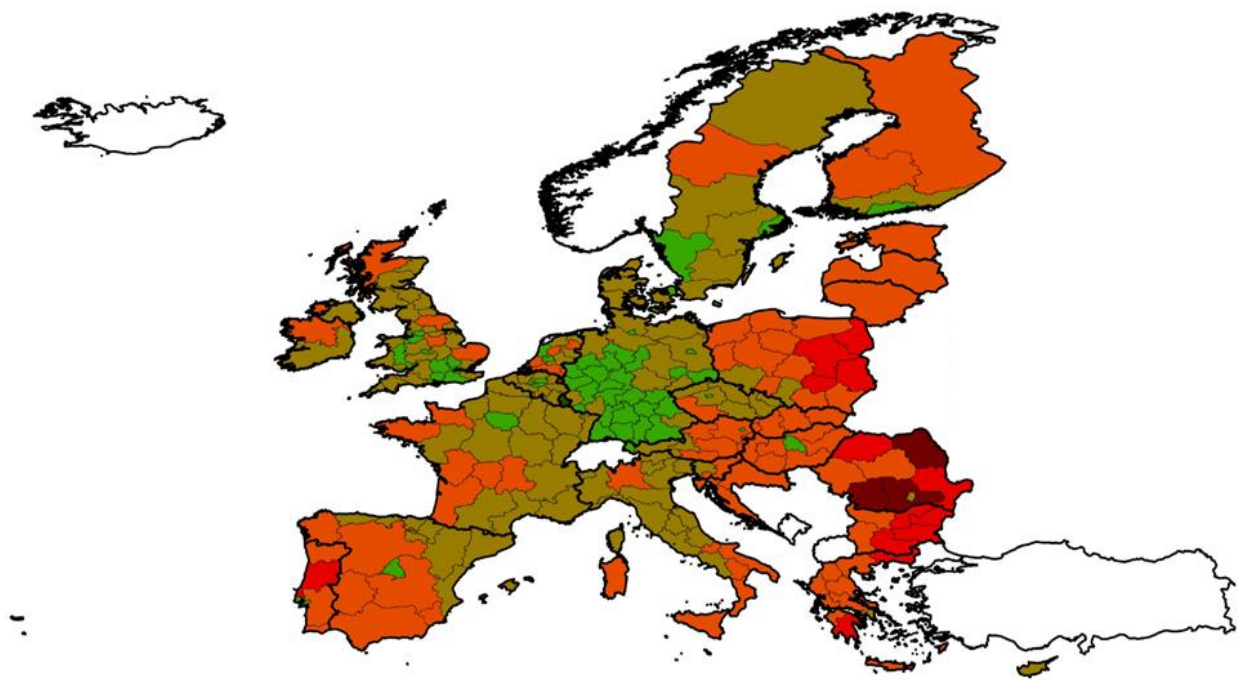
⁴² Polimi calculations based on data available on EU website <https://urban.jrc.ec.europa.eu/t-pedia/#/>.

The maps reveal that:

- **The CEE Member States are disadvantaged** by their high share of employment in agriculture;
- **The CEE Member States, parts of Greece, Ireland and some scattered regions around the UK and Germany** are disadvantaged by a very low productivity level in the agricultural sector;
- **Most of the regions in Southern European countries** that are disadvantaged by their high share of employment in agriculture take advantage from a relatively high productivity in this sector. Agricultural productivity does not differ so much in Western European regions, while it is a source of lower GDP per capita in the CEE Member States.

Map 5: Losses/gains in GDP per capita in PPS due to share of employment in agriculture and agricultural productivity differences

a) Effect of the share of employment in agriculture

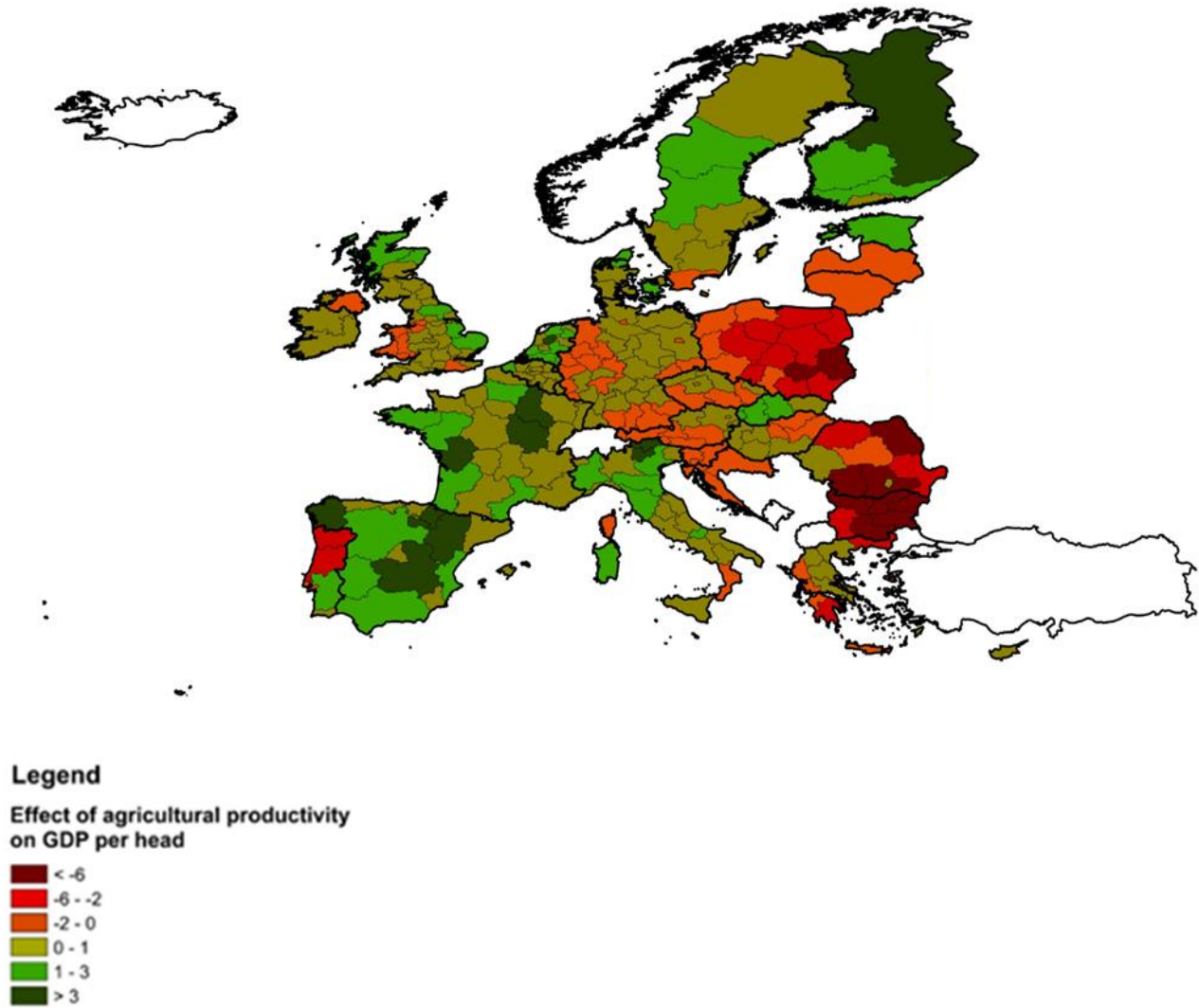


Legend

**Effect of agricultural specialization
on GDP per head**

- < -13
- -13 - -7
- -7 - 0
- 0 - 2
- 2 - 7
- > 7

b) Agricultural productivity effect

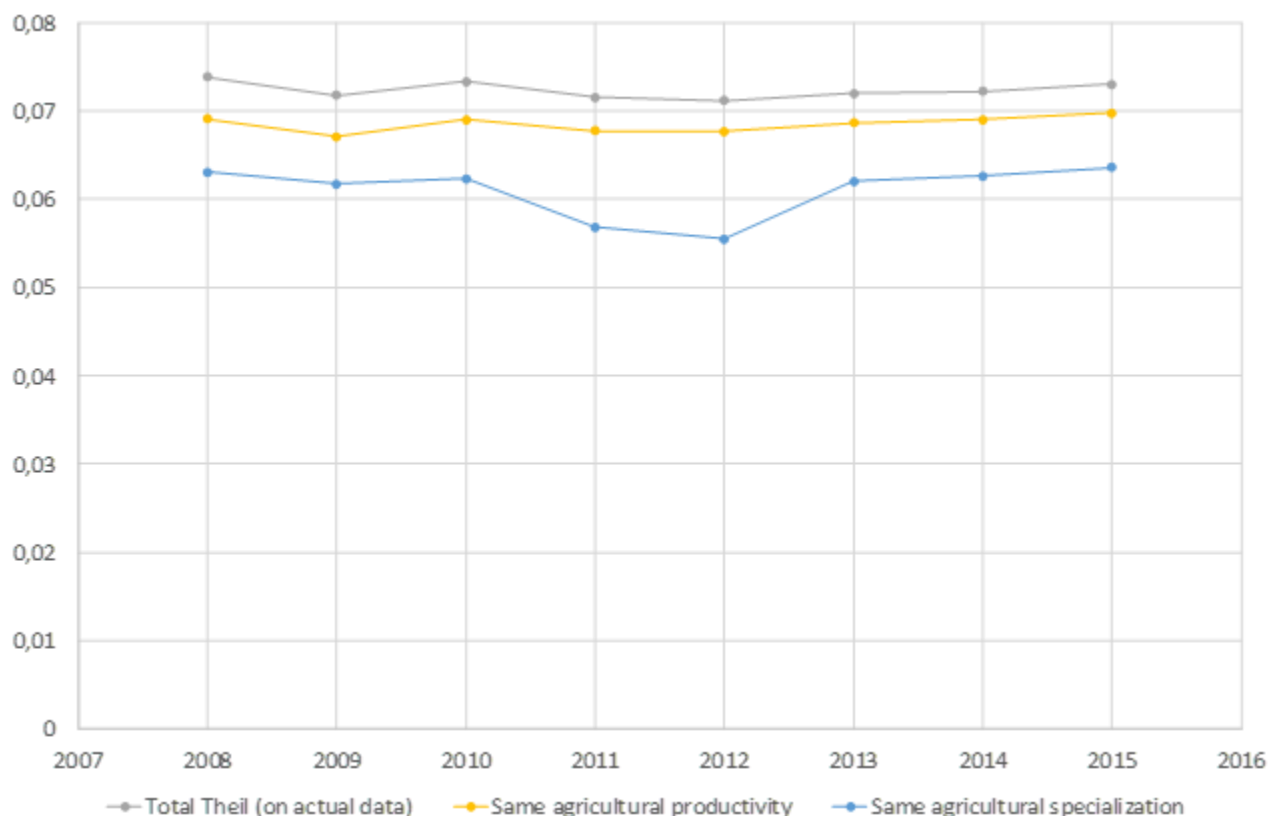


Source: POLIMI (2019).⁴³

This suggests that, if the **agricultural industry** had the same productivity or the same share of employment everywhere, regional disparities would be lower than current levels, as depicted in Figure 17.

⁴³ Polimi calculations based on data available on EU website <https://urban.jrc.ec.europa.eu/t-pedia/#/>.

Figure 17: Evolution in actual disparities and in disparities under equal share of employment in agriculture or equal productivity in agriculture (total Theil indices)



Source: POLIMI (2019).⁴⁴

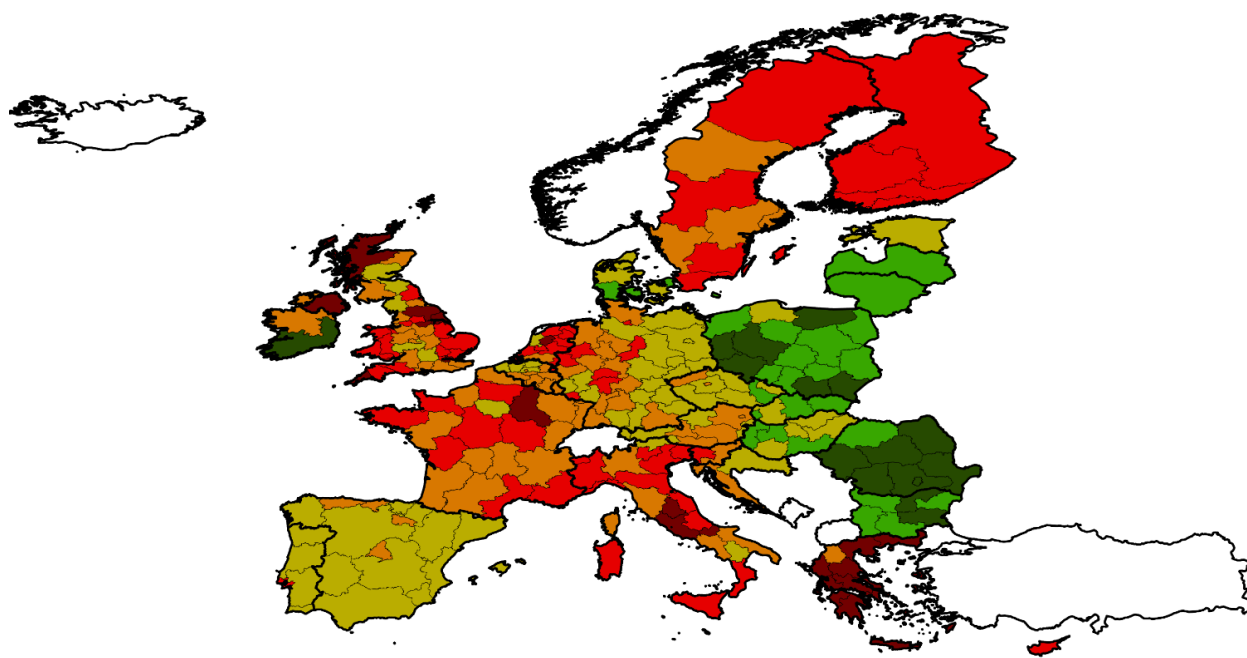
2.4.2 Sources of evolution in regional disparity: an industrial approach

The previous section presented the major causes for the present level of regional disparities. Based on this, it is interesting to assess the causes that led regions to reach such levels of disparities. The search for such reasons calls for an interpretation of the evolution of regional disparities. To identify the source of the evolution of regional disparities, we begin by discussing the way productivity has evolved over time.

Map 6 shows those regions that register a **higher (green) or lower (red) productivity growth** with respect to the European average over the period 2007-2015. As the map shows, gains in productivity growth are registered mainly in the CEE Member States, in Eastern Germany, Denmark, Belgium, Spain and Portugal, with other cases scattered around. Losses in productivity gains are typical in France, Greece and Italy as well as in peripheral areas of the UK, in the Netherlands and in part of Western Germany.

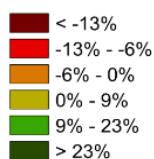
⁴⁴ Polimi calculations based on data available on EU website <https://urban.jrc.ec.europa.eu/t-pedia/#/>.

Map 6: Relative productivity growth (total change in GDP per employee in PPS) – 2007-2015



Legend

Total shift 2007-2015



Source: POLIMI (2019).⁴⁵

The shift from the European average in productivity growth can be decomposed into three effects, so as to describe the sources of the **evolution of productivity dynamics**:

- **the industrial composition effect** – also termed the '**MIX effect**' – deriving from the presence of sectors in the region with more marked dynamics at European level, as a result of an increasing global demand in those sectors;
- **the productivity effect of the region's sectoral structure** – or the '**DIFF effect**' – which derives from the regional economy's capacity to develop each of its sectors at greater average rates than those achieved by the corresponding European sectors;
- **the sectoral reallocation effect**, represented by the reallocation of employment, over time, into sectors with higher productivity levels. This effect is significant in those economies whose sectoral composition is still in favour of low value-added services. In this case, in fact, inter-sectoral shifts can take place among sectors that have strong productivity differences.

While the first two represent the dynamic version of the effects analysed for productivity levels, the novelty is given by the sectoral reallocation effect that has a meaning only in a dynamic perspective. This effect is higher, the lower the stage of development in an area; productivity

⁴⁵ Polimi calculations based on data available on EU website <https://urban.jrc.ec.europa.eu/t-pedia/#/>.

increases from low value-added industries, like agriculture and construction, to higher value-added industries, such as services.

Map 7a-c show the positive (green) or negative (red) MIX, DIFF and reallocation effects, respectively, for the period 2007-2015. The three maps have different scales as the three effects have different magnitudes. They show that:

1) **CEE Member States register:**

- **a positive MIX (Map 7a):** Sectors of specialisation in Central Eastern European Member States, namely agriculture and industry, whose employment share is higher than the EU average, are sectors in which productivity growth is higher at European levels. In the case of the agricultural sector this is due to protected conditions during the period of crisis, while in the case of the industrial sector this is due to technological advances;
- **a positive DIFF**, since all sectors register an increase in productivity higher than the European average (**Map 7b**);
- in general, **a positive sectoral reallocation effect (Map 7c)**. It is not by chance that in these countries the reallocation effect is high: the high share of employment in agriculture and construction allows to register a shift of employment towards sectors with higher levels of productivity, particularly from agriculture and construction to industry.⁴⁶

2) **Southern Member States** present:

- **a positive MIX concentrated in Portugal, Italy and Greece (Map 7a)**. Portugal is in fact characterised by a share of employment higher than the EU average in industry and agriculture, Italy in industry and Greece in agriculture;
- on average, **a lower increase in productivity with respect to the European average**, with differences among countries. Italy and Greece show a negative productivity growth, Portugal, Spain and France a positive one (Map 7b);
- **a limited positive reallocation effect concentrated especially in Italy**, since the agricultural sector loses employment in favour of low value-added services. Moreover, all Southern Member States suffer from the reallocation from public services (Map 7c) when employment is lost in this sector, since very little job opportunities exist.

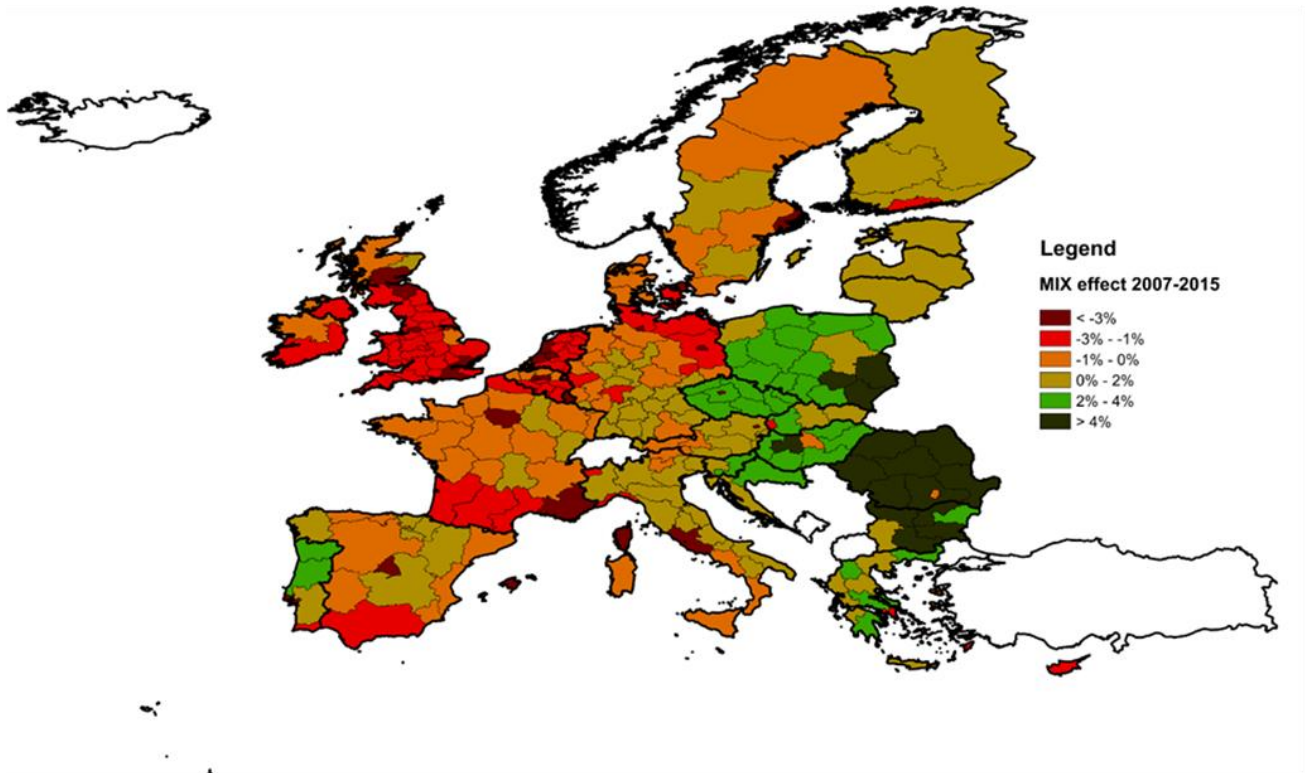
3) **Northern Member States** are characterised by:

- **on average, a negative MIX effect**, due to their high share of employment in sectors like non-market services and finance, that register a lower increase in productivity in Europe. The exception is Germany, whose high share of employment in industry – a leading sector in terms of increase in productivity in Europe – generates a positive MIX (Map 7a);
- **on average, a negative DIFF (Map 7b)**. Their sectors, in primis industry in Germany and finance in London, hit severely by disruptive events such as the crisis, Brexit or digital transformation, register a lower increase than elsewhere in Europe;
- **on average, a negative sectoral reallocation**, especially in the UK, Belgium and The Netherlands (Map 7c). As a result of the crisis, jobs are destroyed in high value-added services and new job opportunities created are inevitably in less productive sectors.

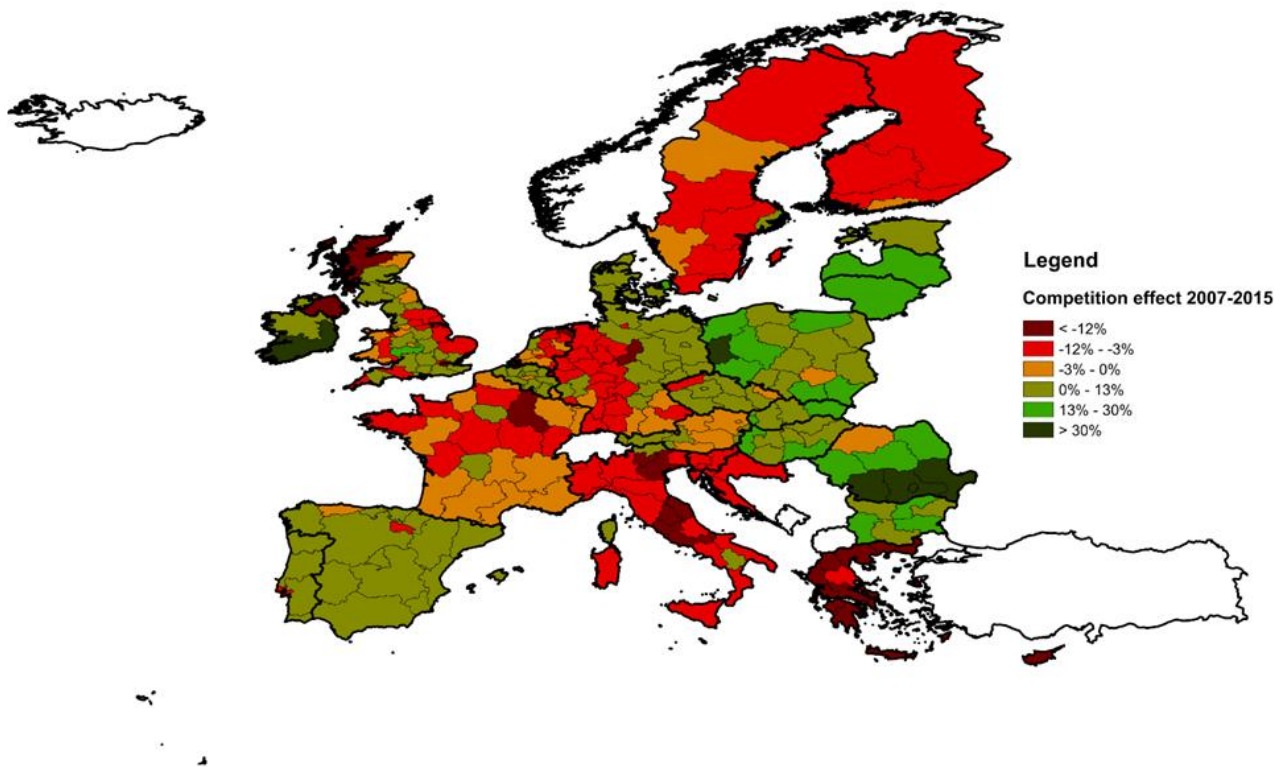
⁴⁶ See also maps in Annex 6.2.5.

Map 7: MIX, DIFF and reallocation effects

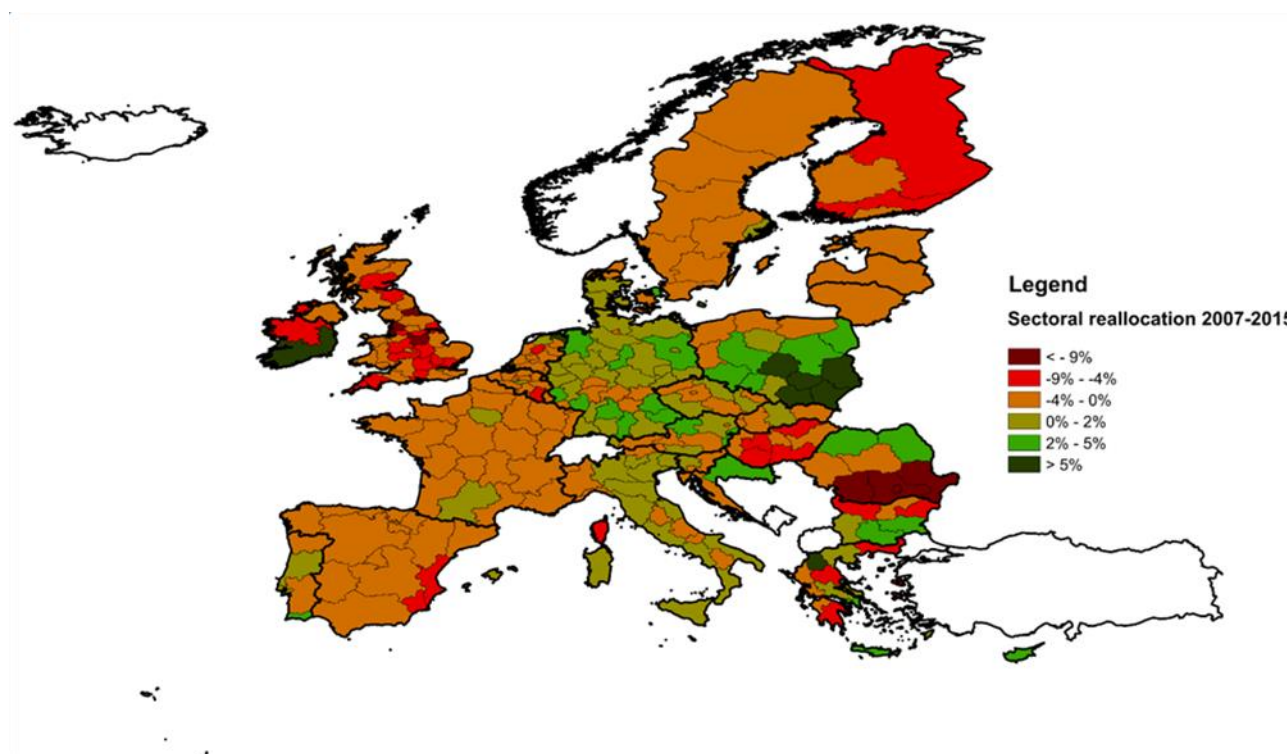
a) MIX effect



b) DIFF effect



c) Sectoral reallocation effect



Source: POLIMI (2019).⁴⁷

The **evolution of regional disparities** can therefore be attributed to the favourable MIX, DIFF and reallocation effects in the CEE Member States; all three effects exert their positive influence on the dynamics of productivity growth, counterbalancing the limited reallocation effect and negative DIFF effect registered, on average, in Southern Member States. The last ones can only (and just in a few cases) register a positive MIX effect, which, however, weighs relatively less with respect to the DIFF effect, as the reallocation effect does.

Table 7 shows the **five best performing regions** (all belonging to CEE Member States, where initial productivity levels were lower) and the **five worst performing regions** (four of which are in Greece) in terms of relative productivity growth rates, and the decomposition of productivity growth into the three effects. The important role played by the competition effect over the other two emerges, explaining both the best and the worst performing trends. Productivity growth nearly equally depends on the reallocation of the labour force and on the mix of dynamic sectors present in the region.

⁴⁷ Polimi calculations based on data available on EU website <https://urban.jrc.ec.europa.eu/t-pedia/#/>.

Table 7: Total shift in productivity, MIX, DIFF and reallocation effects in the five best performing and worst performing regions – 2007-2015

	Total shift in productivity growth	MIX effect	DIFF effect	Reallocation effect
<i>Five best performing regions</i>				
Podkarpacie (PL)	39.3%	5.34%	15.6%	18.2%
Bucharest-Ilfov (RO)	36.9%	-1.14%	52.0%	-13.9%
Dolnoślaskie (PL)	36.7%	2.5%	29.6%	4.6%
Wielkopolskie (PL)	35.6%	4.5%	25.6%	5.4%
Lubuskie (PL)	35.4%	3.3%	34.8%	-2.7%
<i>Five worst performing regions</i>				
Central Greece (EL)	-20.5%	2.6%	-23.6%	0.4%
North Aegean (EL)	-22.7%	-0.09%	-18.0%	-4.7%
South Aegean (EL)	-22.9%	-1.7%	-22.7%	1.5%
Northern Ireland (UK)	-24.3%	-1.4%	-20.0%	-2-3%
Ionian Islands (EL)	-29.0%	-0.7%	-30.8%	2.5%

Source: POLIMI (2019).⁴⁸

2.4.3 Sources of evolution in regional disparities: a resource-based approach

Growth assets endowment in different countries and regions

The previous section highlighted the effects that **different sectoral productivity levels and different industrial mix of industries have on regional disparities**. Moreover, the previous section detected the time trends in productivity growth rates that are behind the achievement of certain productivity levels.

What is missing is the **interpretation of the sources of regional growth** and their role in the explanation of regional imbalances. Therefore, there is the need to identify the factors that are associated to regional growth, and to highlight how their spatial imbalance may act on the process of catching up of lagging regions with respect to advanced ones. The spatial distribution of growth assets is in fact uneven in Europe. This leads to the idea that if the endowment of growth assets in lagging regions were higher (at the European average, as an example), the catching up process of less developed countries and regions would be faster, and therefore regional disparities would decrease.

Just by looking at the distribution of the most traditional (and vital) growth assets across Northern, Southern and Eastern European countries, it emerges quite clearly that their distribution is different in the three groups.

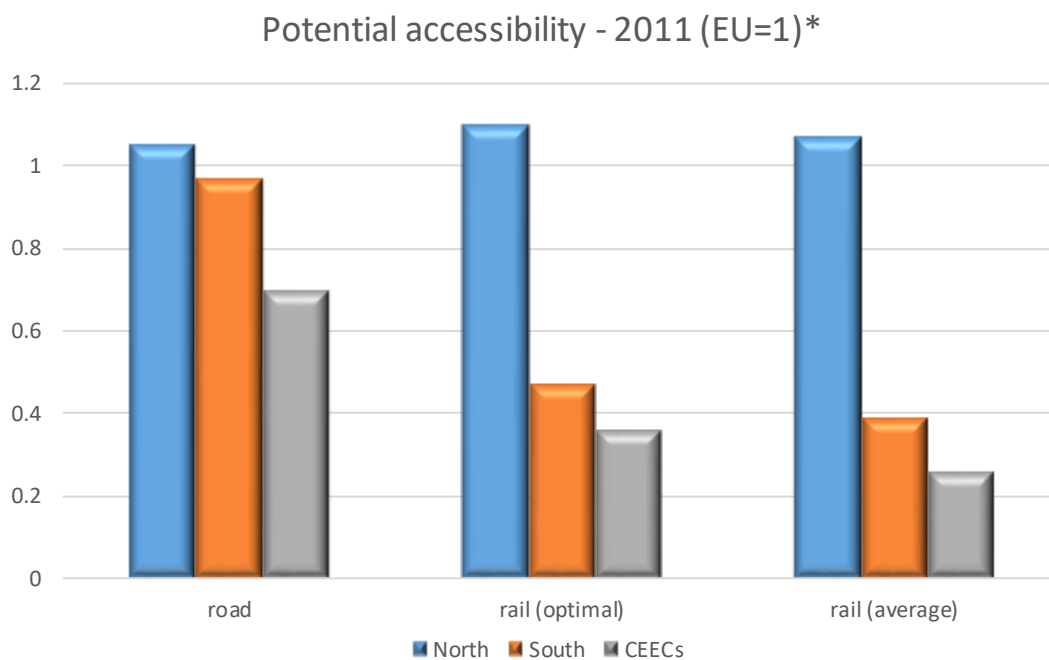
The CEE Member States register a **lower endowment of any type of growth assets** (public and private, tangible and intangible). The difference with respect to the more developed and

⁴⁸ Polimi calculations based on data available on EU website <https://urban.jrc.ec.europa.eu/t-pedia/#/>

more dynamic **Northern European countries** is always statistically significant; this holds for soft assets, such as quality of government, as well as more traditional and material assets, such as transport infrastructure. Northern European countries are endowed of all assets, and, with respect to Southern Member States, differ to the ones on which competitiveness is expected to lie: human capital, innovative capacity, quality of government, product innovation, R&D investments, transport infrastructure and rail infrastructure.

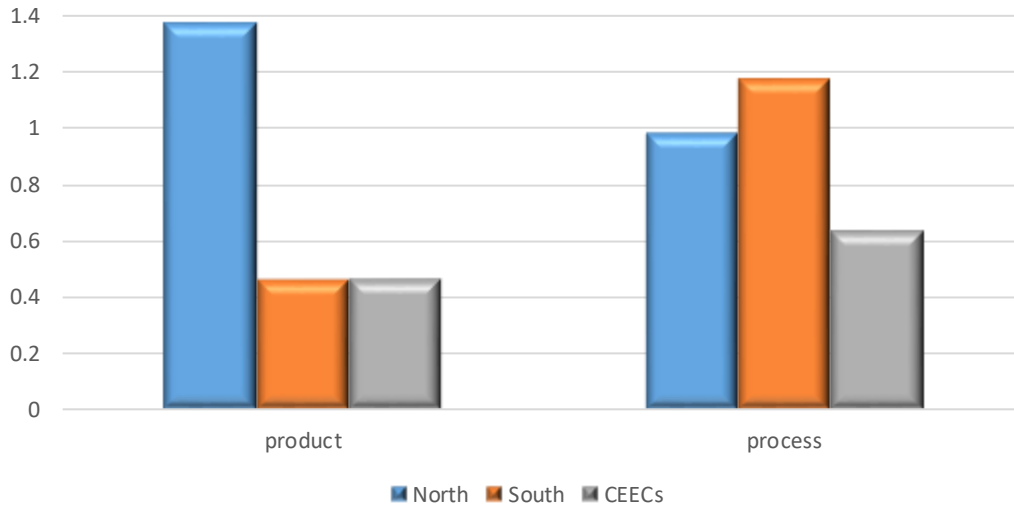
Southern Member States show a mixed situation with respect to the other two groups. For some assets, their endowment is similar to the CEE Member States. This is the case in product innovation, rail networks, R&D over GDP, while for the quality of government, it shows a higher endowment with respect to the CEE Member States, but also a statistically significant difference (lower level) compared to the Northern European countries.

Figure 18: Differences in growth assets among groups of countries



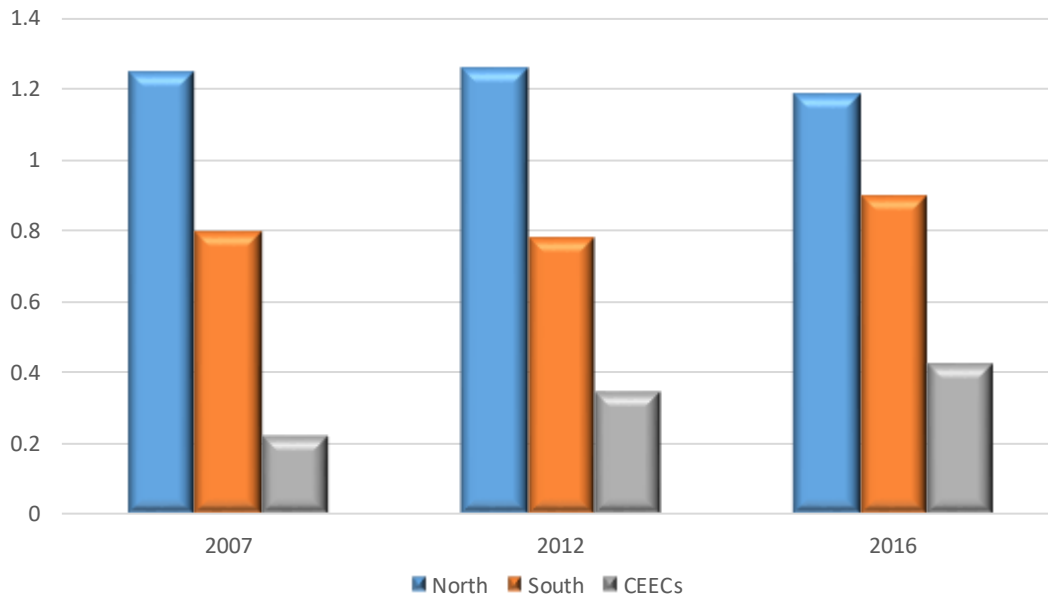
* The difference between South and CEECs in rail accessibility is not statistically significant

Product and process innovation (% of firms introducing product/process innovation, 2004-2006, EU=1)*



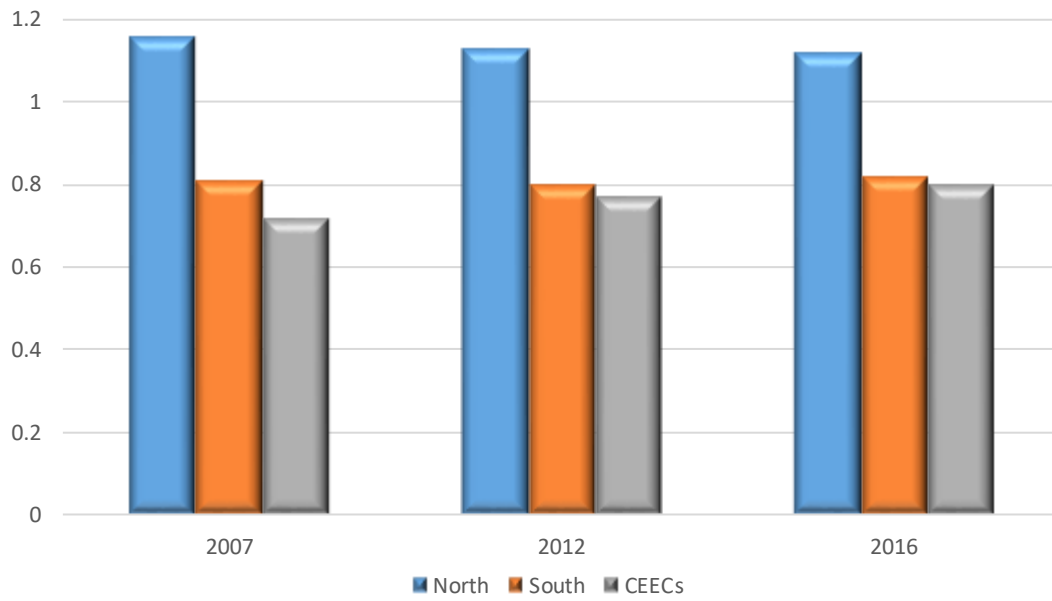
* The difference between South and CEECs is not statistically significant for product innovation, while all the groups are statistically different for process innovation

Trademarks per thousand residents (EU=1)*



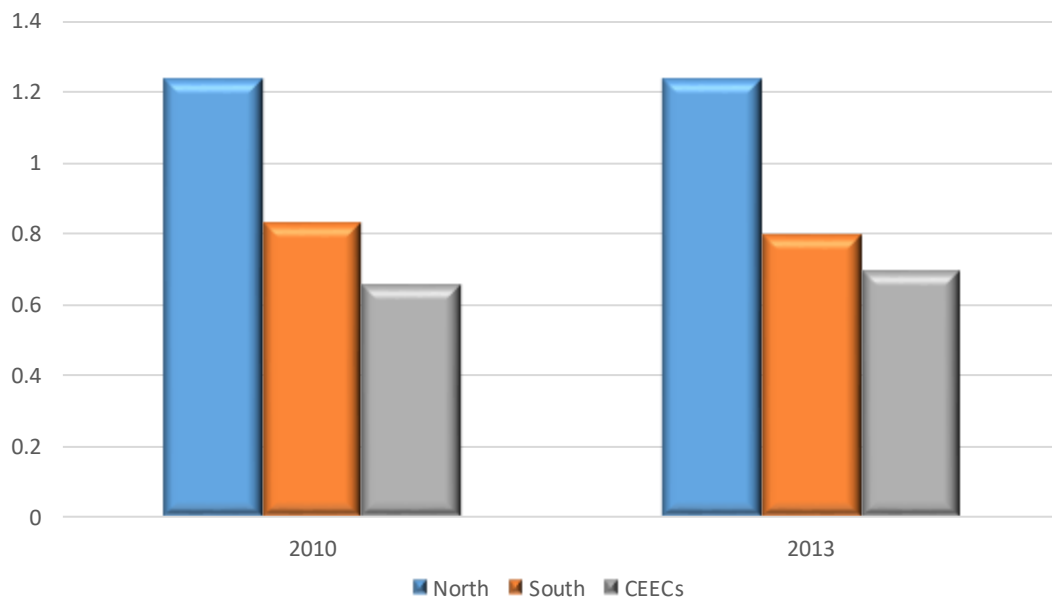
*2007: difference between North and South hardly statistically significant
 2012: difference between South and CEECs not statistically significant
 2016: North statistically different from CEECs, but not statistically significant differences between the other groups

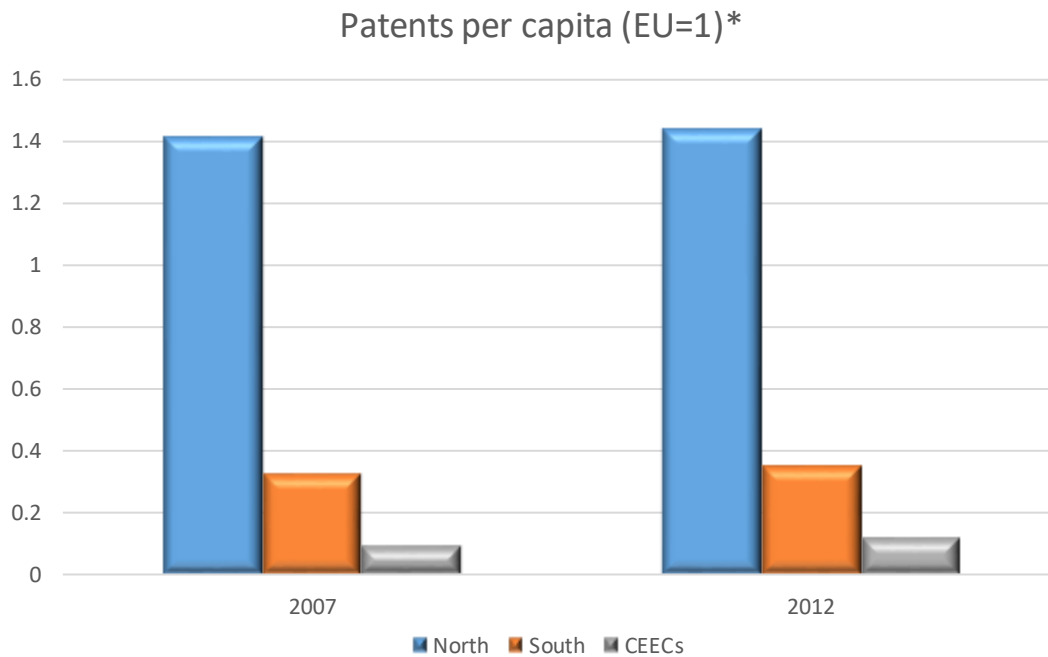
Share of workforce with tertiary education (EU=1)*



* The difference between South and CEECs is not statistically significant

Quality of government (EU=1)*





* All the groups statistically different from each other

*The difference between South and CEECs is not statistically significant

Source: POLIMI (2019).

Growth assets explaining regional performance and disparities

Based on the analysis presented so far in Chapter 2, a legitimate question arises: How much do these **differences in growth assets endowment** explain regional disparities? On which assets should policy strategies focus in order to reduce disparities? The reply to these questions depends on the role that these assets play in regional growth. Regression analyses in which regional growth is made dependent on different growth assets, with the usual controls, have been run.⁴⁹ In synthesis, the results are presented in Table 8, and the following interesting results emerge:

- the **most important assets for growth** are accessibility, human capital, quality of government, radical innovation (i.e. product innovation) and market innovation, measured as trademarks (Table 8, step 1);
- some assets, namely **quality of government and market innovation**, are subject to increasing returns; the more a region is endowed with such assets, the steeper the growth. Constant returns, instead, characterise accessibility, radical innovation and human capital (Table 8, step 2);
- **some assets favour agricultural areas**. Agricultural regions require human capital, radical innovation, quality of government and market innovation in order to grow. The last one particularly calls for the importance of the capacity to brand local products (e.g. denomination of origin/geographical indication) for the growth of agricultural regions (Table 8, step 3);
- **the lack of radical innovation is a detriment to industrial areas' growth**. Those industrial regions with a limited amount of radical innovation capacity register lower competitiveness (Table 8, step 3);
- **urban areas get an advantage from the presence of high value functions and human capital**. In line with what is the most advanced theory of urban growth, it is not

⁴⁹ For the specific results of the regression analysis see Annex 6.2.7.

the size of the city that explains growth, but especially the type of functions that are present in the city.⁵⁰ Moreover, urban areas require human capital for their growth (Table 8, step 3).

Based on these results, simulations have been run, so as to produce the effects of such observations on regional disparities.⁵¹ In particular, simulations are run which assume that investments are spent in less developed regions⁵² to make them achieve the average level of endowment of their significant growth assets, which are presented in Table 8.

Table 8: A synthetic representation of the regression results

STEP 1 - Endowment of growth assets: average effects	STEP 2 – Different endowment levels	STEP 3 – Specific productive specialisation areas
What are the assets that favour growth?	Does a growth assets' role depend on its level?	What assets could favour specific areas?
Positive effects on growth from: <ul style="list-style-type: none"> - Accessibility, - Human capital; - Quality of government; - Radical innovation - Market innovation 	Constant returns to: <ul style="list-style-type: none"> - Radical innovation - Human capital - Accessibility Increasing returns to: <ul style="list-style-type: none"> - Quality of government - Market innovation (Trademarks) 	Agricultural areas get advantage from: <ul style="list-style-type: none"> - Relatively high human capital - Market innovation - Radical innovation - Quality of government Industrial areas are penalised by: <ul style="list-style-type: none"> - Low radical innovation Urban areas are get advantage from: <ul style="list-style-type: none"> - High level functions - Human capital

Source: POLIMI (2019).

Figure 19 presents the levels of regional disparities obtained in each simulation for the different groups of regions. In all cases, regional disparities would decrease. In particular, in the case of all less developed regions, the Theil index would decrease by around 5% in case of an increase of quality government, and by around 3% in the case of an increase in human capital. A decrease of around 1.5% would be the effect if market or radical innovation would increase. Finally, only a very small decrease in disparities would be the result of an increase in accessibility (Figure 19a). These results show the importance of quality of government and human capital, which appear to be inadequate in the CEE Member States and Southern Member States. The strong differences in market and radical innovation, instead, do not affect disparities so much, since the model of innovation of lagging regions is not so much based on R&D and product innovation (patents), but more on softer aspects like process and organisational innovation.

Among the **three types of less developed regions**, agricultural ones are those that help in decreasing regional disparities the most when they are endowed with their significant growth assets. A higher endowment of intangible assets like quality of government and innovation (both radical and market innovation) in these areas produce a decrease of disparities of around 7% (Figure 19b). The increase in human capital in agricultural areas decreases disparities less

⁵⁰ Camagni, R., Diappi, L. and Leonardi, G. (1986), Urban Growth and Decline in a Hierarchical System: A Supply-oriented Dynamic Approach, *Regional Science and Urban Economics*, vol. 16(1), pp. 145-160. ; Capello, R., Camagni, R. (2000), Beyond Optimal City Size: An Evaluation of Alternative Urban Growth Patterns, *Urban Studies*, vol. 37(9), pp. 1479-1496. ; Richardson, H. W. (1969), *Regional Economics*, World University, Redwood Press, Trowbridge.

⁵¹ For the methodology of the simulations see annex 6.2.8.

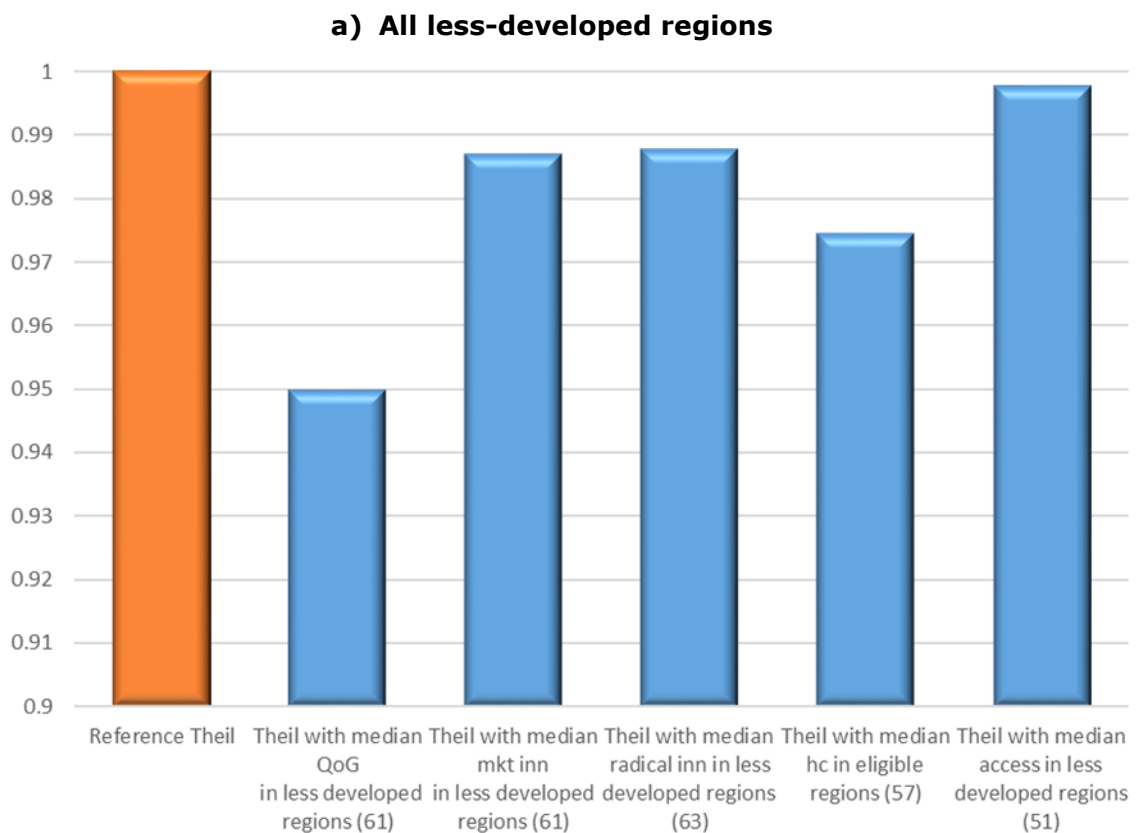
⁵² Regions eligible for funding from the European Regional Development Fund and the European Social Fund for the period 2014-2020 (less developed regions). Commission Implementing Decision of 18 February 2014 setting out the list of regions eligible for funding from the European Regional Development Fund and the European Social Fund and of Member States eligible for funding from the CF for the period 2014-2020 (notified under document C(2014) 974) (2014/99/EU) <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32014D0099> , accessed 17 May 2019.

(around 2%), a result that does not surprise given the fact that growth in this sector is more dependent on technical improvements than on quality of human capital.

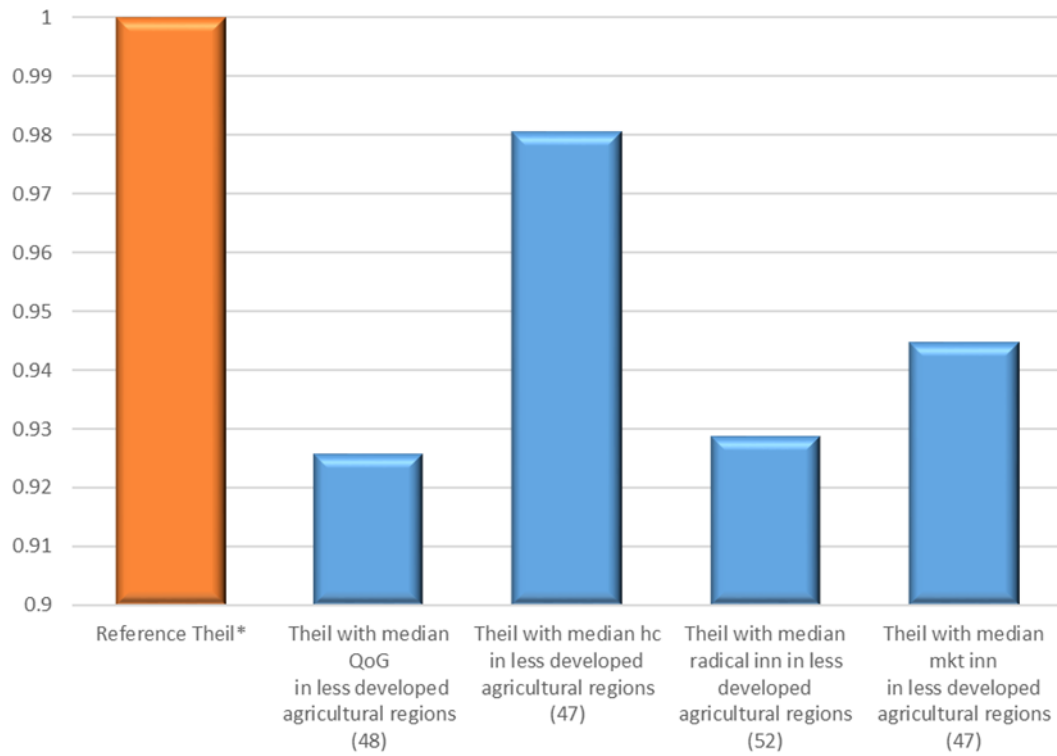
Industrial regions can help decrease regional disparities (of approximately 1%) if their capacity to innovate increases at the European level (Figure 19c). Lastly, we can claim that regional disparities decrease by around 1% if high level functions increase their presence in metro regions; the decrease in disparities would be higher (more than 2%) if human capital is developed in the less developed metro regions to the level of metro regions in Europe (Figure 19d).

The **main message** that stems from these results is that the **reduction of regional disparities is a difficult, costly and complex process and takes time**. The results also suggest that more than on hard assets (like accessibility), policies must intervene on soft elements, including on ethics, organisation, education and innovation.

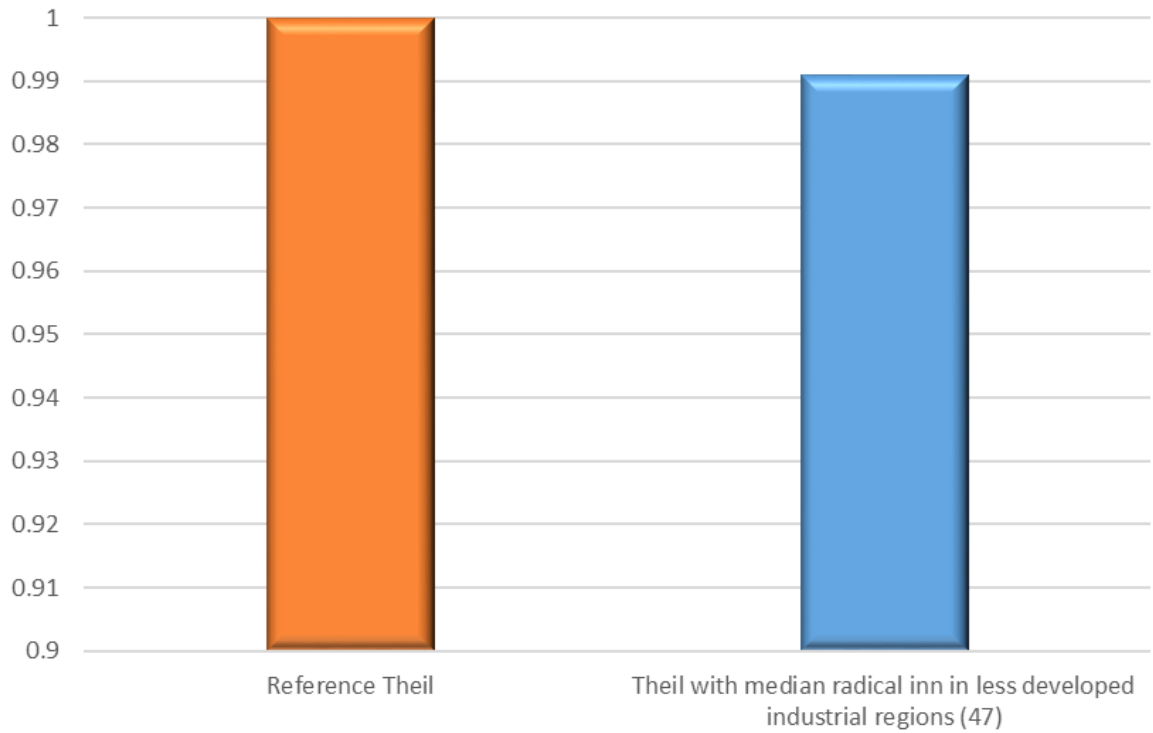
Figure 19: Regional disparity levels under the assumptions of similar regional endowment of growth assets



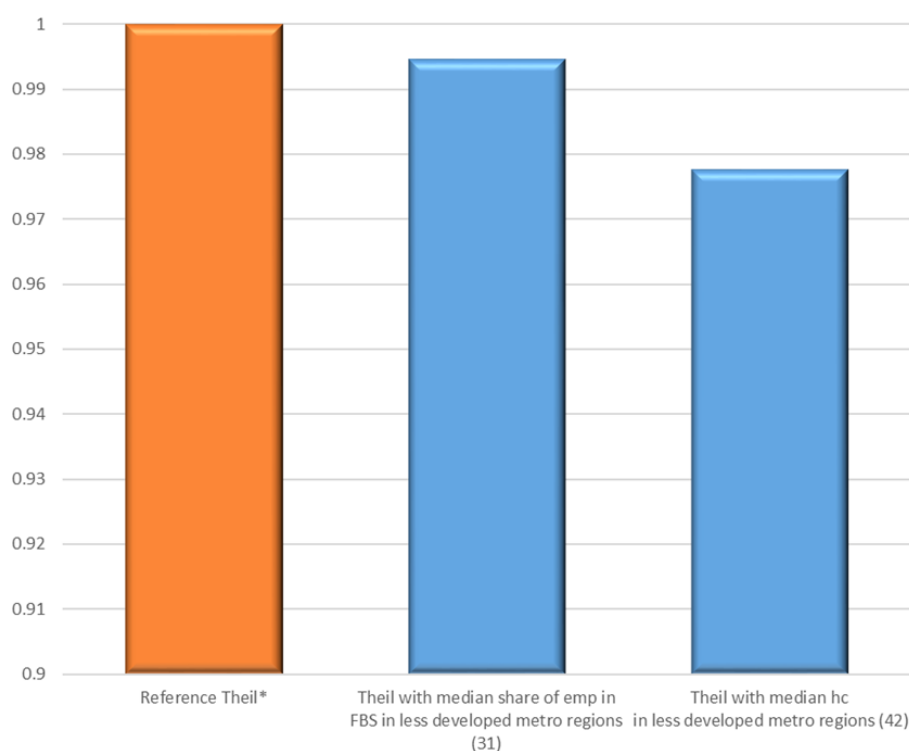
b) Less-developed agricultural regions



c) Less-developed industrial regions



d) Less-developed metro regions



Source: POLIMI (2019).

2.4.4 Sources of regional disparity levels: the role of agglomeration economies

Urban areas have always been interpreted as sources of efficiency gains for economic activities. A vast literature on this issue theoretically explains such a statement and a large body of empirically sound analyses confirms the existence of positive increasing returns linked to the size of cities.⁵³ This “efficiency premium” may explain why, in a situation of scarce endowment of financial resources, cities might be seen as areas in which it is worth investing, compared to less densely populated areas.⁵⁴

If the existence of efficiency gains in urban areas has been largely explored, a different, and extremely interesting, question to investigate is the **relevance of urban efficiency gains** in regional disparities.

In order to reply to such a question, an empirical two-step procedure has been run.⁵⁵ The first step is the estimation of a traditional regional production function, where the GDP of regions (NUTS 2) in Europe is explained by labour (distinguishing between quantity and quality of labour force), capital (distinguishing between financial and infrastructural capital) and presence of metropolitan areas, which captures the “efficiency premium” of cities on the entire regional fabric, or, in other words, the effect of the presence of metropolitan areas on regional production capacity.

⁵³ See, among others, Chinitz (1961), Alonso (1971), Shefer (1973), Sveikauskas (1975), Segal (1976), Carlino (1979). For a review on agglomeration economies, see Rosenthal and Strange (2004).

⁵⁴ Farole T., S. Goga, and M. Ionescu-Heroiu (2018) Rethinking Lagging Regions - Using Cohesion Policy to deliver on the potential of Europe's regions, World Bank Report on the European Union, World Bank Group.

⁵⁵ See Annex 6.2.9 for the technical specifications.

A methodological note is important at this stage. Urban economists call “agglomeration economies” the effect of city size on urban GDP. In our approach, instead, the effect of city size is measured on regional GDP. In this case, the positive results obtained depict that the city size effect is so strong that it affects the efficiency of regions where cities lie and not merely that of cities themselves. Our methodology, therefore, captures the effects of urban efficiency gains on the entire regional fabric; in this way one can capture the effects of the presence of cities on regional disparities.

The estimation of the regional production function confirms the existence of:

- **positive urban efficiency gains**, i.e. a positive effect of the presence of metropolitan areas on regional production capability. Technically speaking, the higher the level of population living in metropolitan areas in the region, the higher the GDP;
- **increasing urban efficiency gains**, i.e. a positive effect of the presence of very large city regions on regional production capability.⁵⁶ A non-linear and positive relationship indeed links urban size to regional GDP.

Agglomeration economies, interpreted as either positive effects due to the size (existence of metropolitan regions), or increasing returns due to the size (existence of very large city regions), are present and explain part of the efficiency in regional production.

The second step simulates how regional disparities would look like in a world in which regions would not gain urban productivity advantages.⁵⁷ As Figure 20 shows:

- in a **world with no agglomeration economies** (i.e. with no urban efficiency gains), regional disparities would be 7% lower than what they are in the real world;
- in a **world with no big city regions** (i.e. with no increasing urban efficiency gains), regional disparities would be 8.5% lower.

However, a question arises. How relevant is the 7% (or 8.5%) decrease in regional disparities? A reply in this sense is provided by simulations that can capture the relevance of the other production factors on regional disparities. The results, presented in Figure 20, are in this sense interesting, in that:

- among the traditional input factors, **human capital has the highest relevance**. A world with no spatial differences in human capital would register much lower regional disparity levels (30%), obtained at the expense of production capacity. This result is in line with the recent World Bank report, claiming that human capital represents the most relevant factor of economic potential for lagging regions;⁵⁸
- accessibility has a similar effect on disparities. In a world with no spatial differences in **infrastructure accessibility**, regional disparities would be 25% lower. As in the case of human capital, decrease in regional disparities would have been obtained for lower levels of production;
- in a world with similar **quality of government and product innovation** throughout European regions, disparities would be, respectively, 13% and 6% lower.

By looking at these results, an important message is obtained. In both their general and restricted interpretation (positive or increasing urban efficiency gains), **agglomeration economies have a lower relevance with respect to the other input factors**, suggesting that policies aiming at redistributing assets like human capital and accessibility and at re-

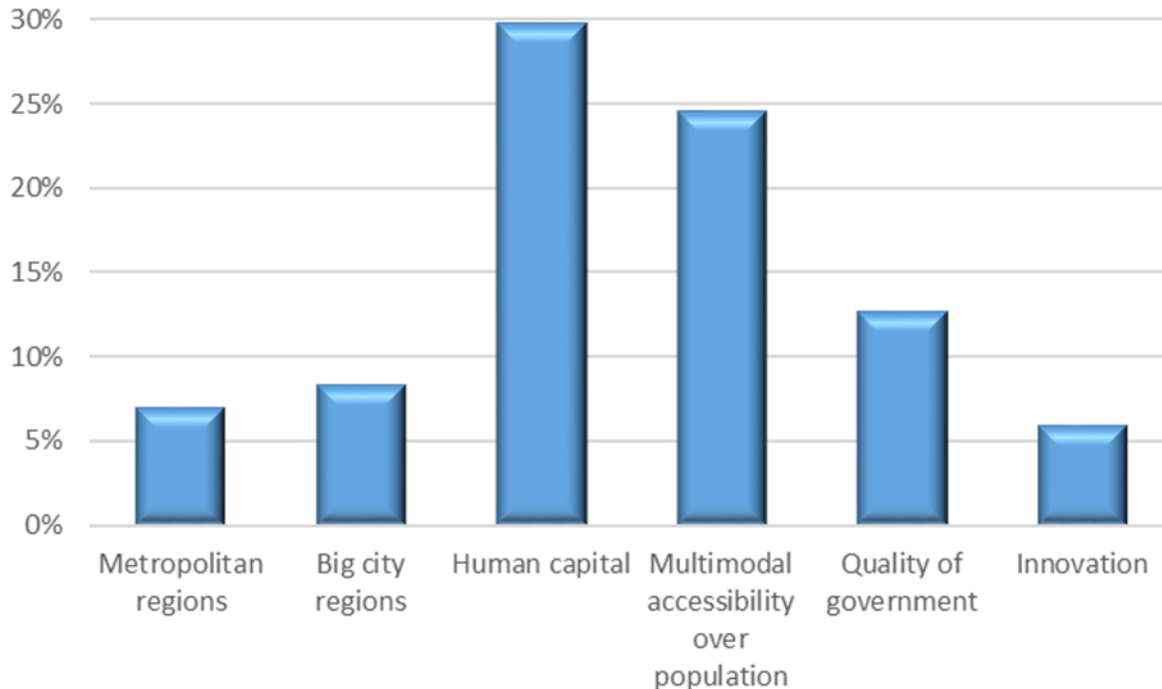
⁵⁶ The results obtained show that the larger the cities, the higher the efficiency gains of the region.

⁵⁷ In technical terms, this means that we simulate a situation of cities of equal size everywhere, i.e. of cities unable to generate agglomeration economies. See Annex 6.2.9 for the methodology.

⁵⁸ Farole T., S. Goga, and M. Ionescu-Heroiu (2018) Rethinking Lagging Regions - Using Cohesion Policy to deliver on the potential of Europe's regions, World Bank Report on the European Union, World Bank Group.

equilibrating the quality of government have a much higher impact on disparities than the presence of cities.

Figure 20: Relevance of agglomeration economies on regional disparities: comparison with other production factors (% reduction of Theil index - 2016)



Source: POLIMI (2019).

i

Infobox 3: Agglomeration economies as a source of regional disparities - methodology

The methodology is based on two steps, explained in detail in Annex 6.2.9. The **first step** is the estimation of a traditional regional production function where the GDP of regions (NUTS 2) in the EU is explained by labour (distinguishing between quantity and quality of labour force), capital (distinguishing between financial and infrastructural capital) and presence of metropolitan areas (metropolitan population). The econometric specification is then augmented to include the squared metropolitan population, so as to capture the existence of increasing returns to scale. The **second step** simulates how regional disparities would look like in a world with no agglomeration economies or with no big city regions. In particular, the simulation follows some steps:

- a situation of a homogenous distribution of population over space was simulated by setting the parameter of the metropolitan population and its square to zero (no urban efficiency gains), and subsequently by setting to zero only the square of metropolitan population (no increasing urban efficiency gains);
- GDP PPS in 2016 was estimated on the basis of the regression coefficients obtained through the simulation;

- the estimated GDP PPS was rescaled so that it had the same range and the same European total value as the real one. This step allows to simulate the pure distributive effect of the simulation, keeping the aggregate effects constant;
- the rescaled estimated GDP PPS for 2016 was applied to calculate a simulated Theil index which was finally compared to the real one, obtaining the relevance of agglomeration economies in determining inter-regional disparities.

The same procedure was also applied to the other production factors, in order to be able to capture the relative importance of agglomeration economies in determining inter-regional disparities.

2.5 National (sub-national) public investment and regional disparities

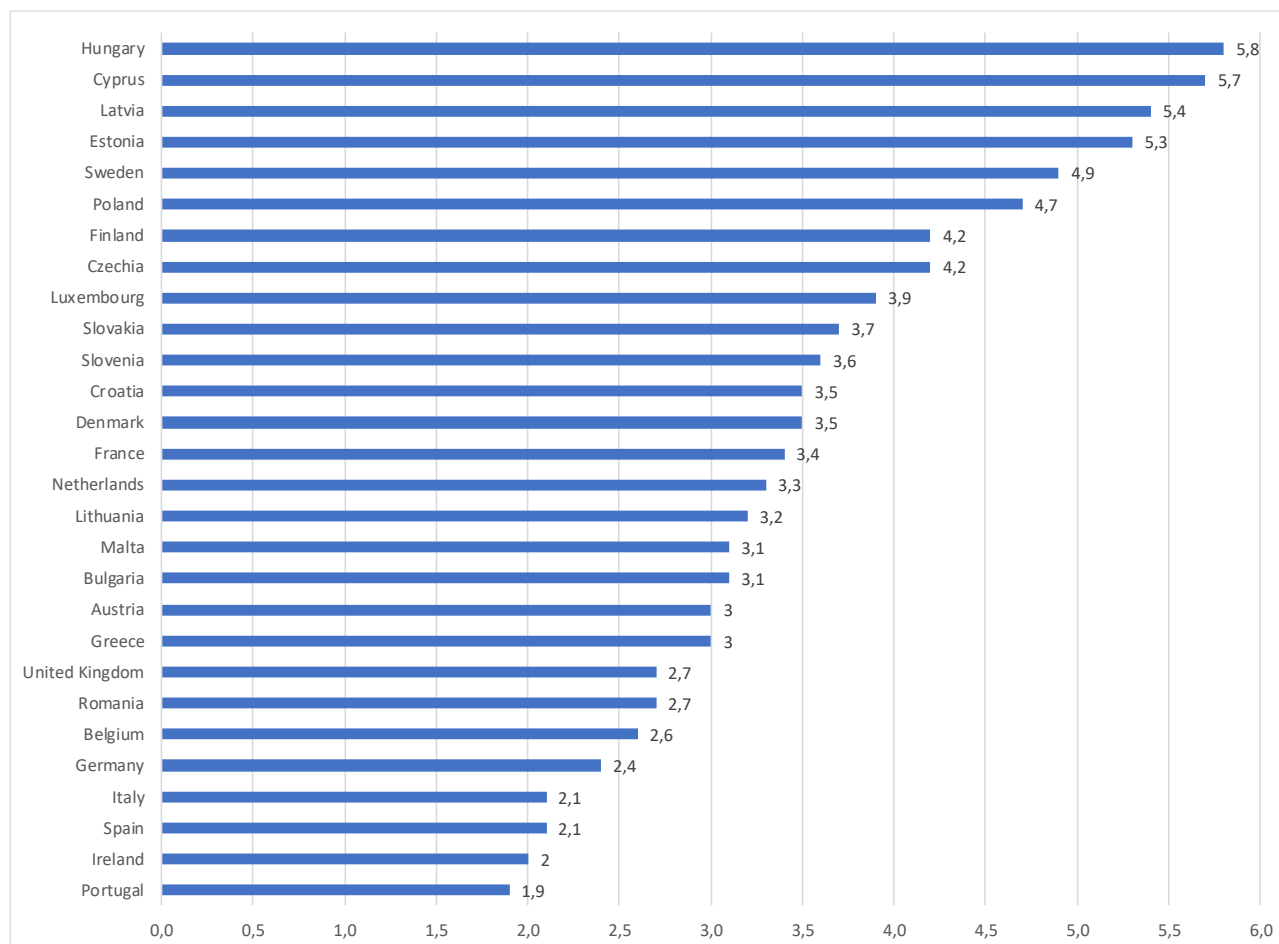
2.5.1 State of public investments in the EU

The global economic and financial crisis of 2008-2009 have had great effects upon the state of public finances in Europe and posed a major challenge to the institutional structure of the EU countries. This sub-chapter looks at the levels of **public investments**⁵⁹ on the national and sub-national level and provides some insights from the literature on the trends in public investments after the crisis, the governance of investments and the role of regional authorities.

In general, **public investments in many EU countries as a share of GDP is still below the pre-crisis level** (Figure 21). Low public investment in less-developed EU members and scarcity of sub-national investment in lagging regions can undermine convergence. With the revival of the European economies, Member States' public debt has declined, but is still well above its pre-crisis level in 2007. As a result of pressure on public finances, public investment in the EU has fallen from 3.4% of GDP in 2008 to 2.9% in 2018. In some Member States, there have been substantial cuts in growth-enhancing spending. Since GDP per capita in most Member States is below the EU average, these cuts may mean that inequalities in the EU cannot be reduced in the future.

⁵⁹ Public Investments are usually defined as 'gross fixed capital formation (GFCF) expressed as a percentage of GDP for the government sector'. Public investment refers to capital expenditure on physical infrastructure (roads, government buildings, etc.) and soft infrastructure (human capital development, innovation support, research and development, etc.) with a productive use that extends beyond a year.

Figure 21: Total public investment in the EU-28 in 2018 (in % of GDP)



Source: Prognos AG (2019), based on Eurostat.

At the national level, **post-crisis fiscal adjustments** have led to a major encroachment on the competence rights and autonomy of local governments and administrations. The new financial framework conditions have prompted many countries to rethink financial relations between levels of government in terms of taxes and spending powers. There has been a **significant re-centralisation** of decision-making on public resources and financial allocations.⁶⁰ Recent developments in Italy make up a good case in point. Since the early 1990s, Italy has experienced an unprecedented process of institutional and fiscal decentralisation, which came to a halt during the 2008-2009 crisis. Until now, Italy has experienced very low (in a few years even negative) growth rates and a deterioration of all relevant budgetary indicators. This has had a profound impact on fiscal relations between levels of government, and the Italian system of fiscal federalism went toward a re-centralisation of politics. Local governments experienced a stronger financial adjustment with the associated costs. On the one hand, they had greater fiscal autonomy to raise funds to finance the central government deficit, and on the other hand, the new budget rules left little room for investment (public investment) by local governments.⁶¹

Many sub-national governments suffered due to **falling revenues** between the years 2008 and 2009, originating, inter alia, of reduced transfers from central governments or stagnating revenues. There was an apparent focus on prosperous regions: in Italy, for instance, public investment was somewhat higher in the regions of the Centre and North, and especially high in

⁶⁰ Ahmad, E., Bordignon, M., Brosio, G. (2016), Multi-level Finance and the Euro Crisis: Causes and Effects. Studies in Fiscal Federalism and State-Local Finance series. Edward Elgar Publishing: Cheltenham.

⁶¹ Cerniglia, F., Longaretti, R., Michelangeli, A. (2017), Decentralization of public expenditure and growth in Italy: Does the composition matter? CRANEC Working Paper 04/17.

the regions of Aosta, Bolzano and Trento, unfavourable of the lagging Mezzogiorno regions in the South. In Spain, public investment was channelled to the Convergence regions, though Andalusia received below national average investment.⁶² In 2018, government investment (i.e. gross fixed capital formation (GFCF)) across the EU is 2.9% of GDP, which remains below, yet is on a path towards the pre-crisis level of 3.4%. Member States most impacted by this trend were some of the most affected by the economic recession, i.e. Ireland, Portugal and Spain, where GFCF remained below 2% until 2016. By 2018, these figures had only marginally increased in Ireland (2.0%) and Spain (2.1%), while in Portugal it still remained below 2% (1.9%). Other growth inducing expenditures have also declined during that period, such as total expenditures on transport, communication, energy or education. This is specifically the case for Member States with GDPs below the EU average, raising concerns over the likelihood of their convergence to the rest of the EU.

2.5.2 Role of national (sub-national) public investments in reducing regional disparities

Growth assets endowment makes a difference in regional disparities, as well as in their efficient use. Investments, both private and public, are thus fundamental in this respect. The question which is thereupon raised is: **to what extent do investments play a role for growth?** Is this role different between private and public investments? Is regional policy able to stimulate investments?

The empirical evidence shows that investments in the previous years (period 2003-2006 in the current estimations) do play a role in explaining regional growth in the following years (period 2007-2016 in the estimations), confirming the expectation that investments exert long lasting effects which need some time. The results synthetically represented in Table 8 state that investments do play an important role in shaping growth trajectories of regions.

When split between **private and public investments**, the results are similar: both public and private investments have a positive effect on growth, however with a caveat. In fact, while the stimulus of private investments holds in whatever conditions, results on public investments are not so stable. Their importance vanishes in the presence of private investments, indicating that the effect of public investments on growth is strongly related to the concurrent presence of private investments.

Table 9: The role of investments on growth and disparities

STEP 1 – Investments and Growth	STEP 2 – Intensity of investments	STEP 3 – Investments and regional disparities
What is the role of investments on growth?	Does the intensity of investments make a difference?	Do investments have a different return in less developed regions?
<p>Positive effects on growth of investments in general.</p> <p>Positive effects on growth of</p> <ul style="list-style-type: none"> - private investments <p>No direct effects of European funds on growth.</p>	<p>Increasing returns on:</p> <ul style="list-style-type: none"> - total investments; - private investments. <p>Critical mass required for public investments in order to be effective.</p>	<p>Higher returns on less developed regions of:</p> <ul style="list-style-type: none"> - total investments; - private investments. <p>No difference in public investments.</p>

Source: POLIMI (2019) based on regression analysis on different data sources including Eurostat data and Cambridge data (see Annex 6.2.10).

⁶² European Commission, Directorate-General for Regional and Urban Policy (2010), Investing in Europe’s Future. Fifth report on economic, social and territorial cohesion. EU COM Publication: Brussels.

Adding **financing from the ESI Funds** to the growth model, the results on investments still hold: the effects of national and local investments are independent from European funds. What might be unexpected is that European funds do not seem to have a statistically significant direct impact on growth in the analysed period. However, as shown below, European funds do play a role in an indirect way, by stimulating national investments and, through them, growth.

A second issue is whether the intensity of investments has a role on growth. As expected for total and private investments, **strong cumulative and self-reinforcing effects** exist between investments and economic growth; the higher the level of investments, the higher the effects on growth. This is less the case for investments of the public sector, which reflect almost constant returns to scale.

Finally, the importance of investment for the decrease of regional disparities is observed by the fact that **less developed regions register a higher return of investments on growth than the European average**. In other words, less developed regions increase growth more than the other regions, per euro invested. When a distinction is made between private and public investments, the higher return of investments on growth is found only for private ones, suggesting that public investments take place also in places where there is little or no return.

2.6 Role of European Cohesion Policy Funds (ESI Funds) in stimulating national and local investments

The following step in the analysis aims to **verify whether regional policy can be effective in stimulating investments** and, through the **growth enhancing** effect of these, in stimulating regional growth. Data for regional policy investments from national sources are not available in a systemic way⁶³, nor is it possible to approximate them with the investment of the regional public sector. Available data are cohesion policy data and level of national and regional investments for all countries and regions. This study, therefore, uses these ones. The analysis of the impact of the ESI Funds shows that European Cohesion policies do stimulate national and local investments. This issue was approached by running a regression analysis explaining the role that European funds (period 1999-2002 in the estimations, also lagged) have played on total investments (2003-2006), and on public and private ones.

Table 9 synthesises the reasoning and delivers an important message, which complements and counterbalances the unexpected result of the previous section: **although a direct impact of European funds on growth is not statistically evident, an indirect effect exists**.⁶⁴ European funds, indeed, stimulate investments, and this holds true for both private and public ones. This indirect effect goes both via the private and the public sector.

This evidence is very important because there is a large and long-standing debate in the literature on the ability of cohesion policy to induce growth in the different regions.⁶⁵ While the aggregate effect remains under scrutiny, evidence is increasingly showing that the impact of cohesion policy depends on many different conditions, which makes it difficult to disentangle an

⁶³ These data have been computed for some specific countries and periods of time, see Coppola, G., Destefanis, S., Marinuzzi, G., & Tortorella, W. (2018), European Union and nationally based Cohesion Policies in the Italian regions. *Regional Studies*. doi:10.1080/00343404.2018.1447099 and Psycharis, Y., Tselios, V., & Pantazis, P. (2018), The contribution of CFs and nationally funded public investment to regional growth: Evidence from Greece. *Regional Studies*. doi:10.1080/00343404.2018.1525696.

⁶⁴ Cohesion Policies are very likely to have played a role in regional growth, although measuring their net effects is particularly difficult due to the lack of counterfactual. Overall, it seems reasonable to think that the situation would have been worse in case of their absence. Moreover, the recent literature on the impact of cohesion policies funds concentrates on the so-called conditioning factors, by which the impact is mediated by local territorial conditions and, therefore, finding an aggregate and unique effect is hard.

⁶⁵ Although most of the papers now find a positive impact, there still are articles in which the impact is not evident (e.g. Aiello, F., Pupo, V. (2012), Structural funds and the economic divide in Italy, *Journal of Policy Modelling*, 34 403-418).

aggregate effect.⁶⁶ Moreover, knowing the aggregate effect is not very helpful because it does not help design better policies.⁶⁷

The **intervention logic of the policy** are currently also a central topic because of their importance in policy improvement.⁶⁸ The analysis presented here seems to suggest that there is an important channel by which cohesion policy funds can induce growth, namely through the stimulation of public and, especially, private investments. Hence, no displacement takes place, but cohesion policy and its transfers (which are not directly measured in the investment statistics) seem to be additive to local investments.

The **joint role of nation-funded and EU-funded regional policies** is very important, because the effectiveness of cohesion policy heavily depends on its implementation, and an effective implementation needs the constructive involvement of the countries to which regions belong. Moreover, different countries may have different preferences in terms of regional policy objectives which can also be a factor behind the varying effectiveness of cohesion policy, especially for weak regions lacking good institutions.

Moreover, the different countries of the EU can invest their own funds to either complement and reinforce the EU objectives or to pursue their own ones, different and possibly even conflicting. Since a statistical systemic analysis of regional policies implemented by the countries outside the EU framework is not possible due to data limitations, an in-depth analysis of a large sample of Member Countries is necessary. This will be presented in the next section.

Table 10: The role of European funds on investments and disparities

STEP 1 – Investments and policies	STEP 2 – Investments, policies, and regional disparities
<p>European policies stimulate:</p> <ul style="list-style-type: none"> - total investments - Public investments - private investments 	<p>Do policies stimulate investments in less developed regions?</p> <p>Similar efficiency of European policies in less developed regions with respect to all other regions</p>

Source: POLIMI (2019) based on regression analysis on different data sources including Eurostat data and Cambridge data (see Annex 6.2.1010).

⁶⁶ Becker, S. O., Egger, P. H., & Ehrlich, M. Von. (2013), Absorptive capacity and the growth and investment effects of regional transfers: A regression discontinuity design with heterogeneous treatment effects. *American Economic Journal: Economic Policy*, 5(4), 29–77; Rodríguez-Pose, A., & Garcilazo, E. (2015), Quality of Government and the Returns of Investment: Examining the Impact of Cohesion Expenditure in European Regions. *Regional Studies*, 49(8), 1274–1290; Percoco, M. (2017). Impact of European Cohesion Policy on regional growth: does local economic structure matter? *Regional Studies*, 51(6), 833–843; Crescenzi, R., Fratesi, U., Monastiriotis, M. (2019), Back to the member states? Cohesion Policy and the national challenges to the European Union, *Regional Studies*, DOI 10.1080/00343404.2019.1662895; Fratesi, U. Perucca, G. (2019), "EU Regional Development Policy and Territorial Capital: A Systemic Approach", *Papers in Regional Science*, 98(1), 265-281.

⁶⁷ Fratesi, U. (2016), "Impact Assessment of European Cohesion Policy: Theoretical and Empirical Issues" in: Piattoni, S. and Polverari, L. (Eds.) *Handbook on Cohesion Policy in the EU*, Edward Elgar, Cheltenham, pp. 443-460.

⁶⁸ Berkowitz, P., Monfort, P., & Pieńkowski, J. (2019), Unpacking the growth impacts of European Union Cohesion Policy: Transmission channels from Cohesion Policy into economic growth. *Regional Studies*. doi:10.1080/00343404.2019.1570491.

3 NATIONAL POLICIES AND COHESION – APPROACHES OF SELECTED EU MEMBER STATES FOR ADDRESSING WITHIN-COUNTRY ECONOMIC DISPARITIES

While Chapter 2 focuses on the evolution of between- and within-country disparities and its key determinants, **Chapter 3 concentrates on the respective nationally-funded policies that Member States have in place to reduce disparities**, thereby shedding light on research questions 6-12 (see Chapter 1). The policy perspective is particularly important in the context of the findings of Section 2.5, where the importance of investment on regional growth is stressed. A policy perspective initially requires a stock-taking of what Member States have nationally (or regionally) funded policies in place that aim at reducing disparities. Further, the duration, the level of governance of the design and implementation and the financial magnitude need to be taken into account and policies need to be classified according to the thematic areas they cover. These are essential characteristics in order to see the extent to which the objectives behind the national policies align with those of the EU and will subsequently allow to distinguish patterns in policy approaches between the Member States.

The analysis of Chapter 3 mainly consists of the findings from **11 Member States**, namely Bulgaria, Croatia, the Czech Republic, Hungary, Italy, Poland, Portugal, Romania, Slovakia, Slovenia and Spain. For each country, the architecture, the design and governance as well as the relationship with the ESI Funds were assessed (for the complete 'country briefings', see the Annex). Additionally, eight case studies on specific policy measures were performed for Bulgaria, the Czech Republic, Hungary, Italy, Poland, Romania, Slovenia, Spain.

The key findings from Chapter 3 are the following:

Overview of key findings from the policy analysis

1. **All 11 EU Member States analysed have several national policies for economic cohesion** (60 measures identified, some covering more than one policy area), focusing on a broad spectrum of policy categories from infrastructure to innovation. Among the identified key policy categories, those aiming at the categories 'Innovation and Sector Development' (38) and at 'Business Environment and Trade' (33) are the most frequently used. Policies from the categories 'Urbanisation and Connectivity' (17) as well as 'Skills and Mobility' (18) appear less often.
2. **Economic cohesion and the reduction of economic disparities between the respective country and the EU is often understood more broadly** by the Member States than is described in the EU treaties. Thus, territorial cohesion is often an inseparable part of the broader efforts of the country to reduce the economic disparities within the EU.
3. **The governance of policies favours centralisation and the design as well as the implementation of policies at the national level is clearly favoured.** Almost 90% of all policies were designed at the national level, while only 3% are designed purely at the regional level. This is understandable as national policy makers try to address cohesion. However, also for the implementation of policies a similar, although less pronounced picture is observed: 70% of all 60 measures are implemented on the national level, whereas 16% are implemented at the regional level.
4. **The majority of national policies for cohesion have an explicit spatial dimension**, either by favouring regions based on specific economic criteria (e.g. high unemployment) or by selecting dedicated regions directly. Less than 25% of policies do not pre-define the type of regions eligible for support and are open to all kind of regions

in the 11 EU Member States. Capital cities, when specifically addressed by national policies, primarily were excluded from eligibility.

5. **The budget of the nationally funded measures, focused on cohesion policies, is generally much smaller than the ESI Funds in all the countries observed but for Italy**, where the national funding is around 93% of the equivalent ESI Funds. Other significant national contributions are in place in Romania and to a lesser extent in Spain. The national funding of policies in countries such as Slovenia, Hungary, the Czech Republic and Croatia is minimal, here the ESI Funds remain the main source of financing of policies explicitly addressing economic and territorial cohesion challenges. Nationally funded measures support activities that cannot be financed by the ESI Funds, increase the flow of funding in areas where national or EU sources alone are not enough or support regions in transition and territories facing development challenges across all types of regions.
6. **In several Member States, the absorption of national funding is an issue**, indicating that the degree of funding – in addition to funding from the ESI Funds and other EU instruments – needs to be monitored carefully.
7. **The dividing line between EU and national policies supporting cohesion is frequently quite blurred**. This is to be expected given that the ESI Funds work within the ‘grain of national policies and priorities’, with complementary objectives and targets (e.g. developing low carbon economies and renewable energy sources, fostering innovation in the business community, enhancing skills etc.). Wholly distinctive national policies, therefore, tend to be found in policy areas not covered by the ESI Funds. Synergies with the objectives of the ESI Funds are not always clear in national policy measures but there are several positive examples on complementarities.
8. **There are mixed experiences regarding Member State attitudes to regional disparities**. Some actively support the more prosperous regions, including capital cities, with the view that doing so also benefits less developed regions. Some are more actively engaged in supporting less developed regions and reducing within-country disparities, including some exclusion of funding to capital cities and more prosperous regions (e.g. through funding eligibility criteria). Countries which had seen economic improvements following the 2007-2013 programming period, increasing their GDP PPS and decreasing their internal disparities, have been less concerned with space-specific interventions in the following years (the current programming period).

The subsequent **subchapters** are structured as follows:

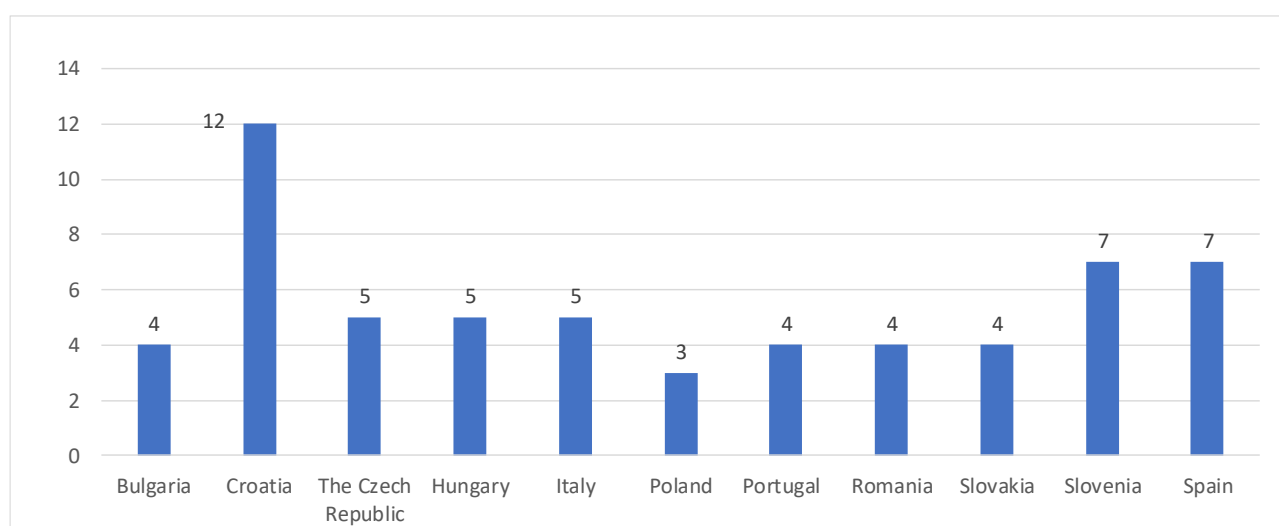
Section 3.1 aims at giving an overview of national policies for addressing regional economic disparities. This includes the mapping of policies per Member State, the characterisation and categorisation of policies, the analysis of the level of design and implementation and last but not least an analysis of the budgets for the policies. Section 3.2 provides an analysis of the patterns between national policies in the light of the findings on within-country disparities from Chapter 2. Finally, Section 3.3 draws on the conducted research on the endowment with growth assets.

3.1 Overview of national policies for addressing regional economic disparities within the EU Member States: characterisation, governance, financial magnitude

3.1.1 Overview of national policies in the relevant Member States

A total number of **60 policy measures have been investigated**,⁶⁹ as presented in Figure 22. While the total number of policies is relevant to understand how far national governments address cohesion with their own approaches, the pure number of identified measures is not an indication of the importance of the nationally funded policies, as the financial weight and the scope of the various measures often varies considerably among the countries. Italy, for example, only registers five distinct national policy measures for cohesion, yet with a significant national budget of €67.6 billion (see also Section 3.1.4). In the case of Croatia, however, the 12 measures identified are small initiatives, which altogether amount to €280 million over the period 2014-2018. Apart from Croatia, the number of identified policy measures addressing cohesion is evenly balanced, ranging from three measures in Poland, to five in the Czech Republic, Hungary and Italy to seven in Spain and Slovenia.

Figure 22: Number of policy measures for cohesion per country (n=60)



Source: Prognos/Technopolis (2019).

Apart from the financial aspect that is discussed in Section 3.1.4, the **duration of the respective policies** also differs. Whereas some are aligned to the current Regional Policy framework of the EU (2007–2013, 2014–2020), the majority do not. For some cases the duration is not specified, for others, for instance “The Programme of Regional Incentives” in Spain (1985–ongoing), the respective funding periods are much longer, or last, in the most extreme case only a year or two.

⁶⁹ This number includes seven policies in the Croatian case where 2 policies have been merged to one. This was done to ensure comparability, due to the fact that Croatia has a large amount of relatively small (in terms of budget) in place.

Infobox 4: 2019 European Semester: Country Reports – country-specific recommendations for Eastern and Southern European Member States⁷⁰

For the first time, the country-specific recommendations include assessments about the regional dimensions of disparities in EU Member states. What is presented in the country reports constitutes the views of the Commission, based on the underpinning Semester analysis. The country-specific recommendations state that

- Bulgaria, Germany, Spain, France, Croatia, Ireland, the Netherlands, Portugal, Romania and Sweden have **economic imbalances**.
- Cyprus, Greece and Italy have **excessive economic imbalances**.

In addition, these countries are shaped by **regional disparities** in many socioeconomic dimensions, including economic and labour market performance, productivity levels, quality of governance or demographic patterns.

For Bulgaria, a shortage of labour, due to high levels of emigration, is identified as a key challenge for the future development of the country. In some Member States, investments are held back by a lack of transparency in the public sector, complex tax systems, distorted labour markets or weaknesses in institutions. To address these issues, Poland, for example, has adopted a 'Constitution for Business', a comprehensive set of five laws to improve the business environment. Bulgaria, Slovakia, the Czech Republic, Slovenia, and Romania have been reforming their public procurement systems. The increase in disparities across the EU is not surprising, as the Eastern enlargements from 2004 onwards meant the admission of economically much weaker member states. The comparatively low economic performance of the newly added regions has not yet been fundamentally altered by the economic catching-up process. The capital city regions of Poland, Slovakia, the Czech Republic, Hungary and Romania also progressed up so far in economic terms, that by 2017 they were all above the EU average. Prague and Bratislava even belong to the league of European metropolitan regions with an economic output of more than 150% of the EU average (metropolitan convergence).

3.1.2 Characterisation and categorisation of national policies

3.1.2.1 Thematic focus of policy measures

We have categorised the 60 policy measures into **four different categories** that are essentially based on the broader sectors (or thematic objectives) that they target, namely:

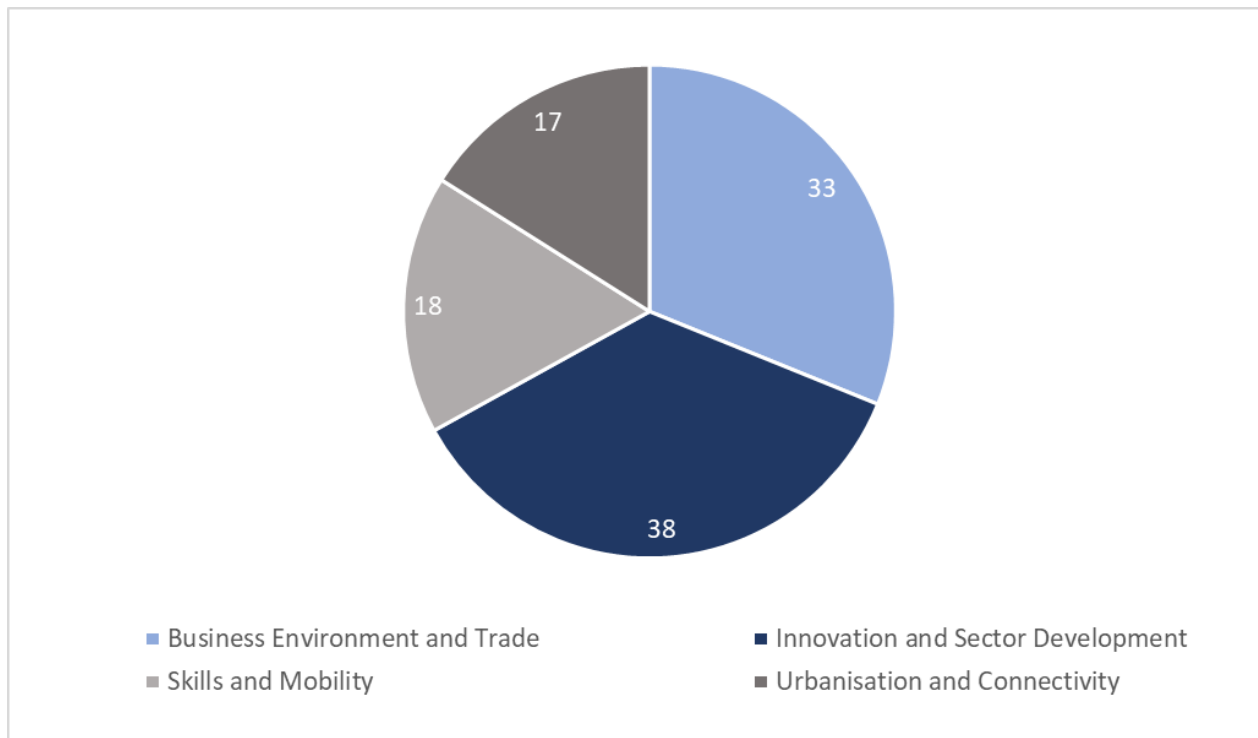
- Urbanisation and Connectivity
- Skills and Mobility
- Innovation and Sector Development
- Business Environment and Trade

The measures are distributed accordingly (Figure 23), however, it must be noted that each policy can potentially be distributed to more than one category. This is due to the fact that policy-makers can follow up on one or more objectives with one policy. For instance, in the case of the Spanish "Programme of Regional Incentives", the policy is aimed at strengthening the business

⁷⁰ European Commission (27 February 2019): 2019 European Semester: Country Reports; accessed under: https://ec.europa.eu/info/publications/2019-european-semester-country-reports_en

environment, and also on innovation. Hence, this policy is accounted for in both categories. Based on this methodology of classifying and counting, Figure 23 shows the distribution of policy measures. Among the identified key policy categories, those aiming at the categories 'Innovation and Sector Development' (38) and 'Business Environment and Trade' (33) are the most frequently used. Policies supporting 'Urbanisation and Connectivity' (17) as well as 'Skills and Mobility' (18) appear less often.

Figure 23: Characterisation into thematic policy categories – number of measures per category (n=106)



Note: The higher accumulated number of all four categories compared to the 60 measures can be explained through the double counting of certain measures that fall into multiple categories.

Source: Prognos/Technopolis (2019).

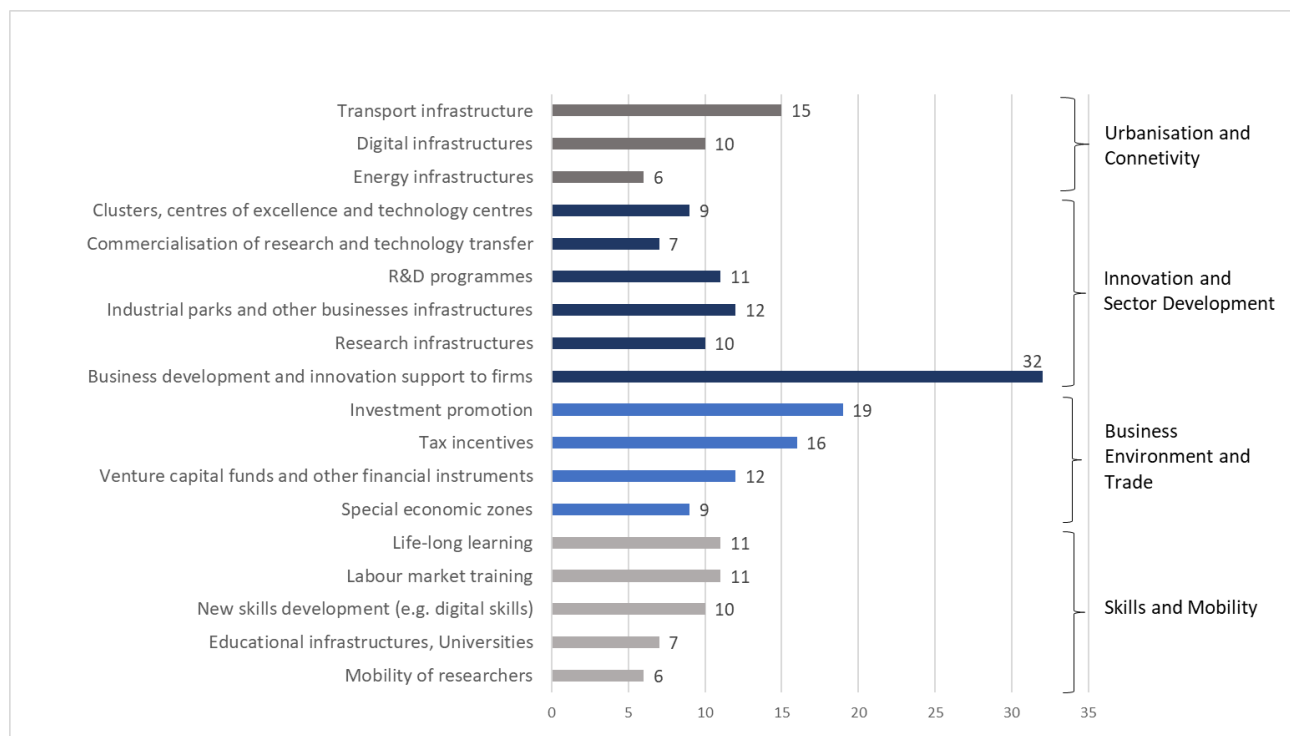
Even though the first classification into the four different categories shown in Figure 23 is a helpful first step to get a broad overview, a **further classification by thematic objective** is useful to obtain a more in-depth understanding of the policy measures. The suggested classification focuses on the policy priorities of public intervention. A key reference for developing this classification is the joint report of the World Bank and the EC on "Rethinking Lagging Regions", especially the suggested framework for approaching policy in lagging regions.⁷¹ Here, it is suggested to differentiate between different policy instruments, for instance in the case of the category 'Urbanisation and Connectivity', transport-, energy- and digital infrastructure. This classification allows to single out the type of policy measures and instruments that are implemented as part of the policy strategy at different levels. Further, this allows to differentiate between policies that have a direct or an indirect impact on cohesion between regions.

As shown in Figure 24, there is a relatively **balanced distribution of policy instruments**, the only instrument standing out is business development and innovation support to firms, from the category 'Innovation and Sector Development' with 32 appearances. While the instrument 'Transport infrastructure' is the instrument which is most frequently used in the category 'Urbanisation and Connectivity', the category 'Business Environment and Trade' is led by the instrument 'Investment promotion'. Overall, there are 31 instruments identified within the

⁷¹ World Bank (2018), Rethinking Lagging Regions – Using Cohesion Policy to deliver on the potential of Europe's regions, World Bank Report on the European Union: Washington D.C.

category 'Urbanisation and Connectivity', 45 in the category 'Skills and Mobility', 56 in the area 'Business Environment and Trade', whereas the category 'Sector Development and Targeted Investment' includes 81 instruments.

Figure 24: Types of policy instruments by thematic policy category – number per type



Note: The higher accumulated number of all four categories compared to the 60 measures can be explained through the double counting of certain measures that fall into multiple categories / see Table 36 for the number of policy instruments per country.

Source: Prognos/Technopolis (2019).

As illustrated, the **majority of policy measures have a direct impact on cohesion**. Only the instruments 'tax incentives', 'venture capital funds and other financial instruments' and 'investment promotion' are purely indirect, whereas the instruments in the policy category 'Skills and Mobility' are both direct and indirect.

3.1.2.2 Spatial dimension of policy measures (place-based approaches)

Next to a classification by thematic objective that indicates which sectors are preferentially targeted by policy-makers, the extent to which **policies target a specific region** (place-based approach) is a useful categorisation.⁷² This analysis is relevant to one of the central objectives of this chapter, namely to find out which EU Member States have national policies in place that explicitly aim at reducing disparities in specific types of regions. Based on the country briefings and policy fiches presenting the 60 identified policy measures (see Annex 2), the following categories indicate the **degree of spatial targeting** of the respective policies can be derived:

⁷² Spatial categorisation is an essential feature to in the field of regional economics. For a in-depth study on policy categorisation by spatial relevance, see: IW Consult GmbH and BAW Institut für regionale Wirtschaftsforschung GmbH (2009), Möglichkeit des Bundes, durch die Koordinierung seiner raumwirksamen Politiken regionale Wachstumsprozesse zu unterstützen: Cologne.

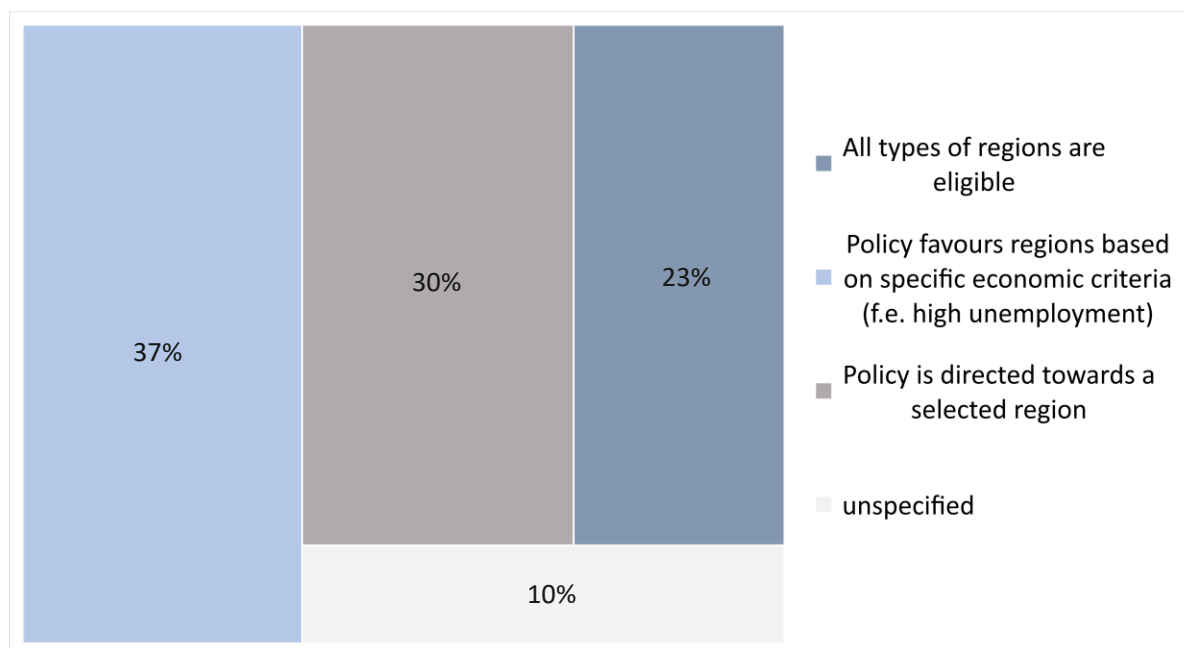
Table 11: Categories of spatial targeting of the respective national policies

Category	Policy example
Policy is directed towards a selected region	Act regulating the gradual closure of the Trbovlje-Hrastnik Mine and the economic development of the region (Slovenia): The idea of the act is to regulate the closure of the mine by providing financial support to the surrounding municipalities to overcome the damages and economic and social costs caused by the closure of the mine.
Policy favours regions based on specific economic criteria	Programme for supporting investments of major importance to the Polish economy for the years 2011-2023 (Poland): Support is not granted to investment projects located in districts where the unemployment rate is lower than 75% of the country average. Additional scoring points in the selection procedure are given for locations in Eastern Poland.
All types of regions are eligible	Small and medium enterprises support strategy (the Czech Republic): Four strategic priorities have been defined under the SME Strategy 2014+: cultivation of business environment, development of consultancy services and education for business; development of enterprise based on support for research, development and innovation, including the innovation and business infrastructure; support for the internationalisation of SMEs; and sustainable energy management and energy innovation development. All regions are eligible to apply for this programme

Source: Prognos/Technopolis (2019).

Figure 25 illustrates the **extent to which policies use spatial targeting** and are either directly guided towards a selected region or indirectly benefit less developed areas. Policies with these characteristics make out a share of 67% of all investigated policies, the largest share depend on certain economic criteria (37%), followed by 30% of the policies that directly benefit a selected region. The remaining percentage could either not be classified (10%) or is structured in a way that all regions are eligible to apply (23%).

Figure 25: National policies with spatial targeting



Source: Prognos/Technopolis (2019).

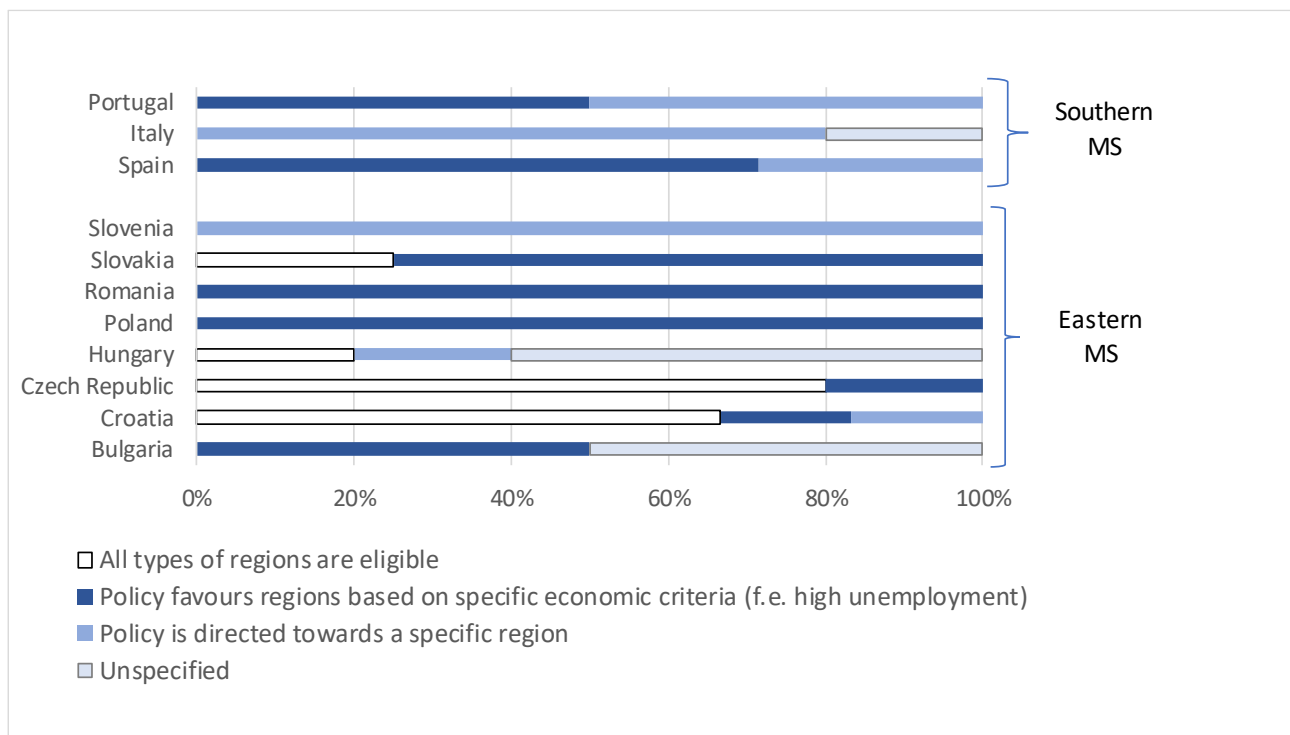
While Figure 25 allows to get an overview of the policies with a spatial focus, the following Figure 26 takes the **analysis of spatial targeting on a country level** which makes the share of policies comparable between the relevant Member States of this study.

Of all policies investigated, **Romania and Poland** appear to rely entirely on policies that function *on the basis of economic indicators* (unemployment rate, GDP per capita). **Slovenia**, on the other hand, has all of its identified policies *linked to selected regions*, for instance through the “Act on Development Support for Pomurje Region” or the “Act Regulating the Gradual Closure of the Trbovlje-Hrastnik Mine and the Economic Development Restructuring of the Region” (see Infobox 4 below).

Other countries such as the **Czech Republic and Croatia** appear to have most of their policies *open for all regions*, meaning that all regions can apply for grants, tax incentives and so on.

Overall, it can be assessed that the **Southern Member States** analysed in the study (Italy, Portugal and Spain) have a higher share of policies that are either directed towards a selected region or that favour a selected region based on economic indicators, as only one policy does not fall into this category. In comparison, the picture of the policies in the relevant **CEE Member States** appears to be fragmented. As stated before, some countries rely solely on spatial policies, however others (for instance Hungary or Bulgaria) show a less clear picture with a mix of policies.

Figure 26: Share of policies that benefit selected regions per country



Source: Prognos/Technopolis (2019).

Another qualitative indicator used to classify the identified policies was their “**direct growth relevance**”. A policy has a direct growth relevance if it is either directly directed at the economy or influences a location factor (for instance a railway line with the purpose to shorten the travel time to the nearest reloading point). The other classification option in this regard would be the indirect growth relevance, meaning that a policy aims to increase a regional income level (for instance a fiscal transfer or a policy to incentivise the local population not to move away). The picture that emerges from this investigation is relatively clear cut, a majority (73%) of the relevant 60 policy measures have a direct growth relevance, while 14% can be seen as having

an accelerator effect by aiming for the regional income level, the residual (13%) can be connected to both classifications.

When considering the spatial dimension of policy measures, the **role of capital cities** is of great interest. Across the countries of inquiry, the identified policies relate to capital cities in different ways. Among the countries that explicitly refer to capital cities in their national policies, the majority of policies deliberately mention the exclusion of their capital cities. For instance, in eight of the 11 countries considered (The Czech Republic, Hungary, Portugal, Romania, Slovakia, and Spain), the respective capital cities are deemed ineligible or deliberately disregarded for 12 out of a total of 29 policies. This is either because the policies are aligned according to economic criteria that the capital city does not fulfil or due to outright spatial targeting on less developed regions, in which the capital is not to be found.

Nevertheless, there are **some policies** – in Croatia (three policies) the Czech Republic (one), Hungary (one) and Spain (one) – that, either **directly or indirectly, prioritise capital cities**. For instance, in Croatia, three policies that are mostly associated to research projects and knowledge-based enterprises allocate the greatest share of funding to the city of Zagreb. Finally, there remain some countries – Bulgaria, Italy, Poland and Slovenia that do not specifically mention capital cities.

As such, among the countries considered in this section, national policies primarily mention capital cities to indicate their exclusion or ineligibility, while a few exceptions remain.

i

Infobox 5: Capital cities and national policies

Capital cities excluded: Modern Cities Programme in Hungary

(Policy Fiche HU 1, see Annex 2)

The objective of this programme is to foster the economic and infrastructural development and modernisation of cities, including transport systems, industrial parks and education infrastructures. Examples include the development of the University of Debrecen, investment into the South Industrial Park, as well as infrastructure investment for an innovation centre. Budapest is explicitly excluded from this program.

Capital cities advantaged: Research projects in Croatia

(Policy Fiche HR 8, see Annex 2)

The objective of this programme is both to foster new and enhance existing knowledge, with the ultimate aim of developing research groups that are competitive at the international level. Thus, while in theory all regions were eligible for this funding, in practice, from 2013 to 2018, 76% of the funded projects (and 78% of total funding) were conducted by the University of Zagreb and other research organisations in the capital city.

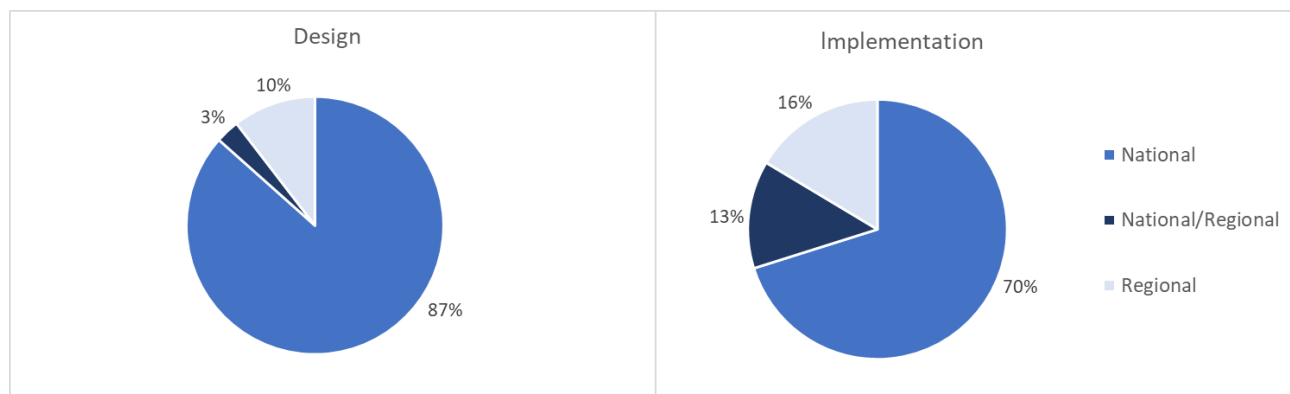
3.1.3 Implementation and design of national policy measures

Institutions are an important ingredient for economic growth and the **quality of government** is subject to increasing returns, meaning that the higher the endowment with this asset the better the potential for growth (see section 2.4.3). Research shows that government quality improvements are essential for less developed regions, and basic endowment shortages are still

the key barrier to development.⁷³ This is relevant also in the context of national policy implementation and the governance of policies in the **multi-level governance system** of Member States. Therefore, the following analysis looks at the governance mode of national policies for cohesion, specifically at the question who is involved in the design of policies and who implements them.⁷⁴

National policy measures can be designed and implemented at three different levels of governance (national, regional or at both). Figure 27 shows that the **design and the implementation of policies at the national level is clearly favoured**. For the design, 87% are organised at the national level, while only 3% at the regional level and 10% at both. For the implementation a similar, but less pronounced picture is drawn. 70% of all 60 measures are implemented on the national level, whereas 16% are implemented at the regional level. This is broadly in line with the degree of centralisation of public expenditure, and above all public investment: as discussed in Chapter 2.5, the share of investment managed at a regional and local level has decreased overall over the last 15 years and public investment expenditure has been increasingly tied to central governments.⁷⁵

Figure 27: Design and implementation modes – share of policy measures (n=60)



Source: Prognos/Technopolis (2019).

Of the 11 analysed Member States, Bulgaria and Croatia have only policies in place that are designed and implemented at a national level. For the case of Bulgaria, a variety of different national ministries (economy, labour etc) design and implement the policies, in Croatia, some of the policies fall under the authority of HAMAG-BICRO, the Croatian Agency for SMEs, Innovation and Investments, which works under the supervision of the Ministry of Entrepreneurship and Crafts. Similarly, Hungary, Portugal, Romania and Slovenia have most of their policies designed and implemented at a national level, while in the CEE Member States only the Czech Republic and Slovakia have a slightly higher focus on regional governance. This is illustrated in the case of Slovakia, which allows both its “Programme for the regeneration of rural areas” and the “Modernisation of the Slovak Railway Infrastructure” to be designed and implemented regionally.

Only Italy and especially Spain have an institutional framework of regional policy where the responsibility of regional policy is mainly regional (and with active national coordination).⁷⁶ For the case of Spain most policies are designed at a national level (Ministry of Finance in a few cases) and then implemented in cooperation between a national and a regional entity. In Italy there are two policies in place (‘Pacts for Development’ and ‘National Operational Plans’) where

⁷³ Rodríguez-Pose, A. and Ketterer, T. (2019), Institutional change and development in lagging regions in Europe. <https://voxeu.org/article/institutional-change-and-development-lagging-regions-europe>.

⁷⁴ While the level of funding is another important indicator for the involvement of regional municipalities, this study only includes policies that depend on national financing, this was agreed upon by DG Regio.

⁷⁵ DG Regio (2017): 7th Cohesion Report.

⁷⁶ Davies, S. (2017), Regional policy in a changing Europe: Annual Review of Regional Policy in Europe, EoRPA Paper 17/1 Paper prepared for the 38th meeting of the EoRPA Regional Policy Research Consortium at Ross Priory, Loch Lomondside, 1-3 October 2017.

the regional authorities define the strategic dimensions and priority actions for the development of their own territory based on the 'Masterplan of the South' which has been designed by the Government, thus the programmes are essentially designed in cooperation between the national and the regional level and implemented at the regional level.

Based on the detailed country briefings of all the 11 Member States and the case study analysis on selected policies in eight countries, some additional findings on the **governance structures** of the national policies for reducing disparities can be reported:

- **In most of the 11 Member States, some sort of a Ministry for Regional Development is in charge to design the respective policies** for reducing national disparities, depending on the sector, thematic Ministries can be involved. In some cases (Bulgaria, Romania, Croatia) the relevant Ministry is also in charge of the coordination of the ESI Funds;
- **Regional implementation has been seen in some cases reported as a strength, because it allowed for increased flexibility** in the assignment and reassignment of funding (Spain, Hungary). On the other hand, it has been described in other cases that a regional implementation can lead to an overburdening of the local administration because of the long duration or the complexity of the programmes (Italy), indicating once more the importance of government quality;
- **Effective implementation of policies at both national as well as regional level is frequently undermined by the fact that there is a lack of monitoring systems in most countries.** Various case studies reveal that there are little to no output nor results indicators that measure the effectiveness and/or concrete improvements such as a decreasing unemployment rate etc. This is the case for Romania, where it is particularly mentioned but also for Spain, where indicators are neither used at the state or at the regional level.

All in all, based on the findings from the analysis of the governance structures of national policies it can be concluded that, in line with findings from other studies⁷⁷, a majority of policies are designed and implemented at national level, even though differences between countries exist (some countries clearly prefer national design and implementation, only a few countries have a tendency of regular involvement of regional entities).

3.1.4 Financial magnitude of national policies for cohesion

Another important dimension to the analysis is the **financial volume of the identified national policies for cohesion**. While comparing the quantity of policies might potentially lead to a deformed picture, the financial volumes that are spent by national governments on a certain policy can potentially illustrate the magnitude of a certain policy measure.

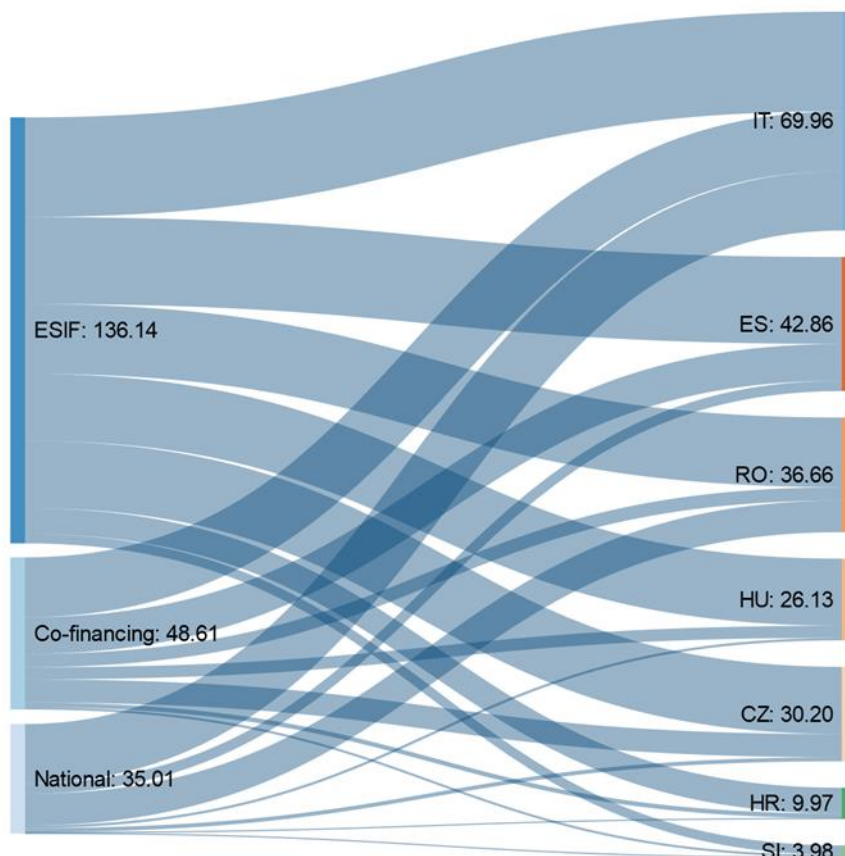
In this context, comparable data was gathered for seven out of the 11 countries, namely Croatia, the Czech Republic, Hungary, Italy, Romania, Slovenia and Spain.⁷⁸ Here, the data was mainly available for grants and investment, whereas data for interest subsidies or credit guarantees was naturally more challenging to gather, data for the measures that work with tax incentives was not available at all.

As it is illustrated in Figure 28, the **budget of the nationally funded measures is only a very small fraction of the ESI Funds** with the exception of Romania (among others in the context of the 'National Programme for Local Development', see Infobox 6 below) and Italy where the national funding is around 38% and 37% respectively of the ESI funding and co-financing. The national funding of policies in countries such as Slovenia, Hungary, the Czech Republic and

⁷⁷ *ibid*; DG Regio (2017): 7th Cohesion Report.

Croatia is minimal between a minimum of 2.7% in Croatia and a maximum of 8.5% in Spain of the ESI funding and co-financing.

Figure 28: Comparison of budgets - ESI funded measures (without co-financing), co-financed measures, and nationally funded measures supporting the reduction of economic disparities (in € billion)



Note: The amounts for the different countries illustrate the total budget (ESI Funds, co-financing and National). ESI Funds and Co-financing include only the CF, ERDF and ESF. Budgets for the national funding were only available for seven countries, Portugal, Slovakia, Bulgaria and Croatia are not shown in this figure.⁷⁹

Source: Prognos/Technopolis (2019).

National funded measures complement the ESI Funds either by providing additional funding in national priority areas where the ESI funding is not sufficient, or by supporting activities that are not eligible for funding by ESI Funds. In Italy, the largest share of the national funding (67%), is directed to network infrastructures, mainly roads, to compensate for the low funding from the ESI Funds. Comparing the two streams of funding national funding is almost four times the funding of the ESI Funds and the relevant co-financing (see table below). Spain and Italy also direct additional national funding to their regions 'in transition' to balance the significantly lower ESI funding. This focus is much clearer in Italy, where the nationally funded policy is directed at the entire Mezzogiorno, which includes five less developed regions and three regions in transition. In the Czech Republic the national support on R&D (71.1% of the total), amounting to 22% of the ESI funding and co-financing, is follow-up funding for projects previously supported by the ESI Funds and operating costs of research infrastructure that has been developed with ESI funding. In other cases, such in Spain, Hungary, Slovenia and

⁷⁹ Based on the country briefings and the interviews it can be indicated that national policies with an explicit cohesion objective are mainly financed by the ESI Funds and co-financing (Bulgaria, Slovakia, Poland), which paints a similar picture in comparison with the other CEE Member States (except Romania).

the Czech Republic, national measures provide tax breaks, support to FDI and to both large companies and SMEs.

Table 12: Proportion of the budget of nationally funded measures to ESI Funds on activities reducing the economic disparities in selected countries — 2014-2020 (%)

Thematic Areas	CZ	ES	HR	HU	IT	RO	SI
Competitiveness of businesses	13.2	98.9	5.0		30.1	53.1	
Competitiveness of businesses & Sustainable & Quality Employment							18.9
Educational & Vocational Training					3.3		
Information & Communication Technologies (ICT)					5.4		
Network Infrastructures in Transport & Energy	2.7		1.7		374.3		
Network Infrastructures in Transport & Energy, Educational & Vocational Training, Business Competitiveness				9.4			
Research & Innovation	22.0		10.1	0.3	8.7		
Social Inclusion, Environment Protection & Resource Efficiency, Network Infrastructures in Transport & Energy, ICT						64.7	
Social Inclusion, Sustainable & Quality Employment, Environment Protection & Resource Efficiency			8.4				
Sustainable & Quality Employment				0.4	10.5		
Total	4.5	8.5	2.7	3.2	37.2	38.1	4.8

Note: ESIF funding includes funding from ESF, ERDF and the CF and the relevant national co-financing. To compare the budgets of the nationally and ESI funded measures, a classification based on the Thematic Objectives (TO) was used. The adopted classification called "Thematic Areas" uses the description and content of all TOs, with the exception of the TO "Competitiveness of SMEs". The new Thematic Area is named "Competitiveness of businesses" and includes all size of companies. In some cases, the nationally funded measures corresponded to more than one TO and therefore, both ESI Funds and national funding data were aggregated to create new Thematic Areas. In these cases, we keep in the description of the new Thematic Areas the description of the aggregated TO. For comparing the total shares of the two streams of funding, we use the budget of all TOs for the estimation of the ESIF Funds.

Source: Prognos/Technopolis (2019).

Frequently, **national measures are characterised by the lack of specific direction** by providing a broad range of eligible thematic areas and the priorities are defined bottom up by the demand. In Romania, with the second-highest stream (in absolute figures) of national funding after Italy, 93% of the budget is directed to territorial investments which under the same policy measure ("The National Programme for Local Development") cover a broad area of themes from network infrastructures, to ICT, to the improvement of the environment and social inclusion activities. The measure provides funding equal to 65% of the ESI Funds in the same thematic areas. A similar example, although with much lower funding, is the "Modern Cities Programme" in Hungary which supports a variety of areas such as local businesses, network infrastructures, educational infrastructures and vocational training.

Infobox 6: Romania – National Programme for Local Development

(Policy Fiche RO 1, see Annex 2)

The programme is aimed at reducing social and economic disparities among regions through budget transfers to municipalities for investments for improved local public infrastructure (such as roads, schools, kindergartens). Along with two schemes stimulating company investments and job creation, the National Programme for Local Development is the core national investment programme to combat inter-regional disparities in Romania. It targets the policy category of 'Urbanisation and Connectivity' and funding is provided at national level, whilst design and implementation occur at regional level. The programme includes 3 sub-programmes:

- "The modernisation of the Romanian village";
- "The urban regeneration of cities and towns";
- "County level infrastructure".

The PNDL covers a large range of investments covering water and sewage systems, education, health, roads and bridges, social and cultural infrastructure, sports, and the headquarters of local authorities and their subordinated institutions.

3.2 Analysis of patterns between national policy approaches for reducing within-country disparities

Section 3.2 aims to analyse the patterns between Member States' within-country disparities and their policy approaches. To analyse whether certain Member States register a convergence or divergence trend, and if the respective trend can be explained due to wealthier regions slowing down or less developed regions catching up, Figure 15e (Section 2.3.3) shows the national average annual GDP per capita growth rate compared to the average annual GDP per capita growth rate in the richest areas, defined as those regions belonging to the highest 25% of the national per capita GDP, in the crisis (2007-2012) and in the post-crisis (2012-2016) period. Based on this analysis, the relevant Member States can be classified as follows for the 2007-2012 period:

- **Concentration with slowdown:** Italy, Spain
- **Concentration with growth:** Bulgaria, Poland
- **Catching up in stagnation (Diffusion):** Portugal, Slovenia
- **Catching up with growth (Diffusion):** the Czech Republic, Hungary, Romania, Slovakia

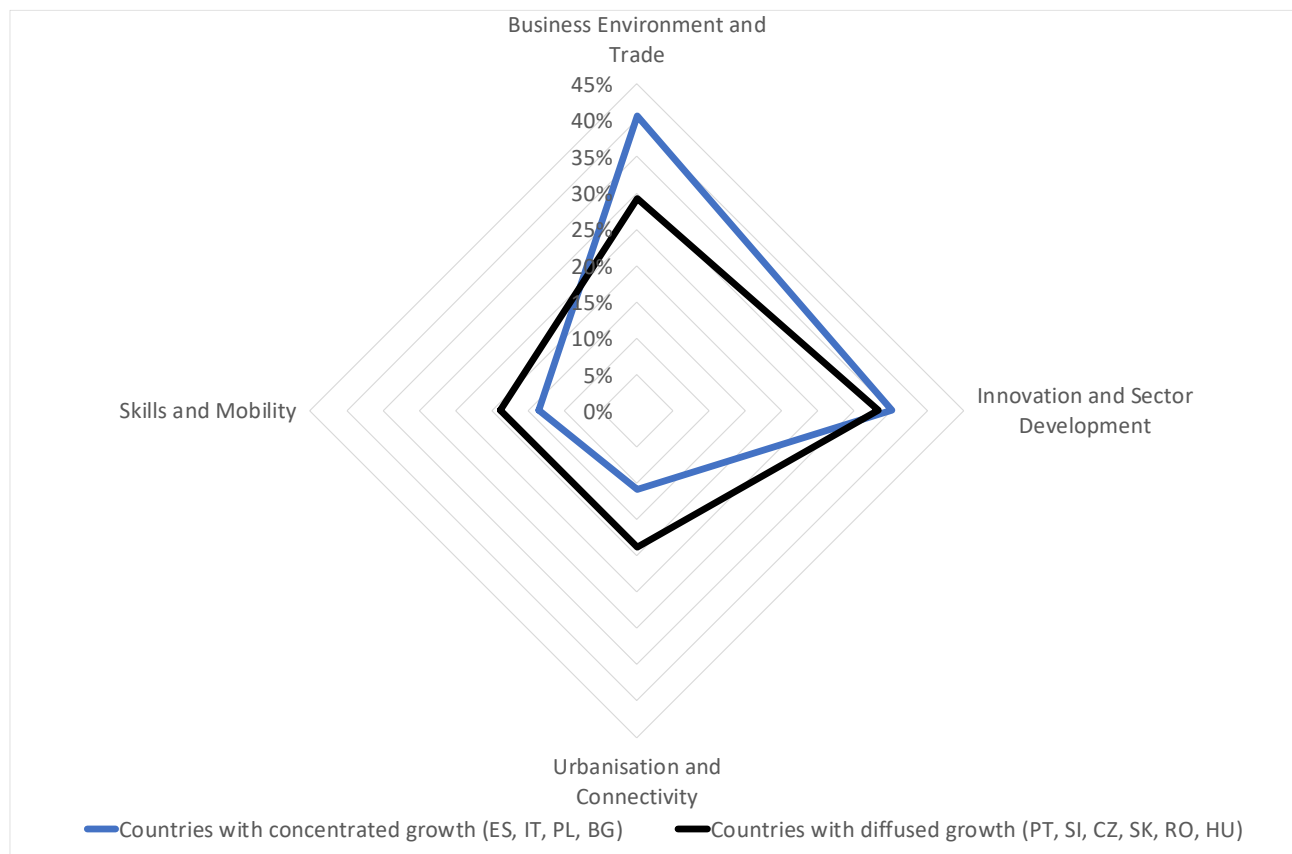
The following two subsections attempts to link the grouping of countries to the two central categorisations of national policies, one that classifies policies based on their thematic objective (Subsection 3.2.1) and one based on the spatial objective of national policies (3.2.2).

3.2.1 Relation between the thematic focus of policies and different sets of within-country disparities

To begin with, Figure 29 builds up on the two superordinate groups, i.e. countries that are marked by concentration and countries that are characterised by diffusion for the 2007-2012 period. Overall, there is a relatively strong tendency towards policies connected to the business environment (for countries with concentration 41%, for countries with diffusion 29%) and to

innovation-related policies (for countries with concentration 35%, for countries with diffusion 33%), while policies relating to 'Skills and Mobility' as well as 'Urbanisation and Connectivity' are less often used. Yet, countries characterised by concentration (Spain, Italy, Poland, Bulgaria) show a higher share of policies connected to the business environment, indicating an importance of instruments such as investment promotion, tax incentives for companies and certain cases the setting up of special economic zones, whereas countries characterised by diffusion (Portugal, Slovenia, the Czech Republic, Slovakia, Romania, Hungary), have a slightly higher share of policies connected to urbanisation as well as connectivity (incl. infrastructure).

Figure 29: Concentration vs. diffusion - share of policies in the respective categories



Note: Due to the lack of data for the relevant time period, Croatia has been left out.

Source: Prognos/Technopolis (2019).

Altogether, Figure 29 does **not show a very strong pattern in policy approaches between the two country groups**. Therefore, Figure 30 goes a step further and looks at the four specific categories of the country classification (i.e. "concentration with growth", "concentration with slowdown", "catching up in stagnation", "catching up with growth").

In countries characterised by **"catching up with growth"**, policies falling into the category 'Innovation and Sector Development' are most popular (42% of all policies). Particularly the Czech Republic (three national policies for 'Innovation and Sector Development'), Hungary (4) and Romania (3), stick out, although Romania is the only country of this group which spends a significant amount of national funds on this policy category through its state aid scheme to stimulate investments in less developed regions. A similar focus on innovation & sector development in their national policies for cohesion is visible in the Southern EU Member States Italy and Spain, which, however, are characterised as countries showing a **"concentration with slowdown"** (i.e. showing divergence since the national average annual growth rate is negative, and the richest regions are either stagnating less (Spain) or minimally growing (Italy)). But the two countries groups differ when it comes to their second most relevant policy category: while

the countries “catching up with growth” also focus the most at the development of infrastructure (category ‘Urbanisation & Connectivity’; around 25% of all policies), in particular transport infrastructure, the two Southern EU Member States place the highest emphasis on policies for strengthening the business environment (at least in terms of share of policies, not in terms of financial volumes; compare Table 12).

The analysed Member States characterised by “diffusion”, either marked by “**concentration with growth**” (Poland, Bulgaria) or “**catching-up in stagnation**” (Portugal, Slovenia) also place the highest emphasis on the business environment (around 35% of all policies), but stick out due to their comparatively higher focus on human capital (category ‘Skills and Mobility’)

Figure 30: Concentration (with slowdown & growth) vs. diffusion (with slowdown & growth) - share of policies in the respective thematic categories

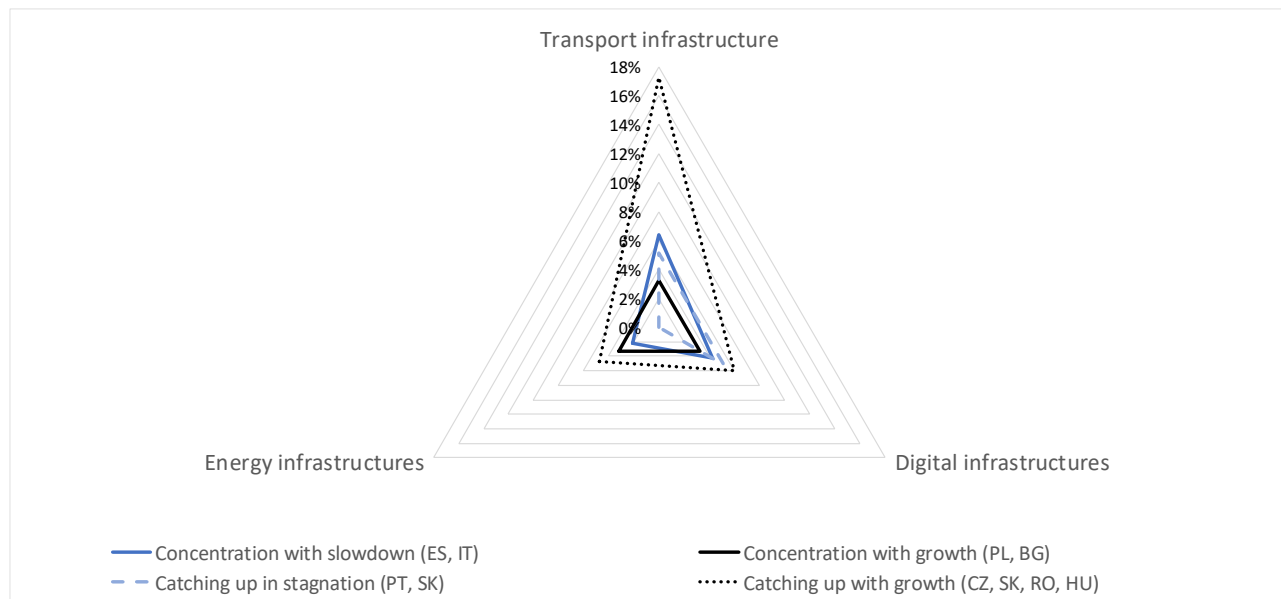


Note: Due to the lack of data for the relevant time period, Croatia has been left out.

Source: Prognos/Technopolis (2019).

Below, the country groups are assessed regarding their relative focus on policy instruments in the category ‘Urbanisation & Connectivity’, looking at the share in transport infrastructure, energy infrastructure and digital infrastructure (see Figure 31). As has been outlined above, the countries characterised by “**catching up with growth**”, have the highest share of policies in this field dominated by transport infrastructures. In this context, the example of Slovakia is notable, where three policies are in place for infrastructure development; all of which are designed and implemented at the regional level. The estimated amounts for Slovakia (under €20 million) and also the Czech Republic (under €30 million) are, however, relatively small, compared to Hungary (the Modern Cities Programme; budget per annum for the period 2014-2020 over €100 million) and in Romania (National Programme for Local Development; over €1 billion). Also Italy, characterised as a country with “**concentration with slowdown**”, has a strong focus on transport infrastructure, with an accumulated budget of around €5 billion per annum.

Figure 31: Share of policy instruments in the category 'Urbanisation and Connectivity'



Note: Due to the lack of data for the relevant time period, Croatia has been left out.

Source: Prognos/Technopolis (2019).

3.2.2 Relation between the spatial focus of policies and different sets of within-country disparities

We now turn to the **interplay between within-country growth dynamics and the place-based nature of national policies**. Figure 32 shows that countries experiencing concentration – thus, some sort of within-country divergence from 2007-2012 – primarily pursued national policies that were place-based in nature, either dependent on regional economic criteria (53%) or directly targeting a specific region (32%). This dynamic is largely mirrored among ‘catching-up’ countries that experience some sort of diffusion (within-country convergence), albeit to a lesser degree. Among this group, national policies were also primarily place-based, allocated according to economic criteria (35%) or specifically targeting a region (35%), yet still allocating 21% of policies where all regions are eligible.

Figure 32: Concentration vs. diffusion - share of policies that are spatially focused



Note: Due to the lack of data for the relevant time period, Croatia has been left out.

Source: Prognos/Technopolis (2019).

Disaggregating the country groups further in Figure 33, we assess the country groups “concentration with slowdown”, “concentration with growth”, “catching up in stagnation” and “catching up with growth”. As described in more detail above, these categories distinguish whether the richest regions in a country are growing (or stagnating) faster or slower than the rest of the country. The “concentration with slowdown” (Italy and Spain) country group, where the national average annual growth rate is negative and the richest regions are either stagnating less (Spain) or barely growing (Italy), employ national policies that specifically target regions, both through economic criteria (42%) and through direct targeting of specific regions (50%), conceivably in an effort to boost growth in those regions. One of these policies specifically targeting regions is the Italian ‘Complementary Operational Programme’ (see Infobox 7).

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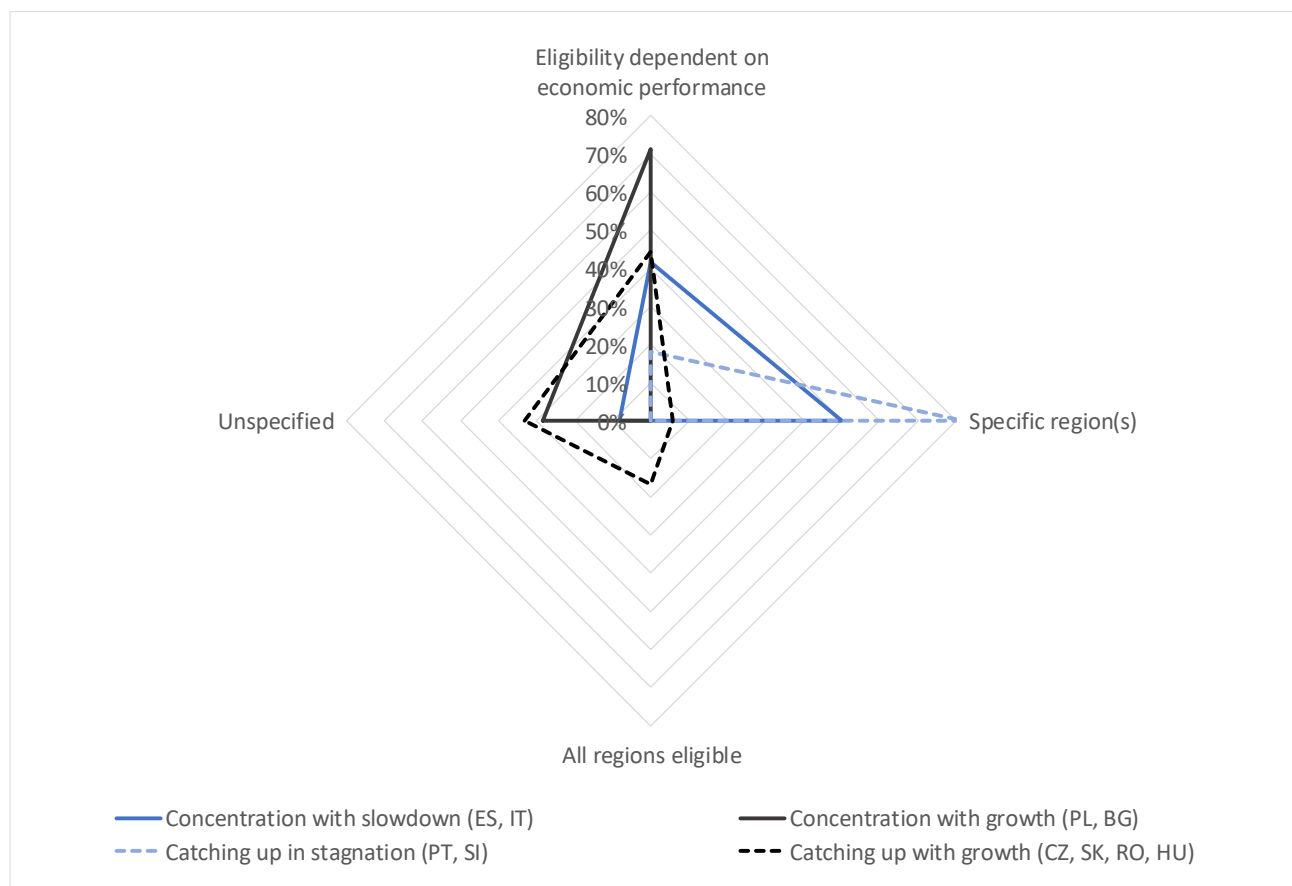
Infobox 7: Italy – Complementary Operational Programme (Policy Fiche IT 5, see Annex 2)

In light of previous experiences with delays in the use of EU resources and the risk of not being able to benefit from it because of the so-called automatic decommitment to which Structural Funds are subject, the law of stability 2014 has provided that the national co-financing resources can also contribute to the financing of complementary interventions with respect to the programs co-financed by the Structural Funds. The resources of the Revolving Fund, made available as a result of the adoption of EU Operational Programmes with a lower national co-financing rate than as programmed, can be therefore transferred outside the operational programmes themselves, in favour of defined interventions, precisely, complementary to the programming of the Structural Funds 2014-2020. The POCs move in parallel with the European operational programmes, having also the same eligibility criteria for expenditure and the same management and control system.

The “concentration with growth” country group (Poland and Bulgaria) have experienced divergence because the richest regions are growing faster than the national average. This group primarily pursues national policies that are targeted towards regions that are economically less developed (71%). The “catching up in stagnation” country group (Slovenia and Portugal), where the richest regions stagnated more than the national average, pursued national policies that were heavily place-based, primarily targeting specific regions (82%). Finally, the “catching up with growth” country group (The Czech Republic, Slovakia, Romania, and Hungary), where the richest regions’ annual growth rate is positive, but the national average is growing faster, has a relatively broader allocation of policies. While 44% of national policies are distributed according to economic criteria, 17% are allocated where all regions are eligible and 33% of national policies are spatially unspecified.

As such, a cursory glance at both Figure 32 and Figure 33 is sufficient to recognise that for almost all country groups, irrespective of concentration (divergence) or diffusion (convergence) dynamics, national policies tend to primarily be place-based in nature, either targeting specific regions or allocating according to economic performance.

Figure 33: Concentration (with slowdown & growth) vs. diffusion (with slowdown & growth) - share of policies that are spatially focused



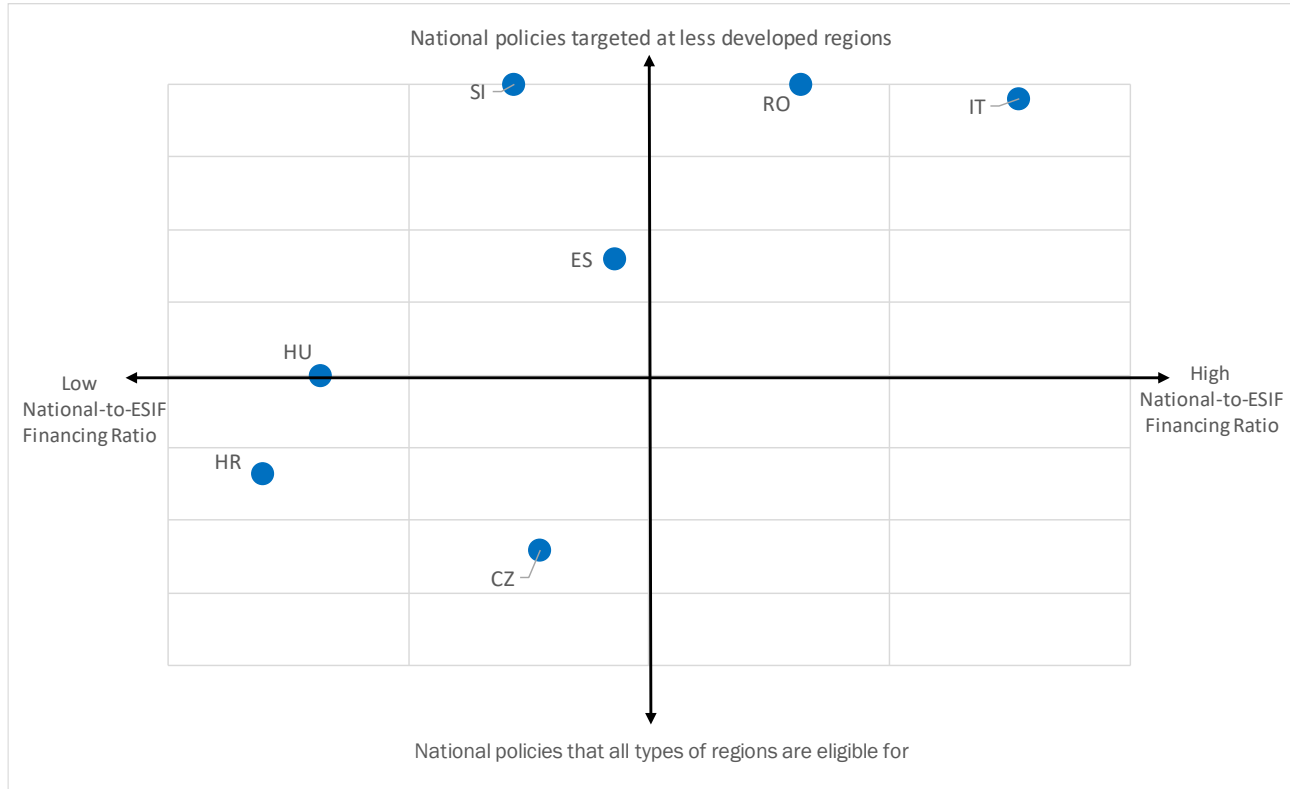
Note: Due to the lack of data for the relevant time period, Croatia has been left out.

Source: Prognos/Technopolis (2019).

Figure 34 relates the **place-based nature of national policies** to the ratio of national-to-ESIF financing. The vertical axis depicts the place-based nature of national policies, with policies targeted towards specific regions (either directly or based on economic criteria) on one end and national policies that all types of regions are eligible for on the other, while the horizontal axis reflects the share of national-to-ESI Funds financing aimed at reducing economic disparities. A higher ratio indicates that the Member State’s national financing is closer to ESI Funds levels (See Figure 28). Figure 34 shows a trend in which countries that have higher shares of targeted

national policies tend to also have a relatively higher national-to-ESI Funds financing ratio. This seems to reflect the fact that countries which demonstrate a greater policy focus on less advantaged regions also attribute greater degrees of national financing to such aims, suggesting a relationship between their policy priorities and the corresponding financing allocation.

Figure 34: Targeted national policies and national-to-ESIF financing ratio



Note: The figure is limited to seven countries, since national funding data is not available for Poland, Bulgaria, Slovakia and Portugal. The horizontal axis reflects the log transformation of the national funding shares in Section 3.1.4. The vertical axis is the share of policies with an explicit spatial component.

Source: Prognos/Polimi/Technopolis (2019).

The above analysis, while providing some insight into the interplay of regional growth dynamics and the nature of national policies, must be accompanied with a **note of caution**. First and foremost, limited data availability prevents us from being able to offer more conclusive insights. Regarding national policies pursued, the limited sample size of policies considered (e.g. only four policies in all of Portugal) hinders us from concluding with decisive confidence that a country is either pursuing a spatially targeted or more broad approach. Moreover, policy comparability across countries further complicates the matter. In respect to the national-to-ESI Funds financing ratio, data unavailability limits the analysis to six out of the 11 countries of interest. Thus, while it is a valuable exercise that offers some insight into the interaction of the different typologies addressed in this study, it should be regarded as suggestive and as an initial step. More comprehensive data on the nature of national policies as well as greater data availability for more countries would allow future research to provide more conclusive insights into the dynamic of interest.

3.3 Policy instruments aiming at improving the respective country's growth assets

Next to the analysis of patterns of policy approaches and within-country disparities of the Subsections 3.2 the question of **potential patterns between the resource endowment and the policy approaches** of a country emerges. Resource endowment is identified in Section 2.4.3 as a factor associated to regional growth. Here, it is highlighted how their spatial imbalance

may act on the process of catching up of lagging regions with respect to advanced ones. The spatial distribution of growth assets is in fact uneven in Europe. This leads to the idea that if the endowment of growth assets in lagging regions were higher (at the European average, as an example), the catching up process of less developed countries and regions would be faster, and therefore regional disparities would decrease. There are two possible situations which can arise: the first one in which a country, highly endowed with a specific resource, implements a lower number of policies in related fields, because it prefers to concentrate investments on lacking resources and build a balanced system. This first case can be labelled as a supply-driven policy approach, in which the purpose of the government is to supply the country with the missing resources. The second one is the case in which a country, highly endowed with a specific resource, implements a larger number of policies in related fields, because the presence of related economic actors provides additional political demand for it. Consequently, this second case can be labelled a demand-driven policy approach.

In this context, the subsequent account analyses the connection between the respective resource endowment of a Member States and its policy approaches. First, this is done for the endowment with the asset innovation (market and radical innovation), second the connection of the assets human capital and transport infrastructure with the policy approaches is investigated upon.

3.3.1 Analysis of the distribution of policies regarding innovation capacities

As stated in Chapter 2, the **most important assets for growth include radical innovation, product innovation and market innovation**. Particularly market innovation can lead to increasing returns, the more a region is endowed with this asset, the higher chance there is for growth. Similarly, industrial regions with a low degree of radical innovation capacity register a lower competitiveness. Whereas all policies that are shown in the policy grid have a certain relevance for the asset 'innovation', some particularly stand out and appear to have a higher correlation with the assets.

In Figure 35a the level of **market innovation** in the country is compared to the share of policies in the category 'Innovation and Sector Development' (which mostly comprehends innovation related measures, including business development and innovation support to firms, R&D programmes, research infrastructures, commercialisation of research and technology transfer, industrial parks and other businesses infrastructures and clusters, centres of excellence and technology centres). A weak positive association, although not statistically significant, is present. While some countries are relatively highly endowed with the asset market innovation, their share in innovation-related policies appears to be mediocre, this is particularly valid for the Southern European Member States, Spain, Portugal and Italy. The countries with a lower endowment with the asset market innovation illustrate a more mixed picture. Romania, Hungary and the Czech Republic (see Infobox 8) have a relatively high number of policies related to innovation in place, Slovakia on the other hand the lower share of policies in this field of all countries.

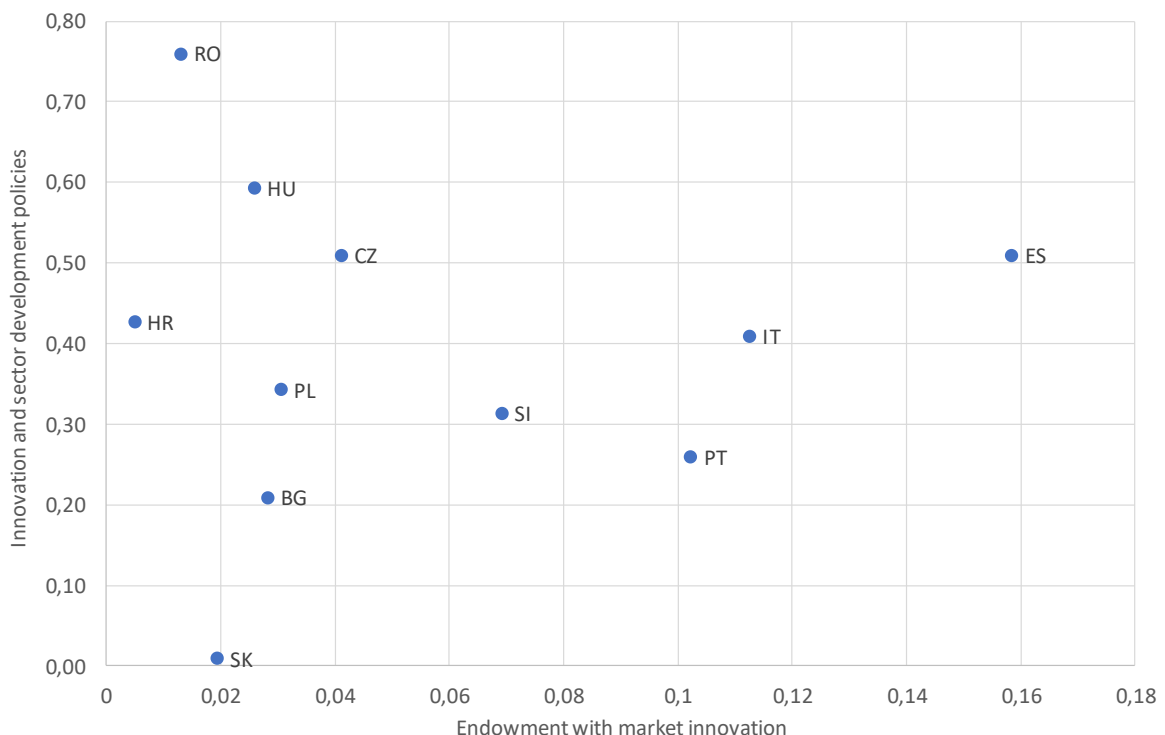
Infobox 8: The Czech Republic – National Programme for R&D&I (Policy Fiche CZ2.1, see Annex 2)

The main aim of national (NPS I and NPS II) programmes is a sustainable development of the centres of R&D&I funded from the ERDF between 2007-2013 by means of Czech operational programmes, which provides considerable contribution to regional development, and therefore contributes to the competitiveness of the whole country. They were designed to reflect the need to bridge a transition period for these centres after ESI Funds finished. However, there are limitations in terms of the profile of applicants. Given the vast majority of these centres were built outside of Prague, most of the applicants were expected to come from the regions, other than Prague, i.e. much poorer regions. The programme supports exclusively multiannual projects.

The same positive and not statistically significant association between the resource endowment and the share of policy measures in innovation is present for **radical innovation** (Figure 35b). In this case, countries with more radical innovation tend to have a larger percentage of policies concerned with innovation, reflecting a demand-driven policy approach.

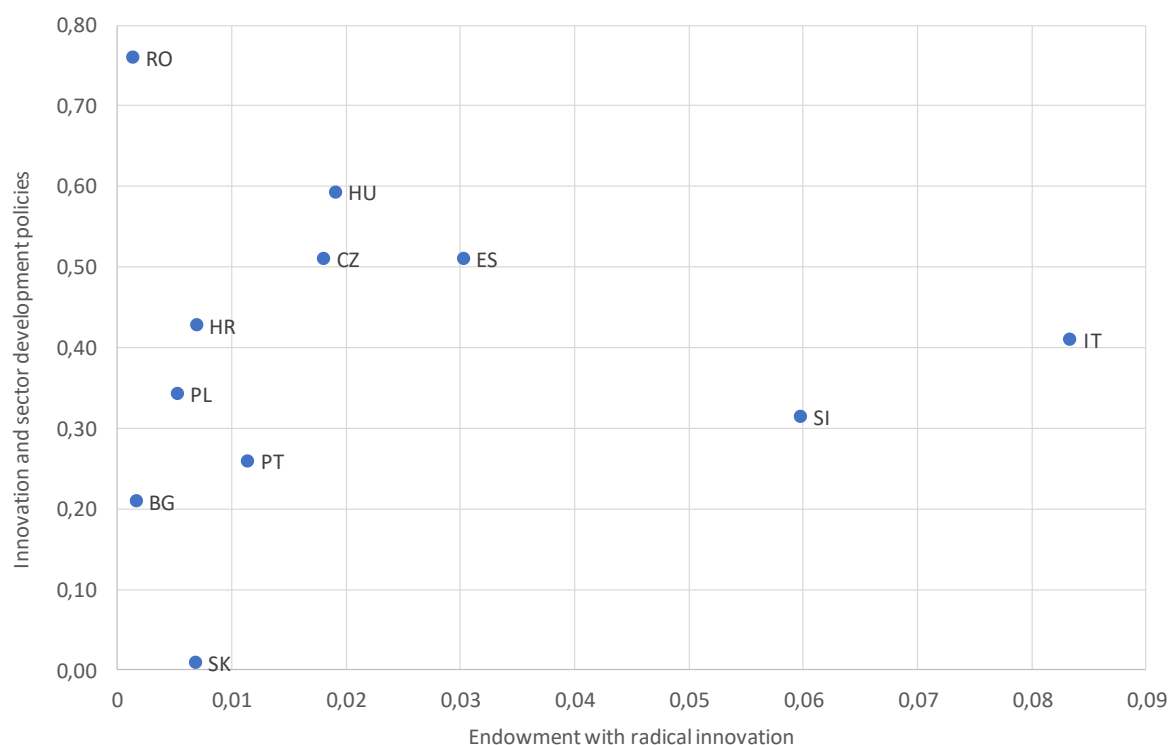
Figure 35: Assets' endowment and share of policy measures by asset (market / radical innovation) and policy ('Innovation and Sector Development')

a) Market innovation



Source: POLIMI (2019).

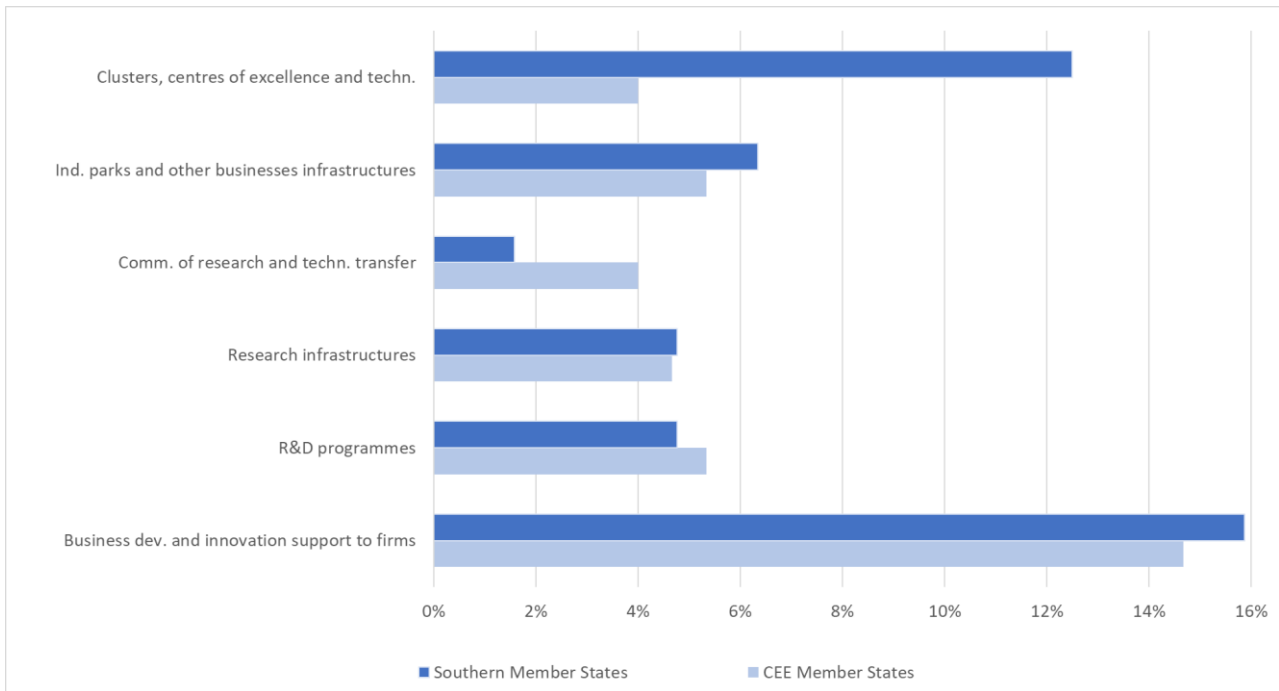
b) Radical innovation



Source: POLIMI (2019).

While Figure 35 illustrates the respective endowment and the number of policies in the category 'Innovation and Sector Development', it is worthwhile to extend the analysis with regards to innovation-related policies to the policy instrument level. Figure 36 investigates the distribution of **policy instruments in the respective policy category**, one the one hand for the relevant Southern European Member States (Portugal, Spain and Italy) and the Eastern European Member States (Bulgaria, Croatia, the Czech Republic, Hungary, Romania, Slovenia and Slovakia). It can be seen that the Southern Member States have slightly higher share of policies in the relevant fields, a larger difference is only registered for 'clusters, centres of excellence and technology centres'. Furthermore, the estimated magnitude of the policies (for the ones available) reveal that Italy and Spain spend the largest absolute amounts on innovation-related policies, resulting in a significant gap between Southern and CEE Member States when it comes to nationally financed innovation measures.

Figure 36: Investing in the growth asset innovation - share of policies



Note: Due to data availability the countries here are regarded in two groups, the Southern Member States (Italy, Portugal and Spain) and the CEE Member States (Bulgaria, Croatia, the Czech Republic, Hungary, Romania, Slovenia and Slovakia).

Source: Prognos/Technopolis (2019).

3.3.2 Analysis of the policies directed at infrastructure and human capital

Other important assets that are favourable for growth are physical infrastructure and human capital. While both elements are said to have a stimulating effect on economic growth, according to the analysis of Section 2.4.3, the latter is of particular importance to reduce regional disparities.

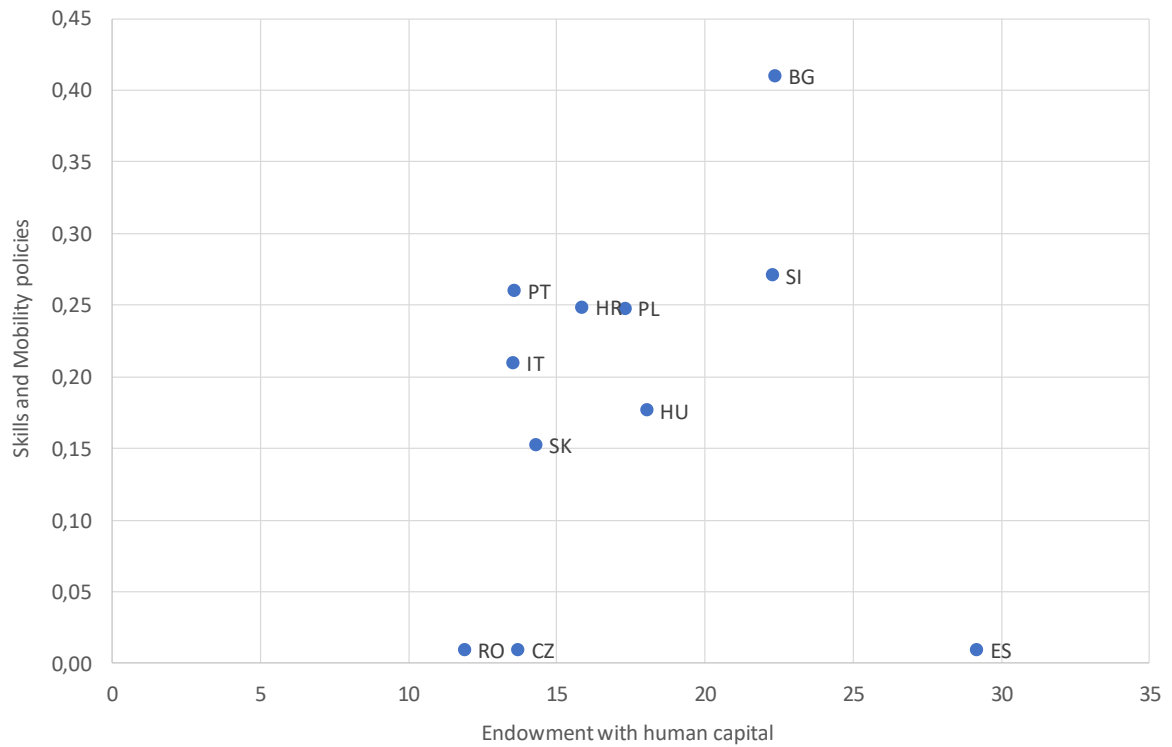
In this light, this section investigates the share of policies from the category 'Skills and Mobility', namely the mobility of researchers, educational infrastructure, labour market training, new skill development and life-long-learning. Additionally, the share of policies from this category is contrasted with the policies aiming to improve physical infrastructure, specifically transport-, digital, - and energy infrastructure.

A demand-driven approach also emerges for **human capital** (which contains policies from the category 'Skills and Mobility') (Figure 37a): countries characterised by a higher level of human capital are normally implementing a larger share of related policies (which include life-long learning, new skills development, labour market training, educational infrastructures, universities, mobility of researchers).

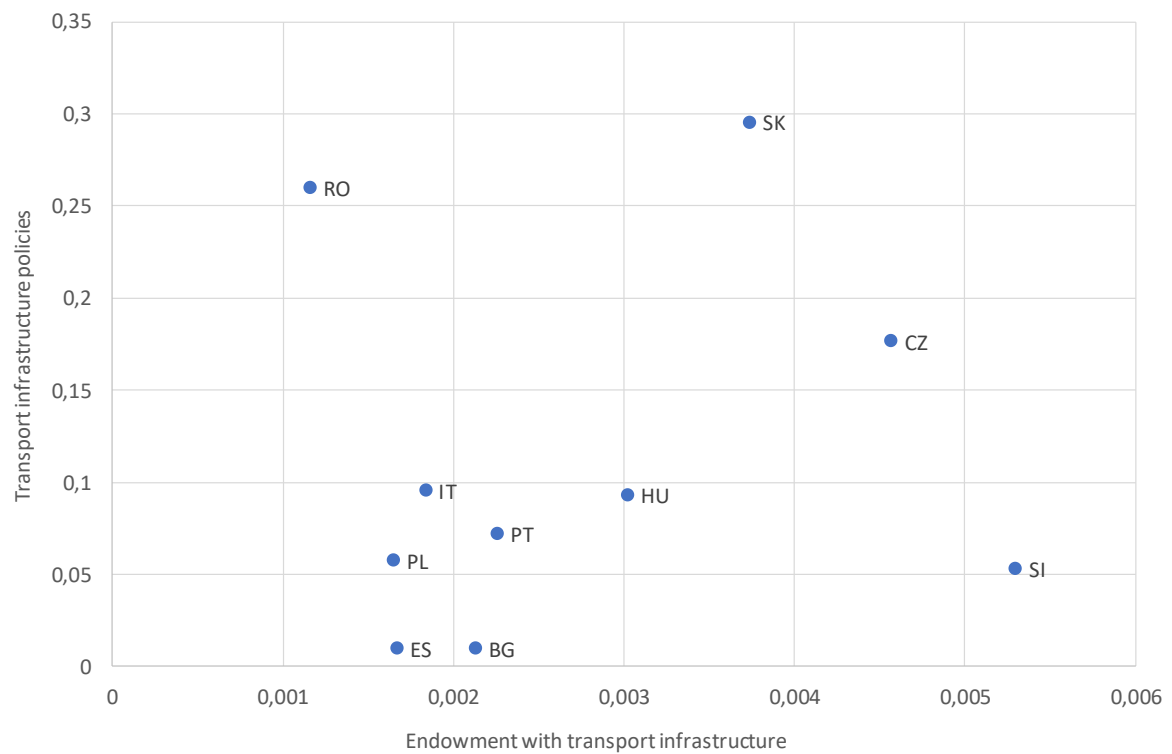
The case of **accessibility**, where its endowment has to be compared only with policies in transport infrastructure, rather than on general policies from the category 'Urbanisation and Connectivity', is presented in Figure 37b. In this case, with the only exception of Slovakia and Romania, the percentage of policies on infrastructure is relatively similar among the various countries. In this case as well, however, there seems to be the slight prevalence of a demand-driven approach because the number of policies in infrastructure seems to increase with the endowment of accessibility. Spain is an outlier because it does not seem to implement any infrastructural policy, which may be justified by the fact that it invested heavily in infrastructure using the Cohesion Fund so that it does not need a national specific policy.

Figure 37: Assets' endowment and share of policy measures by asset (human capital / transport infrastructure) and policy (skills and mobility / transport)

a) Human capital



b) Transport infrastructure

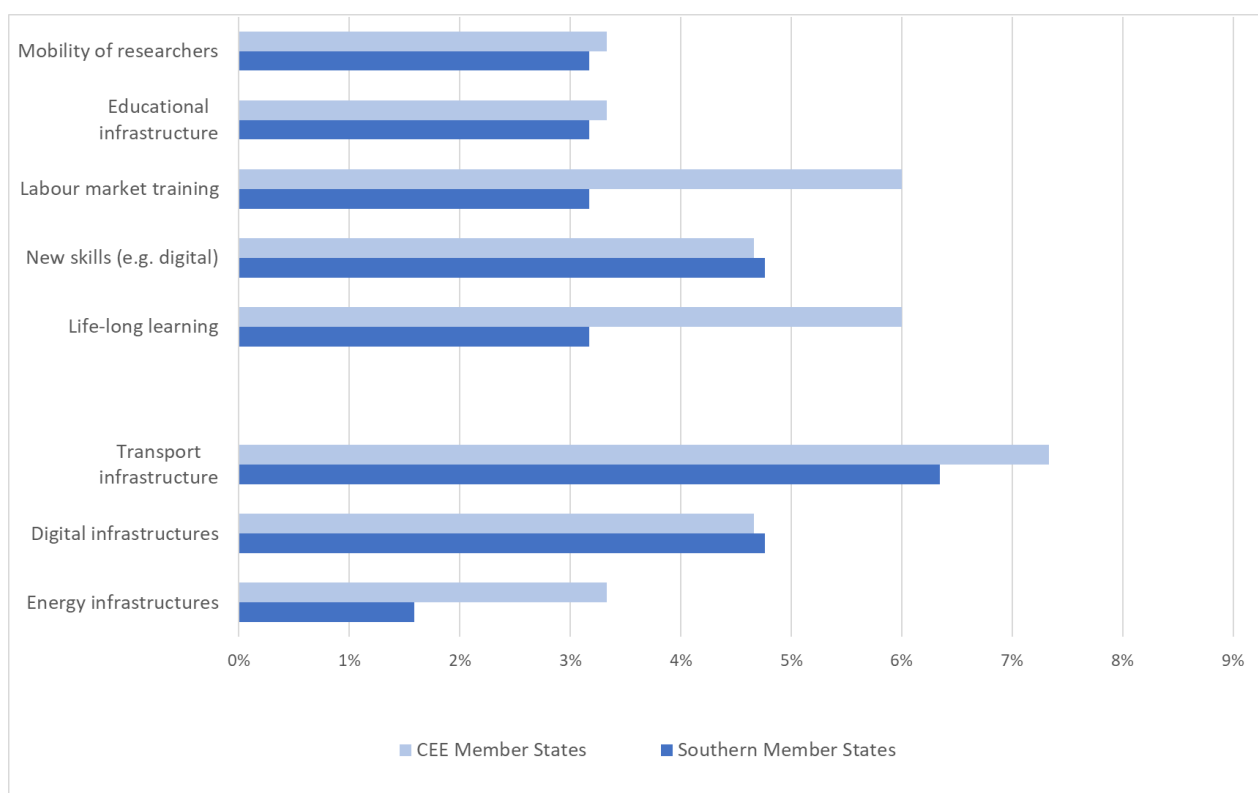


Source: POLIMI (2019).

Likewise, to the subsection on innovation-related policies, it is worthwhile to extend the analysis with regards to policies from the categories 'Skills and Mobility' and 'Urbanisation and Connectivity' to the policy instrument level.

Figure 38 investigates the **distribution of policy instruments in the respective policy category**, both for the relevant Southern European Member States (Portugal, Spain and Italy) and the CEE Member States (Bulgaria, Croatia, the Czech Republic, Hungary, Romania, Slovenia and Slovakia). A balanced picture for the policies concerning human capital can be observed. Here, the differences are rather small, only the subcategories 'life-long learning' and 'labour market training' show a higher number of policies for CEE Member States compared to Southern European one. For the policies regarding the 'physical infrastructure', most of the policies target transport infrastructure, even though a larger share also aims for improving digital infrastructure.

Figure 38: Investing in the infrastructure and soft skills- share of policies



Note: Due to data availability the countries here are regarded in two groups, the Southern Member States (Italy, Portugal and Spain) and the CEE Member States (Bulgaria, Croatia, the Czech Republic, Hungary, Romania, Slovenia and Slovakia).

Source: Prognos/Technopolis (2019).

4 CONCLUSIONS AND OUTLOOK

The issue of regional economic inequalities in the EU has gained increasing importance on public and political agendas in the aftermath of the global financial and economic crisis, and in the context of political movements gaining support in the so-called “places left behind”.⁸⁰ Recent evidence has shown that regional disparities have been on the rise in many European countries and structural economic disparities within the EU remain serious, either in terms of GDP per capita levels way below than the 75% of the EU-28 average⁸¹ (e.g. in the CEE countries) or significant gaps to leading regions or in terms of growth, productivity, and employment⁸² (e.g. in Southern EU Member States). Regional disparities in productivity levels have been increasing since the mid-1990s, due to more rapid growth in leading regions in the EU and limited diffusion of structural change and innovation.⁸³

Against this background, the **overarching aim of this study** was to provide robust and most recent evidence on the nature and extent of regional disparities, especially economic disparities within the EU’s Member States, and explain the drivers behind economic divergence. Similarly important was the second overarching objective, i.e. to identify and characterise nationally-mandated policies for cohesion and show whether they contribute to the EU’s objectives regarding economic, social and territorial cohesion. Thereby, the study was to provide a better understanding of the role of national policies in the context of the EU’s cohesion policy.

The study is based on a **comprehensive analysis** of national and regional data, stakeholder interviews in eleven EU Member States, eight in-depth case studies and desk research, to inform the EC ahead of its next Report on Economic, Social and Territorial Cohesion⁸⁴ which is due for publication by September 2021.

4.1 Headline findings of the study

The detailed research and analysis in Chapter 2 and Chapter 3 provides an in-depth understanding of patterns in regional performance and the response to imbalances in regional performance by Member States authorities. It also raises some questions that need to be addressed in the future, as some evidence gaps remain.

From the comprehensive quantitative and qualitative research, we can observe the following:

1. **We have been in a period in which regional disparities were growing following a period of convergence.** A sharp increase in disparities following the financial and economic crisis was clearly observed. Whilst some regions have recovered well – or were less affected by the crisis – others have struggled with a resulting growth in disparities measured by economic indicators. The underlying economic structures (e.g. sectoral balance, levels of productivity and innovations) are a major influence with more successful regions characterised by modern industry and services, highly productive and technologically advanced economies, faring better than those with industrial structures in transformation or an over-reliance on agricultural economies. However, the data suggests a more recent convergence since 2014, although the statistics are limited, and the most recent data used in the study was from 2016. Yet, under certain conditions the

⁸⁰ European Parliament (2019): BRIEFING - Regional inequality in the EU, EPRS | European Parliamentary Research Service: Brussels.

⁸¹ European Commission, Directorate-General for Regional and Urban Policy (2017): My Region, My Europe, Our Future. Seventh report on economic, social and territorial cohesion, EU COM Publication: Brussels.

⁸² Crescenzi, R., Giua, M. (2019): One of many Cohesion Policies of the European Union? On the differential economic impacts of Cohesion Policy across member states. *Regional Studies*, DOI: 10.1080/00343404.2019.1665174

⁸³ Beugelsdijk, S., Mariko, J. K., Milionis, P. (2018): Regional economic development in Europe: the role of total factor productivity. *Regional Studies*, 52 (4), pp. 461-476 and Ridao-Cano, C., Bodewig, C. (2019): How can Europe upgrade its „Convergence Machine“? *Intereconomics – Review of European Economic Policy*, No. 1 pp.11-18.

⁸⁴ The Commission is responsible for the text, graphics and production of the Cohesion Report.

trend towards reduced disparities could be expected to continue and consolidate, but it also depends on the overall economic health of Europe (a new recession could have a negative effect, as could new trade barriers) and demographic trends.

2. **In the Central and Eastern European (CEE) Member States, the evidence suggests that capital and larger cities can exacerbate intra-national economic disparities**, being the focus for investment and talent, and a 'magnet' for in-migration (with resultant depopulation in neighbouring regions). The pattern of depopulation and the migration of people from less developed regions is a major challenge for countries tackling regional imbalance. The increase in within-country disparities in CEE Member States risks becoming an irreversible trend if serious counteracting policies are not taken into consideration. Overall, agglomeration economies have a lower relevance in this respect, when compared to other input factors such as human capital, infrastructural accessibility, or the quality of government, suggesting that policies aiming at reducing the gaps in soft asset endowment have a more pronounced impact on disparities than the pure presence of cities.
3. **The main drivers of change include major institutional and policy events, notably the advent of the Common Market and the Single Currency, as well as the periods of EU enlargement.** However, these events have impacted differently at different spatial levels. The enlargement of the EU seems to have favoured convergence between countries but exacerbating intra-national disparities. Similarly, the constitution of the Common Market and the introduction of the Single Currency helped convergence between countries but resulted in different effects on intra-national disparities. Especially in the case of the Single Market, intra-regional disparities seem to have been exacerbated due to large international investments directed mainly to the 'gateways' of countries, i.e. the largest cities and/or capital cities.
4. **The regional imbalance of productive resources is another important source of disparities.** With a higher balance of spatial distribution of resources, disparities would decrease. In a situation of an even distribution, disparities could decrease more in case of quality of government, marketing or radical innovation, and human capital, and less in the case of accessibility. Effective policies favouring interventions on 'soft' elements, and, on ethics, organisation, education and innovation and less on 'hard' elements, such as infrastructure, would be more effective.
5. **Regional imbalances can be deeply ingrained and can be difficult to reverse even if relative disparities change** (the 'north-south' divide in Italy, for example). The absolute ranking of regions from more developed through transition and to less developed regions only changes slowly, although regions can move between categories (e.g. Germany is a good case in point here, where regional disparities were absorbed at a comparatively impressive speed until the beginning of the crisis period).
6. **Given the factors involved in determining the economic performance at both country and regional level there are limits to the role public policy and funding can play in addressing disparities.** However, the evidence from the quantitative analysis is that EU and national funding have helped growth through the stimulation of private investments (although it should be stressed that we were not tasked to conduct an evaluation of the impact of policies). Yet in some countries the impact of significant levels of EU and national policy as well as funding has failed to halt economic disparities. In Spain, for example, there has been a long tradition in public intervention – and funding – to address regional disparities, yet disparities have grown in recent years and gaps in GDP remain sizeable. It is possible that disparities would be worse without EU and national policies, but it is also possible that the strength of exogenous drivers is such that cohesion policies will struggle to make a significant impact on the scale of disparities, or the direction towards greater convergence or greater disparities.

7. **The policy responses from Member States vary, and many national policies, especially those focused on sectoral growth, do not have explicit territorial or regional dimensions** (but might have indirect impacts on economic cohesion). Indeed, there is also a tendency towards the centralised governance of policies – in terms of design, implementation and funding. Post-crisis fiscal adjustments have led to a major reduction of the competence rights and autonomy of local governments and administrations, leading to a significant re-centralisation of decision making. However, intra-regional disparities are generally recognised and all countries reviewed have some “cohesion-type” national policies specifically aimed at reducing disparities between regions and promoting convergence.
8. **The budget of the nationally funded measures is only a very small fraction of the ESI Funds in all Member States but Italy** where the national funding is around 93% of the ESI funding. Other significant national contributions are in place in Romania and to a lesser extent in Spain, whereas the national funding of policies in countries such as Slovenia, Hungary, the Czech Republic and Croatia is minimal. Nationally funded measures often support activities that cannot be financed by the ESI Funds, increase the flow of funding in areas where national or EU sources alone are not enough or support regions in transition and territories facing development challenges across all types of regions. Key investment areas include network infrastructures (Italy), dedicated support to regions “in transition” (Italy with the entire Mezzogiorno, Spain) or follow-up financing of R&D projects (including R&D infrastructures) as a follow-up funding for projects previously funded by the ESI Funds (the Czech Republic). All CEEs also provide tax breaks, support to FDI and to both large companies and SMEs.
9. **There are strong inter-linkages between EU Cohesion Policy and national policies as well as ‘purely’ national policies tend to focus on other policy domains.** The EC has encouraged coordination and complementarity between policies and our review of national policies suggests some interesting patterns with national policies supplementing EU programmes and replacing EU funding when it expires to ensure continuity of support. However, national policies allow for more flexibility. As the case study evidence for the Czech Republic, Italy, Romania and Spain reveal, the flexibility that the respective national policy provides is much appreciated.
10. **Synergies with the objectives of the ESI Funds are not always clear in national policy measures but there are several positive examples on complementarities.** The case study evidence shows that synergies are not always clear but tend to exist in some cases. For Bulgaria and Romania, the case studies shows that the respective national policies do not use or pay sufficient attention to possibilities for synergising their projects with ESI funded programmes which would take away a possibility for leveraging. Nevertheless, other case studies (the Czech Republic, Italy and Slovenia) indicate that their respective policies do synergise with EU funded projects.
11. **Political instability and changing budgets can threaten the sustainability of national policies.** In several Member States it was observed that changing political administrations can potentially lead to a change of priorities and therefore endanger the long-term financial sustainability of a programme. This is a central difference compared to the ESI Funds which operate under a scheme of greater stability with a clearly defined timescale and supra-national approval processes. This goes hand in hand with the fact that for the national policies analysed in-depth in the eight case studies little or no monitoring of performance and achievement was found, which weakens policy effectiveness and the opportunity to make fact-based decisions. There are little to no input or output indicators that measure the effectiveness and/or concrete improvements such as a decreasing unemployment rate etc.

Overall, it can be summarised from this study that, **despite the sixty years of integration, no group of countries resulting from subsequent EU enlargements in the EU registers a lower level of disparity with respect to another group** (i.e. relative imbalances might be reduced but nevertheless remain), making the convergence process still incomplete. The long-term processes associated with greater convergence, leading to higher levels of development in regional economies through information diffusion, integration of local cultures and know-how, strong imitation processes in economic activities still must show all their effects.

At the same time, we see that **public investments from both the ESI Funds and national policies have and can play an important role in shaping growth trajectories of regions**, with strong cumulative and self-reinforcing effects. ESI Funds stimulate growth mostly indirectly by stimulating investments, a similar effect is likely for many of the analysed national policies. But this requires private investments to go alongside of public sector engagement, and it requires the public sector to focus on growth-enhancing policy measures – tailored to the conditions of the Member State in question and its regions – that promote the diffusion of innovation (RTD) investments and talent, which encourage a more even spread of productivity and ensure high quality governance to lead and oversee the process of change and monitor the performance of policies.

4.2 Conclusions for future policy approaches

This study has derived several conclusions which provide important messages for future cohesion policy approaches in the Member States of the EU.

As has been discussed throughout this report, full convergence of regional economies in the EU is an unrealistic objective and leads to potentially misleading policy responses. However, focussing on untapped regional potential by designing coherent policy approaches with a strong place-based character can help reducing within country disparities and support a more sustainable development.

From the research we can note that whilst policy approaches and investments need to be tailored to specific country and regional characteristics, there are observations from the study that provide some general lessons on appropriate **policy responses** that could help to reduce regional disparities in most circumstances:

- **Stronger focus of policies on assets for growth**, in particular human capital formation and innovation capabilities (especially skills development, diffusion of innovation, product innovation etc. as growth & productivity-enhancing measures). (Infrastructural) Accessibility is also important but rather a necessary and not sufficient condition for growth;
- **Focus on transformative measures, in particular supporting innovation diffusion and the uptake of advanced (digital) technologies, especially in SMEs and low productivity sectors** and emphasise regional strengths through smart specialisation strategies. Low productivity in the CEE and Southern European countries mostly depends on their unfavourable mix of industrial activities and both regions are disadvantaged by their high share of employment in agriculture (with very low productivity levels in the CEE). For rural areas with high share of (low-productivity) agriculture, transformation pathways also reside in a shift towards a bio-economy activities and circular economy;
- **Balancing the growth and dynamics of regional “growth-centres”** (e.g. capital cities) with measures to ensure that their growth is not absorbing the development capacities of other regions in the country. This might mean spatial targeting of cohesion-type policies on less developed regions, using eligibility criteria to steer public investments to where they are most needed and/or focussing on the development of 2nd tier cities;
- **Strengthening of the capacity and quality of regional and local governance**, with institutional capacities as fundamental requirement for regional growth, and the bridge

from policy to delivery, retaining the flexibility to respond to regional/local needs and opportunities;

- **Stronger emphasis on coordination and coherence of policies**, both within the national context (e.g. via overarching pacts for regional policy) and with EU policies, most notably the ESI Funds and the European Semester;
- **Greater focus on the increasing public investment levels to pre-crises levels**, as they can help to expand macroeconomic production capacities and support real increases in income in the long term;
- **Strengthening the culture of evaluation and policy review**. It was striking from the country reviews that in many cases the impacts of national policies are not systematically assessed and fed back into the policy review process.

Looking forward, discussions will further intensify around the **new Cohesion Policy programming period 2021–2027**. Many EU Member States and regions are already re-assessing their policy priorities, which could lead to reforms to regional policy strategies, policy measures and policy structures before 2021. The quality and intensity of coordination as a pre-condition for higher complementarity and coherence remains an area which is crucial to facilitate greater effectiveness of future policies across the Member States and help reducing regional disparities. Material from this study could be usefully deployed in the negotiations at country level (e.g. partnership agreements), the Country-Specific Recommendations as part of the European Semester and in support of the new “enabling conditions” for the programming period.

More generally, this study has generated a volume of analysis and case study material that could be used to greater effect to raise awareness of the factors leading to regional disparities, how they occur and how policy can provide a degree of mitigation. A wider programme of dissemination including presentations at EU and a wider international level could be considered.

4.3 Implications for further study

As indicated throughout the study, there are still some open questions requiring future research.

With regards to the **analysis of regional disparities**, further insights could be generated from a so-called “club-analysis”, where regions are clustered around some main similarities, and see which is the disparity trend that emerges. In this way, structural features may emerge that make regions converge. This can be done both for inter and intra national disparities. It is known in the literature as “club convergence”, i.e. the idea that a single level of GDP per capita is impossible to be achieved especially in the short period because of structural differences in the regions. Instead the aim should be a similar level of GDP per capita among groups of similar regions that converge to a certain disparity level thanks to similar structures like industrial specialisation, settlement structure, quality of human capital, functions hosted.

A second additional analysis is a **more in-depth analysis of the role of cities on regional disparities**. It is not only the presence of large cities that influences disparities, but also: i) the presence of an efficient and integrated urban system, ii) the capacity of cities to network with other cities. All these elements influence the growth of the region and therefore regional disparities.

A third additional analysis would concern the **study of transfers inside the countries**, between regions and between the states and their regions. These transfers are in part due to the presence in most countries of progressive tax systems, by which poorer regions citizens do normally pay less taxes because they are poorer. The transfers, however, can also be due to processes of redistribution of national resources, either due to explicit development policies or to political economy mechanisms. All these transfers can have an impact on regional growth and disparities which need be investigated.

With regards to the **policy analysis**, the picture becomes more blurred. As systematic inventory of all national policies for cohesion is not existing, and therefore each analysis relies on primary research in the individual Member States. Moreover, many national automatic economic mechanisms have an indirect impact on cohesion which makes it difficult to provide a neat separation line. While this study was able to identify a broad spectrum of policies, thereby providing a comprehensive picture, it may have not identified all policies that could be of interest. Such an inventory, nevertheless, would be a very basis for future analysis and could also help the EC in its effort for greater coordination, complementarity and coherence of policies. Under these conditions, future study could focus more intensively on the impact of national policies and assess the joint impact on reducing disparities. This would require, however, better financial data from national sources, as otherwise an assessment of the role of cohesion policy investments (national, EU) in stimulating regional investments will not be possible.

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6 ANNEX I – FURTHER FINDINGS AND METHODOLOGICAL EXPLANATIONS

6.1 Main findings from the literature analysis on regional disparities and national policies for cohesion

The literature review conducted in this study is based upon a structured document analysis of academic journals, working and policy-papers, monographs and book chapters, as well as relevant reports from international institutions such as the OECD, the World Bank and the EU. The focus of the review is on empirical studies and reports published in the 2000s and 2010s. In sum, around forty publications have been reviewed, of which 14 have been published in 2018 or 2019. While the complete literature review can be found in the **Inception Report** of this study, what follows below is a summary of its main findings:

1. **Regional disparities** have been on the rise in many **European countries** and **structural economic disparities** within the EU remain serious. Most CEE Member States have a GDP-per-capita of less than 75% of the EU-28 average. GDP per capita in all Romanian and Bulgarian regions, except for the capital city regions, is below 50% of EU average.⁸⁵
2. **Regional disparity in productivity levels** have been increasing in the EU since the mid-1990s, due to more rapid growth in leading regions and limited diffusion of structural change and innovation.⁸⁶
3. There is a **convergence of capital city regions**
4. **across the EU (metropolitan convergence)**, which can be however at the expense of the surroundings. Leading regions at the **productivity frontier** (often capital city areas) are catching-up while rural areas are falling behind.⁸⁷
5. **Agglomeration forces** have driven the spatial localisation of European industries and agglomeration has a positive effect on growth pathways. Sectoral differences materialised with capital-intensive and skill-intensive activities concentrating in the core of the EU while slow growing industries characterised by unskilled labour tend to agglomerate in **peripheral areas**.⁸⁸
6. **Economic convergence** across EU regions will be highly unlikely in the short- and medium-term. Regional disparities will persist or even become worse in certain territories.⁸⁹
7. **CEE Member States: Poland, Romania, Bulgaria, Slovakia, The Czech Republic and Hungary** all show the same pattern: the capital city has become a **'champion region'**, and in most cases its performance drives the national average, while other regions are falling behind.
8. In **Poland** there is a clear west-east income gap between the regions and the income of the capital region is more than one and a half times that of the other national regions. This makes the capital region around **Warsaw** the only Polish region in the EU to fall into the

⁸⁵ European Commission, Directorate-General for Regional and Urban Policy (2017), *My Region, My Europe, Our Future. Seventh report on economic, social and territorial cohesion*, EU COM Publication: Brussels.

⁸⁶ Beugelsdijk, S., Mariko, J. K., Milionis, P. (2018), *Regional economic development in Europe: the role of total factor productivity*. *Regional Studies*, 52 (4), pp. 461-476 and Ridao-Cano, C., Bodewig, C. (2019): *How can Europe upgrade its „Convergence Machine“?* *Intereconomics – Review of European Economic Policy*, No. 1 pp.11-18.

⁸⁷ OECD (2016), *OECD Regional Outlook. Productive Regions for Inclusive Societies*. OECD Publishing: Paris.

⁸⁸ Iammarino, S., Rodriguez-Pose, A., Storper, M. (2018), *Regional Inequality in Europe: evidence, theory and policy implications*. *Journal of Economic Geography*, Vol. 19, No. 2 and De Dominicis, L. (2014), *Inequality and growth in European regions: Towards a place-based approach*. *Spatial Economic Analysis*, 9 (2), pp. 120-141.

⁸⁹ Farole, T., Goga, S., Ionescu-Heroiu, M. (2018), *Rethinking Lagging Regions – Using Cohesion Policy to deliver on the potential of Europe’s regions*, World Bank Report on the European Union: Washington D.C.

"medium" income category. **Bucharest, Bratislava or Prague** are also positive outliers that have outperformed their own countries and other regions by far.⁹⁰

9. **Southern Europe:** There are regions that underperformed their national average. Several **Italian regions** experienced a decline of between -20% and -40% in GDP since 2009. In general, almost all regions located in **Southern Europe**, with very few exceptions (for instance, the **Spanish region 'Pais Vasco'**), show an economic underperformance relative to others. **Andalusia's** economic development has been marked by ups and downs. The boom up until 2008/2009, which was also institutionally reflected by the progress from LDR to transition region, was followed by a severe economic crisis. Although Andalusia was one of the European regions with the highest growth rates between 2000 and 2008, it has fallen back since then, with disproportionately high unemployment rates and a slump in the economy. To this day, the creation of jobs for the unemployed (young) people remains there a serious challenge.⁹¹

As such, the literature illustrates a **complex narrative** where many different factors are influencing regional patterns of convergence and divergence, both between Member States and within regions of those states.

6.2 Regional Disparities in the EU Member States: Data and methodology

6.2.1 The THEIL index and the weighted coefficient of variation compared

Many different measures of regional disparities exist in the literature. They generally provide a quite consistent picture of the main patterns followed, but also have different results because they are differently sensible to the features of the distribution including the tails.⁹²

Unweighted measures were not considered because the representation they provide is biased by the fact that different regions have different sizes. For instance, the population size of NUTS 2 regions in Europe varies from 12.2 million to less than 30 thousand inhabitants.⁹³

Among the weighted ones, the one which has been chosen in this context is the Theil index. This index has the advantage of being decomposable in two or more layers⁹⁴ and this is very important because it allows an analysis to distinguish between within-country and between-country disparities.

However, the weighted coefficient of variation is also a very common indicator, especially in official EU Commission documents.⁹⁵ For this reason, this Annex shows that the Theil index and the weighted coefficient of variation depict a consistent pattern for regional disparities in Europe.

⁹⁰ Alcidi, C. (2019), Economic Integration and Income Convergence in the EU. *Intereconomics – Review of European Economic Policy*, No. 1, pp. 5-11.

⁹¹ Leth, D. O. (2015), The impact of EU Cohesion Policy. Lessons from the region of Andalusia, Spain. Unpublished thesis.

⁹² Ezcurra, R., & Rodríguez-Pose, A. (2009), Measuring the Regional Divide. In R. Capello & P. Nijkamp (Eds.), *Handbook of Regional Growth and Development Theories* (pp. 329–353). Cheltenham: Edward Elgar.

⁹³ Eurostat, (2018), *Regions in the European Union: Nomenclature of territorial units for statistics - NUTS 2016/EU-28*. Statistics. Brussels: Publications Office of the European Union,. <https://doi.org/10.2785/15544>.

⁹⁴ Akita, T. (2003), Decomposing regional income inequality in China and Indonesia using two-stage nested Theil decomposition method. *Annals of Regional Science*, 37(1), 55–77. <https://doi.org/10.1007/s001680200107> ; Butkus, M., Cibulskiene, D., Maciulyte-Sniukiene, A., & Matuzeviciute, K. (2018), What is the evolution of convergence in the EU? Decomposing EU disparities up to NUTS 3 level. *Sustainability (Switzerland)*, 10(5). <https://doi.org/10.3390/su10051552>.

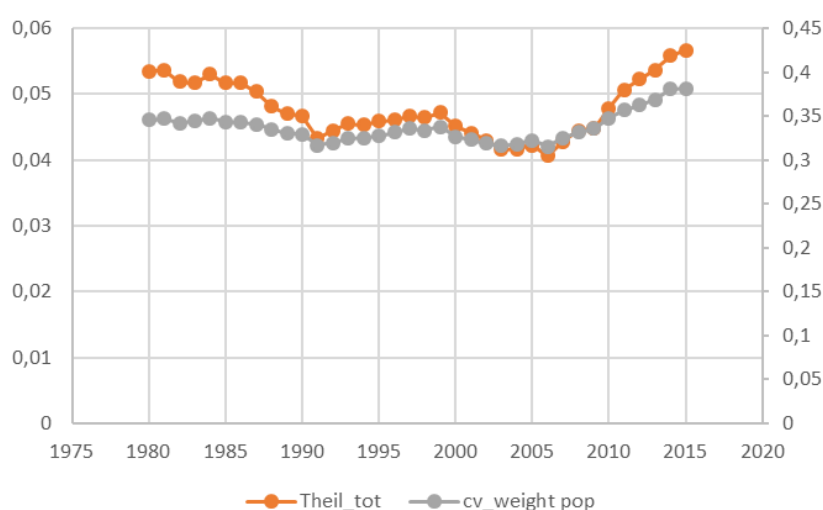
⁹⁵ European Commission (2017), *My Region, My Europe, Our Future – Seventh Report on economic, social and territorial cohesion*, accessed 28 June 2019 at https://ec.europa.eu/regional_policy/sources/docoffic/official/reports/cohesion7/7cr.pdf.

When demonstrated that the two indicators provide a consistent picture, the Theil index is preferred and applied in this study thanks to its decomposition in intra and intercountry components.

Figure 39 presents the dynamics of the level of total disparities between the NUTS 2 regions of the EU, calculated with the two indicators. As it can be seen, the picture is highly consistent, the peaks and troughs coincide and when one indicator increases the other does it too.

The difference between the two indicators is in terms of the magnitude of detected disparities (the two are plotted on different scales) and in terms of variations in increases and decreases, because the Theil seems to be slightly more sensible. However, the dynamics coincides perfectly, and this is what matters, if one wants to study the evolution of disparities and its determinants.

Figure 39: Comparing the evolution of regional disparities in Europe in terms of GDP per capita in PPS - Theil index (left axis) vs weighted coefficient of variation (right axis)



Source: Polimi (2019).

6.2.2 Identification of metropolitan areas

In order to perform an analysis of regional disparities at NUTS 3 level inside the respective NUTS 2 regions, there is a conceptual and methodological issue to be addressed. The issue comes from the fact that in many cases NUTS 3 regions do not include self-contained economic areas. Flows of people in terms of commuting are quite usual between different NUTS 3, especially when they belong to the same urban area and, in fact, many of the most important urban agglomerations in Europe span over several NUTS 3 regions, in some cases even belonging to more than one NUTS 2 region.

In an analysis of disparities, this issue is especially relevant because when people live in a region and work in another, population is calculated where they live and GVA where they work. This leads to overestimation of GVA in small NUTS 3 with many incoming commuters, while an underestimation takes place for the NUTS 3 that are origin of these flows.

Considering this aspect, if the analysis of NUTS 3 disparities within NUTS 2 regions is performed without any amendment to the current definition of statistical regions, it will incur in what is called the modifiable areal unit problem (MAUP), caused by the fact that geographical boundaries are not meaningful to define areas containing the phenomenon that one wants to capture,

generating results that depend on the definition of statistical areas rather than on the phenomenon itself.

In the specific case of metropolitan areas, to solve this issue one needs to account for commuting flows between one region and the other so to identify economically meaningful metropolitan areas. Providentially, Eurostat provides a comprehensive classification of European metropolitan areas as aggregations of NUTS 3 regions.⁹⁶

As a consequence of this classification, if two NUTS 3 regions belong to the same urban area they have to be considered as just one territorial unit. Problems arise when metropolitan areas span over several NUTS3 regions. Figure 40 presents many possible different cases and how they have been solved and treated in the analysis:

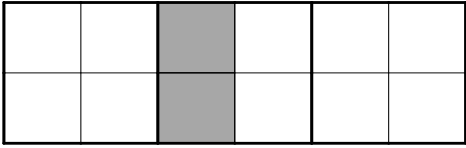
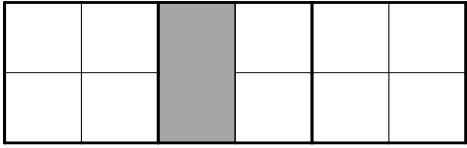
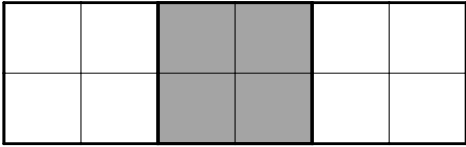

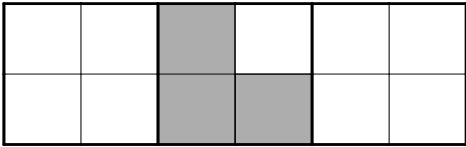

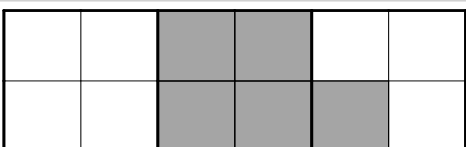
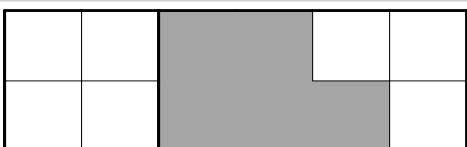
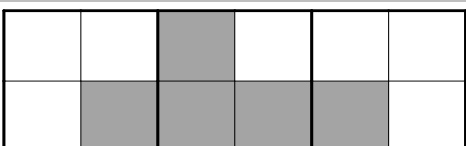

- the first case (A) is the easiest one, in which within a large NUTS 2 region two or more NUTS 3 regions belong to the same metropolitan area; in this case it is sufficient to aggregate these NUTS 3 regions into just one unit;
- the second case (B), which is a sub-case of the previous one, is when all the NUTS 3 regions within the NUTS 2 do belong to the same metropolitan area. In this case therefore NUTS 3 variability inside the NUTS 2 region is lost because the aggregation of NUTS 3 regions coincides exactly with the NUTS 2 region. This is the case of Ile de France;
- when there are two or more metropolitan areas within each NUTS 2 region (case C) the analysis does not need to merge these metropolitan areas but just all the regions within each metropolitan area. This is the case for example of Lombardy;
- a more complex situation emerges when a metropolitan area spans over more than one NUTS 2 region (cases D and E). In this case NUTS 3 regions belonging to the same NUTS 2 have to be aggregated together with NUTS 3 regions belonging to the same metropolitan areas but to a different NUTS 2. At this point, it is not possible to have a meaningful boundary between NUTS 2 and hence this also requires the aggregation of two or more NUTS 2 regions because otherwise their borders would not be meaningful. This is the case, for example, of London.

A final dataset is built with the application of such aggregations, with a decrease of the number of NUTS 2 regions from 276 to 241 and of NUTS 3 regions from 1342 to 1082.

In this way, the intra-regional disparities are analysed in slightly different way from the standard Eurostat NUTS classification but this is fully consistent with the metropolitan areas definition of Eurostat, solving the issue of commuting flows between different NUTS 3 regions.

⁹⁶ Dijkstra, L., Metropolitan regions in the EU, Regional Focus 01/2009, Brussels, DG REGIO, 2009, http://ec.europa.eu/regional_policy/sources/docgener/focus/2009_01_metropolitan.pdf ; Dijkstra, L., Poelman, H. Regional typologies: a compilation, Regional Focus 01/2011, Brussels, DG REGIO, 2011.

Figure 40: Graphical representation of data aggregation

	How data are provided by Eurostat	How data are analysed
A		
B		
C		
D		
E		

Legend:

Grey: metropolitan regions as defined by the EU

Dark line: NUTS 2 border

Light line: NUTS 3 border

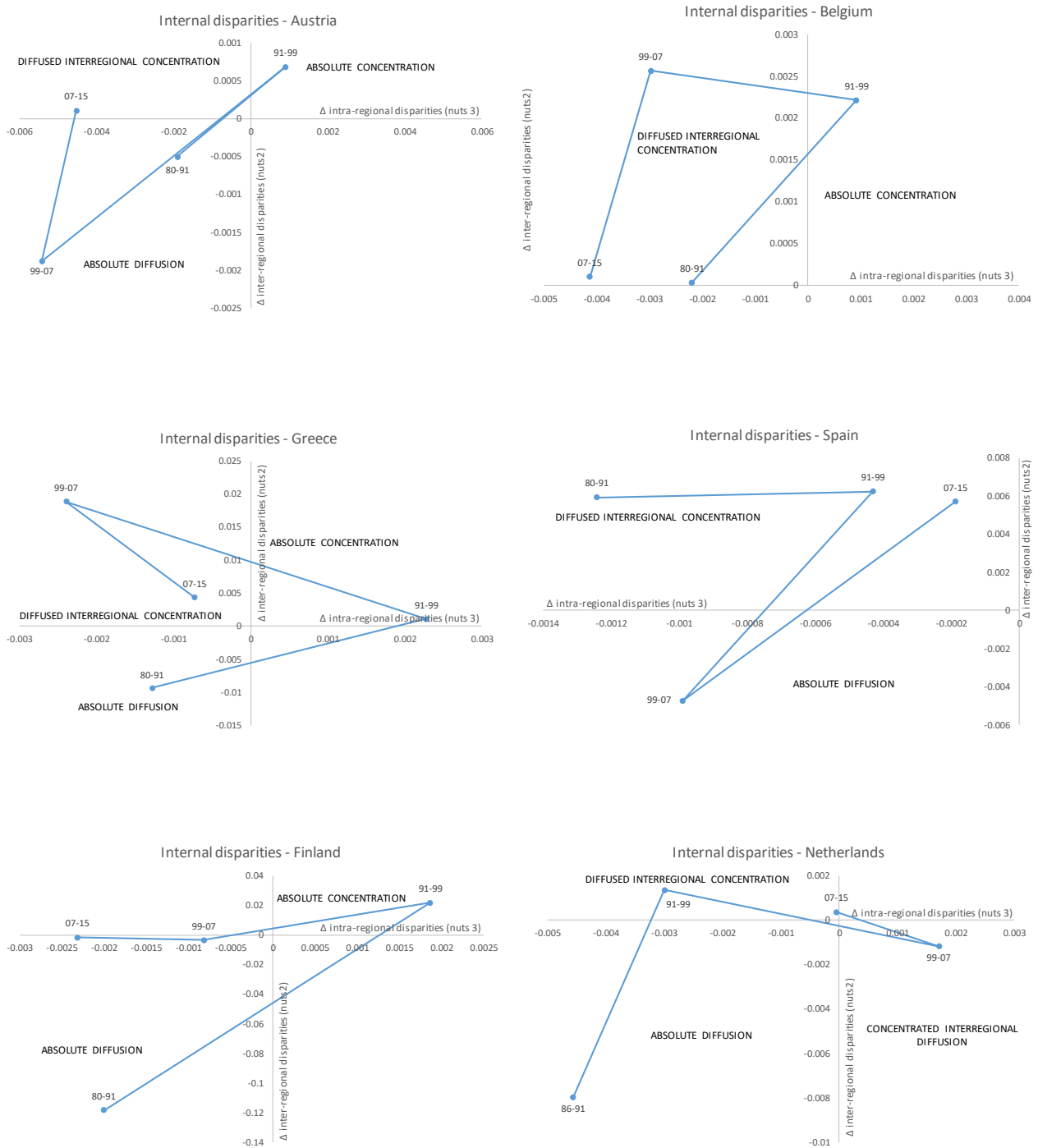
Source: Polimi (2019).

6.2.3 Interregional vs. Intra-regional disparities by single country

The European countries show differences in their geographical patterns of growth, as far as interregional (between NUTS 2) and intraregional (within NUTS 2) disparities are concerned. In particular, we were able to single out three specific situations, namely:

- Some old Member States ending-up in a situation of *diffused inter-regional concentration* (increasing interregional disparities accompanied by decreasing intraregional disparities).

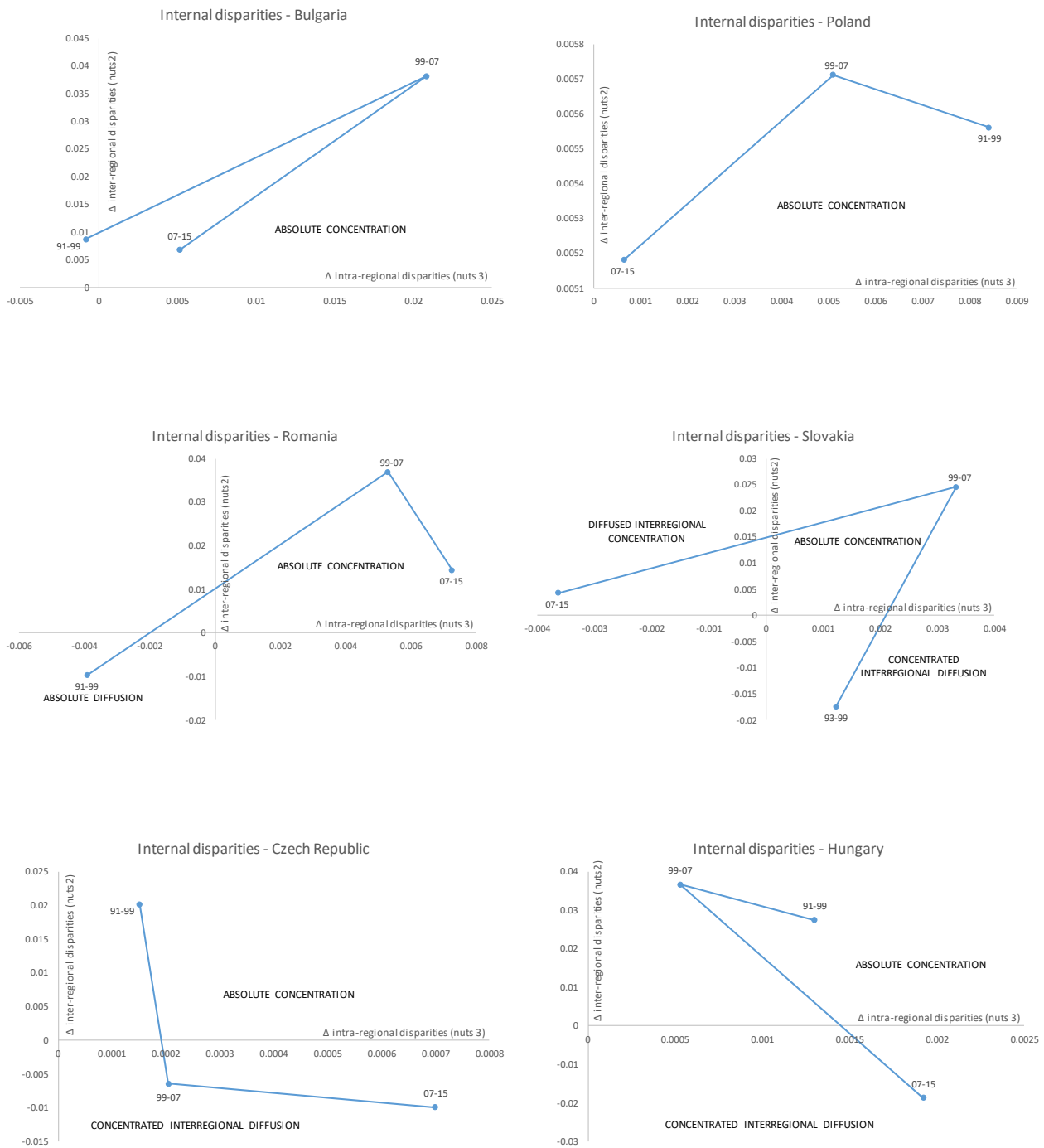
Figure 41: Diffused internal disparities in the old Member States



Source: Polimi (2019).

- CEE Member States countries characterised by *absolute concentration* (increasing disparities both at the interregional and intraregional level).

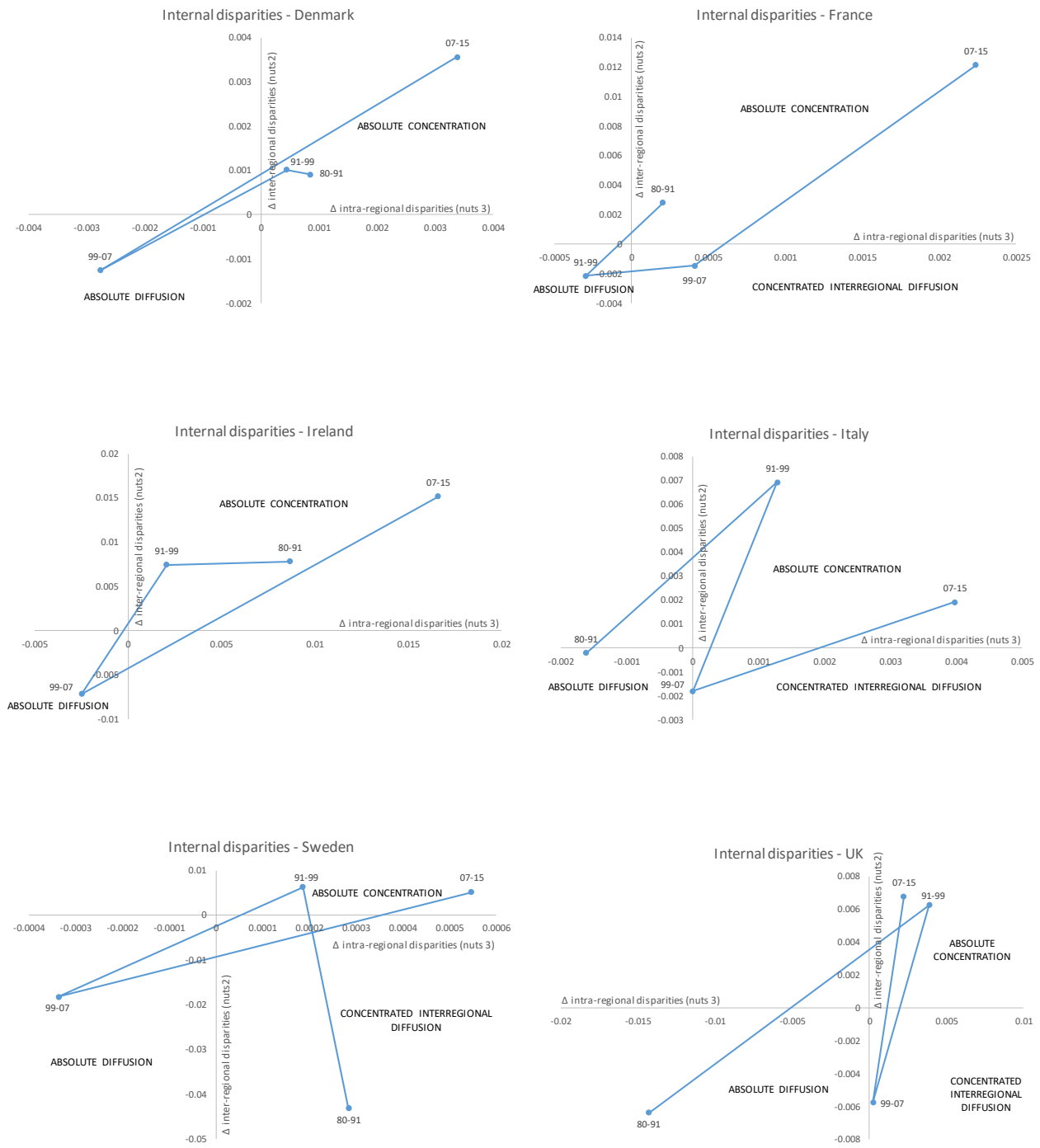
Figure 42: Increasing inter- and intraregional disparities of the CEE Member States



Source: Polimi (2019).

- Old Member States experiencing *absolute concentration* (increasing disparities both at the interregional and intraregional level) during the crisis.

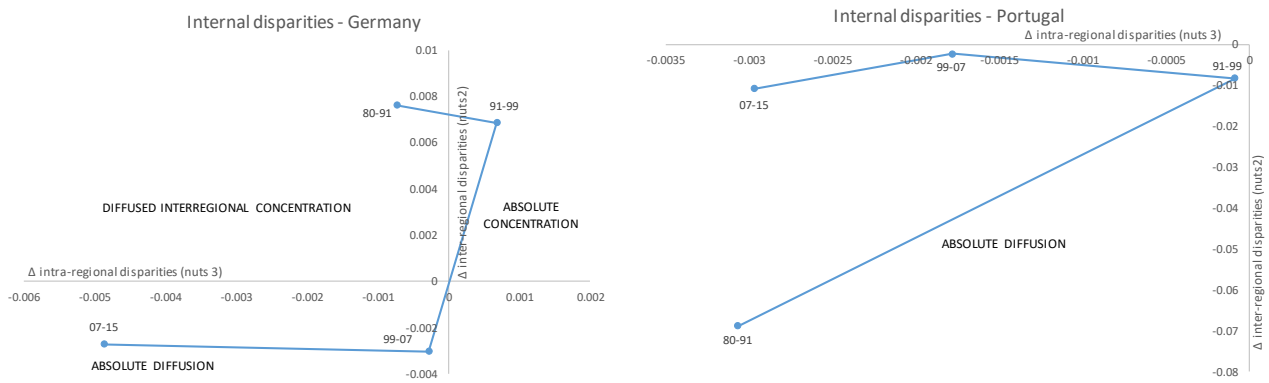
Figure 43: Increasing intra- and interregional disparities in old Member States



Source: Polimi (2019).

- Finally, Germany and Portugal show a peculiar behavior, ending up in absolute diffusion (decreasing disparities both at the interregional and intraregional level).

Figure 44: Absolute diffusion in Germany and Portugal



Source: Polimi (2019).

6.2.4 The role of sectoral composition and productivity differentials on EU regional disparities

The purpose of this analysis is to show to what extent regional disparities in Europe depend on regional industrial sectoral composition or whether disparities are an effect of different levels of productivity within the same sector across European regions. The starting point is the observation that regional disparities depend on regional GVA per capita, which can be decomposed into regional productivity and regional employment rate.

$$(4.1) \text{ Regional income per capita} = \frac{Y_r}{N_r} = \frac{Y_r}{E_r} * \frac{E_r}{N_r} = P_r * \frac{E_r}{N_r},$$

where Y is GVA, N is population, E is employment and P is productivity in a given region r .

Productivity, however, is not the same in all sectors and, consequently, a different level of regional productivity can depend on (i) the fact that the region is specialised in sectors which are less productive, for example traditional or labour intensive sectors, or (ii) the fact that, with equal sectoral composition, regions can be less productive in the same sectors.

To take the different sectoral productivities into account, income per capita can be decomposed as follows:

$$(4.2) \text{ Regional income per capita} = \frac{Y_r}{N_r} = \frac{\sum_{i=1}^n P_r^i E_r^i}{N_r} = \frac{\sum_{i=1}^n P_r^i s_r^i}{N_r} E_r = \sum_{i=1}^n P_r^i s_r^i * \frac{E_r}{N_r},$$

where $P_r^i = \frac{Y_r^i}{E_r^i}$, $s_r^i = \frac{E_r^i}{E_r}$ and, by definition, $\sum_{i=1}^n s_r^i = 1$

each of the n sectors is represented by an index i . By definition, the decomposition is consistent with the fact that regional productivity (P_r) is a weighted average of the sectoral productivities (P_r^i).

In order to analyse whether inter-sectoral productivity and/or regional sectoral composition determines the position of regions in terms of GDP per capita in the European Union, it is possible to calculate the regional level of GDP per capita by assuming all regions having either the same productivity level of the EU or the same sectoral composition of the EU.

In formulas, these two effects are calculated as:

$$(4.3) \text{ Regional productivity effect} = \sum_{i=1}^n P_{EU}^i s_r^i * \frac{E_r}{N_r} - \sum_{i=1}^n P_r^i s_r^i * \frac{E_r}{N_r}$$

$$(4.4) \text{ Regional industrial MIX (sectoral composition) effect} = \sum_{i=1}^n P_r^i s_{EU}^i * \frac{E_r}{N_r} - \sum_{i=1}^n P_r^i s_r^i * \frac{E_r}{N_r}$$

Those regions with a larger (smaller) GDP per capita when their productivity is artificially set to the EU average, are regions suffering (gaining) from their industrial productivity. Those regions registering a larger (smaller) GDP per capita when their sectoral shares are artificially set to the EU average, are regions suffering (gaining) from their sectoral composition.

The two effects are calculated for the year 2015 with six sectors (the maximum number available in the Cambridge Econometrics database), at NUTS 2 level and standardised in terms of percentage of the EU GDP per capita in PPS. The two effects are mapped in Map 3.4.1 in the main report.

In order to register the productivity or sectoral composition effect on regional disparities, and their relative order of magnitude, the Theil index is computed under the two assumptions of all regions having the same productivity and all regions having the same sectoral composition. It turns out that the effect of productivity is the largest one. In fact, should all EU regions have the same productivity, the Theil index would decrease of 60% (Figure 3.4.1 in the main report). The effect of sectoral composition, however, is not negligible since the Theil index would decrease of more than 23% should all regions have the same EU sectoral composition.

6.2.5 The role of agricultural employment on EU regional disparities

Although agriculture is no longer an important sector in terms of employment or total value added at the EU level, there are some regions, especially lagging regions, whose economy still depends largely on agriculture. These regions are in fact mostly present in the new Member States and in some peripheral regions of the Western countries; even some regions in the core of the EU keep an important share of employment in agriculture.

At the EU level, agriculture has on average a lower productivity than the other sectors, but agricultural productivity can vary considerably from a region to the other. For the purpose of this analysis, given the focus on regional disparities and data limitations, productivity will be considered in terms of value added per employee, rather than in terms of production per hectare as in agricultural analyses.

$$(5.1) \text{ Regional income per capita} = \sum_{i=1}^n P_r^i s_r^i * \frac{E_r}{N_r},$$

$$\text{where } P_r^i = \frac{Y_r^i}{L_r^i}, s_r^i = \frac{E_r^i}{E_r}. \text{ By definition, } \sum_{i=1}^n s_r^i = 1$$

The question is to what extent a region is suffering, in terms of GDP per capita, from a high share of employment in agriculture and to what extent it is suffering from a lower than average agricultural productivity.

For this reason, equations 4.3 and 4.4 of Williamson (1965) can be reformulated, keeping agriculture as the EU average and the other sectors to the regional values, in order to disentangle the agricultural effects. To keep computations simple, rather than having all the other sectors separately, all non-agricultural sectors have been merged into one macro-sector "rest", which is the total GVA and employment of the other sectors. In this way, the effect of agricultural productivity and the effect of the share of employment in agriculture become the following ones:

$$(5.2) \text{ Effect of regional agricultural productivity} = (P_{EU}^{agri} S_r^{agri} + P_r^{rest} S_r^{rest}) * \frac{E_r}{N_r} - (P_r^{agri} S_r^{agri} + P_r^{rest} S_r^{rest}) * \frac{E_r}{N_r}$$

$$(5.3) \text{ Effect of the share of employment in agriculture} = (P_r^{agri} S_{EU}^{agri} + P_r^{rest} S_{EU}^{rest}) * \frac{E_r}{N_r} - (P_r^{agri} S_r^{agri} + P_r^{rest} S_r^{rest}) * \frac{E_r}{N_r}$$

When regional agricultural productivity is smaller (larger) than the EU average, the region gains (suffers) from agricultural productivity; when the share of agriculture is larger (smaller) than the EU average, the region suffers (gains) from its share of employment in agriculture.

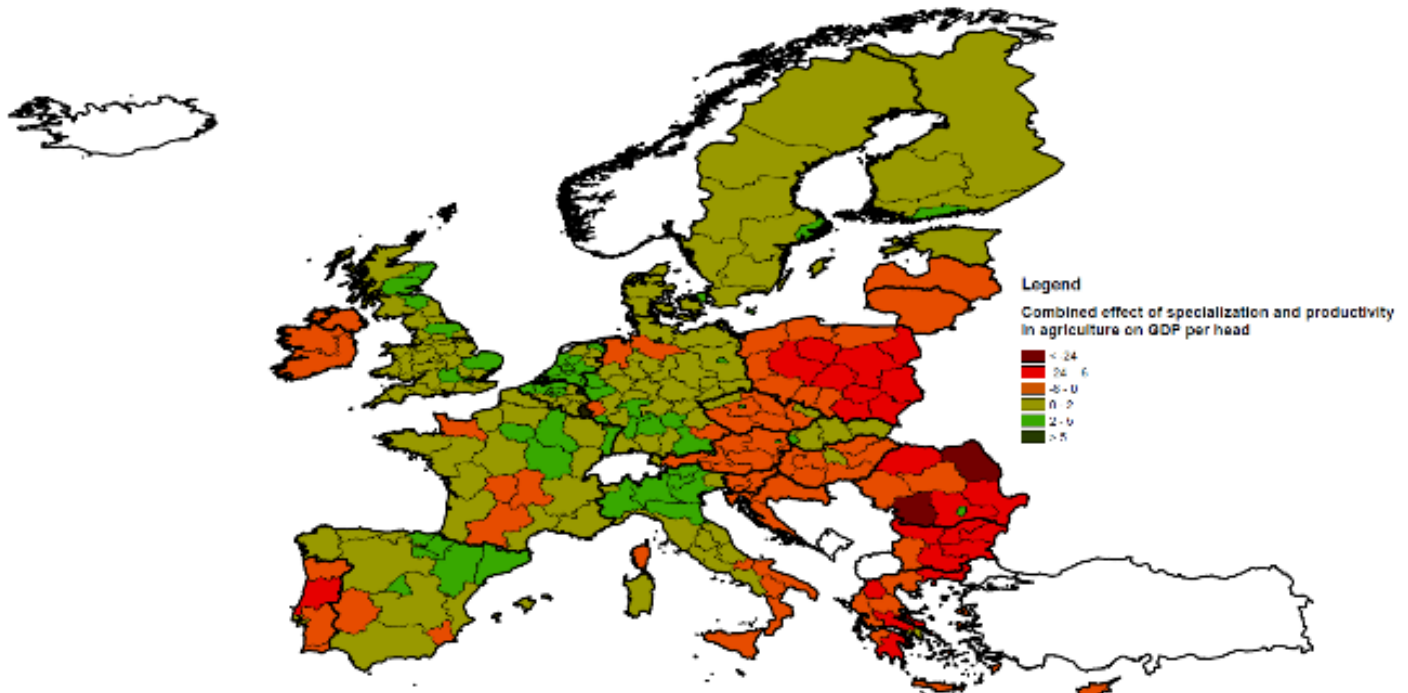
A combined effect can also be calculated, where the regional share of employment in agriculture is set to the EU level and the regional agricultural productivity too. This case is interesting because there are some advanced regions (e.g. Emilia Romagna) which compensate their high share of employment in agriculture (causing a loss in GDP) with a higher agricultural productivity (generating an increase in GDP).

$$(5.4) \text{ Combined regional agricultural effect} = (P_{EU}^{agri} S_{EU}^{agri} + P_r^{rest} S_{EU}^{rest}) * \frac{E_r}{N_r} - (P_r^{agri} S_r^{agri} + P_r^{rest} S_r^{rest}) * \frac{E_r}{N_r}$$

The three effects are calculated for the year 2015 using Cambridge Econometrics data at NUTS 2 level and standardised in terms of percentage of the EU GDP per capita in PPS. The three effects are mapped in Map 5 in the main report (share of employment in agriculture and productivity effect) and in Map 4 (combined effect).

The impact on disparities of these two effects and their relative magnitude are presented in Figure 17 in the main report.

Map 8: Combined regional agricultural effect (year 2015)



Source: Polimi (2019).

6.2.6 A dynamic industrial approach to productivity growth: shift & share analysis

From an industrial perspective, differences in productivity growth among European regions can be interpreted as the result of an increase in the demand of specific goods, or as a higher productivity growth in an industry in a specific region with respect to the same industry located somewhere else.

These considerations are at the basis of the well-known 'shift-share analysis', applied to productivity growth. Regional productivity growth can be thought as:

$$(6.1) \quad \Delta P_r = \Delta P_{EU} + s$$

where ΔP stands for productivity growth⁹⁷, r is the region, EU the European Union (reference area) and s is the "shift", measuring the difference between local productivity growth with respect to the one in the reference area (EU). The shift can of course be either positive or negative depending on the specific region growing more or less than the European Union.

In particular, the shift can be decomposed in:

- a MIX effect, when regions endowed with a mix of sectors whose demand at world level is more dynamic than other sectors. It is therefore a typical demand-driven composition effect and
- a DIFF effect, when regions are characterised by sectors that register higher productivity dynamics than elsewhere. It is therefore a typical supply-driven competition effect.

The two effects are calculated as follows:

$$(6.2) \quad \text{MIX effect} = \sum_{i=1}^n \frac{E_{i,r}^0}{E_r^0} \left(\frac{P_{i,EU}^1}{P_{i,EU}^0} - \frac{P_{EU}^1}{P_{EU}^0} \right)$$

$$(6.3) \quad \text{DIFF effect} = \sum_{i=1}^n \frac{E_{i,r}^0}{E_r^0} \left(\frac{P_{i,r}^1}{P_{i,r}^0} - \frac{P_{i,EU}^1}{P_{i,EU}^0} \right)$$

where E is the employment and is used to highlight the relevance of the specific sector in the particular region, i represents the (n) sectors, and there are 2 time periods (0 and 1, where 0 is prior to 1).

An application of this methodology is provided in Figure 45, panels (a), (b) and (c). The figure reports an analysis at NUTS 2 level of the productivity dynamics of six macro-sectors (the maximum number available in the Cambridge Econometrics database) in three macro-territorial areas (North, CEECs, and South) with respect to the European Union, based on the annual average productivity growth between 2007 and 2015.⁹⁸

The Figure is built so to easily highlight the two effects:

- all industries that lay above the 45 degrees' line in Figure 45 register a higher productivity growth with respect to Europe and thus a positive DIFF (competition) effect;
- all industries that lay on the right of the vertical line in Figure 45 representing the average industrial growth at the EU level, are sectors whose demand grows more than the EU

⁹⁷ Here measured as GDP PPS per employee.

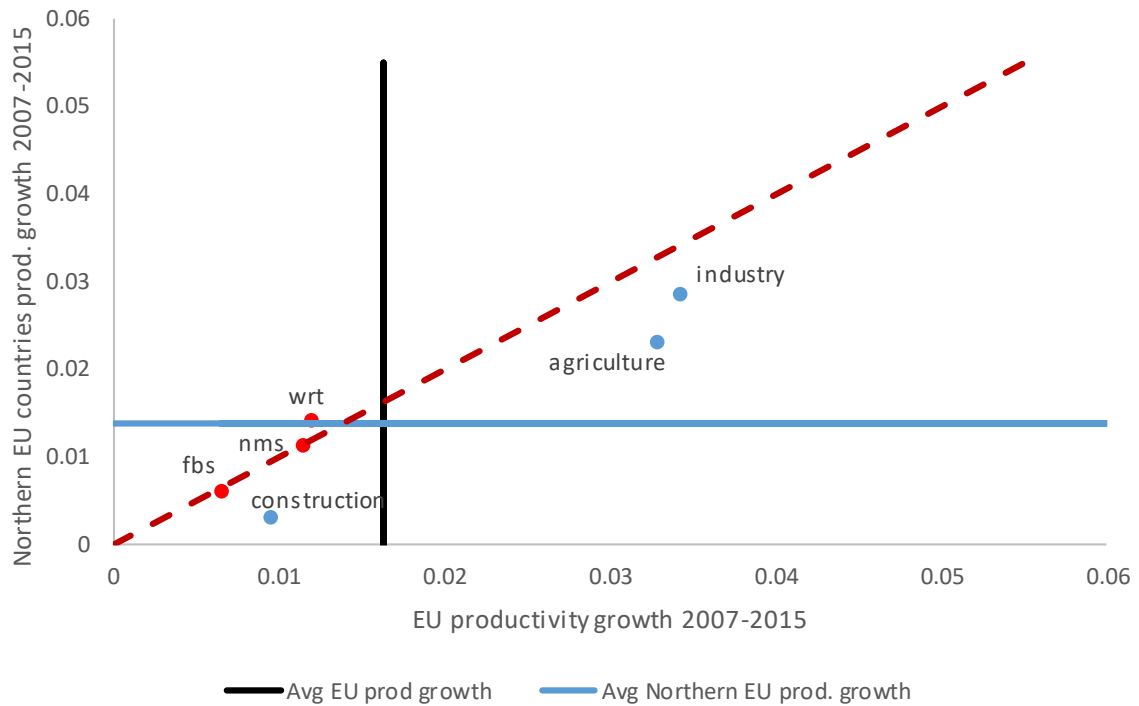
⁹⁸ "North" includes Austria, Belgium, Germany, Denmark, Finland, France, Ireland, Luxembourg, Netherlands, Sweden, and UK. "CEE" includes Bulgaria, the Czech Republic, Estonia, Croatia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia, and Slovakia. "South" includes Cyprus, Greece, Spain, Italy, Malta, and Portugal.

average. When they represent a large share of employment in the region, they register a positive MIX (composition) effect.

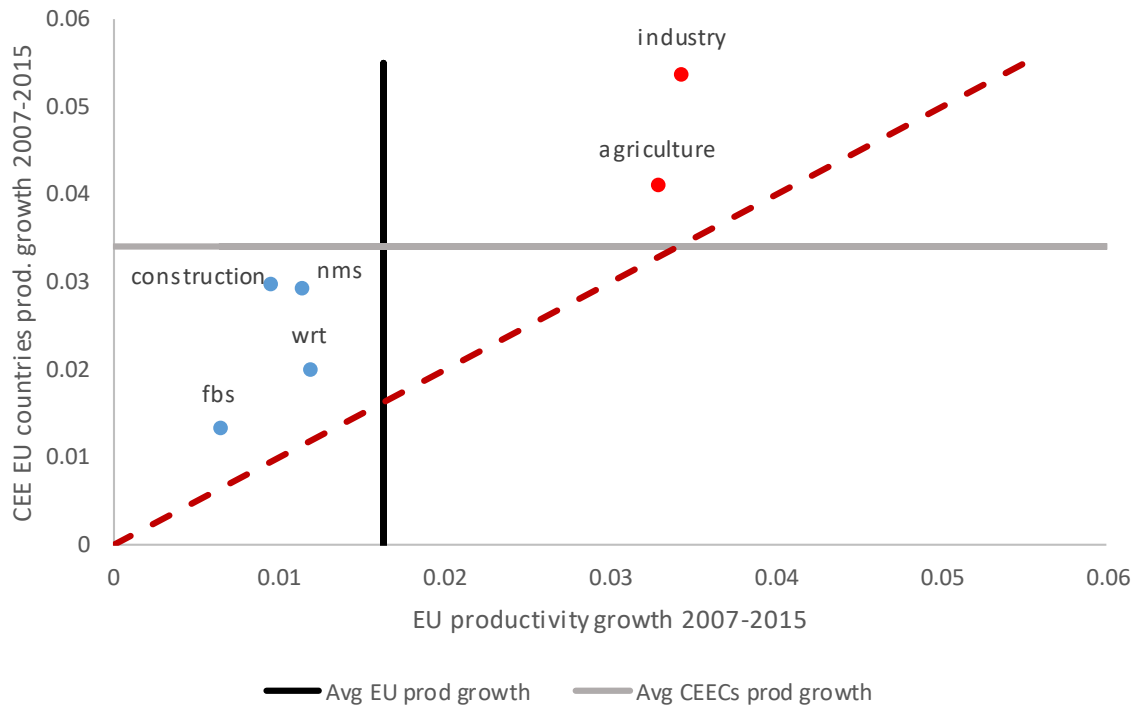
As can be easily seen from the figure, particularly positive is the performance of CEECs, which show both a positive MIX and a positive DIFF in sectors in which the area registers a higher share of employment with respect to the average EU (red in the chart). On the other hand, the situation of Northern and Southern MS is more concerning, being their specialisation sectors (higher share of employment with respect to the EU, red in the chart) much worse off.

Figure 45: Shift & share analysis on average annual productivity growth 2007-2015

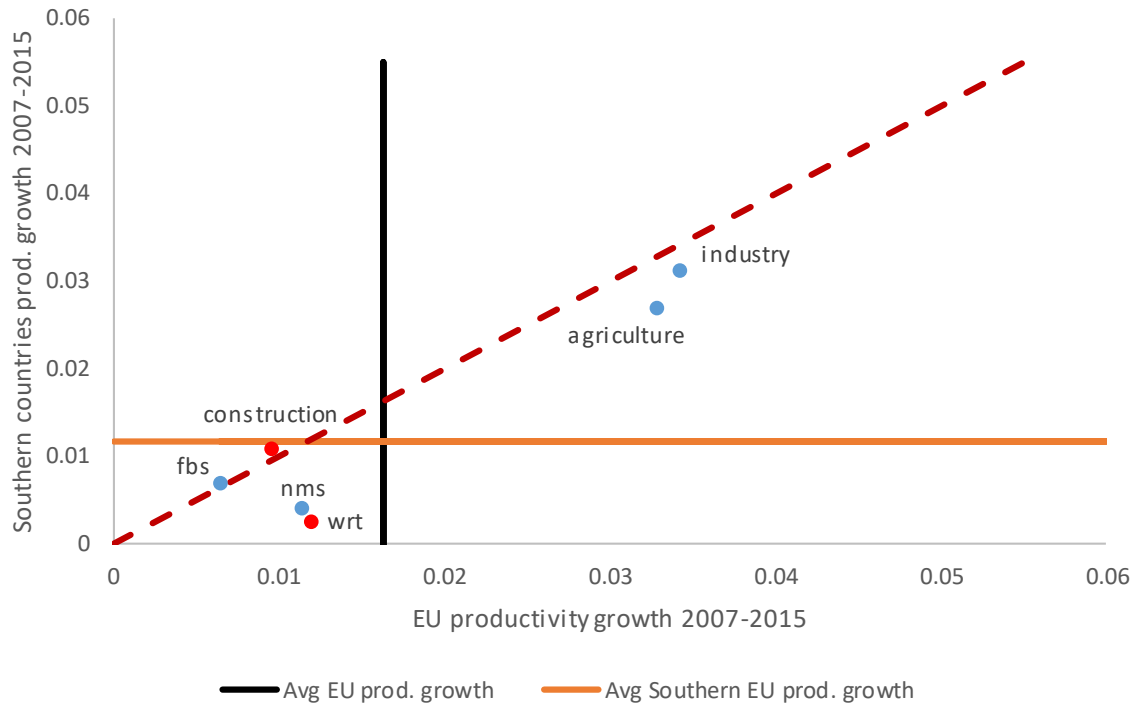
a) Northern European Member States



b) CEE Member States



c) Southern European Member States



● Sectors registering a higher share of employment with respect to the EU

Source: Polimi (2019).

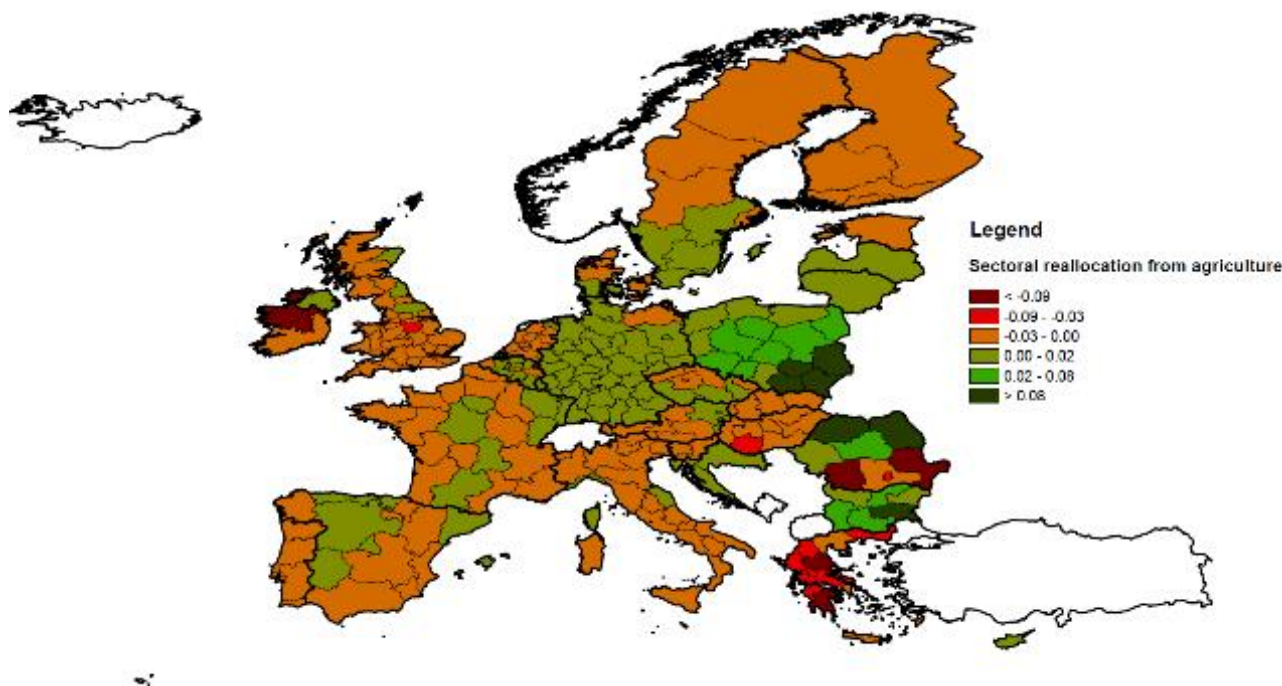
The basic Shift & Share analysis presented above can be made more informative and meaningful through the highlighting of a further effect, suitable to explain the total shift: **the sectoral reallocation effect**, representing the reallocation of employment over time towards sectors with different productivity growth. The full decomposition in this case is expressed in equation (6.4):⁹⁹

$$(6.4) \quad \underbrace{\left(\frac{P_r^1}{P_r^0} - \frac{P_{EU}^1}{P_{EU}^0}\right)}_{\text{TOTAL SHIFT}} = \sum_{i=1}^n \frac{E_{i,r}^0}{E_r^0} \left[\underbrace{\left(\frac{P_r^1}{P_r^0} - \frac{P_{i,r}^1}{P_{i,r}^0}\right)}_{\text{REALLOCATION}} + \underbrace{\left(\frac{P_{i,r}^1}{P_{i,r}^0} - \frac{P_{i,EU}^1}{P_{i,EU}^0}\right)}_{\text{DIFF}} + \underbrace{\left(\frac{P_{i,EU}^1}{P_{i,EU}^0} - \frac{P_{EU}^1}{P_{EU}^0}\right)}_{\text{MIX}} \right]$$

The reallocation effect does not provide a detailed piece of information once calculated for single sectors, since the sector of destination is in fact unknown, but has a great importance in aggregate terms, providing a general magnitude of the effect. The main report contains maps on the total reallocation.

For the sake of completeness, the effects by sector are in any case displayed in the maps below.

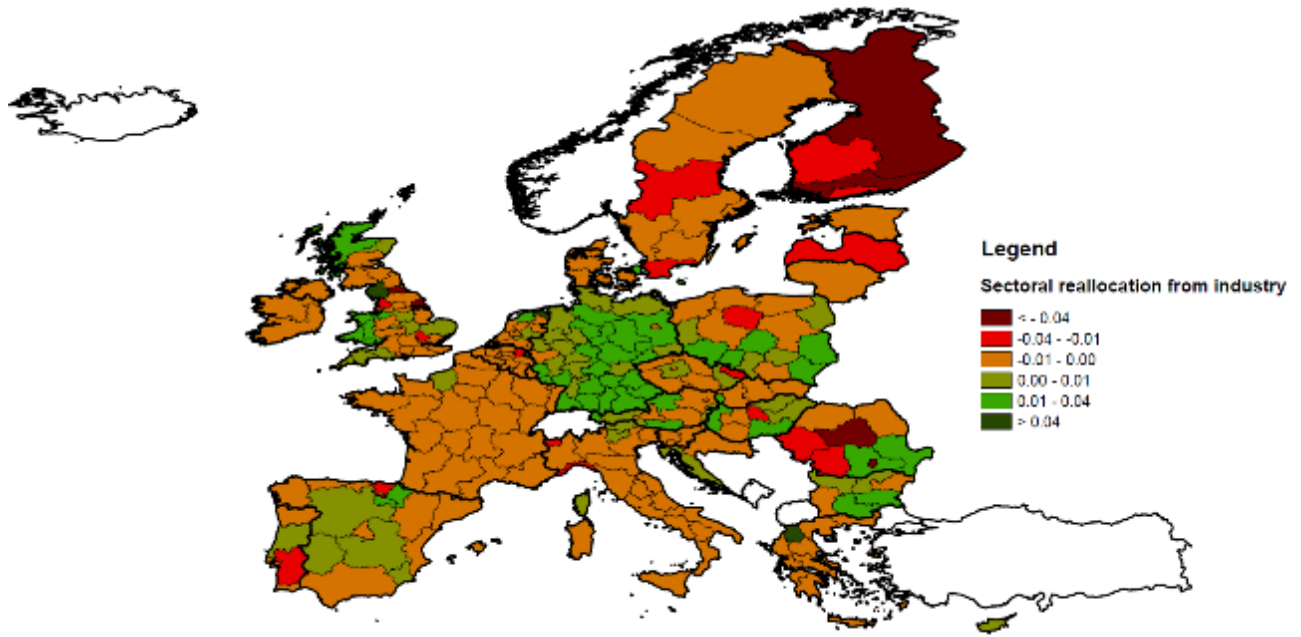
Map 9: Sectoral reallocation from agriculture based on productivity growth (2007-2015)



Source: Polimi (2019).

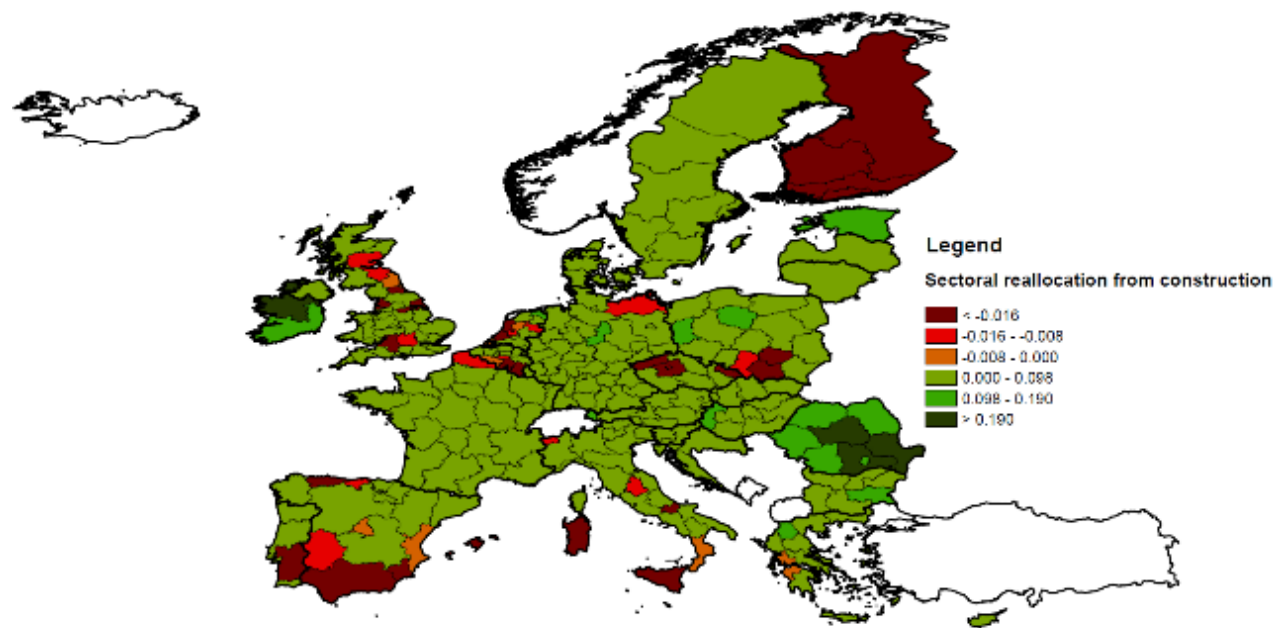
⁹⁹ Camagni, R. (1980), Il mutamento strutturale nell'industria di una regione europea, *Economia e Politica Industriale*, n. 26.

Map 10: Sectoral reallocation from industry based on productivity growth (2007-2015)



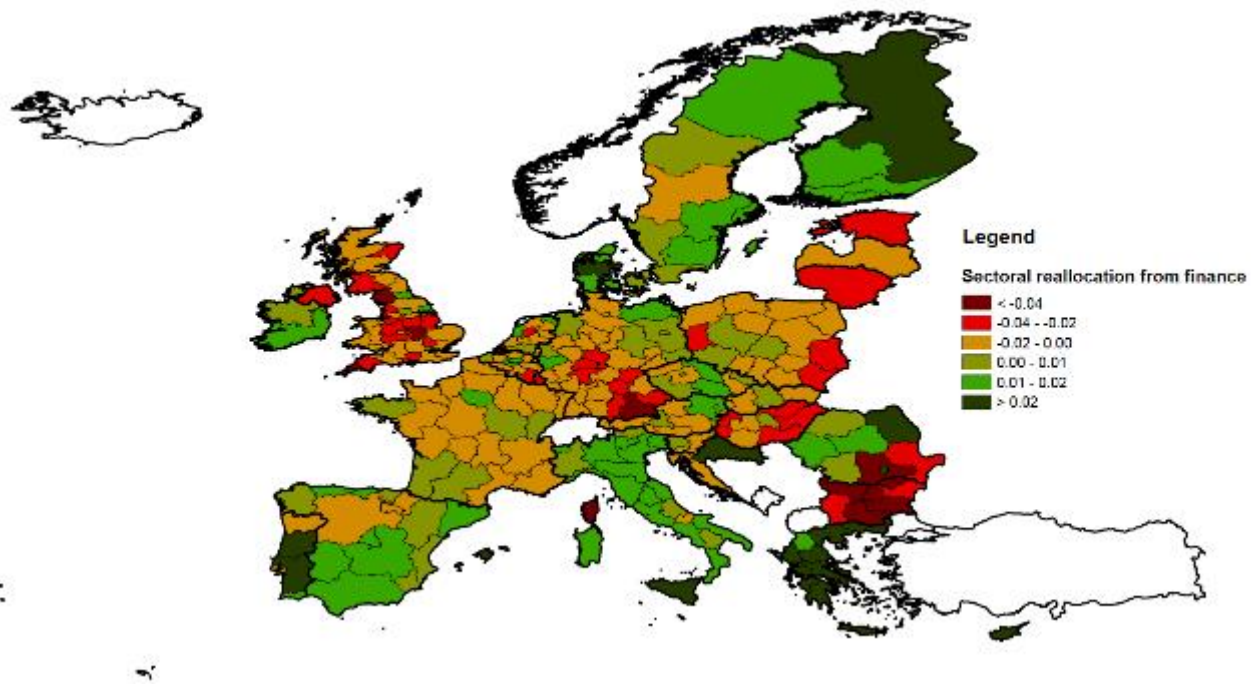
Source: Polimi (2019).

Map 11: Sectoral reallocation from construction based on productivity growth (2007-2015)



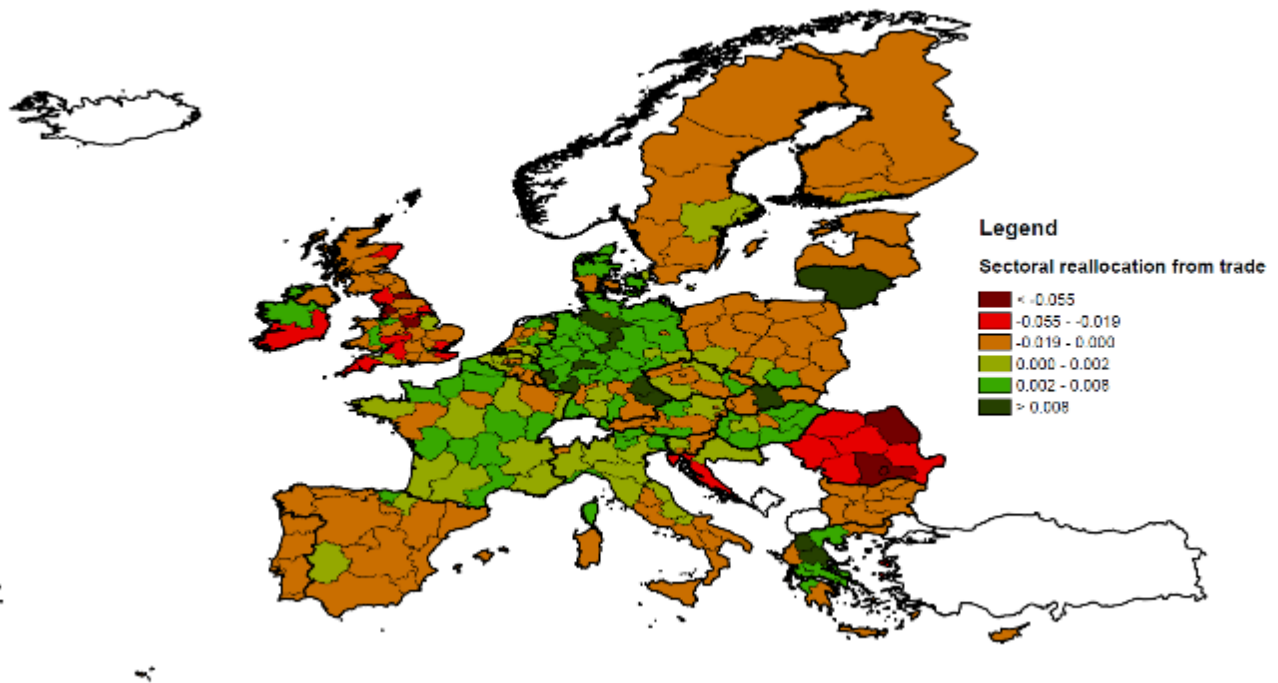
Source: Polimi (2019).

Map 12: Sectoral reallocation from finance and business services based on productivity growth (2007-2015)



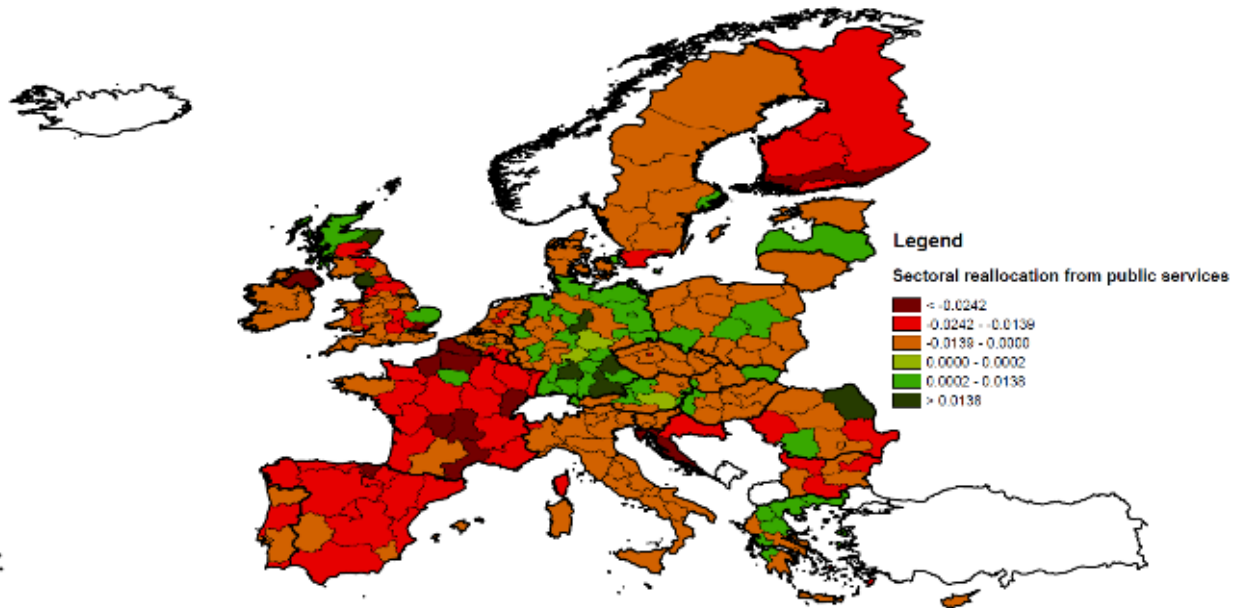
Source: Polimi (2019).

Map 13: Sectoral reallocation from wholesale and retail trade based on productivity growth (2007-2015)



Source: Polimi (2019).

Map 14: Sectoral reallocation from non-market services based on productivity growth (2007-2015)



Source: Polimi (2019).

6.2.7 Growth assets and regional performance: methodology and results from regression analyses

The regression analysis was meant at investigating the effects of different growth assets on regional performance (GDP growth). It was carried out on European NUTS 2 regions in three subsequent steps:

1. Analysis of the average effects of different growth assets on GDP growth (step 1);
2. Analysis of the possible specific role of different endowment levels of growth assets on GDP growth (constant/increasing returns) (step 2);
3. Analysis of the particular growth assets that could favor GDP growth in different areas (e.g. agricultural, industrial, metropolitan) (step 3).

Step 1 – Effects of growth assets on GDP growth

The first link was investigated through the following models:

$$(7.1a) \text{ gdp growth} = \alpha + \beta_1 \text{human capital} + \beta_2 \text{accessibility} + \beta_3 \text{QoG} + \beta_4 \text{radical inn} + \beta_5 \text{mkt inn} + \beta_6 \text{gdp pc} + \beta_7 \text{metro} + \beta_8 \text{trust} + \beta_9 \text{sh agr} + \beta_{10} \text{sh ind} + \beta_{11} \text{sh ht} + \beta_{12} D + \varepsilon$$

$$(7.1b) \text{ gdp growth} = \alpha + \beta_1 \text{human capital} + \beta_2 \text{accessibility} + \beta_3 \text{QoG} + \beta_4 \text{radical inn} + \beta_5 \text{mkt inn} + \beta_6 \text{gdp pc} + \beta_7 \text{metro} + \beta_8 \text{sh fbs} + \beta_9 \text{metro*sh fbs} + \beta_{10} \text{trust} + \beta_{11} \text{sh agr} + \beta_{12} \text{sh ind} + \beta_{13} \text{sh ht} + \beta_{14} D + \varepsilon$$

where *gdp growth* is our measure of economic performance; it is computed as average annual GDP PPS growth rate between 2007 and 2016.

Specification (7.1a) differs from specification (7.1b) in that the latter includes the standardised share of employment in financial and business services (*sh fbs*) and its interaction with the metro dummy, in order to better catch the impact on regional growth of the presence of urban agglomerations characterised by advanced services. Specification (7.1b) will work as the basis for the subsequent models.

The main variables of interest – whose impact on economic development is expected to be positive – are the regional growth assets, namely:

- *human capital*, measured as percentage of college graduates over total labor force;
- *accessibility*, measured as multimodal accessibility per million inhabitants;
- *QoG*, representing the University of Gothenburg quality of government index;
- *radical inn*, representing the endowment of radical innovation measured as patent applications per thousand inhabitants; and
- *mkt inn*, representing the endowment of marketing innovation measured as trademark applications per thousand inhabitants.

Additional controls include:

- per capita GDP PPS in 2007 (*gdp pc*) to control for the initial level of development;

- a dummy variable (*metro*) equal to 1 if the NUTS 2 region hosts one or more "metropolitan regions"¹⁰⁰;
- *trust*, measured as percentage of citizens trusting others, to control for intangible territorial capital;
- share of employment in agriculture (*sh agr*), as a control on sectoral composition;
- share of employment in industry (*sh ind*), as a further control on sectoral composition; and
- share of employment in high-tech sectors (*sh ht*) as a measure of specialisation in highly technological industries.

Finally, country fixed effects (*D*) are included.

In order to ensure as much as possible the expected direction of causality, the variables enter the models according to the correct temporal consequentiality; they are indeed lagged to the beginning of the growth period explained.¹⁰¹

Step 2 – Effects of growth assets on GDP growth for different endowment levels

The second link of the reasoning – i.e. the possibly different impact of different endowment levels of assets on economic growth – was investigated by estimating equation (7.1b) introducing one at a time each investigated growth asset divided by quartiles.

The equation therefore becomes:

$$(7.2) \text{ gdp growth} = \alpha + \beta_1 \text{asset } 1q + \beta_2 \text{asset } 2q + \beta_3 \text{asset } 3q + \beta_4 X + \beta_5 \text{gdp pc} + \beta_6 \text{metro} + \beta_7 \text{sh fbs} + \beta_8 \text{metro} * \text{sh fbs} + \beta_9 \text{trust} + \beta_{10} \text{sh agr} + \beta_{11} \text{sh ind} + \beta_{12} \text{sh ht} + \beta_{13} D + \varepsilon$$

where *asset* represents in each estimation a specific investigated growth asset (either human capital, accessibility, quality of government, radical innovation or marketing innovation), inserted by quartile through dummy variables equal to 1 if the region is part of the first, second or third quartile of the distribution, respectively (the fourth quartile is therefore the reference category/benchmark), zero otherwise. *X* represents all other investigated growth assets, while the other variables, country fixed effects and the temporal consequentiality remain the ones described above.

Step 3 – Effects of growth assets on GDP growth in specific areas

The third link of the reasoning – i.e. the possibly different impacts of assets on economic growth in areas with different sectoral composition – was investigated through the following models:

$$(7.3a) \text{ gdp growth} = \alpha + \beta_1 \text{asset} + \beta_2 \text{sector spec} + \beta_3 \text{asset} * \text{sector spec} + \beta_4 Z + \beta_5 X + \beta_6 \text{gdp pc} + \beta_7 \text{trust} + \beta_8 \text{sh ht} + \beta_9 D + \varepsilon$$

$$(7.3b) \text{ gdp growth} = \alpha + \beta_1 \text{asset } 1q + \beta_2 \text{sector spec} + \beta_3 \text{asset } 1q * \text{sector spec} + \beta_4 Z + \beta_5 X + \beta_6 \text{gdp pc} + \beta_7 \text{trust} + \beta_8 \text{sh ht} + \beta_9 D + \varepsilon$$

$$(7.3c) \text{ gdp growth} = \alpha + \beta_1 \text{asset } 2q + \beta_2 \text{sector spec} + \beta_3 \text{asset } 2q * \text{sector spec} + \beta_4 Z + \beta_5 X + \beta_6 \text{gdp pc} + \beta_7 \text{trust} + \beta_8 \text{sh ht} + \beta_9 D + \varepsilon$$

¹⁰⁰ Metropolitan regions are NUTS 3 regions or a combination of NUTS 3 regions which represent all agglomerations of at least 250,000 inhabitants (for further details: <https://ec.europa.eu/eurostat/web/metropolitan-regions/background>, accessed 15 May 2019).

¹⁰¹ The only exceptions are Quality of Government (QoG), 2010; trust, 2000; and share of employment in high-tech sectors (*sh ht*), average 2002-2006.

$$(7.3d) \text{ gdp growth} = \alpha + \beta_1 \text{asset } 3q + \beta_2 \text{sector spec} + \beta_3 \text{asset } 3q * \text{sector spec} + \beta_4 Z + \beta_5 X + \beta_6 \text{gdp pc} + \beta_7 \text{trust} + \beta_8 \text{sh ht} + \beta_9 D + \varepsilon$$

$$(7.3e) \text{ gdp growth} = \alpha + \beta_1 \text{asset } 4q + \beta_2 \text{sector spec} + \beta_3 \text{asset } 4q * \text{sector spec} + \beta_4 Z + \beta_5 X + \beta_6 \text{gdp pc} + \beta_7 \text{trust} + \beta_8 \text{sh ht} + \beta_9 D + \varepsilon$$

where asset (specification 7.3a) is again the particular growth asset being considered (either human capital, accessibility, quality of government, radical innovation or marketing innovation); X is, as above, a vector including the other investigated growth assets. Sector spec refers to the specific sectoral specialisation considered (either agricultural, industrial, or financial and business services in metropolitan regions, measured as before through the shares of employment in these sectors) and Z is a vector including the variables representing the other sectoral specialisations that are not the focus of the specific regression.

As before, every growth asset is subsequently explored in its different levels of endowment (specifications 7.3b-7.3e) through dummy variables associated to the different quartiles of the distribution. All the other variables, country fixed effects and the temporal consequentiality are as described before.

Table 13 displays a more detailed description of the variables listed above and of their sources, while Table 14 report the outcomes of the different sets of regressions. Such results are commented in the main report in Section 2.4.3.

Table 13: Description of variables

Variable	Description	Computation	Source
<i>gdp growth</i>	GDP growth	Average annual GDP PPS growth rate between 2007 and 2016	Eurostat
<i>human capital</i>	Human capital	% of college graduates/labor force	Eurostat
<i>accessibility</i>	Multimodal accessibility	ESPON multimodal accessibility per million inhabitants	ESPON, TRACC project
<i>QoG</i>	Quality of Government	University of Gothenburg Quality of Government index	University of Gothenburg - Quality of Government Institute
<i>radical inn</i>	Radical innovation	No. of patent applications per thousand inhabitants	Eurostat
<i>mkt inn</i>	Marketing innovation	No. of trademark applications per thousand inhabitants	Eurostat
<i>gdp pc</i>	GDP per capita	Per capita GDP PPS	Eurostat
<i>metro</i>	Metropolitan region	Dummy variable =1 if the region includes "a metropolitan region" (see footnote 1), zero otherwise	European Commission

<i>sh fbs</i>	Share of employment in financial and business services	Standardised share of employment in financial and business services	Cambridge Econometrics
<i>trust</i>	Trust	% of citizens trusting others	European Value Survey
<i>sh agr</i>	Share of employment in agriculture	Employment in agriculture/total emp.	Cambridge Econometrics
<i>sh ind</i>	Share of employment in industry	Employment in industry/total emp.	Cambridge Econometrics
<i>sh ht</i>	Share of employment in high-tech sectors	Employment in high-tech sectors/total emp.	Eurostat

Source: Polimi (2019).

Table 14: GDP growth

	(1)	(2)
human capital	0.033*** (0.011)	0.027** (0.011)
accessibility	10.623** (4.017)	10.637** (4.124)
QoG	0.186* (0.097)	0.264** (0.104)
radical innovation	1.586*** (0.581)	1.826*** (0.591)
marketing innovation	2.477*** (0.943)	2.397*** (0.940)
gdp pc	-0.038*** (0.011)	-0.045*** (0.012)
metro	-0.012 (0.108)	-0.914 (0.549)
share emp fbs		-0.678 (0.718)
metro#share emp fbs		1.194* (0.723)
trust	1.332** (0.626)	1.369** (0.624)
share emp agriculture	-2.163** (0.926)	-1.164 (1.204)
share emp industry	-1.390* (0.861)	-0.754 (0.979)
share emp high-tech	-0.136 (3.940)	-1.823 (4.109)
COUNTRY FIXED EFFECTS	YES	YES
Constant	1.676*** (0.421)	2.220*** (0.679)
Observations	254	254
R-squared	0.880	0.882
Adjusted R-squared	0.861	0.862

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$
Source: Polimi (2019).

Table 15: GDP growth.

	(1) asset: HUMAN CAPITAL	(2) asset: ACCESSIBILITY	(3) asset: QoG	(4) asset: RADICAL INNOVATION	(5) asset: MARKETING INNOVATION
human capital		0.030*** (0.012)	0.025** (0.011)	0.034*** (0.012)	0.026** (0.012)
accessibility	12.132*** (4.116)		10.478** (4.094)	12.342*** (4.270)	9.595** (4.134)
QoG	0.284*** (0.104)	0.307*** (0.105)		0.264** (0.110)	0.239** (0.106)
radical innovation	2.098*** (0.595)	1.968*** (0.600)	1.836*** (0.587)		2.040*** (0.578)
marketing innovation	2.282** (0.941)	2.246*** (0.952)	2.565*** (0.936)	3.378*** (0.888)	
gdp pc	-0.047*** (0.012)	-0.042*** (0.013)	-0.043*** (0.012)	-0.046*** (0.012)	-0.039*** (0.011)
metro	-0.943* (0.545)	-1.219** (0.545)	-0.619 (0.520)	-0.745 (0.552)	-0.961 (0.551)
share emp fbs	-0.457 (0.717)	-1.110 (0.706)	-0.374 (0.696)	-0.527 (0.727)	-0.762 (0.730)
metro#share emp fbs	1.238* (0.717)	1.581** (0.725)	0.815 (0.680)	0.991 (0.727)	1.209* (0.726)
trust	1.403** (0.624)	1.187* (0.630)	1.258** (0.620)	0.815 (0.612)	1.578** (0.618)
share emp agriculture	-1.066 (1.194)	-1.634 (1.199)	-1.358 (1.198)	-0.869 (1.237)	-1.103 (1.210)
share emp industry	-0.811 (0.972)	-1.245 (0.961)	-0.813 (0.978)	0.013 (1.053)	-1.112 (1.001)
share emp high-tech	-0.835 (4.068)	-4.893 (4.129)	-3.234 (4.124)	0.488 (4.058)	-1.407 (4.119)
asset 1 st quartile	-0.237 (0.237)	0.002 (0.158)	-0.715*** (0.237)	-0.039 (0.261)	-0.555*** (0.212)
asset 2 nd quartile	-0.132 (0.166)	-0.243* (0.131)	-0.606*** (0.188)	-0.304* (0.177)	-0.321** (0.170)
asset 3 rd quartile	-0.349* (0.114)	-0.053 (0.124)	-0.213 (0.146)	-0.136 (0.128)	-0.279** (0.129)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	2.595*** (0.717)	2.801*** (0.656)	2.361*** (0.683)	2.155*** (0.741)	2.707*** (0.732)
Observations	254	254	254	254	254
R-squared	0.885	0.882	0.885	0.881	0.883
Adjusted R-squared	0.864	0.861	0.865	0.859	0.862

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Source: Polimi (2019).

Table 16: Step 3 regressions results. Share of employment in agriculture. Dependent variable: GDP growth

	(1) asset: ACCESSIBILITY	(2) asset: ACCESSIBILITY	(3) asset: ACCESSIBILITY	(4) asset: ACCESSIBILITY	(5) asset: ACCESSIBILITY
human capital	0.0266** (0.012)	0.027** (0.012)	0.031*** (0.011)	0.029*** (0.012)	0.026** (0.012)
QoG	0.265** (0.104)	0.302*** (0.104)	0.330*** (0.102)	0.292*** (0.105)	0.278*** (0.105)
radical innovation	1.833*** (0.595)	1.865*** (0.594)	1.896*** (0.579)	1.871*** (0.599)	1.871*** (0.608)
marketing innovation	2.397*** (0.943)	2.123** (0.946)	2.211*** (0.914)	2.263** (0.951)	2.260** (0.957)
accessibility	12.547 (13.509)				
share emp agriculture	-1.124 (1.236)	-3.542** (1.465)	-0.909 (1.175)	-2.343* (1.279)	-1.469 (1.226)
asset#share emp agriculture	-34.168 (230.040)				
asset 1 st quartile		-0.057 (0.156)			
asset 2 nd quartile			0.028 (0.111)		
asset 3 rd quartile				-0.048 (0.117)	
asset 4 th quartile					0.068 (0.161)
asset 1q#share emp agriculture		2.842** (1.387)			
asset 2q#share emp agriculture			-4.354*** (1.233)		
asset 3q#share emp agriculture				2.051 (1.554)	
asset 4q#share emp agriculture					1.131 (2.263)
gdp pc	-0.046*** (0.012)	-0.037*** (0.012)	-0.039*** (0.012)	-0.037*** (0.012)	-0.040*** (0.012)
metro	-0.930 (0.561)	-1.510** (0.572)	-1.612*** (0.540)	-1.156** (0.549)	-1.129** (0.554)
share emp fbs	-0.699 (0.734)	-1.386* (0.725)	-1.643** (0.700)	-1.213 (0.716)	-1.043 (0.721)
metro#share emp fbs	1.215* (0.737)	1.833** (0.749)	2.055*** (0.711)	1.497** (0.725)	1.489** (0.733)
trust	1.374** (0.626)	1.146* (0.624)	0.942 (0.609)	1.129* (0.631)	1.271** (0.635)
share emp industry	-0.765 (0.984)	-1.196 (0.951)	-1.374 (0.922)	-1.784* (0.991)	-1.179 (0.983)
share emp high-tech	-1.793 (4.124)	-4.267 (4.046)	-4.381 (3.929)	-4.297 (4.105)	-3.515 (4.125)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	2.245*** (0.701)	3.106*** (0.684)	3.148*** (0.642)	2.873*** (0.667)	2.559*** (0.686)
Observations	254	254	254	254	254
R-squared	0.882	0.882	0.889	0.880	0.880
Adjusted R-squared	0.862	0.861	0.869	0.859	0.858

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Source: Polimi (2019).

Table 17: Step 3 regressions results. Share of employment in agriculture. Dependent variable: GDP growth (continued)

	(6) asset: HUMAN CAPITAL	(7) asset: HUMAN CAPITAL	(8) asset: HUMAN CAPITAL	(9) asset: HUMAN CAPITAL	(10) asset: HUMAN CAPITAL
human capital	0.028** (0.012)				
QoG	0.264** (0.104)	0.284*** (0.106)	0.297*** (0.106)	0.281*** (0.102)	0.262*** (0.103)
radical innovation	1.832*** (0.593)	1.997*** (0.597)	2.078*** (0.600)	2.250*** (0.583)	1.999*** (0.583)
marketing innovation	2.373*** (0.946)	2.355** (0.954)	2.253** (0.957)	2.119** (0.930)	2.256** (0.942)
accessibility	10.678*** (4.136)	10.769** (4.185)	11.058*** (4.180)	10.859*** (4.164)	10.782*** (4.130)
share emp agriculture	-0.557 (2.496)	-0.456 (1.483)	-0.747 (1.354)	-1.060 (1.179)	-0.958 (1.185)
asset#share emp agriculture	-0.039 (0.140)				
asset 1 st quartile		-0.0655 (1.548)			
asset 2 nd quartile			0.135 (0.146)		
asset 3 rd quartile				-0.455*** (0.134)	
asset 4 th quartile					0.497*** (0.159)
asset 1q#share emp agriculture		-1.091 (1.747)			
asset 2q#share emp agriculture			-0.239 (1.304)		
asset 3q#share emp agriculture				6.138** (3.636)	
asset 4q#share emp agriculture					-6.500 (4.160)
gdp pc	-0.046*** (0.012)	-0.044*** (0.012)	-0.045*** (0.012)	-0.044*** (0.012)	-0.046*** (0.012)
metro	-0.920* (0.551)	-1.062** (0.554)	-1.067** (0.552)	-1.028* (0.538)	-0.928* (0.542)
share emp fbs	-0.663 (0.722)	-0.636 (0.731)	-0.629 (0.727)	-0.457 (0.711)	-0.438 (0.714)
metro#share emp fbs	1.197* (0.724)	1.401** (0.730)	1.400** (0.726)	1.349** (0.708)	1.192* (0.713)
trust	1.386** (0.628)	1.596** (0.625)	1.685** (0.628)	1.417** (0.610)	1.388** (0.623)
share emp industry	-0.699 (1.000)	-0.909 (0.995)	-0.920 (0.990)	-0.953 (0.965)	-0.504 (0.981)
share emp high-tech	-1.943 (4.1940)	0.323 (4.096)	1.054 (4.118)	-0.769 (3.962)	-2.627 (4.079)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	2.201*** (0.684)	2.337*** (0.701)	2.256*** (0.693)	2.378*** (0.667)	2.445*** (0.672)
Observations	254	254	254	254	254
R-squared	0.882	0.880	0.880	0.886	0.885
Adjusted R-squared	0.862	0.858	0.859	0.866	0.865

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Source: Polimi (2019).

Table 18: Step 3 regressions results. Share of employment in agriculture. Dependent variable: GDP growth (continued)

	(11) asset: QoG	(12) asset: QoG	(13) asset: QoG	(14) asset: QoG	(15) asset: QoG
human capital	0.028** (0.011)	0.030** (0.012)	0.029** (0.011)	0.030** (0.012)	0.027** (0.012)
QoG	0.133 (0.120)				
radical innovation	1.779*** (0.587)	1.700*** (0.599)	1.708*** (0.600)	1.776*** (0.599)	1.906*** (0.594)
marketing innovation	2.664*** (0.941)	2.455*** (0.962)	2.429*** (0.950)	2.344** (0.957)	2.457*** (0.946)
accessibility	10.565*** (4.091)	11.402*** (4.170)	11.443*** (4.144)	11.333*** (4.173)	10.954*** (4.128)
share emp agriculture	0.564 (1.447)	1.816 (2.353)	-1.574 (1.218)	-1.427 (1.223)	-1.318 (1.209)
asset#share emp agriculture	1.776** (0.840)				
asset 1 st quartile		0.064 (0.222)			
asset 2 nd quartile			-0.310** (0.150)		
asset 3 rd quartile				0.008 (0.150)	
asset 4 th quartile					0.105 (0.182)
asset 1q#share emp agriculture		-3.308* (2.184)			
asset 2q#share emp agriculture			2.386 (2.111)		
asset 3q#share emp agriculture				2.784 (2.931)	
asset 4q#share emp agriculture					7.366* (4.485)
gdp pc	-0.044*** (0.012)	-0.039*** (0.012)	-0.038*** (0.012)	-0.040*** (0.012)	-0.038*** (0.012)
metro	-0.865 (0.545)	-0.361 (0.538)	-0.390 (0.522)	-0.424 (0.530)	-0.446 (0.519)
share emp fbs	-0.678 (0.713)	-0.094 (0.717)	-0.154 (0.701)	-0.174 (0.714)	-0.217 (0.698)
metro#share emp fbs	1.140 (0.717)	0.459 (0.698)	0.515 (0.681)	0.525 (0.692)	0.593 (0.678)
trust	1.333** (0.619)	1.425** (0.631)	1.438** (0.628)	1.563** (0.626)	1.393** (0.624)
share emp industry	-0.796 (0.971)	-0.712 (0.992)	-0.608 (0.985)	-0.744 (0.996)	-0.697 (0.986)
share emp high-tech	-1.209 (4.087)	-1.273 (4.164)	-2.651 (4.182)	-2.061 (4.170)	-2.100 (4.131)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	2.060*** (0.678)	1.626** (0.736)	1.907*** (0.674)	1.911*** (0.689)	1.489** (0.691)
Observations	254	254	254	254	254
R-squared	0.885	0.881	0.881	0.880	0.882
Adjusted R-squared	0.864	0.860	0.860	0.859	0.862

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Source: Polimi (2019).

Table 19: Step 3 regressions results. Share of employment in agriculture. Dependent variable: GDP growth (continued)

	(16) asset: RADICAL INN	(17) asset: RADICAL INN	(18) asset: RADICAL INN	(19) asset: RADICAL INN	(20) asset: RADICAL INN
human capital	0.027** (0.011)	0.034*** (0.011)	0.032*** (0.012)	0.033*** (0.012)	0.031*** (0.011)
QoG	0.264*** (0.102)	0.341*** (0.108)	0.260** (0.105)	0.233** (0.108)	0.267** (0.105)
radical innovation	0.318 (0.757)				
marketing innovation	3.233*** (0.961)	3.778*** (0.859)	3.439*** (0.873)	3.637*** (0.878)	3.819*** (0.902)
accessibility	11.701*** (4.059)	12.163*** (4.153)	12.091*** (4.220)	10.766** (4.208)	12.587*** (4.209)
share emp agriculture	-1.662 (1.191)	4.537** (2.274)	-1.065 (1.228)	-1.147 (1.230)	-1.150 (1.212)
asset#share emp agriculture	66.269*** (21.401)				
asset 1 st quartile		0.785*** (0.245)			
asset 2 nd quartile			-0.306** (0.140)		
asset 3 rd quartile				-0.198 (0.169)	
asset 4 th quartile					-0.130 (0.183)
asset 1q#share emp agriculture		-5.530*** (2.027)			
asset 2q#share emp agriculture			1.656 (1.864)		
asset 3q#share emp agriculture				5.925 (4.340)	
asset 4q#share emp agriculture					12.547** (5.473)
gdp pc	-0.047*** (0.012)	-0.040*** (0.012)	-0.045*** (0.012)	-0.041*** (0.012)	-0.048*** (0.012)
metro	-0.985* (0.539)	-0.662 (0.545)	-0.698 (0.552)	-0.662 (0.556)	-0.815 (0.550)
share emp fbs	-0.832 (0.706)	-0.433 (0.719)	-0.518 (0.727)	-0.588 (0.732)	-0.650 (0.724)
metro#share emp fbs	1.302* (0.709)	0.979 (0.718)	0.946 (0.726)	0.897 (0.731)	1.012 (0.723)
trust	1.066* (0.619)	0.834 (0.602)	0.770 (0.609)	0.811 (0.615)	0.770 (0.607)
share emp industry	-1.358 (0.979)	0.738 (1.008)	-0.072 (0.967)	-0.090 (0.974)	-0.550 (0.977)
share emp high-tech	0.988 (4.131)	2.424 (3.889)	1.375 (3.949)	1.464 (4.031)	3.394 (4.159)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	1.933*** (0.672)	1.040 (0.744)	2.073*** (0.685)	1.930*** (0.695)	1.945*** (0.685)
Observations	254	254	254	254	254
R-squared	0.887	0.883	0.880	0.878	0.881
Adjusted R-squared	0.868	0.862	0.859	0.857	0.860

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Source: Polimi (2019).

Table 20: Step 3 regressions results. Share of employment in agriculture. Dependent variable: GDP growth (continued)

	(21) asset: MARKETING INNOVATION	(22) asset: MARKETING INNOVATION	(23) asset: MARKETING INNOVATION	(24) asset: MARKETING INNOVATION	(25) asset: MARKETING INNOVATION
human capital	0.026** (0.011)	0.026** (0.011)	0.027** (0.012)	0.024** (0.012)	0.027** (0.012)
QoG	0.236** (0.103)	0.225** (0.105)	0.233** (0.105)	0.274*** (0.107)	0.252** (0.106)
radical innovation	1.759*** (0.582)	2.564*** (0.541)	2.491*** (0.551)	2.393*** (0.551)	2.001*** (0.576)
marketing innovation	1.360 (0.995)				
accessibility	9.417** (4.081)	9.060** (4.125)	9.686** (4.147)	9.768** (4.167)	9.864** (4.142)
share emp agriculture	-1.880* (1.211)	2.333 (1.991)	-1.327 (1.232)	-0.941 (1.219)	-1.064 (1.208)
asset#share emp agriculture	54.518*** (19.245)				
asset 1 st quartile		0.073 (0.199)			
asset 2 nd quartile			-0.139 (0.146)		
asset 3 rd quartile				-0.225* (0.141)	
asset 4 th quartile					0.142 (0.181)
asset 1q#share emp agriculture		-3.769** (1.771)			
asset 2q#share emp agriculture			3.224* (1.732)		
asset 3q#share emp agriculture				4.270 (3.165)	
asset 4q#share emp agriculture					4.850 (4.793)
gdp pc	-0.040*** (0.012)	-0.026** (0.010)	-0.029*** (0.011)	-0.027*** (0.010)	-0.034*** (0.011)
metro	-0.963 (0.541)	-1.106** (0.550)	-1.056* (0.554)	-0.999* (0.556)	-0.894 (0.552)
share emp fbs	-0.796 (0.708)	-0.941 (0.723)	-0.842 (0.738)	-0.736 (0.731)	-0.608 (0.726)
metro#share emp fbs	1.272 (0.712)	1.443** (0.723)	1.308* (0.724)	1.331* (0.732)	1.138 (0.728)
trust	1.086 (0.622)	1.587** (0.617)	1.695*** (0.621)	1.585** (0.622)	1.412** (0.633)

share emp industry	-1.481	-1.225	-0.977	-0.688	-0.965
	(0.997)	(0.996)	(0.993)	(0.996)	(0.999)
share emp high-tech	0.159	-1.391	-1.852	-1.623	-0.514
	(4.104)	(4.112)	(4.148)	(4.160)	(4.211)
COUNTRY	YES	YES	YES	YES	YES
FIXED EFFECTS					
Constant	2.082***	2.029***	2.212***	1.944***	2.028***
	(0.670)	(0.707)	(0.692)	(0.688)	(0.683)
Observations	254	254	254	254	254
R-squared	0.887	0.883	0.881	0.880	0.882
Adjusted R-squared	0.867	0.862	0.860	0.859	0.861

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Source: Polimi (2019).

Table 21: Step 3 regressions results - share of employment in industry. Dependent variable: GDP growth

	(1)	(2)	(3)	(4)	(5)
	asset: ACCESSIBILITY	asset: ACCESSIBILITY	asset: ACCESSIBILITY	asset: ACCESSIBILITY	asset: ACCESSIBILITY
human capital	0.027** (0.012)	0.029*** (0.012)	0.030*** (0.012)	0.029** (0.012)	0.026** (0.012)
QoG	0.264** (0.104)	0.276*** (0.105)	0.305*** (0.105)	0.279*** (0.106)	0.281*** (0.106)
radical innovation	1.825*** (0.593)	1.829*** (0.596)	1.953*** (0.596)	1.884*** (0.605)	1.908*** (0.605)
marketing innovation	2.397*** (0.943)	1.903** (0.955)	2.278** (0.940)	2.110** (0.981)	2.294** (0.966)
accessibility	10.922 (10.449)				
share emp industry	-0.737 (1.124)	-1.922* (1.022)	-1.222 (0.969)	-1.327 (1.012)	-1.251 (1.096)
asset#share emp industry	-3.712 (124.954)				
asset 1 st quartile		-0.221 (0.281)			
asset 2 nd quartile			-0.119 (0.242)		
asset 3 rd quartile				0.151 (0.235)	
asset 4 th quartile					0.128 (0.285)
asset 1q#share emp industry		2.207 (1.474)			
asset 2q#share emp industry			-0.578 (1.257)		
asset 3q#share emp industry				-0.586 (1.225)	
asset 4q#share emp industry					-0.028 (1.625)
gdp pc	-0.045*** (0.012)	-0.036*** (0.012)	-0.042*** (0.012)	-0.037*** (0.012)	-0.040*** (0.013)
metro	-0.912 (0.556)	-1.151** (0.545)	-1.242** (0.544)	-1.169** (0.551)	-1.163** (0.552)

share emp fbs	-0.672 (0.743)	-0.974 (0.708)	-1.159 (0.707)	-1.094 (0.714)	-1.099 (0.725)
metro#share emp fbs	1.189 (0.742)	1.385* (0.722)	1.605** (0.719)	1.475** (0.728)	1.531** (0.731)
trust	1.366** (0.634)	1.061 (0.629)	1.153* (0.624)	1.207* (0.632)	1.288** (0.636)
share emp agriculture	-1.160 (1.213)	-1.508 (1.207)	-1.725 (1.191)	-1.773 (1.205)	-1.563 (1.256)
share emp high-tech	-1.822 (4.119)	-4.092 (4.083)	-5.015 (4.044)	-4.576 (4.119)	-3.446 (4.129)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	2.218*** (0.686)	2.809*** (0.661)	2.826*** (0.654)	2.708*** (0.679)	2.643*** (0.680)
Observations	254	254	254	254	254
R-squared	0.882	0.881	0.882	0.879	0.879
Adjusted R-squared	0.862	0.860	0.862	0.858	0.858

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Source: Polimi (2019).

Table 22: Step 3 regressions results - share of employment in industry. Dependent variable: GDP growth (continued)

	(6) asset: HUMAN CAPITAL	(7) asset: HUMAN CAPITAL	(8) asset: HUMAN CAPITAL	(9) asset: HUMAN CAPITAL	(10) asset: HUMAN CAPITAL
human capital	0.035** (0.017)				
QoG	0.267** (0.104)	0.290** (0.106)	0.312*** (0.106)	0.283*** (0.103)	0.275*** (0.103)
radical innovation	1.899*** (0.604)	1.923*** (0.614)	2.050*** (0.597)	2.105*** (0.605)	1.979*** (0.584)
marketing innovation	2.264** (0.966)	2.453** (0.977)	2.311** (0.956)	2.252** (0.937)	2.293** (0.945)
accessibility	10.366** (4.153)	11.011*** (4.208)	10.793*** (4.177)	12.570*** (4.159)	11.444*** (4.107)
share emp industry	0.343 (2.029)	-0.601 (1.166)	-1.241 (1.041)	-1.041 (1.012)	-0.269 (1.048)
asset#share emp industry	-0.052 (0.085)				
asset 1 st quartile		0.097 (0.338)			
asset 2 nd quartile			-0.133 (0.279)		
asset 3 rd quartile				-0.448 (0.281)	
asset 4 th quartile					0.657 (0.301)
asset 1q#share emp industry		-0.680 (1.530)			
asset 2q#share emp industry			1.475 (1.502)		
asset 3q#share emp industry				1.048 (1.747)	
asset 4q#share emp industry					-2.362 (1.958)

gdp pc	-0.045*** (0.012)	-0.045*** (0.012)	-0.046*** (0.012)	-0.048*** (0.012)	-0.046*** (0.012)
metro	-0.906 (0.550)	-1.079* (0.556)	-1.100** (0.522)	-0.976* (0.543)	-0.890* (0.545)
share emp fbs	-0.625 (0.725)	-0.684 (0.736)	-0.676 (0.727)	-0.410 (0.716)	-0.389 (0.722)
metro#share emp fbs	1.184 (0.724)	1.420* (0.732)	1.440** (0.726)	1.298* (0.712)	1.185* (0.716)
trust	1.311** (0.631)	1.640*** (0.629)	1.638*** (0.628)	1.563*** (0.621)	1.290** (0.621)
share emp agriculture	-1.056 (1.218)	-0.882 (1.226)	-0.863 (1.207)	-0.988 (1.187)	-0.837 (1.195)
share emp high-tech	-2.593 (4.300)	0.885 (4.233)	1.202 (4.102)	-0.585 (3.983)	-2.887 (4.174)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	2.038*** (0.741)	2.348*** (0.698)	2.370*** (0.708)	2.378*** (0.673)	2.340*** (0.681)
Observations	254	254	254	254	254
R-squared	0.883	0.880	0.881	0.885	0.885
Adjusted R-squared	0.862	0.858	0.859	0.865	0.864

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Source: Polimi (2019)

Table 23: Step 3 regressions results - share of employment in industry. Dependent variable: GDP growth (continued)

	(11) asset: QoG	(12) asset: QoG	(13) asset: QoG	(14) asset: QoG	(15) asset: QoG
human capital	0.027** (0.011)	0.030** (0.011)	0.029** (0.012)	0.031*** (0.012)	0.025** (0.012)
QoG	0.290* (0.171)				
radical innovation	1.849*** (0.605)	1.930*** (0.604)	1.775*** (0.601)	1.705*** (0.625)	1.855*** (0.597)
marketing innovation	2.355** (0.968)	2.007** (0.956)	2.383*** (0.960)	2.297** (0.968)	2.242** (0.967)
accessibility	10.468** (4.229)	10.606** (4.173)	11.527*** (4.220)	11.162*** (4.180)	10.914** (4.389)
share emp industry	-0.736 (0.985)	-1.472 (1.095)	-0.516 (1.131)	-0.860 (1.048)	-0.473 (1.044)
asset#share emp industry	-0.164 (0.870)				
asset 1 st quartile		-0.681* (0.377)			
asset 2 nd quartile			-0.138 (0.278)		
asset 3 rd quartile				0.020 (0.284)	
asset 4 th quartile					0.351 (0.342)
asset 1q#share emp industry		2.418 (1.568)			
asset 2q#share emp industry			-0.334 (1.411)		
asset 3q#share emp industry				0.554 (1.742)	

asset 4q#share emp industry					-0.471 (2.124)
gdp pc	-0.045*** (0.012)	-0.040*** (0.012)	-0.039*** (0.012)	-0.040*** (0.012)	-0.037*** (0.012)
metro	-0.902 (0.554)	-0.507 (0.528)	-0.417 (0.523)	-0.488 (0.527)	-0.425 (0.523)
share emp fbs	-0.652 (0.733)	-0.206 (0.708)	-0.194 (0.702)	-0.269 (0.708)	-0.135 (0.712)
metro#share emp fbs	1.182 (0.727)	0.660 (0.689)	0.546 (0.683)	0.601 (0.689)	0.540 (0.684)
trust	1.333** (0.654)	1.374** (0.636)	1.545** (0.627)	1.626** (0.631)	1.410** (0.640)
share emp agriculture	-1.092 (1.264)	-0.584 (1.287)	-1.423 (1.239)	-1.409 (1.225)	-1.153 (1.224)
share emp high-tech	-2.016 (4.243)	-2.440 (4.216)	-2.735 (4.200)	-1.850 (4.172)	-2.586 (4.320)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	2.208*** (0.684)	2.134*** (0.689)	1.910** (0.694)	2.021*** (0.688)	1.659** (0.687)
Observations	254	254	254	254	254
R-squared	0.882	0.881	0.881	0.879	0.881
Adjusted R-squared	0.862	0.860	0.860	0.858	0.860

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Source: Polimi (2019).

Table 24: Step 3 regressions results - share of employment in industry. Dependent variable: GDP growth (continued)

	(16) asset: RADICAL INNOVATION	(17) asset: RADICAL INNOVATION	(18) asset: RADICAL INNOVATION	(19) asset: RADICAL INNOVATION	(20) asset: RADICAL INNOVATION
human capital	0.027** (0.012)	0.036*** (0.011)	0.031** (0.011)	0.032*** (0.012)	0.034*** (0.012)
QoG	0.265** (0.104)	0.274*** (0.106)	0.247** (0.104)	0.261** (0.107)	0.250** (0.106)
radical innovation	1.655 (1.310)				
marketing innovation	2.438*** (0.984)	3.703*** (0.847)	3.349*** (0.859)	3.572*** (0.881)	3.459*** (0.894)
accessibility	10.606** (4.139)	13.031*** (4.114)	13.224*** (4.186)	10.753** (4.223)	10.967** (4.205)
share emp industry	-0.826 (1.099)	2.965* (1.071)	-0.723 (0.992)	0.111 (1.034)	-0.767 (1.099)
asset#share emp industry	0.751 (5.139)				
asset 1 st quartile		1.116*** (0.279)			
asset 2 nd quartile			-0.758*** (0.233)		
asset 3 rd quartile				0.137 (0.290)	
asset 4 th quartile					-0.092 (0.293)
asset 1q#share emp industry		-5.040*** (1.386)			

asset 2q#share emp industry			3.585*** (1.403)		
asset 3q#share emp industry				-0.948 (1.801)	
asset 4q#share emp industry					1.585 (1.552)
gdp pc	-0.046*** (0.012)	-0.045*** (0.012)	-0.043*** (0.012)	-0.044*** (0.012)	-0.046*** (0.012)
metro	-0.918* (0.551)	-0.724 (0.538)	-0.663 (0.544)	-0.718 (0.559)	-0.772 (0.556)
share emp fbs	-0.687 (0.723)	-0.679 (0.710)	-0.472 (0.717)	-0.581 (0.735)	-0.650 (0.735)
metro#share emp fbs	1.199* (0.725)	0.980 (0.709)	0.902 (0.717)	0.927 (0.734)	0.974 (0.731)
trust	1.380** (0.629)	1.253** (0.602)	0.749 (0.601)	0.841 (0.618)	0.942 (0.618)
share emp agriculture	-1.179 (1.211)	-1.495 (1.222)	-1.047 (1.203)	-0.998 (1.234)	-1.218 (1.232)
share emp high-tech	-1.716 (4.184)	4.162 (3.883)	1.764 (3.899)	2.094 (4.019)	1.410 (4.085)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	2.235*** (0.688)	1.479** (0.690)	2.135*** (0.676)	2.031*** (0.693)	2.201*** (0.698)
Observations	254	254	254	254	254
R-squared	0.882	0.886	0.883	0.877	0.879
Adjusted R-squared	0.862	0.866	0.863	0.856	0.858

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Source: Polimi (2019)

Table 25: Step 3 regressions results - share of employment in industry. Dependent variable: GDP growth (continued)

	(21) asset: MARKETING INNOVATION	(22) asset: MARKETING INNOVATION	(23) asset: MARKETING INNOVATION	(24) asset: MARKETING INNOVATION	(25) asset: MARKETING INNOVATION
human capital	0.027** (0.011)	0.026** (0.012)	0.024** (0.012)	0.026** (0.012)	0.025** (0.011)
QoG	0.265** (0.104)	0.220** (0.106)	0.232** (0.104)	0.262** (0.106)	0.273*** (0.105)
radical innovation	1.898*** (0.664)	2.349*** (0.556)	2.537*** (0.549)	2.490*** (0.562)	2.321*** (0.617)
marketing innovation	2.637* (1.373)				
accessibility	10.770*** (4.170)	9.860** (4.182)	11.688*** (4.233)	9.972** (4.171)	10.863** (4.166)
share emp industry	-0.549 (1.298)	-0.504 (1.096)	-1.398 (1.027)	-1.000 (1.050)	-0.091 (1.127)
asset#share emp industry	-1.900 (7.893)				
asset 1 st quartile		0.124 (0.328)			
asset 2 nd quartile			-0.467* (0.260)		
asset 3 rd quartile				-0.366 (0.301)	
asset 4 th quartile					0.586** (0.286)
asset 1q#share emp industry		-1.742			

		(1.462)			
asset 2q#share emp industry			3.145**		
			(1.456)		
asset 3q#share emp industry				1.786	
				(1.798)	
asset 4q#share emp industry					-1.924
					(1.537)
gdp pc	-0.046***	-0.028***	-0.028***	-0.029***	-0.039***
	(0.012)	(0.010)	(0.010)	(0.010)	(0.011)
metro	-0.917	-0.988*	-0.961*	-0.950*	-0.914
	(0.550)	(0.555)	(0.552)	(0.557)	(0.551)
share emp fbs	-0.662	-0.959	-0.835	-0.705	-0.531
	(0.723)	(0.728)	(0.722)	(0.732)	(0.727)
metro#share emp fbs	1.197	1.293*	1.271*	1.252*	1.169
	(0.724)	(0.729)	(0.726)	(0.732)	(0.727)
trust	1.368**	1.769***	1.817***	1.654***	1.558**
	(0.625)	(0.623)	(0.623)	(0.618)	(0.618)
share emp agriculture	-1.115	-1.446	-1.279	-1.030	-0.864
	(1.223)	(1.258)	(1.221)	(1.227)	(1.211)
share emp high-tech	-2.125	-0.331	-1.353	-1.647	-2.847
	(4.304)	(4.278)	(4.134)	(4.171)	(4.292)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	2.187***	2.158***	2.173***	2.054***	1.998***
	(0.694)	(0.711)	(0.687)	(0.689)	(0.683)
Observations	254	254	254	254	254
R-squared	0.882	0.881	0.882	0.880	0.882
Adjusted R-squared	0.862	0.860	0.861	0.859	0.861

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Source: Polimi (2019).

Table 26: Step 3 regressions results. Metropolitan regions. Dependent variable: GDP growth

	(1)	(2)	(3)	(4)	(5)
	asset:	asset:	asset:	asset:	asset:
	ACCESSIBILITY	ACCESSIBILITY	ACCESSIBILITY	ACCESSIBILITY	ACCESSIBILITY
human capital	0.032***	0.034***	0.035***	0.032***	0.031***
	(0.011)	(0.011)	(1.197)	(0.011)	(0.011)
QoG	0.197**	0.222**	0.230**	0.211**	0.193*
	(0.098)	(0.100)	(0.098)	(0.100)	(0.100)
radical innovation	1.600***	1.549***	1.587***	1.660***	1.622***
	(0.590)	(0.593)	(0.583)	(0.595)	(0.600)
marketing innovation	2.456***	2.240**	2.476***	2.382**	2.190**
	(0.946)	(0.963)	(0.934)	(0.965)	(0.975)
accessibility	11.365***				
	(4.128)				
metro_share emp fbs [§]	0.093	-0.014	-0.057	0.031	0.156
	(0.144)	(0.133)	(0.131)	(0.131)	(0.165)
asset#metro_share emp fbs	-3.253				
	(14.132)				
asset 1 st quartile		0.374			
		(0.247)			
asset 2 nd quartile			-0.596***		
			(0.173)		
asset 3 rd quartile				0.145	
				(0.181)	
asset 4 th quartile					0.241
					(0.165)
asset 1q#metro_share emp fbs		-0.244			

		(0.252)			
asset 2q#metro_share emp fbs			0.499**		
			(0.192)		
asset 3q#metro_share emp fbs				-0.151	
				(0.220)	
asset 4q#metro_share emp fbs					-0.204
					(0.197)
gdp pc	-0.039***	-0.029**	-0.035***	-0.033***	-0.032***
	(0.012)	(0.011)	(0.011)	(0.011)	(0.012)
trust	1.273*	1.038	1.118*	1.095	1.160*
	(0.628)	(0.631)	(0.617)	(0.633)	(0.635)
share emp industry	-1.268	-1.778**	-1.363	-2.007**	-1.473
	(0.883)	(0.868)	(0.864)	(0.888)	(0.907)
share emp agriculture	-1.909*	-2.761***	-1.668*	-2.347**	-1.657
	(1.005)	(1.040)	(0.999)	(0.992)	(1.106)
share emp high-tech	-0.857	-4.358	-3.984	-4.111	-2.972
	(4.032)	(3.940)	(3.867)	(3.996)	(3.995)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	1.647***	1.839***	1.813***	1.913***	1.616***
	(0.423)	(0.419)	(0.411)	(0.421)	(0.461)
Observations	254	254	254	254	254
R-squared	0.880	0.878	0.883	0.876	0.877
Adjusted R-squared	0.861	0.858	0.863	0.856	0.857

⁵This variable is computed multiplying the dummy *metro* by the standardised share of employment in financial and business services (*fbs*)
Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Source: Polimi (2019).

Table 27: Step 3 regressions results. Metropolitan regions. Dependent variable: GDP growth (continued)

	(6)	(7)	(8)	(9)	(10)
	asset: HUMAN CAPITAL	asset: HUMAN CAPITAL	asset: HUMAN CAPITAL	asset: HUMAN CAPITAL	asset: HUMAN CAPITAL
human capital	0.008				
	(0.016)				
QoG	0.197**	0.214**	0.237**	0.206**	0.170*
	(0.097)	(0.101)	(0.100)	(0.100)	(0.097)
radical innovation	1.519***	1.720***	1.610***	1.925***	1.694***
	(0.581)	(0.593)	(0.597)	(0.590)	(0.573)
marketing innovation	2.458***	2.483**	2.396***	2.250**	2.544***
	(0.936)	(0.965)	(0.954)	(0.948)	(0.929)
accessibility	11.909***	11.528***	11.168***	12.112***	10.992***
	(4.026)	(4.144)	(4.073)	(4.120)	(4.003)
metro_share emp fbs ⁵	-0.416	0.184	0.229*	0.171	0.015
	(0.276)	(0.159)	(0.133)	(0.131)	(0.132)
asset#metro_share emp fbs	0.025**				
	(0.012)				
asset 1 st quartile		-0.037			
		(0.208)			
asset 2 nd quartile			0.481**		
			(0.195)		
asset 3 rd quartile				-0.252	
				(0.188)	
asset 4 th quartile					-0.102
					(0.204)
asset 1q#metro_share emp fbs		-0.150			
		(0.230)			

asset 2q#metro_share emp fbs			-0.522**		
			(0.230)		
asset 3q#metro_share emp fbs				-0.022	
				(0.197)	
asset 4q#metro_share emp fbs					0.515***
					(0.198)
gdp pc	-0.042***	-0.038***	-0.035***	-0.037***	-0.039***
	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)
trust	1.253**	1.535**	1.579**	1.462**	1.263**
	(0.620)	(0.632)	(0.627)	(0.622)	(0.618)
share emp industry	-0.760	-1.539**	-1.610**	-1.984**	-1.501*
	(0.910)	(0.925)	(0.873)	(0.891)	(0.851)
share emp agriculture	-1.772*	-1.870**	-2.323**	-2.449**	-2.501**
	(0.978)	(1.021)	(9.993)	(1.007)	(0.974)
share emp high-tech	-1.685	2.495	3.018	2.253	-0.770
	(4.016)	(3.937)	(3.923)	(3.851)	(3.879)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	2.134***	1.874***	1.682***	1.981***	2.277***
	(0.480)	(0.430)	(0.427)	(0.419)	(0.428)
Observations	254	254	254	254	254
R-squared	0.883	0.876	0.879	0.880	0.884
Adjusted R-squared	0.863	0.856	0.859	0.861	0.865

[§]This variable is computed multiplying the dummy *metro* by the standardised share of employment in financial and business services (fbs)
Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Source: Polimi (2019).

Table 28: Step 3 regressions results. Metropolitan regions. Dependent variable: GDP growth (continued)

	(11)	(12)	(13)	(14)	(15)
	asset:	asset:	asset:	asset:	asset:
	QoG	QoG	QoG	QoG	QoG
human capital	0.031***	0.032***	0.032***	0.032***	0.029***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
QoG	0.378***				
	(0.108)				
radical innovation	1.590***	1.574***	1.662***	1.695***	1.707***
	(0.568)	(0.582)	(0.588)	(0.585)	(0.585)
marketing innovation	3.181***	2.614***	2.412***	2.512***	2.500***
	(0.940)	(0.946)	(0.948)	(0.944)	(0.953)
accessibility	9.971**	10.811**	11.389***	11.035***	10.847***
	(3.950)	(4.035)	(4.063)	(4.041)	(4.059)
metro_share emp fbs [§]	0.090	-0.108	0.061	0.091	0.099
	(0.125)	(0.138)	(0.146)	(0.129)	(0.134)
asset#metro_share emp fbs	-0.255***				
	(0.072)				
asset 1 st quartile		-0.426**			
		(0.205)			
asset 2 nd quartile			-0.197		
			(0.177)		
asset 3 rd quartile				0.443**	
				(0.202)	
asset 4 th quartile					0.427**
					(0.215)
asset 1q#metro_share emp fbs		0.449**			
		(0.190)			
asset 2q#metro_share emp fbs			-0.007		
			(0.193)		
asset 3q#metro_share emp fbs				-0.464**	
				(0.227)	

asset 4q#metro_share emp fbs					-0.190 (0.198)
gdp pc	-0.045*** (0.011)	-0.038*** (0.011)	-0.036*** (0.011)	-0.037*** (0.011)	-0.036*** (0.011)
trust	1.387** (0.609)	1.492** (0.615)	1.443** (0.619)	1.543** (0.615)	1.359** (0.621)
share emp industry	-1.104 (0.857)	-0.945 (0.885)	-1.057 (0.896)	-1.327 (0.881)	-1.045 (0.876)
share emp agriculture	-0.605 (1.028)	-1.116 (1.032)	-2.077** (1.003)	-1.888** (0.984)	-1.767* (0.989)
share emp high-tech	0.332 (3.935)	0.146 (4.044)	-2.056 (4.087)	-1.156 (4.027)	-1.024 (4.059)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	1.510*** (0.411)	1.735*** (0.422)	1.751*** (0.434)	1.717*** (0.422)	1.451*** (0.437)
Observations	254	254	254	254	254
R-squared	0.887	0.881	0.880	0.881	0.881
Adjusted R-squared	0.868	0.862	0.860	0.861	0.861

⁵This variable is computed multiplying the dummy *metro* by the standardised share of employment in financial and business services (fbs)
Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Source: Polimi (2019).

Table 29: Step 3 regressions results. Metropolitan regions. Dependent variable: GDP growth (continued)

	(16)	(17)	(18)	(19)	(20)
	asset: RADICAL INNOVATION	asset: RADICAL INNOVATION	asset: RADICAL INNOVATION	asset: RADICAL INNOVATION	asset: RADICAL INNOVATION
human capital	0.032*** (0.011)	0.035*** (0.011)	0.034*** (0.011)	0.034*** (0.011)	0.036*** (0.011)
QoG	0.196** (0.098)	0.238** (0.099)	0.201** (0.098)	0.207** (0.101)	0.198** (0.100)
radical innovation	2.504*** (0.899)				
marketing innovation	2.786*** (0.972)	3.838*** (0.850)	3.148*** (0.875)	3.549*** (0.878)	3.602*** (0.912)
accessibility	11.016** (4.034)	10.585*** (4.027)	11.051*** (4.156)	11.211*** (4.145)	11.529*** (4.093)
metro_share emp fbs ⁵	0.143 (0.137)	-0.090 (0.141)	0.201 (0.142)	0.037 (0.141)	0.071 (0.132)
asset#metro_share emp fbs	-1.070 (0.826)				
asset 1 st quartile		-0.039 (0.189)			
asset 2 nd quartile			0.072 (0.161)		
asset 3 rd quartile				-0.027 (0.174)	
asset 4 th quartile					0.414* (0.236)
asset 1q#metro_share emp fbs		0.714*** (0.211)			
asset 2q#metro_share emp fbs			-0.361* (0.186)		
asset 3q#metro_share emp fbs				0.036 (0.208)	
asset 4q#metro_share emp fbs					-0.302 (0.242)
gdp pc	-0.041***	-0.035***	-0.037***	-0.040***	-0.041***

	(0.012)	(0.011)	(0.012)	(0.012)	(0.012)
trust	1.262*	0.927	0.761	0.836	0.817
	(0.623)	(0.597)	(0.605)	(0.617)	(0.611)
share emp industry	-1.484*	-0.229	-0.681	-0.479	-0.871
	(0.891)	(0.856)	(0.834)	(0.846)	(0.867)
share emp agriculture	-1.743*	-0.208	-1.452	-1.581	-1.551
	(0.992)	(1.025)	(0.972)	(1.000)	(0.990)
share emp high-tech	-0.200	2.766	1.635	2.652	1.847
	(4.049)	(3.781)	(3.848)	(3.927)	(3.988)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	1.551***	1.264***	1.573***	1.587***	1.590***
	(0.427)	(0.437)	(0.422)	(0.431)	(0.427)
Observations	254	254	254	254	254
R-squared	0.881	0.884	0.881	0.876	0.878
Adjusted R-squared	0.862	0.864	0.861	0.856	0.858

[§]This variable is computed multiplying the dummy *metro* by the standardised share of employment in financial and business services (fbs)
Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Source: Polimi (2019).

Table 30: Step 3 regressions results. Metropolitan regions. Dependent variable: GDP growth (continued)

	(21)	(22)	(23)	(24)	(25)
	asset:	asset:	asset:	asset:	asset:
	MARKETING	MARKETING	MARKETING	MARKETING	MARKETING
	INNOVATION	INNOVATION	INNOVATION	INNOVATION	INNOVATION
human capital	0.031***	0.030***	0.029***	0.031***	0.031***
	(0.011)	(0.011)	(0.011)	(0.011)	(1.208)
QoG	0.166	0.183*	0.183*	0.186*	0.173*
	(0.100)	(0.103)	(0.099)	(0.101)	(0.100)
radical innovation	1.462**	2.297***	2.311***	2.205***	1.655***
	(0.591)	(0.536)	(0.543)	(0.546)	(0.578)
marketing innovation	4.163***				
	(1.489)				
accessibility	10.668***	10.741***	11.010***	10.683***	10.025**
	(4.042)	(4.081)	(4.074)	(4.099)	(4.048)
metro_share emp fbs [§]	0.185	0.145	-0.013	0.135	0.093
	(0.147)	(0.146)	(0.139)	(0.151)	(0.130)
asset#metro_share emp fbs	-1.581				
	(1.077)				
asset 1 st quartile		-0.017			
		(0.207)			
asset 2 nd quartile			-0.193		
			(0.163)		
asset 3 rd quartile				0.008	
				(0.178)	
asset 4 th quartile					0.647**
					(0.265)
asset 1q#metro_share emp fbs		-0.361			
		(0.259)			
asset 2q#metro_share emp fbs			0.367*		
			(0.189)		
asset 3q#metro_share emp fbs				-0.118	
				(0.202)	
asset 4q#metro_share emp fbs					-0.408*
					(0.251)
gdp pc	-0.038***	-0.026***	-0.017*	-0.022**	-0.026**
	(0.011)	(0.009)	(0.010)	(0.009)	(0.010)
trust	1.247*	1.632***	1.527**	1.536**	1.413**
	(0.623)	(0.620)	(0.623)	(0.626)	(0.619)

share emp industry	-1.646*	-1.185	-1.214	-1.208	-1.799*
	(0.910)	(0.907)	(0.887)	(0.894)	(0.915)
share emp agriculture	-1.789*	-1.665*	-1.277	-1.648*	-1.799*
	(0.984)	(0.988)	(1.015)	(1.003)	(0.986)
share emp high-tech	0.313	-1.350	-0.227	-0.0603	1.407
	(4.090)	(4.065)	(4.063)	(4.106)	(4.155)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES
Constant	1.558***	1.470***	1.301***	1.377***	1.520***
	(0.424)	(0.424)	(0.423)	(0.418)	(0.419)
Observations	254	254	254	254	254
R-squared	0.881	0.879	0.879	0.877	0.880
Adjusted R-squared	0.862	0.859	0.859	0.857	0.861

[§]This variable is computed multiplying the dummy *metro* by the standardised share of employment in financial and business services (fbs).
Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Source: Polimi (2019).

6.2.8 Growth assets and regional performance: methodology and results from the simulation analyses

The results obtained through the regression analyses presented in Annex 6.2.7 allowed to assess the potential impact of different endowments of growth assets on GDP growth and consequently on per capita GDP. The influence of the growth assets' endowment on regional disparities requires an additional step; it is obtained by the (re)computation of the Theil index based on a GDP level obtained under different assumptions on growth assets' endowment.

More in detail, the simulations presented within the interim report involved a change in the values of the variables of interest (growth assets) for the regions eligible for funding from the ERDF and the ESF for the period 2014-2020 (less developed regions).¹⁰² This choice was made according to the idea that the less developed regions are in fact those ones on which the European Commission has got a more practical opportunity to act (almost) directly.¹⁰³

The procedure for each simulation is schematically sketched below:

- since the growth period explained through the regressions is from 2007 to 2016, starting from the real value of GDP in 2007 we estimated GDP in 2016 for all the NUTS 2 regions through the coefficients obtained in the regressions, taking the error term into consideration¹⁰⁴;
- using such estimated GDP for 2016, we computed a simulated GDP per capita in 2016 and calculated a reference Theil index;
- in the less developed regions of interest (see before), we increased the endowment of the growth asset under focus to the median value (in case the region had already an endowment equal or greater than the median, its value was not changed);
- we exploited again the regression coefficients to estimate GDP in 2016 with the new values;
- using such estimated GDP for 2016 we recomputed GDP per capita and recalculated the Theil index;
- finally, we compared the reference Theil index with the one obtained through the simulation.

The results of the simulation are reported in Section 2.4.3 of the report.

¹⁰² Commission Implementing Decision of 18 February 2014 setting out the list of regions eligible for funding from the European Regional Development Fund and the European Social Fund and of Member States eligible for funding from the CF for the period 2014-2020 (notified under document C(2014) 974) (2014/99/EU) <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32014D0099>, accessed 17 May 2019.

¹⁰³ In particular, the simulations were carried out on the regression specifications (1b) and (3a) reported in Annex 6.2.8.

¹⁰⁴ The error term is taken into consideration by re-calculating the reference GDP per capita on the basis of regression coefficients instead of actual values.

6.2.9 Methodology for the identification of the relevance of agglomeration economies in inter-regional disparities

This subchapter presents the methodology for the identification of the relevance of agglomeration economies in inter-regional disparities. The methodology is based on two steps, an econometric and a simulation step.

First step: econometric analysis

In order to assess the relevance of agglomeration economies in regional disparities, an empirical two-steps procedure has been run. The first step is the estimation of a traditional regional production function, where the GDP of regions (NUTS 2) in the EU is explained by labour (distinguishing between quantity and quality of labour force), capital (distinguishing between financial and infrastructural capital) and presence of metropolitan areas.

In particular, the following regression was estimated:

$$gdp_{2016} = \alpha + \beta_1 pop\ metro_{2010} + \beta_2 k\ stock_{2010} + \beta_3 accessibility_{2006} + \beta_4 human\ k_{2010} + \beta_5 emp_{2010} + \beta_6 QoG_{2010} + \beta_7 innovation_{2010} + \beta_8 countryFE + \varepsilon$$

Where the units of analysis are NUTS 2 regions, *gdp* is total GDP in PPS, and *pop metro* is the main variable of interest, measured as metropolitan population pertaining to the region and meant to catch the (expectedly positive) returns to scale of agglomeration economies. *k stock* is the financial capital stock, *accessibility* represents infrastructural capital, *human k* is a measure of the quality of labour force, *emp* represents total employment, *QoG* measures the quality of government, and *innovation* is measured as number of patent applications per million inhabitants. Country fixed effects (*countryFE*) are also included.

The specification is then augmented to include the squared metropolitan population, so as to capture the existence of increasing returns to scale, as follows:

$$gdp_{2016} = \alpha + \beta_1 pop\ metro_{2010} + \beta_2 pop\ metro^2_{2010} + \beta_3 k\ stock_{2010} + \beta_4 accessibility_{2006} + \beta_5 human\ k_{2010} + \beta_6 emp_{2010} + \beta_7 QoG_{2010} + \beta_8 innovation_{2010} + \beta_9 countryFE + \varepsilon$$

In order to assure as much as possible the expected direction of causality, the explanatory variables enter the model according to the correct temporal consequentiality; they are indeed six years lagged with respect to the dependent variable, referring to 2016.¹⁰⁵

Table 31 displays a more detailed description of the variables listed above and of their sources. The computation of the variable *pop metro* (introduced to catch agglomeration economies) deserves particular attention. It is in fact calculated as the sum of metropolitan population pertaining to the NUTS 2 region. According to the Eurostat definition, metropolitan regions are NUTS 3 regions or a combination of NUTS 3 regions that represent all agglomerations of at least 250,000 inhabitants.¹⁰⁶ More specifically, metropolitan areas can be completely included in the same NUTS 2 region or can be spread across different NUTS 2 regions (see Annex 6.2.2). For this reason, the metropolitan population associated to each NUTS 2 region was computed as the sum of the metropolitan NUTS 3 areas included in the region in the first case and as the sum of the population in all the metropolitan NUTS 3 areas pertaining to the region in the second. For example, if one particular metropolitan area is shared between two different NUTS 2 regions, its population was assigned to both the NUTS 2 regions, since they both take advantage of the related agglomeration economies. For both the sum of different metro regions in the same NUTS 2 and for the allocation to NUTS 2 regions of the population of a metropolitan area that lies across them the theoretical explanation lies in the "borrowed size" effect that the literature has

¹⁰⁵ The only exception is *accessibility* (2006). Such exception is due to data availability.

¹⁰⁶ For further details: <https://ec.europa.eu/eurostat/web/metropolitan-regions/background>, accessed 20 September 2019.

envisaged.¹⁰⁷ The efficiency gains of a metropolitan area, in fact, do not remain confined within their geographical and/or administrative boundaries but spread around the surrounding areas.¹⁰⁸

Table 32 reports instead the results of the main specifications (columns 1 and 2) and of a series of additional regressions run on different time spans as a robustness check (columns 3 to 8). As expected, the endowment of capital (both financial and infrastructural), labour (both in terms of quantity and quality) and innovation positively affects the overall level of GDP. In addition, most specifications show an important role of the quality of government (institutions), as well. As for our main research interest, the positive and significant coefficient associated to the *pop metro* variable (metropolitan population pertaining to the region) in specification (1) shows clearly the existence of positive urban efficiency gains. Moreover, the negative and significant coefficient of the same variable in specification (2) accompanied by a positive and significant coefficient of its square proves the presence of *increasing* urban efficiency gains. A non-linear relationship of a U-shaped form links indeed urban size and GDP: very large cities (especially big metropolitan areas) play a particularly relevant role in regional production capability.

Table 31: Variable's description

Variable	Description	Computation	Source
<i>gdp</i>	Production	GDP in PPS	Eurostat
<i>pop metro</i>	City size	Resident population in metropolitan areas pertaining to the region (see text for additional details on the computation)	Eurostat
<i>k stock</i>	Financial capital stock	Computed by Perpetual Inventory Method (PIM) on GFCF, base year 2000	Cambridge Econometrics – DG REGIO
<i>accessibility</i>	Infrastructural capital	ESPON multimodal accessibility per million inhabitants	ESPON, TRACC project
<i>human capital</i>	Quality of labour force	% of college graduates/working age population	Eurostat
<i>emp</i>	Size of labour force	Total employment	Cambridge Econometrics – DG REGIO
<i>QoG</i>	Quality of Government	University of Gothenburg Quality of Government index	University of Gothenburg - Quality of Government Institute
<i>innovation</i>	Product innovation	No. of patent applications per million inhabitants	Eurostat

Source: Polimi (2019).

107 Alonso, W. (1973) Urban zero population growth, *Daedalus*, vol.102 (4), pp. 191–206.

108 Meijers E. (2013) Cities Borrowing Size: An Exploration of the Spread of Metropolitan Amenities across European Cities, paper presented at the Association of American Geographers annual meeting, Los Angeles, April 9-13.

Table 32: Regression results. Dependent variable: GDP PPS.

	(1) <i>dep var 2016 indep vars 2010</i>	(2) <i>dep var 2016 indep vars 2010</i>	(3) <i>dep var 2016 indep vars 2012</i>	(4) <i>dep var 2016 indep vars 2012</i>	(5) <i>dep var 2008 indep vars 2002</i>	(6) <i>dep var 2008 indep vars 2002</i>	(7) <i>dep var 2008 indep vars 2004</i>	(8) <i>dep var 2008 indep vars 2004</i>
pop metro	0.079*** (3.66)	-0.262*** (-3.70)	0.061*** (3.19)	-0.565*** (-4.31)	0.033* (1.88)	-0.150*** (-3.22)	0.037** (2.14)	-0.177*** (-3.90)
pop metro ²		0.317*** (5.03)		0.306*** (5.56)		0.169*** (4.24)		0.195*** (5.04)
k stock	0.460*** (9.50)	0.427*** (9.18)	0.466*** (10.61)	0.434*** (10.41)	0.252*** (7.37)	0.244*** (7.43)	0.295*** (8.61)	0.276*** (8.47)
accessibility	0.029* (1.62)	0.028* (1.66)	0.018 (1.14)	0.020 (1.33)	0.049*** (2.81)	0.047*** (2.79)	0.025 (1.40)	0.023 (1.38)
human capital	0.143*** (4.50)	0.170*** (5.57)	0.145*** (5.41)	0.161*** (6.36)	0.069** (2.55)	0.085*** (3.23)	0.068*** (2.82)	0.091*** (3.91)
emp	0.480*** (10.13)	0.581*** (11.80)	0.495*** (11.35)	0.592*** (13.29)	0.747*** (20.08)	0.794*** (21.23)	0.684*** (19.24)	0.750*** (20.80)
QoG	0.031 (0.81)	0.023 (0.67)	0.074** (2.02)	0.048 (1.38)	0.054* (1.73)	0.046* (1.51)	0.060** (1.98)	0.052* (1.82)
innovation	0.051** (2.09)	0.038* (1.63)	0.032* (1.47)	0.025 (1.23)	0.032* (1.66)	0.023 (1.24)	0.047** (2.46)	0.035* (1.92)
constant	-27341*** (-3.81)	-24883.04*** (-3.51)	-27634.8*** (-4.71)	-23847.34*** (-4.30)	-20552.63*** (-3.90)	-18283.79 (-3.59)	-18422.36*** (-3.62)	-16818.57*** (-3.49)
COUNTRY FE	YES	YES	YES	YES	YES	YES	YES	YES
No. of obs.	253	253	257	257	231	231	238	238
R-squared	0.947	0.952	0.9586	0.964	0.967	0.970	0.968	0.971
Adj. R-squared	0.939	0.945	0.9527	0.958	0.961	0.964	0.963	0.967

Standardised coefficients. T-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Source: Polimi (2019).

Second step: simulations

The second step simulates how regional disparities would look like in a world with no agglomeration economies (general interpretation) or with no very large cities (restricted interpretation). In particular, the simulation was carried out based on the regression presented above (specification 2 in Table 32) and according to the following procedure:

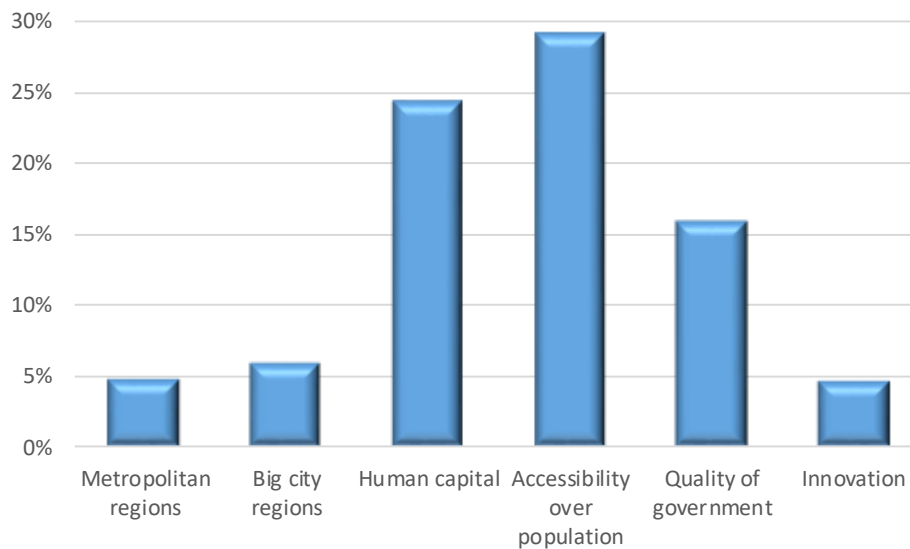
- starting from GDP PPS for 2016, a (reference) Theil index was computed;
- a situation in which there are no agglomeration economies at all was simulated by setting the parameter of the metropolitan population and its square to zero (no urban efficiency gains), and subsequently by setting to zero only that of very large cities (no increasing urban efficiency gains);
- GDP PPS in 2016 was estimated on the basis of the regression coefficients obtained by the simulation;
- the estimated GDP PPS was rescaled so that it had the same minimum and maximum values as the real one, and the same European total value as the real one. This step allows to simulate the pure distributive effect of the simulation, keeping the aggregate effects constant;
- the rescaled estimated GDP PPS for 2016 was applied to recalculate the Theil index;
- finally, the new simulated Theil index was compared with the real one, obtaining the relevance of agglomeration economies in determining inter-regional disparities.

The same procedure was also followed for the other production factors, in order to be able to capture the relative importance of agglomeration economies in determining inter-regional disparities.¹⁰⁹ The results are displayed in Figure 13 in the main text.

As a further robustness check, the same simulation was carried out for the 2008 GDP PPS (specification six in Table 32). The results are shown in Figure 46 below and are consistent with those displayed in the main text for 2016.

¹⁰⁹ Although not statistically significant in the main specification (column 2, Table 32), the quality of government was included in the simulation since it came out to be statistically significant for most of the other specifications of the model (see Table 32).

Figure 46: Relevance of agglomeration economies on regional disparities: comparison with other production factors (% change - 2008)



Source: Polimi (2019).

6.2.10 Methodology and results of the investment analysis

This annex presents the results of the analysis of investments. In particular, the analysis has the aim to know whether investments are an important determinant of regional convergence in Europe. They are in fact one of the drivers on which the cohesion policy can act towards regional growth, especially in lagging regions.

The analysis is developed through three different steps:

- the first step aims to investigate whether there is an impact of investments on aggregate regional growth and, in particular, whether such impact differs in case of private or public investments (Step 1);
- the second step investigates whether these effects are subject to increasing returns to scale through an analysis of quantiles (Step 2);
- the third step analyses whether these effects are more or less effective in lagging regions in particular. If this is the case, investments in lagging regions are expected to play a role on the decrease in regional disparities (Step 3).

The analysis of investments is also complemented with an analysis on the role of cohesion policy funds in increasing the regional investment rates. The investment rates are in fact important channels through which cohesion policy can act as a growth enhancer for less developed regions in Europe and as such reduce regional disparities.

The data on GDP and investments are those published by the DG Regio with the source obtained by Cambridge Econometrics. Data on regional cohesion policy expenditure are those published in the "Historic EU payments - regionalised and modelled" database by DG Regio. All other data are the same as in the analysis of the previous Annexes, and as such are already described in Table 33.

The six investment sectors are aggregated into 2 groups:

- private investments, which include investments made by the following private sectors: A, Agriculture, forestry and fishing; B-E, Industry (except construction); F, Construction; G-J, Wholesale and retail trade; transport; accommodation and food service activities; ICT; K-N, Financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service, etc;
- public investments, which include investments made by the following public sector, also known as non-market sector: O-U, Public administration and defence; compulsory social security; education; human health and social work activities; arts, entertainment and recreational services.

All investments are expressed as a ratio between investment and GVA.

Step 1 - Impact of investments in different sectors on aggregate regional growth

In the first step of the analysis, the impact of investment on regional GDP growth is detected through the following model:

$$(9.1a) \text{ gdp growth} = \alpha + \beta_1 \text{public investments} + \beta_2 \text{private investments} + \gamma_1 \text{controls} + \gamma_2 \text{national dummies} + \varepsilon$$

where *gdp growth* is our measure of economic performance; it is computed as average annual GDP PPS growth rate between 2007 and 2016.

The regression includes a large battery of regional controls, which coincide with the assets of the previous annex. The regressions also include the full battery of country dummies to account for national factors.

The model is then enlarged to regional policies to detect whether there is a direct impact of cohesion policy funds or it is mediated by investments.

$$(9.1b) \text{ gdp growth} = \alpha + \beta_1 \text{public investments} + \beta_2 \text{private investments} + \beta_3 \text{cohesion policy funds} + \gamma_1 \text{controls} + \gamma_2 \text{national dummies} + \varepsilon$$

The regression results are presented in Table 33.

It is immediately possible to see that total investment positively and significantly influences regional growth (columns one to four). The same happens for private and public investments, if measured separately. However, when both private and public investments are entered in the regressions at the same time, only private investments remain significant, signalling that the two types of investments are related and that the impact of public investments is mediated by private ones.

The second part of Table 33 (columns five to eight) presents the same regressions with the addition of the total amount of cohesion expenditure. This coefficient is never significant, signalling the absence of an unmediated impact of cohesion policy on growth unmediated by investments.

The effect of cohesion policy on growth, however, is significant and sizeable because they are able to impact the regional investments which, in turn, influence regional growth.

Table 34 presents a battery of regressions in which the dependent variables are the total investments, on the left, the private investments, in the middle, and the public investments, on the right.

The model which is estimated is the following one:

$$(9.2) \text{ investment rate} = \alpha + \beta_1 \text{cohesion policy} + \gamma_1 \text{controls} + \gamma_2 \text{national dummies} + \varepsilon$$

As evidenced in Table 34 (columns one to 15) the effects of regional policy on investments are sizeable and significant, for all funds, also because normally the same regions which receive more of one fund also receive more of the other. Especially significant is the role of ERDF.

Step 2 - Effects of investments on GDP growth for different endowment levels

This second step investigates whether there are increasing or decreasing returns in the impact of investments on GDP growth.

For this reason, analogously to Annex 7, regressions are run with quantiles in terms of investments, in particular four quartiles are computed for each investment variable.

The investigation takes place through the following model, which is an extension of the model of equation (9.1a):

$$(9.3) \text{ gdp growth} = \alpha + \beta_1 \text{investment } q1 + \beta_2 \text{investment } q2 + \beta_3 \text{investment } q3 + \beta_4 \text{investment } q4 + \gamma_1 \text{controls} + \gamma_2 \text{national dummies} + \varepsilon$$

where *investment* represents the specific type of investment which is investigated (either total, private or public) and it is included in the model through dummy variables equal to 1 if the region is part of the first, second, third or fourth quartile of the distribution, respectively (the first quartile is then dropped from the regression and kept as the reference category/benchmark). For instance, in the case of a region characterised by a very low level of investment, the related dummy for the first quartile will be equal to 1, while of course the dummies referring to the other quartiles of the distribution will be equal to zero.

Results are presented in Table 35.

As it is possible to see (columns one, two, five, six), by keeping the first investment quantile as benchmark, all the other quartiles grow significantly more, for total investments and for private investments. This effect is significantly more sizeable for the fourth quartile, the one with the highest investment rate.

Public investments, on the other hand (columns three, four, seven and eight), see less evidence of increasing returns, but still have a positive impact of being in the fourth quartile and, differently from the standard regressions of Table 33, this effect remains significant when public and private investments are included at the same time (columns four and eight).

It is hence possible to conclude that not only investments do have an impact on regional growth but this is especially true when their amount is very large.

Step 3 - Impact of investments in lagging regions on regional growth

In the third step, the purpose is to understand whether the effects of investments on growth and the effects of policies of investments, which were analysed in the first step, are different for weak regions.

Because the purpose is to have a prospective analysis, rather than a causal one, the interest is on those regions which are currently lagging. To use a definition which is legal rather than statistical, the subset of regions which is analysed is the one of regions eligible for the less developed regions objective in the programming period 2014-2040, as stated in the regulations published in L 50/22 Official Journal of the European Union 20.2.2014.

The various specified models of the first step, therefore, have been expanded to include the eligibility and the interaction between the eligibility and the most important determinant.

$$(9.4) \text{ gdp growth} = \alpha + \beta_1 \text{public investments} + \beta_2 \text{private investments} + \gamma_1 \text{controls} + \gamma_2 \text{national dummies} + \delta_1 \text{eligibility} + \delta_2 \text{eligibility} * \text{investments} + \varepsilon$$

$$(9.5) \text{ investments} = \alpha + \beta_1 \text{cohesion policy} + \gamma_1 \text{controls} + \gamma_2 \text{national dummies} + \delta_1 \text{eligibility} + \delta_2 \text{eligibility} * \beta_2 \text{cohesion policy} + \varepsilon$$

where *eligibility* is a dummy which is equal to 1 if the region is included in the lagging region objective and 0 otherwise.

The results of the first analysis, which is consistent with the one of Table 33, are presented in Table 36. By looking at the columns seven to 10 of the table, it does not seem that there is an impact of the eligibility dummy per se on regional growth, nor there is a change in the coefficients of the effect of investment on GDP growth. However, when the two variables of investments (of the three types) are interacted with the eligibility dummy, some interesting results appear (columns 11 to 13).

For total investments and for private investments alike, the general coefficient remains almost unaffected, but the eligibility dummy becomes significant and negative, while the interacted coefficient is positive and significant. This pattern can be interpreted as a different behaviour of less developed regions in the relation between investment and growth; it seems that these regions would grow less *ceteris paribus* but they have a larger effect of investment on growth which compensates the original situation. For this reason, investing in lagging regions is even more important than in non-lagging ones.

The impact of public investments, however, is unaffected (column 13), so it is important to stimulate market investments. To see whether the investment stimulus of cohesion policy is stronger in lagging regions, the analysis of Table 34 has been replicated in Table 37.

The results of Table 37 show that, *ceteris paribus*, lagging regions tend to have lower total and private investments, but this path is not significant for public ones (columns four to six). When looking at the impact of cohesion policy funds on investment growth, this is significant for all types of investments, as in the first step (columns seven to nine), and this is not affected by the fact that lagging regions have lower investments (columns 10 to 12). When looking at the interactions (columns 13 to 15 in Table 37) it seems that cohesion policy remains able to increase the investment rate in all three types of investments, but its efficiency in doing so is lower in less developed regions, stemming from a much lower capability of increasing local public investments.

Table 33: Effects of investments on regional GDP growth

VARIABLES	(1) gdp growth	(2) gdp growth	(3) gdp growth	(4) gdp growth	(5) gdp growth	(6) gdp growth	(7) gdp growth	(8) gdp growth
human capital	0.036*** (0.010)	0.038*** (0.010)	0.033*** (0.011)	0.035*** (0.011)	0.037*** (0.010)	0.039*** (0.010)	0.033*** (0.011)	0.036*** (0.011)
accessibility	10.749*** (3.839)	10.989*** (3.854)	11.472*** (3.935)	10.734*** (3.848)	10.737*** (3.841)	10.998*** (3.862)	11.441*** (3.938)	10.687*** (3.849)
QoG	0.119 (0.094)	0.132 (0.094)	0.129 (0.096)	0.118 (0.094)	0.110 (0.094)	0.130 (0.094)	0.117 (0.097)	0.104 (0.095)
radical innovation	0.972* (0.527)	0.935* (0.531)	1.188** (0.539)	0.980* (0.530)	0.976* (0.527)	0.937* (0.532)	1.209** (0.541)	1.003* (0.531)
market innovation	2.603*** (0.916)	2.400*** (0.918)	2.713*** (0.952)	2.628*** (0.930)	2.486*** (0.927)	2.359** (0.933)	2.639*** (0.957)	2.538*** (0.934)
gdp pc	-0.026** (0.011)	-0.028*** (0.011)	-0.026** (0.011)	-0.026** (0.011)	-0.027** (0.011)	-0.029*** (0.011)	-0.026** (0.011)	-0.027** (0.011)
metro	0.078 (0.106)	0.055 (0.106)	0.051 (0.110)	0.080 (0.107)	0.065 (0.108)	0.050 (0.108)	0.042 (0.110)	0.068 (0.108)
trust	1.016* (0.613)	1.098* (0.614)	1.113* (0.630)	1.009# (0.616)	1.027* (0.613)	1.104* (0.616)	1.112* (0.630)	1.005# (0.616)
sh ht	1.889 (3.756)	2.067 (3.774)	1.553 (3.856)	1.863 (3.767)	1.683 (3.766)	2.004 (3.788)	1.289 (3.874)	1.550 (3.781)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES	YES	YES	YES
total investments 2003-06	4.147*** (0.976)				4.397*** (1.020)			
market investments 2003-06		4.518*** (1.135)		4.032*** (1.182)		4.572*** (1.154)		4.088*** (1.183)
non market investments 2003-06			7.850** (3.190)	4.682 (3.251)			9.132** (3.574)	6.178* (3.591)
cohesion policy funds 2003-06					-0.007 (0.008)	-0.002 (0.008)	-0.007 (0.009)	-0.009 (0.009)
Constant	-0.093 (0.405)	-0.015 (0.405)	0.709** (0.341)	-0.088 (0.407)	-0.079 (0.406)	-0.001 (0.408)	0.742** (0.344)	-0.059 (0.408)
Observations	254	254	254	254	254	254	254	254
R-squared	0.886	0.885	0.880	0.886	0.886	0.885	0.880	0.887
Adjusted R-squared	0.868	0.867	0.861	0.868	0.868	0.867	0.861	0.868

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$, # $p < 0.15$

Table 34: Effects of cohesion policy on regional investments

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	tot. Inv. 2003-06	tot. Inv. 2003-06	tot. Inv. 2003-06	tot. Inv. 2003-06	tot. Inv. 2003-06	mkt inv. 2003-06	mkt inv. 2003-06	mkt inv. 2003-06	mkt inv. 2003-06	mkt inv. 2003-06	non-mkt inv. 2003-06	non-mkt inv. 2003-06	non-mkt inv. 2003-06	non-mkt inv. 2003-06	non-mkt inv. 2003-06
human capital	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.001** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000** (0.000)	0.001** (0.000)
accessibility	0.324 (0.252)	0.345 (0.256)	0.318 (0.262)	0.230 (0.254)	0.344 (0.257)	0.244 (0.224)	0.256 (0.226)	0.240 (0.227)	0.192 (0.225)	0.257 (0.225)	0.079 (0.076)	0.090 (0.076)	0.078 (0.083)	0.038 (0.076)	0.087 (0.079)
QoG	0.011* (0.006)	0.011* (0.006)	0.010# (0.006)	0.007 (0.006)	0.010* (0.006)	0.007 (0.005)	0.007 (0.006)	0.006 (0.006)	0.004 (0.005)	0.006 (0.005)	0.004** (0.002)	0.005** (0.002)	0.004* (0.002)	0.003# (0.002)	0.004** (0.002)
radical innovation	0.034 (0.035)	0.036 (0.035)	0.039 (0.036)	0.044 (0.035)	0.038 (0.035)	0.043 (0.031)	0.044 (0.031)	0.044 (0.031)	0.048# (0.031)	0.045# (0.031)	-0.008 (0.010)	-0.008 (0.010)	-0.006 (0.011)	-0.004 (0.010)	-0.007 (0.011)
market innovation	-0.020 (0.061)	-0.022 (0.062)	-0.065 (0.063)	-0.043 (0.061)	-0.033 (0.062)	0.010 (0.054)	0.005 (0.055)	-0.016 (0.054)	-0.004 (0.054)	0.004 (0.055)	-0.029# (0.018)	-0.027# (0.018)	-0.050** (0.020)	-0.039** (0.018)	-0.036* (0.019)
gdp pc	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000** (0.000)	-0.000** (0.000)	-0.001** (0.000)	-0.000** (0.000)	-0.000** (0.000)
metro	-0.013* (0.007)	-0.015** (0.007)	-0.017** (0.007)	-0.013* (0.007)	-0.014* (0.007)	-0.009 (0.006)	-0.010* (0.006)	-0.011* (0.006)	-0.009# (0.006)	-0.009# (0.006)	-0.004* (0.002)	-0.005** (0.002)	-0.006*** (0.002)	-0.004** (0.002)	-0.005** (0.002)
trust	0.060# (0.040)	0.067# (0.041)	0.061# (0.042)	0.065# (0.040)	0.059 (0.041)	0.040 (0.036)	0.044 (0.036)	0.039 (0.036)	0.043 (0.036)	0.039 (0.036)	0.020* (0.012)	0.023* (0.012)	0.022* (0.013)	0.022* (0.012)	0.020# (0.013)
sh ht	0.044 (0.248)	0.037 (0.251)	-0.006 (0.257)	0.072 (0.249)	0.017 (0.252)	-0.017 (0.220)	-0.024 (0.222)	-0.045 (0.222)	-0.002 (0.221)	-0.031 (0.221)	0.061 (0.074)	0.061 (0.074)	0.039 (0.081)	0.074 (0.075)	0.048 (0.078)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
cohesion policy funds 1999-02	0.002*** (0.000)					0.001*** (0.000)					0.001*** (0.000)				
ERDF funds 1999-02		0.003*** (0.001)					0.002** (0.001)					0.002*** (0.000)			
CF funds 1999-02			0.004** (0.002)					0.003** (0.001)					0.001# (0.001)		
ESF funds 1999-02				0.014*** (0.003)					0.008*** (0.003)					0.006*** (0.001)	
EAFRD funds 1999-02					0.010*** (0.003)					0.006** (0.002)					0.004*** (0.001)
Constant	0.246*** (0.021)	0.247*** (0.021)	0.268*** (0.021)	0.254*** (0.021)	0.251*** (0.021)	0.216*** (0.019)	0.218*** (0.019)	0.228*** (0.018)	0.221*** (0.018)	0.218*** (0.019)	0.030*** (0.006)	0.029*** (0.006)	0.039*** (0.007)	0.033*** (0.006)	0.033*** (0.007)
Observations	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254
R-squared	0.626	0.617	0.598	0.624	0.613	0.482	0.473	0.471	0.480	0.476	0.836	0.836	0.804	0.835	0.819
Adjusted R-squared	0.568	0.557	0.536	0.566	0.552	0.402	0.391	0.389	0.399	0.395	0.810	0.810	0.773	0.810	0.791

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10, # p<0.15.

Source: Polimi (2019).

Table 35: Returns to scale in the effects of investments on regional GDP growth

VARIABLES	(1) gdp growth	(2) gdp growth	(3) gdp growth	(4) gdp growth	(5) gdp growth	(6) gdp growth	(7) gdp growth	(8) gdp growth
human capital	0.034*** (0.011)	0.038*** (0.011)	0.027** (0.012)	0.028** (0.012)	0.034*** (0.011)	0.038*** (0.011)	0.027** (0.012)	0.028** (0.012)
accessibility	10.974*** (3.911)	11.558*** (3.895)	10.971*** (3.971)	10.626*** (3.913)	10.973*** (3.920)	11.538*** (3.904)	10.972*** (3.980)	10.626*** (3.922)
QoG	0.124 (0.095)	0.110 (0.096)	0.133 (0.097)	0.097 (0.096)	0.123 (0.096)	0.112 (0.096)	0.131 (0.097)	0.095 (0.097)
radical innovation	0.958* (0.546)	0.862# (0.544)	1.246** (0.546)	0.946* (0.547)	0.962* (0.548)	0.857# (0.546)	1.253** (0.548)	0.952* (0.549)
market innovation	2.407** (0.932)	2.266** (0.930)	2.542*** (0.948)	2.456*** (0.934)	2.379** (0.949)	2.308** (0.944)	2.511*** (0.962)	2.431** (0.948)
gdp pc	-0.024** (0.011)	-0.026** (0.011)	-0.022* (0.011)	-0.019* (0.011)	-0.024** (0.011)	-0.026** (0.011)	-0.022* (0.011)	-0.020* (0.011)
metro	0.064 (0.108)	0.062 (0.108)	0.034 (0.110)	0.090 (0.110)	0.061 (0.110)	0.067 (0.110)	0.030 (0.112)	0.087 (0.112)
trust	0.987# (0.627)	1.049* (0.625)	1.159* (0.634)	0.940# (0.629)	0.991# (0.629)	1.041* (0.627)	1.161* (0.635)	0.942# (0.630)
sh ht	2.075 (3.843)	2.091 (3.821)	1.907 (3.877)	2.128 (3.817)	2.026 (3.863)	2.161 (3.837)	1.866 (3.891)	2.093 (3.831)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES	YES	YES	YES
total investments 2003-06 2Q	0.274** (0.114)				0.274** (0.114)			
total investments 2003-06 3Q	0.282** (0.132)				0.283** (0.133)			
total investments 2003-06 4Q	0.519*** (0.154)				0.524*** (0.158)			
market investments 2003-06 2Q		0.275** (0.113)		0.281** (0.113)		0.276** (0.113)		0.281** (0.113)
market investments 2003-06 3Q		0.290** (0.124)		0.286** (0.125)		0.288** (0.124)		0.287** (0.125)
market investments 2003-06 4Q		0.466*** (0.136)		0.413*** (0.140)		0.464*** (0.137)		0.413*** (0.140)
non market investments 2003-06 2Q			0.145 (0.132)	0.119 (0.131)			0.143 (0.132)	0.118 (0.131)
non market investments 2003-06 3Q			0.218 (0.160)	0.210 (0.159)			0.218 (0.160)	0.210 (0.159)
non market investments 2003-06 4Q			0.459** (0.189)	0.388** (0.191)			0.467** (0.192)	0.394** (0.195)
cohesion policy funds 2003-06					-0.001 (0.008)	0.002 (0.008)	-0.002 (0.008)	-0.001 (0.008)
Constant	0.676** (0.338)	0.671** (0.332)	0.837** (0.342)	0.536# (0.352)	0.688** (0.347)	0.646* (0.344)	0.857** (0.358)	0.553# (0.367)
Observations	254	254	254	254	254	254	254	254
R-squared	0.883	0.883	0.880	0.886	0.883	0.883	0.880	0.886
Adjusted R-squared	0.864	0.864	0.860	0.865	0.863	0.863	0.860	0.864

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10, # p<0.15.

Source: Polimi (2019).

Table 36: Effects of investments on regional GDP growth in less developed regions

VARIABLES	(1) gdp growth	(2) gdp growth	(3) gdp growth	(4) gdp growth	(5) gdp growth	(6) gdp growth	(7) gdp growth	(8) gdp growth	(9) gdp growth	(10) gdp growth	(11) gdp growth
human capital	0.038*** (0.011)	0.036*** (0.010)	0.038*** (0.010)	0.033*** (0.011)	0.038*** (0.011)	0.036*** (0.010)	0.038*** (0.010)	0.033*** (0.011)	0.037*** (0.010)	0.040*** (0.010)	0.033*** (0.011)
accessibility	12.100*** (3.971)	10.749*** (3.839)	10.989*** (3.854)	11.472*** (3.935)	12.099*** (3.980)	10.729*** (3.846)	10.969*** (3.860)	11.472*** (3.943)	10.674*** (3.807)	10.809*** (3.823)	11.497*** (3.954)
QoG	0.156# (0.097)	0.119 (0.094)	0.132 (0.094)	0.129 (0.096)	0.155# (0.099)	0.128 (0.095)	0.141# (0.096)	0.127 (0.098)	0.092 (0.096)	0.109 (0.096)	0.126 (0.099)
radical innovation	1.151** (0.545)	0.972* (0.527)	0.935* (0.531)	1.188** (0.539)	1.154** (0.548)	0.951* (0.530)	0.911* (0.534)	1.190** (0.542)	0.994* (0.525)	0.981* (0.529)	1.188** (0.543)
market innovation	2.316** (0.949)	2.603*** (0.916)	2.400*** (0.918)	2.713*** (0.952)	2.327** (0.958)	2.553*** (0.924)	2.343** (0.926)	2.719*** (0.960)	2.684*** (0.916)	2.381** (0.918)	2.735*** (0.966)
gdp pc	-0.030*** (0.011)	-0.026** (0.011)	-0.028*** (0.011)	-0.026** (0.011)	-0.030** (0.012)	-0.024** (0.011)	-0.026** (0.011)	-0.026** (0.012)	-0.027** (0.011)	-0.027** (0.011)	-0.026** (0.012)
metro	-0.001 (0.109)	0.078 (0.106)	0.055 (0.106)	0.051 (0.110)	-0.001 (0.109)	0.079 (0.107)	0.056 (0.106)	0.051 (0.110)	0.040 (0.107)	0.005 (0.108)	0.051 (0.110)
trust	1.299** (0.632)	1.016* (0.613)	1.098* (0.614)	1.113* (0.630)	1.301** (0.634)	1.006# (0.614)	1.087* (0.616)	1.114* (0.631)	1.081* (0.609)	1.141* (0.610)	1.122* (0.634)
sh ht	1.858 (3.898)	1.889 (3.756)	2.067 (3.774)	1.553 (3.856)	1.856 (3.907)	1.900 (3.762)	2.083 (3.780)	1.552 (3.865)	0.966 (3.746)	1.371 (3.756)	1.490 (3.886)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
eligibility					-0.017 (0.170)	0.081 (0.165)	0.086 (0.166)	-0.010 (0.168)	-1.293** (0.612)	-1.206** (0.583)	-0.064 (0.323)
total investments 2003-06		4.147*** (0.976)				4.214*** (0.987)			3.017*** (1.104)		
market investments 2003-06			4.518*** (1.135)				4.610*** (1.151)			3.072** (1.320)	
non market investments 2003-06				7.850** (3.190)				7.847** (3.198)			7.555** (3.532)
eligible * total investments 2003-06									4.799** (2.060)		
eligible * market investments 2003-06										5.685** (2.459)	
eligible * non market investments 2003-06											0.908 (4.622)
Constant	1.018*** (0.321)	-0.093 (0.405)	-0.015 (0.405)	0.709** (0.341)	1.030*** (0.345)	-0.170 (0.435)	-0.098 (0.437)	0.716* (0.364)	0.268 (0.470)	0.339 (0.472)	0.736* (0.379)
Observations	254	254	254	254	254	254	254	254	254	254	254
R-squared	0.877	0.886	0.885	0.880	0.877	0.886	0.885	0.880	0.889	0.888	0.880
Adjusted R-squared	0.858	0.868	0.867	0.861	0.858	0.868	0.867	0.861	0.871	0.869	0.860

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10, # p<0.15.

Source: Polimi (2019).

Table 37: Effects of cohesion policy on regional investments in less developed regions

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	tot. inv. 2003-06	mkt inv. 2003-06	non-mkt inv. 2003-06	tot. inv. 2003-06	mkt inv. 2003-06	non-mkt inv. 2003-06	tot. inv. 2003-06	mkt inv. 2003-06	non-mkt inv. 2003-06	tot. inv. 2003-06	mkt inv. 2003-06	non-mkt inv. 2003-06	tot. inv. 2003-06	mkt inv. 2003-06	non-mkt inv. 2003-06
human capital	0.001 (0.001)	-0.000 (0.001)	0.001*** (0.000)	0.001 (0.001)	-0.000 (0.001)	0.001*** (0.000)	0.000 (0.001)	-0.000 (0.001)	0.001** (0.000)	0.000 (0.001)	-0.000 (0.001)	0.001** (0.000)	0.000 (0.001)	-0.000 (0.001)	0.000** (0.000)
accessibility	0.326 (0.264)	0.246 (0.228)	0.080 (0.083)	0.325 (0.262)	0.245 (0.226)	0.080 (0.083)	0.324 (0.252)	0.244 (0.224)	0.079 (0.076)	0.322 (0.248)	0.243 (0.220)	0.079 (0.075)	0.328 (0.246)	0.247 (0.220)	0.081 (0.074)
QoG	0.009 (0.006)	0.005 (0.006)	0.004* (0.002)	0.006 (0.007)	0.003 (0.006)	0.003* (0.002)	0.011* (0.006)	0.007 (0.005)	0.004** (0.002)	0.008 (0.006)	0.004 (0.005)	0.004** (0.002)	0.009# (0.006)	0.004 (0.005)	0.005** (0.002)
radical innovation	0.043 (0.036)	0.048# (0.031)	-0.005 (0.011)	0.048 (0.036)	0.053* (0.031)	-0.005 (0.011)	0.034 (0.035)	0.043 (0.031)	-0.008 (0.010)	0.041 (0.034)	0.048# (0.030)	-0.008 (0.010)	0.040 (0.034)	0.048# (0.030)	-0.008 (0.010)
market innovation	-0.069 (0.063)	-0.019 (0.055)	-0.051** (0.020)	-0.053 (0.063)	-0.004 (0.054)	-0.050** (0.020)	-0.020 (0.061)	0.010 (0.054)	-0.029# (0.018)	0.008 (0.061)	0.033 (0.054)	-0.025 (0.019)	-0.005 (0.061)	0.026 (0.054)	-0.031* (0.018)
gdp pc	-0.001 (0.001)	-0.000 (0.001)	-0.001** (0.000)	-0.001* (0.001)	-0.001 (0.001)	-0.001** (0.000)	-0.001 (0.001)	-0.000 (0.001)	-0.000** (0.000)	-0.001* (0.001)	-0.001 (0.001)	-0.001** (0.000)	-0.001 (0.001)	-0.001 (0.001)	-0.000* (0.000)
metro	-0.019*** (0.007)	-0.012* (0.006)	-0.007*** (0.002)	-0.019*** (0.007)	-0.012** (0.006)	-0.007*** (0.002)	-0.013* (0.007)	-0.009 (0.006)	-0.004* (0.002)	-0.012* (0.007)	-0.008 (0.006)	-0.004* (0.002)	-0.013* (0.007)	-0.008 (0.006)	-0.004* (0.002)
trust	0.068# (0.042)	0.045 (0.036)	0.024* (0.013)	0.070* (0.042)	0.046 (0.036)	0.024* (0.013)	0.060# (0.040)	0.040 (0.036)	0.020* (0.012)	0.061# (0.040)	0.041 (0.035)	0.020* (0.012)	0.061# (0.039)	0.041 (0.035)	0.020* (0.012)
sh ht	-0.007 (0.259)	-0.046 (0.224)	0.039 (0.081)	-0.011 (0.257)	-0.049 (0.222)	0.039 (0.082)	0.044 (0.248)	-0.017 (0.220)	0.061 (0.074)	0.045 (0.243)	-0.016 (0.217)	0.061 (0.074)	0.131 (0.245)	0.031 (0.219)	0.099 (0.074)
COUNTRY FIXED EFFECTS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
eligibility				-0.023** (0.011)	-0.022** (0.010)	-0.001 (0.004)				-0.033*** (0.011)	-0.028*** (0.010)	-0.005# (0.003)	-0.012 (0.014)	-0.016 (0.013)	0.005 (0.004)
cohesion policy funds 1999-02							0.002*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.001*** (0.000)	0.003*** (0.001)	0.002*** (0.001)	0.001*** (0.000)
eligible * cohesion policy funds 1999-02													-0.001** (0.001)	-0.001 (0.001)	-0.001*** (0.000)
Constant	0.268*** (0.021)	0.228*** (0.018)	0.039*** (0.007)	0.285*** (0.023)	0.245*** (0.020)	0.040*** (0.007)	0.246*** (0.021)	0.216*** (0.019)	0.030*** (0.006)	0.268*** (0.022)	0.235*** (0.019)	0.033*** (0.007)	0.254*** (0.022)	0.227*** (0.020)	0.027*** (0.007)
Observations	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254
R-squared	0.589	0.461	0.802	0.597	0.473	0.802	0.626	0.482	0.836	0.642	0.502	0.837	0.649	0.506	0.845
Adjusted R-squared	0.527	0.380	0.772	0.534	0.392	0.771	0.568	0.402	0.810	0.584	0.422	0.811	0.591	0.424	0.819

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10, # p<0.15.

Source: Polimi (2019)

6.3 Analysis of the relationship between national policy measures for cohesion, disparities and assets' endowment

The following analysis serves as an addendum to the assessment provided in 3.2 and 3.3, which outlined both national policy approaches towards reducing within-country disparities and discussed policy instruments that sought to improve the respective country's growth assets. What follows below should be regarded as a similar exploration, yet pursued in a different form.

As indicated above, the following describes whether a relationship exists between the national / regional policy measures, disparities and endowments. It is organized around three different research questions:¹¹⁰

1. Do policy measures reflect particular disparity and GDP trends in each country?
2. Do policy measures reflect particular assets' endowment in each country?
3. Do policy measures related to a particular asset reflect the different endowment of that specific asset between regions eligible for the "less developed regions" objective in 2014-2020 and the others?

The first research question calls for a correspondence analysis between within-country disparity trends, GDP growth and policy measures.

Since the national policies which are studied in the selected countries are running along the EU programming period 2014-2020, the relevant economic situation of the individual countries to be considered is the one of the years before this programming period, which coincides with the EU programming period 2007-2013.

Figure 47 represents on the horizontal axis the average annual GDP PPS growth rate 2007-2013 and, on the vertical axis, the total variation of the Theil index of regional disparities inside the country in the same period. Each point represents one country. Slovenia and Croatia are excluded since, having just two regions, the Theil index would not be reliable.

Through the dimension of the circle, the Figure also represents a third dimension: the percentage of measures with a spatial target ¹¹¹ (Figure 47). To compute this percentage, the total number of measures has been used, which is not a perfect proxy, but is a measure systemically available for all countries, differently from the policy amounts which are not available for all countries and measures and cannot hence be used for systemic comparisons.

The results which arise are very interesting: when looking at how many policy measures are implemented which have a specific spatial objective, being either policy measures depending on economic indicators or measures for specific types of regions, it turns out that there is a relationship with the economic situation of the country in terms of growth and disparities. In particular, those countries which had lower problems following the 2007-2013 programming period, i.e. which increased their GDP PPS and decreased their internal disparities, have been less concerned with space-specific interventions in the following years (the current programming periods). Therefore, **countries with increasing GDP**

¹¹⁰ These three analyses will be performed through the use of associations rather than econometrics, due to the qualitative nature of the available data and the limited number of observations (11).

¹¹¹ These are the sum of policies dependent on economic indicators and policies for specific types of regions.

and reducing disparities did not need to curb disparities and hence implemented more 'spatially-blind' policies.

A similar analysis has been conducted for the share of policies which have been implemented in the various countries in the different macro-fields (Figure 48a, b, c, d). The four fields are those described in the previous section, namely: i) policies in the field of productive systems; ii) policies in the field of innovation; iii) policies in infrastructure; iv) policies devoted to human capital.

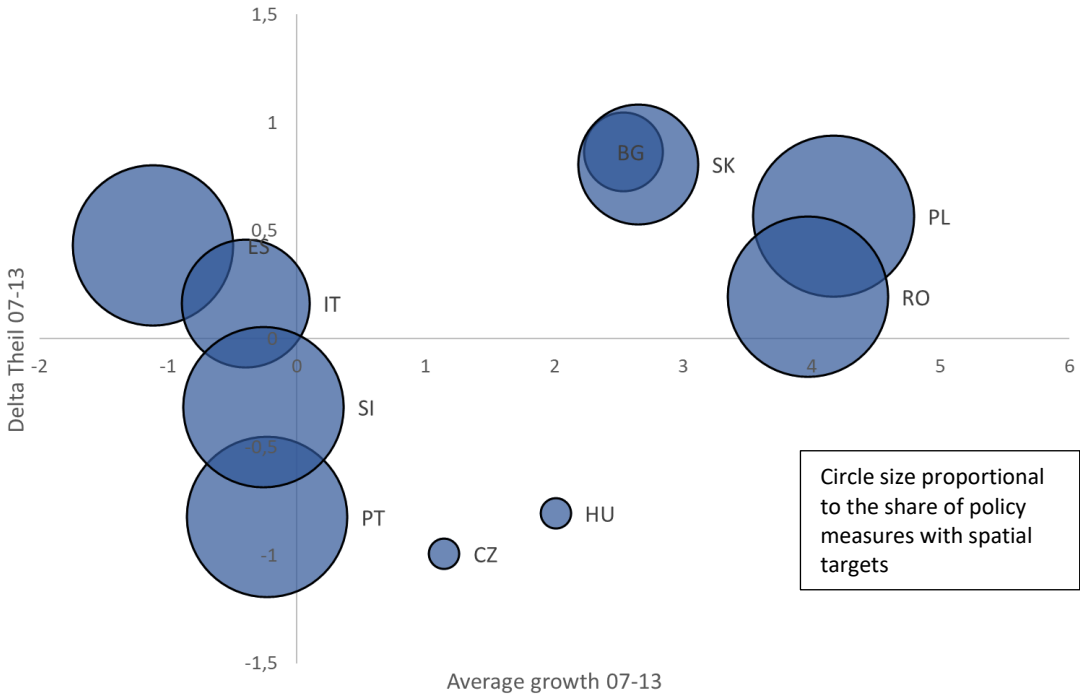
Differently from the relation between spatial and non-spatial policies, the **results do not seem to show an important association between the typology of policy choices of countries and their patterns in terms of growth and internal disparities.**

Policies for the productive system are quite similarly present in all countries, as are those for innovation, although the latter seems to be more present in some CEE Member States than in their western counterparts.

Policies for infrastructure are diffused in all countries, where they are normally present with a similar incidence, so that they can be considered as political flagship measures which every country needs to implement. The exception to this pattern is represented by Slovakia and Romania, two countries which did not have a problem with growth but experienced increasing disparities.

Policies for human capital, finally, have a very different spatial diffusion. They represent a significant share of policies for Portugal, Bulgaria and Poland, but are not present at all in other countries. The association with the situation of the country in terms of growth or disparities seems however to be weak.

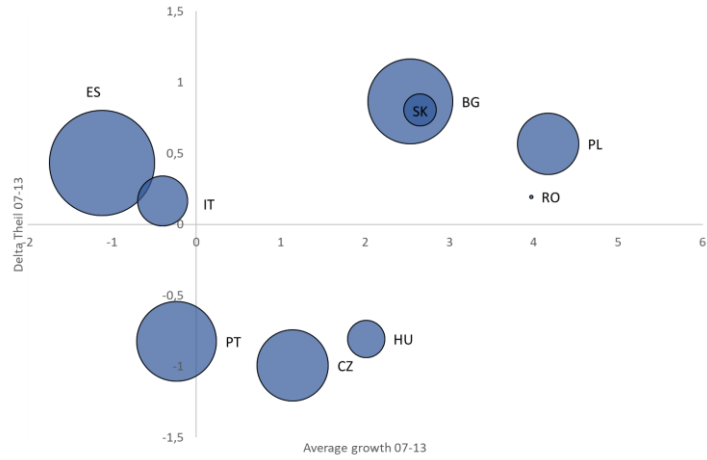
Figure 47: Relationship between the share of policy measures with spatial targets and the trends of disparity and GDP growth



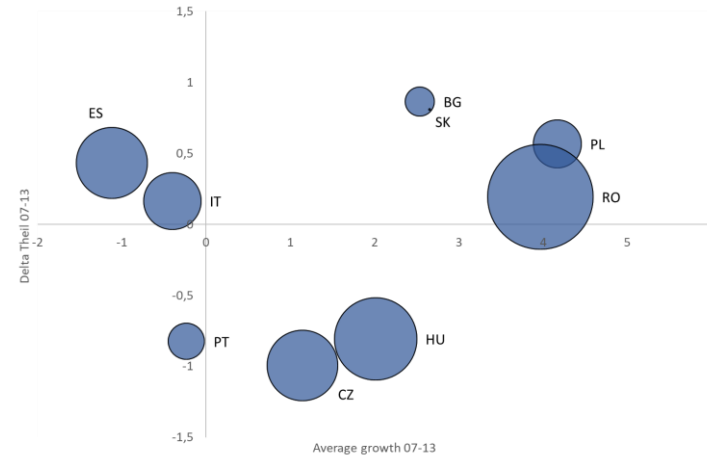
Source: POLIMI (2019).

Figure 48: Implemented policy measures by field of intervention and by disparity and GDP trends

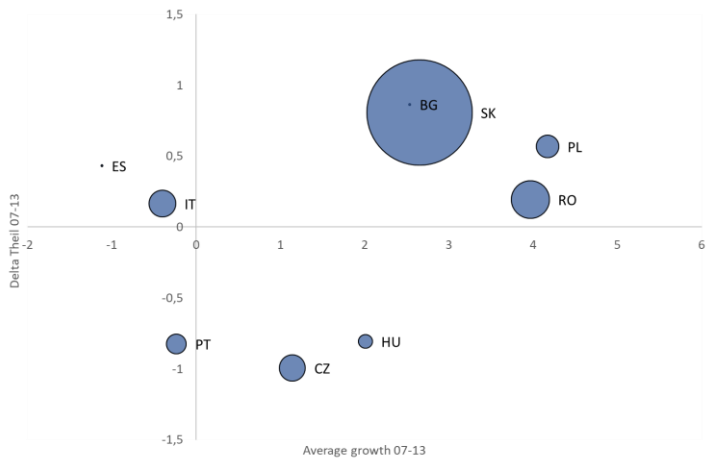
a) Share of policies in 'Business Environment and Trade'



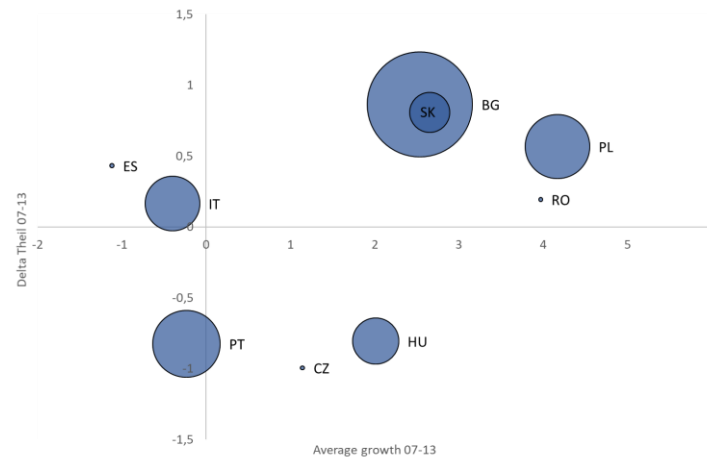
b) Share of policies in 'Innovation and Sector Development'



c) Share of policies in 'Transport Infrastructure'



d) Share of policies in 'Skills and Mobility'



Source: POLIMI (2019).

The second question calls for an analysis on the association between the policy choices of countries and their assets' endowment. The analysis focuses on those resources which were identified in Chapter 2 as those relevant to regional growth, namely market innovation, radical innovation, human capital and accessibility.

There are two possible situations which can arise: the first one in which a country, highly endowed with a specific resource, implements a lower number of policies in related fields, because it prefers to concentrate investments on lacking resources and build a balanced system. **This first case can be labelled as a *supply-driven policy approach***, in which the purpose of the government is to supply the country with the missing resources. The second one is the case in which a country, highly endowed with a specific resource, implements a larger number of policies in related fields, because the presence of related economic actors provides additional political demand for it. As a consequence, this second case can be labelled a ***demand-driven policy approach***.

There is not a full correspondence between the resources and the policy measures identified in the analysis, so that for example it is not possible to say to which of the four policy items policies of tax incentive are associated to. However, each of the four resources can be associated to a specific policy axis represented in Figure 49 (abcd).

In Figure 49a the level of market innovation in the country is compared to the share of policies in Sector development and targeted investment (which mostly comprehends innovation related measures, including business development and innovation support to firms, R&D programmes, research infrastructures, commercialisation of research and technology transfer, Industrial parks and other businesses infrastructures and clusters, centres of excellence and technology centres). A weak positive association, although not statistically significant, is present.

The same positive and not statistically significant association between the resource and the share of policy measures in innovation is present for radical innovation (Figure 49b). In this case, countries with more radical innovation tend to have a larger percentage of policies concerned with innovation, reflecting a demand-driven policy approach.

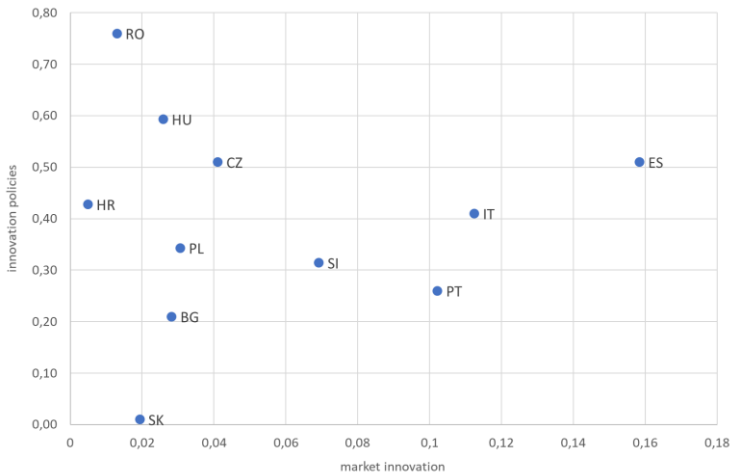
A demand-driven approach also emerges for human capital related policies (policy from the category 'Skills and Mobility') (Figure 49c): countries characterized by a higher level of human capital are normally implementing a larger share of related policies (which include life-long learning, new skills development, labour market training, educational infrastructures, universities, mobility of researchers).

Finally, the case of accessibility, where its endowment has to be compared only with policies in Transport infrastructure, rather than on general policies on Urbanisation and connectivity (Figure 49d). In this case, with the only exception of Slovakia and Romania, the percentage of policies on infrastructure is relatively similar among the various countries. Also, in this case, however, there seems to be the slight prevalence of a demand-driven approach because the number of policies in infrastructure seems to increase with the endowment of accessibility. Spain is an outlier because it does not seem to implement any infrastructural policy, which may be justified by the fact that it invested heavily in infrastructure using the CF so that it does not need a national specific policy.

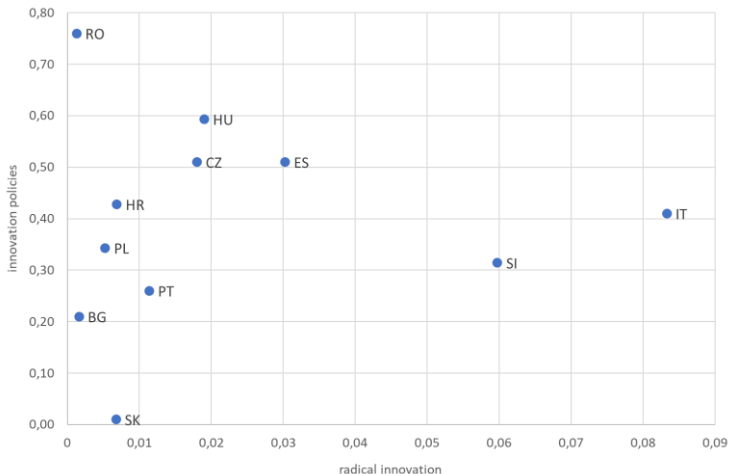
In general, therefore, **the demand-driven approach seems to prevail and the various countries are more likely to implement policies when they are highly endowed of related resources.**

Figure 49: Assets' endowment and share of policy measures by asset and policy

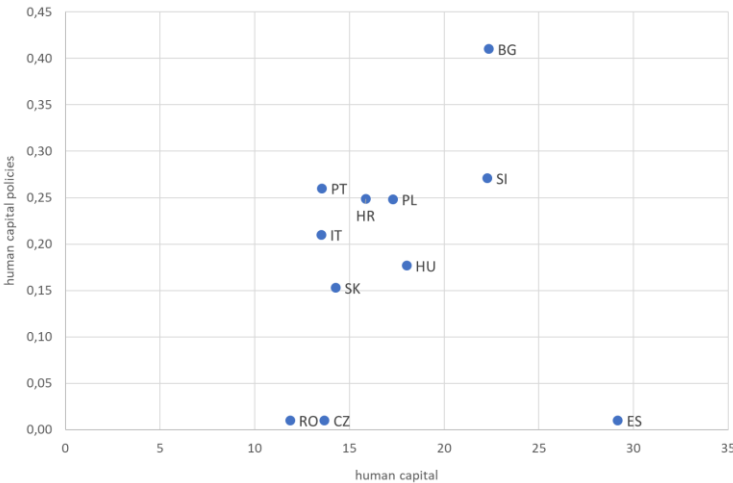
a) Innovation policies and market innovation endowment



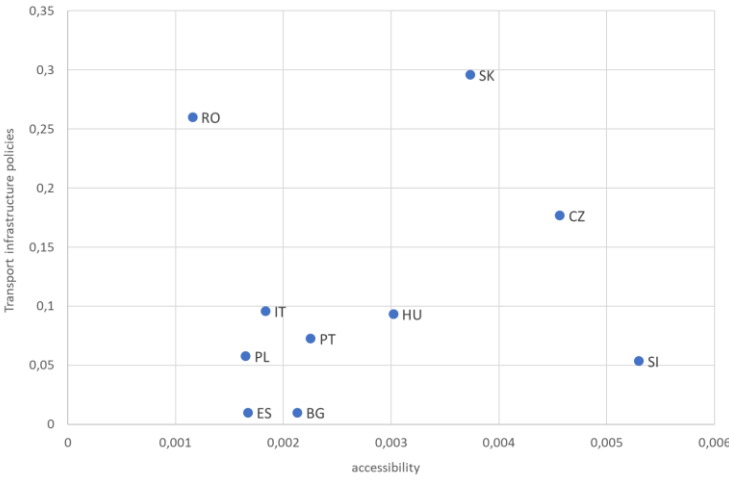
b) Innovation policies and radical innovation endowment



c) Human capital policies and human capital endowment



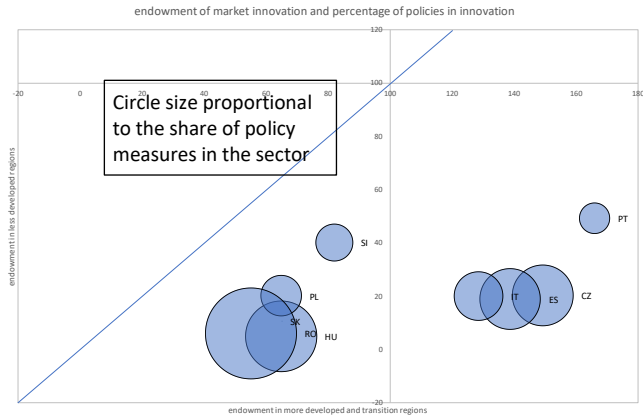
d) Infrastructure policy and level of accessibility



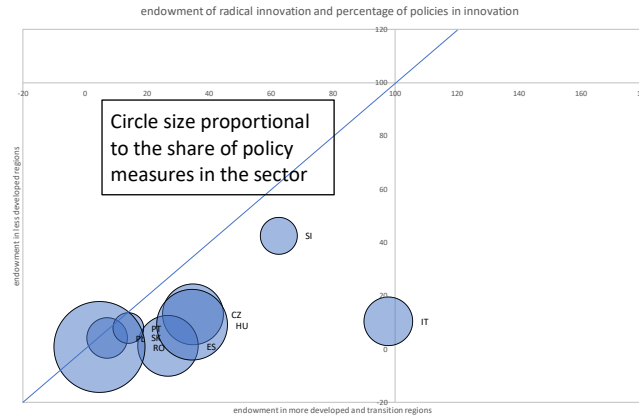
Source: POLIMI (2019).

Figure 50: Assets endowment in regions eligible to “less developed regions” objective of 2014-20 programming period and in other regions, and share of policy measures related to the asset

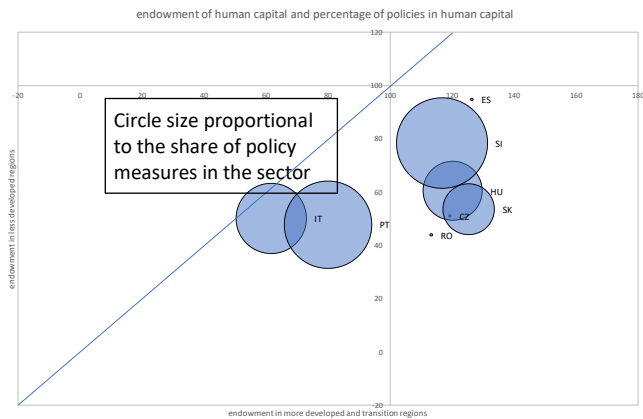
a) Share of measures in ‘Inn. and Sector Dev.’ by endowment in market innovation in less developed regions and others



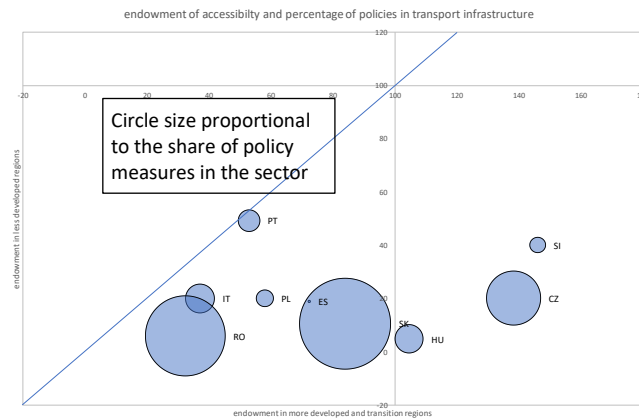
b) Share of measures in ‘Inn. and Sector Dev.’ by endowment in radical innovation in less developed regions and others



c) Share of measures in ‘Skills and Mobility’ by endowment in human capital in less developed regions and others



d) Share of measures in ‘Transport Infrastructure’ by different levels of accessibility in less developed regions and others



Source: POLIMI (2019).

The third question analysed is whether the share of national policy measures associated with a particular asset reflects the different endowment of that specific asset in two groups of regions of the country: those eligible in 2014-2020 for the “less developed regions” objective and the others, i.e. the more developed or transition regions.

In Figure 50 each graph represents the endowment of a resource in the regions of a country eligible for the “less developed regions” objective in the EU programming period 2014-20 and the other regions. These data are presented as population-weighted averages and expressed in percentage of the EU weighted average. The size of the circle represents the share of policies in the policy field related to that particular asset. The various graphs also depict a bisecting line which represents the case in which there is no difference in the endowment of resources between less developed regions and the others.

The graphs of Figure 50 allows to detect the position of each country with respect to the EU average, the relative position of the two groups of regions inside each country and the internal differences. Moreover, through the size of the circles, it is possible to see whether there is an association between the regional situations, in the following way: if circles are larger moving towards the bottom, the policy is more diffused when less developed regions are lowly endowed of the asset; if circles are larger moving leftwards, the policy is more implemented when developed or transition regions are weak; if circles are larger when moving far from the bisectrix, policies are more diffused where disparities are larger.

The first message arising from Figure 50 is the absence of countries in the upper right quadrant, because there is no country, among the 11 sample ones, in which the endowment of a resource is larger than the EU average in both less developed regions and in more developed or transition ones. Indeed, the upper left quadrant is also empty, meaning that all less developed regions of these 11 countries have an endowment of resources which is lower than the EU average. Finally, there is not even a country above the bisecting line, because in all countries the endowment of resources in less developed regions is lower than the one of more developed and transition ones. There are however cases in which the endowment is above the EU average in more developed and transition regions and below in less developed regions, as well as other cases in which the endowment is below the EU average in both groups of regions.

By looking at policies for innovation (Figure 50a and Figure 50b) we can first observe that radical innovation is below the average in all countries, whereas market innovation is stronger in the more developed or transition regions of four countries, mostly southern European (the Czech Republic, Italy, Spain, Portugal). Radical innovation is similar among the 11 countries, which are clustered down left in Figure 50a. All sample countries hence have very low values in both less developed regions and in the others, with the partial exception of Italy and Slovenia, the first one with stronger radical innovation in more developed and transition regions (very close to the EU average), the second one with similar levels in both regions.

In terms of policy, it is relatively hard to find a regularity for innovation policy, which is quite similarly distributed. For what concerns market innovation, however, the circles are far away from the bisecting line, and hence internal disparities are larger. In this case, it seems that the national policy effort, measured by the share of policies in innovation, is (weakly) associated with the situation of less developed regions (vertical axis) and almost independent of the situation in the others.

In the case of human capital (Figure 50c) differences between less developed regions and more developed and transition ones are not very pronounced, in all countries the values are relatively similar and also relatively similar to the EU average, with many having larger than average human capital endowment in more developed and transition regions.¹¹² In terms of policies, it is possible to see a weak association with the share of policies in human capital, which tend to be

¹¹² Poland was not included in the analysis since the data on human capital are not available for Mazowieckie NUTS 2 region, which is the only non-less developed region in Poland.

larger in countries closer to the bisecting line, i.e. having lower differences between less developed regions and the others.

Finally, the endowment of accessibility and the investments in transport infrastructure (Figure 50d). Accessibility is very low in all regions belonging to the “less developed regions” objective and is only higher than the EU mean in the more developed and transition regions of Slovenia, Hungary and the Czech Republic. In terms of policy, this is another case in which the situation of endowment in less developed regions seems to guide policy measures. In fact, when less developed regions suffer from low accessibility, the country is more likely to implement policies in transport infrastructure, almost independently of the situation of the other regions.

Summing up, the evidence is not too pronounced. However, a general trend seems to appear **countries are often implementing policies in fields in which their less developed regions are weak.**

7 ANNEX II - COUNTRY BRIEFINGS, POLICY FICHES AND CASE STUDIES

Annex II presents the country briefings, the policy fiches from the 11 Member States as well as the case studies.

This annex is provided in a separate file to allow for better readability.

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