
The relation between the Europe 2020 index and countries' competitiveness

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**THE RELATION BETWEEN THE
EUROPE 2020 INDEX AND
COUNTRIES'
COMPETITIVENESS**

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Table of contents

1. Introduction.....	1
2. The Europe 2020 Strategy.....	2
2.1 Competitiveness in the Europe 2020 Strategy.....	2
2.2 Economic context in 2010 financial crisis.....	3
2.3 Governance of the Europe 2020.....	4
2.4 Before and after the Europe 2020 Strategy.....	6
2.5 Criticisms.....	10
3. The Global Competitiveness Index.....	14
4. Focus on the regional level.....	16
4.1 Regions in the Europe 2020 Strategy.....	16
4.2 The gap between North-Centre and Mezzogiorno's regions of Italy.....	17
5. Indexes literature review.....	21
6. Methodology.....	24
7. Results.....	28
7.1 European Union countries.....	28
7.2 Regions of Italy.....	40
8. Conclusion.....	49
9. References.....	51
10. Appendix.....	58

1. Introduction

In 2010 the European Union adopted the Europe 2020 Strategy, a ten-year plan which aimed to deliver smart, sustainable and inclusive growth. These three pillars were organised into five targets focused on employment, the reduction of poverty and social exclusion, education, research and development (R&D), climate change and energy sustainability. These targets were not only defined for the European Union as a whole. Each Member States had its own national targets agreed on based on the current economic and social situations and on its potential achievements. Further, data about the results of the different regions within the countries are available which allows to investigate how conditions and performances can vary even within the same nation. This thesis presents an analysis of the achievements relative to the Europe 2020 Strategy reached by Member States by comparing the performances of Member States with high and with low Global Competitiveness Index (GCI) as of 2010, the year of the inception of the Strategy. In order to do this, we apply a decomposition of the composite indexes as proposed by Walheer (2018). Applying composite indexes alone can generate confusion about real reasons of the results obtained. Thanks to the decomposed indexes, which are country-, group-, and objective-specific indexes, we can instead identify the causes of better and worse performances of the countries towards their Europe 2020 targets. The decision to base the countries' classification on the GCI is due to the fact that this index is an assessment of countries' competitiveness. Building a more competitive Europe is indeed the overall aim of the Europe 2020. Furthermore, we choose to focus on one Member State, Italy, to measure its progresses toward the targets of the Europe 2020 at the regional level. The analysis is carried out with the decomposition of the composite indexes applied to EU countries as seen in Walheer (2018). It is interesting to investigate the differences in the results of North-Centre regions and the so-called Mezzogiorno, which includes the regions of Abruzzo, Apulia, Basilicata, Calabria, Campania, Molise, Sardinia and Sicily, because of the competitiveness disparity between these two areas that has characterised Italy since of its creation as a nation and that no policies or reforms have been able to lessen significantly.

Therefore, our research questions are the following:

1. What are the performances of high and low GCI EU Members States towards achieving the Europe 2020 Strategy objectives?
2. Is the competitiveness gap between North-Centre and Mezzogiorno regions of Italy reflected in different Europe 2020 Strategy performances?

2. The Europe 2020 Strategy

2.1 Competitiveness in the Europe 2020 Strategy

Facing the new challenges of the 20th century, namely increasing globalisation, competition from fast-growing economies, opportunities and threats posed by growing digitalisation, shortage of energy resources, in 2010 the European Commission developed a plan called Europe 2020 Strategy aimed at making of the European Union the most competitive area in the world by maintaining and reinforcing the cohesion among members and the values on which the EU was built on. The increase in competitiveness, as well as in the sense of belonging among citizens, was needed more than ever in the aftermath of the 2008 financial crisis which not only damaged the economies but also undermined people's trust in governments and financial institutions. Indeed, as Barroso ¹ (2010) explained, the short-term objective of the Europe 2020 was to exit from the crisis with as minimum as possible negative impact on individuals and families. More importantly, the long-term aim was to keep the EU on track to deliver Smart, Sustainable and Inclusive growth which are the foundations of the strategy in order to reach greater competitiveness. It is relevant at this point to define what competitiveness means. Several definitions of the term were proposed by authors and organizations. The OECD defines it as "a measure of a country's advantage or disadvantage in selling its products in international markets" (OECD, n.d.). Krugman and Porter disagreed with this definition based on competition among nations and preferred to relate the concept to the ability of a country to make the best use of its resources to create an appropriate level of wealth sustainable in the long run (Gros and Roth, 2012). Other institutions followed their line of thought. For instance, the World Economic Forum (WEF) described competitiveness as the set of institutions, policies, and factors that determine the level of productivity of a country and identified it with the GCI which will be more precisely presented in Chapter 3 (WEF, 2010). In their assessment of the achievement of the Europe 2020, Gross and Roth (2012) adopted a definition of competitiveness based on productivity and praised the writers of the Europe 2020 for not choosing only GDP as a measure of wealth and economic growth, but different other indexes. Indeed, the Strategy identifies three priorities also called pillars:

- Smart growth which aims at making the economy more knowledge and innovation based.
- Sustainable growth as a way to promote a more resource-efficient, greener and competitive economy.
- Inclusive growth representing the engagement of the EU in the creation of a higher level of employment and a greater and territorial cohesion (European Commission, 2010).

¹ The president of the European Commission from 2004 until 2014.

Additionally, in 2010 the European Council adopted headline targets which represents the results that the EU planned to achieve by 2020 and that are used to measure the progresses of each country and of the EU as a whole: increasing employment rate for men and women between 20 and 64 years of age to 75 % and reducing poverty so that within the EU as a whole, at least 20 million people are no longer faced with the risk of poverty or social exclusion are part of the Inclusive growth; reducing greenhouse gas emissions by at least 20 % compared to the level in 1990, increasing the share of renewable energy sources in final energy consumption to 20% and driving up energy efficiency by 20% are the targets included in Sustainable growth, frequently referred as the “20/20/20” targets; raising the total amount of investment in R&D to 3 % of GDP and reducing the school drop-out rate to less than 10 % and increasing the proportion of people between 30 and 34 years old who have completed tertiary (or equivalent) education to at least 40% as part of the Smart growth (Heuse and Zimmer, 2011). While these were targets at the global EU level, each of them was also declined in national indicators, higher or lower than the EU values, designed to be more realistically reachable according to the economic and social situation of each Member State (Becker, 2020). Further, the pillars were classified into seven flagship initiatives which define a range of concrete actions at both national and EU levels to promote and support the pillars’ targets:

- Innovation Union: easing access to finance for research and innovative projects;
- Youth on the move: improving aspects of the education system;
- A digital agenda for Europe: making high-speed internet available to the entire EU population;
- Resource efficient Europe: raising the use of renewable resources while reducing the use of carbon and supporting energy efficiency;
- An industrial policy for the globalisation era: support SMEs and a sustainable industrial environment;
- An agenda for new skills and jobs: increasing labour participation and promoting better matches between labour demand and supply;
- European platform against poverty: promoting cohesion such that each member can benefit from growth and people living in poverty or social exclusion can be part of the society (European Commission, 2010).

2.2 Economic context in 2010 financial crisis

The event that shaped the most the structure and objectives of the Europe 2020 was the 2008 financial crisis. Firstly, not only did it erase years of progress of economic growth and social improvements and some results achieved by the Lisbon Strategy ² in the previous eight years, but it also highlighted some already existing weaknesses that are at the base of the

² Predecessor plan of the Europe 2020 Strategy, detailed in Section 2.4.

economy within the EU such as lower growth rate and employment than the main commercial partners due to a growing productivity gap with them, reluctance to investment in innovation, lower employment rate and fewer worked hours, an ageing population and an economy dependent of fossil fuels as well as high public and private indebtedness in some countries (Colak and Ege, 2011; European Commission, 2010). These factors contributed to make it even harder for the EU to successfully deal with the crisis. Nonetheless, the European institutions recognised them and developed a Strategy focused on tackling these vulnerabilities. However, that was not enough to prevent the 2011 sovereign debt crisis from spreading around the continent. This eurozone crisis has made emerged a characteristic of the EU that represents a risk factor for its economic stability: the competitiveness and development gap among Member States, especially between Northern countries and Southern ones, namely Spain, Italy, Portugal and Greece. They were the ones that suffered the most from the crisis due to their structural weaknesses, even more severe than the ones of the EU as a whole, to which one can add other complications, such as widespread corruption (Gros and Roth, 2012). Further, the impact of the crisis showed how closely dependent on each other are the economies of EU members. Unfavourable conditions and a lack of appropriate reforms in a few countries risked bringing the entire EU system down. Nonetheless, thanks to this interrelation, policy makers realised that a common plan such as the Europe 2020 could have been a powerful instrument to fix and improve structural fragilities (European Commission, 2010). Secondly, the crisis highlighted issues in the way financial markets worked that could have been improved. For instance, before the crisis, countries in unstable financial conditions received high levels of capital to finance consumption that were unsustainable, but during the crisis those same countries stopped receiving any monetary aid because of a lack of trust by external investors and uncertainty about their recovery (Gros and Roth, 2012).

2.3 Governance of the Europe 2020

The Europe 2020 is built on a well-defined governance framework that should ensure its implementation and a clear measurement of results. This system of governance provides that the European Parliament, Commission and Council as well as regional and local institutions will take actions and cooperate to achieve the Europe 2020 targets (Heuse and Zimmer, 2011). The governance structure reminds the one of the Lisbon Strategy, mainly based on members' commitment to implement reforms by taking advantage of instruments and support available at the EU level (Bongardt and Torres, 2010).

The governance was broken down into two approaches. The first one was the thematic approach, which corresponds to the EU level and emphasises the strong link among the economies of the Members and whose main instruments were the headline targets and the flagship initiatives. Further, this approach was the one that provided Member States with the discretion to choose which actions to take provided that they were in line with European and national targets. The second, called country reporting, defined measures to help EU

Members to recover from the crisis, encourage sustainable growth and economic stability by focusing on fiscal policies and other macroeconomic topics linked to the necessity of growth and competitiveness. Moreover, it envisaged assistance to Member States given their limited public spending capacity especially after the crisis. Member States' reports are based on a thorough evaluation of the current economy (EC, 2010; Bongardt and Torres, 2010).

The Strategy was focused on economic, social and employment-related topics whose competence was shared between the EU itself and its members. This allocation of competencies was regulated by the Treaty on the Functioning of the European Union (TFEU), which established the coordination mechanism for decisions about the economy and the employment, but it did not say anything about the way social policies should be coordinated. The Europe 2020 was also based on integrated guidelines on employment (EGL) and Broad Economic Policy Guidelines (BEPGs). To achieve higher simplicity, these guidelines were reduced to 10 in 2010 after the initial 24 established in 2008. They were crucial for the success of the Strategy because they represented the opinions of the Council and support national and EU targets (European Commission, 2010)

In the context of the thematic approach and the country reporting, Member States received policy recommendations and EU institutions agreed on three main areas that must be closely supervised. Firstly, there was fiscal surveillance whose main instrument is the Stability and Growth Pact (SGP) that prescribed measures for budget discipline in order to avoid out-of-control national deficit and contained the famous and debated 3% rule³. Further, macroeconomics surveillances for imbalances were introduced. Members at risk received recommendations from the council had to implement a plan to improve their conditions. If they failed to comply, financial sanctions were applied. The third kind of surveillance was the one about structural reforms. The European Council proposed guidelines and Member States were required to present the initiatives they would implement with the aim of creating a single document. This was the document that defined national targets, starting from the ones at the EU level and the measures that ought to be taken to achieve them. Further, the Strategy governance also included the Euro Plus Pact, which contributed to enhanced surveillance and organization of the national economic measures, and the European Semester, which ensured higher coordination among budgetary and economic and structural EU members' reforms while also defining priorities for the long term (Heuse and Zimmer, 2011). In the system of governance of the Strategy, several agents were involved:

- The European Commission monitored annual progress in the achievement of the three pillars, it issued recommendations or warnings and policy proposals;

³ The excessive deficit procedure is applied when country's government deficit is above 3% of GDP. Should a member with such deficit not follow the Council recommendations, this last will impose financial sanctions.

- The European Council was in charge of coordinating policies and actions at the country level with the EU ones and it could hold meetings focused on specific topics;
- The European Parliament discussed targets and progresses towards the EU 2020 with national parliaments;
- The different formations of the Council of Ministers worked to achieve the EU targets relative to their own field of interest and shared information with each other;
- National, regional and local institutions, in collaboration with their parliaments, presented reforms and proposes to implement them (European Commission, 2010).

2.4 Before and after the Europe 2020 Strategy

The Lisbon Strategy

The Lisbon Strategy is the predecessor of the Europe 2020. It was set up in 2000 by the European Council and consisted of a series of reforms mainly based on knowledge development, environmental sustainability and social cohesion to be achieved by 2010. It shared with the Europe 2020 the aim of making of the EU one of the most competitive areas worldwide, in particular “the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth, with more and better jobs and greater social cohesion” (European Committee of the Regions, n.d.). The motivation of the Lisbon Strategy was to increase the lower growth and productivity of the EU compared to other large economies especially North America and Asia. Further, the Lisbon Strategy recognised two major issues in the EU that needed to be dealt with: the ageing population, which could cause the public expenditure to increase in the following years and reduce growth by 1% by 2040 while putting in danger the European welfare state model, and the limited diffusion of new information and communication technologies, which prevents improvements in productivity in the workplaces (Zgajewski and Hajjar, 2005). Furthermore, the EU economies faced increasing external competition in a globalised economy where the EU could survive by investing, above all, in high-tech goods and services and in R&D (Ivan-Ungureanu and Marcu, 2006). What the creators of the Strategy deemed as most important was to close the technology and innovation gap between Europe and its competitors in order to improve its competitiveness and become a “knowledge society” since the new economy relies on information and new technologies (Rodriguez et al., 2010). While the Lisbon Strategy had originally only a social and an economic goal, in 2001 the environmental pillar was added. The three pillars are known as the “triangle”. These pillars would lead to the creation of numerous jobs and implementation of new policies for sustainable development and social inclusion. Within the Lisbon Strategy, the European Council adopted the Open Method of Coordination (OMC) to ensure better cohesion of the reforms without imposing binding rules. This system of governance established targets that were common for the entire European Union while Member States chose independently which measures to implement

in order to achieve the common targets (Ivan-Ungureanu and Marcu, 2006). Further, quantitative and qualitative indicators were developed to measure the progresses of the Member States toward the objectives (Zgajewski and Hajjar, 2005).

In 2000, the European Council decided that the Lisbon Strategy would have focused on the following five areas:

- Increasing investments in Information and Communication Technology and providing internet access to every citizen and institution;
- Raising the number of people holding a secondary education diploma;
- Improving competition and internal market liberalisation and stimulating entrepreneurship;
- Implementing financial and macro-economic policies and connecting the Stability and Growth Pact with objectives about productivity and employment;
- Modernising the European social model and guaranteeing sustainable pensions and social stability (Rodriguez et al., 2010).

In 2005, a task force led by Wim Kok ⁴ carried out a mid-term evaluation of the Strategy known as the Kok Report. The conclusion of the report was that the goals set in 2000 would unlikely have been reached by 2010 due to insufficient coordination among European institutions and Member States, an excessive number of goals some of which were also in conflict with each other ⁵. The Report suggested to take action to increase investment in R&D by approving tax incentives for enterprises and encouraging public-private partnership; to implement internal market legislations not yet transposed by Member States; to balance regulation with competition to create an environment that stimulate entrepreneurial activity; to create a flexible labour market to face the issue of the ageing population moving away from the mentality of early retirement; to develop plans at the Member States level to promote the use of renewable energy technology and new vehicle fuels (Ivan-Ungureanu and Marcu, 2006). Taking into account the conclusions of the Kok Report, in 2005 the European Commission listed three objectives to re-launch the Lisbon Strategy: more growth thanks to a liberal EU market and deregulation in order to attract investors and workers and thanks to investment in R&D and ICT to improve knowledge and innovation; more and better jobs by creating a more flexible labour market, achieve mutual recognition of qualifications and invest in lifelong learning; better governance by reducing reporting obligations to make coordination among Member States and institutions easier as well as a clearer definition of the tasks at the national and at the EU level so that they could complement each other (Rodriguez et al., 2010). The original objectives set in 2000 by the Lisbon Strategy were not changed by its 2005 revision but a greater attention was given to the achievement of higher growth and employment, without forgetting the

⁴ The Netherlands Prime Minister from 1994 to 2002.

⁵ More information about the Kok Report and other criticisms are presented in the next Chapter.

need of a sustainable development for the environment and for future generations. Additionally, the European Commission proposed the Community Lisbon Programme which defined which actions should have been taken at the EU level. In particular, it focused on achieving higher knowledge and innovation to improve growth, on making Europe a more attractive place to invest and work and on creating more and better jobs. Finally, as the Kok Report did, the European Commission stressed again the importance of an adequate communication strategy to inform and get citizens involved in the Lisbon agenda. Hence, coordination and communication between the European Union Institutions and national and local institutions were essential to reach that objective (Zgajewski and Hajjar, 2005; Ivan-Ungureanu and Marcu, 2006). Regarding the results of the Lisbon Strategy, it is wise to present the achievements of the EU countries as of 2007-2008, thus before the 2008 financial crisis which represented an exceptional event that negatively impacted the progresses at both national and EU level as well as the worldwide economic system. The total employment rate target was to have 70% of the population employed by 2010. In 2008, employment rates greatly varied among Member States. Northern countries showed the best results with some of them having already surpassed the target, while Mediterranean countries had employment levels between 55% and 65% though their GDP per capita was in line with the ones of the Northern countries. Eastern EU countries presented the worst results having low levels of employment and GDP per capita. As of 2008 only Finland and Sweden had surpassed the target of 3% of national GDP to be spent in R&D, while eastern Europe countries invested less than 1% of their GDP in R&D. The majority of the Member States reached or were very close to the threshold (80%) of the proportion of students between 20 and 24 years old having obtained a secondary diploma given that only Spain and Portugal presented a percentage lower than 60%. Regarding the rate of people at risk of poverty and long-term unemployment rate, Scandinavian countries were again the best performers having results well below the targets of 15% and 3% respectively. However, their at-risk-of-poverty rate increased in the last years of the Strategy reducing the gap between Scandinavian nations and the rest of Europe. Mediterranean and Eastern Member States as well as UK and Ireland had a percentage of poverty risk higher than 15%. There was no clear pattern for the long-term unemployment rate since countries from different geographical areas were not able to reach the target by 2008. Only five countries, among which the best performer were Finland and Sweden, succeeded in reaching the target of 20% of energy production from renewable energy, while even other highly developed European countries such as the UK and the Netherlands presented poor results (less than 10%). Though overall, between 2000 and 2007 there was an increase in the employment rate and in the percentage of the population holding a secondary diploma, the negative points overweighted these positive ones. Indeed, long-term unemployment and at-risk-of-poverty rate were still high in several Member States, while R&D investment as a percentage of GDP was low and it even decreased in many European countries between 2000 and 2008 (Bertolini and Pagliacci, 2011; Rodriguez et al., 2010).

After the Europe 2020 Strategy

After 2020, no program structured like the Lisbon Strategy and the Europe 2020 Strategy was proposed or implemented by the European Union. Nonetheless, the European Commission has an agenda of priorities to be achieved by working together with the other EU institutions and the national governments. Between 2019 and 2024, the European Commission decided to focus on six priorities:

- A European Green Deal to fight climate change. The aims are to achieve zero greenhouse emissions by 2050 and to have economic growth independent from resource use. The current policies adopted by the EC make it possible to reduce net greenhouse gas emissions by at least 55%, compared to 1990, by 2030. The European Green Deal benefits not only the environment but also European citizens and allows future generations to still have resources at their disposal. The main goals of the program are the improvement of the quality of air, water and soil and reducing pollution; energy-efficient buildings; promoting the use of public transportation as well of products that can be repaired, recycled and re-used; a cleaner energy thanks to the most innovative technologies; a resilient and cost-effective energy market;
- A Europe fit for the digital age to make Europe a leader in the development of secure and human-centric technology. The EU digital strategy wants to make digital technology available for citizens and businesses while working on artificial intelligence, data, secure space-based communication and increasing investments in technology related fields. This will also contribute to reach the goal of the European Green Deal;
- An economy that works for people to support the development of businesses and reduce poverty and inequality in the population. Particular attention is given to small and medium-sized enterprises, including by facilitating their access to capital, and making the Capital Markets Union and the Economic and Monetary Union stronger. Among the aims there are safer conditions for workers at the workplace, the reduction of the gender gap and establish fair wages in line with national labour law, more and better opportunities for young workers. Further, actions to tackle financial crimes such as tax evasion and fraud are enforced. The program is also meant to help Member States' economies and societies to recover from the COVID-19 pandemic;
- A stronger Europe in the world is the priority that focuses on the implementation of the security and defence agenda, also by making use of innovative technologies. One of its aims is the strengthen of the trade agenda while respecting environmental and labour protection. It includes the creation of partnerships with Africa and countries

of the Western Balkans. Since the beginning of the invasion of Ukraine and Russia, it also involves aid to Ukrainian people and sanctions on Russia. By supporting the Common Foreign and Security Policy ⁶, the European Commission contributes to the development of a coordinated approach to external action;

- Promoting our European way of life means protecting justice and European values. This priority includes the New Pact on Migration and Asylum to make immigration processes clearer and more humane. It also concerns the implementation of the European Health Union to provide more adequate responses to health crises and better care for patients. Further, the European Rule of Law report about the status of the rule of law and the respect of fundamental rights and values across the EU is annually published;
- A new push for European democracy aims to protect European democracy from external threats by ensuring media freedom and journalism security. Additional actions against gender-based violence and to support the rights of people with disabilities are introduced. The ultimate goal is always the uphold of the rule of law based on the European Treaties (EUR-Lex, 2021; European Commission, n.d.; Ursula von der Leyen, 2019).

Further, at the end of 2020 a new package called Next Generation EU (NGEU) was adopted by the European Council in order to support the economic and social recovery of Member States from the COVID-19 pandemic and to make Europe greener, more digital and more resilient. This recovery plan will be in place until 2026 and provides for an investment of € 806.9 billion by the EU which reaches € 2.018 trillion combined with the EU long-term budget, also called Multiannual Financial Framework (MFF). The main instrument of the NGEU is the Recovery and Resilience Facility which supplies loans and grants to Member States according to plans drawn up by each of them. The European Commission is to obtain the resources for the program by issuing bonds on behalf of the EU. These resources in the form of transfers or loans are divided among Member States according to the extent to which the Coronavirus has harmed their economy and society (Buti and Messori, 2020).

The NGEU recovery program will provide clean technologies and renewables and broadband services, increase energy efficiency, invest in education for digital skills, incentivize the use of sustainable transport among its several objectives. Moreover, the NGEU will contribute to finance existing EU programmes such as the Recovery Assistance for Cohesion and the Territories of Europe (REACT-EU) which supports policies for the economic recovery from the pandemic and Horizon Europe, the EU funding program for research and innovation (European Union, 2021; European Commission, n.d.).

⁶ It is the foreign policy of the EU regarding security and defence and external actions mainly about trade and relationships with third countries.

2.5 Criticisms

The literature identified several areas where the structure and the objectives of the Europe 2020 Strategy could have been more efficiently designed and that therefore became objects of different kinds of criticism. Before explaining the main sources of criticism of the Strategy, we deem it useful to present the reasons of the failure of its predecessor strategy, the Lisbon Strategy, on which all the reviewed literature agreed upon. The failure of the Lisbon agenda became clear just after five years given the mixed results and the obvious need for further efforts at the country level and by assessments after 2010, as the Kok Report concluded (Kok, 2004). It would not have been successful even if the 2008 crisis had not happened. As proof of the failure, one can look at the increased performance-divergence between Member States with the best results and those with the worst ones recorded in 2010 (Bongardt and Torres, 2010). Specifically, the Kok Report stressed that the reforms required by the Strategy had incentivised deregulation instead of increasing productivity and investments and badly impacted workers' rights. Moreover, it was considered crucial to improve communication with the European citizens so that they would better know the Lisbon agenda and support its reforms. The Report also underlined the advantages of the European social welfare compared to the minimal US social welfare system (Ivan-Ungureanu and Marcu, 2006). The failure was not due to the lack of efforts by countries and institutions nor by conflicts among them, but rather to the fact that its structure and targets were poorly designed from the beginning, without any proper identification of the areas where reforms for growth were more needed and those where actions were not necessary and lack of appropriate governance and coordination among members. Furthermore, the targets of the Lisbon Strategy were later recognised as too numerous, and too ambitious and hard to reach even for the richest Member States, and often in conflict with each other (Colak and Ege, 2011). It was also argued that the Lisbon Strategy result indicators were unsuitable for the assessment of the agenda during the period of its implementation (Pasimeni, 2013). Moreover, most of the Lisbon goals were related to areas outside the jurisdictional competence of the EU. European institutions' desire was to put national policies in a European dimension, making Members share reforms and improving economic integration. The Commission had the power to evaluate countries' progresses and press members to take action and cooperate but did not have the legal authority to force the countries in doing it. Probably, had the commission been more aware of each country's needs, it would have known the points to focus on in order to influence members' policies (Erixon, 2010). This criticism also concerns the Europe 2020, given that many of its reforms were not related to domains in which the European institutions can impose common policies for the entire EU or oblige members to take action. Moreover, with the reporting approach of the Lisbon Strategy, European countries were only evaluated on their progresses, but still the EU did not hold any further power.

A further criticism, to which both the Lisbon Strategy and the Europe 2020 were subject, was the choice of peer pressure as part of the governance structure. Indeed, national leaders seemed reluctant when it came to criticise each other reforms and the peer pressure mechanism became an exercise of mutual congratulations in front of the media to not harm electoral support. It may be argued that peer pressure helped anyway government leaders to share opinions about their country's conditions and reforms, but this remains only an assumption since it is hard to know what politicians discussed with each other and whether helpful facts were shared in this context (Wyplosz, 2010). To conclude, the Kok Report and other critics of the Lisbon Strategy acknowledged the validity of the economic, social and environmental pillars. However, it emphasised that the focus should have been on improving economic growth and employment in order to successfully deal with other competitor economies and face the issue of the ageing population. Therefore, there was a great need for reform in the social and economic European model (Ivan-Ungureanu and Marcu, 2006). Regarding the criticisms of the Europe 2020 itself, there is no lack of them. First of all, it did not address the reasons for the failure of the Lisbon Strategy. Indeed, none of the targets of this one were achieved, yet reporting of the results were mixed, giving a positive evaluation during certain periods and negative ones during others. Hence, it was reasonable to ask how the Europe 2020 was not going to repeat the mistakes made in the drafting of the Lisbon strategy if it had not spent time reflecting on them and how to be sure that the assessments were reliable given the great extent to which several judgments of the previous strategy were not aligned with each other (Pochet, 2010). Moreover, the authors of the Europe 2020 believed that competitiveness could be stimulated by applying the same policy agenda in the entire EU. This approach was revealed not to be effective since some countries obtained a high level of development and excellent economic results, while others still lagged behind. Moreover, the Strategy seemed not to take into account that the EU is made of countries with different economies, mentalities and needs, hence the same single agenda may be appropriate for some members and for some areas but not for others. Further, the Europe 2020 forgot about the benefits of institutional competition among Members, which contributed to the growth of the EU by defining rules that limited what countries could do rather than saying what countries should do (Erixon, 2010).

Though the financial crisis and its repercussions were acknowledged, the Europe 2020 did not offer many useful tools to tackle the consequences of the financial crisis at both the national and European level. It is hard to understand how targets of the Europe 2020 and successful strategies to recover from the crisis were related while there was no mention of changes in public regulation that should be needed to face future crises. Not mentioned either was the contribution of the Europe 2020 to the management of the crisis exit strategy which was therefore reduced to the execution of the Stability and Growth Pact. Moreover, the Europe 2020 contemplated the reduction of the poverty rate among its targets, but it failed to consider that other kinds of inequality were both the causes and the

consequences of the financial crisis. Among inequalities, we can mention wage inequality and part-time job contracts as well as regional imbalances. In this context, the creation of a green economy was highly unlikely given that as long as the wealthier were seen benefitting from extreme material comfort or even wasting resources by disadvantaged people, the latter would have little or no interest in making efforts and concessions for environmental improvement.

Linked to this, was the issue of the failure to identify and treat inconsistency among targets. As an example, it appeared very ambitious to undertake and pursue a growth path that conciliated social cohesion and debt curb with the reduction of gas emissions and a more environmentally sustainable economy (Pochet, 2010).

Lastly, the trade dimension seemed to be forgotten by the creators of the Strategy. The plan did contain references to the single market only to express the willingness of turning it into a digital one, but it did not mention the single markets for goods and possible ways to set up the ones for services (Erixon, 2010).

3. The Global Competitiveness Index

Since the aim of the Strategy was boosting the competitiveness of the EU, we decided to focus on the association that exists between the Europe 2020 and the Global Composite Index (GCI). In his paper, Pasimeni (2013) wanted to investigate the relation between the composite indexes of the Europe 2020 and other economic and social indexes among the which was the Global Composite Index. This relation is particularly relevant since the regression the author performed showed a strong correlation equal to 0,740 with high degree of linearity 0,749 and a significance level of 99% which indicated robust results. This analysis showed a positive point since it could then be concluded that the targets were in line with the concept of competitiveness that the Strategy set as a final goal. Our focus in this thesis in the next Sections is on the computation and analysis of the indexes reached by Member States grouping them into two groups. The first one is composed of those members with a GCI higher than the average CGI of all European countries and the second group is includes Member States with a lower-than-average CGI. The values of the GCIs are retrieved from the 2010 Global Competitiveness Report which has been annually published by the World Economic Forum (WEF, 2010) since 2004. This year is chosen since it is the year of the start of the implementation of the Europe 2020 strategy. The GCI is a comprehensive tool that measures the competitiveness level of 139 countries taking into account more than 100 variables grouped into 12 pillars defining 12 crucial elements of competitiveness (WEF, n.d). Around two-thirds of the variables are retrieved from the Executive Opinion Survey ⁷, while the remaining one-third is found in publicly available sources, for instance the United Nations. The index is constructed as a weighted average of these variables. The 12 pillars are: Institutions, Infrastructure, Macroeconomic stability, Health and primary education, Higher education and training, Goods market efficiency, Labor market efficiency, Financial market sophistication, Technological readiness, Market size, Business sophistication and Innovation. Since the extent to which each pillar matters for countries varies according to the stage of development of the economy and the society, different weights are assigned to the pillars to take this into account. Economies of countries in the first stage of development are factor-driven and their competitiveness is determined by unqualified labour and natural resources. Institutions, Infrastructure, Macroeconomic stability, Health and primary education are the pillars that matter the most at this stage. The second stage of development is efficiency-driven, which characterised more competitive countries with higher productivity and wages due to more efficient processes. Competitiveness is based on Higher education and training, Goods market efficiency, Labor market efficiency, Financial market sophistication, Technological readiness, Market size. The most developed countries are in the innovation-driven stage.

⁷ It provides an evaluation of areas of competitiveness for which statistical data are not available by asking the opinion of more than 16000 business leaders.

Competition is determined by the Business sophistication and Innovation pillars. At this stage wages are so high that can be sustained only by those businesses that can compete with “new and unique products” (WEF, 2010).

4. Focus on the regional level

4.1 Regions in the Europe 2020 Strategy

Regional and local governments play crucial roles in the development and welfare of each country by having the authority of implementing policies that directly touch the citizens and the local economies. In the context of the Europe 2020 Strategy, the competency of the areas concerned by the three pillars belongs to regional and local governments in many EU countries (Council of European Municipalities and Regions, 2014). It is therefore crucial for the Europe 2020 to consider the power and contribution of these institutions to increase competitiveness. Further, since they are closer than national authorities to the local populations, local bodies have a privileged channel to convey messages and show them the benefits of the actions and the policies taken at the EU level by applying them in their area. Unfortunately, though every country had its own national targets, in most of the cases regional and local governments had only been consulted without being actively involved in the definition of those. Therefore, disparities in the economy and in the social situation among regions had not been given the appropriate attention they should have received to make sure that national targets were feasible and that they did not compromise the welfare and economy of regions (Council of European Municipalities and Regions, 2014). A stronger involvement of municipalities should have been indeed envisaged by the Europe 2020 for more successful results.

The literature has investigated the relation between the Europe 2020 and regions within Member States at the level NUTS 2 which identifies 242 basic regions for the application of regional policies according to the NUTS 2021 classification by the Eurostat ⁸.

Dijkstra and Athanasoglou (2015) divided regions into three categories according to their level of GDP per capita compared to the EU average between 2014 and 2020. This classification was proposed by the Cohesion Policy which groups Member States into “more developed”, “transition” or “less developed”. Conclusions were that the two groups with higher GDP perform definitively better in all targets except for early school leavers. A classification of regions carried out by the authors showed that the ten best performing regions belong to Nordic countries such as Sweden, Germany, Finland, Denmark, Belgium, while the worst ones were situated in the South of Italy, Romania, Spain, Greece, Bulgaria and Hungary. Some Member States, especially Italy and Spain, presented large differences in performances among Southern and Northern regions given that areas in the South were further from reaching the EU targets than regions in the North.

To analyse the performances of regions at the NUTS 2 level in 2018, Becker et al. (2020) created a regional Europe 2020 index. Their results confirmed those obtained by Dijkstra and Athanasoglou (2015). Regions in Sweden, Finland and Germany were the closest to the

⁸ At this level, no data are available for the targets that compose the Sustainable growth pillar.

achievement of their objective and, oppositely, areas of Spain, Italy, Bulgaria and Romania were far from it. Moreover, Becker et al. (2020) highlighted the variance of regions within the same country. In half of the countries having more than one region, the internal variance increased between 2010 and 2018, meaning that some regions experienced improvements in their performances and/or others presented deteriorating performances. Italy was the country that presents the highest divergence among its regions than any other EU Member.

4.2 The gap between North-Centre and Mezzogiorno's regions of Italy

The case of the persistent economic and social disparity between regions in the North-Centre and in the Mezzogiorno of Italy is a subject that holds the attention of economists and sociologists all over the world. This gap was present even before the Unification of Italy in 1871 and it kept growing over the years as it was never successfully addressed by politicians and the reforms they put in place (Felice, 2017).

Recently, the creation of the Single European Market in 1992 put an end to the public support from the Italian government that the Mezzogiorno had received until then, but those State interventions were not replaced by other meaningful measures in support of the Southern area of the country. The lack of support had therefore contributed to the worsening of its already fragile economic and social conditions (Guerrieri and Iammarino, 2001). Since the birth of Italy as a nation, organised criminal associations are one of the main reasons that explain why the Mezzogiorno lags behind other Italian regions and other European countries. Organizations such as Mafia, Camorra and 'Ndrangheta began their illegal activities in the 19th century. Since then, they have prevented the development of the area by hindering the functioning of the market, corrupting public institutions, arousing fear and distrust in citizens among each other and towards governments. This sentiment of mistrust is often accompanied by poor attention and compliance with the laws and low spirit of cooperation among all agents.

This stagnant situation in the South of Italy that keeps the area from catching up like other backward European regions are doing. Their GDP has indeed grown between the end of the '90 and the beginning of the 2000's getting closer to the average of the EU, while the weight of the GDP of the Mezzogiorno on the EU GDP has declined (Felice, 2017; Banca d'Italia, 2010).

In 2017 the GDP per capita in the Mezzogiorno was about 56% of the one in the rest of the country. This number represents the fact that in the former region a smaller proportion of the population living in the Mezzogiorno was employed and that productivity was 20% lower than in the Centre-North. Moreover, the Mezzogiorno was the area of Italy where the dispersion of equivalent family incomes ⁹ had always been the highest and it increased during the 2008 recession and 2011 sovereign debt crisis more than in the other areas of the

⁹ Equivalent income is given by the total income of a family divided by the number of equivalent adults in the family, computed according to the equivalence scale of the OCSE.

country. In 2016 the logarithmic deviation, an index to measure inequalities, was 0,216 in the Mezzogiorno compared to 0,171 in the other parts of Italy mainly because of the smaller number of family components who received an income and of a sharp decline of the incomes that were already the lowest in the recent previous years (Banca d'Italia, 2018).

In 2010 among the main features that are noticed when looking at the macroeconomic picture of the Mezzogiorno, there was the fact that it only accounted for a quarter of the national GDP and for less than a 1/10 of the export, that about 45% of unemployed people reside there as well as more than 2/3 of those in relative poverty and more than 50% in absolute poverty (Banca d'Italia, 2010). In 2019, the gap in poverty conditions between the North and the South of Italy persisted. In the Mezzogiorno, 8,6% of the families were in a condition of absolute poverty, while the proportion in the North and in the Centre was 5,8% and 4,5% respectively. Compared to the previous year, the absolute poverty rate declined by more than 1% in the Centre and in the Mezzogiorno thanks to the increase in consumption by the poorer families to which financial support measures from the government contributed. In terms of relative poverty conditions, the difference between the areas of the country was even greater. Indeed, in 2019 the rate of relative poverty in the North and in the Centre was around 7% while it was 21% in the Mezzogiorno (ISTAT, 2019). Since the creation of Italy as a country, the employment rate in the Mezzogiorno has always remained far lower than the one in the Centre-North of the country with a gap between the two areas that continued to increase in the 2000s reaching 11% in 2019. Further, there were nearly 3 million people living in the South looking for jobs or for working more hours and the situation was even more dramatic for those younger than 35 years old, whose gap with the rest of Italy was 19% (Panetta, 2019). While the North regions of the country were able to recover and increase the total employment rate by 1% in 2018 compared to 2008, in the South the rate decreased by 2 percentage points. Moreover, the South was characterised by a higher percentage of non-voluntary part time jobs ¹⁰ that from 2008 to 2018 grew 1% faster than in the North and Centre and also by higher instability. Indeed, the proportion of workers without a stable job contract was 25% in 2018 which corresponds to twice the one of the rests of Italy (Fellini and Reyneri, 2020).

In the early 2000s not only the employment rate, but salaries and good prices were lower as well in the Mezzogiorno. This was linked to the fact that most job positions were to be found in traditional sectors, for instance retail and wholesale trade, transports, while advanced services such as financial, insurance and technology had a limited presence (Guerrieri and Iammarino, 2001).

Regarding R&D, the amount of funds that Italy invested to stimulate and support the related activities is low and, since 2000, it grew at a slow pace, especially when compared to other European countries in a similar stage of development. What was more troubling was the fact that the government allocated few and not enough resources to both public and industrial research and that the expenditures for R&D were not equally distributed, being

¹⁰ Non-voluntary part-time job is relative to people accepting a part-time job because they cannot find a full-time one.

particularly poor in the South and in the Islands. As of 2015, private investments in R&D in the North were nearly three times higher than in the rest of the country where public investments are prevalent. The Mezzogiorno accounted for only 17% of the total national R&D expense. In particular, universities and public institutions represented the largest part of R&D in this region which meant that it was concerned to a high extent by the low level of public investments. In the North and in the Centre of Italy, instead, companies, together with universities, were the sectors that account for most of R&D.

This imbalance in the distribution for R&D expenses prevented Italy from exploiting opportunities and resources in the Mezzogiorno that may have brought a positive contribution to R&D national projects. Further, it precluded the area from enjoying possible economic and social growth (Fabrizio, S. et al., 2018).

Further, the fact that firms became smaller and smaller in the Mezzogiorno while those in other regions grew also in size, contributed to explain the loss of competitiveness and prevented them to exploit opportunities such as exporting local “Made in Italy” products abroad (Guerrieri and Iammarino, 2001). Regarding the degree of internationalisation of the Mezzogiorno, another sign of backwardness was the percentage of the inward FDI which was still below 1% in the early 2000s (Guerrieri and Iammarino, 2001).

The delay in the development of the Mezzogiorno was not only related to its economic condition. Public and essential services were less accessible and developed there than in the Centre-North, not because fewer resources were available but rather because they were not efficiently used. One of the most concerning gaps was the one of education. The proportion of people holding a high school diploma in the Mezzogiorno was about 76% against 84% in the rest of the country in 2019. Mezzogiorno’s universities registered a decline in the number of students who move mainly to the Northern regions to continue their studies. The main reasons for this choice were better job opportunities to be found in the North and the lower quality of teaching and infrastructure of universities in the South (Panetta, 2019). The quality of the human capital may be the most worrying aspect since, according to the results of national and international standardized tests, it existed a significant gap between North and South Italy in terms of knowledges acquired by students from elementary to high school: schools in the South tended to be more behind the other Italian regions (Banca d’Italia, 2010). According to the most recent ISTAT report on education, considering every age category, the proportion of the Italian population having a tertiary education title was 19,6% in 2019, definitively lower than the average same proportion in the EU which exceeded 33%. Similarly, while in the EU nearly 79% of the population between 25 and 64 hold a high school diploma, in Italy only 62,2% concluded high school. Furthermore, between the Mezzogiorno and the other areas of the country there was a more than 10 percentage points difference regarding those holding a diploma (65,7% and nearly 70% respectively in the North and in the Centre, while 54% in the Mezzogiorno). In the Mezzogiorno, only 15% of the population concluded university compared to more than 20% in the North-Centre regions. Because of the structural backwardness of the Mezzogiorno, there the employment

rate of the population with a high education degree was lower than in the other regions (71% against about 85% for North and Centre Italy) (ISTAT, 2020).

Education played a critical role in improving the social and economic condition of individuals. The higher the education level, the lower the chances of being in poverty conditions. For instance, in 2019 the absolute poverty rate among those holding a high school diploma was 3,4% compared to 8,6% of those who only attended secondary school (ISTAT, 2019). The percentage of Early Leavers from Education and Training (ELET) in Italy declined over the years reaching 13,5% in 2019 but it was still far from the 10% target of the EU 2020. In the Mezzogiorno the (ELET) represented 18,2% of the population compared with 10,5% and 10,9% recorded in the North and in the Centre. Further, while in these two areas the employment rate for the ELET was 49,5% and 47% respectively, in the Mezzogiorno not having a higher secondary education diploma lowered even more the chances of finding a job where the relative employment rate is only 22,7% (ISTAT, 2020).

5. Indexes literature review

Composite indexes are largely used in the literature, including by authors interested in assessing the progress of the Europe 2020 Strategy and the extent to which its goals have been achieved. A composite indicator (CI) is obtained by aggregating individual indicators into a single index and it is particularly useful to measure concepts that cannot be described by a single indicator (OECD, 2008). The popularity of composite indicators is due to the fact that they can be easily interpreted even by those who are not specialised in the analysed topic as only the data related to the objectives are needed to compute them. CIs are one of the best tools to compare countries or institutions since they can be expressed as rankings or maps and, being unit free, they also allow for the comparison of different dimensions of countries and institutions.

Given how easy it is to understand them, they are a great communication instrument and can shape public opinions, while providing policy makers with a tool that represents multidimensional phenomenon useful in the decision-making process. Nonetheless, their application has some undesirable implication. First, given that they summarize diverse concepts, the final result may be too simplistic, if not misleading, to be correctly used for policy decision-making. Further, indicators and weights are arbitrarily chosen by the researchers, thus they are subjective and may be considered invalid by other studies. The creation process of the indexes must therefore be based on statistical rules and transparent, otherwise it could bias the selection of policies or make it difficult to find possible adequate solutions (OECD, 2008; Becker et al., 2020).

Several authors have adopted composite indexes since they are well suited to evaluate and compare Member States' performances towards the targets of the Europe 2020 as it can be seen as a complex phenomenon broken down into smaller parts. They show the overall performances of each member for the Strategy both as a whole and for each target.

Shares of R&D expenditure, tertiary education, renewable energy, energy efficiency and employment are positive targets hence the aim of member states is to reach the highest possible level of these indicators. On the contrary, the share of the early school leavers, greenhouse gas emissions and poverty rates are negative targets thus lower values represent better performances.

Colak and Ege (2013) used indexes to measure how far member states were from reaching their national targets classifying countries in Candidates, Old Members and New Members. The composite indexes for each growth pillar were computed by aggregating indexes for each eight sub-targets for each country according to the chosen weight allocation. Next, sub-target indicators were normalised so that targets could become comparable with each other given that, being related to different areas, they had different units of measures and scales. Indicators assumed in this way values between 0 and 1 where 1 meant that a country was close to achieve its targets and vice versa. The most common normalisation technique was the min-max one. As for the weighting system, the two authors chose to take an equally

weighted average of the three growth pillars which were obtained from a weighted average of their sub-target indexes components.

Pasimeni (2011), after having normalised the indicators, applied a geometric aggregation method of sub-target indicators rather than a linear one built using the averages of the sub-targets. Indeed, the implementation of a geometric average considered large divergences among countries sub-target values. Differently from the linear method which allowed compensation of inadequate, poor indicator values by good performances in other indicators, the geometric method did not do that, rather it penalised members with unbalanced performances. Differently from Colak and Ege (2013), he assigned equal weights to each indicator to give all of them the same importance.

As Pasimeni (2011), Rogge (2019) implemented a geometric composite index to which he added Benefit-of-the-Doubt (BoD) weights instead of equal weights or fixed weights. This method involved a first step where the objective function was defined as $\max_{\omega_{c,i}} \sum_{i=1}^m \omega_{c,i} y_{c,i}$ with the constraints $\sum_{i=1}^m \omega_{c,i} y_{j,i} \leq 1 \forall j = 1, \dots, n$ and $\omega_{c,i} \geq 0 \forall i = 1, \dots, m$ where $y_{c,i}$ was the performance of country c for the i th indicator, $y_{j,i}$ was the performance of country j in the sample for the i th indicator and $\omega_{c,i}$ was the optimal BoD-weight for the country c evaluated on the i th indicator. The max between ω and y was then divided by the objective function to obtain the BoD weights of the indicators. In the second step the weights became exponents to build the geometric index. With this method, we obtain again values ranging from 0 to 1 such that current country's performances could be compared to their national targets. Further, the author proposed a formula to monitor member performances over time by measuring performance changes. This was done by continuously comparing the global value of the BoD weighted composite indicator at the beginning of a chosen period with the value achieved at the end of it.

As Rappai (2016) pointed out, the studies presented so far did not take into account hence did not offer a solution to two concerns. Firstly, there were great gaps among the members' development levels, thus each country had different aims from the beginning of the implementation of the Strategy in 2010. This also implied different paces in reaching the targets. Moreover, results were biased by bottleneck issues because at a certain point in time some members did not reach targets while others stopped working to achieve more targets. Secondly, indicators were not independent of each other which entailed the issue that too much importance could be put on some factors, while others may be neglected. While it was true that the geometric aggregation method penalised members with some very good and some very bad performances, it did not solve the issues mentioned above. Instead, to deal with the bottleneck problem, Rappai (2016) suggested to assign lower weights to countries that were about to reach their targets and higher ones to countries that were far from them rather than giving the same weight to each country. To deal with the lack of interdependence, hence correlation, among the Europe 2020 targets, the author computed the empirical Mahalanobis distance from the target time t from which he subtracted the empirical Mahalanobis distance at time $t - 1$ whose positive sign means improvement and

vice versa. As covariance matrix in the Mahalanobis distance formula, the author chose a new covariance matrix for the indicators of the Member States each year.

6. Methodology

Though thanks to the composite indexes, the progresses and the distance from the targets can be easily measured and understood, this kind of indexes do not provide any indication about the causes of the good or bad results achieved by the countries. The causes can be classified into three categories and their influence on the performances can be assessed by decomposing the composite index. We hence obtain decomposed indexes which provide policy makers and the public with deeper information about the reasons of countries' performances. First, there are group specific reasons to which all countries belonging to the same group are subjected. Further, country specific reasons include events that affect only a particular country. Lastly, when there are issues related to definition of the target itself, we talk about objective specific reasons (Walheer, 2018).

For the decomposition of the Europe 2020 composite index, we follow the methodology proposed by Walheer (2018).

We assume J countries with I objectives to be achieved by time T . Each objective is linked to a clearly defined and quantifiable target: each country has a target $x_{j,i}^T$ for each member j . $x_{j,i}^t$ represents the performance of country j for the objective i at a time t . In the case of a positive target, country j has to increase the current target level to meet the objective i . Thus, the objective is reached if $x_{j,i}^t \geq x_{j,i}^T$ for $t \geq T$. We talk about a negative target when the objective i is met by decreasing the current target level. In this case the objective is achieved when $x_{j,i}^t \leq x_{j,i}^T$ for $t \leq T$. To construct the composite index, we rely on the min-max transformation taking into account the target level to normalise the indicators $x_{j,i}^t$. The normalised indicators for each country j at time t for objective i are

$$NXT_{j,i}^t = \frac{x_{j,i}^t - X_{m,i}}{X_{M,i} - X_{m,i}} \quad (1) \text{ for positive target}$$

and

$$NXT_{j,i}^t = \frac{X_{M,i} - x_{j,i}^t}{X_{M,i} - X_{m,i}} \quad (2) \text{ for negative target.}$$

Since the min-max transformation does not consider the values of the targets, a simple transformation is necessary to introduce the target levels in the formula. Our results are

$$NXT_{j,i}^t = \frac{x_{j,i}^t - X_{m,i}}{x_{j,i}^T - X_{m,i}} \quad (3) \text{ for positive target}$$

and

$$NXT_{j,i}^t = \frac{X_{M,i} - x_{j,i}^t}{X_{M,i} - x_{j,i}^T} \quad (4) \text{ for negative target}$$

where $x_{j,i}^T$ is the value of the target. $X_{m,i}$ and $X_{M,i}$ are the minimum and the maximum of the indicators $x_{j,i}^t$ respectively for all countries and all periods. Given that there is no ranking between $x_{j,i}^t$ and $x_{j,i}^T$, $NXT_{j,i}^t$ could exceed one. Focusing on a positive target, if $x_{j,i}^t < x_{j,i}^T$

before the last period and $X_{j,i}^t$ increases when t increases, at a certain period we could have $X_{j,i}^t = X_{j,i}^T$ meaning that the objective has been reached or $X_{j,i}^t > X_{j,i}^T$ when the objective has been surpassed. Indeed, we can have one of these three possible results: $NXT_{j,i}^t > 1$ when the objective is reached and outperformed, $NXT_{j,i}^t < 1$ when the objective is not achieved, $NXT_{j,i}^t = 1$ when the objective is perfectly reached.

Next step is to build the composite index with the normalised indicators that take the target levels into account. Our composite index CI_j^t is defined for each country j at time t . We decide to apply a geometric weighted aggregation method as in Walheer (2018) and exogenous weight, hence we have $\omega_{j,i}^t = 1/I$, so that the same relevance is assigned to all objectives. With $w_{j,i}^t \geq 0$ and $\sum_{i=1}^I w_{j,i}^t = 1$, we obtain

$$CI_j^t = \prod_{i=1}^I (NXT_{j,i}^t)^{\omega_{j,i}^t} \quad (5).$$

CI_j^t is a positive function of the indicator $NXT_{j,i}^t$. Hence, the higher $NXT_{j,i}^t$, the better the performance, which imply a higher value of CI_j^t and vice versa. If all objectives have been reached or surpassed, $NXT_{j,i}^t$ is greater than 1 and CI_j^t is equal or higher than 1 as well, though the opposite is not true. We are here facing a compensability issue as high values of $NXT_{j,i}^t$ compensate for low values of it in CI_j^t . This represents a critical issue above all because the indicators $NXT_{j,i}^t$ are not bounded from above.

Now we choose the weights $\omega_{j,i}^t$ of the objectives. Between exogenous and endogenous weights, we apply the former. They are subjective as they are defined by the expert and, in our case, we opt for $w_{j,i}^t = 1/I$, so that (5) becomes now the geometric average.

$NXT_{j,i}^t$ and CI_j^t provide information about the progress towards objective i and I objectives, but they do not determine the reasons for better or worse performances. To overcome this issue, $NXT_{j,i}^t$ can be decomposed into three parts:

- a country-specific index that shows how each sector performs with respect to the best performer for each period;
- a group-specific index that present how the group performs for every year;
- an objective-specific index revealing if, in principle, the targets can be reached in the period.

This decomposition is particularly relevant for policymakers since it allows to see whether certain shocks, policies or events have had an effect on one or more levels of the countries' performances.

Before developing the decomposition of $NXT_{j,i}^t$ for positive targets, we have to define a maximal value for each year $X_{M,i}^t = \max_j \{X_{j,i}^t\}$. Hence, we can decompose equation (3) into three parts by multiplying top and bottom by $X_{M,i}^t - X_{m,i}$ and $X_{M,i} - X_{m,i}$. Our result is

$$NXT_{j,i}^t = \frac{X_{j,i}^t - X_{m,i}}{X_{j,i}^T - X_{m,i}}$$

$$\begin{aligned}
&= \frac{X_{j,i}^t - X_{m,i}}{X_{j,i}^T - X_{m,i}} \times \frac{X_{M,i}^t - X_{m,i}}{X_{M,i}^t - X_{m,i}} \times \frac{X_{M,i} - X_{m,i}}{X_{M,i} - X_{m,i}}, \\
&= \frac{X_{j,i}^t - X_{m,i}}{X_{M,i}^t - X_{m,i}} \times \frac{X_{M,i}^t - X_{m,i}}{X_{M,i} - X_{m,i}} \times \frac{X_{M,i} - X_{m,i}}{X_{j,i}^T - X_{m,i}}, \\
&= COUNTRY_{j,i}^t \times GROUP_i^t \times OBJECTIVE_{j,i}
\end{aligned} \tag{6}$$

$COUNTRY_{j,i}^t$ tells us what the performance of country j for objective i is in year t compared to the best practice of that period represented by $X_{M,i}^t$. Since $X_{j,i}^t \leq X_{M,i}^t$, one is the highest value that this index can assume and it means that country j is the best practice. In the case that the value is below one, the country could achieve better performance in the period. Possible explanations for suboptimal level can be events or policies that only affect that country, but a value below one can also represent a structural inefficiency. This index is very similar to the standard min-max normalisation index, though here the maximal value depends on the period.

$GROUP_i^t$ indicates the performance of the group in year t by comparing the best practice of period t represented by $X_{M,i}^t$ and the highest value of the indicators for all years represented by $X_{M,i}$. The index is bounded by one from above given that $X_{M,i}^t \leq X_{M,i}$. Similarly to the country-specific index, lower values are due to factors or policy implementation negatively affecting the group in that period or to structural issues for the group.

$OBJECTIVE_{j,i}$ shows whether country j is, in principle, able to reach objective i by comparing the maximal value of the indicators for all years represented by $X_{M,i}$ to the objective target of country j represented by $X_{j,i}^T$. Since there is not any natural ranking between $X_{M,i}$ and $X_{j,i}^T$, this index is unbounded. If the objective is not reachable for the period, the index assumes values lower than one. When the value is equal or higher than one, the opposite is true. The objective specific index is useful to identify issues at the objective-level, hence, to understand if the targets are well set and reachable.

The decomposition of $NXT_{j,i}^t$ for the negative targets requires to define the minimal value for each year $X_{m,i}^t = \min\{X_{j,i}^t\}$. Multiplying top and bottom by $X_{M,i} - X_{m,i}^t$ and $X_{M,i} - X_{m,i}$, we obtain

$$\begin{aligned}
NXT_{j,i}^t &= \frac{X_{M,i} - X_{j,i}^t}{X_{M,i} - X_{j,i}^T} \\
&= \frac{X_{M,i} - X_{j,i}^t}{X_{M,i} - X_{j,i}^T} \times \frac{X_{M,i} - X_{m,i}^t}{X_{M,i} - X_{m,i}^t} \times \frac{X_{M,i} - X_{m,i}}{X_{M,i} - X_{m,i}}, \\
&= \frac{X_{M,i} - X_{j,i}^t}{X_{M,i} - X_{m,i}^t} \times \frac{X_{M,i} - X_{m,i}^t}{X_{M,i} - X_{m,i}} \times \frac{X_{M,i} - X_{m,i}}{X_{M,i} - X_{j,i}^T},
\end{aligned} \tag{7}$$

$$= COUNTRY_{j,i}^t \times GROUP_i^t \times OBJECTIVE_{j,i}$$

Obviously, the interpretation of the three components is analogous to the decomposition in equation (6) but here it is based on minima instead of maxima.

Considering the geometric weighted aggregation, we can apply an analogous decomposition for the composite index:

$$\begin{aligned}
CI_j^t &= \prod_{i=1}^I (NXT_{j,i}^t)^{\omega_{j,i}^t} \\
&= \prod_{i=1}^I (COUNTRY_{j,i}^t * GROUP_i^t * OBJECTIVE_{j,i})^{\omega_{j,i}^t} \\
&= \prod_{i=1}^I (COUNTRY_{j,i}^t)^{\omega_{j,i}^t} * \prod_{i=1}^I (GROUP_i^t)^{\omega_{j,i}^t} * \prod_{i=1}^I (OBJECTIVE_{j,i})^{\omega_{j,i}^t} \\
&= COUNTRY_j^t \times GROUP_i^t \times OBJECTIVE_j^t
\end{aligned} \tag{8}$$

In (8) the three components of the decomposition do not depend on the objectives, contrary to (6) and (7). This is due to the fact that in the computation of the composite index CI_j^t , the aggregation is over objectives.

7. Results

In Section 7.1 we introduce the results of the composite indexes for the Inclusive, Smart and Sustainable growth pillars for EU Members. Then, those indexes are decomposed in sector, group-, and objective-specific indexes. European countries are divided into two groups: the first one is composed by Member States (in green in the Tables) having a GCI higher than the EU average, the second by those Member States (in blue in the Tables) with a GCI lower than the average. Section 7.2 shows the results of the composite and decomposed indexes for the Inclusive and Smart growth pillars of Italian regions that are grouped in North-Centre' (in green in the Tables) and Mezzogiorno's (in blue in the Tables) regions, which, as described in Chapter 4, are known for their competitiveness gap ¹¹. Regarding the data, for the 27 countries of the EU, data are retrieved from Eurostat which is the statistical office of the European Union, while data for regions of Italy come from Eurostat and from Istat, the national institute of statistics main producer of official statistics. We consider the time period between 2008 and 2020 though this period changes for some indexes whose values are not available for certain years. GCI values are found in the 2010 Global Competitiveness Index report by the World Economic Forum.

7.1 European Union Countries

Composite Inclusive growth pillar results

The complete results of the Inclusive growth pillar composite index are presented in Table 1 in the Appendix which shows the composite index and the descriptive statistics (minimum, median, average, maximum, and standard deviation) for each country in every year. Figure 1 describes instead the descriptive statistics on a line graph to show the changes in the values over time. Germany, Finland, Sweden, Estonia, Croatia and Slovakia are not present since they have targets that are different from the percentage of People at risk of poverty or social exclusion, hence we decide not to consider them to have more consistent results.

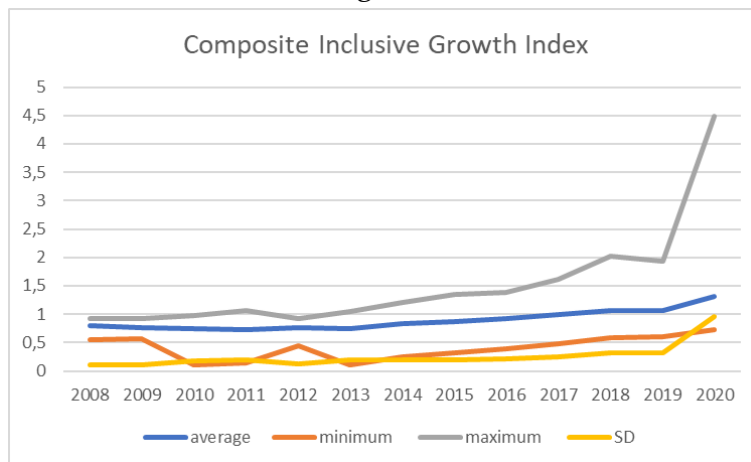
Table 1 shows that the average increased between 2008 and 2020 from 0,8 to 1,3. The fact that the index had a value higher than one meant that the objective was globally achieved. The minimum in 2008 indicated that the country having the poorest performance was Malta, while in the end of the period it was Luxembourg. The Netherlands achieved the best results at the beginning of the period, but it was then Bulgaria and Romania that presented the highest index value in 2020, respectively 4,5 and 3,7. However, their results were influenced by the fact that they chose a target close to their current percentage of People at risk of poverty or social exclusion easier to reach compared to other countries which chose instead

¹¹ Data about the Sustainable growth pillar are available at the Nuts 2 level.

more challenging targets. The maximum tells us that Romania was the first country to reach the target in 2011 with a value slightly above one.

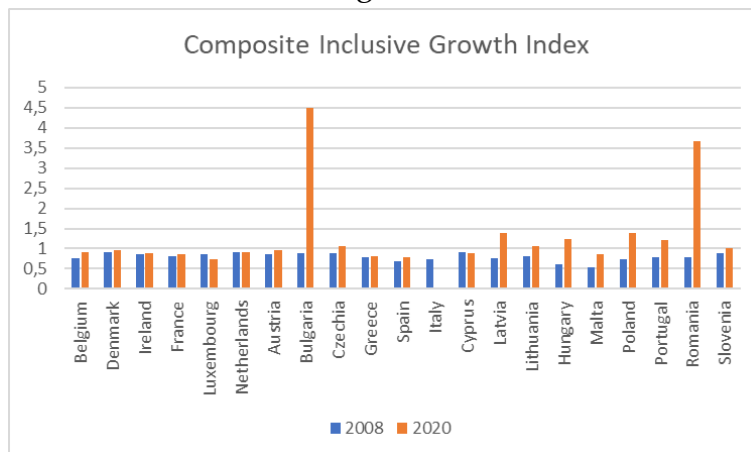
The maximum in Figure 1 shows that while no countries reached the targets in 2008, more Member States achieved it in the end of the period of interest. The minimum had a fluctuating trend until 2013 and then it rose gradually. The average was characterised by a positive trend. The standard deviation presented a sharp increase in the end of the period from 0,098 in 2008 to 0,95, consistently with the large increase in the maximum values while the values of the minimum did not present such large changes.

Figure 1



Changes of index values over time are described in Figure 2 which compares Member States' performances in 2008 and 2020. Eight countries were able to achieve a value of the index higher than one in 2020, which means that they surpassed their targets. Bulgaria and Romania were clearly the EU countries that improved the most their results which rose from 0,89 to 4,49 and from 0,78 to 3,67 respectively.

Figure 2



Composite Smart growth pillar results

As we did for the Inclusive growth pillar, we now present the composite index and the descriptive statistics of the Smart growth pillar. In the Appendix, Table 2 shows that, overall, the performances of the Member States have improved over the years: the average value was 0,57 in 2008 and grew to 0,92 in 2019. Given that the value in the last year is below one, the target was not globally reached though very close to the objective. Most of the Member States presented good results higher or close to one in 2019. Nonetheless, countries such as Bulgaria, Malta and Portugal have to work to improve their indexes which were respectively 0,67; 0,51 and 0,36. In 2011, Denmark was the first country to reach the target as the value was 1,01 and this was recorded as Maximum. The best performer in 2008 was Finland which reached 0,98, while in the end of the period it was Cyprus which had the better result (1,64) though this may be the consequence of the low target for GERD set by this country at 0,5 compared to values above 2 for countries with a high GCI.

Looking at the maximum in Figure 3 we can conclude that since 2008 there was at least one Member State having a value very close to the target that was then reached in 2011 when the maximum became higher than one. It presented a regular increasing trend, while the minimum showed fluctuations especially from 2013 to 2015. It globally increased over the period but by a lower extent than the maximum. The standard deviation showed little fluctuations around the value of 0,2 with the exception of 2014 when it was only 1,6 due to the convergence among maximum and minimum values.

Figure 3

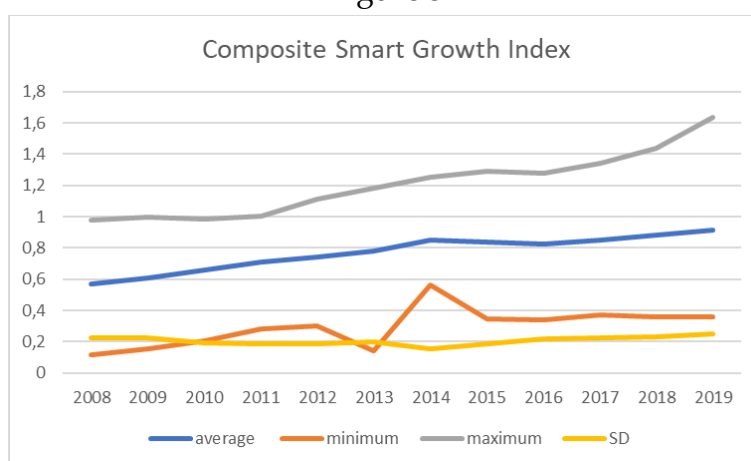
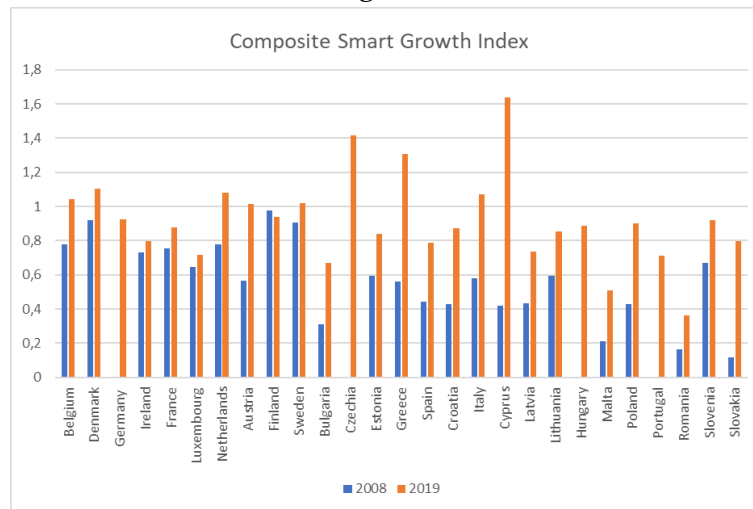


Figure 4 helps us to better identify results' changes that took place during the period of interest by displaying the initial and final composite index levels of all EU countries. None of them had already reached the objective in 2008 but by 2019 eight of them succeeded in achieving a value above one. Czechia, Cyprus and Slovakia were the countries that improved the most their performances over the period. Slovakia did not reach the objective

in 2019, nevertheless it had the biggest improvement from 0,12 to 0,8 between 2008 and 2019. The value for Czechia in 2008 is not available, though the increase from 0,57 to 1,4 over the from 2009 to 2019 was remarkable.

Figure 4

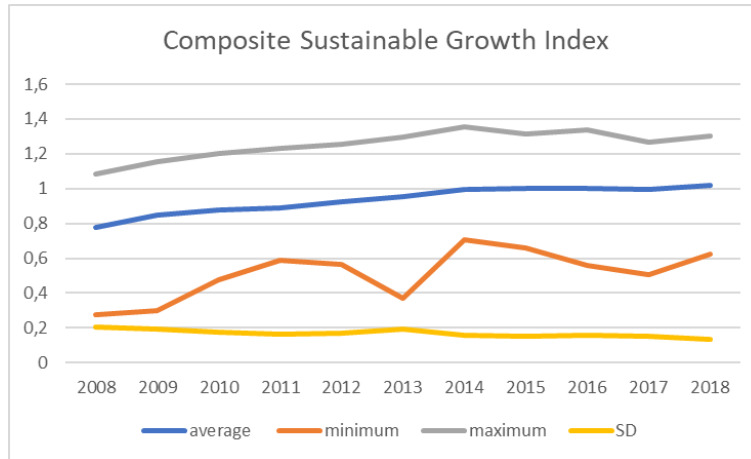


Composite Sustainable growth pillar results

Table 3 in the Appendix shows that overall Member States improved their performance relative to the Sustainable growth pillar, as the average grew from 0,78 in 2008 to 1,09 in 2018. This means that the target was globally achieved. Portugal presented the best performances for the entire period of interest reaching 1,3 in 2019. Portugal, together with Croatia, had index values higher than one, thus reached the target, in every year. Malta was the worst performer at the beginning, but it reached the objective in 2019, while the value of Germany in 2019 corresponded to the minimum (0,63).

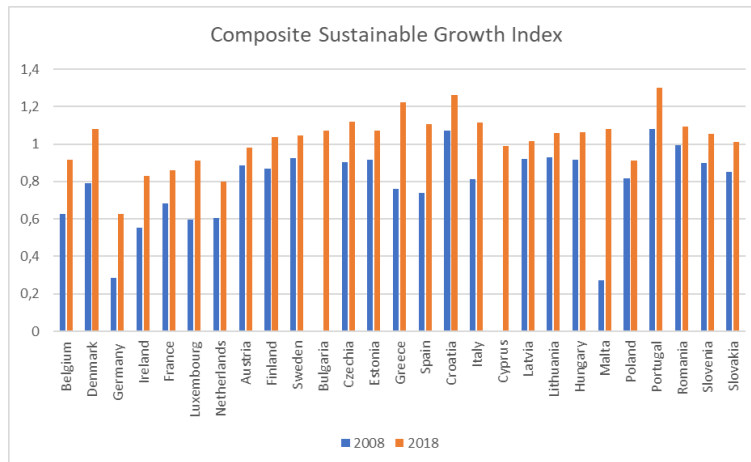
Figure 5 shows the descriptive statistics for the Composite Sustainable growth pillar. As explained above, the maximum stayed above one for the period because two countries reached the target every year. The maximum had a rising trend though it gradually declined between 2014 and 2017. The minimum increased following an irregular trend with peaks in 2011 and 2014 and a deep in 2013. As expected, when maximum and minimum converged, the standard deviation went down from 0,2 to 0,14 between 2008 and 2018.

Figure 5



In Figure 6, we can see more in details the changes in the performances from 2008 to 2018. While Portugal and Malta had already reached the target in 2008, 14 more countries succeeded in achieving it in 2018. Malta was by far the one among the Member State that achieved the greatest improvement from 0,27 to 1 between 2008 and 2018. Cyprus as well was able to increase its index value from 0,48 to 0,99 over the period.

Figure 6



Finally, Table 4 compares the average of the composite index separately for countries with high and low GCI for each pillar in the initial and final year of the Strategy. The high GCI group had a better Inclusive growth pillar average in 2008, but its increase was very modest compared to the one achieved by the low GCI group which almost doubled. Hence in 2020 the average of the latter group was 1,5, while the one of the high GCI group was 0,89. Overall, countries with high GCI were the best performer in the Smart growth pillar both at the beginning and at the end of the period though there was a significant improvement by the low GCI group which narrowed the gap. Therefore, by 2019 the gap became only about 0,05 (0,95 and 0,89 respectively). By contrast, the low GCI group had better results than the high GCI one in the Sustainable growth pillar and the gap between the two groups remained constant, being around 0,2, in both years. According to the Table, the targets were only

achieved by the low GCI group for the Inclusive and Sustainable growth pillar in 2020 and 2018 when the averages were higher than one.

Table 4

	Inclusive growth pillar		Smart growth pillar		Sustainable growth pillar	
	2008	2020	2008	2019	2008	2018
High GCI group	0,858	0,894	0,784	0,951	0,682	0,908
Low GCI group	0,772	1,528	0,425	0,899	0,859	1,091

Decomposition of the results

The composite index provides a measure of the results and the efforts that still need to be done by the EU countries to achieve the Europe 2020 targets. Nonetheless, this index is not sufficient to fully understand the reasons of best and worst performances. For this reason, in this section we decompose the composite index in country-, group-, and objective-specific index.

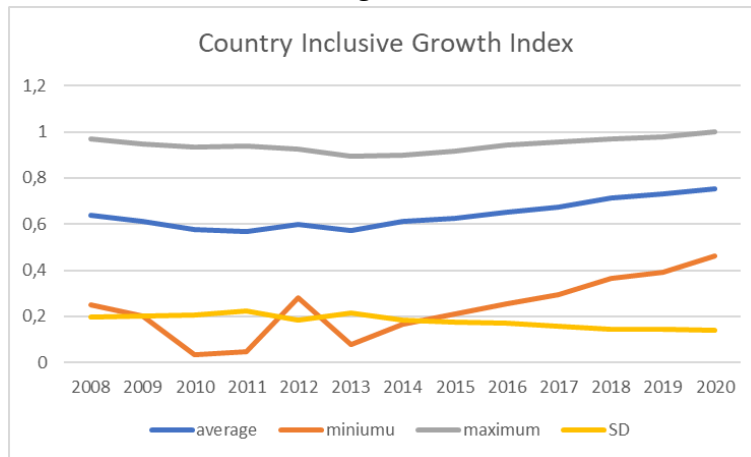
Country-specific index

The Country-specific index shows how each country performs in respect to the best practice of the given year. If the index is equal to one, it means that country has the same performance as the best practice of the sample for a certain year. A Country-specific index lower than one means that a certain event or policy affects only that country or it may indicate a structural inefficiency and that the objective is, in principle, reachable.

Inclusive growth pillar

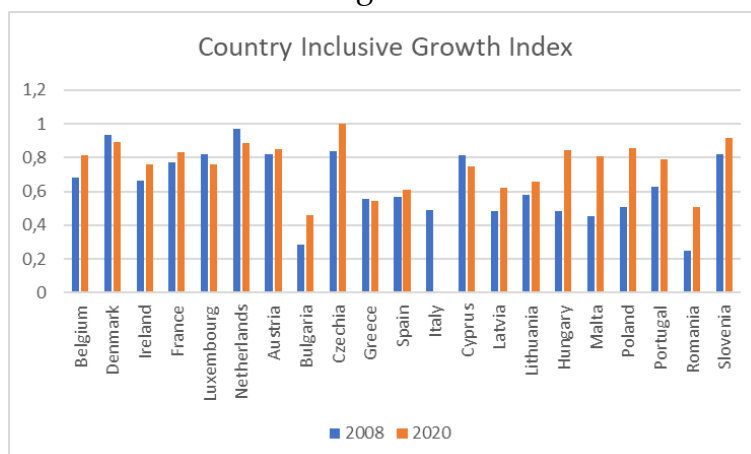
From Figure 7 we see that the average was below one, hence there was room for improvement and the target was reachable in principle. Nonetheless, the average rose from 2008 to 2020 which was a positive development. Though the maximum showed a decline in the middle of the period, overall, it increased slightly from 0,97 to 1. After an irregular trend between 2008 and 2013, the minimum sharply increased from 0,08 in 2013 to 0,45 in 2020. The combination of the two trends brought the standard deviation to go down over the period of interest.

Figure 7



As Figure 8 shows, results for the Country-specific index for Inclusive growth were mixed as 6 Member States experienced a reduction in the index value (included Italy whose performance decreased between 2008 and 2019). Country-specific index values for Denmark and for the Netherlands were higher than the Composite index from 2008 till 2012 and 2014 respectively, while that was the case from 2010 till 2020 for Croatia. This means that the performances of those countries were likely to be underestimated by the Composite index. Only Czechia reached the target in the end of the period of interest though Denmark and Ireland were close to reach it in 2008 as their values were nearly equal to one. Bulgaria and Romania remained the worst performers during the period though they made improvements. The greatest improvements were generally showed by countries in the low GCI group which contributed to explain their good performances relative to the Composite Inclusive growth index.

Figure 8

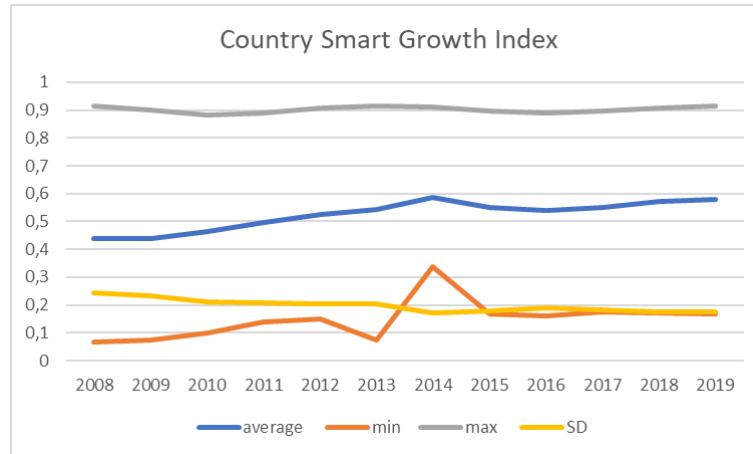


Smart growth pillar

Figure 9 shows that Member States could, in principle, improve their performances for the period and reach the objective, since the average was below one even though it increased

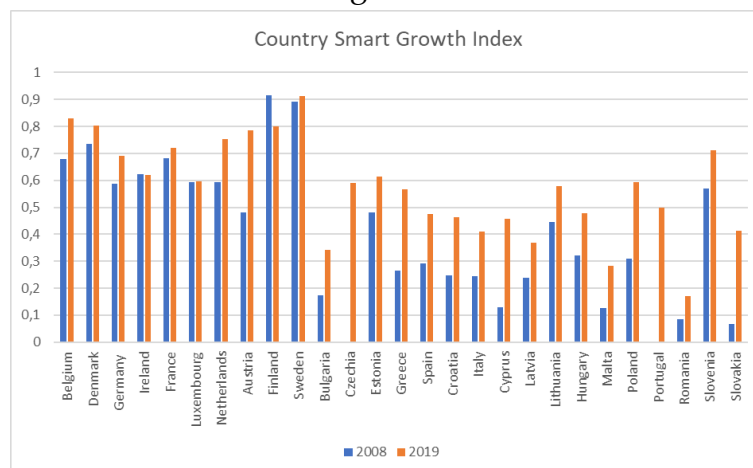
over the years meaning that there was a global improvement. The standard deviation decreased a little indicating that the indexes became more homogeneous. Indeed, the maximum remained constant, while the minimum increased.

Figure 9



All countries improved their Smart growth index from 2008 to 2019, except from Ireland and Finland whose bad performances were explained by events or policies that affected only those countries, as Figure 10 presents. Czechia and Portugal also improved their index from 2009 to 2019, though data are available for 2008. None of the countries presented Country-specific indexes higher than the composite index, thus there were no performances underestimated by the composite index. We have now identified that the worst performance of Romania, Malta and Bulgaria and the best results of Sweden and Belgium were due to country-specific events and policies.

Figure 10

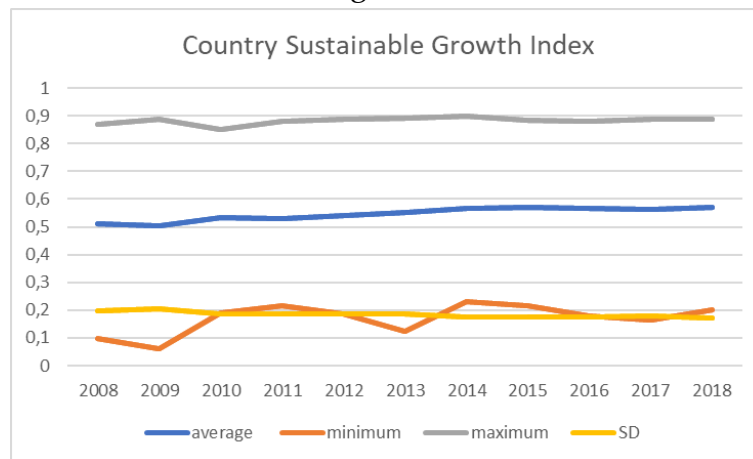


Sustainable growth pillar

Similarly to what was observed in Figure 9 relative to the Smart growth index, Figure 11 shows that the average value of the Country Sustainable growth pillar increased and was

lower than one which means that the target was in theory reachable if more efforts were done by the Member States. While the maximum followed a quite stable pattern around 0,85 and 0,9, the minimum rose from 0,1 to 0,2 after fluctuations. The standard deviation decreased slightly from 0,19 in 2008 to 0,17 in 2018.

Figure 11



From Figure 12 we can see that the efforts by all EU countries were successful in improving the results between 2008 and 2018 (also Cyprus and Malta, as it can be seen in the Appendix, whose data are not available for 2008). However, no country was able to fully achieve the target since all index values are below one. The Composite Sustainable growth pillar indexes were all higher than their respective Country-specific index, which meant that there was no underestimation of the Country-specific indexes. Latvia and Sweden were the best performers from the beginning of the strategy, while Germany was by far the one with the worst index value, probably influenced by ambitious targets for environment related results already high.

Figure 12

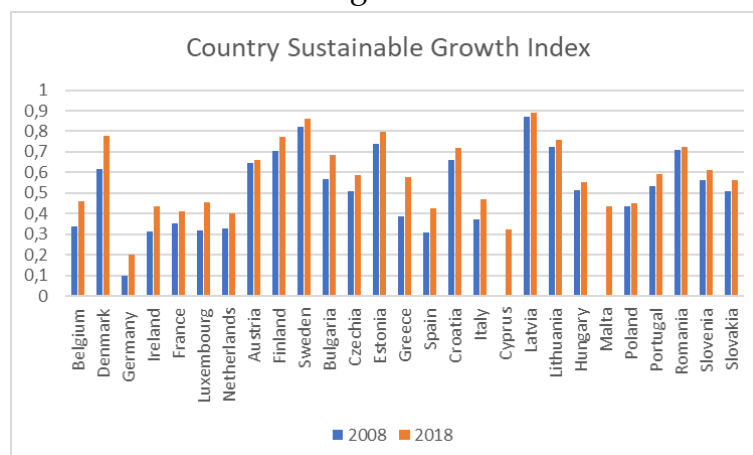


Table 7 compares the average Country-specific index of the groups. Regarding the Inclusive growth pillar, events or factors that only affect countries allow those in the high GCI group

to perform better than the low GCI Member States. The high GCI group had on average higher Country-specific indexes for the Smart growth pillar throughout the period of the Strategy than the second group which made, however, bigger improvements. On the contrary, when it came to the Sustainable growth pillar, low GCI countries had on average slightly better performances than those in the high GCI group. The Inclusive growth pillar was the one both groups had better Country-specific index in, while low GCI countries performed poorly in Smart growth. Nonetheless, the value for both groups grew since the beginning of the Europe 2020 for each group and pillar.

Table 7

	Inclusive growth		Smart growth		Sustainable growth	
	2008	2020	2008	2019	2008	2018
High GCI group	0,810	0,828	0,667	0,742	0,434	0,532
Low GCI group	0,553	0,719	0,266	0,471	0,560	0,598

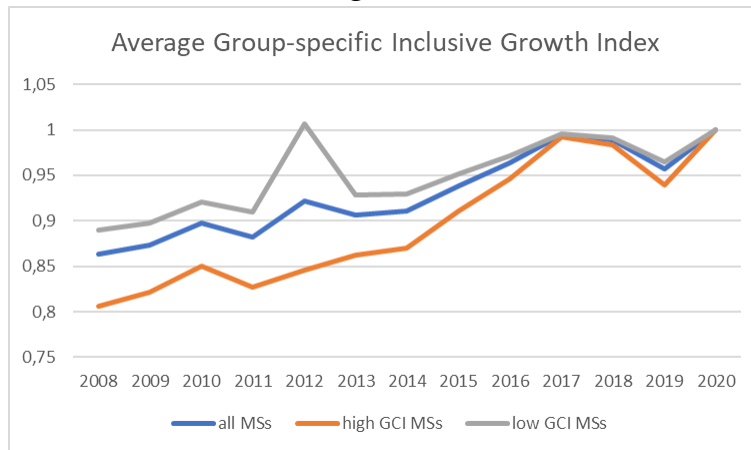
Group-specific index

The Group-specific index tells us about the yearly changes in the performances of the two groups (Member States with an GCI higher and lower than EU average). It assumes the same value for every Member States since it only depends on time and an index value equal to one means that the group is the best performer in the specific year. Values lower than one indicate that some event or policy affected the entire group that year or that there were structural issues. This is indeed the case for every pillar during the period (with the exception of the Inclusive growth pillar in 2012).

Inclusive growth pillar

From Figure 13 we can clearly see that low GCI EU countries performed better than the high GCI group since 2008 having respectively an index of 0,89 and of 0,8. Regardless of pattern fluctuations, the results of both groups improved during the period of interest, reaching a value of one in 2020 which means they both were the best performer for that year. Nonetheless, the low GCI group had already achieved an index of one in 2012.

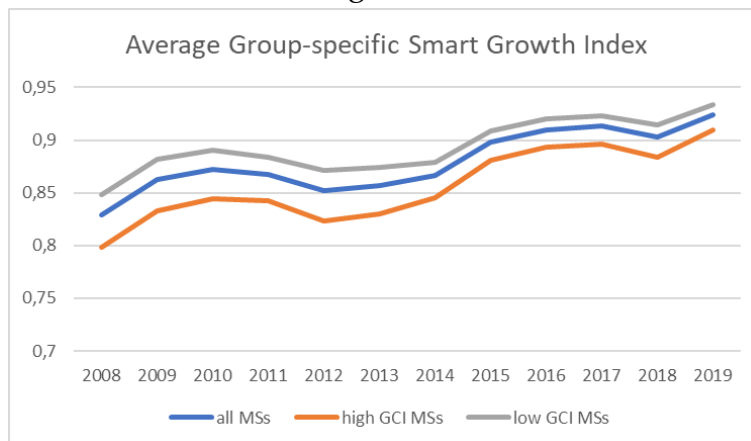
Figure 13



Smart growth pillar

Figure 14 shows that the low GCI group of countries outperformed more competitive EU Members. The graph shows some fluctuations, though both groups improved their results overall. The difference persisted for the entire the period of interest though it had narrowed by 2019, since in that year indexes were 0,8 and 0,85 for the high and low GCI groups compared to 0,9 and 0,93 respectively in 2008.

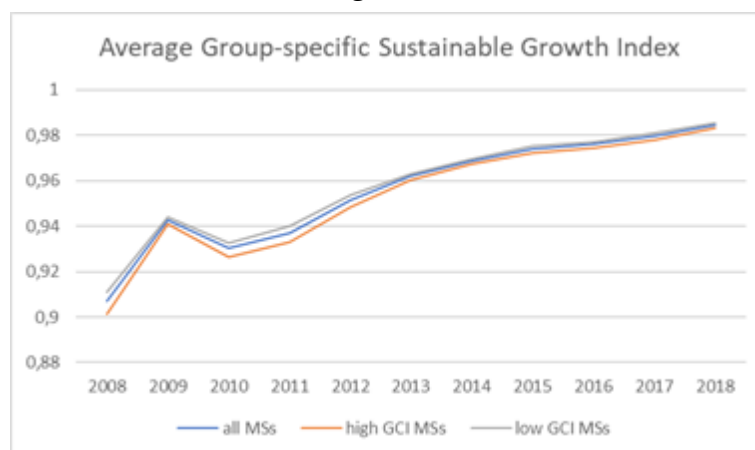
Figure 14



Sustainable growth pillar

Group index values relative to this pillar were already quite high in 2008 for both groups since they were in a range between 0,9 and 0,92. The index value increased for both groups and converged to 0,98 in 2018 after a peak in 2009. Again, the low competitiveness group maintained an average higher than the high GCI countries, as presented in Figure 15.

Figure 15



Objective-specific index

The Objective-specific index indicates whether the targets themselves are reachable or not and allows to identify issues present at the objective-level, such as not clear enough objectives or objectives that are too high or too low. A value above one means that the objective can be reached for the period. The value of the Objective-specific index depends only on the country; thus, its value does not change through the period of interest. Figure 16 and Figure 17 present the descriptive statistics for the high GCI and low GCI groups respectively. Both groups could reach or surpass one or more targets given that, on average, the index was higher than one. With the exception of the minimum of the Sustainable growth pillar, every other value for the average, minimum, maximum, and standard deviation were higher for the less competitive group. On average, Inclusive growth pillar had the poorest performance in both groups, while low GCI countries performed the best in both the Sustainable growth pillar and in the Smart one. The standard deviation for the Sustainable growth pillar was about 0,5 in both Figures. However, it was particularly low, only around 0,1, for the other two pillars for the high GCI group, while above 0,65 for the low GCI Member States. This meant that countries' performances of the former group were more homogeneous than the ones of the latter group.

Figure 16

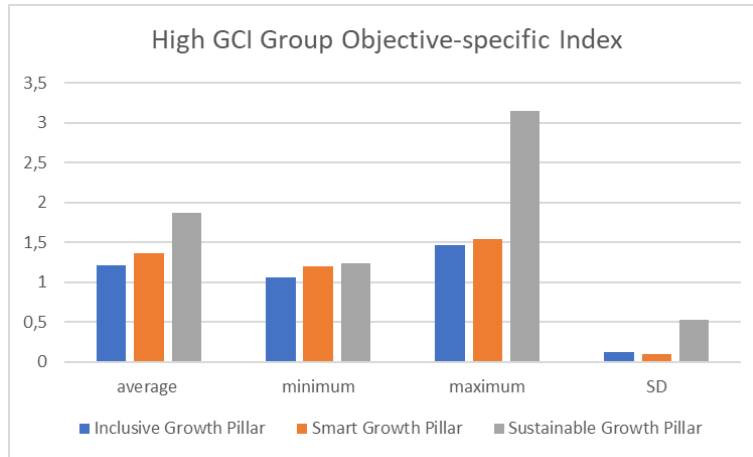
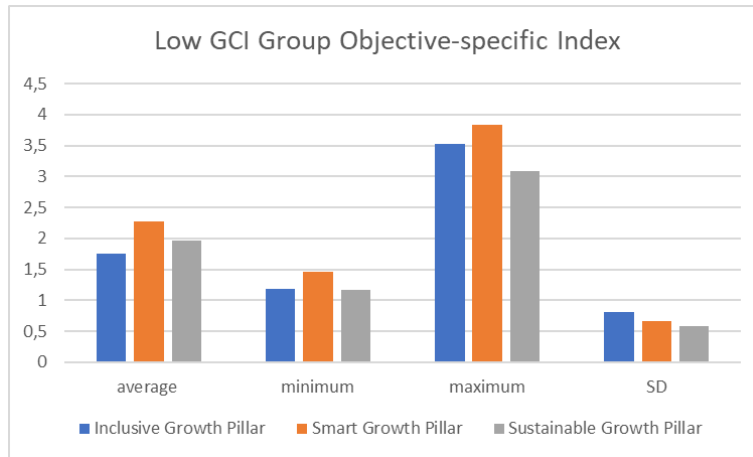


Figure 17



7.2 Regions of Italy

Composite Inclusive growth pillar results

From the descriptive statistics in Table 5 in the Appendix we can see that the performance of Italian regions deteriorated on average since this measure fluctuated over time and slightly declined from 0,71 in 2008 to 0,69 in 2020. The Autonomous Province of Bolzano was the best performer during the entire period and had already reached the target in 2008 since the index was above one. On the opposite, Campania and Apulia were the one with the lowest index values. The standard deviation rose over the time as the difference between performances increased.

The maximum in Figure 18 shows that at least one region reached the target every year since it was always above one. The minimum and the average decreased around the middle of the period and rose in the end but never reached again their initial values.

Figure 18

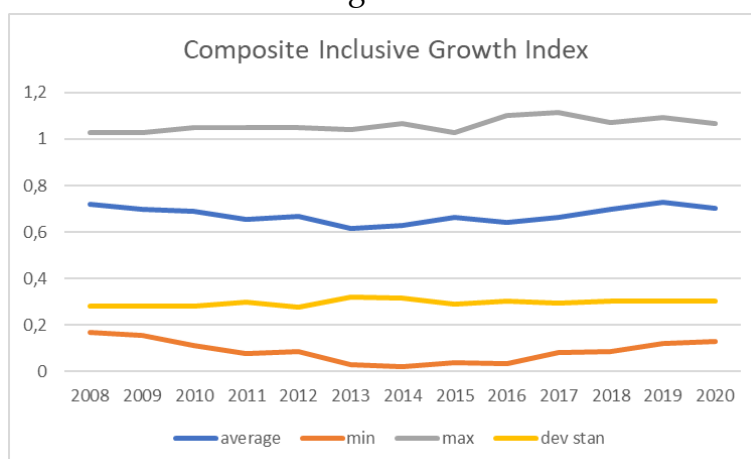
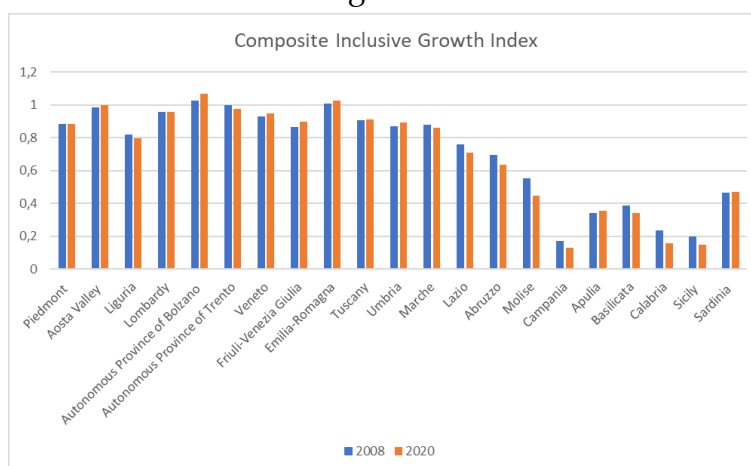


Figure 19 indicates that North-Centre regions were the ones that performed the better, in particular the Autonomous Province of Bolzano and Emilia-Romagna which had already reached the target in 2008. Together with Aosta Valley, they were the three regions that achieved the target in 2020. Campania and Sicily had the worst results having indexes lower than 0,2 in both 2008 and 2020. These two regions, as well as other 8 regions, also presented a worsening of their performances from 2008 to 2020. However, region's performances improved or deteriorated to a small extent, and the biggest change was in the performance of Calabria which decreased from 0,24 to 0,17.

Figure 19



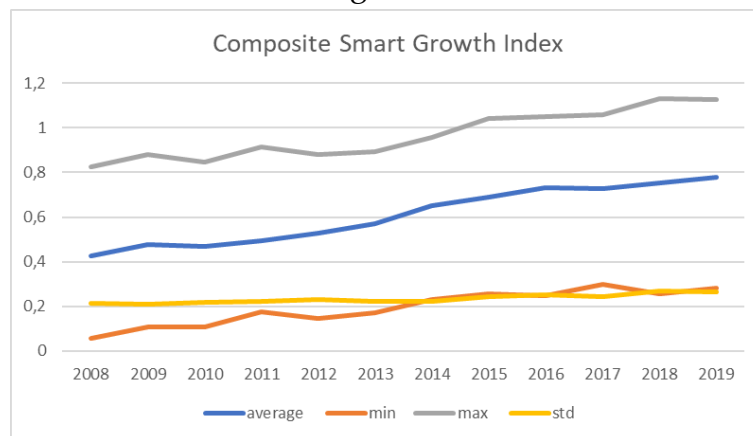
Composite Smart growth pillar results

On average, there was a significant improvement in the regions' performance as the average rose from 0,42 to 0,76 between 2008 and 2019, as Table 6 in the Appendix presents. While Lazio achieved the best result in the first 3 years, by the end of the period the best performer was the Autonomous Province of Trento which was the first region to achieve the target in 2015 with an index slightly above one. The worst performers were again Mezzogiorno regions, in particular Sicily in 2008 and Calabria in the end of the period. As we observed in

the Composite Inclusive growth pillar, the standard deviation rose from 0,22 to 0,26. Unfortunately, many data are missing.

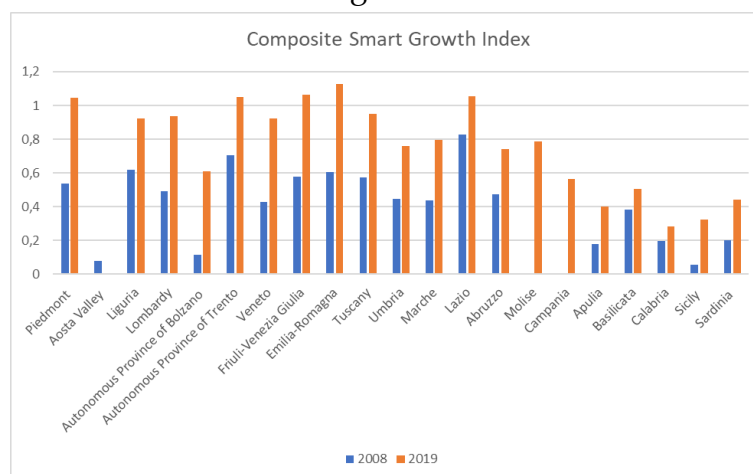
From Figure 20 we can see that the maximum and the minimum followed a similar rising pattern since there were important increases in their values over the period. The maximum also tells us that the target was first reached in 2015, when it acquired a value higher than one. The patterns of minimum and maximum influenced the average which rose in line with them over the time. We can also notice a small increase in the standard deviation.

Figure 20



By 2019, 5 regions in the North-Centre had achieved the target since their indexes were above one, as in Figure 21. Oppositely to what we saw for the Composite Inclusive growth pillar, all regions improved their performance (Molise and Campania included though their data for 2019 are not available). Most regions presented large improvements. For instance, the Autonomous Province of Bolzano increased the index from 0,11 to 0,61 and Sicily was able to rise the index from 0,055 to 0,325.

Figure 21



In Table 8 we can see the average for North-Centre and Mezzogiorno regions separately for the Inclusive and the Smart growth pillars. Regarding the first pillar, North-Centre regions performed way better than the Mezzogiorno in both 2008 and 2020. Their average remained steady at about 0,92, while the one of the Mezzogiorno experienced a small decline of 0,045 thus it became 0,335 in 2020. The Smart growth pillar average improved greatly for both groups between 2008 and 2019. North-Centre regions had higher average throughout the period and at the end of the period the value was 0,94 compared to 0,5 for the Mezzogiorno. The fact that the averages are below one means that none of the groups was able to reach the targets.

Table 8

	Inclusive growth pillar		Smart growth pillar	
	2008	2020	2008	2019
North-Centre regions	0,915	0,918	0,495	0,936
Mezzogiorno regions	0,380	0,335	0,248	0,506

Decomposition of the results

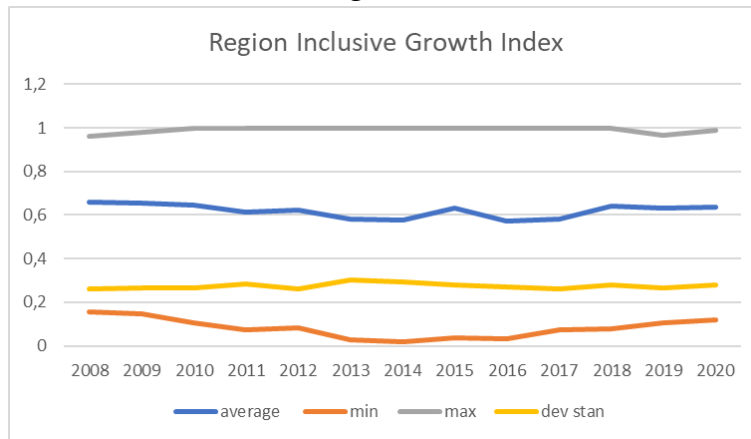
Region-specific index

The Region-specific index shows how each region performs in respect to the best practice of the given year. If the index of a country is equal to one, it means that it has the same performance as the best practice of the sample for a certain year. A Region-specific index lower than one means that a certain event or policy affects only that region or it may indicate a structural inefficiency and the objective is, in principle, reachable.

Inclusive growth pillar

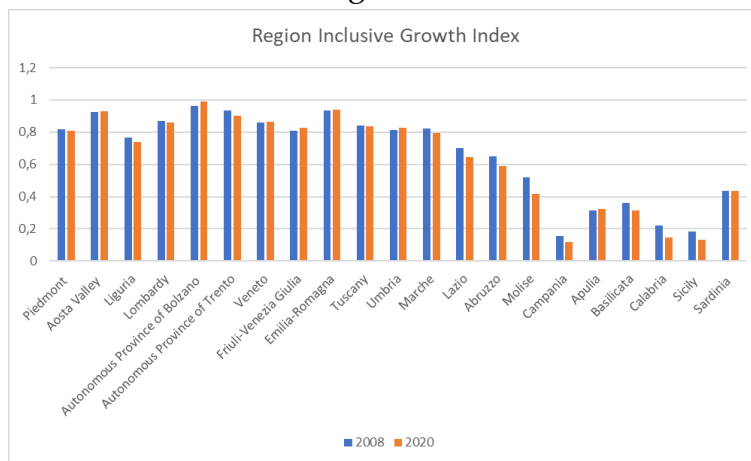
Given that the average in Figure 22 was lower than one, the target for the Inclusive growth pillar could, in principle, be reached by the regions. The maximum equal to one indicated the best performer, which was the Autonomous Province of Bolzano (see Appendix). The minimum was particularly low being below 0,1 between 2011 and 2018. No extreme changes in the performances were recorded over the period, and this was reflected in a quite steady pattern of the average and the standard deviation.

Figure 22



Since all indexes in Figure 23 are lower than one, no region was able to achieve the target in 2020, though the Autonomous Province of Bolzano reached it in previous years. The highest performances belong to regions in the North-Centre of Italy and were due to region specific events or policies, while Mezzogiorno regions, especially Sicily and Campania, presented poor performances. All Region-specific indexes for Inclusive growth pillar were lower than the relative Composite indexes, which meant that Region-specific indexes were not underestimated.

Figure 23



Smart growth pillar

Figure 24 shows that the average was below one, hence the objective was reachable in principle. While the maximum slightly declined between 2008 and 2019, the minimum increased. Since towards the end of the period those values converged, there was also a decline in the value of the standard deviation.

Figure 24

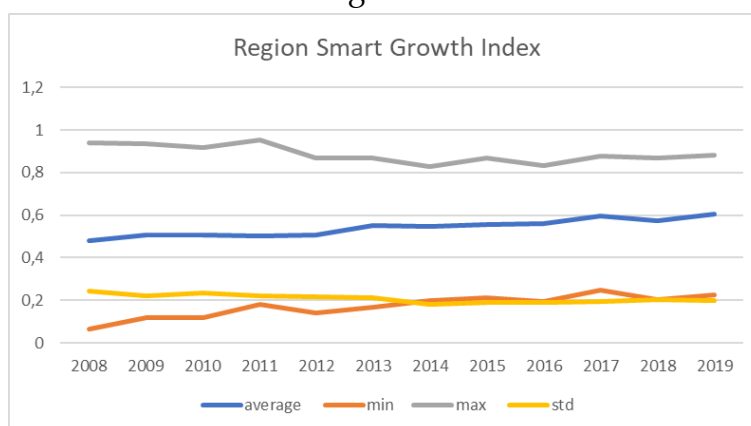


Figure 25 shows that over the period of interest the target was not reached by any regions as all values are below 1. Lazio had the best performance in 2008 (0,94) while in 2020 was Emilia-Romagna which achieved the best result (0,88). All regions improved their results with the exception of Lazio and Basilicata. From 2008 till 2011 the Region-specific indexes were higher than the relative Composite indexes, meaning that the former were underestimated by the latter.

Figure 25

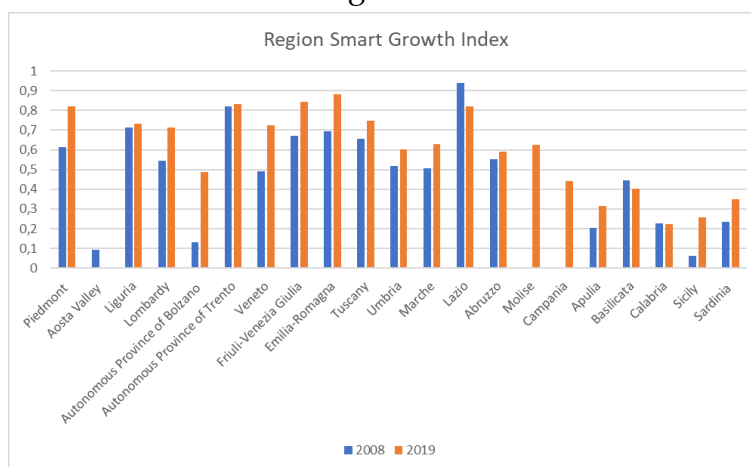


Table 9 presents the average Region-specific index of the groups. Due to factors or policies that only affected the region, Mezzogiorno regions obtained quite poor results in both pillars, while region in the North-Centre of Italy reached higher values especially relative to the Inclusive growth pillar. Being every value below one, the objective was never completely reached.

Table 9

	Inclusive growth		Smart growth	
	2008	2020	2008	2019
North-Centre regions	0,851	0,843	0,569	0,736
Mezzogiorno regions	0,355	0,309	0,288	0,401

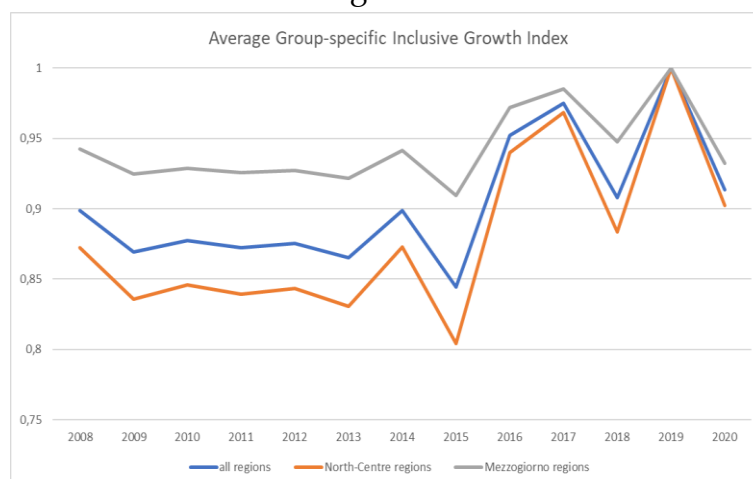
Group-specific index

The Group-specific index tells us about the yearly changes in the performances of the two groups (North-Centre regions and Mezzogiorno regions). It assumes the same value for every region since it only depends on time and an index value equal to one means that the group is the best performer in the specific year. Since the values for each group and pillar were below one for the entire period, it can be concluded that some event or policy affected the group or that the group had structural issues.

Inclusive growth pillar

Mezzogiorno regions had on average better results for the Group-specific index than North-Centre regions, as seen in Figure 26. For both groups, index values were already high in 2008 (0,87 for North-Centre regions and 0,94 for the ones of Mezzogiorno). From 2014 the index of both groups fluctuated greatly. The index of North-Centre regions grew and reached 0,90 in 2020, narrowing the gap with the Mezzogiorno whose value declined slightly compared to 2008.

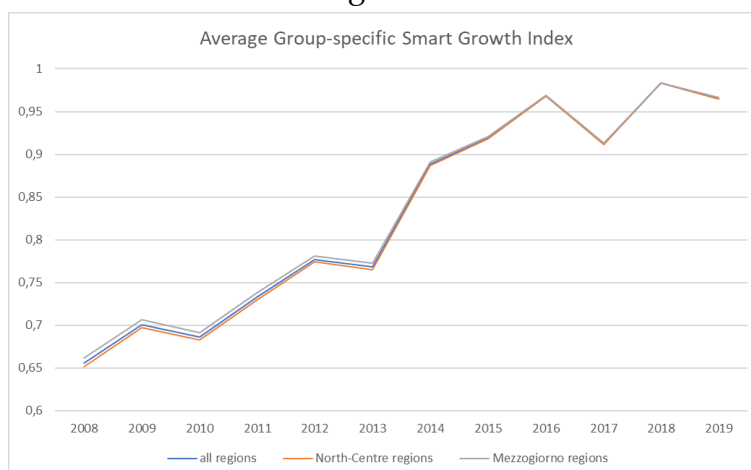
Figure 26



Smart growth pillar

North-Centre and Mezzogiorno regions achieved Group-specific index values very close to each other, especially from 2013 to 2019 when, by approximation, they were both equal 0,77 and 0,96 respectively. On average, there was a gradual improvement in region's performance since 2008 when the indexes were 0,65 and 0,66. This information are presented in Figure 27.

Figure 27



Objective-specific index

The Objective-specific index indicates whether the targets themselves are reachable or not and allows to identify issues present at the objective-level. A value above one means that the objective can be reached for the period.

In Figure 28 and 29 we can see the descriptive statistics for the North-Centre and Mezzogiorno region groups. The value of this index was the same in each year since it depends only on the country.

Both groups could reach or surpass one or more Smart growth pillar targets given that, on average, the index was higher than one. This was the case also for the Inclusive growth pillar for Mezzogiorno regions, while the average for North-Centre regions was 0,99 which meant that the target was not completely reachable. Mezzogiorno regions have higher Objective-specific indexes for both pillar than the rest of the country (3 compared to 0,99 for Inclusive growth pillar and 1,8 compared to 2,6 for Smart growth pillar). Within the groups, for the North-Centre region group the descriptive statistics of the Smart growth pillar were significantly higher than the ones of the Inclusive growth pillar though the higher standard deviation indicated lower homogeneity among regions. The opposite was true for Mezzogiorno regions which presented better average and maximum for the Inclusive growth pillar but also an important standard deviation of 1,6.

Figure 28

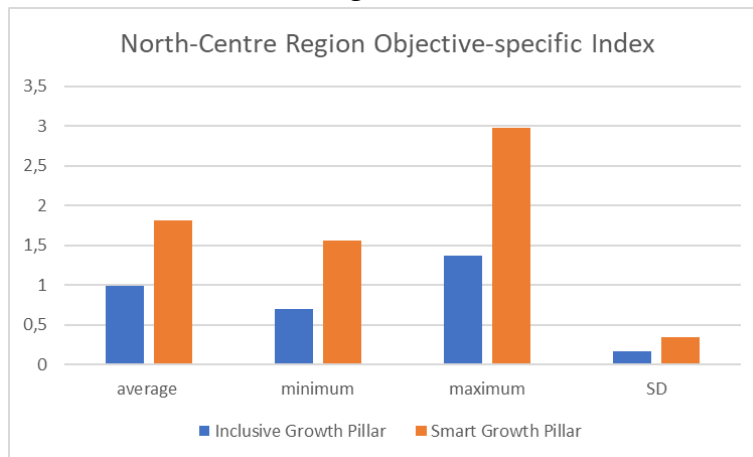
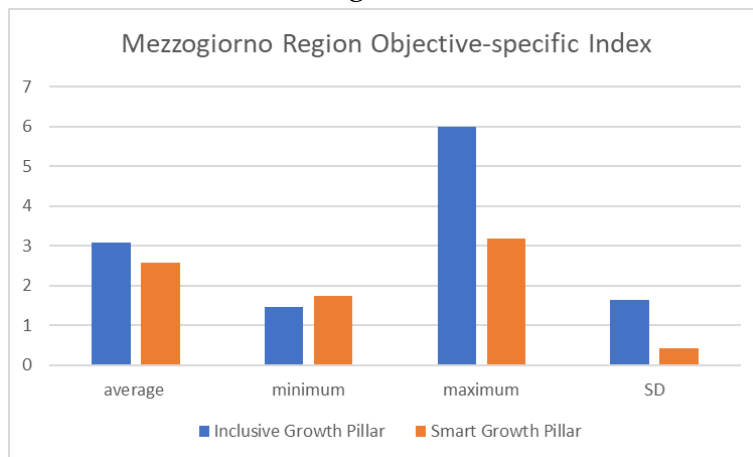


Figure 29



8. Conclusion

In 2022, we are now able to assess the results reached by each Member State and overall, by the European Union in the context of the Europe 2020 Strategy. Discriminating by EU countries with a higher and lower Global Competitiveness Index helps to identify differences and progresses among them and which countries needs more support and reforms from policymakers.

Our analysis found that the Inclusive growth target was reached at the European level in 2020 and it is worth to underline that, while countries with high GCI had and maintained good performances from the beginning till the end of the Strategy, those with a low GCI made the biggest improvements throughout the period. Despite being close to the target value, the Smart growth target was not reached by the EU. Nonetheless, the value of the index increased remarkably on average and for all Member States, especially for those having a low GCI which presented low values of the index in the first years of the Strategy. Regarding the Sustainable growth target, with the exceptions of few outliers, Member States with a low GCI showed better performances than the group with a higher GCI. Nearly all countries reached or were very close to the target value that was overall achieved at the UE level by 2018.

Our results indicate better performances by the low GCI group of countries for the Inclusive growth and the Sustainable growth pillar. Their index values improved thanks to their efforts and actions, but also due to the fact of having national targets lower than the ones of the high GCI group, which can be easier to reach to a certain extent though countries with a low GCI had initial less favourable conditions. On the other hand, high the GCI group showed more excellent results regarding the Smart growth pillar.

The fact that index values increased for both GCI groups and for all three pillars mean that the Europe 2020 has been successful in encouraging countries to take actions in different domains to improve citizens' conditions, research and sustainability. This shows the potential of coordinate efforts at the EU level. However, some aspects of the Strategy have reasons to be criticized and they should be taken into consideration when it comes to the development of future strategies and programs. Moreover, further reforms encouraging Member States to invest more in R&D should be promoted by policymakers since the Smart growth target was not achieved by end of the Europe 2020 period.

Italy showed poorer performances compared the EU average for the Inclusive growth pillar and Smart growth pillar whose targets were not achieved neither at the national level nor by any of the two region groups when considered separately. Mezzogiorno regions were characterised by the lowest index values for both the Composite Inclusive and Smart growth pillar indexes, on the contrary North-Centre regions had good performances close to the target values.

Our results shows that there was no striking gap between the performances of EU countries with a high GCI and those with a low GCI which in some cases even presented the highest index values. In Italy, instead, the difference in performance between North-Centre and Mezzogiorno regions was more significant, especially looking at the Composite and Region-specific indexes. This finding reflects the economic divide between the two areas, being the North-Centre more developed and richer than the South, which determines poorer social

conditions in the latter regions. Indeed, economic inequality is at the root of other kind of disparities. Further, the results of the Region-specific indexes indicate that the good performances of the North-Centre regions and the poor ones of the Mezzogiorno are mainly due to events affecting that particular region.

Interventions from both the national government and EU institutions should focus on higher investments in higher educations to train high skilled workforce and providing financial incentives to companies to locate in the South to make it a less agricultural and more industrialised and competitive area. This will lead to better employment opportunities and therefore better incomes and lower poverty rate, improving many aspects of citizens' life. Lastly, what needs to be improved is the sense of nationhood and unity among regions which has been undermined for years by far-right political parties fighting to keep southern stereotype alive and to emphasize the differences between Northern and Southern Italy. Nowadays, this political divide seems to be less pronounced, having the focus shifted to a stronger nationalism which sees other countries as threats, though relevant disparities still persist regarding economic and social conditions. Though some of Italy regional diversities represent part of its beauty, having a more unified country would improve citizens' conditions and give Italy a stronger and more credible position on the international scene.

This work presents of course some limitations. The main one is that some data about the headline targets of the Europe 2020 were not available for certain EU countries and years. Further, not being the People at risk of poverty or social exclusion target directly available as a percentage, it was manually computed using population data of 2008 and 2020 and the target as the number of People at risk of poverty or social exclusion for each Member States. Similarly, since targets at the regional level for Italy and any other EU countries were not available, they were computed based on the national and regional populations, the national and regional GDP and the national targets.

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10. Appendix

Table 1

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Belgium	0,771	0,792	0,776	0,771	0,763	0,776	0,768	0,783	0,806	0,841	0,870	0,865	0,906
Denmark	0,906	0,864	0,853	0,852	0,854	0,851	0,870	0,884	0,908	0,920	0,938	0,938	0,970
Ireland	0,864	0,758	0,705	0,642	0,710	0,754	0,830	0,908	0,983	1,043	1,099	1,066	0,883
France	0,814	0,809	0,797	0,801	0,803	0,824	0,826	0,846	0,853	0,886	0,887	0,876	0,875
Luxembourg	0,871	0,848	0,843	0,879	0,850	0,864	0,837	0,839	0,849	0,858	0,855	0,841	0,733
Netherlands	0,919	0,905	0,909	0,905	0,900	0,879	0,890	0,905	0,917	0,934	0,955	0,956	0,925
Austria	0,862	0,895	0,904	0,904	0,919	0,906	0,902	0,926	0,943	0,958	0,980	0,947	0,968
Bulgaria	0,894	0,638	0,105	0,150		0,418	1,207	1,145	1,353	1,503	2,017	1,942	4,494
Greece	0,792	0,743	0,581	0,299		0,113	0,249	0,323	0,396	0,472	0,582	0,607	0,813
Spain	0,675	0,626	0,583	0,493	0,450	0,498	0,542	0,605	0,659	0,717	0,751	0,703	0,777
Italy	0,728	0,711	0,710	0,659	0,581	0,611	0,639	0,677	0,682	0,726	0,773	0,767	
Cyprus	0,908	0,899	0,847	0,778	0,670	0,669	0,682	0,676	0,740	0,847	0,906	0,917	0,876
Latvia	0,773	0,608	0,658	0,638	0,801	0,861	0,980	1,045	1,154	1,220	1,227	1,249	1,383
Lithuania	0,808	0,703	0,687	0,746	0,793	0,878	0,994	0,991	0,988	1,039	1,082	1,098	1,074
Hungary	0,602	0,572	0,586	0,589	0,589	0,640	0,750	0,886	0,962	1,004	1,145	1,156	1,245
Malta	0,547	0,592	0,641	0,709	0,765	0,789	0,829	0,896	0,989	1,067	1,103	1,094	0,870
Poland	0,736	0,768	0,774	0,792	0,807	0,877	0,939	1,011	1,089	1,176	1,212	1,244	1,393
Portugal	0,796	0,795	0,783	0,715	0,683	0,730	0,778	0,835	0,937	1,024	1,076	1,045	1,206
Romania	0,784	0,923	0,983	1,066	0,905	1,038	1,158	1,347	1,378	1,621	1,854	1,919	3,675
Slovenia	0,883	0,864	0,800	0,784	0,752	0,755	0,790	0,830	0,918	0,982	1,018	1,027	1,009
Average	0,801	0,771	0,737	0,720	0,764	0,749	0,830	0,874	0,930	0,995	1,064	1,060	1,306
Minimum	0,547	0,572	0,105	0,150	0,450	0,113	0,249	0,323	0,396	0,472	0,582	0,607	0,733
Maximum	0,919	0,923	0,983	1,066	0,919	1,038	1,207	1,347	1,378	1,621	2,017	1,942	4,494
SD	0,098	0,111	0,176	0,199	0,120	0,198	0,195	0,197	0,211	0,241	0,316	0,317	0,952

Table 2

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Belgium	0,776	0,787	0,811	0,806	0,839	0,846	0,877	0,871	0,929	0,952	0,973	1,041
Denmark	0,919	0,992	0,984	1,005	1,044	1,065	1,060	1,107	1,131	1,110	1,096	1,105
Germany	0,000	0,768	0,765	0,792	0,832	0,854	0,837	0,851	0,864	0,892	0,910	0,926
Ireland	0,732	0,800	0,804	0,799	0,824	0,849	0,866	0,763	0,775	0,803	0,782	0,798
France	0,756	0,790	0,784	0,789	0,803	0,835	0,840	0,856	0,839	0,843	0,859	0,877
Luxembourg	0,645	0,770	0,734	0,749	0,696	0,741	0,734	0,711	0,760	0,724	0,725	0,714
Netherlands	0,777	0,792	0,847	0,892	0,915	0,967	0,994	1,013	1,009	1,050	1,056	1,082
Austria	0,566	0,620	0,636	0,635	0,723	0,752	0,985	0,960	0,992	0,988	0,992	1,012
Finland	0,975	0,995	0,986	0,987	0,973	0,947	0,933	0,906	0,908	0,891	0,890	0,937
Sweden	0,905	0,930	0,925	0,942	0,947	0,959	0,960	0,973	0,980	0,991	0,994	1,020
Bulgaria	0,310	0,369	0,459	0,421	0,468	0,529	0,633	0,719	0,650	0,632	0,654	0,669
Czechia	0,000	0,571	0,778	0,985	1,113	1,182	1,253	1,290	1,280	1,345	1,382	1,417
Estonia	0,595	0,653	0,757	0,892	0,857	0,824	0,742	0,767	0,723	0,759	0,781	0,839
Greece	0,559	0,555	0,568	0,644	0,713	0,856	0,915	1,055	1,133	1,229	1,288	1,308
Spain	0,440	0,476	0,574	0,617	0,643	0,667	0,688	0,702	0,701	0,728	0,754	0,787
Croatia	0,427	0,507	0,540	0,534	0,516	0,600	0,703	0,717	0,703	0,690	0,826	0,874
Italy	0,582	0,592	0,644	0,673	0,759	0,801	0,890	0,941	0,993	1,011	1,045	1,073
Cyprus	0,419	0,767	0,758	0,823	0,810	1,002	1,140	1,083	1,167	1,257	1,437	1,638
Latvia	0,434	0,348	0,552	0,658	0,659	0,655	0,728	0,669	0,429	0,572	0,714	0,736
Lithuania	0,594	0,608	0,616	0,691	0,716	0,764	0,817	0,855	0,770	0,793	0,817	0,853
Hungary	0,000	0,612	0,665	0,715	0,764	0,842	0,865	0,863	0,784	0,812	0,890	0,886
Malta	0,209	0,222	0,299	0,375	0,477	0,493	0,000	0,496	0,433	0,449	0,477	0,509
Poland	0,429	0,495	0,547	0,577	0,663	0,676	0,719	0,756	0,751	0,791	0,861	0,902
Portugal	0,000	0,271	0,359	0,468	0,501	0,537	0,563	0,596	0,633	0,644	0,658	0,713
Romania	0,165	0,153	0,203	0,284	0,302	0,145	0,000	0,345	0,338	0,371	0,362	0,361
Slovenia	0,669	0,709	0,795	0,899	0,936	0,953	0,931	0,925	0,901	0,902	0,881	0,918
Slovakia	0,117	0,217	0,431	0,482	0,561	0,628	0,653	0,787	0,678	0,751	0,773	0,797
Average	0,569	0,609	0,662	0,710	0,744	0,777	0,852	0,836	0,825	0,851	0,884	0,917
Minimum	0,117	0,153	0,203	0,284	0,302	0,145	0,563	0,345	0,338	0,371	0,362	0,361
Maximum	0,975	0,995	0,986	1,005	1,113	1,182	1,253	1,290	1,280	1,345	1,437	1,638
SD	0,227	0,226	0,191	0,189	0,184	0,203	0,157	0,189	0,219	0,223	0,232	0,251

Table 3

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Belgium	0,625	0,713	0,752	0,789	0,828	0,848	0,878	0,865	0,893	0,905	0,914
Denmark	0,793	0,828	0,852	0,897	0,945	0,958	1,003	1,032	1,034	1,072	1,080
Germany	0,285	0,668		0,639	0,565	0,371	0,707	0,660	0,556	0,506	0,625
Ireland	0,554	0,653	0,677	0,738	0,752	0,771	0,804	0,800	0,786	0,822	0,830
France	0,684	0,737		0,722	0,756	0,758	0,824	0,819	0,823	0,830	0,860
Luxembourg	0,597	0,619	0,600	0,604	0,630	0,667	0,733	0,768	0,789	0,818	0,912
Netherlands	0,603	0,650	0,613	0,665	0,677	0,678	0,727	0,725	0,729	0,758	0,797
Austria	0,886	0,954	0,925	0,943	0,972	0,968	1,000	0,985	0,976	0,958	0,982
Finland	0,868	0,892	0,853	0,902	0,947	0,967	1,008	1,032	1,012	1,042	1,036
Sweden	0,923	0,971	0,929	0,964	0,991	1,006	1,022	1,030	1,032	1,039	1,047
Bulgaria		0,895	0,933	0,923	0,973	1,048	1,023	1,017	1,033	1,024	1,069
Czechia	0,902	0,961	0,973	0,990	1,051	1,090	1,124	1,120	1,112	1,110	1,121
Estonia	0,917	1,005	0,998	1,008	1,017	1,002	1,018	1,069	1,061	1,056	1,073
Greece	0,761	0,818	0,893	0,938	1,027	1,117	1,141	1,157	1,165	1,192	1,224
Spain	0,737	0,920	0,972	0,963	1,016	1,108	1,125	1,096	1,140	1,101	1,106
Croatia	1,071	1,132	1,161	1,170	1,217	1,256	1,264	1,274	1,262	1,235	1,262
Italy	0,810	0,911	0,900	0,924	1,002	1,070	1,112	1,100	1,101	1,125	1,113
Cyprus		0,478	0,618	0,713	0,875	1,064	1,029	1,051	0,926	0,864	0,987
Latvia	0,922	0,973	0,923	0,962	0,984	0,997	1,012	1,002	0,998	1,014	1,017
Lithuania	0,930	0,987	0,980	0,982	1,006	1,032	1,045	1,075	1,072	1,076	1,059
Hungary	0,915	1,037	1,066	1,105	1,162	1,189	1,147	1,129	1,123	1,090	1,064
Malta	0,273	0,298	0,477	0,587	0,645	0,760	0,811	0,941	1,047	1,059	1,081
Poland	0,817	0,865	0,863	0,898	0,922	0,940	0,957	0,960	0,932	0,904	0,913
Portugal	1,082	1,154	1,204	1,229	1,254	1,296	1,356	1,314	1,340	1,264	1,300
Romania	0,994	1,056	1,070	1,038	1,068	1,097	1,112	1,110	1,116	1,102	1,094
Slovenia	0,901	0,992	0,996	0,993	1,018	1,062	1,094	1,097	1,061	1,061	1,053
Slovakia	0,852	0,927	0,914		0,971	0,962	1,019	1,048	1,021	0,999	1,012
Average	0,779	0,846	0,875	0,887	0,925	0,956	0,994	1,002	0,999	0,997	1,019
Minimum	0,273	0,298	0,477	0,587	0,565	0,371	0,707	0,660	0,556	0,506	0,625
Maximum	1,082	1,154	1,204	1,229	1,254	1,296	1,356	1,314	1,340	1,264	1,300
SD	0,202	0,194	0,176	0,165	0,171	0,194	0,157	0,151	0,159	0,154	0,137

Table 5

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Piedmont	0,885	0,866	0,845	0,818	0,826	0,845	0,825	0,856	0,815	0,839	0,890	0,915	0,883
Aosta Valley	0,986	0,955	0,936	0,942	0,918	0,835	0,893	0,889	0,867	0,886	0,960	1,040	1,001
Liguria	0,820	0,856	0,844	0,818	0,778	0,734	0,702	0,738	0,767	0,772	0,828	0,847	0,798
Lombardy	0,957	0,932	0,923	0,909	0,872	0,896	0,894	0,905	0,900	0,917	0,972	0,978	0,957
Autonomous Province of Bolzano	1,028	1,026	1,051	1,047	1,049	1,043	1,065	1,029	1,100	1,115	1,072	1,092	1,069
Autonomous Province of Trento	0,999	0,984	0,968	0,931	0,867	0,937	0,944	0,924	0,832	0,907	0,900	0,984	0,976
Veneto	0,929	0,907	0,889	0,898	0,889	0,870	0,876	0,874	0,882	0,931	0,951	1,009	0,948
Friuli-Venezia Giulia	0,867	0,850	0,876	0,869	0,843	0,851	0,853	0,885	0,869	0,893	0,943	0,947	0,898
Emilia-Romagna	1,009	0,969	0,970	0,946	0,938	0,900	0,917	0,937	0,957	0,948	1,001	1,000	1,027
Tuscany	0,906	0,901	0,855	0,826	0,816	0,849	0,842	0,866	0,896	0,863	0,891	0,904	0,911
Umbria	0,870	0,837	0,832	0,793	0,765	0,747	0,760	0,717	0,771	0,807	0,827	0,917	0,895
Marche	0,882	0,867	0,846	0,786	0,774	0,763	0,813	0,770	0,755	0,746	0,875	0,863	0,859
Lazio	0,760	0,746	0,733	0,711	0,662	0,669	0,701	0,679	0,650	0,689	0,706	0,744	0,709
Abruzzo	0,696	0,618	0,607	0,552	0,624	0,609	0,557	0,560	0,565	0,545	0,620	0,681	0,636
Molise	0,553	0,485	0,480	0,448	0,430	0,281	0,342	0,445	0,438	0,422	0,567	0,468	0,449
Campania	0,170	0,158	0,114	0,079	0,086	0,081	0,060	0,089	0,120	0,170	0,088	0,127	0,130
Apulia	0,339	0,315	0,299	0,264	0,195	0,193	0,207	0,179	0,252	0,289	0,336	0,338	0,356
Basilicata	0,385	0,339	0,375	0,252	0,248	0,216	0,329	0,347	0,383	0,409	0,375	0,447	0,341
Calabria	0,235	0,224	0,208	0,170	0,152	0,040	0,069		0,075	0,126	0,175	0,199	0,157
Sicily	0,198	0,189	0,178	0,089		0,031	0,022	0,037	0,036	0,082	0,088	0,121	0,145
Sardinia	0,467	0,481	0,523	0,481	0,517	0,410	0,364	0,407	0,394	0,395	0,468	0,560	0,471
Average	0,711	0,691	0,683	0,649	0,663	0,610	0,621	0,657	0,634	0,655	0,692	0,723	0,696
Minimum	0,170	0,158	0,114	0,079	0,086	0,031	0,022	0,037	0,036	0,082	0,088	0,121	0,130
Maximum	1,028	1,026	1,051	1,047	1,049	1,043	1,065	1,029	1,100	1,115	1,072	1,092	1,069
SD	0,287	0,288	0,289	0,307	0,284	0,326	0,324	0,297	0,309	0,302	0,309	0,311	0,310

Table 6

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Piedmont	0,536	0,506	0,621	0,678	0,735	0,780	0,908	0,898	0,967	0,967	1,020	1,043
Aosta Valley	0,079											
Liguria	0,617	0,703	0,678	0,682	0,693	0,745	0,843	0,810	0,770	0,723	0,827	0,922
Lombardy	0,491	0,515	0,595	0,609	0,678	0,722	0,769	0,820	0,859	0,918	0,893	0,935
Autonomous Province of Bolzano	0,114	0,134	0,219	0,345	0,284	0,392	0,453	0,512	0,482	0,478	0,655	0,612
Autonomous Province of Trento	0,706	0,772	0,798	0,914	0,882	0,822	0,958	1,043	1,049	1,034	1,105	1,048
Veneto	0,429	0,432	0,480	0,521	0,582	0,594	0,707	0,781	0,919	0,834	0,922	0,924
Friuli-Venezia Giulia	0,579	0,580	0,642	0,675	0,735	0,852	0,865	0,938	0,809	0,916	1,066	1,062
Emilia-Romagna	0,606	0,676	0,641	0,727	0,843	0,830	0,828	0,921	1,020	1,059	1,131	1,127
Tuscany	0,572	0,536	0,534	0,539	0,599	0,625	0,711	0,813	0,841	0,873	0,929	0,951
Umbria	0,445	0,583	0,595	0,618	0,599	0,632	0,754			0,747	0,751	0,759
Marche	0,437	0,397	0,518	0,531	0,490	0,531	0,616	0,679	0,788	0,842	0,757	0,794
Lazio	0,826	0,879	0,845	0,723	0,840	0,891	0,949	0,967	0,988	0,976	1,003	1,056
Abruzzo	0,475	0,513	0,505	0,586	0,527	0,593	0,669	0,590	0,677	0,714	0,639	0,743
Molise		0,277	0,338	0,249	0,263	0,481	0,513			0,696	0,732	0,785
Campania			0,106	0,257	0,338	0,335	0,432	0,457	0,496	0,515	0,520	0,563
Apulia	0,178	0,108	0,189	0,244	0,323	0,385	0,494	0,443	0,428	0,415	0,431	0,401
Basilicata	0,384	0,418	0,377	0,266	0,319	0,317	0,348	0,447		0,513	0,475	0,505
Calabria	0,196	0,238	0,227	0,178	0,260	0,276	0,471	0,457	0,377	0,297	0,258	0,282
Sicily	0,055		0,109	0,180	0,213	0,170	0,272	0,258	0,248	0,320	0,338	0,325
Sardinia	0,201	0,193	0,198	0,174	0,145	0,203	0,232	0,279	0,414	0,377	0,314	0,442
Average	0,417	0,470	0,461	0,485	0,517	0,559	0,640	0,673	0,714	0,711	0,738	0,764
Minimum	0,055	0,108	0,106	0,174	0,145	0,170	0,232	0,258	0,248	0,297	0,258	0,282
Maximum	0,826	0,879	0,845	0,914	0,882	0,891	0,958	1,043	1,049	1,059	1,131	1,127
SD	0,217	0,212	0,221	0,221	0,228	0,223	0,220	0,240	0,248	0,241	0,269	0,262